Irrigation Management in Nepal's Dhaulagiri Zone

Institutional Responses to Social, Political and Economic Change

Berg, Torsten Rødel

Publication date:
2008

Document Version
Publisher's PDF, also known as Version of record

SPIRIT
Doctoral Programme

Aalborg University
Fibigerstraede 2-97
DK-9220 Aalborg East

Phone: +45 9940 7195
Fax: +45 9635 0044

Mail: spirit@ihis.aau.dk

Irrigation Management in Nepal's Dhaulagiri Zone: Institutional Responses to Social, Political and Economic Change

Torsten Rødel Berg

SPIRIT PhD Series

Thesis no. 16

ISSN: 1903-7783

SPIRIT
School for Postgraduate Interdisciplinary Research on Interculturalism and Transnationality

Irrigation Management in Nepal's Dhaulagiri Zone: Institutional Responses to Social, Political and Economic Change

SPIRIT – Doctoral Programme
Aalborg University
Denmark
SPIRIT PhD Series
Thesis no. 16

ISSN 1903-7783

Published by
SPIRIT & Department of History, International and Social Studies
Aalborg University

Distribution
Download as PDF on
http://spirit.ihis.aau.dk/

Front page lay-out
Cirkeline Kappel

The Secretariat
SPIRIT
Fibigerstraede 2, room 97
Aalborg University
DK-9220 Aalborg East
Denmark
Tel. + 45 9940 7195
Fax. + 45 9635 0044

E-mail: spirit@ihis.aau.dk
Homepage: http://spirit.ihis.aau.dk/

Irrigation Management in Nepal's Dhaulagiri Zone:

Institutional Responses to Social, Political and Economic Change

A thesis submitted for the degree of Ph.d

in

the Faculty of Social Sciences, Aalborg University

by

Torsten Rødel Berg

Department of History, International and Social Studies
March, 2008

Acknowledgements

The Danish Council for Development Research funded this research for two and a half years, for which I am very grateful. Since the commencement of the research in late 2004, I have been associated with the Development and International Relations (DIR) research unit at Aalborg University's Department of History, International and Social Studies (IHIS), where I have also been employed as an external lecturer.

I am grateful to an enormous number of people for their support throughout the process of this research. I wish to thank my primary supervisor, Johannes Dragsbæk Schmidt of Development and International Relations, and my secondary supervisor, Helle Munk Ravnborg of the Danish Institute for International Studies, for their invaluable guidance. They may not know it themselves but Jytte Agergaard from the Department of Geography at Copenhagen and Neil Webster from the Danish Institute for International Studies inspired me to go ahead with the studies in the first place. Thank you. As a 'development practitioner', it was quite a change for me to re-enter academia, but I have thoroughly enjoyed it, particularly because of my colleagues at Development and International Relations, including Vibeke Andersson, Annette Kanstrup Jensen, Jacques Hersch, Jens Müller, Li Xing, Mammo Muchie, Louise Takeda, Corrie McDougall, Berhanu Balcha, and Mona Dam. On the administrative side, I wish to thank Marianne Høgsbro, Helle Weiergang, and Jytte Kongstad. You have always been helpful, as have Morten Mortensen and Louise at the Computer Unit. I have also benefited a great deal from meeting inspiring individuals in various research networks, including the Danish Water Forum (Research), the Danish Association of Development Research (FAU), and the International Association for the Study of the Commons (IASC). Jan Grønnebæk deserves special thanks for listening to my ideas during runs, and Derrick Olesen for a language check of the research proposal.

In Nepal, I wish to express sincere thanks to Helle and Jeevan Shrestha, their sons Victor and Vincent, and their extended family in Kupondole. Your friendship and hospitality made my stay very pleasant. I am also indebted to Leyla Tegmo-Reddy of the International Labour Organization in Kathmandu for providing office space and access to various resources, and to Sita Gurung for her assistance. The assistance of Yogendra Pant, the then chairperson of the NGO the Dhaulagiri Community Resource Development Centre (DCRDC), was crucial, as was that of field assistants Tara Nath Acharya and Nir Bahadur Thapa, at a time when doing rural research was not without risks. May the DCRDC continue to provide development alternatives in the Dhaulagiri Zone. I wish to thank Professor Manandhar and Dr Poudel of the Central Department of Geography, Tribhuvan University, Kirtipur, for affiliating me, and Dr Gurung at Prithivi Narayan Campus in Pokhara for providing access to historical data and for working (along with Dr Poudel) with me in Mustang.

Also in Nepal, thanks to Subarna Kapali for assistance with the database. My former colleagues, Devendra Adhikari and Manu Thapa of Danida's Energy Sector Assistance Programme, deserve many thanks for their support, and for helping me out with the maps. Thanks to Marcus Moench of the Institute for Social and Environmental Transition, as well as Prachanda Pradhan of the Farmer Managed Irrigation Systems Promotion Trust for advice on the direction of the research, to Jenny Riley for responsive editing, and to Finn Thilsted and his colleagues at the Royal Danish Embassy for providing feedback to my ideas, and to Nogendra Sapkota, Asian Development Bank for discussions and secondary data. Much of the data in this thesis date back to the 1990s, and I wish to extend my sincere thanks to all former colleagues in the Dhaulagiri Irrigation Development Project who contributed to making that project and my time there so special: thanks to Chris Baker, chief

technical adviser, for giving me interesting assignments, and to H.S.S. Fonseka with whom I spent many interesting moments. I owe a very special thanks to the farmers of the Dhaulagiri Zone for giving me their time, both in the 1990s and the 2000s.

My wife Sussie deserves the deepest thanks of all for putting up with a frequently absent husband, and for keeping our daughters, Frida and Maja, happy. I could not have done this without your support.

Torsten Rødel Berg, March 2008.

Contents

List of tables

List of figures

List of charts

List of maps

Irrigation Management in Nepal's Dhaulagiri Zone: Institutional Responses to Social, Economic and Political Change

Chapter 1: Introduction

1.1 The Focus, the Purpose and the Problem of the Thesis

The focus of this thesis is irrigation and its institutional settings in the hills and mountains of Nepal's Dhaulagiri Zone. Community-level water irrigation management institutions constitute the prime level. These institutions will be examined in terms of the implications of social, economic and political change in relation to irrigation as common property regimes[1]. This involves analysis along the following lines: firstly, the historical, social and economic contexts of irrigation systems and rural development; secondly, the performance of irrigation systems; and, thirdly, relationships between the economic and political context, access to livelihood opportunities, and irrigation system performance. The analysis is primarily conducted in the temporal context of the 1990s and 2000s, and involves repeat survey methodology.

One aim of this thesis is to explore, empirically, if and how irrigation systems and their institutions are affected by what appears to be a changing role of agriculture in rural economies and livelihoods. Another, closely related aim is, through this empirical exploration, to identify factors that affect the roles and the performance of irrigation institutions, and the challenges that changing external conditions represent to theory and policy formulation. It is believed that better understanding of the challenges and processes involved in rapid socio-economic change in relation to collectively managed irrigation is required for the formulation of needs-responsive policies. Irrigation is a key resource—the management of, and the access to, being important in livelihood and poverty contexts. It is also believed that in the current contexts of rapid and heterogeneous change commonly associated with economic globalization, dominant thinking on irrigation institutions as effective ways of organizing agricultural production—as reflected in both theory and policy—fails to fully capture changing ground-level reality. Therefore, it is proposed that the central role provided to community-based natural resource management institutions in rural development policy and planning frameworks requires re-thinking. It is the ambition of this thesis to contribute to such re-thinking.

In the context of irrigation in Nepal the problematic may be summed up as follows: livelihood diversification, related changing forms of agriculture and growth in non-farm income, along with demographic issues, appear to have become major elements in socio-economic change in rural Nepal. If agriculture is no longer the major source of livelihoods, incentives for investing time and labour in collective operation and maintenance of irrigation systems are likely to be affected, and may therefore have implications for the capacity of local water management institutions to operate and maintain irrigation systems effectively and in a sustainable manner. So would the introduction of crops that require irrigation schedules different from those of conventional crops. However, the relationships between social, economic and political change and institutional change in irrigation systems are not well understood, partly because of the rapid nature of change and partly because of a theoretical dearth within this area of research. As a consequence, contemporary rural development

1 A common property regime is a set of institutions, regulations and management practices subject to collective decision-making. See section 2.5.1.

frameworks tend to inadequately address the increasing complexity of local irrigation management. In sum, it is considered relevant, both empirically, theoretically and in a policy sense, to analyse institutional responses to change in terms of their broader context.

1.2 Points of Departure

1.2.1 "Nepal is a Landlocked Country……"

A great many reports, academic or otherwise, on Nepal's development begin by stating that "Nepal is a landlocked country". This is usually to somehow explain Nepal's relative geographical disadvantage and thus limited achievements in terms of social and economic development[2]. Being sandwiched between China (Tibet) and India has indeed created a high degree of economic dependence, particularly on India, which controls Nepal's access to the sea, and through trade and transit agreements is able to set conditions for trade. The topography of the 147,000 km^2 country, commonly divided into three ecological zones (mountains, hills and *terai*) with the majority of the population of some 28 million people concentrated in the smallest of these zones, the *terai* (or plains) bordering India, is another often-cited constraint to development.

There is little doubt that these physical attributes have played a part in shaping the predominantly agrarian-based economic development of the country. The geographical focus in this study is on the mountains and the hills, where limited access has meant that local economies, many based on irrigated agriculture, were relatively isolated for centuries. It may be argued, as do Bray (1991) and Schendel (1991), that the isolated and scattered nature of irrigation, such as found in the hills and mountains of Nepal, has not contributed to the patterns of change or 'laws of motion', such as those that, for example, Geerts (1963) and Wittfogel (1957) with their concepts of agricultural involution and hydraulic society, respectively, claimed had taken place in parts of East and Southeast Asia.

Indeed, the social and economic ramifications of Nepal's thousands of irrigation systems have, generally speaking, not involved the generation of food surpluses and thus the release of labour for, for example, cultural activities and specialization, as is claimed to have been the case in so-called hydraulic societies. Difficult topography aside, the historical 'neglect and rule' nature of the state in Nepal has also played a role in constraining economic achievements. The Kathmandu Valley was the closest that Nepal came to anything that may resemble a hydraulic society. With its intricate triple cropping irrigation systems, some of which were state-sponsored, this valley "represented an island of high agricultural productivity against a general background of inefficient and extensive farming practices" (Regmi 1978:14), also with a great deal of specialization and some of the impressive cultural artefacts associated with a strong state. State-sponsored irrigation canals (so-called *raj khulo*) were also in place in the districts of Nuwakot, Kaski, Palpa and Syangja from the 19th century, but the areas irrigated were not large[3].

---

[2] In 2007, Nepal was ranked 142 of 177 nations in the composite Human Development Index and 148 in terms of GDP per capita (United Nations Development Programme 2007).

[3] These state-operated systems were apparently developed when Nepal was divided into principalities. These became slowly incorporated into the unified state of Nepal under King Prithivi Narayan Shah (see Agergaard 1998. See Benjamin and Shivakoti 2002 for the origins of the Palpa *Raj Khulo*).

Rana[4] rule in particular, characterized as it was by a combined philosophy of feudal greed and mediocrity, appears to have played a major role in suppressing economic potential. As Mahesh Chandra Regmi, Nepal's eminent historian and prime source of evidence on irrigation in the country[5] points out throughout his scholarship, the purpose of government to the Ranas was the extraction of revenue through taxation on agricultural lands and the maintenance of controls to ensure that the small elite in Kathmandu secured these revenues. As noted in chapter 5, one such control measure was to restrict internal movement and social upliftment by not investing in infrastructure, social and physical, preferring to collect whatever meagre revenues could be obtained from subsistence farmers. Other measures included intricate systems of land tenure aimed at ensuring tax collection and control. This involved the granting of so-called *birta* lands (ownership of which was permanent and, in addition to the collection of taxes for the state, involved the imposition fines that accrued as personal income) as well as *jagir* lands (with fewer privileges and on a temporary basis) to loyal subjects (see Benjamin and Shivakoti 2002).

Unlike their Shah (or Gorkhali) predecessors who attached importance to land reclamation and resettlement, the Ranas had limited ambitions beyond securing personal wealth and the *status quo*. The period of their rule was therefore characterized by lack of agricultural innovation, and Agergaard argues that the foundation for what she calls the "undeveloped agrarian economy of Nepal" (1998:30) was laid in the 19th century. In this regard, she quotes the concluding paragraph of Regmi (1978):

> "Under the agrarian system that existed in Nepal during the 19th century, resources were extracted from the peasants without any compensation, and neither the state nor the elite groups who absorbed these resources took serious interest in the lowly occupation of tilling the land and raising crops… low productivity due to inadequate capital investment in agriculture, the mainstay of Nepal's economy, was consequently the key link in the chain of historical causation that explains why Nepal remained a poor country during the 19th century" (Regmi 1978:158 in Agergaard 1998:31).

While irrigation had been introduced with the migration of Hindu caste groups into the hills from as early as the first millennium (see section 5.8.1), it was most probably based on the production of only one annual crop (monsoon rice) for centuries (Regmi 1978). As Benjamin and Shivakoti (2002) argue, some agricultural innovation and intensification, such as that associated with the introduction of new crops and irrigation, may have developed through the spread of *birta* and *jagir* forms of land tenure and the associated coercion of the state such as that involving *jhara*, a form of forced labour. However, relative rapid population increase (a tripling since 1850, see Agergaard 1998) probably also played a role. The fact that most of the irrigation systems investigated in this study (in the hills) were developed during the 20th century would tend to support this, along the lines of Boserup's (1965) theory that agricultural intensification occurs in response to population growth. It is also quite clear, from the histories provided by farmers in this study, that it was farmers themselves that built most of the systems without state involvement. As Benjamin and Shivakoti put it, "in an environment of central neglect… farmers had to provide irrigation facilities by the own efforts" (2002:58).

---

[4] The Ranas, a section of the nobility that managed to hang on to power from 1846 to 1951, are generally blamed in the literature for keeping Nepal isolated, underdeveloped and feudal.

[5] As Benjamin and Shivakoti (2002) point out, most of the information on irrigation in Nepal derives, indirectly, from Regmi's work on land tenure and taxation.

The period from 1950, following more than 100 years of Rana rule, is often referred to as the era of *bikash*, or development, or planned development because of the establishment of a series of national five-year plans that since 1956 have specified goals and objectives for the various sectors of the economy. The era has been characterized by massive flows of foreign aid to Nepal, but there is a general consensus in the literature that more than 50 years of development aid has produced relatively meagre results. Explanations for this vary, ranging from emphasis on the caste system and 'fatalism' (Bista 1991) to lack of commitment on the part of the political elite (Mihaly 1965); however, most commentators, regardless of emphasis, implicitly or explicitly, acknowledge that the historical political economy, particularly the legacy of the Ranas and the Shah rulers before them, is a major factor in a political economy of aid which, with the rent-seeking nature of its bureaucracy, political mismanagement and a centralist culture combining to make development relatively unsuccessful in Nepal.

In the context of irrigation, it is quite obvious that the rent-seeking and centralist culture was sustained by foreign aid when the Department of Irrigation came into existence in 1951. Large-scale irrigation projects supported by foreign donors, although implemented far from the capital, were generally controlled by the centre (see Dixit and Gyawali 1999, also section 4.2). The country's tendering regulations that involved a hierarchy of contractors, ensured, at least until the early 1990s when the legislation was partly changed, that controlling the projects was a lucrative affair. Fuelled by a 'productivist' (Wilson and Rigg 2003) quest to increase national food production and informed by water-control thinking, much attention was focused on large-scale irrigation development in the *terai*, which had seen considerable immigration from the hills. How many hectares of what became known as agency-managed irrigations systems (as opposed to farmer-managed irrigation systems) were developed is uncertain[6]. What is quite clear though, is that irrigation management in Nepal, in the period from the early 1950s to the early 1990s, became increasingly 'governmentalized' (see Pradhan and Yoder 1990, International Labour Organisation 1995). It is also quite clear that the merits of these agency-managed systems in terms of sustainability are poor, and that the contribution of 'indigenous' systems to agricultural production has been largely ignored (Pradhan P, 1988). In the 1980s, the focus changed to irrigation development and rehabilitation in the hills and mountains; in addition to food production, the objective was now one of food security and halting emigration from the hills to the *terai,* by then considered to have reached food production and 'carrying' capacity.

With the introduction of democracy in Nepal in 1990, and the subsequent dawn of policies supporting steps towards more autonomous management of natural resources at the community level, the 'governmentalization of irrigation' trend was slowed and eventually reversed. A series of events led to local resource management institutions occupying a significant role in the development strategies and legal framework of Nepal including its Agricultural Perspective Plan of 1995 (National Planning Commission 1995). First of all, community-focused policies were— and continue to be—endorsed by development agencies for which local natural resource management organizations were considered particularly appropriate institutional forms. Secondly, along with accompanying strategies emphasizing 'good governance', popular participation and decentralization, the 1990s saw a series of studies that rediscovered the historical role of indigenous irrigation (see e.g. Pradhan P 1989, Pradhan and Yoder 1990, Rana 1992, KC and Pradhan 1993, Yoder 1994, ILO 1995, Pradhan P 2003). There was a focus, in much of this work, on how

[6] By one count, community institutions manage, or partly manage, at least 16,700 irrigation systems, or 67 per cent of Nepal's irrigable area, the remaining being agency- (government-) managed (Pradhan P 1989), but the distinction between agency- and farmer-managed systems is often somewhat blurred (Gyawali and Dixit 1999).

penetration of government authority with its legislative and regulatory framework, imposed on 'traditional' institutions, might lead to the erosion of capacity for cooperation in irrigation through loss of indigenous management and technological skills. Thirdly, case studies from Nepal in influential collective action literature (see, for example, Ostrom *et al.* 1992) demonstrated that farmer-managed systems performed better than agency-managed systems, and pilot projects such as the Dhaulagiri Irrigation Development Project (see section 1.2.3) demonstrated that participatory resource management worked in practice.

In sum, numerous studies found that farmer-managed irrigation systems (or what is more commonly referred to in the literature as community-based irrigation systems) in Nepal display a variety of specific socio-economic and institutional contexts, and a similarly vast variety of water management practices. These typically include the pooling of resources for the construction and maintenance of canals and tanks as well as the regulation of water distribution and allocation. They usually also include the monitoring of violation of rules, and arbitration and negotiation in the case of conflict. Local irrigation management institutions also play roles in safeguarding the resource, including the protection of watersheds. Similarly, a wide range of water management institutional and organizational patterns are found. Committees may be selected or elected, written constitutions may or may not exist, some organizations are very hierarchical, others have flatter structures, etc. (see Pradhan P 1989). These characteristics may influence the mobilization of resources, water allocation rules, conflict resolution, etc., and are believed to influence overall performance of systems. Regardless of the variations, coordination—at least in cropping regimes based on cereal crops—is necessary because of the complexity and interrelationship between the many tasks that must be performed to ensure the flow of resources necessary to accomplish irrigation delivery (Yoder 1994). In other words, many of the qualities that are perceived as central to sustainability, and which appear to be lacking in agency-managed systems, appear to be present in community-based irrigation.

Documentation of the qualities of community-based irrigation in Nepal in past decades have brought these systems into the league of more celebrated and well-documented community systems in mountains or hills in Asia, such as the *muang fai* systems of northern Thailand (see, for example, Elstner and Neef 2004, Tan-Kim-Yong *et al.* 2005) and the *subaks* of Bali (see, for example, Geertz 1980, Lansing 1980).

1.2.2 Irrigation Systems and Agrarian Change

As research such as that referred to above suggests, community-based irrigation systems appear to possess certain qualities that render them viable and sustainable modes for organizing agricultural production. However, the problematic of this thesis is focused not so much on irrigation systems themselves, but rather on how these systems and their institutions are shaped by changing wider economic and political contexts. It follows that irrigation and its institutions are seen to be closely linked with agrarian change. The problematic of section 1.1 has been arrived at on the basis of growing evidence of the declining and changing role of agriculture in the rural economies of Nepal, as in many other parts of the world, as a result of global and regional economic forces. Barker and Molle note that:

> "Although traditional communal irrigation schemes are often praised for their endogenous mix of local wisdom and social cohesion, and sometimes romanticized, these systems are now exposed to new threats, as communities have opened to the world, agriculture moved from subsistence to commercialization, and villagers diversified their economic activities" (2002:4).

The scenario suggested by Barker and Molle obviously draws attention to external forces other than those associated with government authority, which was, as noted in section 1.1, the preoccupation of earlier research. Also, as Rigg emphasizes, there are strong empirical indications that rural areas, their economies and agriculture are changing:

> "the distinctions between rural and urban are becoming blurred as households increasingly occupy, or have representation in, both the rural and urban worlds and, more to the point, earn a living in both agricultural and non-farming activities… this requires a re-thinking of the rural economy and rural life, a reappraisal of policy initiatives and planning strategies, and a re-formulation of theories of agricultural and rural development" (Rigg 2001 in Barker and Molle 2002: 22).

Indeed, rapid social and economic change in rural areas leads to increasingly complex rural development trajectories, as captured in the notion that "trends and discontinuities in the character of rural areas generate a rural development problematic sharply different from that of the past" (Ashley and Maxwell 2001:397) and, it should be added, from that prescribed by conventional theoretical approaches to rural development such as, for example, the pervasive growth–linkages thinking. Livelihoods diversification in particular creates increased complexity. Both of the above quotes allude to a theoretical (and a policy) dearth with respect to understanding changes in the relative importance of agriculture. In both the policy and academic 'camps', there appears to be considerable confusion with respect to responding conceptually and practically to the 'discontinuities' referred to above; a problem that is no doubt compounded by the speed with which many rural areas are changing.

Rigg (2006) points out that to the following trends seem to be occurring in the developing world.

- Occupations and livelihoods in the countryside are diversifying.
- Occupational multiplicity is becoming more common.
- The balance of household income is shifting from farm to non-farm.
- Livelihoods and poverty are becoming de-linked from land (and from farming).
- Lives are becoming more mobile and livelihoods correspondingly delocalized.
- Remittances are playing a growing role in household economies.
- The average age of farmers is rising.
- Cultural and social changes are being implicated in livelihood modifications and in new ways.

In Nepal, rural livelihoods and local economies have, particularly in the past decade, become more strongly associated with employment opportunities in India and, increasingly, labour markets further a field. Agriculture as a source of livelihood remains important, but not as important as it used to be, even if increased commercialization of agriculture is occurring, particularly in areas within reach of roads (Blaikie and Coppard 1998). Livelihood diversification at the household level appears to be the main reason for agriculture's declining role. Comparison of data on non-farm incomes from the mid-1970s with data from the mid-1990s reveals that non-agricultural income has increased significantly over the past decades for all categories of rural households (Blaikie *et al.* 2002). Recent census data suggest that one-third of the economically active population is solely involved in non-agricultural activities (International Center for Integrated Mountain Development *et al.* 2003), while in the 1980s only 14 per cent of the population worked in non-agricultural activities (World Bank 1991).

It should also be noted that the rural development trajectory of Nepal in past decades has moved in conflicting directions. On the one hand, it appears that democratic policies meant greater ability to pursue livelihood interests on the part of certain groups of farmers. These groups were also helped by increasing levels of connectivity to gain access to markets and information. On the other hand, the Maoist armed movement, which was launched in 1996, in many ways stifled institutional and economic life. In many rural areas of the country, the conflict led to economic crisis, displacement and exodus on a large scale.

These trends compel a questioning of the key assumption behind the placing of community-based irrigation institutions at the forefront of rural development frameworks. In particular, the contingent assumption within collective action theory[7]—the main body of thought that has informed scholars and planners—of the centrality of agriculture to people's livelihoods has to be questioned. A corollary problem in this context is the tendency to perceive communities as stable entities in which people are seen to depend on natural resources for survival (Moench 2002, Sadeque 1999). In the face of the growing evidence of changing ground-level realities, it appears increasingly problematic to consider communities and their institutions as stable entities in which people have incentives to manage key resources such as irrigation water collectively.

These changing realities have not gone entirely unnoticed in Nepal. Indirect information points to a number of implications: Gyawali and Dixit (1999) note with reference to irrigation systems in the Tinau Basin that the changing nature of labour relationships and increased mobility induce farmers to default on long-standing norms by working elsewhere instead of contributing to cleaning canals and erecting diversions. On the same note, Pradhan P (2003) expresses concern that the migration of young men will lead to labour shortages for operation and maintenance tasks in the Chattis Mauja system in the *terai*. A recent study (DANIDA 2002) on hill communities with micro-hydropower in the hills indicates vast income differentials as a result of remittances; something that prominent studies suggest is harmful to cooperation (Tang 1991, Bardhan 1995). Finally, Blaikie *et al.* (2002) note that demographic restructuring of villages in the hills may lead to disintegration of the "moral economy" of the village.

1.2.3 The Dhaulagiri Irrigation Development Project

Another point of departure for this study is my involvement in the Dhaulagiri Irrigation Development Project, a technical cooperation project between the Department of Irrigation and the International Labour Organization[8] funded by DANIDA and implemented in Parbat, Baglung, Myagdi and Mustang Districts in Nepal's Dhaulagiri Zone (see map 1, section 5.1). The core methodological approach in this study involves comparison between socio-economic and institutional circumstances in the early 1990s and the early 2000s in communities affected by project interventions. The 'historical' data in this repeat survey consists of so-called key-effects

---

[7] While, admittedly, too general a notion and an oversimplification, collective action theory refers to the academic discourse that started out in reaction to Hardin's (1968) pessimistic views on the viability of common ownership of natural resources. The theories and concepts for solving collective action problems in rural development in this discourse are applied in relation to management and governance of the commons, which refers to a "diversity of resources or facilities as well as to property institutions that involve some aspect of joint ownership or access" (Dietz *et al.* 2002:18). See chapter 2.

[8] The involvement of the International Labour Organization in an agricultural project was based on the philosophy of its Special Public Works Programme, which sought to alleviate poverty through labour-, and community-based methods for infrastructure development. It is also quite probable that the Basic Needs Strategy that informed development in Nepal in the 1980s, formulated by the International Labour Organization, with food security as an element, led to the its involvement in irrigation.

monitoring studies (Dhaulagiri Irrigation Development Project 1992, 1993, 1994, 1995) that were carried out when I worked as Socio-economic Monitoring and Evaluation Officer for the project from 1992 to1995. While this is not an impact study of the project, its activities and philosophy should be considered important 'case' context.

As explained in previous sections, pre-1950s irrigation in Nepal mainly entailed the production of monsoon rice and, until the 1980s, project interventions focused mainly on development of large-scale systems in the *terai*. The Dhaulagiri Irrigation Development Project along with a number of other projects[9] focused on irrigation rehabilitation in the hills and mountains, with the broad objective of seeking to halt migration to the *terai*[10] through improved living standards and better food security in the hills and mountains. These improved conditions were to come about as a result of increased agricultural production through more reliable supply and more efficient use of water. It involved two major interventions: firstly, replacing or improving temporary earth and stone structures at the points in feeder streams where water is diverted into irrigation canal systems (the intake) with cement and sometimes iron structures. Temporary structures, often made of earth and stone, tend to be washed away by floods and require considerable labour inputs. Secondly, lining earthen canals with cement so as to minimize conveyance losses (i.e., water loss in the canals) from seepage and leakage. Cement lining of canals often has the added advantage of increasing the flow of water as friction is reduced. The aim of bringing not only increased, but also more reliable, supplies of water was to enable the irrigation of crops other than monsoon rice, such as wheat and maize, all year round. It was also to reduce the labour inputs required for maintenance activities, thus freeing labour for managing additional crops.

The Dhaulagiri Irrigation Development Project, started in 1989 and completed in 1996, coincided with the dawn of a policy environment that was, as described in section 1.2.1, characterized by a focus on decentralized and participatory resource management. The project acted as a field laboratory for policy frameworks that promoted the implementation, operation and management of irrigation by farmers through legally recognized irrigation associations. This institutional engineering was by and large carried out in accordance with conventional wisdom at the time, based strongly on the assumption that agriculture was central to people's livelihoods and that, therefore, people would continue to cooperate in its management. It also involved the testing, implementation and documentation of community-based, labour-intensive and thus local-employment-generating construction methods (the so-called piecework system[11]). Additionally, the project involved a number of 'irrigation-related' activities, including income-generation and savings groups for women, environmental protection measures, and improved access (mainly mule trails).

By the end of the project period, 67 irrigation systems had been assisted, the vast majority (59) as rehabilitation projects, and a minority (eight) as new projects. The project's final evaluation report (Dhaulagiri Irrigation Development Project 1996) estimates that close to 6000 households (or some 34,000 individuals) had gained improved or new irrigation facilities; that up to 200 construction groups and irrigation organizations had been formed or strengthened; that some 3000 individuals had received training; and that 1500 women in the so-called beneficiary communities had become members of women's saving groups. The selection of projects for assistance was not based on any

[9] Including the World Bank's Irrigation Line of Credit and the Asian Development Bank's Irrigation Sector Project.

[10] Following decades of government-encouraged migration, the *terai* was considered to have reached its 'carrying capacity'.

[11] This approach, which was (at least in the context of Nepal) pioneered by the project, allowed the contracting of minor works to community-based construction groups and unlicensed contractors.

form of master planning prioritization at district level. Any community, provided it could muster 75 signatories, could apply for rehabilitation assistance and was, in principle, entitled to a pre-feasibility survey involving the application of both technical and social selection criteria, and provided criteria were met, project assistance. In practice, however, the majority of projects that ended up receiving assistance were not necessarily the most needy. Rather, a combination of 'first come first served' and the local political economy meant that they tended to be located in central areas or be otherwise relatively well endowed.

The empirical setting of this study and its meaning are introduced in more detail in chapter 5. Suffice it to say at this point, that the basic approach, pioneered in the context of Nepal by the Dhaulagiri Irrigation Development Project, was replicated in subsequent irrigation projects[12] on a larger scale. There has not, neither in the design of these projects nor in the literature, been much questioning of the wisdom of the dominant rehabilitation approach[13] to improving food security and living standards in the hills and mountains of Nepal. Additionally much as in the days of the Dhaulagiri Irrigation Development Project, Nepal's rural development frameworks continue to assign central places to institutions for the cooperative management of irrigation. This is seemingly based on the persistent assumption that not only is agriculture central to people's livelihood, but that the type of agriculture that is central is based on community-managed irrigation.

[12] The Asian Development Bank and the World Bank's Irrigation Sector Project in the hills.

[13] One contribution, however, breaks rank and questions the wisdom of promoting water control technologies that only aim at strengthening existing rice–maize–wheat irrigation regimes. These technologies, it is pointed out, not only require substantial cooperation in operation and management, but are also by design geared towards relatively large flows of water and coordinated irrigation. Perhaps, it is asked, it would be wiser to promote technologies that focus on micro-sources of irrigation and that are geared to the more individualized irrigation requirements of high-value crops (mainly horticultural) for which the hills and mountains are seen to have a competitive advantage? (Parajuli *et al.* 2001).

Chapter 2: Towards Re-thinking of Irrigation and Rural Development

2.1 Introduction

It is the intention in this chapter to present the theoretical background for analysis of irrigation systems and their institutions in the context of livelihood change. Because of the rural change perspective of this thesis, it includes elements of the meta-level theory formation associated with rural development and agrarian change. However, its frameworks for analysing performance in irrigation systems and for analysing institutional change in a social and economic perspective are in the main related to middle-level theory construction. That level of theory construction is associated with, in the words of Martinussen, "phenomena between structures and individual actors", which, as he noted in the latter half of the 1990s, represent a "break with the previously predominant tendency to focus on societal formations in their entirety as the central units of analysis" (1997:353).

I accept that a great deal of the problematic of this thesis, particularly the elements that relate to the changing role of labour in irrigation, might quite plausibly be explained by drawing on the literature on agrarian change and structural transformation. Not least the more recent works on changes in rural economies that situate rural livelihood diversification and related themes within the dynamics of globalization, de-agrarianization and de-peasantization (see, for example, Bryceson 2001, Rigg 2006, Wilson and Rigg 2003, Start and Johnson 2004 and the various articles in *Development Policy Review* 19(4) 2001). However, as Ashley and Maxwell suggest, diversification can be understood as being "*by* households or *of* economies" (2001:408). I will, in this endeavour, focus on both, i.e., on how the micro-world (de Haan and Zoomers 2005) of households, institutions, communities, etc. responds to external conditions, without losing sight of the fact that many of these conditions are indeed structural in nature.

As suggested above, two broad bodies of theory with which I will mainly engage may both be said to belong within middle-level theory construction. The first is primarily associated with natural resource management, and may be referred to as what I define later in the chapter to be collective action theory. Its literature has grown immensely over the past couple of decades, not least in the context of irrigation, and has become important in terms of both actual contributions[1] and influence on policy. The main objective of most contributions within this body of literature has been to demonstrate that so-called collective action problems can be solved, i.e., that cooperation in managing irrigation and other natural resource and agriculture endeavours is feasible. This has typically been demonstrated through explanation of the internal level circumstances of the workings of these endeavours. In the course of demonstrating this, certain theories have been advanced that may explain how some cooperative endeavours work, or may be made to work, under certain circumstances, but any theory with "general explanatory power", as Martinussen (1997) notes, on the so-called commons and their workings has not been generated as a result.

Within the main competing body of literature, which I choose to categorize under a broad 'property, access and entitlements' heading, the objectives and focuses of contributions have been more diffuse than that of the collective action literature. In general though, these contributions have

[1] One indicator in this respect is articles catalogued in the 'Common-Pool Resource Biography' at Indiana University, which show that the number of articles on the commons had grown from 275 in 1990 to more than 1000 new articles in 2000. Likewise, the number of scholars (whose papers often coincide with those in the above-mentioned biography) attending the biannual conferences held by the International Association for the Study of Common Property (IASCP) grew from 150 to more than 600 over the same period (Dietz *et al.* 2002). Please note that not all contributions to the IASCP may be said to belong to collective action scholarship.

tended to focus on the dynamics of natural resource management under various property arrangements, and the external social, economic, political, cultural and historical contexts that influence institutional arrangements. They are also characterized by a tendency to subsume such dynamics in wider processes of agrarian change. Even so, this body of literature has, as its already mentioned diffuse nature would suggest, also not generated a theory with general explanatory powers on the dynamics of rural change and its wider contexts. I do not actually believe that a general theory of rural change or natural resource management, its trajectories or dynamics in relation to surrounding social and economic environments is possible, nor particularly useful. Not only because analytical perspectives are diverse, as the demarcation of theoretical perspectives roughly outlined above would suggest, but also because local natural resource management represents empirical contexts that are far too diverse and dynamic to warrant comprehensive theories. To do justice to certain empirical contexts, as the empirical sections of this thesis will demonstrate, seemingly divergent conceptual and analytical frameworks may have to be employed.

So why talk about comprehensive theories at all? Because, as Agergaard (1998) notes[2], certain thought dominates research, despite analytical disjunctions. That dominant thought, which obviously changes over time, I propose is, within the area of local natural resource management and rural change (as within other areas), to a large extent the results of a striving towards some degree of generalization. What is perceived, in certain periods of time, within major discourses generated in particular political and economic environments[3], as the most plausible, widely applicable, widely disseminated and valid forms of explanation becomes dominant thought. Any theoretical presentation obviously needs to relate to such dominant thought before any attempts can be made to re-think the issues.

Hence, the main objectives of this chapter are: firstly, to present and discuss the most dominant approaches to local natural resource management and its explanatory value in the context of what I perceived, in the first chapter, as a rapidly changing rural livelihood context. Secondly, I will attempt to identify some of the ingredients required for re-thinking of approaches. It may be noted at this point that somewhat detailed theoretical elements will also appear in chapters 8 and 9 in connection with the conceptual and analytical frameworks applied to empirical contexts. Therefore, the presentation in this chapter seeks to take a ‘step back’ in relation to the analytical frameworks and focus on the theoretical trajectories and foundations that underlie these frameworks.

2.2 Defining and Understanding Institutions: The Main Positions

I find it appropriate to start out by defining institutions, as this many-faceted concept is repeated throughout this thesis. In the following, I will not so much discuss the methodological tensions and cleavages regarding the concept—that discussion surfaces in later sections—but merely introduce the definitions and some of the minor tensions surrounding the concept. I will, however, also

---

[2] Agergaard notes this in the context of migration processes (but not in the context of migration as a manifestation of diversification)—an area of research that also expresses itself at “diverse analytical levels and from different analytical perspectives” (1998:37).

[3] Johnson (2004:429) quotes Campbell and Pedersen on what could be called the ‘political economy of dominant thought’: “There is ample evidence showing that those paradigmatic views that came to dominate the intellectual landscape at different moments in history did so in part because they were backed by substantial material resources and intellectual elites who were able to gain footholds in important institutional arenas where they could articulate their ideas, train protégés, and establish influential and professional networks for the propagation of their views” (2001:274). I would add to this that certain ‘paradigms’ are accommodated in political environments (see section 2.3.1).

position myself in relation to these definitions so that the reader has an idea about the direction of my argumentation.

Institutions occupy a central, sometimes explicit, sometimes implicit, place in the social sciences and development research. They are most commonly defined as "the rules of the game in society or, more formally … the humanly devised constraints that shape human interaction" (North 1990:3), and it is these "rules, enforcement characteristics of rules, and norms of behaviour that structure human interaction" (North 1989:1321). These institutions, or social structures, are also commonly understood to be composed of "cultured-cognitive, normative and relative elements" (Scott 2001:48) that operate at multiple levels from localized interpersonal relationships to world systems. Emphasizing the constraining role of institutions on the individual, North's definition is quite central to neoclassical economic perceptions of institutions as phenomena that somehow regulate utility-maximizing behaviour in a market economy. These perspectives on institutions are characteristic of the dominant body of literature mentioned in the introduction, i.e., that associated with collective action. They also "emerge from some kind of behaviouralism", as Martinussen (1990:8) has pointed out, and stand in some contrast to what he calls more functional definitions.

I take these functional definitions to denote perspectives with emphasis on the functions that institutions perform rather than on the cultured-cognitive and normative aspects. In the specific context of natural resource management institutions I refer, as mentioned in the previous section, to these perspectives in the context of 'property, access and entitlements,'. In the more general context of institutions, I opt to categorize these functional definitions under the broad rubric of political economy of institutions[4] approaches, thus emphasizing concern with the who-gets-what-and-where functions of institutions. Within this line of thinking, Bromley (2006:31) suggests that "institutions are the means whereby the collective control of individual action is given effect". Institutions are seen as arenas where various interests are pursued, and they define fields of action for both individuals and groups. They are constituted chiefly by social and economic relations in combination (Bromley 2006), specifically by broadly defined social relations of cooperation, negotiation, competition and power (Lund 1994). Institutions are also very dynamic, as Berry (1989, 1993) has demonstrated, and must be understood in wide contexts, including both their contemporary and their political-economic historical foundations. They are also generally seen to facilitate access to livelihood opportunities and, therefore, play important livelihoods roles; people craft and play out livelihoods "within the context of various and varying set of matrices of institutions", as Bingen (2000:9) states.

As the last statement in particular indicates, the broad political economy of institutions approaches, which suggest that institutions may act as both as constraints and opportunities, stand in contrast to the neoclassical emphasis on institutions as something that mainly constrains individual behaviour. As will be more clearly spelt out later in this chapter, the differences between the neoclassical/behavioural and the political economy of institution definitions of institutions obviously lead to diverging analytical trajectories. There is, however, some degree of consensus on the centrality of institutions to those processes of change that we usually refer to as development. It seems safe to suggest that common ground could be reached by referring, as Bingen does, to

[4] I here use the somewhat contested term 'political economy' in what I perceive as its sociological sense, i.e., to denote emphasis on economic and political power in the context of individuals in relation to groups and other 'forces' in society. In the words of Collinson, political economy analysis "focuses on the distribution of power and wealth between different groups of individuals, and on the processes that create, sustain, and transform these relationships over time" (2003:10). A more normative definition is provided by Cousins who defines political economy as "questions of structured inequality and relations of power" (1990:14).

institutions as “both formal and informal norms, rules, procedures and processes that define the way in which individuals should inter-relate and act” (2000:3).

The terms institutions and organizations are often used interchangeably, both colloquially and in research. The cooperative arrangements in irrigation, which I refer to as irrigation institutions in this study, typically have some degree of organizational manifestations: they display structures of “recognized and accepted roles or positions that are ordered in some relationship to each other in order to achieve specified goals” (Bingen 2000:2) through committees, designations, etc. However, these institutions are much more than their recognizable structures. They are constituted by rules, formal and informal, as well as already mentioned social relations that are rooted in historical political-economic conditions of access to resources. Hence, the term institutions when applied in this thesis, in the context of organizational manifestations, refers to their ‘deeper’ substance.

In this study, I employ a pragmatic approach to the debate on the nature of institutions. I hold that institutions are indeed the rules of the game but also much more, to the extent that the political economy of institutions approaches have considerable explanatory value with respect to rural change. I therefore place the main conceptual and analytical emphasis on institutions as conduits of access to resources and opportunities, as well as on the social and economical dynamics of the contexts in which access may occur, rather than on constraining functions and internal level analysis. However, as suggested in the previous section, I do not find the approaches to institutions mutually exclusive, but posit that the more neoclassical-economics-inspired approaches serve useful analytical purposes. This pragmatism stems from two factors: firstly, both lines of thinking offer frameworks that can meaningfully inform analyses. Secondly, my attempts at pursuing a grounded methodology imply that it is the empirical context, i.e., the nature of the data and its purpose, that guides the choice of explanatory frameworks.

2.3 Theoretical Trajectory of ‘The Local Resource Management Institution’ in Rural Development

The dynamics of irrigated agriculture and its institutions are, as pointed out in chapter 1, considered in a broad ‘re-thinking rural development’ perspective in this study. I will therefore briefly outline a theoretical and conceptual trajectory of the role of institutions and its corollary concepts in rural development thinking. When referring to rural development, I do not refer to a body of thought but to a sector characterized by competing ideas and policies. The objective is to arrive at an understanding of the place that the ‘local natural resource management institution’ (i.e. the kind of institution through which much irrigation is managed) occupies in current rural development thinking.

Neat characterization of certain periods as being dominated by specific thinking is tempting, but obviously problematic as “paradigms and theoretical frameworks tend to accumulate in a competing environment rather than replace each other” (Martinussen 1990:3, see also Ellis and Biggs 2001). However, certain trends in the treatment of natural resource management institutions within rural development may be discerned. Agrawal and Gibson (1999) discuss the relationship between village institution and the nebulous concept of community, and point out that ‘community’ and village life (rather than their specific institutions) were popular subjects of analysis among nineteenth and early twentieth century scholars attempting to understand the transformations of their time. Some of these scholars, they argue, represent romantic notions of kin networks, harmony and joint property seen to be under threat from the external, eroding forces of ‘progress’. These notions may still explain some of the attraction that ‘community’ holds today, particularly among conservationists. In contrast, the early roots of modernization theory, represented by Marx and Engels, Weber and (early) Durkheim, highlighted the disappearance of community, and saw market

penetration and urbanization as positive community-eroding factors paving the way for progress. These evolutionary views carried on to later modernization theorists whose perceptions were, as Agrawal and Gibson further argue, characterized by negative views of community and village life, connoting it with being underdeveloped, static and fatalistic; factors that were seen as obstacles on the path from traditional to modern.

The evolutionary perspective heritage became particularly evident in post World War II modernization-inspired theories of rural development. While these were less explicitly negative about community as such than earlier scholars, village life continued to be considered traditional and backward, at least in less developed regions, as in Rostow (1960). Institutions, other than the market, were generally not recognized as tools for managing resources or structuring other forms of economic and social relations. In these neoclassical economics-inspired theories, markets were seen as the principal institutions to integrate and facilitate the activities of producers, savers and investors in the process of specialization. The central role assigned to the market, without much consideration for facilitating or constraining mechanisms, may be further illustrated by the emphasis on essential linkages (backward, forward and consumption) as in the pervasive 'regional growth linkages' school (see Start 2001).

North (1990), while obviously dealing with rural development at a much later stage when principles associated with new-institutional economics (see below) were gaining ground, is an exception within neoclassical economic perspectives on rural development. While aligning himself closely with evolutionary perspectives on economic growth, not least rural growth linkages models, he adds—with a focus on transaction costs—considerable institutional nuances to these models. In North's primordial village, trade is limited, as are subsequent transaction costs; whatever exchange exists is facilitated by a dense social network of 'informal constraints'. However, as markets grow and cover larger distances, transaction costs increase as trust and kinship networks can no longer be relied upon. In the face of increased complexity, institutions in the shape of standards, legislation and, eventually, capital markets emerge.

As highlighted by Ellis and Biggs (2001), the above neoclassical models of rural growth linkages were (and continue to be) at odds with parallel thinking on the 'political economy of agrarian change'. This was (and is) because of the former's neglect of issues such as rural property relations in agrarian change processes, inequality, class and power as well the general forces of development under capitalism that are seen to influence these dynamics. In the 'political economy of agrarian change thinking' institutions are predominantly embedded in these larger dynamics, some of which may be seen as institutions in themselves, or at least as constitutive elements of institutions. Explicit mention of institutions was therefore limited, something. This also owes, as Long (2001) mentions, to the fact that much of the debate during the 1970s and 1980s within this theoretical framework centred on grand theory with a particular focus on 'the agrarian question', i.e., on proletarianization versus peasantization of the countryside.

It should be noted that collective action within this framework connoted collective resistance to those institutions seen to serve as mechanisms of socio-political control in the sociological sense of the notion (Berg 1991). Increased alienation of the rural poor from the resource bases on which livelihoods depend was seen as an important stimulant to such collective action (Korten 1980). This is obviously quite different from the meaning of collective action in the neoclassical economics sense where, as explained later, the notion connotes the abilities of communities to cooperate in managing resources.

Neoclassical modernization theories, along with equally-structurally-founded Marxist-inspired macro-perspectives on development, underdevelopment and agrarian change, dominated rural

development debates well into the 1980s. This may well explain why the social and economic implications of the elaborate systems regulating cooperation in the commons and semi-commons that prevailed throughout the later Middle Ages in Europe and elsewhere received, as Wade wrote less than two decades ago, "strangely little attention from students of present-day peasant societies" (1988:11). Ostrom's review and analysis of "long-enduring, self-organized and self-governed common pool resources" (1990:58) in Switzerland, Japan, the Philippines and Spain is an exception that also seeks (particularly in the case of Spain) to understand these institutions in a wider historical governance context. So are Wade's references to traditional grazing and cropping regulations in England (Wade 1988). It may be added that North (1990) in his previously mentioned analysis also acknowledges what he refers to as the English heritage of institutions and ideas, from town meetings to self-government. Overall though, in relation to the more influential strands in rural development thinking, it seems appropriate to characterize institutions as a minority discourse of rural development, at least until the 1980s and 1990s.

The one event that began to draw attention to non-market institutions such as those associated with common pool and common property resources was the publication of Hardin's article on the 'Tragedy of the Commons' in 1968. With its pessimistic arguments, firmly rooted in the dogma of 'utility maximization of the individual' of neoclassical economic thinking, environmental degradation was considered inherently related to common ownership. Any attempt at restraining individual use of a common resource was considered likely to fail because of 'human nature' (Hardin 1968), the crux of the argument being: one person may limit his use of a resource but if others do not (and why should they?) then the resource will degrade anyway, so why restrain oneself?

2.3.1 Emergence of a Dominant Discourse: Enter the 'Local Resource Management Institution'

Reactions to Hardin's paper—said to be one of the most-often cited scientific papers of the second half of the twentieth century—formed a theoretical context that initially challenged and nuanced Hardin's assertions (Martinussen 1997), and at a later stage[5] mapped and systematized conditions for community-based resource management. The quest for resolving the 'tragedy' of the commons fed into the phenomenal rise, in mainstream economic thinking, of attention to institutions in the 1980s and 1990s that is commonly referred to as new-institutional economics. That this 'new' perspective on economics was in fact not altogether new was noted by Berry who found that, in what she calls new-institutional neoclassical economics, appreciating "the role of interlinked, often personalized transactions between economic agents, the economic literature has only caught up with the relevant literature in economic anthropology" (1993:12).

The theoretical context[6] that challenged Hardin was based on the strand (another being that of transaction costs) in new-institutional economics that deals with collective action in relation to public or collective goods (Nabli and Nugent 1989) and resources associated with common property arrangements. The mainstream economic concepts of 'excludability' (the degree to which someone can be excluded from benefiting from a good) and 'subtractability' (the degree to which someone's

[5] The 1985 Annapolis, Maryland, United States conference organized by the National Research Council Panel on Common Property Resource Management is considered a major point of departure in commons research. See chapter 8 for more details.

[6] However, the ability or inability of (rational, self interested) individuals to cooperate in the pursuits of joint welfare was originally theorized by Mancur Olson (1965).

use of a good means less of that good for others to use) within categories of goods[7] were central to the theoretical context. Common pool resources, to which irrigation systems are seen to belong, are understood to have low excludability; it is difficult to exclude someone who, by virtue of, for example, land ownership, is entitled to irrigation water. At the same time subtractability is high; "the withdrawal of an acre-foot of water from an irrigation canal means that there is one acre-foot of water less for anyone else to use", as Ostrom *et al.* (1993:89) put it. These characteristics may lead to a situation, analogous to Hardin's 'tragedy', where:

> "Whenever one person cannot be excluded from the benefits that others provide, each person is motivated not to contribute to the joint effort, but to free-ride on the efforts of others. If all participants choose to free-ride, the collective benefit will not be produced" (Ostrom 1990:6).

In the context of community-managed irrigation systems, 'contribution to the joint effort' is mainly associated with labour and other forms of contribution to maintenance. This is discussed in more detail in chapter 8. The bottom line here is that, within a rational choice framework that stresses the micro-foundations of institutions (Scott 2001), Ostrom (1990, 1992, see also Ostrom *et al.*1993), in particular, argued that the presence of specific rules and incentives might overcome the 'collective action problem' of free-riding and subsequent 'tragedy'. As a result, natural resource management institutions—based on individual economic rationales as determinants for investment in what was referred to as collective action—were increasingly seen as efficient ways of organizing economic activity within the realm of natural resource management. The idea that "social outcomes can be explained in terms of the calculation that individuals make about the perceived costs and benefits of future actions" is, as Johnson (2004:411) points out, strongly embedded in methodological individualism. Although the constraining role of institutions on human behaviour is toned down compared with non-new-institutional neoclassical approaches, the emphasis is still on rules (i.e., institutions) that constrain human behaviour (in this case the propensity to free-ride). I refer throughout this study to this approach as the collective action school (or thinking, approaches and thought) and to its literature as collective action research.

The readily observable existence of cooperatively managed resource systems in many parts of the world, not least irrigation systems, fuelled the resolve to refute Hardin's tragedy metaphor, even if he was in fact confusing free-for-all open-access grazing situations with common property situations where users have rights, duties and ensuing benefits. Identification of predominantly internal enabling factors for collective action, diagnosed as social homogeneity and supportive traditions, and the rules, rights, duties and sanctions that in 'best practice' cases regulate cooperation over the commons, led to the elaboration of design principles (Ostrom 1990, 1992, see also Vermillion 2001). This again led to the persuasive notion that appropriate local institutions might be engineered as part of government-cum-donor policies, i.e., that enabling institutional factors could be created through external intervention. Numerous case studies demonstrated that various collective action problems had in fact been solved (see Ostrom 1990, the collection of cases in Bromley *et al.* 1992, Baland and Platteau 1996). As an example of the substantial production of evidence in favour of community-level management, it was convincingly demonstrated in the case of Nepal that community-managed irrigation systems actually perform better than government-managed systems (see Ostrom *et al.* 1992, Shivakoti and Ostrom 2002, and chapter 1 in this study).

[7] Usually public goods, private goods, common pool, and toll goods.

The impact of providing central places to community-based management in development policy goes beyond the management of natural resources, to encompass various kinds of cooperative arrangements (in public works, cooperatives, etc.). In the case of irrigation, it involved taking away power from line agencies and allowing 'participation' by farmers, mainly in the construction and operation of irrigation schemes but also in a formal legal sense. Social mobilization, applying the 'get the institutions right' social engineering ideas of Ostrom, became key elements in irrigation development, and eventually formal legal ownership of irrigation systems (and other resources from forests to drinking water) came to rest with communities who became responsible for operation and maintenance.

While the initial focus in the collective action discourse was predominantly on the management of resources characterized by some degree of common ownership, focus on the 'local', the 'community' and its institutions has increasingly been accommodated within the broad and somewhat fuzzy sphere of decentralization[8]. Within that sphere, the discourse throughout the 1990s and 2000s has become increasingly resource-specific (Saleth *et al.* 2003)[9]. A vast proportion of developing countries are affected by decentralization reforms[10], and collective action thinking has contributed to the trend. In sum, perceptions of the 'local natural resource management institution' as an efficient, participative and perhaps even egalitarian medium for organizing rural development activities at the micro-level found a particularly central place in the rural development frameworks of most countries from the 1990s onwards, as a nearly hegemonic discourse (see van Meijl and von Benda-Beckmann, F 1999).

Returning to the theoretical trajectory angle of these last two sections, notions of the importance of rural institutions other than the market obviously no longer belonged to a minority discourse. Rather, they had found resonance in the post-structural turn that Blaikie and Coppard claim the "social sciences have taken over the past decade or so, to focus on the competing knowledge claims of science, the state and formal institutions on the one hand, and the farmers on the other" (1998: 28). In a specific rural development context, this paradigm shift stands in contrast to the macro-perspectives on rural development outlined earlier, by envisaging "rural development as a participatory process that empowers rural dwellers to take control of their own priorities for change" (Ellis and Biggs 2001:443). Central to this shift, was a focus on actor-oriented perspectives with rural people seen as capable of understanding of the processes of change in which they are involved.

Much of the academic debate in the last couple of decades has indeed focused on the structure versus actor, agency and practice controversy. There have been notable critiques of the analytical

---

[8] Decentralization means many things to many people and is an increasingly contested notion. I prefer Ribot's definition of decentralization: it is "any act by which a central government formally cedes power to actors and institutions at lower levels in a political-administrative and territorial hierarchy" (Ribot 2004:9). However, decentralization is often used to denote what we may associate with both 'democratic decentralization' (as in Ribot's definition) and 'privatization decentralization' such as the ceding of power to user groups.

[9] The key statement from the Bonn Freshwater Conference in 2001 is a good example of this. "Decentralization is key. The local level is where national policy meets community needs. Local authorities—if delegated power and the means, and if supported to build their capacities—can provide for increased responsiveness and transparency in water management, and increase the participation of women and men, farmer and fisher, young and old, town and country dweller… [as well as encourage] cooperation within river basins and make existing agreement more vital and valid" (Bonn Keys, in Hall 2005:118).

[10] Agrawal (2001) estimates that at least 60 countries claim to be in the process of decentralizing aspects of natural resource management.

value of alleged 'post-modernist', 'neo-populist' and 'social-constructionist' views and notions that tend to see the 'institutions as the facts' (see for example, Blaikie and Coppard 1998, Harriss and de Renzio 1997). I will return to some of these aspects in later sections. Suffice it to say at this point that the location of collective action theories on the management of resources in the commons, in a theoretical tradition that focuses on behaviour and choice at the individual and group levels, not only explains a strong degree of 'agency' orientation in natural resource management thought, it has also ensured accommodation within the larger 'growth linkage' rural development discourse mentioned earlier.

Further, it may be argued that the paradigm shift towards actor-oriented perspectives found fertile ground among donors, disillusioned as they were with the inefficiency of development aid, particularly the top-down approaches spawned by modernization-inspired strategies (Ellis and Biggs 2001). Among the rural development themes of the 1980s onwards (including NGOs, farming systems research, indigenous knowledge, participation), notions of the efficiency of 'the local natural resource management institution', with theoretical emphasis on incentives and choice, were particularly attuned to the liberal environment promoted by international donors (see Start 2001). That liberal environment—which also led some observers to talk of a 'Washington Consensus on Food, Agriculture and Rural Development'[11] (see Maxwell and Heber-Percy 2001)—gained ground in a number of countries that from the 1980s had not only embarked on decentralization reforms, but had also adopted structural adjustment policies and associated policies of economic liberalization.

2.4 The Limitations of Collective Action Approaches

As the previous section establishes, the theoretical and related political trajectories of institutions in rural development and natural resource management have, at least since the 1980s, been dominated by collective action research, with a principal focus on how individual incentives in combination with social institutions affect social outcomes (Johnson 2004). It would appear though, that the ambitions of this thesis to capture institutional change in relation to livelihoods change in a rural development context can only be partly fulfilled through the relatively restrictive, efficiency-oriented conceptual frameworks of collective action. The frameworks may help us understand how common property regimes work or do not work under certain circumstances; but how these circumstances come about is less certain. This is linked to the tendency within collective action thinking to explain the workings of, for example, irrigation institutions at internal management levels. This, it would appear, limits the ability to capture change (Moench 2002), be it social, political or economic.

Further limitations, as suggested by the internal level approach, include the tendency to perceive communities and associated resource management institutions as *stable* entities, as if the enabling factors for successful commons, such as interest in a natural resource and its management, social homogeneity, 'supportive traditions', etc. were constants. Of particular relevance to the 'new rural development problematic' that frames this investigation, collective action assumes that people have *incentives* to collectively manage key resources such as irrigated agriculture. That assumption is

[11] Maxwell and Heber-Percy (2001:57) identified the Washington Consensus on Food, Agriculture and Rural Development as follows: "An accommodation has been found between the pre-eminence of a poverty reduction objective and the legacy of a neo-liberal, market-oriented model. Growth is regarded as essential, the private sector will be the main engine of development, government will provide strategic policy and investment support for infrastructure, service delivery and marketing, participation will be encouraged (perhaps more in some models than others) and safety nets will be provided."

increasingly problematic (Sadeque 1999, Moench 2002) if agriculture is no longer as central to rural economies and to people's livelihoods as it used to be. There are, in other words, limitations to what collective action research can explain in increasingly complex empirical contexts.

It appears that the limitations are associated with the mode of explanation in collective action. Berry states that:

> "Methodological individualism—a somewhat misleading term since it refers not to a method of research but to a mode of explanation—has been rightly criticized for treating social processes as multiples or weighted sums of autonomous individual acts" (1994:27).

Methods of research that presume the possibility of studying individuals or groups in isolation, she argues, preclude observation of the social relations and interactions that we try to understand. She recommends that in order to go beyond understandings that reflect the "theoretical presuppositions rather than any demonstrable social realities" (1994:34) associated with the 'abstract' language of neoclassical economics a host of methodologies should be employed. These include what she calls studying people rather than surveying individuals, through lifetime histories, re-studies and analysis of how people gain access to resources, and the role that fluid and dynamic institutions play in the process. Given that a re-study forms part of the empirical premises on which this study is based, I obviously find Berry's recommendations appealing. I will return to these issues in section 2.5.2 and in the methodology chapter.

Theories that, as their point of departure, assume informed rational individual behaviour and individual incentives, and emphasize the importance of rules at internal levels may indeed be narrow in the sense that they fail to adequately capture the wider dynamics of power and political economy contexts. This, however, does not mean that what they do capture is captured wrongly. Bardhan and Ray, in a discussion of the methodological dichotomies in mainstream economics and politico-economic anthropological[12] methods in commons research, argue that

> "… methodological individualism, utility maximization and exogenous preferences together create what might be called a thin theory of human action, but it is this thinness that gives micro-economic models their precision, parsimony and predictive power" (2006:661).

The documentation, in the collective action school, of the variety of ways that obstacles to cooperation in the commons have been overcome, and the models used to explain this, have proven useful tools for measuring success of failure in the 'management' of resources sense. Therefore, as frameworks for measuring performance and efficiency in the commons, collective action approaches such as that associated with the 'Oakerson Framework for Analysing the Commons' (Oakerson 1992) appear well suited for just that. It is, as also Cousins has noted, "extremely useful as a starting point for analysis" (1993:4). I demonstrate and elaborate further on this in chapter 8 of this study.

2.5 Competing Perspectives

In the following I will present and discuss competing perspectives to collective action on the commons. These are closely aligned with what I referred to as 'political economy approaches' in section 2.2. They are also to a large extent, in a rural development perspective, related to what I referred to as 'the political economy of agrarian change' in section 2.3. It has to be kept in mind

[12] This is not to suggest that the overall approach towards explanation in this thesis is one of social and cultural anthropology; the dichotomy could just as well be between neoclassical approaches and the 'holistic critical' social science approaches of this thesis.

though, that drawing neat lines between perspectives is nearly as problematic as neatly characterizing certain periods as being dominated by specific thinking (see section 3). This has particularly been the case following the 'post-structural turn' with its 'complexity' claims and attention to agency and other specifics across disciplines. Competing perspectives on the commons are not necessarily dichotomous or mutually exclusive. They do, however, as I will argue, reflect different epistemologies that are worth taking note of because of their methodological ramifications and subsequent explanatory value.

Therefore, examining the cleavages can be a useful academic exercise. Defining where ideas 'are coming from' helps in understanding methodological tensions as well as the political economic policy environments in which theories are accommodated. It also exposes both strengths and weaknesses in respect to the extent to which various explanations are likely to be accommodated in political economic contexts. Those strengths and weaknesses are obviously related to prevailing ideologies and the dominant discourses that these generate, but they are also related to more practical issues such as the extent to which theories adequately and readily explain phenomena[13]. Therefore, I find that characterization of theoretical propositions in respect to ambition, i.e., their level and purpose rather than where they diverge—as representing different layers of explanation—is a constructive approach. This pragmatism is reflected in the frameworks identified for empirical analysis in this study.

Methodological criticism and critical reviews of achievements are not new in collective action scholarship on the commons (see, for example, Agrawal 2001, 2002). Nor is criticism of the collective action approaches or elements thereof by non-collective action scholars (see, for example, Berry 1993, Bromley 2006, and contributions in the next sections). However, comprehensive analysis on where the literature crystallizes in terms of epistemology and disciplinary approaches seems a relatively new phenomenon, with the contributions by Bardhan and Ray (2006), Mosse (2006) and particularly Johnson (2004) being the most prominent to my knowledge. Put somewhat sweepingly, the crystallized positions on the commons may be described as follows. At one end of the continuum we have, as the previous sections have shown, mainstream neo-institutional neoclassical economists making prescriptions. At the other end, we have anthropologists having 'conversations' (see Bardhan and Ray 2006, Mosse 2006) on property relations. In between the extremes we find (political) economists who may be prescriptive, but who also borrow concepts from 'conversations'. I will start out with an example of the latter type.

2.5.1 Common Property Resources or Common Property Regimes?

First of all we need to return to definitions in order to obtain more precision and to re-focus. In the process of providing evidence that the tragedy of the commons need not to occur, it appears that the concepts associated with the commons became increasingly blurred in much of the collective action literature. Bromley[14], in particular, (see 1991, 1992a, 1992b) has been at pains to advocate the use of the concept of common property regimes, arguing that there are no common property resources, only common property (and other forms of tenure) regimes. He points out that "the literature is full of casual references to common property resources as if this were a universal and immutable classification—almost as if the prevailing institutional form were somehow inherent in a natural

[13] And may, therefore, influence the relative ease with which they may be converted into policy.

[14] Bromley is sometimes associated with the collective action literature (see, for example, Johnson 2004). I will argue that he differs on account of his rejection of , for example, methodological individualism, emphasis on the role of historical and other context in the analysis of the commons, as well as his views on property and other institutions as social relations.

resource" (1992a:65). He adds that "there is no such thing as a common property resource—there are only resources controlled and managed as common property, as state property or as private property" (1992a:66).

Bromley's point is that the institutional form is not inherent in the resource. Trees, fish, water and other natural resources are controlled and managed in the various forms mentioned above, or they may not be controlled or managed at all and come in the shape of open access resources. Fuys *et al.* put it concisely when they state that:

> "*Common property* refers to some form of shared resource tenure—usually involving a group that is defined that uses and manages the resource. A *common property regime* represents a set of institutions, regulations and management practices subject to collective decision-making. The term refers to the kind of tenure that exists, not the resource itself" (2006:3, my italics).

But is it really the case that the resource does not matter in relation to the institutional arrangement? As Berthelsen (1997) points out, water, in the case of irrigation, constitutes a specific condition of production[15]. That specific condition of production, as I elaborate on in more detail in chapter 7, renders cooperation (in water conveyance, control and distribution) the most effective way of producing wet rice (but not necessarily the production of non-cereal crops, see chapter 9). In this narrow, 'internal' sense, characteristic of the collective action school's use of the notion of common property resources, the resource may indeed be said to influence the institutional form of its management. However, as Berthelsen also points out, with reference to Marxist economic perspectives, the specific conditions of production are subsumed in common conditions of production (which I take to mean irrigated agriculture).

These common conditions are subject to external conditions imposed by the "societal production process" (Berthelsen 1997:49), a somewhat hazy term that I take to include, for example, irrigation infrastructure promotion under agricultural policies that emphasize wet rice production. In this broader sense, the role of the resource as a determinant of the institutional form is diminished, and it makes more sense to focus on the form of tenure, i.e. the common property regime that serves a specific (production) purpose. In more concrete terms, we may say that it is the water in relation to human artefacts (the intake, the canals, the distribution mechanisms) and in relation to certain cropping patterns under certain ecological, economic and political conditions that makes management of the resource as common property, under a common property regime, effective.

Also in concrete terms, it may be argued that property is a key concept, which, while most commonly treated as property rights in the collective action literature (see Ostrom 1990), tends not receive sufficient attention as an institution with economic and social dynamics. While most people will think of property as something very tangible (typically land), Bromley (1991) explains that property is not an object; it is a social relation "that defines the property holder with something of value against all others" (1991:2). That value is a benefit stream and a property right is a claim to a benefit stream, protected by an authority, usually the state in the legal sense, and the 'local' management system in the practical sense. Property should be seen as a social instrument, an institution that protects valuable 'things' with rights, and "particular property regimes are chosen for particular purposes" (Bromley 1991:3). Just as the state has a duty to protect individual rights

[15] Which, in line with Wittfogel 1957 (and what insfluenced him, i.e. Marx's ideas on a pre-capitalist mode of production in which irrigated agriculture is important) obviously affects institutional arrangements in society at what we could call a structural level.

holders' claims to property, rights holders have duties; in the case of common property regimes those duties, on the part of the individual rights holder, relate to the protection and upkeep of something in which a social unit has common interests. Bromley points out that:

> "Irrigation systems represent the essence of a common property regime. There is a well-defined group whose membership is restricted; an asset to be managed (the physical distribution system); an annual stream of benefits (the water that constitutes a valuable agricultural input); and a need for group management of both the capital stock and the annual flow (necessary maintenance of the system and a process for allocating the water among members of the group of irrigators), to make sure that the system continues to yield benefits to the group" (1992b:13).

Going beyond conventional perceptions of the determining role of the resource in shaping institutional arrangements appears an important step towards a broader understanding of common property regimes. So does a deeper understanding of the dynamics of property as a social relation, not least if what is 'valuable' is no longer solely associated with agricultural production under a common property regime. Although not directly related to the problematic of this study, except perhaps in respect to notions of stability in collective action, we are also reminded that the fact that membership is restricted in irrigation systems, based as it is on individual ownership of land, means that common property regimes have something in common with individual property regimes: non-owners are excluded from what is in fact a corporate group common property regime.

So while excludability is low in the internal sense, as held in collective action thought (see previous section), it is high in relation to outsiders. Bromley pointed this out in the early 1990s (see Bromley 1992a) and it obviously challenges perceptions (also mentioned in the previous section) of the 'local natural resource management institution' and community as an egalitarian, somewhat neutral medium for organizing rural development at the micro-level. Interestingly, debates that question the status of natural resource management decentralization as practically a panacea in this regard, as well as in relation to poverty reduction and democracy, have only seemed to gain vigour in the 2000s (see, for example, Meynen and Doornbus 2004, Ribot 2004, Manor 2004, Beck and Fajber 2006, Vandergeest 2006).

2.5.2 'Property, Access and Entitlement' Approaches

Both the issue of equity and that of property lead towards perspectives that may be said to belong towards the other end of the continuum from collective action thinking, in terms of both epistemological and normative foundations. Johnson (2004) pins what he calls 'the entitlement school' against the collective action school by noting that:

> "Two bodies of thought compete for a voice in this literature [on the commons]. One, responding to Hardin's tragedy of the commons, is primarily concerned with the problem of achieving collective action to conserve natural resources which are both depletable and unregulated. A second, motivated by notions of moral economy… and entitlement… deals with problems of creating and sustaining resource access for poor and vulnerable groups in society" (2004: 408).

He notes, as the above quote suggests, two types of tension between these two bodies of thought: The first is a normative tension expressed in concern, within the collective action school, with the efficiency and 'health' of the commons (whether in a conservation or production context) on the one hand, and the 'entitlement' scholars' concern with problems of inequality (and the implicit normative assertion that socio-economic equality is desirable) on the other:

> "Whereas 'collective action scholars' analyse the rules and sanctions that encourage individuals to conserve the commons, 'entitlement scholars' emphasize the historical struggles that determine resource access and entitlement, and the ways in which formal and informal rules create and reinforce unequal access to the commons" (2004:409).

The second is a methodological tension. Johnson points out that entitlement scholars tend to favour a sociological–historical method with emphasis on explaining property rights regimes in their historical context. This stands in contrast to the collective action school's deductive models and methodological individualism-based approaches that are embedded in a wider trend of positivism in (particularly United States) social science. Within this trend, he argues, historical 'facts' are, at best, 'selected' and interpreted so as to make theories and predictions, and in line with Popper's (1957) 'poverty of history' thinking, history generally plays a limited role. Entitlement scholars, therefore,

> "… have criticized the collective action literature for its instrumental and historically de-contextualized understanding of common property relations, calling for a more historical understanding of the ecological and socio-economic factors that affect the myriad relations on which property, common property and other forms of resource entitlements are based" (Johnson 2004: 409).

By pointing out the embeddedness of the collective action school in positivism's tendency to neglect the value of contextualized analysis, historical and socio-economic, Johnson touches upon the concerns in the problematic that substantiate this study: that dominant approaches, in policy and research, to irrigation and rural development, based on assumptions about stability, the continued centrality of agriculture, and on farmers having incentives to invest in collective action, fail to keep up with 'reality' in a rapidly changing world. By also pointing out that collective action scholarship tends to be "firmly grounded in the art of deduction" (2004:424) (as opposed to more inductive and grounded methods) by virtue of its accommodation in a positivist social science, he touches upon some of the epistemological reasons for the apparent tendency, within collective action, to inadequately capture change in common property regimes.

It is also worth repeating, in the context of how Johnson's entitlement approach may be defined epistemologically vis-à-vis collective action, that both approaches are actor-oriented. However, actor orientation in the entitlements approach differs from the already mentioned assumption in collective action that commons endeavours are "simply the aggregated outcome of the effective agencies and interests of individuals" (Long 2001:57). In this context, Berry points out that:

> "In moving beyond individual and analytical individualism, however, it is important not to lose sight of agency. People are, after all, our principal informants: their statements and actions not only provide researchers with much evidence about social practices, but they also play an active role in shaping our understanding of their circumstances" (1994:27).

2.6 Towards Re-thinking

Notwithstanding epistemological differences, the focus in what Johnson (2004) calls 'entitlement' scholarship on natural resources restricts, much as the narrow focus in collective action theory on agriculture as the central source of livelihoods does, the ability to capture changes in irrigated agriculture that may not necessarily be related to natural resources. In that sense, in relation to the problematic of this thesis, the scholarship represents conventional wisdom that does not appear to constitute sufficiently useful ingredients in a re-think of approaches. In another sense though, unlike collective action, the approach is characterized by what does appear as a major ingredient in a re-think, i.e., the focus on the broader factors that determine resource access and livelihood construction. For that reason, I will build on the approach and add 'property' and 'access' as two

major, related themes to Johnson's 'entitlements'. Admittedly, this results in a very broad 'heading' that resembles a set of complementing approaches rather than a comprehensive body of thought. However, these added ingredients, I will argue, appear to hold the potential for approaching a re-thinking of common property regimes in irrigation. I will begin with property.

2.6.1 Property as a Dynamic of Rural Change

It may be recalled how Bromley, in section 2.5.1, in the context of common property regimes, explained that property is a social relation that, in the case of irrigation, may yield a benefit stream. From a macro-level perspective, property may not only be seen as a very central social relation, but also—most commonly in relation to land—as an institution that influences agrarian change. Property is a central dynamic of rural change because of processes of turning access into property claims and eventually property rights. Those processes involve struggles, negotiations, power, influence and eventually sanctioning by socially legitimate institutions such as the state, as Lund (1994) suggests. Lund also points out—with reference to agency orientation—that agrarian change—or rather the wide range of social, economic and political processes that cause such change—is multi-level and involves, but is also a lot more than, change in individual strategies.

This notion of property is obviously related to the Marxist-inspired 'political economy of agrarian change' school. It is, however, also clear that the recognition of people's agency is not entirely congruent with the largely structural analyses in the 'political economy of agrarian change' of the past[16]. The dynamics of turning access into property rights as a force in agrarian change is, as suggested above, most clearly illustrated in the context of property relations in relation to land. Lund and Sikor (2006), for example, demonstrate how villagers in Vietnam, owing to a combination of land scarcity and market forces, through individual and community level negotiation and claims, achieve formal (private property regime) land rights in land re-allocation processes. Natural resource devolution in the forestry sector in many parts of the world also involves related processes that result in 'handing over' of, if not land rights, then tenure rights to communities under common property regimes. In irrigation in the hills of Nepal, the process of turning access into property claims and rights entailed historical ethnic geography dimensions as well as ongoing water allocation dimensions, as explained in chapters 5 and 6.

Thus the notion of property relations as a dynamic of rural change is useful in understanding the historical process of creating common property regimes. But because of the focus on processes involved in turning access into property claims and rights and the benefits that they create in relation to natural resources such as land and water, this dimension cannot stand alone in addressing the 'transforming rural economies' and 'if agriculture is no longer as central to people's livelihoods as it has been, what may then happen in common property regimes' problematic of this thesis, with it implicit assumptions of reconfiguring benefit streams. Property is, however, a good entry point for understanding determinants of access to opportunities in general. Property, such as land and water and the benefits that these generate, relate to relative economic status and, as Start and Johnson point out, one should not "underplay the importance of economic status whether in assets

[16] This change rests, compared with earlier approaches, as I have already touched upon, with the 'post-structural turn'. Put somewhat bluntly, I propose that whereas the spoils of that turn, in relation to mainstream/neo-institutional economics, led to increased emphasis on methodological individualism, it led, in 'the political economy of agrarian change', to greater recognition of the empirical context and the value of specifics, of ethnographic methods and of the 'scientific' value of qualitative methods in combination with structural analysis as a contextual backdrop. This is not to say, though, that neo-institutional scholarship does not contain any of these qualities.

or net entitlements flows, in influencing the qualitatively different patterns of access that arise in rural areas. Power over markets is determined by relative bargaining position" (2004:36).

That, in turn, is determined by initial resource position (or endowments). Simply put, from a political economy perspective, differential access to opportunities, many of which are offered in various types of markets, tends to depend on how 'well placed' a person is in terms of capital, influence (power), sources of information, and so on. Additionally, in rural areas connectivity through roads, infrastructure endowments in the shape of irrigation, and proximity to central places in general constitute a structural context to being 'well-placed' and overcome barriers to access that less well-placed persons may experience. Being well-placed to access opportunities, including those that are not directly related to agriculture but may, for instance, be offered in global labour markets, will often depend on rights to property in the shape of natural resources and the values that they generate. These values may enable a household to pay upfront costs associated with access to particularly lucrative labour markets in the absence of networks that may otherwise facilitate labour migration.

Likewise when related to agriculture, opportunities may come in the shape of new technology, and households with better-than-average endowments can afford to be less risk-averse in terms of adopting new crops (Start and Johnson 2004), not least in areas with better-than-average initial road and irrigation conditions resulting from public investment, as is also seen in the context of the green revolution in India (see, for example, Harriss 2000 for a comparison of agricultural performance across states). Being well-placed often gains a particular spatial connotation in the micro-context of irrigation systems where access to water is often associated with location in relation to the water conduit. Farmers in the head-ends of irrigation systems are often in better positions, both qualitatively and quantitatively, to access water than are farmers located in tail-ends, a predicament known as the 'tail-end problem' in irrigation literature (see chapters 7, 8, and 9).

Moreover, poverty may be understood as failure to access opportunities. From a political economy perspective that failure should, as de Haan and Zoomers point out, be seen as social exclusion, "a process in which groups try to monopolize specific opportunities to their own advantage" (2005:33), through, for instance, property relations. So while the problematic of this thesis, with its speculations on changing rural economies and reduced importance of agriculture (and thus land) requires that we go beyond a narrow association of property with land and other natural resources, we still need to keep in mind the role of property, in the shape of natural resources, in determining access to opportunities. This is after all a rural context.

2.6.2 Access as a Dynamic of Social and Economic Change

Keeping these political economy aspects in mind, we can embark on separating both the concepts of property and access from a narrow association with socially acknowledged rights to physical resources and the benefits that they may create. Von Benda-Beckmann F and Von Benda-Beckmann K's scope-widening proposal that "the function of property concerns the ways in which the relations between society's members with respect to valuables are given form and significance" (1999:21) is useful in this respect. So are Ribot and Peluso's 2003 ideas on property and access as expressed in their 'theory of access', which—while claiming to focus on access to natural resources (and appearing as more of a set of ideas than a coherent theory)—stands out as a major contribution that not only places property in a wide context of access but also places access in a wide 'access to opportunities' context (see also de Haan and Zoomers 2005, Start and Johnson 2004 for this perspective). Ribot and Peluso do not dispute the theorizing of property in the context of property rights and benefit streams, but propose closer attention to the origins of those socially acknowledged claims or rights that underlie property. Therefore, they take a 'step back' in the chain

of logic and define property as social relations in respect to 'things' (of value) and define access as the "ability to benefit from things—including material objects, persons, institutions and symbols" (2003:153).

As I also propose in the previous section, Ribot and Peluso argue that ability to gain access stems, to a large extent, from power. They see it as inherent in social relations, as something that emerges "from or flows through both intended and unintended consequences of social relationships" (2003:156). The things that people may have ability, or power, to benefit from through access, Ribot and Peluso argue, include not only tangible 'things' or resources, such as land, capital and labour even if these factors remain important, but also more fluid, immaterial 'things' including persons, institutions, and political and socio-economic processes. This perspective widens the scope of both access and property, and enables some degree of differentiation between the two dynamics. In 'property relations as a social dynamic' thinking, at least in the context of agrarian change, the transformation of physical resources through struggles, negotiations, power, etc. into something (property) to which people have rights and therefore benefits tends, as already mentioned, to be at the forefront as a dynamic of change. In taking a step back in the chain of logic, the focus in access as a social dynamic thinking is on the investment in access to economic opportunities (which may include physical resources but also markets, persons, etc.) through various access mechanisms that also involve struggles, negotiations, the exercise of power, and so on. It is the transformation of these processes into benefits, some of which may derive from property rights, which constitutes a social dynamic.

Access to opportunities may be secured, for instance as Berry (1989, 1993) argues, by investing in institutions, ranging from networks to kinship, and as I will argue in this thesis, by investing in 'operational' institutions such as user groups and cooperatives. Ribot and Peluso argue that, if examined over time and understood within political-economic moments, mechanisms of access may be understood as 'access pattern processes' (see also Lund 1994), and explain social change because:

> "People and institutions are positioned differently in relation to resources at various historical moments and geographical scales. The strands [of access] thus shift and change over time, changing the nature of power and forms of access to resources" (2003:154).

Again, I understand the resources referred to as anything that may eventually yield benefits. Understanding access pattern processes at particular moments in time and as processes is particularly important in the context of the over-time methodology employed in this thesis (see chapter 3). The strands mentioned are both structural and relational. At the relational level, access depends, as already mentioned, on participation in a variety of institutions, access to which again depends on power, much of which may stem—as also mentioned above—from property rights and economic status. The importance and nature of these institutions change as the benefits that investment in institutions may generate also change, in tune with the opportunities offered to particular segments of the population in particular politico-economic moments. The institutions that constitute relational access mechanisms to various opportunities or benefits are thus fluid and dynamic (Berry 1993, 1994, Ribot and Peluso 2003).

2.6.3 Entitlement and Livelihood Approaches

Through elaboration of the various mechanisms involved in the process of rural change, livelihood (or 'sustainable livelihoods' as it became known in the 1990s' 'future positive' discourses of, for example, the Department for International Development of the United Kingdom) analysis emerged as a central 'post-modern' attempt at combining structure and agency in the 1990s. In its simplest terms, it comprises the notion that a portfolio of assets such as natural capital, social capital, human

capital, physical capital, and financial capital defines livelihoods. Sometimes political capital is added to the list (see Nicol 2000). Livelihoods are constructed in terms of people's ability to put these assets into productive use and raise themselves out of poverty. The various elements involved are elaborated on in chapter 9. While the livelihoods approach is not a theory as such, it is obviously based on a set of concepts, the most central being that of entitlement:

I will bring the concept to the forefront for two reasons, even if access, by focusing on ability to benefit from 'things', in many ways subsumes the concept of entitlement. First of all, entitlement connotes normative concerns associated with problems of creating access for the poor to resources (Johnson 2004) and opportunities in general. As should be clear by now, such normative concerns influence the choice of topic for this thesis and its approach to explanation. In this vein, the main idea behind using the notion in combination with the more encompassing notion of access, with its emphasis on processes and dynamics, is to bring to the agenda the distribution of benefits, or rather abilities to gain access to benefits. Secondly, combined with property and access, the notion of entitlement is central to qualifying the usefulness of livelihoods analysis as a framework for analysing rural change. Entitlement is best understood together with Sen's complementing concepts of endowments and capabilities.

Coined by Sen (1981), entitlement refers to the range of livelihood possibilities that people *can* have (see also de Haan and Zoomers 2005, Ellis 2000). The related notion of capabilities, also coined by Sen, refers to what people can do or be with their entitlements in terms of changing their livelihoods conditions (Leach *et al.* 1997). Most of what people can have or do depends on endowments, i.e., the property rights and resources (usually referred to as assets in livelihood analysis) both at the level of the household and at the more structural 'initial infrastructure' condition level that influence their power and relative position to access opportunities and change livelihoods, as discussed in section 2.6.1. Entitlement remains the most intriguing of these concepts in the context of property and access because it refers to the political economy and social relations related processes of gaining opportunities, much in the same way as access denotes processes associated with benefiting from 'things' such as property. As de Haan and Zoomers point out, "endowment is the right in principle and entitlement is what one actually gets" (2005:35) through negotiation, competition, cooperation, etc.

These central concepts have been somewhat abused in their journey from Sen's original ideas of explaining causes of and abilities to cope with famine to elements in livelihood approaches. Citing Longhurst (1994), Ellis points out that:

> "It is unfortunate that a lot of writing about livelihoods in developing countries mixes terms and concepts borrowed from alternative structures of ideas, without appreciating that the piecemeal deployment of such concepts often serves neither to clarify nor to remain true to their intent in the body of thought from which they were extracted" (2000:16,17).

Ellis provides as an example the influential definition of livelihoods by Chambers and Conway that a "livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living" (1992:7 in Ellis 2000:7). The problem with respect to using the concept of capabilities in a definition of livelihood, Ellis remarks, is that because it originally refers to what a person can achieve given social and economic characteristics and endowments, it overlaps with assets and activities and thereby confuses process and outcomes. I propose, along the lines of de Haan and Zoomers (2005), that it was capability as self-help, rather than in its original deeper meaning, that ensured the accommodation of livelihood approaches in development policies in the late 1990s—most prominently in the United Kingdom where the 'New Labour' government embraced the positive image of the livelihoods approach. The neo-liberal appeal of the approach is

evident; people are seen to possess options and strategies for coping as (rational) decision-takers in a world of opportunities. It is mainly with respect to this aspect, embodied in the notion that the household may be treated as a black box for which "some combined utility function is assumed" (Bagchi *et al.* 1998: 457), that criticism has been raised.

Greater attention to notions of access in relation to entitlement serves to downplay the rational choice elements of the livelihoods approach and its relatively thin theory of human action. First of all, notions of access, by emphasizing the role of mediating social relations and other institutions, add substance to processes associated with acquiring the capitals that constitute important elements in enabling people to shape their livelihoods (see Ellis 2000)—what they can have—other than that of the 'black box of opportunities' in much livelihoods analysis. Secondly, as de Haan and Zoomers point out, as "access is not only an issue affecting the use or acquisition of capitals… [but] also an issue associated with the beneficial exploitation of livelihood opportunities" (2005:34), it draws attention to dynamics of entitlement where the performance of social relations matters a great deal. While indeed important, it is not only the possession or ownership of capitals that matter; so do various processes at institutional level in various socio-political arenas and moments. De Haan and Zoomers (2005) provide the example of vegetable marketing where success depends—in addition to access to physical and financial capital—on, for example, marketing channels, transparent prices, and farmers trust in traders.

Marx has famously, albeit somewhat insipidly[17], observed that "people make their own history, albeit not under conditions of their own choosing" (Marx 1852, paraphrased from Baggchi *et al.* 1998: 457). By putting livelihood 'in its place' through the paying of closer attention to access in relation to endowments and entitlements in shaping capabilities, the emphasis may be seen to shift to the conditions under which people make history, i.e., the structural rather than the agency element.

As Seddon and Adhikari propose:

> "To discuss the structure of livelihoods is to recognize explicitly that the livelihoods of individuals and households are structured by the wider political economy, and that the livelihoods of the poor and less powerful differ significantly and substantially from the livelihoods of the rich and influential, not only quantitatively, but also qualitatively" (2003:49).

Given such attention, I find that the livelihoods approach, to quite an extent, pulls together the somewhat 'fuzzy' concepts (Sikor and Lund 2006) involved into a meaningful and flexible conceptual and analytical framework where institutional mechanisms, as a means of gaining access, stand out as central elements. We may also choose to see the livelihood approach as an attempt at making sense of the realization, emerging over the past decades, that rural change entails more than merely agricultural development. In that sense, as an analytical framework that considers a multitude of factors as shaping livelihoods and rural change, the livelihoods approach in many ways

[17] As Bardhan and Ray ask, in relation to Marx's statement, "Who could disagree?" (2006:660). Interestingly, Marx's exact wording is unclear and seems to be presented as paraphrases. Franks, for instance, refers to Marx as having said that "people make their own history, but not in circumstances of their own choosing" (Franks 2004, quoting Layder 1994:207–208). Bardhan and Ray (2006) quote Marx from 'the Eighteenth Brumaire of Bonaparte' (1852) as having said that "men make their own history, but they do not make it just as they please; they do not make it under circumstances chosen by themselves", and like most others use the quote in order to illustrate that the idea that individuals may be understood as autonomous agents within the constraints of social structures, as opposed to being mere "products of the structures that bound their agency" (Bardhan and Ray 2006:660).

represent the most comprehensive and holistic approach on offer. Accordingly, livelihoods analysis and elements of livelihoods trajectory methodology, have, in this study, been singled out as a particularly useful approach to the capturing of rural change at the level of individuals, institutions and society (see chapter 9). I propose, however, that a couple more concerns, related to the macro- and structural context of rural change, be considered part of the re-thinking of changes in irrigation systems managed as common property regimes.

2.6.4 Livelihoods, Diversification and Common Property Regimes

As an approach that has come about in response to the complexity of patterns of rural change, livelihood thinking is common in the context of rural economic diversification. As already suggested in section 1.2.2, any re-thinking of the trajectory of rural change will have to consider such diversification as a major theme. It is typically thought of as being about livelihood diversification, with rural people straddling both rural and non-rural (foreign as well as local) domains, depending on a combination of rural and non-rural incomes, markets and institutions. It must be emphasized though, that diversification may also take place within agriculture such as when farmers diversify their cropping portfolio to include, for instance, not only cereal crops but also vegetable crops. It may also denote the rise of non-farming activities in the rural economy in general, and/or at the level of livelihood units such as the household or the individual.

Diversification thus takes place at different levels, such as that of the rural economy and that of the household or the individual. There are usually links between types of diversification and the levels at which they occur, but as Start and Johnson (2004) point out, these are not always particularly direct. Links may, for instance, include the stimulation of agricultural diversification in response to increased demand for vegetables in expanding rural town centres. However, as is often the case in Nepal, such demand may be fuelled by remittances that are invested in rural towns rather than village areas, and which thereby may become part of urbanization dynamics. Both direct and indirect links may also be associated with increased demand for labour, such as when remittances stimulate construction activities in rural towns, or when more hands are needed to produce vegetables for growing markets. Local labour shortages, exacerbated by migration and remittance-fuelled economic activities, would typically be part of the picture.

Diversification is a relatively new concept in the context of the historical structural transformation from agricultural to industrial societies, understood as the proportional decline in the agricultural sector in its contribution to national output and employment, and the rise of the manufacturing sector (see Kuznets 1966). These processes that have characterized most industrialized nations are typically seen to be closely associated with the idea that economic development emanates from (primary sector) agriculture though growth linkages (backward, forward and consumption), thus implying gradual transfers of resources from the agricultural to the (secondary) manufacturing and other (tertiary) sectors. In the words of Mellor, “the faster agriculture grows, the faster its relative size declines” (1976). Thus, the (regional) growth-linkages school tends to view the processes through the lens of rural non-farm economic activities[18] associated with backward, forward and consumption linkages to agriculture (see, for example, Davies 2004, Start and Johnson 2004,

[18] This is probably too much of a generalization, as some (see, for example, Davies 2004, Start and Johnson 2004) actually tend to also group outside-agriculture-related economic activities such as migration as falling within the rural non-farm activities sector. The focus remains, however, on activities with linkages to agriculture and on agriculture as the vehicle of economic growth.

Ashley and Maxwell 2001) and the specialization[19] that is seen as a corollary of most economic development (see, for example, Johnston and Kilby 1975). There is a tendency to view non-farm activities as add-ons to the main business of farming, even if, as Rigg—bringing matters to a head—notes "an increasing number of rural households have no commitment to farming whatsoever" (2006:181).

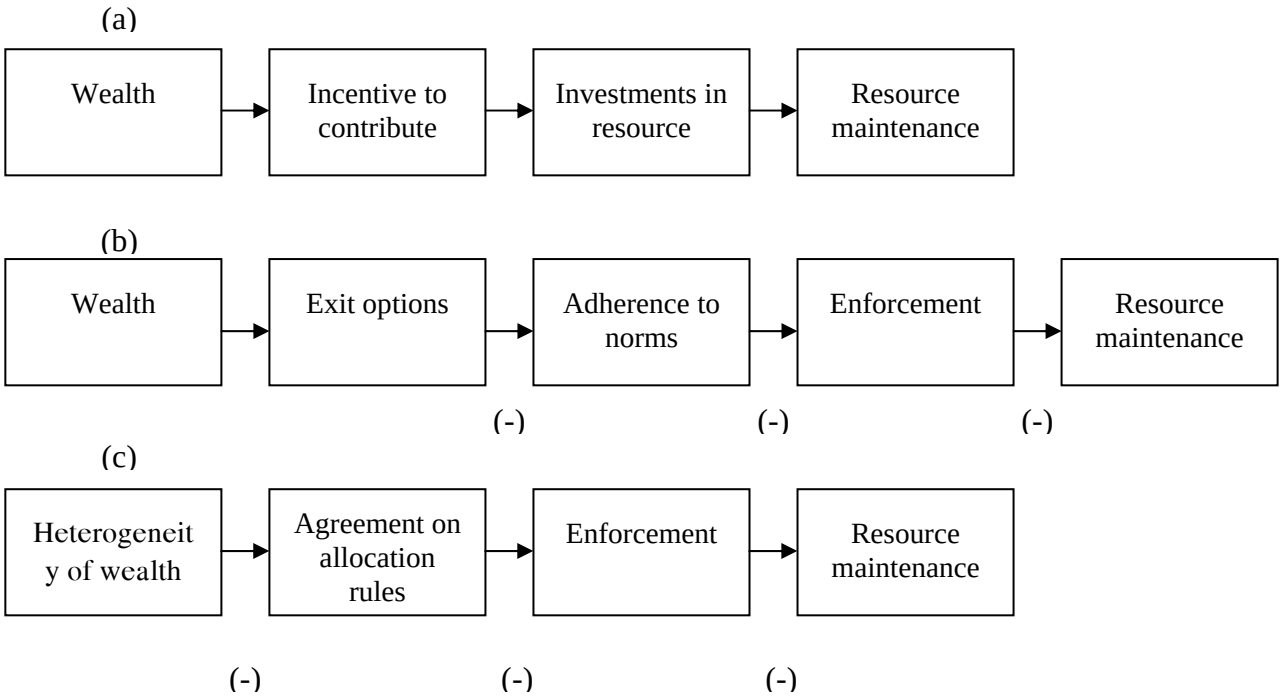
However, as Ashley and Maxwell (2001) point out, the rural non-farm economy is about diversification. As Ellis argues, so are many other rural development concerns. Indeed, livelihood diversification—the "process by which rural households construct an increasingly diverse portfolio of activities" (2000:15)—cuts across a number of self-bounded arenas of discussion in rural development from household coping and risk strategies to rural–urban migration and, I add to Ellis' arenas, situations of a complete divorce between rural household economies and farming, as noted by Rigg above. I also add changing common property regimes in irrigation as another arena that diversification cuts across. Comprehensive livelihood diversification frameworks, based conceptually on the relations and processes that determine access opportunities, as outlined in the preceding sections, while serving quite clearly to illustrate the causes of 'within' and 'without' agriculture diversification, may also serve to some extent to explain the effects that people's strategic livelihood choices may have on common property regime irrigation.

However, the putative relationship between increasingly diversified livelihoods and changes in irrigated agriculture, from its organization to changing cropping patterns to maintenance levels and to productivity, is under-explored. This is symptomatic of the general problem noted by Rigg (2006) of tracing the effects of current transformations that do not conform with conventional growth-linkages structural transformation. I have already discussed the epistemological limitations of the collective action approach; with respect to actual research on the commons, Agrawal (2002) notes that understanding such relationships is an area where commons research falls short of explanation despite the multiplicity of causal variables generated from the numerous case studies that have characterized the post-Hardin era. To the extent that collective action frameworks do address the problematic, notions of *shifts* in costs and benefits (Ostrom 1992) and economic heterogeneity (where inequity is seen to undermine mechanisms of reciprocity; see chapter 8) are applied. The focus, however, remains largely on internal institutional characteristics and arrangements.

When, within this literature, reference is made to the wider economy, alternatives to cooperating on the commons are seen as exit options, as in a 2002 volume edited by Ostrom *et al.* that seeks to assess 15 years of collective action research. There, it is noted that "integration of resource users into world economies tends to make them less dependent on particular resources, thus increasing their exit options with respect to local resources and management rules" but that the "net effect of these changes is unknown and has barely been theorized or investigated" (Stern *et al.* 2002:475, see also Bardhan and Dayton-Johnson 2002 in that volume). The hypothetical state of these speculations is presented as follows.

[19] Which, as Ellis (2000) points out, is incompatible with diversification at the level of the individual but not at the level of the household.

Figure 1
Hypothesized Effects of Wealth or Wealth Inequality on Common Pool Resources



Source: Bardhan and Dayton-Johnson 2002.

This model describes three causal paths of hypothesized effects of wealth or wealth inequality, resulting from non-agricultural incomes on common pool resource maintenance. The minus signs indicate negative effects on the variable to the right of the arrow. Path A describes a situation where resource users have "enough at stake, and enough wealth to maintain the resources on their own" (Stern *et al.* 2002:448). Paths B and C hypothesize the effects when this is not the case; in B, it is wealth and exit options that cause institutional arrangements to deteriorate, while in C, deterioration is caused by a heterogeneity of wealth. The latter two scenarios are considered the most common in irrigation systems. To my mind, models like these, are illustrative of the paths that changes in external condition may lead to, as well as of the little that we actually know about the general effects of such change. They are therefore also symptomatic of rather 'thin' approaches to understanding and explaining processes of change in common property regimes.

As suggested in chapter 1, the rapid nature of rural change and the ensuing empirical diversity renders cause and effect relationships difficult to establish, and theorization problematic. The 'access, entitlement and property' approaches, collated in livelihood analysis frameworks, though not offering any clear causality and general 'answers' as such, nevertheless provides a 'thicker' framework for attempting to understand the effects of diversification on common property regimes.

To sum up some of my earlier propositions in this regard, a 'thicker' framework implies emphasis on the notion that people, positioned differently in relation to access to opportunities at various historical moments and places, invest in institutions for reasons of livelihood construction. The institutions that people invest in are also positioned differently at various moments and places, and livelihoods are therefore played out within the context of a varying set of institutions. As Berry has

observed, this implies that people invest in the institutions "which prove more effective in giving people access to livelihoods or the means of production" (1989:51), i.e., the institutions to which they are able to gain access to and which, at any given time for any given group of people, make the most sense. This strongly suggest—as indeed also suggested in figure 1—that the relative importance of certain institutions changes in tune with external political economic conditions, and that what were once strong institutions may see a weakening of key functions as a result of a shift in institutional investment at the household-livelihood-unit level during processes of diversification. As Mosse notes in this regard:

> "… if farmers are rational optimizers (and there is no suggestion that they are irrational), they have to optimize across all of the multiple social fields that constitute their lives…" (2006:702).

The already mentioned under-researched nature of the putative effects of farmers optimizing across social fields—whether it happens at all, the extent to which it may happen, how it may manifest itself, and possible effects on irrigation systems—illustrates the relevance of empirical investigations into this element of rural diversification.

Rounding off this section, it is worth noting that both schools of thought on the commons—from their respective methodological individualism and "socio-historical" (Mosse 2006:695) points of departure—tend to converge in the sense that mechanisms of change in the commons and its institutions are seen as largely interest-based (Berry 1993, Johnson 2004). Thus, incentives—seen as either rational, individual, utility-maximizing, decision-making investment in collective action or as strategic decisions that stem from conflict, bargaining, entitlement, claims and access—to invest or not invest in common property regimes and to include them or not include them in livelihood strategies are indeed central to both perspectives. It is, however, the latter perspective that—by emphasizing social relations and dynamics rather than individual rational objectives and static, internal levels—appears to constitute the most relevant conceptual tool for understanding diversification in relation to common property regime irrigation systems. Because collective action models fail to encompass changed rural contexts, their ability to explain the changing roles of local institutions in the management of irrigated agriculture is also limited.

2.6.5 The Role of Geography

As suggested in section 2.6.3 attention to access implies, by downplaying the capability and opportunity elements, if not less attention to how people make history, then in many ways more attention to the conditions under which they make it. In section 2.6.1, I discussed the importance of being well placed socio-economically and in terms of initial infrastructure conditions with respect to terms of access. In the following, I will briefly follow up on this discussion by touching upon the spatial dimensions of these initial condition aspects of access. There is obviously nothing new in pointing to the role of geography. However, the point I wish to make is that the role of spatial factors as determinants of access to assets, terms of production and exchange and, ultimately, patterns of diversification opportunities and the way irrigation is organized is particularly pronounced in hills and mountains and therefore requires special attention.

Relatively low levels of connectedness (such as roads, telecommunication, electricity, etc.), public services and investment are general characteristics of rural areas compared to urban areas. In hills and mountains, this is particularly pronounced to the extent that such areas may be characterized as low-potential. As Conway notes:

> "The worst poverty is often located in arid or semi-arid zones or in steep hill-slope areas that are ecologically vulnerable. There the poor are isolated in every sense. They have meagre

holdings or access to land, little or no capital, and few opportunities for off-farm employment. Labour demand is often seasonal and insecure. Extension services are few and far between, and research aimed specifically at their needs is sparse" (1997:134–135, quoted in Ashley and Maxwell 2001:397).

This is obviously a rather sweeping observation, and as this thesis will show, irrigated farmers tend to be relatively better endowed than uphill farmers within such low-potential areas in terms of abilities to access resources and opportunities. Despite a great deal of heterogeneity in this respect, they nevertheless face obstacles to livelihood change that differ from those of farmers in more central areas. As Zoomers (1999) observes in the Andes—a setting that is relatively comparable to the Himalayas—geographical settings such as agro-ecological zones and distance to markets significantly influence livelihood opportunities and outcomes. In Zoomers' case, it was found that opportunities and outcomes were related more closely to location-related factors than 'strategic actions' on the parts of farmers. While the current research will not establish if this is also the case in the hills and mountains of Nepal, it draws attention to location as an important structural backdrop to the construction of livelihoods in a diversifying economy.

Location-related factors affect both 'within' and 'without' agriculture levels of diversification and may be understood with the assistance of growth-linkages concepts. At the 'within' agriculture level of diversification, relatively small farm sizes make it difficult for hill and mountain farmers to compete with lowland and more centrally located farmers with respect to the expansion of cereal crops[20]. The expansion of road connections also typically means that with reduced transport costs, the cost of 'imported' cereals also decreases. In the hills, such constraints on expansion of production are pronounced in relation to 'traditional crops', i.e., rice, (the production of which is closely related to the way irrigation is organized) wheat and maize. In the mountains, the inability to expand livelihoods through cereal crop production relates to the production of mainly buckwheat and naked barley. However, agricultural growth and increased farm income may be created through linkages to the urban (and indeed the world) economy through products, which in certain places, have competitive advantage (Wiggins and Proctor 2001), such as horticultural crops.

Both hills and mountains represent conducive growing areas for what are generally referred to as winter vegetables such as high-value cauliflower and cabbages (hills) as well as apples (mountains), for which there is considerable demand, both in growing 'rural towns' and in urban centres further away. Many farmers, not least those located close to transport arteries, have diversified their cropping portfolios accordingly and, as a consequence, situations of 'legal pluralism' with respect to access to and use of irrigation water exist in many systems; the implications of this on irrigation organization are discussed in chapter 9. However, successful utilization of the competitive advantage of hills and mountains depends on both the already mentioned improved connectedness through roads as well as on growth in urban economies; the demand represented by rural towns is particularly essential. The notion that rural development in hills and mountains depends on location-specific competitive advantage is quite central to the Agricultural Perspective Plan for Nepal, a strongly growth-linkages informed document (see chapter 4).

With respect to 'without' agriculture diversification Wiggins and Proctor (1999) argue that rural areas have competitive advantage in certain sectors only, such as crafts tourism, extractive industries, and the cheap labour that may provide incentives for industries to locate outside central

[20] There are, however, exceptions to this. As shown in chapter 5, rice is typically both a 'subsistence' and a 'cash' crop in the hills, owing to demand for local high-grade rice—the sale of which by many households is compensated for by the purchase of cheaper, 'imported' rice.

urban areas. Whether other forms of 'without' agriculture diversification such as migration may be meaningfully understood in the context of competitive advantage is doubtful[21]. There is, however, little doubt that location-related factors influence patterns of migration. This is particularly evident when it comes to gaining access to specific labour markets, where people's initial conditions—how 'well placed' people are—are associated with location and tend to play determining roles with respect to access to lucrative labour markets. I discuss the possible impacts of migration on irrigation systems in chapter 9.

I will round off this section by arguing that the notion of access gains special meanings in hill and mountain areas that cannot be captured through the concepts of growth-linkages related theory alone. These meanings have developed through the combination of difficult topography and physical isolation, and the historical concentration of wealth and power in central areas with relative easy access outside the hills and mountains. Access in the hills and the mountains therefore connotes more than mere physical access, it also connotes more metaphorical meanings associated with exclusion vs. inclusion, drudgery vs. 'easy life', modernity vs. backwardness, being 'someone' vs. being 'nobody', having 'connections' vs. being 'isolated', 'progress' vs. 'retreat', and so on.

2.7 Collective Action, Property, Access and Entitlements as Ingredients in a Re-thinking of Approaches

Early in this chapter I proposed that comprehensive theories on the dynamics of natural resource management and changing institutions were unattainable. I then proceeded to account for dominant thought within natural resource management in the context of rural development. Here I established that collective action approaches, while inadequate in many ways, nevertheless offer important tools, useful, in particular, in the diagnosis of problems and performance in common property regimes. I then focused my attention on alternative approaches that, to a greater extent than collective action, capture political economy contexts and dynamics and therefore change, starting out by redefining 'common property resources'. Having thus introduced property as a central dynamic concept, I moved towards the approaches that I propose contain central ingredients in a re-thinking: property, access and entitlements, brought together in a livelihoods analysis framework, as ideas that offer scope for capturing change in dynamic common property regime contexts. The usefulness of these ingredients, however, I argued, requires that we go beyond certain restrictions associated with a tendency to focus on access to natural resources rather than access to resources as opportunities. The ingredients proposed represent an attempt at developing a set of ideas in relation to the on-the-ground situation and the way that it has been problematized in this thesis. In the following I will briefly expand on where I place emphasis with respect to this set of ideas.

2.7.1 Collective Action Frameworks as Tools for Measuring Performance

While collective action frameworks have serious limitations in respect to capturing change and the role of the wider context, what such frameworks do capture is captured well. The nature of the empirical data used in this study as well as their intention to measure change (before analysing wider causes and effects) involves the use of a collective action analytical framework that is particularly useful for measuring performance, namely that of Oakerson's (1992) framework for analysing the commons.

---

[21] Except perhaps in relation to the martial qualities that the British associated with certain hill groups and therefore recruited for the Gurkha regiments. These perceived qualities have effectively branded hill people, and seem to persist in 'noble savage' type notions of '*bahadur*' (warriors) on the part of employers of hill people as watchmen in India (see, for example, *Himal South Asian*, Jan–Feb 1997).

2.7.2 Changing Common Property Regimes as Subsumed in Rural Change

Collective action has emerged as a near-hegemonic discourse in rural development over the past decades. Investigating mainly internal level workings of common property systems, it has contributed to understanding of how common property regimes work under circumstances of stability, with agriculture as a central livelihood concern. However, changing rural areas, characterized by livelihood diversification, make these assumptions increasingly problematic. I therefore suggest that the de-contextualized methodological individualism of collective action, while useful in the diagnosis of performance in common property regimes, needs to be complemented by more contextualized, political economy approaches to capturing the role of changing common property regimes in rural development.

2.7.3 Understanding Irrigation in Regional Historical Perspectives

It follows from my bringing to the forefront approaches that emphasize political economy contexts, that regional historical perspectives on irrigation should constitute an important contextual backdrop to the case studies of irrigation system. Given Nepal's social, economic and topographical heterogeneity, which offers very few 'typical' situations, I suggest that contexts such as historical patterns of accumulation, ethnic geography, and the spatial distribution of access to opportunities are particularly important.

2.7.4 Strands of Access

Ribot and Peluso's (2003) proposal that people gain access through a combination of structural and relational mechanisms promises to capture some of the complex reality posed by rural institutional change. Access to land as private property and irrigation water as common property may be seen to constitute important structural strands of access. So would the possession of irrigation technology, settlement at locations advantageous for irrigation, infrastructure, and distance to markets. Access to authority and education (partly as a result of caste) and to benefits associated with donor projects, foreign labour markets, new crops, credit, etc. through networks and institutions constitute, to a greater extent, relational strands of access to opportunity. Both strands of access position certain groups to, through various institutions, access opportunities offered at particular points in time.

2.7.5 Access and the Political-economic Moment

Therefore I propose, also in line with Ribot and Peluso, that certain phenomena are best understood in temporal contexts. If, as Ribot and Peluso suggest, "access is about all possible means by which a person is able to benefit from things" (2003:156), then defined temporal contexts add analytical precision. Just as different political and economic circumstances change the terms of access to what people can and wish to gain access to, social relations and social change emerge from cooperation and conflict over benefits within particular political-economic moments. It follows that social relations in certain political-economic moments are manifest in, for instance, cooperation over specific property regimes and in processes of gaining and maintaining property rights if the main livelihood option on offer is irrigated agriculture. Other political-economic moments may offer conditions conducive to the pursuit of alternative livelihoods options, and other social relations may become manifest in activities related to the pursuit of these alternative options. It may also follow that when benefits associated with, for instance, cooperation in irrigation lose ground to other available benefits, then the social relations manifest in cooperative arrangements, as well as in maintaining and gaining property rights in irrigation, will also change.

2.7.6 Livelihoods Analysis as an Integrating Framework

While collective action approaches may be seen as restrictive and possibly even 'reductionist', the 'theory of access' may be seen as the opposite: a political economy theory of everything, symptomatic of post-modernist claims of complex empirical realities. Certain notions in the theory of access are somewhat fuzzy, including the notion of social relations, and the origin and actual role of power in social relations[22]. I will not analyse power relations in much detail in this study. This is because the nature of the re-study data restricts such analysis, and because I find that studies of changes in livelihoods and the institutions through which livelihoods are played out—while implicitly acknowledging the role of power—gain more practical relevance if analysed in concrete social, political and economic contexts. The livelihoods framework constitutes a comprehensive attempt at analysing such relationships. This is not to suggest a theoretical integration along the lines of a comprehensive theory, merely an analytical one, with room for those relatively discrete theoretical elements that do not adequately capture complexity on their own.

[22] While I recognize that power is played out at all levels, I feel that a hierarchy of power, control and ability to access benefits could be more clearly spelled out in this body of thought. Some forms of power would indeed be more important than other forms. Not least the historically strong relationship between the possession of capital, and the ability to access more resources—being 'well placed'—and to benefit more from them than those with lesser, initial endowments. Linked to this, it would also appear that a greater emphasis on control over access to production and exchange should perhaps be at the top of a hierarchical 'what kind of access matters the most in an access to opportunities' order.

Chapter 3: Methodological Approach

3.1 Introduction

Based on repeat-study[1] methodology, this study combines quantitative and qualitative approaches in a comparison of livelihood and institutional change in irrigated communities in Nepal's Dhaulagiri Zone in the early to mid-1990s and the early 2000s. In addition to this core methodological approach, the analytical strategy is based on principles associated with what may be termed a grounded approach (although not 'grounded theory'; see below and footnote 3). This implies an approach that is predominantly inductive rather than deductive[2]. It may be argued that the fact that many of the data are derived from a largely quantitative (cross-sectional) study would render invalid any talk of a grounded approach. Not only is a grounded approach strongly associated with qualitative inquiry, it also came about (as indeed did other qualitative methods) in reaction to the logical-deductive forms of theorizing that are central to quantitative research (Dey 1999). Additionally, when qualitative and quantitative inquiries are combined, the qualitative inquiry usually comes first, often with the objective of generating hypotheses for subsequent quantitative study.

However, this thesis' methodological 'self-understanding' of being grounded must be understood in relation to—as elaborated on in the previous chapters—notions of rural reality changing rapidly and moving in diffuse directions. This means, as also postulated earlier, that conventional theories on agrarian change, rural livelihoods and rural institutions are increasingly unable to explain reality adequately. Therefore, it serves the topic best to let 'ground-level reality' determine not only what has to be explained but also what best explains it. In other words, the main purpose of being 'grounded' is based on a perceived need to re-think rural development, as necessitated by its taking a path that has been hitherto unpredicted and difficult to explain. However, it must be emphasized that the ambition is not to develop theory as in Glaser and Strauss' classical 'grounded theory'[3] (see Kvale 2004); rather, it is to re-think existing contributions and hopefully add facet to theory by seeking to explain snapshots of rapidly changing reality through longitudinal comparison.

In contrast to the theoretically adaptive, 'avoid preconceived ideas' (see Dey 1999:3) textbook versions of grounded theory, the study design is obviously, as the first chapter reveals, theoretically informed, in the sense that cautious criticism of existing thinking feeds into the problematic. Hence it would be wrong to claim that the thesis is without any sort of hypotheses, but rather that—in line with most qualitative research—these are somewhat broad and preliminary, and that their 'testing'

---

[1] I use the terms repeat-study and repeat-survey interchangeably to describe a method of 'comparative static', i.e., the comparison of snapshots over time as a "starting point for imputing processes of aggregate social change" (Blaikie *et al.* 2002).

[2] I find Mikkelsen's definitions of inductive and deductive approaches useful: "The inductive approach… begins with concrete empirical details and then works towards abstract ideas or general principles. There is often a 'bottom-up' perspective—seen from the point of view of the subjects—to the empirical analysis. The deductive approach… begins with abstract ideas (e.g., hypothesis) and then collects concrete, empirical details to test the ideas. One's point of departure in theory or hypothesis is made explicit" (2005:168).

[3] A discussion of the merits of grounded theory is beyond the scope of this thesis; suffice it to say that the idea of developing 'theory' from empirical observation may be directly useful in a micro-sociological context (see eg Dey 1999); it is more problematic to directly relate the empirical to new middle and macro levels of theory construction in the somewhat abstract and complex theoretical frameworks of e.g. agrarian change. While grounded theory holds considerable value as a historical reaction to the dominance of quantitative research, what I advocate is the grounded principle, as applied in a 'let the data speak' or being 'empirically based' approach.

against the research is a flexible process that may—should the data so suggest—entail reformulation or questioning of the original ideas and assumptions, and/or the formulation of new ideas and assumptions.

The level of pre-understanding is largely determined by (and therefore related to the author's epistemological and ontological positions) existing data (in this case, from early 1990s studies) combined with observations (while working as an adviser in Nepal in the early 1990s and then again in late 1990s and early 2000s) in the subsequent period of rapid local and global change and, of course, the thinking that informed the ideas of the research proposal. All these factors constitute indications for what to study, where and how to study it, and may be seen to constitute the first hermeneutics in Giddens' (1984) concept of the double hermeneutic as a characteristic of the social sciences, which as Agergaard suggests,

> "refers to the double process of translation or interpretation which is involved in social research. The first element of interpretation concerns the fact that researchers are socialized into a certain universe of concepts, theories, self-representation, etc. Such scientific traditions exist within all scientific disciplines… however, to social science (and human science) the second part of the double hermeneutics appears: the researched objects are subjects which act and interpret their own actions" (1998:66).

The role of the second part of the hermeneutics, i.e., the value of the subject's interpretations is obviously central to the continued debate about the scientific value of qualitative and quantitative research in social science. That debate, which is related to what I call the post-structural turn in section 2.3.1 and the structure–agency debate, has been invigorated in recent years. Not least as a result of Flyvbjerg's (2001) call for a social science that does not seek to emulate the natural sciences, but rather emphasizes Gidden's first hermeneutics in the sense that social science inquiry is not 'value free', and the second hermeneutics in that causality may refer to the "reasons why an actor carries out an action" (Caterino and Schram 2006:5) without ruling out that structural variables, perhaps unknown to the actor, may also explain causality. Provided that the wider context is understood, these actors and their actions are, according to Flyvbjerg, best understood in the context of case studies because these constitute concrete examples.

The present study may be seen as a multiple case study carried out in a regional 'case' context, but obviously not as a purely qualitative study, as it combines quantitative and qualitative methods in what Mikkelsen (2005) calls methodological pluralism. In addition to seeing people as subjects rather than objects, such pluralism is characterized by "room for combinations of quantitative and qualitative methods from different disciplines… flexibility and improvisations in choice of practical methods, i.e., iteration between data and partial results" (2005:144). I agree with Mikkelsen's position that methodological pluralism has a number of benefits, particularly with respect to obtaining more multifaceted pictures through triangulation. In this study, qualitative surveys are used to qualify the cross-sectional surveys, and to add meaning to these. I also agree with her observation that the use of methodological pluralism requires consideration of key concepts and the epistemologies of different methods if the outcome is to be enhanced as a result of integration. This problematic is particularly evident, I will argue, when methodological pluralism also involves longitudinal comparison, as the conception and design of 'historical' surveys tend to have been informed by different perspectives to, and serve different purposes from, subsequent repeat surveys. This matter is discussed in the next section.

3.2 Perspectives on Repeat-Study Methodology

Before explaining the background of the present study and its design and data collection methodology, I wish to place the repeat-study methodology that is at the heart of this thesis in a wider methodological perspective. Murray (2002) in a paper that examines various methodological practices in livelihoods research identifies three main approaches—the circumspective, the prospective and the retrospective:

> "The circumspective ('looking around') approach concentrates on the empirical investigation of combinations of modes of livelihoods at one moment in time, with the 'present' being typically construed as embracing six months or one year prior to the investigation" (2002:490).

While, according to Murray, the objective of the circumspective practice is to "open up questions about the relationships between different socio-economic activities" (2002:490), seemingly for the sake of academic curiosity, the prospective approach is seen as largely prescriptive. Aiming to influence policy, it seeks to innovate and develop new concepts for planners and policy-makers, through the "placing of much emphasis on project monitoring and evaluation, on analysing the success or failure of past policies… and on specific practical interventions" (2002:491). While I find the distinction between the circumspective and the retrospective approach useful, particularly because of the obvious differences with respect to the horizon for investigating and understanding change, I find the prospective approach distinction unnecessary. Regardless of the timeframe, most livelihoods research is based on ambitions, or has at least the potential, to influence policy, and is, for this reason, also prospective. The retrospective ('looking back') approach entails, in the words of Murray,

> "pushing to the limits of their potential, various methods of understanding the changes that have taken place over a much longer timescale. Central to its effective implementation is the serious pursuit of longitudinal comparison. In principle, the most effective methods of achieving this, in the strict sense, are panel studies of the 'same' population over time" (2002:490).

The key objective, Murray points out, of the retrospective approach in livelihoods research is the analysis of household trajectories of accumulation (or impoverishment) over time, and of matrices of vulnerability. It may be argued, along the lines of Rigg (2006), that the most illuminating examples of livelihoods research and rural change are based on longitudinal comparison, for the simple reason that such longitudinal comparison enables understanding of trajectories of change. One such illuminating example is the project on Long Term Change and Livelihoods of the Overseas Development Group at the University of East Anglia, UK, the results of which are referred to as 'yardstick' data in section 9.4. That project involved fieldwork in 15 villages in western Nepal, immediately south of the Dhaulagiri Zone in 1996–1997 (see Blaikie *et al.* 2002, Bagchi *et al.* 1998). The main comparative base was a cross-sectional survey carried out in the same area in 1974–1975[4].

While certainly not without methodological constraints, many of which revolved around the tensions surrounding integration of quantitative and qualitative approaches (as also discussed in 3.1), the Long Term Change and Livelihoods Project stands out as an important contribution. This

[4] That influential historical work (see in particular Blaikie *et al.* 1980, 2005), along with the ensuing scholarships of Piers Blaikie, John Cameron and David Seddon on Nepal, which often draw on this early base, is referred to throughout this study, particularly in chapter 5.

is not least because of its sound findings (see section 9.4), its uniqueness (many researchers find the repeat-study method attractive but refrain from revisiting earlier data for a number of reasons including 'institutional memory loss' and the methodological difficulties involved), and methodological plurality (it applied a battery of techniques from village mapping to wealth ranking, life histories and sample household surveys), but also because of its discussion of methodological constraints. These included the difficulties associated with sampling. On the one hand, it was seen as desirable to investigate long-term change through revisits to some of the households in the original sample, along the lines of a cohort approach; however, not being a strict longitudinal cohort, the sample had to also be as representative as the original sample survey[5], while at the same time redefinitions of administrative units, and demographic and social changes made the use of stratification criteria identical to those applied earlier problematic. This resulted in some interesting manoeuvres, summed up in the recommendation that repeat sampling surveys (i.e., cross sectionals) should not aim to mimic previous sampling procedures, but employ considerations of 'reasonable accuracy' (see Bagchi *et al.* 1998).

Other considerations include the quality, coverage and objectives of data when researchers revisit secondary data, as well as the acceptable time period over which to map livelihood trajectories. Here the team felt that a 20-year time span was sufficient to track "slow-acting processes such as population growth, technical changes and environmental change" (Bagchi *et al.* 1998:464) and that a longer timeframe would have made it difficult to re-interview respondents because of deaths. These, and related dilemmas, are described in terms of re-studies being prisoners of the past (Blaikie *et al.* 2002). On the one hand, re-studies need, as discussed above, to follow largely similar methodologies and ask largely similar questions in the present as in the past in order to generate comparisons. On the other hand, changed theoretical perspectives and new paradigms confront contemporary researchers. In view of the 1974–1975 study being informed by a neo-Marxist dependency perspective and the 1996–1997 study being informed by a broad 'post-structuralist' agenda as reflected in the methodologies applied, it is noted that re-studies tend to be "imprisoned in the theories, epistemologies… of the original study" (Blaikie *et al.* 2002:1257), and it is therefore asked, somewhat rhetorically "if the re-study is freed from its intellectual and methodological genealogy, is it a re-study?" (Blaikie *et al.* 2002:1257).

3.3 The Comparative Base

Repeat-study methodology was chosen for this study because of the availability of a comparative base (Dhaulagiri Irrigation Development Project 1992, 1993, 1994, 1995; Dhaulagiri Irrigation Development Project 1996). That base stems from my employment from 1992 to 1995 on the International Labour Organization's Dhaulagiri Irrigation Development Project (as described in section 1.2.3). As Monitoring and Evaluation Officer, I was in charge of socio-economic monitoring and evaluation activities including so-called key-effects monitoring surveys. The basic objective of these surveys was, through annual cross-sectional surveys, to build up a database of socio-economic and agricultural data relevant to the objectives of the project. It was believed that through the creation of a time series of data it would be possible not only to measure changes related to the expected direct impacts of irrigation interventions (particularly improved agricultural performance), but also to isolate the variables, other than those directly related to irrigation, that might contribute to possible changes. In addition to these impact study objectives, the intention was

[5] As Blaikie *et al.* point out, the revisited household "would not receive the same probability of being sampled as the rest of the contemporary population" (2002:1257).

also for the surveys to serve as process monitoring tools in the sense of ensuring, through annual surveys, that the project was on track in relation to its objectives. Being a central element in the project's monitoring and evaluation system, the key-effects monitoring survey methodology is documented[6] in a procedural manual on monitoring and evaluation of irrigation systems (Berg 1995a).

While a consulting company associated with the Department of Geography of Prithivi Narayan Campus in Pokhara[7] was subcontracted to conduct the surveys and analyse the data, my responsibilities included planning and design, quality control of data collection and analysis, as well as writing executive summaries of survey results. During the period 1992–1995, I was involved with the four surveys that constitute the comparative base, and took part in three annual tours[8] to most of the 15 irrigation schemes that had been selected for surveys in the four project districts (Parbat, Baglung, Myagdi and Mustang). The surveys continued for another two years following my departure from Nepal, but upon scrutiny of the survey reports I decided not to include the 1996 and 1997 surveys as comparisons for the re-study, as their quality and validity could not been confirmed.

Reflecting the dominant perspectives in Nepal at the time on being 'scientific', the overall study design and the data collection methodology of the 1992 survey was characterized by what was then referred to as a 'formal' (i.e., largely quantitative) approach that aimed to establish complex statistical relationships, and preferred physical measurements to farmers' statements (see section 8.3 for a discussion). Subsequent surveys, reflecting the emerging preference for more 'informal' (i.e., qualitative) approaches, emphasized the use of so-called participatory rural appraisal techniques, more open-ended questions, reflections on sources of bias along the lines of Chambers (1983) and, above all, listening to farmers. Trained in an 'exact' science tradition such a more humble 'reversal of roles' approach to data collection involved considerable re-orientation of the consultants in charge of data collection and initial analysis.

The end-result was a series of surveys that from 1993 to 1995, based on the thinking that it is 'better to be partly right than completely wrong', sought to combine both qualitative and quantitative methods. These changes, along with some rephrasing of questions, the inclusion of new indicators and the omission of others over the years, resulted in questionnaires that were not entirely homogenous over the years, except with respect to key agricultural performance indicators. This has, as is evident from chapters 8 and 9, led to the exclusion of certain data in some years because these do not constitute a clear comparative base, neither 'intra' 1992–1995 nor in relation to the repeat-study. A sample questionnaire from the surveys of the 1990s is provided in annex 1.

3.4 The 2004 (Cross-Sectional) Repeat-Survey

The methodological 'imprisonment in the past' pitfalls alluded to above, and the actions taken in that regard, are accounted for throughout the data analysis. However, the conflicts and dilemmas that arose in this respect had more to do with the differing objectives of the comparative base

---

[6] As noted in the Final Project Evaluation, the "Dhaulagiri Irrigation Development Project is a very well-documented project" (DIDP 1996:12).

[7] The Himalayan Research Centre, a consulting firm associated with the Department of Geography at the Prithivi Narayan Campus in Pokhara.

[8] I arrived in Nepal in September 1992. One of my first tasks was to summarize the findings of the first survey, conducted in May–June of that year.

(process and impact monitoring) and the repeat-study, with its broader contextual perspective and focus on livelihoods and institutions, respectively, than on inconsistent surveys in the 1990s. In order to overcome the narrowness of the comparative base, I designed a number of qualitative surveys, with the aim to not only 'qualify' the repeat-survey, but also add wider dimensions, as discussed in further detail in section 3.5 below.

The repeat-survey, which was conducted in 2004, included largely similar thematic areas as the socio-economic studies that were conducted in 1992–1995. Thus, the 2004 'snapshot' (see annex 2) contains basic data related to population, landholding size, and parameters of livelihood diversification such as income and source of income, employment, migration, and expenditure on food as well as data on yields, cropping patterns and cropping intensities. Institutional aspects include investigations into parameters of cooperation and performance such as organizational structure, operation and management practices, including labour inputs and the basis for labour contribution, as well as water supply, distribution and allocation. Other methodological features of the survey include the following.

- *Coverage and duration*: The 1992–1995 surveys covered 15 communities that had been purposively selected with a view to obtaining as broad a picture as possible. While, in a repeat-survey such as this one I obviously had to select the same communities as in the comparative base, its 'maximum variation sampling approach' was also considered desirable in the repeat-survey, as it was seen to enable identification of factors that have meaning across communities. If, for instance, despite variation between systems—either in the same ecological setting (e.g., the hills or the mountains) or between settings such as hills and mountains—common factors do play in, then generalization is possible. Additionally, looking broadly at both hills and mountains may arguably enable applicability of findings to other settings. In this sense, both commonalities and differences are important.
- However, the deteriorating security situation in the Dhaulagiri Zone in the spring of 2004 meant that only nine of the original 15 communities could be included in the survey (see section 3.8 for a discussion of the effects of the security situation on methodology). Thus, while the 1995 study population consisted of 1361 households, the repeat-survey involved 931 households. This affected the principle of maximum variation sampling to some extent, as the omitted communities, deemed out of bounds to outsiders[9], were typically the more remote Maoist-affected communities (i.e., Hugdisir in Baglung District, Ranabang, Seraphant and Pakhu in Myagdi District, and Setophant in Parbat District). The survey was conducted over a period of 40 days during the months of April and May 2004.
- *Household sample design*: As in the 1990s, 20 per cent of heads of households (male or female, as decided by the household) in the individual schemes were interviewed; however, with a minimum of 10 and a maximum of 30 households in each sub-project. This was deemed necessary owing to resource constraints in the 1990s. That meant an almost full survey in the smallest community (Tiri, 11 households), and a 13 per cent sample in the largest community

[9] It was not actually impossible to travel to these places, particularly not for foreigners—probably because (1) the Maoists saw themselves as 'internationalist' and wished to have a positive image abroad; (2) the army had no interest in harming foreigners and causing a diplomatic incident; and (3) neither side saw foreigners as 'stakeholders' in the conflict. The Nepalese, however, were in danger of abduction by the Maoists, and severe intimidation, torture and even disappearance at the hands of the army. Non-government Organisation workers in particular were at risk, as the Maoists, on the one hand, were keen to co-opt them, and the army, on the other hand, suspected that their mere presence in Maoist-dominated areas was proof of Maoist affiliation.

(Kurgha, 234 households). Obviously this meant that, particularly in the smaller communities, many households were re-visited. See tables 5 and 6 in chapter 6 for basic data on communities. Not being a cohort study, the repeat-survey involved new sample households. In the case of Mustang District, this was done on the basis of the most recent official lists of landholdings as in the 1990s. In the hill districts, where the security situation had led to relative administrative collapse, lists of households were updated together with heads of irrigation institutions or other key informants before samples were drawn.

- As with the surveys of the 1990s, only households with land in the command area of the irrigations schemes (the vast majority; see section 6.2) were sampled. Also in line with previous methodologies, the samples were stratified according to location in the irrigation systems (the main branch canals, i.e., head, middle and tail).
- *Data collection techniques*: As in the 1990s, a semi-structured questionnaire covering similar themes but abbreviated to fit the current scope was used (see annex 2). Assistants were trained (see below) to be observant, iterative, prodding and explorative, and judging from the nature of data collected, also in interview situations where I was not present, these principles were applied throughout. I was actively present during data collection in six communities; the remaining three (Pipalbot, Amalachaur, Arjewa) were considered out of bounds, owing to the security situation. All interviews, including the qualitative ones (see section 3.5), were recorded on tape and later transcribed.
- *Survey organization*: As already mentioned, a consulting company associated with the Department of Geography of Prithivi Narayan Campus in Pokhara conducted the 1992–1995 surveys. In view of the knowledge possessed by this group, and with a view to ensure a homogenous approach with respect to data collection approaches, the idea was to have this company assist with data collection for the entire repeat-survey. Unfortunately, the security situation in the Dhaulagiri Zone deteriorated considerable during the first half of 2004 with a Maoist attack on Beni, the headquarters of Myagdi District in March, with according to local people perhaps 100 dead. This meant that only one area—Mustang District in the mountains, which remained unaffected by the conflict—was considered a safe place to work for local academics. Subsequently, in order to collect data in the hills it was decided to recruit assistants from the Dhaulagiri Community Development Centre, a local Non-government Organisation with some institutional knowledge of the Dhaulagiri Irrigation Development Project[10]. Most importantly, the Non-government Organisation possessed an extensive network of skilled fieldworkers and enjoyed a 'working relationship' with both the armed forces and the Maoists. Two senior staff members from the organisation received theoretical and practical training and conducted the hill part of the survey under my supervision[11].
- *Data analysis*: At the initial data analysis stage, immediately following the fieldwork in the summer of 2004, assistance was secured from a Kathmandu-based consultant who, together with the fieldworkers who had conducted the interviews and myself, initially went through all (n=188) questionnaires in order to clarify ambiguities. The raw data were then categorized according to different levels of aggregation (community and district levels), and organized into 15 base tables and sub-tables showing means and percentages, with a view to enable integration

[10] The Non-Government Organisation (the Dhaulagiri Community Resource Development Centre) had been conducting social mobilization activities in DIDP schemes in Baglung and Myagdi districts from 1992–1997.

[11] Supervision and feedback was provided from the Non-government Organisation's office in Baglung.

with the comparative base. The next step involved 'digging' into the comparative base data, both as it appeared in the summaries of the key-effects monitoring surveys, and in the actual 1992–1995 survey reports, assessing what could be compared and what could not. The agricultural performance data were the most readily comparable across the years, while the data on income, operation and management practices, water supply, distribution and allocation required considerably more digging in order to generate comparisons.

3.5 The Qualitative Surveys

The concepts of 'trajectory'—defined as "a path through time" (Bagchi *et al.* 1998:457)—and 'livelihood trajectory' in particular, which "refers to the consequences of the changing ways in which individuals construct a livelihood over time" (Bagchi *et al.* 1998:457), are central to the Long Term Change and Livelihoods Project of the Overseas Development Group at the University of East Anglia, project. In this vein, the "life history (an individual's own 'story' of the changing livelihoods—constructed by herself albeit not under conditions of her own choosing) becomes a central concept and component of the research methodology" (Bagchi *et al.* 1998:457). I found the potentially change-capturing dimensions of these concepts inspiring, and the qualitative surveys that followed the cross-sectional survey thus aimed to explore livelihood trajectories. Ideally, such exploration implies the following up of the same individuals over time. However, even though a number of people who had also been interviewed in the 1990s were re-selected for interviews, the relatively quantitative nature of the past surveys meant that the existing data could not be said to constitute a comparative base of individual life histories. I therefore broadened the concept somewhat, and aimed for more general and collective (community) livelihood trajectories.

Additionally, the qualitative surveys aimed to not only explore how people construct livelihoods within a longer-term context, but also to examine the role of institutions in those processes. I therefore added the concept (see Berg 2003) of 'institutional trajectory', with a view to, in addition to the life histories of households, also capturing the 'life histories' of water management institutions. This was obviously based on the tenet that livelihoods are crafted and played out in the context of institutions, with this, as explained in chapter 2, influencing the focus of the investigation.

The qualitative surveys, which were designed after preliminary analysis of the findings from quantitative survey, involved the following.

- A key informants checklist (see annex 3) that aimed to qualify issues from the cross-sectional survey. The purposively selected respondents (n=14), most of whom were people active in irrigation institutions, had been identified during the cross-sectional survey and were interviewed about a combination of institutional and socio-economic issues. The perspective was both circumspective and retrospective.
- A checklist (see annex 4) that aimed to investigate livelihood trajectories by focusing on livelihood strategies, the meanings of irrigation institutions and other institutions as well as changes in socio-economic status over the years. Respondents (n=18) were purposively selected among people who had been interviewed in the 1990s and whose life situation I knew something about, and based on maximum variation principles. The perspective was predominantly retrospective.
- A checklist (see annex 5) that went beyond the focus on livelihoods and irrigation institutions, and aimed to map the institutional landscape surrounding the communities and assess the relative importance of various institutions. The purposively selected respondents (n=16) consisted of a combination of people who were active in irrigation institutions and who—during

the previous interviews—had been identified as people who were active in mothers groups and credit groups, etc. The perspective was predominantly circumspective.

In the hills, these qualitative surveys were conducted in the autumn of 2004 and involved two months of fieldwork as well as a month of preliminary analysis and transcription. As was the case with the cross-sectional survey, the data were collected with the assistance of Non-government Orgnisation staff from Baglung, from where I also carried out the preliminary analysis. While I was actively present during most of the interviews, three of the six hill communities remained, as already mentioned, out of bounds to outsiders during the period. In the mountains, the surveys were conducted over a month in the early months of 2006, and entailed in addition to the surveys, a trek from Mustang via Beni to Baglung. Having walked the same route in 1993, the visual impressions and informal talks with people during this 'repeat' trek served as inspiration for the descriptions of the area and its history that appears in chapter 5. The small market survey that appears in section 9.5.2 was also carried out during this period.

3.6 Notes on Other Sources of Data

The thesis obviously relies on sources of data other than the primary data, derived from sources of information other than farmers. During the planning of the cross-sectional survey in the early months of 2004, I was based at the International Labour Organization's Kathmandu office, and spent considerable time tracing data related to the Dhaulagiri Irrigation Development Project, much of which, it turned out, had perished or gone missing during office relocations. Fortunately, the most essential documentation was already in my possession. The affiliation with the International Labour Organization, as well as my formal affiliation with the Department of Geography at Tribhuvan University, proved to be a useful platform for gaining access to resource persons in the donor and Non-Government Organisation community, as well as in government, and thus to the relevant documents that serve as contextual and yardstick (i.e., comparative) data. Likewise, my former colleagues in DANIDA'S Energy Sector Assistance Programme in Kathmandu (where I had been employed from 1999–2002) proved to be an indispensable source of information on current socio-political developments in the country. Similarly, the Dhaulagiri Community Resource Development Centre (DCRDC) in Baglung was an essential source of information on local conditions.

3.7 Notes on the Timeframe

What is an acceptable timeframe for conducting repeat studies? Bagchi *et al.* (1998) and Blaikie *et al.* (2002) find that the span of a generation is appropriate. I will argue that the time span required to meaningfully use repeat-study methodology depends on the scope of the investigation. In this case, the scope involves the examination of livelihood trajectories in the context of institutional, political and economic change. Based on Ribot and Peluso's (2003) suggestion that particular political-economic circumstances offer access mechanisms that shape livelihood trajectories, I use their concept of the 'political economic moment' to denote the period from the early 1990s to 2006 within which the investigation is framed (see section 4.1). Particularly the political events of this period, both in a national and regional context, qualify for an 'analytical moment', not least when understood in the wider historical 'moments' accounted for in chapters 1, 4 and 5.

3.8 Data Collection during War Time

The year 2004 was particularly tumultuous for Nepal, as what had until then been characterized by most observers as an insurgency gradually assumed the characteristic of civil war. The war itself, and its by-products in the shape of prolonged general strikes, roadblocks and curfews, proved not

only to be a logistical challenge, but also affected, as the previous mentioning of out-of bounds areas suggest, the methodological approach. As mentioned earlier, the gradual west-to-east penetration of the Maoists culminated in an attack on Beni, the headquarters of Myagdi District, in April 2004 that left a large number of people dead on both sides and stifled institutional life in the area. This militarization was extremely serious; for instance the Maoist attack on Beni led to several air attacks by the army on villagers and in the succeeding months the few Non-government Organisations that were still active in the areas advocated that no village meetings were to be held in the open. Landmines and roadside bombs were a potential threat along the highway that led into the area.

As mentioned in section 3.4, the Beni incident and its subsequent militarization of the hills in the Dhaulagiri Zone meant that I had to replace the academically trained professionals with two Non-government Organisation staff for data collection in the hills. This led to worries about the quality of the data to be collected, and the need to orientate and train this staff delayed the data collection process. However, my worries about quality were without foundation. Both professionals were originally farmers from Baglung and Myagdi districts, but had for a number of years worked as fieldworkers in agricultural income-generation projects, and what they lacked in academic skills was made up for in terms of local knowledge, enthusiasm and empathy. This resulted in relatively high quality and faithfully recorded interviews with limited recording bias. Hence, while the need to follow up and clarify recording ambiguities made the initial data collection quite an intensive process, the recruitment of the Non-government Organisation staff turned out to be a boon.

On a broader methodological note, the hills of the Dhaulagiri Zone in 2004 represented a vastly different fieldwork climate compared to the 1990s. During data collection for the 1992–1995 surveys, it was the norm rather than the exception to spend nights in the villages. That practice, which despite the hardship associated with sleeping on earthen floors, insects and heat usually rewards the research with better quality data (as a result of greater ‘immersion’, informal interaction and scope for observation) than short ‘quick and dirty’ visits, was unheard of in 2004. Farmers were generally worried about outsiders being caught in nightly crossfire between the army and the Maoists, as well as about the prolonged presence of outsiders causing unwanted attention from both sides of the conflict. Having to spend nights in the relative safety of district headquarters, often located several hours of walking from the communities, was also time-consuming.

Linked to this, it was considerably more difficult, in 2004 compared to the 1990s, to conduct prolonged, qualitative interviews. The presence of the two Non-government Organisation staff who were known and trusted by many farmers was a great help in this respect. However, a climate of fear nevertheless meant that ambitions with respect to obtaining the detailed life histories associated with the livelihood trajectory approach had to be toned down. Relatively ‘hurried’ interviews meant, for instance, that it was difficult to build up to the point during conversations with farmers when the ‘grand picture’, associated with changes in livelihood conditions over the years (such as, for example, the changing nature and role of agriculture), was reflected upon. This problem was, in a couple of cases, compensated for by the conducting of interviews in district headquarters.

These district headquarters were, however, also becoming increasingly militarized. Baglung, which I used as a base, had long been abandoned by most Non-government Organisations and outsiders, amid constant rumours that the town—located some 12 km from Beni—would be attacked by the Maoists any day. These rumours, along with the ever-growing military presence, an influx of displaced people from the western hinterlands, and the eight o’clock curfews, served to create quite a tense atmosphere. This unnerving situation was, however, outweighed to a great extent by the indomitable spirit of the staff and leader of my host institution, the Dhaulagiri Community Resource

Development Centre (from where the data collection staff was also recruited), practically the only Non-government Organisation that continued its activities in the region during this turbulent period.

Chapter 4: 1990–2005 as 'the Political-Economic Moment'

4.1 Introduction

> "We obeyed the Ranas and during the Panchayat we did what we were told. Democracy came and we followed. Tomorrow there may be another system and we will have to listen to them too. We can never say we won't obey." (Inhabitant of the Far Western District of Jumla in the early 2000s in Whelpton 2005:206).

The above sentiment neatly sums up the fatalistic position from which many, particularly rural, people view the vagaries of politics in Nepal. However, even if different powers do come and go, I will argue in line with Ribot and Peluso (2003) that because different political-economic circumstances may change the terms of access for specific individuals and groups, then the terms of access are best understood within particular political-economic moments. Not just terms of access to the natural resources (the 'resources' in Ribot and Peluso's optics) associated with irrigation but (as proposed in chapter 2) also resources understood more broadly as opportunities. Thus, particular political-economic circumstances offer access mechanisms that include the institutional landscapes that surround people, the politics, the laws, the technology, the infrastructure etc. used by certain people to gain access to desired opportunities. The political-economic moment in the context of this study coincides with the temporal context of the re-study, i.e. the period from 1990 to 2005[1].

That period, which I will, in addition to the political-economic moment, refer to as the democratic era, commenced when the late King Birendra gave in to popular street protests known as the Jana Andolan (or 'people's movement') in 1990. It came to an end when the present King Gyanendra on 1 February 2005 dismissed the government, assumed absolute power, and reinforced emergency measures curbing civil liberties. Prior to 2005, institutional life and civil liberties had been affected by a number of democratic regressions imposed by both the Maoists and the state apparatus, but I consider 1 February 2005 as the date on which the last vestiges of democracy were removed.

It may be argued that specific periods cannot be neatly isolated, and that terms of access for certain groups have evolved over long periods of time. Indeed, the brief 1990–2005 democratic era must be understood in the context of the democratic seeds sown in the first democratic period from 1951–1960 and the royal concessions to democracy in later decades. Likewise, the democratic regression of the 2000s has historical precedents, and both the shortcomings of democracy and the insurgency must be understood in the context of centuries of what may best be described broadly as feudalism. Moreover, the terms of access for the particular group in question—irrigated farmers—during the democratic era are rooted in regionally specific historical circumstances, as I will show in the next chapter. I nevertheless find it important to point to a number of themes, which are characteristic of the democratic period, which I consider particularly important as access determinants in a rural livelihood context. These include institutional plurality, reduced information asymmetries, rural development policies, 'globalization', and the democratic regression associated with the civil war.

Linked to the understanding of access in specific temporal contexts, I posit that the broad concept of political space for poverty reduction (Webster and Engberg-Pedersen 2002) is useful in the context of understanding terms of access. It is understood as "the types and range of possibilities present for pursuing poverty reduction by the poor or on behalf of the poor" (Webster and Engberg-Pedersen

[1] The first comparative survey actually investigates events in 1991, and the last survey in the re-study was actually conducted in the spring of 2006, However, the democratic era is a useful cut-off period, hence the 'rounding'.

2002:8), and implies that 'the poor' straddle private/public spheres and navigate within the institutional landscape regardless of private/public categories. Political space for poverty reduction is constituted by three main components: institutional channels for accessing policy formulation and implementation; political discourses of poverty and poverty reduction; and, social and political practices that may influence policy agendas and actual implementation (Webster and Engberg-Pedersen 2002). Political space and the dynamics that it entails is "more likely when there has been a transition towards some form of democracy" (Webster and Engberg-Pedersen 2002:11), as was the case in Nepal in the political-economic moment under examination.

4.2 The Role of Democratic Policies

As Whelpton proposes, it was the virtual closure of the border between India and Nepal in 1989, as a result of a trade and transit dispute, that "sealed the fate of the Panchayat regime" (2005:153) in place since 1960. However, as the same author explains, deeper tensions, including expansion of education coupled with limited ability in society to meet subsequent aspirations, inspiration from the collapse of Eastern European autocracies, and I would add, democratic reform in the region (e.g. the Philippines) led to popular uprisings in 1990 and the restoration (see 4.1) of multi-party democracy in 1991. The "monolithic patronage" (SAPPROS 2001) of the Panchayat system basically involved vertical control of institutional life, from village to parliament. It resembled the various forms of 'guided democracy' seen in other parts of Asia at the time, and while including a token element of popular representation, it enabled the king to rule "unhindered by the pressures of parliamentary democracy" (Whelpton 2005:101).

The return of democracy to Nepal after 1990 coincided with a shared donor agenda emphasizing political decentralization and private sector participation in development, not least in the management of natural resources. Linked to this, the notion that local resource management institutions represent particularly appropriate institutional forms gained serious foothold in policies and legal frameworks towards the mid-1990s[2]. Not least in irrigation, where putting 'the local resource management institution' back on to the agenda, to the extent that it came to occupy a significant role in the rural development strategies and policy frameworks of Nepal, was helped along by a series of influential studies that rediscovered the historical role of indigenous irrigation (see ILO 1995, KC and Pradhan 1993, Pradhan 1989, Pradhan 2003, Pradhan and Yoder 1990, Rana 1992, Yoder 1994). As also mentioned in chapter 1, evidence of community-managed irrigation systems performing better than government-managed systems constituted another determinant with respect to assigning priority to community-based irrigation (Ostrom *et al.* 1992, Ostrom *et al* 2002).

Private sector participation led therefore, first and foremost to the proliferation of what Ribot (2004) terms 'privatization' decentralization, i.e., donor-promoted Non-Government Organisations working with single-purpose[3] user groups, committees, etc., particularly within forestry and irrigation. This tendency was helped along by a new Non-Government Organisation act that eased

[2] See for example, the Agricultural Perspective Plan (National Planning Commission 1995) or, for more pioneering material, the Water Resources Irrigation Policy 2049 (1992) (Ministry of Water Resources, 1992).

[3] I borrow this term from Manor (2004) who contrasts single-purpose institutions such as user groups that often have selected leadership and a narrow portfolio, with multi-purpose institutions such as elected local government with wide portfolios (Manor 2004). It is basically an issue of private vs. public as also discussed in the context of collective action theory in chapter 2.

what had previously been a sector under strict central control[4] (Berg 1995). Increased channelling of donor funds through Non-Government Organisations followed this 'deregulation'. By the late 1990s, some 40 per cent of all donor funds were administered by Non-Government Organisations (Whelpton 2005), whose number had reached some 30,000 (Bhattachan 2001, Whelpton 2005). Prior to the appearance of the 'NGO' acronym in donors' project documents, private, self-help organizations had primarily been either centred around religious activities (so-called *guthi*[5]), community-based natural resource management institutions, or been in the shape of tea-party-type organizations controlled by the Kathmandu elite. The massive mushrooming of Non-Government Organisations that followed the money was indeed problematic. I categorized these organisations as follows in a paper[6] drafted in 1995.

- 'Phoney offices' consisting mainly of signboards and labels, set up to obtain pieces of the development cake.
- Consultancy firms in disguise, set up by professional groups, including government officials.
- Well-meaning and idealistic development organizations, many working in partnership with international NGOs and sometimes government organizations.
- Networks or umbrella organizations with objectives and scope that include attempts at constructing economic development alternatives, capacity and awareness building, promoting human and gender rights, etc., and increasing people's participation at both local and advocacy levels. The higher tiers may work at advocacy levels.
- Professional associations such as micro-hydro owners, farmers (community-based groups, user groups), women's and occupational groups, etc., often federated at district levels.

These are obviously not exclusive categories. Many would argue that the first category remains the most dominant; I would, however, as someone who worked with Nepalese Non-Government Organisations both in the early 1990s and in the early 2000s, argue that the sector has matured considerably over the years. By the early 2000s, the wheat had been sifted from the chaff to the extent that the latter three types of organisation characterized the sector, not only because donors themselves had learned from past mistakes, but also because the Maoist presence meant that there were limits to what you could get away with (see section 4.8). The category at the bottom of the list—what might be referred to as grassroots initiatives (and not actually Non-Government Organisations in the modern sense of the term)—that may be seen to have influenced history in many parts of the world, appeared to dominate in the latter part of the political-economic moment. As one commentator noted in 2002:

> "What is both surprising and promising is that despite the generally bleak climate, Nepal has witnessed a remarkable resurgence in small-scale grassroots mobilizations on issues of community and livelihood. Some of these examples include the creative initiatives of

[4] The Social Service National Coordination Council, which until the early 1990s controlled the activities of foreign NGOs, had the late Queen Aishwarya on its board, something which may be taken to illustrate vested elite interests (prestige, funds, 'stepping stone' jobs, etc.) in the sector.

[5] *Guthi* may be described as mutual help associations, particularly among Newars, often centred on the operation of temples.

[6] Representing a donor (the International Labour Organisation) that promoted the use of Non-Government Organisations, I had been intensively involved in screening, selection and hiring of such organisations.

> ‘untouchable’ castes for dignity and equality; struggles by agricultural labourers for justice; and the voices of the rural people against domestic violence, gambling, alcoholism, and for women’s rights.” (Shah, 2002: no page numbers)

While ‘privatization’ decentralization was a relatively fast process after 1990, political decentralization took place at a much slower pace. Policies after 1990 involved gradual transfers of power from central bureaucracies to new Village Development Committees and District Development Committees (i.e., elected local bodies), but mostly this amounted to mere territorial decentralization in name only, without much change in terms of the operative norms that had characterized the Panchayat period, let alone delegation or devolution. However, annual grants from the central level, particularly after 1994[7] meant that Village Development Committees became increasingly important. Also, legal reforms succeeded, albeit in a small way, to remove power from traditional line agencies and allowed ‘participation’ by farmers, mainly in the construction of irrigation schemes and other infrastructure, and in terms of representation at the district level in emerging local government structures. In donor-supported infrastructure projects, social mobilization activities became key elements in irrigation development; farmers would typically carry out major works themselves, and eventually ownership of irrigation structures came to rest with the communities, whose irrigation institutions became responsible for operation and maintenance[8].

Despite these decentralization efforts, dichotomies between central government and local government in terms of gaining control of resources were an issue throughout the 1990s, as it had been ever since donors starting financing development projects in the early 1950s. In the case of lucrative large-scale irrigation projects, Dixit and Gyawali (1999), for instance, noted the central government’s pre-occupation with large-scale donor-funded water projects, with the role of local government being reduced to adjusting to and mitigating unintended consequences. The importance of the decentralization process for rural livelihoods needs to be understood in this context of planning and governance, where, over the years, a core tension has been the power of central line agencies and their district-level extensions vis-à-vis ‘local’ people.

With the introduction of the 1999 Local Self-Governance Act (see Danida 2002), the decentralization process gained momentum in qualitative terms to increasingly include the devolution of decision-making powers and the build-up of capacity for planning and implementation at local levels. Local bodies became increasingly interesting to donors, as alternatives to top-heavy, central line agencies, not least because the Local Self-Governance Act endorsed the transfer of portfolios from line agencies, including those dealing with drinking water and irrigation, to District Development Committees (Danida 2002). Even if it may be argued that

---

[7] The United Marxist-Leninist (UML) government introduced what they called a ‘Build Your Village Yourself’ programme whereby all Village Development Committees received NRs 500,000 for local development projects. Most funds were used for infrastructure projects.

[8] This marked a departure from previous centralized project implementation practice that involved only line agencies and a hierarchy of contractors. The changes were made possible as a result of amendments to the government’s Financial Rules that assigned “priority to users’ committees formed by local users for the construction of projects to be implemented in rural areas up to a cost ceiling of Nepali Rupees 10 lakh” (one million) (Ch. 42, no. 46, Nepal Gazette, part 3, 01 March 1993:9). These amendments followed wording in the Eighth Plan (1992–1997) emphasizing that “rural communities will be encouraged to organize user groups for building community infrastructure and to organize beneficiary groups in order to strengthen receiving mechanisms at the grassroots level. All projects within the technical and managerial competence of the local people will be implemented by local user groups with assistance from local and district committees” (National Planning Commission 1992:41).

dichotomies also existed between local government institutions at the community level, and that local-level power relations continued to play important roles, such devolutionary steps were important in the context of local livelihoods. Not least because local technical departments, staffed by professionals appointed by locally elected bodies, created scope for community-based resource management institutions to become actual counterparts to the more formal, local institutional setups.

Democratic policies and the creation of political space for poverty reduction (Webster and Engberg-Pedersen 2002) were thus related in the political-economic moment. In Nepal both privatization decentralization and political decentralization, as an outcome of democratic policies, enabled the articulation of a vast plurality of interests for groups that either had the ability to gain access to them directly or for whom external resources could access them on their behalf. Particularly in those parts of rural Nepal that gained road access, farmers' irrigation associations and other prominent single-purpose user groups such as farmers' cooperatives and forestry user groups became connected to a surrounding institutional landscape where decentralization policies enabled their legal recognition as user groups and thus (at least in principle) eligibility for funding through local administrative bodies.

Some of this plurality of interests ended up as development initiatives that, by virtue of being less top-down and involving far more actors than before (including donors, central and local government, local organizations, politicians and communities) in relatively diverse institutional landscapes, improved in qualitative terms[9] compared to the past. The relative success of community-managed forestry, irrigation and energy activities and of thousands of associated income-generating groups is evidence of the importance of the restructuring of institutional landscapes. While the effect of these activities on those without access to single-purpose user groups may be questioned (see for example, Beck and Fajber 2006), the fact that 'soft' issues (such as social mobilization activities and the associated organization of women, marginalized groups, etc.) were increasingly a part of development activities should be considered important.

4.3 Access to Information

Democratic policies in the political-economic moment, helped along by technology, led to reduced information asymmetries between Nepal and the outside world and between urban centres and rural areas within the country. Around the turn of the millennium, Nepal probably had the freest and most flourishing media in South Asia. Literacy rates, which increased from 39 per cent in 1990 to about 58 per cent by 2000 according to one estimate (Whelpton 2005) [10], obviously played a major role. Alongside the printed press, telecommunications also increasingly found their way into rural areas where many Village Development Committees gained access to telephones. Satellite television, widely favoured as a source of information and entertainment over national terrestrial television, found its way into many district headquarters. Cyberspace remained a predominantly urban phenomenon but, as in other developing countries, the indirect role of the internet in reducing information asymmetries should not be underestimated. NGOs and development agencies linked to

[9] Examples include the United Nations Development Programmes's Rural Energy Development Programme, the International Labour Organisations´s Dhaulagiri Irrigation Development Project and the Forestry Programmes undertaken by His (then) Majesty's Government with Danida and Australian Aid. In terms of developing pioneering approaches that were adopted by other development initiatives, the impact of these projects and programmes should be considered to be considerable.

[10] Asian Development Bank (2004) puts the figure much lower, at 43 per cent.

information networks over the internet played important roles in this respect, by facilitating information flows to local government and community levels via fieldworkers and other facilitators.

The livelihood effects of improved access to information are somewhat intangible but should not, in my opinion, be underestimated. It should be recalled that a great deal of innovation—probably most of it—takes place without direct intervention from government and donors. Indeed, many farmers and rural entrepreneurs, it appears, would rather have access to technical know-how than to other forms of intervention[11]. Manuals and plans in hand improve people's position with respect to approaching urban manufacturers of, for example, small hydropower plants and agricultural implements, or government agencies and Non Government Organisations for assistance. Increasing rates of domestic and overseas migration throughout the 1990s (see section 4.5) are also thought to have increasingly contributed to information flows through social remittances, i.e., ideas and practices that are transmitted by migrants (Levitt 1996). Social remittances, of course, associated with Gurkha soldiers and their communities have been a feature in rural Nepal for close to two centuries. The vast increase in migration over the past couple of decades, however, it may be argued, has led to the spread of social remittances to a much broader populace, and appears—in combination with educational advancements—to have raised expectations with respect not only to employment and material goods but also to political and economic systems.

4.4 The Economic Environment and its Rural Development Planning Framework

While a democratic policy environment and reduced information asymmetries in the political-economic moment may be seen as conducive to gaining access to resources, broadly understood, the role of economic policies aimed at the rural sector is more ambivalent. Nepal, like most other countries in the region, had embraced agricultural policies associated with structural adjustment and deregulation. This primarily involved removing subsidies for fertilizers, water-lifting irrigation technology as well as organizational reform of both agricultural input and marketing corporations. The effect that this had on rural livelihoods is probably limited, as discussed in chapter 5.

Otherwise, programmes for the agricultural sector were for most of the period guided by the 1995–2015 Agricultural Perspective Plan, designed by the well-known economist John Mellor, and in line with the overall economic liberalization policies pursued in Nepal. The Agricultural Perspective Plan is characterized by a focus on priority inputs such as irrigation, fertilizer, agricultural roads and power, and research and extension, with the objective of achieving a 'green revolution' and poverty reduction. These priority inputs are to be applied in proper sequence so that they reinforce each other. For the hills, the strategy involves a focus on high-value crops including citrus, off-season vegetables and vegetable seeds, while for the mountains, apples, vegetables and potato seed are envisaged as key crops (National Planning Commission 1995). The Agricultural Perspective Plan is based on a growth-linkages approach that not only sees agriculture as a central source of livelihood but also as the central dynamic in Nepal's economic development. Moreover, it is characterized by recognition of regional comparative advantages, confidence in the dynamics of the role of the private sector, particularly community-based organizations, and market forces.

This Plan has been criticized for ignoring first of all that the rural economy lacks the foundations in terms of human and physical capitals and institutional capacity for adoption of, for instance, new agricultural technologies, and secondly the 'imperfect' nature of rural markets. In this situation, a growth strategy that sought, among other things, to enhance these capitals and focus on public

[11] This is in my experience a common reply when interviewing farmers during feasibility surveys for technically oriented development programmes such as electrification and agricultural extension.

works to raise welfare and effective demand was considered a more suitable approach (Cameron 1998). The Asian Development Bank, which was instrumental in preparing the plan, has recently reviewed it. It concludes that while the realization of the plan is hindered by structural constraints such as land fragmentation and small farm sizes, its general idea remains sound:

> "The Agricultural Perspective Plan is a valid strategy to inform the formulation of agricultural development policy and plans in Nepal. As a general strategy, it has a clear vision and a good appeal to the need of using technology and infrastructure to increase agricultural productivity and move farming from subsistence to commercialization. From the broad point of view of being an overall strategic vision of agricultural development, the Agricultural Perspective Plan is still an appropriate and useful document" (Asian Development Bank 2002:56).

Unsurprisingly, the Asian Development Bank therefore recommends more of the same in its strategy for Nepal for the period 2005–2009 (Asian Development Bank 2004). Also unsurprisingly, it notes that the implementation of the plan has been slow, not because of the plan itself but because of the Government of Nepal's slow implementation of programmes within priority areas. It also notes that implementation has been extremely uneven, and that regions that were already relatively well endowed in terms of infrastructure such as roads, trails, bridges and irrigation prior to the birth of the plan have also been those regions that have benefited the most from investments made during the first nine years of the Plan (Asian Development Bank 2004). The Dhaulagiri region, as I will show in chapter 5, may be said to belong to one such well-endowed area where a combination of investments in road infrastructure and irrigation has had significant livelihood effects for certain groups of people.

4.5 Migration and Remittances

However, it is somewhat surprising that the Asian Development Bank, while noting that rural sources of income have become more diverse, refers to migration as a seasonal phenomenon (Asian Development Bank 2004) that apparently does not warrant particular attention in the years ahead. In this sense, the Asian Development Bank policy echoes the World Bank's view on migration and remittances during the early 1990s, which were seen "as an unfortunate and marginal by-product of a stagnant rural economy to be eliminated progressively by programmes for economic development within Nepal and within the agricultural sector" as Seddon *et al.* (1998:4) have noted. The World Bank also concluded towards the end of the 1990s that:

> "In the short to medium term, agriculture represents the highest potential for growth and poverty alleviation, as the vast majority of the people, and especially of the poor, live in rural areas and draw their livelihood from agriculture" (quoted in Seddon *et al.* 2001:8)

While it is a fact that the majority of the population is involved in agriculture, the unwavering faith in the continued centrality of agriculture is striking. With more than 85 per cent of the population according to the 2001 census (Central Bureau of Statistics 2004) officially living in rural areas (and with some 60 per cent, according to Asian Development Bank 2004, involved in the sector) agriculture certainly remains important, but not as important as it used to be. The low growth in agricultural Gross Domestic Product (2.6 per cent a year on average over the past 20 years) and a contribution to Gross Domestic Product of 39 per cent in 2004 (Asian Development Bank 2004) compared to 65 per cent in the mid-1970s (World Bank 1991) are evidence of this. However, contrary to the intentions of the Agricultural Perspective Plan, Nepal has failed to experience the transformation that in other countries has led to, or indicated, the transition from agricultural to industrial economies (Seddon *et al.* 1998). Rather, in Nepal, resource transfers into non-agricultural

sectors increasingly have come about as a result of non-farm income and remittances from migrants who seek economic opportunities abroad. It would appear that while incomes from remittances may be ploughed back into rural communities in the short run, both domestic and international migration should probably be understood in the context of a trend towards some sort of structural change—we do not know exactly what kind yet—that is not restricted to Nepal, as suggested in chapter 1. In Nepal and other developing countries, urban populations are expected to surpass rural populations within a couple of decades (Pinstrup Andersen *et al.* 1999).

Indeed, labour migration and remittances increasingly became part of the lives and livelihoods of rural families in the political-economic moment. However, migration is not new to rural Nepal. Male farmers seeking to escape the poverty of Far Western Nepal have for decades been both permanently and seasonally employed in India in vast numbers. Seasonal migration for trade has been an entrenched livelihood strategy for Himalayan farmers for centuries. Likewise, Gurkha soldiers from the western and eastern hills have traditionally been employed in the British and Indian Armies. In addition, women and girls from various places, but mainly concentrated in the central hills, have for some time worked in the commercial sex industry in India.

However, labour migration overseas accelerated dramatically in the period leading up to and into the political-economic moment. From an official estimate of 400,000 people working abroad in 1980, the figure for the early 2000s was, quoting a conservative estimate, one in 20 of the population, with a corresponding 25 per cent of households benefiting from remittances (Kollmair *et al.* 2006). The importance of migration to the economy should not be underestimated; 10 years ago another conservative estimate put the value of remittances at Nepali Rupees 35 billion (1997 figures) close to the official figure of Nepali Rupees 38.3 billion for all foreign exchange earnings combined (exports, foreign aid, tourism, remittances, etc.) in the same year, while the most liberal estimate put the figure at Nepali Rupees 69 billion, or almost double the official figure for foreign exchange earnings (Seddon *et al.* 1998). Kollmair *et al.* (2006) reached somewhat a similar conclusion about the proportions involved in the early 2000s.

A number of factors may be pointed at in attempts to explain the substantial increase in labour migration from Nepal during the political-economic moment. These include conventional socio-economic push factors (including historically decreasing land-holding sizes) as well as pull factors such as global economic integration—or globalization, as it also called—and its demanding international labour markets as major structural causes. With reference to section 4.3, I would also point to social remittances, educational attainment, free media and enhanced information flows, as factors that contributed to accelerating migration. Not only did these factors appear to raise people's aspirations for better livelihoods, but improved information flows may also be seen to have improved conditions for the networks on which migrants depend. I have elaborated on these issues in chapters 5 and 9. The civil war's stifling of institutional and economic life is likely to have played a role as a push factor as well.

Access to foreign employment is highly unequal and is gained through a variety of access mechanisms. Relatively accessible, India remained the most important destination for the poorest migrants in the 1990s and 2000s—as it had been for decades before—both in terms of numbers of people who went there (more than one million) and the total volume of remittances. With an open border, labour migration to India, while definitely relying on networks[12], poses little red tape and

[12] The connection between people from Bajhang in the Far West of Nepal and employment in the Indian city of Bangalore is a case in point. See the thematic issue of *Himal South Asian* Jan/Feb 1997 entitled 'Lowly Labour in the Lowlands'.

requires no middleman. Moving up the social ladder, many of the growing number of young men (and increasingly women as well) who now work in the Gulf, the West and the Far East, appear to rely on 'old boy' networks (mostly the Army) to gain access. Others manage to gain access by paying the relatively high commissions charged by manpower agencies. These groups, who tend to be better off than the average, may possibly be said to driven by 'opportunity' rather than distress (see Seddon *et al.* 2001), although I find the distinction fairly notional.

It needs to be mentioned that on top of foreign migration came the highly visible, but difficult to quantify, migration from villages to district headquarters in both the hills and the *terai*, and to Kathmandu. These urbanization dynamics were accelerated by the displacement and subsequent rural exodus resulting from the civil war[13], but should also be understood, as I discuss in chapter 5, in a wider context of migration-fuelled urbanization. I will also, in later chapters examine the consequences of livelihood diversification with migration as a central element, particularly in the context of common property regimes and assumptions about stable communities, agriculture as a central livelihood, and incentives to invest in cooperation that are at the heart of collective action theory. I will, therefore, round off this section with a couple of corollary issues that increasingly affected people's lives in the political-economic moment.

4.6 The Feminization of Rural Life

Although aggregate assessments are lacking, there is general agreement that the political-economic moment saw increased feminization of rural life. Social upheavals in the period included the separation of families as a result of migration. There was, as Cameron observed, a "tendency for joint families to dissolve in the face of material pressures, leaving the elderly very exposed to low quality of life with resentful children or isolated living. At both ends of the age range, there is a gender bias against people who happen to be female" (1998:13). Linked to this, Blaikie *et al.* have observed that "many rural households have become a sort of spatially disparate extended family. The results are increasing feminization of rural life" (2002:1268). As the economically active men migrate, the women are left with the children and elderly. The risks to those left behind are great "if monetary remittances… decrease as the moral economy of the village disintegrates" (Blaikie *et al.* 2002:1268). The point here is that the absence of husbands may create vulnerability, particularly if the status of the household shifts towards that of a *de facto* female-headed household, when remittances cease or if husbands do not return for various reasons, including disease.

In this respect, HIV/AIDS had been a serious issue for quite some time before the 1990s for migrants working in the commercial sex industry in India, and for the husbands and children of those who came back. Increasingly, however, as the epidemic gained pace and spread into the general population, the wives of male migrants to India in particular were also increasingly at risk. Nowhere was the risk higher than in the Far West of Nepal where the majority of men travel to India for permanent and seasonal work, and where the combination of poverty, gender inequality and ignorance lead to high rates of infection (see, for example, *Himal South Asian*, March 2003).

In this context, it has been pointed out that women's rights to property (private and common) are generally more loosely defined than men's. This may mean that women are more likely to lose access to the water, forests and land upon which they depend for food security (Meinzen-Dick *et al.* 1997), if circumstances change and the household becomes *de facto* female-headed, as a result of a migrant husband who does not return. This may well have had serious livelihood consequences for

[13] See, for instance, *Nepali Times*, no. 161 (5–11 September), 2003.

a growing number of women in the political-economic period, not least in the context of the potential disintegration of cooperative institutions and self-help groups that may have resulted from migration and other upheavals. Barriers for women to sustain systems range from social norms—women in some communities are prohibited from working in irrigation systems because of perceptions surrounding ritual pollution (Meinzen-Dick *et al.* 1997)—to time constraints associated with additional domestic responsibilities. However, while the risk of marginalization in the politico-economic moment may have increased for women left behind as a result of migration, it may also be assumed that feminization of rural life held opportunities for some women to improve their relative position vis-à-vis those institutions and structures that are usually defined and dominated by men (Cameron 1998).

4.7 An Episode: Coming Full Circle - The End of the Democratic Era

Three days after Nepal and the world had learned about the bizarre tragedy in which King Birendra and seven other members of the royal family had been killed, allegedly by the gun crazy and heavily intoxicated Crown Prince Dipendra, I decided to defy the official mourning period and collect some things from my office. While at the office, a colleague phoned and told me that Dipendra, who had been in a coma since the event, had passed away, and that I had better hurry home as crowds were gathering in the streets and a curfew had been announced. I decided to drive along Kathmandu's ring road rather than the crowded streets of the city. At Pashupatinath, where the royals had been hurriedly cremated after their murders, my car became stuck in the ever-thickening, barricade-constructing crowd of men, with heads shaved in respect for their dead king. I sheepishly asked a man if he thought I would be allowed to pass. He shook his head, said I had better get the vehicle off the road, and pointed to a residence with a large gate. I managed to drive up to the house, knocked on the gate, and was given permission to leave the car in the compound.

The walk towards my home, along the tracks and trails of the north-eastern part of Kathmandu, left a strong impression on me of the collective despair and grief that the people felt. Photographs of King Birendra and his close family were displayed on makeshift altars, surrounded by the usual paraphernalia used for *puja*[14]. Some people were crying openly, some stared vacantly into the air, many stood around in small groups, sombrely discussing the events of the past days and what might happen next. Away from the crowds, I came across a taxi and got in. I told the driver about the crowds and the barricades at Pashupatinath, and asked him what he thought would happen next. He was in a grim mood. "Somalia—we will be like Somalia. That's what will happen now," he replied.

4.7.1 Democratic Regression

Most people connect Nepal's recent history with the carnage at the royal palace on the evening of 1 June 2001. However, even though the tragedy was on an unprecedented scale as *familicide* and may appear anachronistic, Thapa (2005) reminds us that the history of the monarchy and, in particular that of the Rana regime that held power for more than 100 years, is replete with power struggles that led to murderous takeovers. And if it was not for the fact that the events at the royal palace may be seen to have, if not, heralded the beginning of the end, then certainly, sped up the demise of the democratic era, the violent events at the palace, in 2001 as in centuries before, would have had little effect on life in rural Nepal. Unlike King Birendra, King Gyanendra[15], who became king after the

[14]Hindu worship

[15] Whom many people believe to have masterminded the massacre.

massacre, was not democratically inclined, and appeared particularly determined to tackle the escalating Maoist insurgency with force.

The insurgency began in 1996 when the Communist Party of Nepal (Maoist)—the Maoists, as they were to become better known—announced their 'People's War' from their heartland of the impoverished mid-western hills (see chapter 5). Their agenda was unequivocal and included 'class war' through violent means, secularism, and a republican state. The rise of the Maoists may be understood in the context of a number of factors. These include the democratic policies that had created political space for poverty alleviation among certain groups, including groups that had not earlier been able to articulate their interests. These policies also created political space for mobilization of ultra-leftist factions that had gradually splintered from a leftist movement that, with some degree of unity, had confronted the Panchayat regime in 1990 (see Whelpton 2005). Factors also included skilful and tactical leadership that enabled the expansion of Maoist influence to most of the country, and the playing of indirect political games in Kathmandu without losing grip on the heartland. Most fundamentally, however, the Maoist success should be understood in the context of centuries of centralist rule of a feudal or semi-feudal character and, subsequently, a democratic era with a great deal of what we may metaphorically term 'excess historical baggage'. This excess baggage may be seen to characterize the state machinery from central to local levels. Gyawali succinctly sums up the problem:

> "… the Nepali state since its inception has maintained a feudal character and the bureaucracy has been functioning within this context. Of interest here is the effect of this character on economics. A feudal society differs from a capitalist one in that the creation of scarcity and rent seeking is the goal rather than increased production and profit making" (2001:212).

This pervasive 'culture' led, among other factors, to elastic distinctions between what is public property and what is private property on the part of managers of public utilities (Gyawali 1989 in Pandey 1996) and bureaucrats from central government to local line agencies and politicians. Thereby, it contributed to the failure of mainstream political parties to deliver changes in the lives and livelihoods of the increasingly-aware rural poor, particularly landless rural labourers, and subsequently to the rise of the Maoist movement in the politico-economic moment. The effect that the insurgency had on rural livelihoods and institutions is dealt with in chapter 9. Suffice it to say at this point that the violence and disturbances caused by the insurgency—along with the 2001 events at the royal palace—contributed, I will argue, to a mounting collective lack of faith in 'project Nepal', as exemplified by the taxi driver's analogy to Somalia. Post June 2001, Nepal saw an escalation of the conflict, with a declaration of a state of emergency later in the year, and the deployment of the armed forces in what had until then been considered a matter for the police. Eventually, the conflict saw some 13,000 dead and many thousands of displaced families.

Amid growing political turmoil, the political decentralization process came to a halt when District Development Committees and Village Development Committees were dissolved in July 2002 by the Government of Sher Bahadur Deuba on the pretext of securing (planned) fair elections. The fact that the opposition, including the Maoists, increasingly dominated local bodies is generally believed to be the real reason for this step. It meant that, at the district level, central government was represented by the Chief District Officer (the Magistrate), the Local Development Officer, the police and army, and district line agencies, all of which were appointed by and, as in pre-democracy days, only accountable to the central level. Somewhat ironically, King Gyanendra dismissed the Deuba Government in October of the same year, using the latter's inability to hold planned elections as a pretext. A caretaker government then replaced the cabinet with a prime minister from the Panchayat era (see *Nepali Times*, vol. 103 and vol. 114, 2002).

The final straw in democratic regression was delivered on 1 February 2005 when King Gyanendra dismissed the his appointed government, and introduced further 'emergency' curbing of civil liberties, thus concentrating all power and resources with the monarchy and the army. Interestingly, the king had been given yet another pretext for concentrating power when, after 9/11, the United States had placed the official tag of 'terrorist' on Nepal's Maoist insurgents. As the official proclamation reveals, the king was thus helped in redefining development as security in official discourse:

> "We would like to thank all the friendly nations who have generously supported us, appreciating our commitment to fight terrorism, as well as donors and international financial institutions that have rendered invaluable assistance in our development endeavours. Even the world's democracies are presently faced with the threat of terrorism, which cannot be confined within geographical boundaries. The world community has in fact realized that the more secure, stable and prosperous the smaller nations become, the more secure, stable and prosperous will the region and the world as a whole be. Nepal is, therefore, committed to eliminating terrorism in her own interest as well as in the interest of democracies around the world" (Proclamation to the nation by King Gyanendra on 1 February 2005).

The linking of development with the official security agenda meant increased allocation of resources to the security forces, whose involvement in the crisis increasingly appeared to have its own dynamics and vested economic interests.

4.7.2 Donors and the Conflict

Both the state and Maoist agendas left western donors in a rather awkward position. On the one hand, they were faced with the realization that the power structures, which they had worked within and sought to reform over decades, might have been part of the overall 'structural violence'[16] that had fuelled the conflict[17]. Working through government organizations, even at the practical level (such as road-building) now meant identifying with the state, and was met with Maoist resistance. On the other hand, efforts aimed at making amends through the addressing of root-cause socio-economic issues, involving the targeting of development activities towards previously neglected regions and groups and applying transparent 'best practice' principles, became increasingly problematic and met with resistance from the army. Likewise, the same NGOs that had proved useful in the 1990s had now to thread a careful balance between the army and the insurgents, owing to a shared ambition among the two for controlling areas, their populations and their institutional life, and thus having activities carried out under their respective auspices.

A key concern among donors was that the crisis had increased poverty and made already-insecure livelihoods even more insecure, as development assistance failed to reach intended recipients. Displacement and a general exodus to urban areas, with visibly deteriorating social conditions, nourished this concern. Along the lines of the king's proclamation, state discourse echoed these concerns and used them to legitimize severe restrictions in civil liberties in order to go for a 'final

[16] A term coined by Johan Galtung to refer to the ways in which social, economic, and political systems can institutionalize harm (Galtung 1969).

[17] In this context Metz 1995:184 suggest that: "The poverty of Nepal's people is due primarily to the forced extraction of the social surplus by the small number of people who historically came to rule Nepal, who were supported by British colonialism, and who continue in power due to the flow of 'development'…the feudal power structure has subverted the development process via pervasive corruption, and has thereby maintained its hold, and prevented even growth" (Quoted in Agergaard 1998:24)

solution' rather than any form of negotiated settlement with the Maoists. However, donor assessments of the poverty impact of the crisis stand in some contrast to what Seddon, a long-term observer of the crisis, has suggested:

> "The impact on poverty, however, has been negligible as the economic effects have been felt mainly in the commercialized sectors of the economy, and among the better off. General insecurity has accelerated rural emigration which will further increase reliance on non-farm income and remittances in rural areas; this may benefit the poor. The poor and women have generally benefited from the disruption to traditional social structures and practices. Development efforts by NGOs have become more focused on poverty alleviation" (2005:1).

The logic of Seddon's assessment—that a crisis which virtually halted all development efforts has not had a severe impact on poverty in the context of other forces at play—appears to be a damning verdict on four decades of 'development', including a full decade of democratic policies. However, notwithstanding the costs in terms of human deprivation and suffering associated with, for example, displacement, torture, and human casualties—and staying within strictly economic terms (as was seemingly intended by Seddon)—the observation probably has a great deal of merit, (even if donor interventions has had considerable effects on some people in some areas) as it echoes observations of the extreme regional unevenness of socio-economic development in Nepal (see, for example, Seddon and Adhikari 2003, and chapter 5 of this study). That unevenness is also reflected in the relationship between levels of socio-economic development and levels of insurgency: the origins and heartlands of the Maoist insurgency being the poorest districts of western and mid-western Nepal. It needs to be emphasized that suggestions on the impact of the crisis in terms of livelihoods and most other aspects of human existence under conflict conditions remain somewhat speculative for want of reliable, aggregate assessments. However, any discussion of the impact of the crisis needs to consider who had stakes in the 'development project' and who did not.

Chapter 5: The Study Area

5.1 Introduction

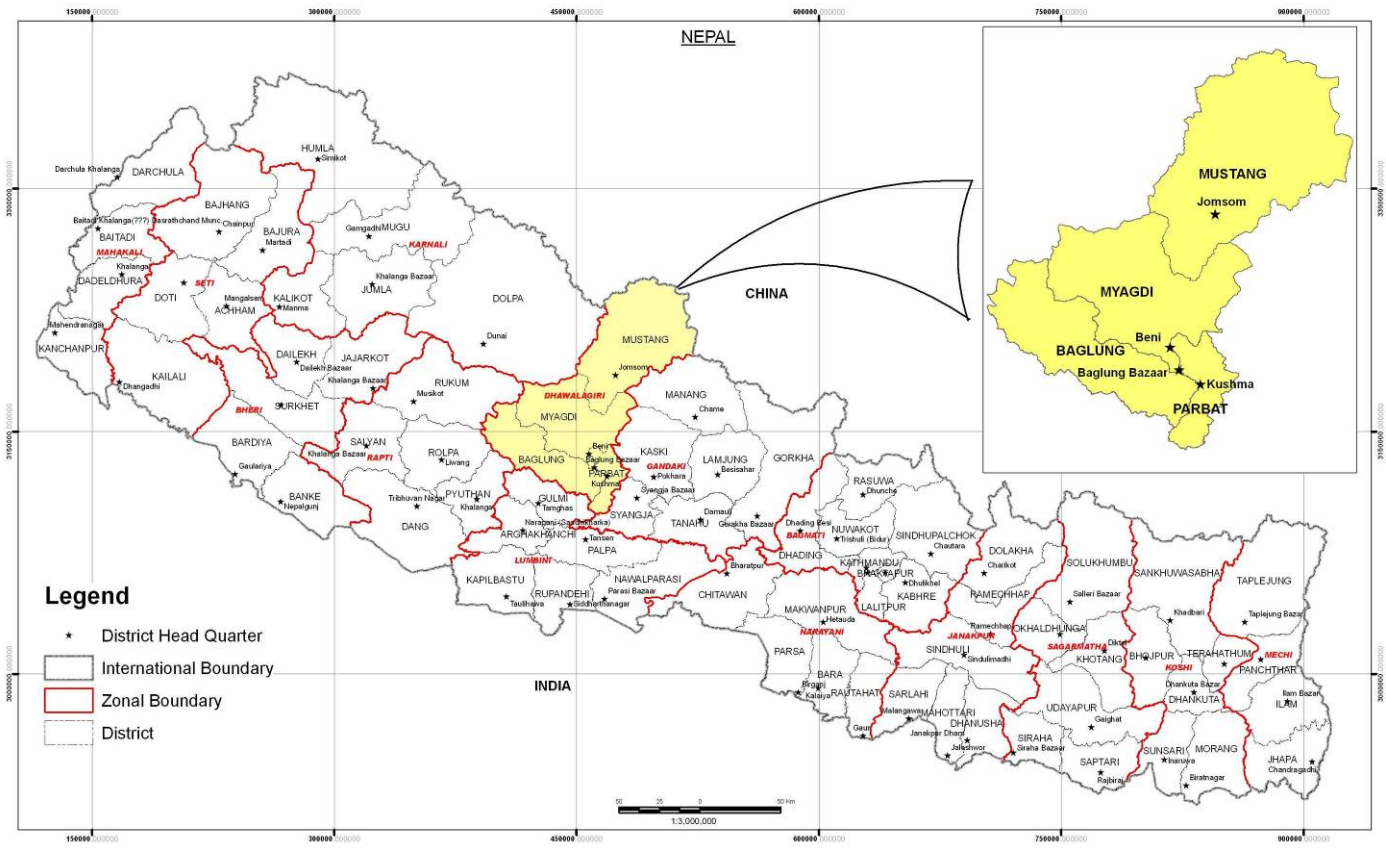
It is one of the main propositions of this thesis that irrigation systems are dynamic and changing, and that changes in these systems must be understood in the context of changes in the surrounding society. Therefore, the purpose of this chapter is to introduce historical and contemporary dimensions of the wider region and context of the overall research area (see Map 1), and to situate the nine irrigation community cases within that context. In this chapter the meso-level, i.e., the four districts that comprise the Dhaulagiri Zone (understood mainly in administrative terms but also as the immediate economic and institutional environment with which the case communities interact), will constitute the units of analysis in what should be perceived as the second stage (the first stage being the macro-level contexts of the previous chapters) of a journey towards the community level, to be arrived at in the following chapter. The journey begins physically and mentally from the outside, narrated through the eyes of an outsider. The narrative is framed within two dominant rural development themes in Nepal over the past decades: the expansion of physical infrastructure and of institutional landscapes, illustrated by means of the penetration of a motorable road into the research area, and the increase in institutional and political life throughout the 1990s. Both themes are central to an understanding of how livelihoods in the irrigated communities have changed as a result of structural and relational access mechanisms (Ribot and Peluso 2003).

The narrative introduces the research area by travelling along the road, drawing attention to the highly visible, sometimes symbolic, 'development' associated with the road, and the more obscure 'development' associated with institutional and political life. This focus on a transport artery suggests that the road has played a central role in opening economic and human potentials and dynamics in the political-economic moment; dynamics that are rooted in the historical importance of an ancient trade route that for centuries has played a role in defining and shaping the area economically, politically and administratively, thereby contributing to the formation of its institutional landscapes.

Departing from the narrative, the journey towards community level continues along the lines of a regional analysis approach that aims to identify, as Long and Roberts put it, "patterns of activity that result from the spatial distribution of economic resources, settlements and social classes" (1984:4). The intention is not to be a comprehensive regional analysis but rather a partial one, so as to better understand the 'space'—political, physical, socio-economic and institutional—where "over time, class interests, and social relationships have developed in a particular way because of a spatially specific pattern of economic change" (Long and Roberts 1984:3). Such an analysis is pertinent for two reasons:

Firstly, meaningful engagement with the concepts of the household and the irrigated community as analytical units requires navigation through a regional context that is characterized by a great deal of heterogeneity in terms of access to resources (broadly understood) and economic and institutional characteristics and linkages. Hence, the navigation aims to eventually situate the irrigated communities in their regional context by identifying the characteristics that distinguish these from other categories. This is particularly important considering the previously argued need to consider both the notions of the village and 'community' as something dynamic and diverse, rather than something stable, homogenous and insular (Leach *et al.* 1997). Highlighting regional and integrative contexts also supports a key tenet of the theoretical framework of the thesis, i.e., that livelihoods and institutional change as experienced by the irrigated farmers must be understood in a wide perspective of rural transformation and agrarian change, involving, as Seddon puts it "the

Map 1
Index Map of the Dhaulagiri Zone



progressive subordination of small local communities to the dynamics of the wider economy and society" (2001:119).

Secondly, as already hinted at in the above paragraph, elements of a regional analysis approach complements the maximum variation sampling approach of the field study, as it enables understanding of what differentiates and what connects within the region. This eventually leads to an understanding of not only the shared characteristics of irrigated communities that enable generalizations within that category within the region, but also of characteristics that may have meaning across categories.

5.2 Before the Road

"There are no roads west of Pokhara, which is the last outpost of the modern world: in one days walk, we are a century away" observed Peter Mathiessen in 1973 in his travelogue *The Snow Leopard* (1978) while part of an expedition that would eventually take him and his entourage of porters deep into the Himalayas. Following for the first part of the journey the main route between Pokhara and Tibet, Matthiessen's first night out of Pokhara was spent at the village of Naudanda, scenically perched on a ridge at what was, at the time, about a days walk north-west of Pokhara. As a first or last stop, depending on the direction of travel, Naudanda was at the time a popular lodging

place for traders with their trains of mules, as well as for porters, farmers, Gurkha soldiers, students or foreign visitors, travelling along what was for centuries a major trade route for the exchange of Tibetan salt and Nepali food grains, linking the mountains and hills with the plains of Nepal and India.

From Pokhara, an economically important middle-hill gateway to the mountainous hinterlands, travellers at that time, as described by Mathiessen, would walk northwest along the trade route through the first pass at Naudanda. They would reach Kusma (the headquarters of Parbat District) on the second day of the journey and the banks of the Kali Gandaki River near Baglung Bazaar (headquarters of Baglung District) on the third. Throughout this first portion of the trail, travellers would be surrounded, as is still the case today, by terraces, both irrigated (*khet*) and unirrigated (*bari*), and farm houses scattered on the steep hillsides of green valleys, predominantly inhabited by rice-growing Hindu farmers of the Brahmin and Chettri (high) castes. At times, settlements along the foot trail would take more a cohesive form, and become small bazaars, with shops selling tea, food, batteries, biscuits and the odd piece of clothing.

Upon reaching the Kali Gandaki River, travellers would have the option of walking northwards up the trade route via Baglung Bazaar along an elevated trail on the western bank of the river, or carrying straight on north by a trail along the eastern bank of the river, for another half-day to Beni (the headquarters of Myagdi District). Here the trail, branching off northwest along the Myagdi River, one of the Kali Gandaki's main tributaries, would take travellers around the Dhaulagiri Massif in a clockwise direction to remote Dolpo (this is where Matthiessen went) and eventually as far as Jumla in Western Nepal. The majority of travellers would, however, continue walking along the main trading route, northwards from Beni along the Kali Gandaki River to settlements along the river itself, or veer off along trails following the river's numerous tributaries to settlements at higher elevations.

Then as now, these valley settlements would, for another couple of days of walking, continue to be inhabited by Hindu farmers, mainly high caste Brahmins and Chettris. Terraced agriculture would still dominate the landscape, but the forests at higher altitudes and the snow-capped peaks would be getting closer. However, increasingly Hindu culture would give way to Buddhist culture, temples would give way to monasteries, prayer wheels, and prayer flags flying from rooftops. Emerging from the deep gorge between the Annapurna and Dhaulagiri ranges to the area of ecological transition from hills to mountains, known as Thak Khola[1], rice paddy would have given way to highland crops. Upon reaching the arid region at Jomsom (headquarters of Mustang District at an altitude of 2700 m) in the southern part of Mustang District at least one week after their departure from Pokhara, travellers would be in a physical, cultural and political landscape entirely different from that just a few days walk to the south. A landscape inhabited by Tibeto-Burman peoples, known as Thakali and Bhotia, residing in scattered, nuclear settlements, surrounded by green, irrigated fields, appearing as bright oases in the desert. For those continuing north to Lo Manthang, the seat of the King of Mustang and the last significant outpost before the Nepal–Tibet border, another 4–5 days of walking would be waiting.

[1]The Thak Khola valley in Mustang District was the centre of this north–south trade in salt and food grains (see Vinding 1984, 1992 and 1998).

5.3 An Episode: Opaque and Visible Change

When, in 1992, as socio-economic adviser to the International Labour Organization's Dhaulagiri Irrigation Development Project (DIDP), I travelled out of Pokhara *en route* to Baglung on a first project visit, Naudanda, where Matthiessen spent his first night, still had a couple of lodges catering to mule train 'drivers' and highlanders bringing flocks of sheep down from the mountains or consumer goods from the plains. However, rather than spending the night in this first stop after Pokhara, travellers were now more likely to stop briefly for a cup of tea and enjoy the magnificent view over Pokhara from where they would have left about an hour earlier by motor vehicle. With access to markets and technology featuring prominently in Nepal's rural development framework, the fortunes of Naudanda had changed because of the arrival of the motor *batu* (road) and the subsequent shortening of travelling times.

Although another prominent rural development theme at the time, 'institutions in development' (and the related notions of participation, indigenous knowledge and local agency) and the order that they connote was not what came immediately to mind while travelling along the new road in 1992. Where were these institutions anyway? Surely not on the steep slopes where small patches of fields and scattered houses seemed glued to the mountains at impossible angles? Yet the intensity of cultivation and the location of dwellings and fields in the extremely difficult terrain suggested something more than the mere physically tangible. In particular, the terraces and irrigation systems on the sides of valleys suggested dynamics associated with ancient agricultural and engineering skills and, above all, modes of organization. That visible enterprise stood in some contrast to a rural Nepal that a great deal of the development literature had characterized with frequent use of words such as resource degradation, scarcity, subsistence and stagnancy, in line with dominant Malthusian environmental disaster narratives (see Luintel 2001, Campbell 2001 for comments on these narratives). So did the level of economic activity associated with the penetration of the road from Pokhara into the hinterlands.

Travelling on a motorcycle along the recently gravelled surface, I was not quite sure how far the road extended into the project area. Having negotiated a couple of rivers (as the bridges were yet to be erected) it turned out that the 'roadhead'[2] was at a place called Maldhunga, beside the Kali Gandaki River, close to Baglung Bazaar. Roadheads, unlike the relatively 'hidden' institutions associated with agricultural organizing practices, represent highly visible, dynamic change. The road, having disadvantaged a number of economically important locations along its course, culminated in a great deal of transit economic activity at the point of meeting the north-bound trail at Maldhunga. Trucks bringing consumer goods into the area had to be unloaded. Passengers waited for bus seats, porters loitered for fares, barbers trimmed hair, and everyone would eventually need something to eat and drink. Not entirely convinced about its safety, I parked the motorcycle in a teashop in the bustling makeshift bazaar, and completed the remainder of the journey to Baglung Bazaar by foot.

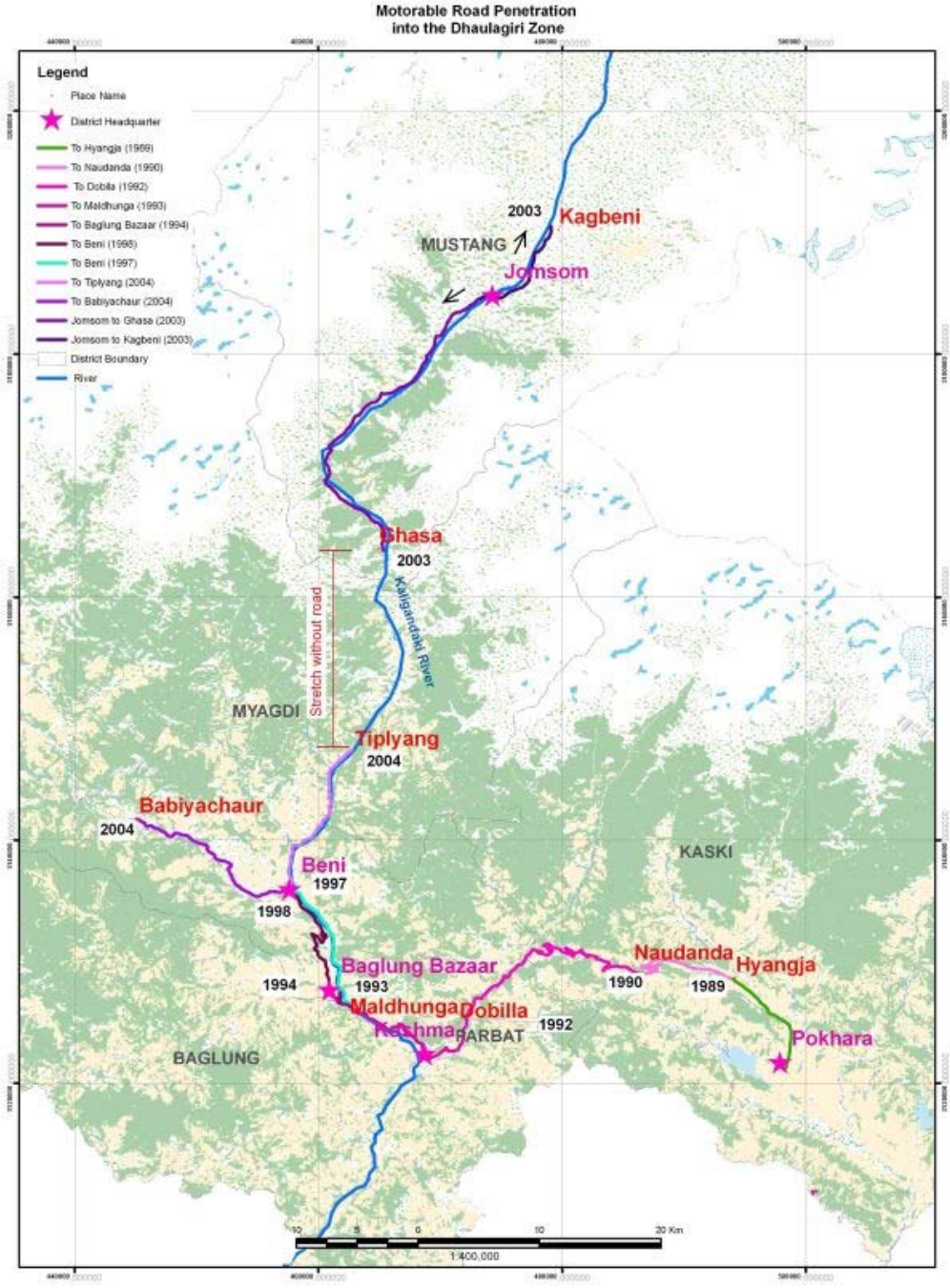
Maldhunga remained the roadhead bazaar for quite some time. Then one fine day the motorcycle had to be parked someplace else. The road had been extended, and the action had shifted to new roadheads, first at Beni Bazaar and shorty after, at Baglung Bazaar, disadvantaging Maldhunga in the process. To Baglung in particular, this meant the consolidation of the town as a regional market centre, as evidenced by the emergence of bicycle and auto-repair shops, cinemas screening Hindi

[2] I.e., the end or beginning of a motorable road. Degrees of access/remoteness in Nepal are often measured in terms of distance to the nearest roadhead.

movies, and the blaring of horns signifying the departure of buses and trucks to Pokhara and beyond. Through my work among bureaucrats, Non-Government Organisation people and farmers in the area, I realized that the road was both a metaphor for and a symbol of development to most people. To some, the meaning of the road was associated with the ability to swap the hardship of walking up steep hills with heavy loads on their backs for the comfort of sitting down in a bus while music plays. To others, roads meant prospects for improved livelihoods. At the level of both the individual and the cooperative, it connoted the ability to reach important markets in the district headquarters and beyond.

To yet others, the ability of the outside world and the market to finally reach them was what was important, with electricity, television and video parlours relieving boredom and bringing about a sense of modernity. To all, the road meant significant reduction in the cost of travel, usually counted in the number of meals that one needed to consume *en route* to and from work places, army pension collection centres, markets, schools or family visits. As Shah (2002) suggests, the notion of development (*'bikas'*) carries "senses of evolution, superiority, advancement, power and betterment" and roads are, as Pigg (1992) notes, central elements of this notion. In sum, the road brought hopes of access to benefits: projects, funds, pipes for water, electricity, movies, tourists and medicine might arrive. Projects, like the one I represented, the International Labour Organisation's Dhaulagiri Irrigation Development Project, were among the 'benefits' to which the road had provided access.

Map 2
Motorable Road Penetration into the Dhaulagiri Zone



Frequent visits to the area that involved taking part in village meetings, watching construction and maintenance work along irrigation canals, and gaining insights into agricultural cycles gradually made the relatively obscure institutions surrounding irrigation more tangible. It appeared that “the

hills are alive" (Benjamin and Shivakoti 2002), not so much with music, but with rational decision-makers aiming to minimize risks through strategic thinking, by means of intricate systems for managing terrain, and pervasive institutions for governing and managing water. And the more frequent the visits, the more the fabric unfolded to reveal the institutional architecture and political dynamics. As what may be argued was a sign of, if not exactly deepening democratization, then certainly growing political space for livelihood advancement, manifestations of organizational and institutional life, subtle and obvious, increased significantly throughout the 1990s in the area along the trade route, as a direct result of Nepal's democratization and improved access.

These manifestations included group meetings (literacy, income-generating, water and sanitation, cooperatives) in courtyards, delegations of villagers (often irrigation, roads or forestry committees) on their way to the district headquarters, as well as trails and tracks, irrigation systems and other infrastructure created through cooperative efforts, often with the assistance of increasingly ubiquitous Non-Government Organisations whose choice of project area, like that of external donors and the government, appeared highly biased in favour of areas with vehicular access. The penetration of the main road network into the hinterlands of the Dhaulagiri Zone is illustrated on map 2, above. The road along the old trade route is planned to eventually reach Mustang and Tibet in 2007. By 2004, it had reached a few hours north of Beni. Construction work has, however, also been in progress from north to south for quite some years now. These developments have shortened travelling time along the trade route considerably: travelling south from Jomsom in 2004, the total overland journey to Pokhara was completed in three days compared to the minimum of eight days required before the road.

5.4 Studies on the Area

> "Since the opening of Nepal to foreign research, the hills of Central and Western Nepal attracted the attention of anthropologists much less than the mountains, the Kathmandu Valley and Eastern Nepal" (Ramirez 2000a:iv).

It would appear that a combination of heterogeneity—in terms of historical administrative configuration[3], socio-economic structure, ethnic composition, topography, etc.—and, until a decade ago, difficult access have resulted in a dearth of comprehensive studies on the Dhaulagiri Zone. Hence, to the knowledge of this author, the area has not previously been constructed as a regional analytical unit; it has not been 'mapped' at aggregate levels in other than the physical and political administrative sense. At disaggregate levels, however, studies appear, although none that are comprehensive in the sense of representing an actual regional development analysis. The studies that do exist at this level include those of the socio-economic baseline variety that often has a district focus, thus reflecting a target-district or community orientation (corresponding with decentralization policies, broadly defined) combined with the sectoral (roads, water, irrigation, etc.) concerns of the donor that had commissioned the study (e.g., Energy Sector Assistance Programme 2002, the various Dhaulagiri Irrigationa Development Project studies used in this thesis, and Department for International Development 2003). These studies have proved useful, both as micro-cases, gap fillers and 'checks' in relation with official population census data available at the district

[3] The administrative configurations of Nepal, particularly the delineation of areas into districts, only rarely reflect historical administrative borders, resources endowments or customary forms of government, i.e., features that may connote coherence and identity referents. The Rana Regime (1846–1950) operated with 33 districts, while the current 75 districts, were drawn up in 1963 with, according to Gurung, "the objective of securing political mobilization for the Panchayat Regime" (2005:42).

level (International Center for Integrated Mountain Development *et al.* 2001 and 2003), and for making comparisons with the national level.

In line with the observations made in the opening quotation, academic studies conducted in the area have their focus on the northern, mountainous part of the Dhaulagiri Zone, typically the ethnographical contributions that construct and cover 'cultural regions' and specific ethnic groups. Works include Vinding's (1984, 1992, 1998) comprehensive ethnography on the Thakali ethnic group in Mustang district and that of Fisher on the cultural identity of the Thakali in the southern districts of the zone (Fisher 2001, 2002). The focus on the northern part of the zone also includes Furer-Haimendorf (1975), whose work deals with, among other things, trade and social organization, and the works of Messerschmidt on political organization and institutions (see, for example, 1995). Lastly Bista (see 2000), Nepal's most eminent anthropologist has, at an early stage, drawn attention to Mustang and its peoples. Even though the above contributions do make references to the southern hill districts of the region, not least with respect to north–south migration and the role of the trade route that transgresses the zone, socio-economic conditions, particular in the hill districts, remain comparatively under-analysed.

In view of this dearth of data and analysis, the influential research carried out by researchers from the University of East Anglia on what was until the early 1970s known as the West–Central Planning Region[4], informed by a neo-Marxist dependency perspective, and based on a mid-1970s rural household survey conducted as part of a road project in the districts immediately south of the Dhaulagiri Zone, has proven useful[5]. The research resulted in four main books (Blaikie *et al.* 1979, Seddon, Blaikie *et al.* 1979, Blaikie *et al.* 1980, revised 2005, and Seddon 1987) and numerous articles as well as the mid-1990s re-study referred to in the methodology section of this thesis (Bagchi *et al.* 1998). As part of their pioneering role with respect to offering "insights into the structures and dynamics of the Nepalese economy and society through the prism of class analysis" (Bagchi *et al.* 1998:445), these works contain a great deal of analysis of determinants of urban growth, rural development and the general economic dynamics of the Dhaulagiri Zone in the Western Development Region. The revised version of *Nepal in Crisis—Growth and Stagnation at the Periphery* (Blaikie *et al.* 2005) has been particularly useful with respect to understanding the Dhaulagiri Zone in a wider context. As numerous references will make apparent to the reader, so has a more recent contribution—*Pokhara—Biography of a Town* (Adhikari and Seddon 2002)—that draws on a great deal of the insights to rural–urban development dynamics of the above mentioned works, but discusses these in the context of the role of Pokhara, the main town in the region, in relation to its hinterland, including the Dhaulagiri Zone.

Other studies that contain agricultural and socio-economic analysis of adjacent areas have helped in the attempt at construction and delineation of the Dhaulagiri Zone as a region. These include Bishop's (1990) detailed analysis of the Karnali region (constructed mainly as a socio-ecological region) to the west of the Dhaulagiri Zone, and MacFarlane's (1976) related (in terms of their use of Malthusian disaster models) account of problems of overpopulation and limited land resources among the Gurung ethnic group near Pokhara. The multidisciplinary French research of the Centre National de la Recherche Scientifique and the Institut National de la Recherche Agronomique that attempts to reconstruct the districts of Gulmi and Argakhanchi (see Ramirez 2000) (to the

[4] Now the Western Development Region.

[5] As mentioned in Chaper 3, that survey forms the comparative base for the re-study that has inspired the methodology for this thesis.

immediate south of the Dhaulagiri Zone) as a social and political region, rich in detail, scope and analysis, has also served as a useful inspiration.

As a final note in the context of the area as a (broadly understood) 'mapped region' and a more recognized regional entity, it needs to be mentioned that the Dhaulagiri Zone constitutes the northern part of one among four so-called growth axes (known officially as the Gandaki Growth Axis[6] or corridor), a status that dates back to Nepal's Fourth Development Plan 1970–1975. The regional development strategy of that plan was based on a perceived need to "integrate the national economy by reducing inter-regional disparity and at the same time make efficient use of resources by balancing projects at specific locations" (Gurung 1989:18), specifically by tying in the economies of the mountains, hills and *terai*. Within this planning framework, north–south roads would link growth centres, where "development efforts would be concentrated" (Gurung 1989:19). The north–south road, along which we will travel in the following two sections, has almost been completed; however—as will emerge from subsequent sections—while some inter-regional integration seems to have taken place, intra-regional integration (and expected disparity reduction) may not have been reduced, as resources have been concentrated in the central parts of the Dhaulagiri Zone, adjacent to the main trading arteries.

5.5 Characteristics of the Dhaulagiri Zone and the Western Development Region

5.5.1 The Physical, Administrative and Ethnic Landscape

While, as mentioned in section 5.4, the Dhaulagiri Zone has not been comprehensively constructed as a region in academic works, the motorable road and other physical features contribute significantly to concepts of locality and regional identity in the area. One such feature is that of the Dhaulagiri Mountain, the towering presence of which, at an altitude of 8196 meters[7], is visible from numerous hills, ridges and valleys both north and south of its massif. Its defining presence is reflected in the naming of schools, development projects, Non-Government Organisations, sports clubs and local newspapers. Another defining feature is that of the Kali Gandaki River[8] and the Trans-Himalayan Valley through which (parallel to the motorable road for most of the way) it flows from north to south in its meandering course from Tibet towards the Ganges River.

Elevation in the region presents extreme variation, from a low in the hills of some 800 meters (Dhaulagiri Irrigation Development Projects 1993) to the already mentioned high of 8196 meters. Parbat District, Baglung District and the southern part of Myagdi District, where six of the irrigation systems are located (Amalachaur, Arjewa, Kurgha, Pakuwa, Lampata and Pipalbot) are subtropical with monsoon rains. Mustang District, where three irrigation systems are located (Thini, Tiri and Khinga) is in the rain-shadow of the Himalayas with resulting arid conditions. The majority of the irrigated areas, and indeed the ones studied in this thesis, are located close to the Kali Gandaki, as are the major settlements and transport arteries. Thus, the focus of this study is on the 'central' area of what is known in administrative and vernacular speak as the Dhaulagiri Zone, i.e., on a belt along the upper Kali Gandaki River, concentrated along a 75-km transect from Parbat

[6] From Bhairawa in the *terai*, on the border with India, to Jomsom in the mountains.

[7] Visible from parts of northern India, Dhaulagiri was thought to be the highest mountain in the world for 30 years from 1808 (www.en.wikipidia.org/wiki/dhaulagiri).

[8] The Gandaki Basin stretches from the Dhaulagiri Range to the Langtang Range. The Kali Gandaki River originates in northern Mustang on the Tibetan Plateau. It becomes know as the Narayani or the Gandak further downstream and joins the Ganges River in west Bihar (see Subba 2001).

District in the south, through Baglung and Myagdi Districts, northwards to Mustang District. Between Myagdi and Mustang Districts, the Annapurna and Dhaulagiri Massifs bisect the area, which changes from the hill ecological zone to that of the mountains ecological zone. These ecological zones will be referred to as the 'hills' and the 'mountains', respectively[9].

In administrative terms, the greater region is designated as the Western Development Region with a total population of 4,571,013, according to the 2001 population census (International Centre for Integrated Mountain Development *et al.* 2001), and is divided into three zones. It administered from Pokhara, a town of around 170,000 people (Adhikari and Seddon 2001) located at roughly the centre of the region. The Lumbini Zone in the south includes both hills and plains. Bordering India, this is the most populous of the three zones, with some 2.5 million people. The Gandaki Zone, in the western part of the region, consists of mountains and hills, and is the second most populous zone with close to 1.5 million people. The Dhaulagiri Zone, with the highest relative proportion of mountain area, is the least populous of the three with close to 0.6 million people (International Centre for Integrated Mountain Development *et al.* 2001) or just above two per cent of the country's population. Of the region's 17 districts[10], four are located in the Dhaulagiri Zone. Covering an area of 3661 km^2, Mustang is the largest of these four districts, followed by Myagdi with 2297 km^2, Baglung with 1784 km^2 and Parbat with 583 km^2 (International Centre for Integrated Mountain Development *et al.* 2003). Combined, the districts make up approximately six per cent of the land area of Nepal. Population densities vary from 4.19 persons per km^2 in Mustang, to 50 persons per km^2 in Myagdi, 151 persons per km^2 in Baglung, and 319 persons per km^2 in Parbat (International Centre for Integrated Mountain Development *et al.* 2003). Reference is made to table 1 for population data.

[9] '*Terai*' (lowlands), 'hills' and 'mountains' are the most common of classifications of ecological zones in Nepal but, given the geographical diversity of the country, they are very broad indeed. However, in the context of the scope of this work they may be justified. For more detailed classification in a climate/land-use context, see Lillesø *et al.* (2005).

[10] These 17 districts, along with the remaining 58 districts in Nepal, were drawn up in 1963 when the number of districts were expanded from 33 under a zonal hierarchy, with—as Gurung asserts—"the objective of wider political mobilization for the Panchayat regime" (2005:41,42). District boundaries often run along rivers, in valley bottoms, rather than along ridges that separate valleys. The fact that the delineation of districts does not reflect the physical or cultural resource base that would make them more 'natural' economic units, suitable for planning purposes, is seen by some as a hindrance to effective political decentralization, as the resource (and hence potential revenue) base renders economic room-for-manoeuvre problematic (see Gurung 2005, Whelpton 2005).

Table 1
Population, Area and Ethnicity in the Dhaulagiri Zone

District	Population (2001)*	Area (km^2)**	Main Ethnic Groups***
Parbat	157,826	583	Brahmin, Chettri, KDS
Baglung	268,937	1,784	Magar, Brahmin, Chettri, KDS
Myagdi	114,447	2,297	Magar, Brahmin Chettri, KDS
Mustang	14,981	3,661	Thakali, Towa, Bhotia

*Sources: * International Centre for Integrated Mountain Development et al. 2001; **Central Bureau of Statistics 1992; ***Department For International Development 2003, Vinding 1998.*
Notes: KDS = Kami, Damai and Sarki, so-called occupational or Dalit (low) castes

The main ethnic groups are listed in table 1. Linguistically Tibeto-Burman[11] in origin, the Magar ethnic group constitutes the largest ethnic group in Baglung and Myagdi Districts (42 per cent in each); at the national level, this group constitutes some seven per cent of the population (Ministry of Population and Environment n.d.). The Magar are followed by high-caste Parbatiya[12]—Brahmin/Chettri and Thakuri, who make up 33 per cent and 34 per cent, respectively. In Parbat District, with 66 per cent, the high-caste Parbatiya constitute the majority of the population. Considering that national data suggest that some 30 per cent of the population of the hills belong to high-caste groups (Whelpton 2005), their proportion in the hill districts of the Dhaulagiri Zone is relatively high. Low-caste Parbatiya (Kami, Damai, and Sarki), also known as occupational castes, make up some 20 per cent in all three hill districts of the zone (Department For International Development 2003). Sprinklings of Gurung, Newar and Thakali constitute the remaining population in the hill districts of the zone. Parbatiya are largely absent from Mustang District, except as civil servants, soldiers and a small number of people belonging to occupational groups. In Mustang District, the ethnic groups include Thakali in the southern Thak Khola area, Towa (who tend to speak Thakali and even call themselves Thakali) in the northern Thak Khola area and, in the northern parts of the district, people who are "culturally Tibetan" (Vinding 1998) and known as Bhotia[13].

5.5.2 The East-West Divide

Based on a wide range of indicators—from socio-economic conditions to services, access and infrastructure—official ranking places the four districts of the Dhaulagiri Zone within the 'most developed' third of Nepal's 75 districts (ahead of districts within 'intermediate' and 'least developed' categories). Mustang at 19th place ranks highest, followed by Parbat at 20th, Baglung at

[11] Tibeto-Burman refers to peoples whose languages are Tibeto-Burman in origin, thought to have arrived from the north and east. This, the largest linguistic grouping in the hills of Nepal (Whelpton 2005), is often referred to as 'Mongoloid'.

[12] Parbatiya (literally 'people of the mountains') is a term denoting hill-residing caste Hindus whose ancestors migrated into the subcontinent from the west, reaching what is now western Nepal during the first millennium AD (Whelpton 2005). This grouping is often referred to as 'Aryan'.

[13] From 'Bhot', the Nepali word for Tibet. Tibetans are commonly referred to as 'Bhote' in Nepali.

24th and Myagdi at 25th (International Centre for Integrated Mountain Development *et al.* 2003). However, this categorization fails to adequately account for significant intra-district variation, particularly with respect to Baglung and Myagdi Districts—a variation that serves to illustrate the historical problems associated with the current district structure (see footnote 10). The western hinterlands of these two districts have more in common with Rolpa, Rukum[14] and Dolpa, their neighbouring districts[15] immediately to the west, which rank 64th, 60th and 67th place, respectively, than they have with eastern Myagdi and Baglung Districts. Indeed, the already mentioned road infrastructure and access to services is concentrated in the eastern parts of Baglung and Myagdi Districts, which is also where we find concentrations of irrigated communities, i.e., the type of community that tends to be relatively prosperous and the subject of investigation in this thesis. The eastern part of the Dhaulagiri Zone has, in terms of 'development', more in common with the cluster of districts that surround Kathmandu in the Central Development Region and those that border India in the extreme east of the country, than it has with its western hinterlands.

These intra-district differences reflect a national pattern, in which poverty tends to gradually increase in an east–west direction, the poorest regions being the Mid-Western and the Far-Western Development Regions. Arguably the fault line of the east–west divide is located a couple of days walking to the west of the Kali Gandaki River. This intra-regional imbalance has to be taken note of when understanding the spread of the Maoist insurgency. It erupted in 1996 in Rolpa and Rukum Districts, both of which, along with the western parts of Baglung and Myagdi, remain hotbeds of Maoist activity. By 2000, the Maoist presence was increasingly felt across the fault line of the east–west divide, in and around the eastern parts of Baglung and Myagdi. In the following years, the eastern areas of the Dhaulagiri Zone witnessed increased Maoist activity both in the shape of sporadic incursions and in terms of actually taking control of institutional and economic life (see chapter 9). The west-to-east penetration of the insurgency culminated in an attack on Beni, the headquarters of Myagdi District, in April 2004 that left a large number of people dead on both sides of the conflict (and which coincided with the launch of fieldwork for this thesis, see chapter 3).

Intra-regional unevenness is also a feature of Mustang District, where cultural and socio-economic distinctions are usually made between Lower (southern) and Upper (northern) Mustang, but differences between the two areas are not usually conceived of as a 'divide', even if wealth is concentrated in lower Mustang. Nor do north–south socio-economic differences reflect any levels of insurgency; as a sparsely populated border district with a heavy army presence, Mustang District remains virtually untouched by the conflict.

5.5.3 Development Activities

None of the integrated rural development projects that characterized development efforts in the 1980s in Nepal reached the Dhaulagiri Zone and, until the 1990s, the area had received only sporadic attention from donors and the Nepalese Government. However, coinciding with the penetration of the road and the democratic reforms initiated in 1990, mushrooming of development projects (not least those that involved Non-Government Organisations) occurred from the early 1990s. By 2000, Parbat and Baglung, the two most accessible districts in the Dhaulagiri Zone,

---

[14] Where, as de Sales writes, "there is, for example, not a single hospital nor any industry" (2002:342). Additionally, as an indication of their poor hinterlands, Baglung and Myagdi Districts display some of the highest shares of marginal farm households (less than 0.5 ha) (International Centre for Integrated Mountain Development *et al.* 2003).

[15] Gurung describes the overall mid-western region as "one of the least developed in the country" (in de Sales 2002:342). For other accounts of socio-economic and cultural conditions in the areas surrounding the immediate study area, refer to Fisher (2002), Millard (2002) and Ramirez (2000b).

ranked 3rd and 10th, respectively in terms of development budget allocation (Danida/East Consult 2000)—developments that appear symptomatic of a general 'upliftment' in aggregate terms, and of resource flows into the Western Development Region[16].

Table 2 provides a non-exhaustive[17] overview of development activities in the Dhaulagiri Zone after 1990. A couple of elements are notable in the context of post-1990 institutional and socio-economic development efforts in the zone. First of all, the variety in terms of scope and sectors of the projects should be noted; drinking water and sanitation was a dominant theme, as was a focus on more direct livelihoods improvement activities, ranging from improved seeds and community forestry to irrigation and other infrastructure, as well as the more diffuse notion of 'income generation'. Secondly, the concentration of activities in the most accessible parts of the zone, i.e., Parbat and Baglung Districts, is evident. Mustang District features in two instances only, and a distinct geographical focus on west Baglung and west Myagdi occurs only in two cases, both of which involve faith-based Non-Government Organisations. Thirdly, the involvement of Non-government Organisations (including community-based organizations) as project implementers, either in combination with government organizations or on their own, is symptomatic of the post-1990 institutional plurality that has characterized development in Nepal (see section 4.2). In this context, it is further notable though, that in most cases, project collaboration has been with traditional line agencies. Only in a couple of (albeit rather prominent) cases have donors actively supported local government.

Table 2
An Overview of Development Projects in the Dhaulagiri Zone from 1990

Project Name	District Coverage	Scope/Sectors	Main Implementers
Nepal–United Kingdom Community Forestry Project (Department for International Development)	Baglung, Parbat, Myagdi	Community forestry	Government/Non-Government Organisations
Seed Sector Support Project (Department For International Development)	Baglung, Parbat, Myagdi	Vegetable seed production	Government/Non-Government Organisations
Lutheran World Service	West Baglung	Integrated community development	Non-Government Organisations
Farmer Income-Generating Project Along the Pokhara–Baglung Highway (DANIDA)	Baglung, Parbat, Myagdi	Commercial vegetable production	Non-Government Organisations

[16] Comparative data from an earlier period is not available; however, there is general agreement among observers that the Dhaulagiri Zone ranked much lower before the 1990s. As Gurung suggests in a 2005 review of regional development efforts in Nepal, "Among development regions, as in 1977, the Central [Region] ranks first. The second place is taken by the Western Region, superseding the Eastern" (2005:28).

[17] The table is exhaustive with respect to major multilateral and bilateral projects. For smaller Non-Government Organisation projects, of which there have been numerous, however, the list is not complete.

Project Name	District Coverage	Scope/Sectors	Main Implementers
International Nepal Fellowship	West Baglung, West Myagdi	Integrated community development	Non-Government Organisations
Nepal Safer Motherhood Project	Baglung, Parbat, Myagdi	Reproductive health	Government/Non-Government Organisations
Rural Infrastructure Development Programme (Asian Development Bank)	Baglung	Road construction	Government/Non-Government Organisations
Rural Energy Development Project (United Nations Development Programme)	Parbat, Baglung	Renewable energy	Government (local)/Non-Government Organisations
Irrigation Development (Japanese International Cooperation Agency)	Parbat	Irrigation, community development	Government/Non-Government Organisations
Food for Work (Gesellschaft for Technisches Zusammenarbeit)	Parbat, Baglung	Community infrastructure rehabilitation	Government/Non-Government Organisations
Medecins Du Monde	Parbat, Myagdi	Public health, community development	Non-Government Organisations
HELVETAS (Self-reliance Drinking Water Project)	Baglung, Parbat, Myagdi	Drinking water and sanitation	Non-Government Organisations
Micro-enterprise Development Project (United Nations Development Programme)	Parbat, Myagdi	Micro-enterprise development	Government/Non-Government Organisations
Sustainable Soil Management Project	Baglung, Parbat, Myagdi	Promotion of Soil fertility	Government/Non-Government Organisations
Rural Water and Sanitation Fund Development Board (World Bank, Department for International Development)	Baglung, Parbat, Myagdi	Drinking water and sanitation	Non-Government Organisations
Rural Water and Sanitation Project (Finnis Interntional Development Agency))	Parbat	Drinking water and sanitation	Government/Non-Government Organisations
Gorkha Welfare Scheme (Department for International Development)	Baglung, Parbat, Myagdi	Drinking water and sanitation	Non-Government Organisations
Water Aid (Department for International Development)	Baglung, Parbat, Myagdi	Drinking water and sanitation	Non-Government Organisations

Project Name	District Coverage	Scope/Sectors	Main Implementers
Energy Sector Assistance Project (DANIDA)	Baglung, Parbat, Myagdi	Promotion of renewable energy	Non-Gvernment Organisations/private companies
Participatory District Development Project (United Nations Development Programme)	Baglung, Parbat Myagdi	Community organization, local government	Government (local)/Non-Government Organisations
Sustainable Development (United Nations Development Programme)	Myagdi	Community development	Government
Institutional Capacity Development Programme (Mellemfolkeligt Samvirke Nepal)	Baglung, Parbat, Myagdi	Community development, strengthening of local Non-Government Organisations	Non-Government Organisations
Dhaulagiri Irrigation Development Project (International Labour Organisation)	Baglung, Parbat, Myagdi, Mustang	Irrigation development	Government/Non-Government Organisations
CARE Nepal	Baglung, Parbat, Mustang	Various income generation	Non-Government Organisations

Source: Yogendra Pant, Dhaulagiri Community Resource Development Centre, Baglung, pers. comm., May 2006.

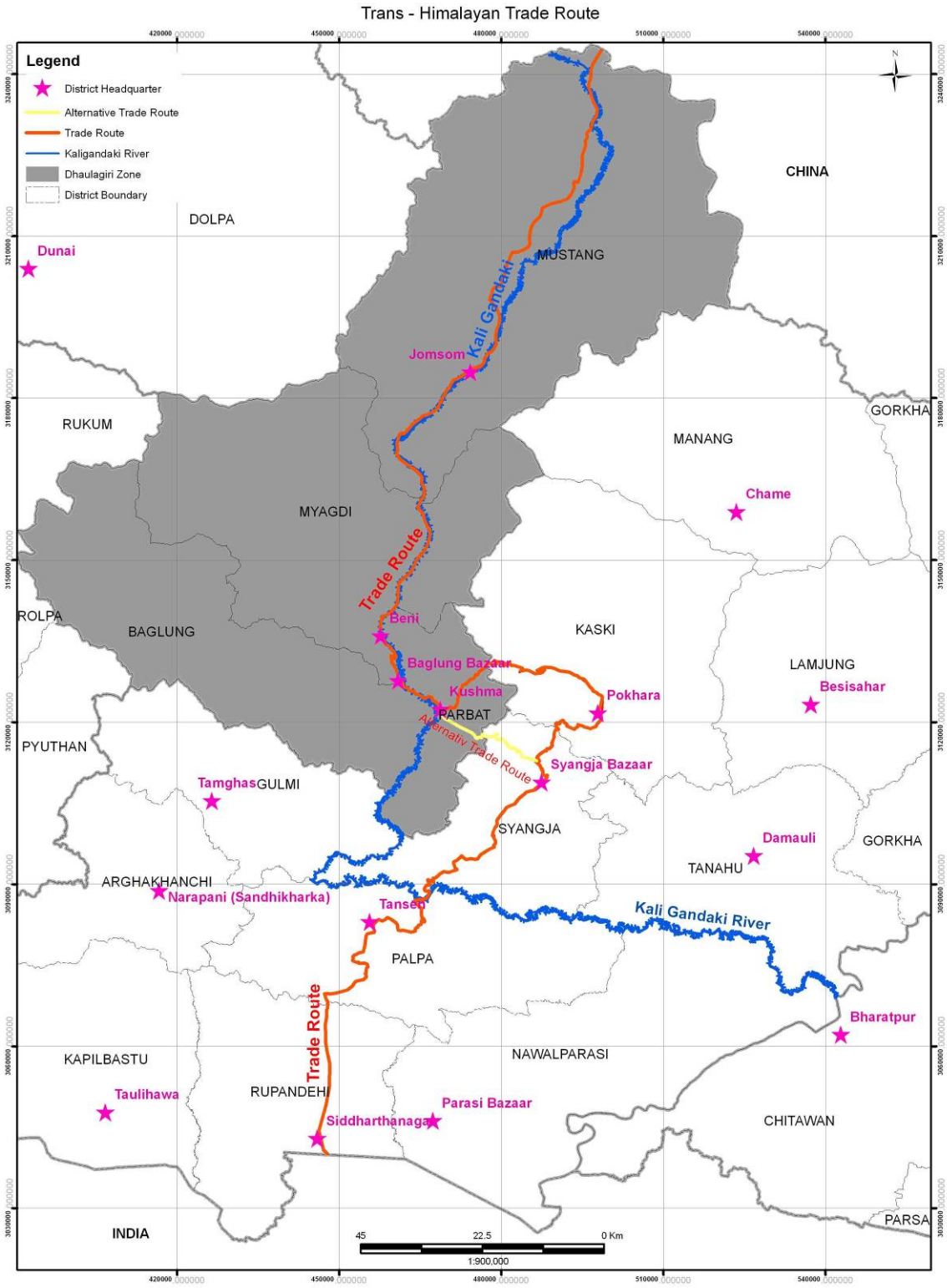
While the reduction in democratic space that began in 2002 (see section 4.7.1) meant a reduction in NGO activities, the most recent count nevertheless includes eight NGOs in each of the district headquarters of Baglung and Parbat Districts, a handful in Myagdi District, and at least two in Mustang District that receive foreign funding (Yogendra Pant, pers. comm., May 2006).

5.6 Trade, Mobility and Rural Development

5.6.1 Historical Perspectives

As alluded to above, the concentration of economic development resulting from flows of goods, capital and people, historically and contemporarily, within the eastern and central parts of the Dhaulagiri Zone are closely related to those of the trade route that links mountains and hills with the plains (see map 3). The nature of these dynamics and their current manifestations will be dealt with in more detail in subsequent sections; at this stage, the aim is to draw attention to the historically constructed regional context as a necessary step towards understanding the contemporary socio-economic, socio-cultural and socio-political characteristics of the Dhaulagiri Zone and, eventually, the case communities.

Trade Routes



Trade between plains, hills and mountains is a particularly important pattern of activity, if we are to understand the characteristics of the Dhaulagiri Zone. In this context, the low population density and the relative remoteness of Mustang District belie its historical influence in the region. Trade expanded significantly during the 19th century in Nepal, with the rise of the Newar as a merchant class, migrating from the Kathmandu Valley to strategic locations along Nepal's north–south trade routes. However, along the trade route that originates in Tibet and transects the Dhaulagiri Zone to end in India, the Thakali people of southern Mustang came to dominate the trade in salt, grain and livestock well into the 20th century, as a combined result of the government awarding customs collection contracts to the Thakali and the strategic location of Thak Khola above a narrow gorge at the ecological transition from mountains to hills.

Controlling the trade made certain families rich and influential, while, as a spin-off, the substantial petty trading benefited many more. Capital accumulated by Thakali working as tin-mining contractors in the 19th century, particularly in Myagdi District, seems to have been important as well (see Whelpton 2005, Fisher 2001). The rise to the status of a merchant class enabled some Thakali to direct business southwards to compete with Newar traders and benefit from the expanding Indian–Nepali border trade in the early 20th century (Seddon *et al.* 1979); when, in 1928 the Thakali monopoly on the north–south trade was lifted, many Thakali purchased mules and diversified their trading portfolio to include a variety of goods that they sold in the bazaars along the trade route (Vinding 1998). In connection with the trading patterns, Thakali women opened inns, initially along the main north–south trade route, as a temporary (winter) occupation, but over the years also as permanent operations along highways and at bus stations (Vinding 1998). This southward expansion was facilitated by the existence of rotating credit associations (*dhikur*) set up in order to raise capital for individual members (see section 9.7.1).

The Chinese occupation of Tibet in 1959 disrupted the flow of salt and wool from Tibet, and the construction of a road from the Indian border to Pokhara in the 1960s made cheap Indian salt available in the hills (Adhikari and Seddon 2002). This meant a drastic decline in the traditional trade. During the following decades, large numbers of Thakali left Thak Khola for the south. As Vinding (1998) notes, a number of scholars have attributed this wave of migration to reasons that range from the disruption of the salt trade to overpopulation, food shortages and subsequent hardship. Vinding, however, based on interviews with migrants in Pokhara argues that 'pull' factors, including the existence of investments in the south, were more important than 'push' factors. Therefore I argue, the wave of migration of the 1960s and 1970s should be seen as another wave of re-direction and diversification of business southwards, somewhat similar to that seen in the early 20th century, and should, it appears, be understood in the context of the established nature of Thakali opportunity migration (as noted by Blaikie *et al.* 2005) and investment along the trade route.

As a result of these dynamics which, as Vinding (1998) points out, should also be understood in the context of general emigration from the mountains and hills, Thakali have spread their businesses as far as Kathmandu, but remain concentrated in the bazaars along the old north–south trade route and its tributaries. The majority reside in Myagdi and Baglung Districts where, despite their making up less than two per cent of the population, they "are far more visible than their proportion of the total population would make them" (Fisher 2002:119). In addition to farming and landownership, livelihoods are earned from a variety of sources including hotels, high-value commodities, shops, contracting business, money-lending and, as an outcome of their economic power, the holding of political office (Vinding 1998) as well as transportation. Most importantly in the context of the institutional landscape of the area, the emigration and settlement of Thakali in these districts and beyond has led to a spread of the previously mentioned rotating credit associations (*dhikur*) to other

ethnic groups, to the extent that with volumes of transactions exceeding those of the banking system (Bhattachan 2002) they constitute important regionally specific institutional vehicles of capital accumulation.

Groups other than the Thakali, particularly Newar traders, have contributed to the economic growth and development of urban settlements in the Dhaulagiri Zone from what were originally fortifications at strategic points created by the Gorkha empire to "secure and administer for tax purposes the outlying areas and trade routes of an expanding state" (Blaikie *et al.* 2005:119). That the north–south trade route and the agricultural hinterland were particularly important sources of both taxation and trade profits is witnessed by the close proximity[18] of the large urban centres and district headquarters of Parbat (Kusma), Baglung (Baglung Bazaar) and Myagdi (Beni) Districts and the concentration of the population of the Dhaulagiri Zone in and along the Kali Gandaki Valley in the immediate hinterland of these towns.

5.6.2 Contemporary Economic Dynamics

Blaikie *et al.* (2005) in their 1974 study of the Western Development Region pointed to three determinants of urban growth or decline (and rightly state that a major difficulty in analysing such determinants concerns satisfactorily distinguishing the relative importance of particular factors). In addition to (1) the growth of the bureaucracy, these factors are (2) increase in the volume of trade, predominantly of imported (as opposed to locally produced goods) as a result of the growth of the rural population and its inability to produce its needs directly, and (3) the construction of major roads through the region concentrating the distribution of imports to a smaller number of on-road locations. These three main factors continue to have considerable relevance in the case of the Dhaulagiri Zone. However, owing to added complexity, this picture, and the centre–periphery–underdevelopment analysis on which it is based—and which has informed much of the literature on regional development in Nepal (see, for example, Seddon *et al.* 1979, Seddon 1987)—is no longer clear-cut, as additional determinants need to be added to the list.

The population in the Western Development Region has indeed almost doubled from the 2.5 million people reported in the early 1970s (International Centre for Integrated Mountain Development *et al.* 2001), although growth may well have declined in recent years as a result of emigration to other parts of Nepal and abroad. However, all four district headquarters of the zone have grown rapidly over the past decade for reasons that include, but also go beyond, those proposed by Blaikie *et al.* (2005). First of all, the civil war, which has caused an influx of people from the hinterlands, in search of a combination of economic opportunity and relative security, needs to be added as determining factor. Secondly, a general trend towards urbanization has been fuelled by a tendency to invest funds remitted from overseas in urban areas, where consumer goods have become increasingly available, as a result of the motorable road that has connected the three hill-district headquarters with Pokhara and beyond for almost a decade.

Thirdly, there are indications that the roles of Kusma, Baglung Bazaar and Beni are no longer solely as supply and distribution centres for goods and services required in the hinterlands. As dealt with in some detail in section 9.5.2, the increased urban demand in these towns has been met with considerable response in the immediate hinterlands, particularly from irrigated areas that, unlike a decade ago, now supply considerable proportions of the fresh vegetables, milk and to some extent poultry products consumed in the district headquarters. However, a significant proportion of the

[18] This is a unique feature in the hills of Nepal where administrative centres can be very remote. Kusma is 55 km from Pokhara, Baglung is 69 km, and Beni is 82 km.

rural population who live on unirrigated land, away from trading arteries and urban areas, remain, as diagnosed by Blaikie *et al.* (2005), unable to produce their needs directly.

Jomsom, the headquarters of Mustang District, and indeed Mustang District itself never really fitted into the picture of determinants depicted by Blaikie *et al.* (2005), chiefly because of the trade dynamics described earlier, and a district population that has been reduced almost by half from close to 27,000 in 1971 to 15,000 in 2001 (International Centre for Integrated Mountain Development *et al.* 2001). Mustang District remains largely untouched by the armed conflict, and Jomsom, unlike the district headquarters to the south, has not experienced an influx of 'refugees'. However, it has grown dramatically from a 'one-horse town' (Jomsom Airport) in 1972 (Vinding 1998), particularly since it became the district headquarter in 1975 (Vinding 1984), to today's substantial settlement. Not the original trading centre of the district, the economic importance of Jomsom has increased mainly as a result of the presence of army and government personnel (in line with Blaikie *et al.*'s 'growth of the bureaucracy' as a determinant), trekking tourists, and to some extent remittances. As is the case in the districts to the south, virtually all non-consumables and luxury goods are imported, mainly from the south, but increasingly also from China to the north. Perhaps even more than in the southern towns of the Dhaulagiri Zone, the immediate hinterlands appear strongly linked to this small urban centre and virtually all vegetables, meats, grains (except rice which is imported from the south) and alcohol are supplied from surrounding villages. Moreover, in addition to livestock (sheep) taken down to Pokhara in connection with the winter migration, apples and locally bottled alcohol are exported to the south and sold in the bazaars along the old trade route and beyond.

5.6.3 The Role of Migration

The added complexity with respect to economic dynamics is closely related to increased overall demand. This leads to the issue of another characteristic of the Dhaulagiri Zone, namely, the importance of migration for the economy. Adhikari and Seddon (2002) provide a fitting assessment of the economy outside Pokhara (the main supply and distribution centre for the Dhaulagiri Zone): they suggest that rural households have become mainly consumers who buy commodities from cash incomes obtained directly from outside sources, or indirectly, i.e., from employment which itself results from the flow of remittances to affluent households with external incomes. Considering the already mentioned tendency to invest remitted finds in urban areas, this characteristic would apply to urban areas as well.

High levels of migration and subsequent remittances are indeed a major characteristic of the Dhaulagiri Zone. As already illustrated in the case of the Thakali, migration, seasonal or temporary, has always been central to livelihood strategies in the mountains, mainly for trading purposes. Migration has also been a central livelihood strategy in the hills for centuries, initially in the shape of army migration (in the British or Indian armies) and, in recent years, in the shape of labour migration[19]. As is evident from table 3, below, which shows the proportion of the population that, at the time of enumeration for the census in 2001, had been abroad for more than six months, far from all households in the Dhaulagiri Zone are affected by migration and its direct and indirect effects. The number of affected households, however, is much higher than the average for Nepal, and also

[19] A strategy that has to be understood in the context of historical factors: for reasons of internal control, it was a primary interest of the Rana rulers and the rulers of the petty states of western Nepal to obstruct rather than facilitate internal movement (Seddon *et al.* 1979) and subsequent economic development, preferring instead to extract taxes from isolated areas. Regmi suggests that this feudal policy often meant that peasants found conditions intolerable and left the land (Regmi 1999a, see also Chapter 1).

compared to other hill and mountain districts (International Centre for Integrated Mountain Development *et al.* 2001). Moreover, overseas migration is likely to have grown significantly since 2001, and continues to grow (Economist Intelligence Unit, 2006).

Table 3
Absentee Population in the Dhaulagiri Zone, Total and by Destination 2001

Origin	Total Population Abroad (%)	In India (%)	In Other Asia (%)	Outside Asia (%)
Parbat	10	82	17	1
Baglung	11	82	16	1
Myagdi	8	43	53	4
Mustang	6	45	32	23
Nepal	3	77	20	3

Source:Compiled from data in International Centre for Integrated Mountain Development et al. (2001).
Note: Rounded figures.

It is an important characteristic of the relatively high rates of labour migration from the Dhaulagiri Zone that compared to other areas, more migrants end up in the 'lucrative' labour markets of South-East Asia, the West and the Gulf countries. Some 57 per cent of migrants from Myagdi District, 55 per cent from Mustang District, 18 per cent from Baglung District, and 17 per cent from Parbat District (International Centre for Integrated Mountain Development *et al.* 2003) end up in these markets rather than the less lucrative Indian market (the national average is 20 per cent). This migration to lucrative markets is probably related to networks associated with recruitment for Gurkha regiments as well as ethnically based networks (Fisher 2002), and most certainly to initial endowments (Seddon *et al.* 1998) that again may well be related to the existence of capital formation institutions such as the already mentioned rotating credit institutions (*dhikur*).

Improved purchasing power is indeed evidenced by an increased variety of imported luxury goods in local shops, particularly by television shops and the ubiquitous video parlours. Fisher noted in 1997 in Myagdi District that "the focus on becoming modern was striking and the common mode of expression was through consumption, buying, eating and possessing modern things" (2002:126). This 'obsession' is mainly visible in the bazaars of the Dhaulagiri Zone where, to provide an example, mobile phones, owned by many, and actually flaunted in public for quite some time before the mobile phone network became operational in 2005, have become the latest status symbol.

5.7 Agricultural Livelihoods

In continuation of the section on trade and mobility, the purpose of this section is to provide an overview of the characteristics of agricultural production and the conditions associated with the earning of agricultural livelihoods in the Dhaulagiri Zone.

Rural livelihood characteristics vary significantly between the four districts. Official data suggest that the majority of the population in the hills has agriculture as its main source of livelihood. Officially, the ratio of the adult economically active population engaged in non-agricultural to agricultural activities is 0.19 in Myagdi District, 0.26 in Parbat District, and 0.35 in Baglung

District (International Centre for Integrated Mountain Development *et al.* 2003). In Mustang District, agriculture plays a significantly lower role as a central source of livelihoods, the ratio being 1.64. As the data on migration suggest, it is widely acknowledged that the centrality of agriculture as a general source of livelihoods in all four districts has decreased over the past couple of decades, but the pace of livelihoods diversification, like its corollary, urbanization, cannot be adequately quantified[20]. However, despite increasingly diversified livelihoods suggested by high levels of migration, most people outside the district headquarters of the Dhaulagiri Zone continue to portray themselves as farmers, regardless of their fundamental direct or indirect source of income.

In physical terms, elevation and its effects on crop mixes and food production affect agriculture in the Dhaulagiri Zone, as in other hill and mountain areas of Nepal. The latter is particularly affected, as the duration of fallow time increases as a result of agro-climatic changes associated with increasing altitude and latitude (Bishop 1990). Rice, wheat, maize, millet, potato, buckwheat and naked barley are the most common crops in the zone. Rice is cultivated at lower altitudes (i.e., not in Mustang District), while millet, buckwheat and naked barley are cultivated at relatively higher altitudes. Maize, wheat, potato and oilseed pulses are cultivated at both low and high levels of elevation. The proportion of operational agricultural area that is irrigated is very high in Mustang District (83 per cent), as arid conditions render non-irrigated agriculture largely futile. Proportions of irrigated area are much lower in the hill districts (but above the hill average), at 14 per cent in Myagdi and Parbat Districts, and at eight per cent in Baglung District (International Centre for Integrated Mountain Development *et al.* 2003).

5.7.1 Macro-Policy Contexts

Agricultural policies in Nepal associated with structural adjustment and deregulation have focused predominantly on removing subsidies for fertilizers, water-lifting irrigation technology in the *terai*, and organizational reform of both agricultural input and marketing corporations. In general, however, studies tend to attach limited importance to these macro-level reforms in the context of hill farmers. Rather, focus is on socio-political structures, access to resources, low purchasing powers, etc. in the context of food security (Adhikari and Seddon 2005), and on transportation, fragmentation of plots, limited availability of arable land, etc. (Asian Development Bank 2002, Food and Agriculture Organisation 2003) as constraints to earning agricultural livelihoods.

For the Dhaulagiri Zone, being a hill and mountain region with reasonable access[21] in central areas, the impact of macro-policies, if any, would concern the removal of the fertilizer subsidy. The fact that the majority of agricultural activities, particularly outside the supply 'catchments' of the urban centres, is primarily for meeting own consumption needs, using locally produced organic fertilizer, suggests that the removal of subsidies is of little importance. Even for farmers whose production may depend on supplementary external inputs and for whom transportation is feasible, i.e., those close to the main transport arteries, the effect, it appears, has been negligible, as the relative disadvantage of possibly increased prices[22] has been off-set by increased availability resulting from the removal of the government monopoly on chemical fertilizer distribution. Additionally, the

[20] Due to the current pace of both phenomena.

[21] Thus not dependent on the supply of relief food supplies from the Nepal Food Corporation, such as parts of the Mid-Western and Far Western Development Regions.

[22] In the second part of the 1990s, the official price of chemical fertilizer increased by some 18 per cent. The retail price of food crops increased by 11–18 per cent over the same period (Food and Agriculture Organisation 2003).

actual price effects of the removal of subsidies is somewhat disputed because areas with road access, in particular, benefit from supplies of subsidized Indian fertilizers that seep across the border and enter the market (Asian Development Bank 2002, Food and Agriculture Organisation 2003).

Another macro-policy issue concerns the staple-crop economy of the Dhaulagiri Zone. The majority of households in the Dhaulagiri Zone are food-deficit[23] but not necessarily food insecure, as long as non-farm income from, for example, migration enables them to purchase food. Most households depend, in particular, on external supplies of cereals (rice) from the *terai* and India to supplement their own production for part of the year but, for some, rice is both a 'subsistence' and a 'cash'[24] crop. As an example of the "inability to produce needs directly", noted by Blaikie *et al.* (2005) (see section 5.6.2), rice is purchased in local markets where road access and Indian fertilizer subsidies have made both Indian and Nepali rice from the *terai* relatively cheap (see Asian Development Bank 2002) compared with locally produced rice. In urban centres, local rice is also expensive compared to imported rice because of its dispersed marketing channels and because demand from wealthy consumers (who can afford to eat local rice, considered to be of superior quality) outstrips supply.

Some farmers, therefore, sell local rice in the bazaars and (as also reported by Adhikari and Seddon 2005) purchase imported rice for their own consumption. However, locally grown rice is also consumed in the villages where rice-surplus households, depending on the distance to markets, tend to sell to their neighbours before selling rice in town. Some local rice also ends up as payment from tenants to landowners who have moved from village to town without selling their land. Despite these internal flows, both the rural and urban parts of the Dhaulagiri Zone remain heavily dependent on imports of rice, as well as lentils, another central component of the Nepalese diet. Given the local demand for local 'luxury' rice and the fact that most households are food-deficit for part of the year, the import of 'cheap' rice benefits most farmers, not least the poor.

5.7.2 Crop Diversification in Response to Urban Demand

Crop diversification to include crops other than the staples already mentioned is a recent phenomenon that has appeared only in the past decade, as a combined result of access to information, agricultural extension, demand and possibly—for some larger, rice-surplus farmers—competition from 'cheap' imported rice as mentioned above. As mentioned in the previous section, irrigated farmers have been able to respond to rising demand in the district headquarters (and in Pokhara and beyond), by growing typical 'cash' crops (including vegetables, fruits, ginger and cardamom) to the extent that conventional cropping patterns are changing. Significantly, farmers cultivate these new crops in irrigated (*khet*) lands traditionally reserved for grain crops.

The institutional and the livelihoods implications of this switch will be dealt with in section 9.5.3; at this point it is brought to attention because, as was the case with the dynamics of urbanization and the remittance economy touched upon in the previous section, it adds complexity to the centre–periphery discourses that have informed much of the literature on regional development in Nepal, and which tend to depict rural areas as places that, in the absence of rural–urban production linkages, depend entirely on larger towns, the *terai* and India. As such, it has implications for

[23] According to a recent study, some 70 per cent of rural households in Myagdi District, 80 per cent in Baglung District, and 76 per cent in Parbat District are food-deficit (Department for International Development 2003).

[24] As staple crops such as rice and wheat are sometimes sold the term cash crop is inadequate but refers in the present context to crops that are produced predominantly for sale in the market rather than for direct consumption.

conventional perceptions of rural areas as importers of even basic foodstuffs, unable to produce these needs directly. The findings (see 9.5.2) of a survey of consumers and vegetable-cum-grain wholesalers and retailers carried out in Baglung Bazaar in early 2006, suggests a more complex picture.

5.8 Tenure Arrangements and the Historical-Spatial Context of Irrigation in the Dhaulagiri Zone

An internal paper, presented at a Dhaulagiri Irrigation Development Project planning workshop in 1994 notes that:

> "… the nature of irrigation development is somewhat problematic and presents a dilemma as regards reaching the poorest of the rural population—mainly because we deal with farmers who already have (*khet*) land. In Nepal, as most of us have observed, there is a tendency for people to get poorer and poorer the further up the hills we go, where soils are of lower quality and where slopes are difficult to cultivate and—most importantly—where water resources are scarce and difficult to control" (Berg 1994:1).

In the following sections, this dilemma will be contextualized in terms of ethnic and social geography.

5.8.1 The Ethnic Geography of Irrigated Agriculture

Irrigation, because it results in higher productivity per unit of land, is an important determinant with respect to the ability to sustain agricultural livelihoods, whether in a subsistence or commercial fashion. As such, agricultural development is intimately linked with irrigation (Pradhan *et al.* 1987). Wet rice, or paddy culture, the irrigated farming technology that is historically associated with the Parbatiya[25] or caste Hindus residing in the hills, is only successful below 1800 m without forceful germination (Bishop 1990)[26]. Hence, in the context of the hills and mountains of Nepal, altitude and irrigation are strongly related, but in the specific context of the hill districts of the Dhaulagiri Zone, access to irrigated land is strongly correlated with caste and ethnicity as well. The most dominant spatial tenure–ethnicity pattern of the hill districts of the zone reflects the situation "over much of the hills with Tibeto-Burman groups predominating at higher altitude and Parbatiya at lower ones" (Whelpton 2005:27). In other words, the Parbatiya who introduced wet rice cultivation in the 12–14th centuries in valley bottoms (Whelpton 2005) continue to farm the most fertile hill land, at relatively low altitudes.

---

[25] Parbatiya (literally 'people of the mountains'), as also mentioned in footnote 12 is a term denoting hill-residing Hindu groups—sometimes referred to in racial terms as Aryan or Caucasian—whose ancestors migrated into the subcontinent from the west, reaching what is now western Nepal during the first millennium AD (Whelpton 2005). While recent 'sons of the soil' (*janajati*) movements, asserting the rights of Tibeto-Burman groups (sometimes referred to as Mongoloid) in the hills, have a tendency to portray the Parbatiya as invaders, it has been suggested that the predominant settlement pattern was not necessarily a result of pushing 'indigenous' peoples off the land; rather it may have been the combined outcome of land being plentiful and the technology and skills introduced by the newcomers (see Whelpton 2005:27) as well as the importance of animal husbandry for, e.g., the Magars, which suggest that they may already have been living in upland areas (Jest *et al.* 2000). This is in some contrast to Hagen who refers to the process as an infiltration, as a result of which "the original inhabitants of Nepal found themselves faced with an overpowering pressure from the lowlands, before which they had to retreat" (1972:78).

[26] Bishop (1990) explains that while paddy in the Karnali Zone, immediately to the west of the study area, may be grown up to 2680 m, this requires the laborious creation of hothouse conditions before transplantation.

In effect, this ethnic geography means that the ethnic settlement pattern (and subsequently the ability for one or other ethnic group to make a living from the land as the above quote by Berg suggests) is also largely a function of altitude. While the proportion of the population that belongs to the Tibeto-Burman groups increases in absolute terms in a south-to-north direction within the Dhaulagiri Zone, with the population of Parbat District in the south being predominantly Parbatiya and that of Mustang District in the north almost homogenously Tibeto-Burman, it also increases in relative terms, at lower latitudes, with altitude. This situation is particularly pronounced in Baglung and Myagdi Districts, where the contrasts between thriving agricultural Brahmin/Chettri (the major, high-caste Parbatiya groups) communities enjoying multiple harvests at valley bottoms and often destitute and depopulated Magar (the major Tibeto-Burman group) communities may be witnessed by taking a short walk uphill, at any given locality.

While, in the hills, a poverty and altitude relationship is the general pattern indeed, the picture is varied as well. Irrigated communities may also be located on riverbanks in rather remote areas and/or at some altitude on mid-slope plains (known as *tar*), where fragile ecological conditions render irrigation precarious and agricultural livelihoods problematic. Yet, even in these cases, moving further uphill is likely to lead to unirrigated communities that are even poorer. Conversely, a number of Magar communities above the paddy culture belt are relatively wealthy, typically because ex-army servicemen pensions and remittances act as considerable supplements to agricultural incomes based on the sale of, for example, oranges or alcohol made from millet, one of the main upland staples.

Furthermore, wet rice cultivation is not solely restricted to Parbatiya. Particularly in what may be termed the 'peri-remote' areas of Baglung and Myagdi Districts, towards the west and the north, Magar—the original inhabitants—and Newar and Thakali—immigrants to the area—have adopted wet rice cultivation skills and share irrigation systems with Parbatiya. Moreover, there are, as also observed in the Magar-dominated areas south of the Dhaulagiri Zone, numerous multi-ethnic settlements and hamlets that "are in contact without totally intermingling" (Jest *et al.* 2000:55,58). On the whole, however, the ethnic map corresponds with altitude, and there is a clear correlation between ethnicity, altitude, agricultural and socio-economic conditions in the hills of the Dhaulagiri Zone. In Mustang District, this correlation does not exist. The irrigation systems are typically located on valleys and *tar* as they are in the hills, but the arid conditions that render non-irrigated agriculture largely futile, also mean that settlements are equated with irrigation (excepting Jomsom, the administrative and market town), i.e., virtually no one lives outside irrigated communities.

5.8.2 Access to Land

Compared with altitude, the ethnic geography in the Dhaulagiri Zone corresponds much less closely with access to land in quantitative terms. However, caste does; and in the hill districts, the landless or the 'effectively landless' often include the 20 per cent of the populations that belong to low-caste Parbatiya (Kami, Damai and Sarki) groups (Department for International Development 2003). These so-called occupational groups are also found in Mustang District but in small numbers; most villages typically have one or two blacksmith (Kami) households for the production and repair of agricultural implements. In the hills, the 'effectively landless', which also include higher-caste Parbatiya and other ethnic groups, own less than 0.25 ha, and tend to be food-deficit (i.e. in terms of what they can grow but not necessarily in terms of what they can buy) for up to nine months a year. 'Marginal' farmers with less than 0.5 ha also experience severe food deficits, while 'large' farmers with more than 1 ha may produce a surplus (International Center for Integrated Mountain Development *et al.* 2003, World Bank 1991), depending, as in the previous categories, on the nature of the land, not least whether it is irrigated or not. In the mountains, a farmer is expected to possess

more than 1.5 ha of irrigated land in order to produce a surplus (Dhaulagiri Irrigation Development Project b 1992). While average farm sizes seem to undergo a constant process of reduction due to land fragmentation, it is widely agreed that both hills and mountains are characterized by owner-operator farmers. Only 15 per cent of agricultural land in the hills is rented (in or out) (Central Bureau of Statistics 1997), and degrees of landlessness—in the sense of having no land at all—are low.

Official, national-level data suggest an agrarian structure with average farm sizes being relatively small; average sizes have been estimated at 0.7 ha for hills and 0.9 ha for mountains (Central Bureau of Statistics 2004). In the Dhaulagiri Zone, averages range from 0.41 ha in Baglung District, to 0.42 ha in Myagdi District, 0.44 ha in Parbat District and 0.47 ha in Mustang District (International Centre for Integrated Mountain Development *et al.* 2003). Another source suggests a slightly larger average size of 0.61 ha for the three hill districts (Department for International Development 2003). While, as already suggested, the hills do not exhibit severe concentrations of landholdings, the distribution of land nevertheless appears skewed. In the hills of Nepal, some 48 per cent of the farmers own more than 1 ha, 33 per cent own between 0.5 ha and 1 ha, and 19 per cent own less that 0.5 ha (Central Bureau of Statistics 2004). District-wise, comparative data, available for Baglung District only (but believed to resemble that of Parbat and Myagdi Districts), confirms much smaller than average landholdings compared with the national figure: some 15 per cent farmers own more than 1 ha land, about 21 per cent farmers own 0.5–1 ha land and about 61 per cent farmers have less than 0.5 ha of land. In absolute terms, the top 15 per cent of farmers in Baglung District own 55 per cent of the land, while the bottom 82 per cent of farmers own 26 per cent of the land (ESAP 2002).

5.9 The Institutional Landscape of the Dhaulagiri Zone

In this final section of the chapter, an overview of the institutional landscape of the Dhaulagiri Zone in the 1990s and early 2000s will be provided. As mentioned in section 4.2, manifestations of political and institutional life increased significantly throughout the democratic Nepal of the 1990s, compared with the monolithic patronage of Panchayat era (SAPPROS 2001), which, as Whelpton suggests, was modelled on other Asian forms of ‘guided democracy’ and “designed to allow an element of popular representation while the king ruled unhindered by the pressures of parliamentary democracy” (2005:101). As elsewhere in Nepal, the institutional plurality since 1990 in the Dhaulagiri Zone, in reaction to decades of centralist ‘development’, consisted of at least five major, parallel elements.

First of all, democratic decentralization involved elected District Development Committees, Village Development Committees and Municipalities[27] as a result of constitutional change. Secondly, what maybe termed, somewhat contradictorily, ‘privatization decentralization’, involving user groups such as irrigation associations, Non-government Organisations and ‘self-help’ groups, promoted by international donors and reflecting liberal ideology and concerns with ‘participation’. Thirdly, political associations, ranging from political parties to ethnic and caste-based associations, seeking to gain influence in the democratic political environment, as well as the Maoists, seeking to overthrow that environment. The private, commercial sector in the shape of chambers of commerce, trade associations and the media may be added as a fourth element: the 1990s saw an upsurge in associational activity in the private sector, fuelled to a large extent by the increase in commercial activity that has been described elsewhere in this chapter and, in the case of the media, the freeing

[27] In urban areas; only Baglung Bazaar is officially classified as urban.

of the press and its political backers. The fifth element consists of social/religious institutions that obviously existed prior to 1990, but which, as commented on later in this section, continued to undergo significant changes.

Table 4 below lists the most prominent types and categories of institutions and organizations that make up these five elements in the Dhaulagiri Zone from 1990 to 2002. The list is meant to provide an overview, and is based on interviews with Non-government Organisation staff in the urban areas of the Dhaulagiri Zone, on interviews with villagers (see chapter 9 for more details on the institutional setting in relation to irrigated communities), and on observations.

Table 4
Summary List of Institutions and Organizations in the Dhaulagiri Zone by Category, 1990–2005

Democratic/ Government/Public	Private/Individual/ Cooperative	Political	Commercial	Social/Religious
District Development Councils	NGOs	Legal political parties	Chambers of commerce	Caste
Village Development Councils	Registered user groups (irrigation, forestry, etc.)	Ethnic affiliations	Trade associations	Class
Baglung Municipality	Unregistered natural resource management institutions	Maoists	Media	Sharecropping
Line agencies	Cooperatives		Daily, periodic, commodities/labour markets	Land renting arrangements
Courts	Mothers' groups		Schools	Festivals
Chief District Office	*Dhikur**		Commercial networks	Temples
Police	*Parma***			Monasteries
Army				
Schools				
Health Posts				
Hospitals				
Village Assembly (Mustang)				
Higher Education (Baglung)				

*Notes: *Rotating credit associations. **Labour exchange arrangements.*

At the aggregate level, the table presents the institutional landscape and the spheres (public, private, political, commercial, social and religious) in the (rural) economy of the Dhaulagiri Zone that are spanned, utilized or which—sometimes as constraints rather than opportunities—influence the construction and the playing out of livelihoods, and the various mixes that may be obtained depending on 'power', endowments and entitlements. It follows from this that the categories and types of institutions obviously overlap in many instances, and that they are not mutually exclusive in terms of utility: user groups often function as platforms from which local elites gain access to representation in local government bodies; mothers' groups, as suggested in chapter 9, serve both

cultural and economic functions; *parma* or labour exchange groups (also chapter 9 for more details), informal as they may appear, are related to cropping regimes and markets labour markets; and so on.

One institution in particular, the *dhikur*, or rotating credit institution, has a particular local flavour. As suggested in previous sections, *dhikur* are directly related to livelihood construction, as vehicles for capital formation. As such, *dhikur*, in the context of the Dhaulagiri Zone, have undoubtedly contributed a great deal to the historical, regional, economic dynamics outlined in this section, not least in the shaping of spatially specific rural–urban economic linkages. *Dhikur* are also explained in more detail in chapter 9.

As social capital—defined as networks of social relations—most of the listed institutions appear to constitute assets that may affect bargaining and other forms of power, and probably levels of shared norms and identity among entire communities or among those included in specific institutions. In line with this proposition to view institutions as predominantly complementary, categorization into 'democratic/government/public' and into 'private/individual', where irrigation associations belong, should not be understood as directly dichotomous from a livelihoods analysis perspective, but rather as way of presenting the two most significant directions of institutional plurality since 1990. This is not to underestimate the importance of the 'inclusive' or 'exclusive' nature of institutions, when it comes to the ability of people to utilize these and to span institutional spheres. It is suggested, however, that even among the poorest, certain matrices of institutions are available (including the Maoists, ethnic associations and labour markets).

The issues of exclusion and inclusion lead on to the role of social 'vertical' institutions that are based on access to and control of productive means and, subsequently, caste and class. In the Dhaulagiri Zone, these relationships are chiefly manifest in labour arrangements that range from the hiring of labour on market terms to semi-feudalistic arrangements as central institutional elements, along with sharecropping and other land-renting arrangements. With some 20 per cent of the population of the Dhaulagiri Zone belonging to so-called occupational castes, the area is no exception in the Nepalese context, where institutions based on caste and class are indeed important determinants of the livelihood conditions of the poor, particularly—as suggested above—their abilities to span institutional spheres.

However, both the 'vertical' and the religious institutions continue to change as part of overall political and 'organized' institutional change. They do so as a result of changes in attitudes and ideas associated with factors that range from improved levels of information, social remittances associated with migration, and inclusionary practices on the part of development Non-government Organisations to the disruption of religious–cultural and oppressionary practices by the Maoists. The rise of the Maoist movement as a prominent element in the post-1990 institutional landscape in the Dhaulagiri Zone and elsewhere is closely related to the democratic space of the early 1990s that created substantial room for manoeuvre for the fully-fledged organization of leftist movements. It is also closely related to the persistence of feudalistic institutions such as those mentioned above and those that characterize the state machinery from central to local levels (see e.g. the quote by Gyawali, section 4.7.1). As mentioned in section 5.5.2, Maoist concentrations in the Dhaulagiri Zone are closely related to intra-zone inequalities and access (broadly understood), symptomatic of Nepal's east–west divide. However, even if the Maoists may not be (at the period of fieldwork for this thesis) directly in control in the eastern part of the Dhaulagiri Zone, i.e., along the main road where the irrigated communities of this investigation are concentrated, their influence is pervasive.

At the time of fieldwork for this thesis (2004–06), the Maoists arguably constituted the single most important institutional presence in the area, measured in terms of ability and ambition, with respect

to the exercise of power and control over institutional, social, economic and political life, from village-based cooperatives to district-based Non-government Organisations, along much the same lines as in Peru in the 1980s and 1990s (see Paerregaard 2002)[28]. As will be dealt with in more detail in chapter 9, this exercise of power, combined with the army's efforts to counteract Maoist influence (and in some cases replace it with army control) became a serious constraint to the pursuit of improved livelihoods.

Suffice it to suggest at this stage that the civil war had begun to render political and organizational life increasingly problematic around the turn of the century, resulting in a decline in interlinked economic and institutional activities. Talks with villagers in the hills at the time of the fieldwork revealed—in addition to a great deal of suspicion towards outsiders—that the aspirations, personal or collective, that fuelled a great deal of institutional activity in the 1990s and which often resulted in progressing livelihood trajectories, had increasingly been replaced by pessimism and frustration concerning the future. People had increasingly begun to doubt, in particular, their ability to become part of the 'modern world' as farmers.

5.10 Summary

The journey into the Dhaulagiri Zone was accomplished along the 'new' road with its combined metaphorical 'hopes of delivery' and concrete meanings. The road opened and facilitated market economic potentials in the area, and a blatant 'roadside bias' (Chambers 1983) sustained institutional activities and the political space upon which they were contingent by transporting projects and funds during the political-economic moment. The eastern area of the Dhaulagiri Zone, near the main transport artery and the district headquarters where most of the irrigated communities under study are located, thereby received a (disproportionate) share of public benefits throughout the 1990s.

It became apparent in the regional-level analysis that variation on a number of levels—west–east, north–south, caste, ethnicity, elevation, etc.—is a major characteristic of the area indeed. However, the initial focus on the road, or more specifically, the trade route on which its alignment is based, led to a focus on the common factors that continue to shape the region and its institutional landscape. It was established that communities with access to irrigation in the Dhaulagiri Zone distinguish themselves from other farming communities, chiefly by virtue of production characteristics (i.e., irrigation technology) that have developed in historical/spatially specific contexts (including the immigration of high-caste Hindus and the resulting ethnic geography). From these regional-level perspectives, the commonalities associated with livelihood conditions in the irrigated communities of the Dhaulagiri Zone (including access to markets and institutions, elevation-specific agricultural production characteristics etc.) were pointed out. The thesis is, therefore, now poised at the gate to the micro-level analysis that will follow in the next chapter.

[28] Because this area was not under complete Maoist control, events are probably not completely comparable with those of Peru. However, Paerregaard's depiction of Maoist control of institutional life in Alto Cunas, where the Shining Path "forced the villagers to dissolve the cooperatives established in the 1970s and to partition the communally owned sheep and cattle herds" (2002:64) bears some resemblance to the Dhaulagiri Zone in the early 2000s.

Chapter 6: The Irrigation Systems

6.1 Introduction

The regional analysis of chapter 5, points towards irrigated communities as distinct categories among a great deal of variation, social, political, cultural and otherwise. The micro-level analysis of this chapter will continue this narrowing down of the characteristics of irrigated communities, with a specific focus on the nine cases. In the previous chapter, we gained access to the 'local' by means of the road as a prominent conduit of change. In order to set the stage for the micro-level analysis, this chapter will introduce the hill and mountain settings, respectively, in the narrative fashion that also characterized the beginning of the previous chapter. In line with the temporal dimensions of the re-study methodology of this thesis, these brief accounts pick up on the pervasive notion of access to 'the external', often perceived as 'the modern', imaginary or real, that also featured in the narrative accounts of chapter 5.

However, I will first attempt to define 'the irrigated community' and its households as a meaningful analytical concept. It is argued that the cases may—despite economic and social divisions—be said to constitute 'communities', not least because of the shared conditions of production associated with common property regimes.

6.2 The Case Communities as Analytical Units

As mentioned in the methodology section, the units of analysis in this study consists of (1) the wider political economy, regionally, nationally and globally, (2) irrigation systems, understood to include interdependent physical and institutional-cum-social relational aspects, and (3) households with irrigated land living in these irrigation systems. Combined, the irrigation systems and these households are understood as communities. This is owing mainly to the presence of an irrigation system as the connecting, shared element that, in the case of cooperation-dependent irrigation, justifies the use of an otherwise contested and sometimes fuzzy notion of 'community' (see e.g. Agrawal and Gibson 1999 for a discussion), but also because irrigation systems are largely coterminous with settlement boundaries.

Because of the shared element and the distinct physical entities, the term community more adequately denotes the combined unit than, for example, 'village'. In addition, 'village' in Nepal is often associated with the wider administrative unit of the Village Development Committee, which usually covers several settlements, irrigated and unirrigated. In the present spatial context, each of the nine discrete populations that were sampled for the surveys in the 1990s and in 2004 represent an "identifiable community of interdependent users" (Feeny *et al.* 1990:4), by virtue of being "exclusive clubs" of detached settlements, nucleated or more scattered, but physically located in the immediate proximity of the irrigated area. Virtually all households in the analytical unit possess irrigated land, as observed elsewhere in the hills of Nepal (see Martens 1989). Therefore, 'community' in the analytical context of this study refers only to that particular, physically tangible, settlement of households with irrigated land that have access to the irrigation resources; those excluded from access to the irrigation resource reside apart from those included, often along the lines of the ethnic geography outlined in section 5.8.1.

In the hill communities, even households belonging to occupational castes, although often located at the fringes of the core settlements, tend to possess small plots of irrigated land, and are therefore included in the sampled population (N). Those who do not posses irrigated land tend to live in separate clusters, at varying distance from the core settlement. In the mountain communities, where

only a handful of families are occupational, all possess some irrigated land and reside in the core, nucleated settlement. In the following sections, the communities, the locations of which are evident from map 4, will be introduced in a south–north direction along the Kali Gandaki River. The hill and mountain community profiles, owing to substantially different characteristics, are presented separately, and each category is introduced in narrative style, in terms of archetypes.

6.2.1 An Episode: The Archetype Irrigated Hill Community

It was a hot spring day in 1995. Our project evaluation team of six persons was making its way up the stone steps towards the village of Pakuwa in Parbat District. Agitated shouting could be heard somewhere up the trail. The source of the shouting, it turned out, was a local farmer who, having met other farmers on the trail, was airing his frustrations about a cow, which he was bringing to the market to sell. The large black and white cow, seemingly of the Holstein-Friesian variety (known as 'improved' cows in Nepal), was unperturbed by the commotion and the complaints voiced against it: it did not yield half the milk that was promised, had cost a fortune and was constantly sick, did not want whatever fodder was available, could not cope with the heat, and, moreover, the medical bills were enormous; in sum, a useless cow. Seeing our team of outsiders approach, the farmer—apparently equating us with the kind of people who had, in the first place, recommended that he should purchase the improved cow—raised his voice even further, denouncing the advice of agricultural advisers and the like and pledging to stick to local cows forever. He rounded off his tirade by strongly suggesting that we buy the cow there and now and take it back down to where it (and we) came from.

The above is based on an actual, particularly illustrative event, but numerous examples of clashes between the 'modern–external' and the 'traditional–local'—notions that evoke dimensions of both access and temporality—could have been hit upon. Not least within the area of agricultural extension where the theoretical 'modern' recommendations of technicians—in Nepal and elsewhere—continue to be at odds with that of farmers for whom secure agricultural production is a key concern. The example is not meant to lead to a focus on asymmetrical information or appropriate technology but to illustrate how access to elements of the modern and the external may affect the lives and livelihoods of the communities investigated. These elements are, however, unlike the almost theatrical example of the man with his cow, not particularly visible: like other rural settings in Nepal, the case communities offer elements of a time warp, and one may feel, in the early 2000s, almost as Matthiessen did in 1972, "a century away" (see chapter 5). The following portrayal of the 'archetypal' hill setting is framed within these temporal contrasts.

At first glance, the archetype irrigated, subtropical hill setting—and one estimate suggests that there may be thousands[1] of such settings in Nepal—predominantly inhabited in this study by Parbatiya (hill Brahmin and Chettri) farmers offers a timeless pastoral setting: fields are tilled using century-old implements with bullocks as the main source of draft power; women carry heavy loads of firewood, fertilizer, crops, etc. in *doko* (baskets) on their backs; neat courtyards flank traditional mud-plastered houses; and the scent of cow dung and cooking, and the sounds of Radio Nepal (a reminder that we are not exactly a century away) played on transistor radios fill the air. None of the communities are electrified as such, but a few wealthy individuals may own small hydropower generating devices. The irrigated area, varying in its degree of terracing, depending on the gradient,

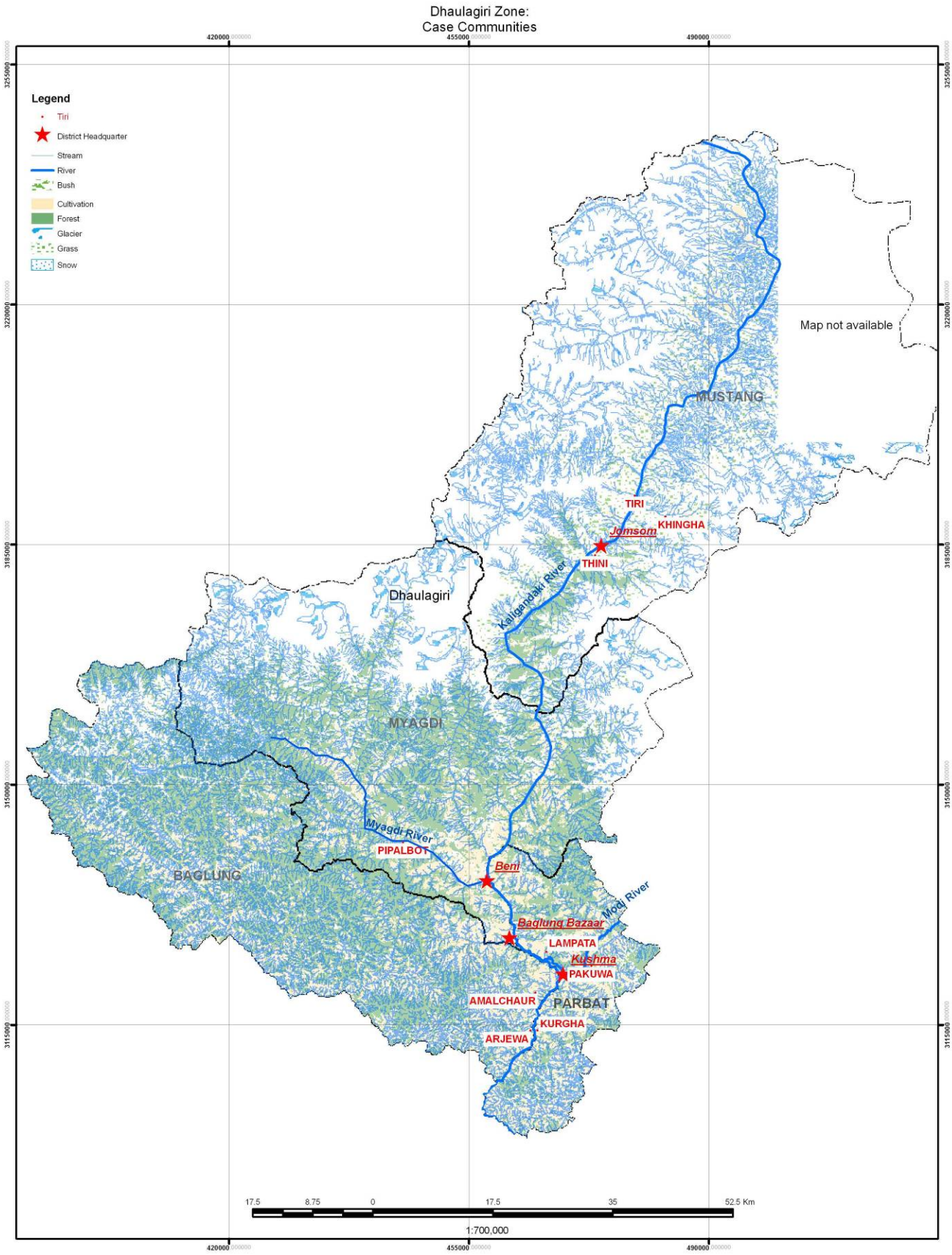
[1] The German Agency for Technical Cooperation (GTZ) has estimated that Dhading District alone has some 3000 farmer-managed irrigation systems. If, as Benjamin and Shivakoti suggest, "we consider Dhading as a typical district, and count just 60 (excluding the Himalayan districts) of Nepal's 75 districts to be similar, we would arrive at an astonishing number" (2002: 59).

technically known as the command area in engineering language, is colloquially referred to as the *khet* (irrigated land). It is usually so sufficiently small and contained that an overview of the hydrological system is easily obtained.

Typically, this *khet*, where chiefly wet rice, maize and wheat are grown, is fed by water originating in a stream that may be several kilometres away, and brought by a *khulo* (channel) cut by farmers into often difficult terrain, sometimes more than one hundred years before. In contrast to, for example, larger lowland systems, the water sources of these gravity systems tend to have ample water or to be dedicated to the community that they serve, which is also the community that developed the system in the first place. Inter-community water conflicts are therefore largely absent, although they do occur occasionally, particularly if attempts are made at using upstream water for water mills or micro-hydro (electricity-generating) devices.

The houses, often surrounded by small kitchen gardens, tend to be located away from the highly productive land, scattered on the sloping land above the command area, a location that also facilitates the one-way transportation of manure from the cattle kept at the farmstead to the fields below (Bishop 1990:165). Here and further up the slope we also find the *bari* (unirrigated land), where dry rice, maize, and at higher altitudes, millet are typically grown. Forested areas in the vicinity of the houses may be sacred and contain small Hindu temples; additionally, most houses and courtyards will contain areas dedicated to worship. Depending on the size of the community, it usually contains one or more shops selling basic goods, from slippers to batteries to torches and instant noodles, and (often combined with retail shops) teashops where, in addition to tea, meals of *dhal bhat* (rice and lentils) may be had, if ordered in advance. Often these shops will be in the vicinity of a *chautari*, or a platform built under a shady tree, that constitutes a public space where men tend to gather, and where village meetings may take place.

Map 4
Case Communities



6.2.2 Hill Community Profiles

The above introduction to an irrigated community in the hills is distilled from the following community profiles that aim to familiarize the reader with the overall setting. The focus in the presentation is on location, access, ethnic composition, and irrigation history.

Pakuwa

The location of Pakuwa in Parbat District, less than one-hours walk from the main road and another half-hour by bus from Kusma (the headquarters of Parbat District), and at an altitude of some 1200 m, makes it one of the most accessible of the studied communities. Pakuwa is approached via a suspension bridge over the Modi River, and a steep ascent through a profusion of green leads straight into the command area of 55 ha, located on a *tar* (a flat area at mid-slope) above the river. 122 households (with 732 people) possess land in the command area, two-thirds of these are Brahmin, and most of the rest are Chettri and Thakuri (a high-caste claiming to be of royal origin): only one lower-caste household, a Kami (smith), resides in the community and has irrigated land.

Controlled and common-property-regime-based irrigation[2] is relatively new in Pakuwa. The present scheme, fed by a 3.5 km channel from the Jahare River, was developed with the assistance of the then District Panchayat in 1979, and was rehabilitated (involving mainly cement lining and concrete culverts) in the period from 1991–92 under the Dhaulagiri Irrigation Development Project. A water users' management committee was registered in 1991 (Dhaulagiri Irrigation Development Project 1996). According to farmers, improved water control had, by 2004, resulted in expansion of the *khet* by some 25 per cent. The close proximity of the road and subsequent market access has resulted in some cropping diversification; most significantly, a majority of farmers sell potatoes in Kusma. The average landholding size at 0.36 ha is below the average for the district (0.44 ha) (International Centre for Integrated Mountain Development *et al.* 2003). Pakuwa used to have a Junior Technical Assistant (from the Department of Agriculture) but the post was transferred in 1999. A school and a health post remain.

Lampata

Lampata in Parbat District is practically as accessible as Pakuwa. It is located less than one-hours walk from the main road between Kusma and Baglung, and less than half-an-hour by bus from the former, at an altitude of some 900 m. The vast majority of the 60 households (360 people) who have land in the 30-ha command area are Brahmin and Chettri; no lower-caste households have irrigated land. As in Pakuwa, controlled irrigation is relatively new in Lampata, where, the first channel ('the upper') was constructed in 1965, apparently by the community itself, and the second 1.5-km channel ('the lower') was constructed (rather than simply rehabilitated)[3] with the assistance of the Dhaulagiri Irrigation Development Project from 1992–93. Several minor landslides along the alignment of the lower channel mean that it is predominantly used in summer. A water users' management committee was registered in 1992. The addition of the second channel led to the expansion of the command area by some 30 per cent, according to farmers. Farmers in Lampata report substantial crop diversification over the past decade, from 2–3 crops (wheat, maize and rice) within the *khet* area to vegetable and potato farming in and outside the *khet*, much of which is sold

[2] As opposed to irrigation that relies on a multitude of small streams and springs for individual or clusters of fields.

[3] The scheme, however, figures as 'rehabilitation' rather than new in the DIDP records; probably because of the addition of an extra channel to an already irrigated area rather than the introduction of irrigation to an area.

in nearby Kusma. The average landholding size of 0.44 ha corresponds with the average for the district. A school is the only public facility in the community.

Amalachaur

Reaching Amalachaur in Baglung District involves walking for an hour from Kusma along a mule trail. The command area of 35 ha, at 1100 m, is located on the western bank of the Kali Gandaki River and is farmed by 102 households (625 people). As in the neighbouring irrigated communities, the vast majority of farmers are Brahmin, followed by Chettri. However, somewhat uniquely in the context of irrigation in this area, some low-caste Majhi (fisherfolk) households have land in the command area. The average landholding sizes of 0.34 ha compares with 0.41 ha for Baglung District. As in Lampata, the command area is divided into an upper and a lower part. The history of the system is unclear, but informants agree that it is at least 100 years old. The Dhapa River feeds a 1.2-km channel that services both parts of the command area, and which was rehabilitated under the Dhaulagiri Irrigation Development Project between 1992 and 1993 (Dhaulagiri Irrigation Development Project1996).

According to farmers, the system worked well until 2001 but increasingly seepage has meant that the lower part has been getting most of the water during winter. The command area has not been expanded since rehabilitation but, as elsewhere, farmers report cropping diversification, from two main crops of maize and paddy, to another main crop of wheat in the *khet*, and a growth in minor crops such as potatoes and vegetables inside and outside the *khet*. The relatively large village of Kusmi Sera, located less that one-hour walk from Amalachaur, represents the closest market centre. However, the majority of crops are sold in Kusma which, like other district headquarters, has experienced substantial growth. A primary school is located in Amalachaur; other facilities are located at Kusmi Sera and Kusma.

Kurgha

To reach this relatively large irrigated community with an 80-ha command area at 1100 m in Parbat District, we have to again start at Kusma and, depending on the season, walk (three hours) or drive (1–2 hours) along a seasonal road, southwards along the western bank of the Kali Gandaki River, via the sizeable settlement of Phalebas. The 234 households (1170 people) with land in the command area are fairly dispersed on a slope above the command area; except for one lower-caste household, all are Brahmin. The 3.3-km irrigation channel dates back to 1933, when an individual named Chiranjibi Poudel “with the expectation of being blessed with a son in return for his pious deed”, as the present water users’ management committee chairman explains, donated cash and kind, and initiated work on the channel with labour contributions from people in the village. The channel was rehabilitated under the Dhaulagiri Irrigation Development Project from 1991–93, during which period a water users’ management committee was formed.

Shortly after rehabilitation a landslide occurred[4], and the project (in 1993) laid down pipes in the fragile area of the slide. The irrigation system, according to farmers, then worked well until 2003, when construction of a *katcha* (earthen) road caused yet another landslide. However, after repairs, the system is in order again, even if leaking occurs. Water supplies are not a problem in summer, but in winter farmers resort to tapping water from various sources for individual fields that average 0.29 ha (2004), a figure well below the district average of 0.44 ha. As in other communities, farmers report substantial diversification. Most farmers grew only two main crops (maize and paddy) prior

[4] Whether the landslide was actually caused by the rehabilitation works remains unclear.

to rehabilitation, now wheat has been added as another main crop, and vegetables, potatoes and mustard as minor crops. The irrigated area, however, did not expand as a result of rehabilitation. Kusma represents the most important market for products. Kurgha has a number of schools, public and private; a lower secondary school and a police station (though now closed as a result of Maoist activity) are located in nearby Phalebas.

Arjewa

Located four-hours walk from Kusma, opposite Kurgha on the eastern bank of the Kali Gandaki River in Baglung District, at approximately 1000 m, on a *tar* that overlooks the river, this relatively small system with a command area of 20 ha is farmed by 126[5] households (800 people) who hold on average 0.16 ha, a figure that is remarkably low, considering the district average of 0.41 ha. This community also stands out from those introduced so far by not being Brahmin-dominated; 75 of the households are Chettri, and the remainder are Brahmin. Also unlike other communities, houses are interspersed with the command area. Accounts of the history of the system vary; some think that it dates back to the 'days of the small kings'[6]. Others suggest, equally imprecisely, that it is at least three generations old.

No outside assistance had been received until that of the Dhaulagiri Irrigation Development Project. A water users' management committee was formed in 1992, and by early 1993 the 0.5-km canal had been lined with cement (Dhaulagiri Irrigation Development Project 1996), and—because of the low-yielding spring that is the source of water—a storage tank had been constructed. These works did mean better water supply and control for the first couple of years. However, the first leak occurred in the tank in 1996; this was subsequently repaired by the project, but by 2004 more leaks had rendered the tank redundant. To make matters worse, landslides have swept away parts of the canal; in these parts, pipes have been laid down. Rehabilitation has not resulted in expansion of the irrigated area, nor has the main cropping pattern changed and unlike neighbouring communities cultivation of vegetables has not caught on. There is a school in Arjewa, and the nearest market is in Kusma.

Pipalbot

To reach Pipalbot (1100 m) in Myagdi District we have to travel some distance northwards along the Kali Gandaki River to Beni, the capital of Myagdi District, and walk for some five hours in a north-westerly direction along the Myagdi River, passing through numerous irrigated communities located in the river valley. The mule trail that eventually leads to the high pasture of Dhorpatan is good, and was built in the early 1990s under the Dhaulagiri Irrigation Development Project; in the dry season, it is passable by jeep up to the bazaar of Babiachaur, one hour before Pipalbot. The ethnic composition in Pipalbot indicates that we are now on the fringe of the Parbatiya heartland. More than half of the 75 households (600 people) with irrigated land are Magar (Tibeto-Burman) and the remaining are Brahmin and Chettri.

---

[5] There is a significant discrepancy between DIDP data on the number of farmers in Arjewa with land in the command area and that of the present survey. The DIDP records suggest that 60 households share the 20 ha of command area, whereas the present survey found the number of households to be 126. However, as the figure of 0.16 ha per average holding is fairly consistent throughout the data and may also be arrived at by dividing 20 with 126, it would appear that 0.16 ha is the most plausible figure. Besides, interviews in the community confirmed that plots are rather small.

[6] This refers to the ancient principalities that became integrated into greater Nepal during the process of unification from 1744–1810. The status of the (vassal) principality was finally abolished in Nepal in 1960 (see Ramirez 2000b).

All the high-caste Parbatiya in this area live and work in the valley bottoms as irrigated farmers, and some of the Magar, who otherwise predominate in the settlements at higher altitudes, have adopted irrigated agriculture (see section 5.8.1). The 75 households farm plots that average 0.41 ha (lower than the district average of 0.44) in the 33-ha command area. The exact history of the irrigation system is unknown ("it was built by our forefathers more than 100 years ago"). Fed by a minor tributary of the Myagdi River, the 2.5-km canal was rehabilitated from 1992–93. A water users' management committee was formed and registered in 1992. The system performed well for the first nine years after rehabilitation, a period which saw the introduction of maize and wheat, in addition to the already cultivated paddy in the irrigated area, and expansion of the irrigated area from the original 31 to 40 ha.

However, the intake to the channel and parts of the channel itself were severely damaged in a flood in 2002, and the command area was reduced to the present 33 ha. As in other communities, farmers report significant diversification into minor crops. These used to be transported to Beni, but strongly increased militarization in the area since 2002 has made road transport somewhat irregular. The militarization is another factor that indicates that we are on the fringe of not only the Parbatiya-dominated area, but also the 'central parts' of the Dhaulagiri Zone. At the time of investigation, the Maoists operated out of the Darbang area a few hours beyond Pipalbot to the north-west, and with the military operating out of Beni to the south, this situated Pipalbot in a fluctuating combat zone. While a school and a health post remain in the area, other infrastructure such as a forestry office and an agriculture office has retreated to Beni.

Basic community profile information for the hills is summarized in table 5 below.

Table 5
Basic Data, Hill Irrigated Communities, 2004

Community	Irrigated Households	Average Irrigated Landholding Size (ha)	Main Ethnic Groups	Total Population
Amalachaur	102	0.34	Brahmin, Chettri	625
Arjewa	126	0.16	Chettri, Brahmin	800
Kurgha	234	0.29	Brahmin, Chettri	1170
Pakuwa	122	0.36	Brahmin, Chettri	732
Lampata	60	0.45	Brahmin, Chettri	360
Pipalbot	75	0.41	Magar, Brahmin	600

Source: Cross-sectional Survey 2004; Key Informant's Survey2004

6.3 An Archetype Irrigated Mountain Community

The archetypal mountain setting (based on the areas of Pacgau and Baragau) offers an equally timeless impression to that of the hills: *mani* walls (rows of Buddhist prayer wheels on a wall) greet visitors to settlements that are nucleated with narrow lanes and archways separating large, two-storey houses with flat roofs (where firewood is stored). These houses are where life during daytime, when heavy winds prevail, tends to be lived. Fields are tilled using implements equally traditional to those in the hills as well as draft power based on hybrids between normal cattle and

yaks known as *jho*. Unlike in the hills, however, both men and women carry heavy loads in *doko* (baskets).

Most work is carried out before 10 a.m. when winds have not yet risen and after 5 p.m. when they have died down. These winds define daily cycles, and the Kali Gandaki River and its tributaries, along which all arable land is located, define human habitation under conditions that are progressively more arid in a south–north direction. Hence a settlement equates with access to irrigation, and close to 90 per cent of the arable land is irrigated. Barley, naked barley, buckwheat and sometimes maize, as well as apples are grown under oasis-like conditions (see Messerschmidt 1995). As in the hills, water is brought to the *khet* via ancient *khulo*, but in the mountains the canals are often in fragile terrain, sometimes involving tunnels through rock, and alignments along steep and unstable cliff-faces which, when landslides occur, pose complex technical problems.

While the people, who generally refer to themselves as either Thakali or Gurung, belong to different clans and have notions of high and low social standing, caste identity is not as much an issue here as in the hills; everyone lives in the same nuclear settlement, including occupational people. The settlements, particularly those close to the Kali Gandaki River, have electricity, and where transistor radios blare in the hills, it is television sets that provide news and entertainment in the mountains. Shops are also considerably different from hose in the hills in that—in addition to the ubiquitous instant noodles, biscuits and slippers—the range of alcohol (some of it bottled locally) and beer (sometimes Chinese from across the border to the north) is impressive, despite the fact that many households have distilleries of their own. The settlements often possess squares where meetings may be held, but otherwise social life is focused around the *gompa*, the Buddhist monastery, the presence of which, it appears, is almost as defining for human habitation as irrigation.

6.3.1 Mountain Community Profiles

Thini

Reaching Thini involves three days of walking northwards from Beni in Myagdi District, along the Kali Gandaki River and a relatively steep ascent. Part of the walk, follows the western fringe of the Annapurna Circuit trekking route. At the point where the route passes through the ‘deepest gorge in the world’ and transcends from the hill ecological zone, on to the increasingly arid mountain ecological zone, trekkers of all nationalities mix with trains of mules, huge flocks of sheep, seasonal migrants, porters carrying impossibly heavy loads and groups of riders on small, sturdy horses. It is along this funnel-like route that the meaning of the Kali Gandaki corridor[7], as a relatively demarcated geographical band, with steady directional flows defined by historical north–south economic linkages[8], stands the clearest. Emerging from the gorge, the Thak Khola Valley opens up and the remaining trip to Jomsom, the administrative headquarters of Mustang District, may be completed along a motorable road. Thini (2800 m) and its relatively large command area of 93 ha is a 30-minute walk from Jomsom, on the western side of the Kali Gandaki River.

[7] The planning concept that originates from Nepal’s Fourth Development Plan (see chapter 5).

[8] The traditional salt/grain trade with Tibet, described in section 4.5.1 having been replaced, to a large extent by tourism (see Vinding 1984 , Haffner *et al.* 2003)

The white, flat roofed two-storey houses in the nucleated settlement that constitutes Thini village are perched on a slope above the *khet*. 167 households have irrigated land[9] in the *khet*; 100 of these households belong in Thini, the remaining are in Jomsom[10]. They farm plots that average 0.56 ha, close to the district average of 0.47 ha. The vast majority (80 per cent) claim to be Thakali and most of the rest refer to themselves as Gurung (both of whom are groups of Tibeto-Burman descent) except three occupational caste households (of Parbatiya descent)[11]. Buddhism predominates, as witnessed by the existence of a large monastery above the village, but Hindu festivals are increasingly being observed.

The irrigation system is as old as the settlement of Thini[12] and the 3.2-km channel that diverts water from the Thini River, along an almost barren, rocky slope, was rehabilitated by the Dhaulagiri Irrigation Development Project from 1992–93. A water users' management committee was registered in 1992. Apart from culverts, this did not involve much cementing of the channel itself (which has been cut out of rock), but rather a great deal of stabilization work in the landslide-prone environment, and securing of the intake from floods[13] with gabion boxes[14]. This has not led to any expansion of the irrigated area, but to a steady water supply and far fewer labour inputs compared to the pre-rehabilitation period. Four main crops are grown in Thini; wheat and naked barley as winter crops, and maize[15] and buckwheat as summer crops. Apples are grown in orchards on the fringes of the command area, as are vegetables. The administrative and tourists centre of Jomsom represents an important market for Thini. Apart from Thini's own school and a reputed health centre, a wide range of services is available in Jomsom.

---

[9] The arid physical conditions of Mustang mean that agriculture (except for forest crops) is only possible with irrigation; hence, practically all households in Thini have some irrigated land.

[10] This sharing of a command area by two settlement is a unique feature in the context of the cases examined in this study. The Jomsom residents who have land in the command area mainly reside in 'Old Jomsom' to the north of 'Jomsom Airport'. Both Jomsom and Thini residents are included in the sample survey, but the qualitative investigation has mainly taken place in Thini itself. This is because a great deal of the interaction took place around the irrigation channel that runs along the fringe of Thini village, and because more key informants were available in Thini.

[11] The ethnic origins of the residents in Thini are not always clear, and ethnic claims on the part of certain groups are often contested by other groups. Among anthropologists the definitions are contested as well: Vinding (1998) in his discussion of the topic arrives at the conclusion that there are three subgroups of the largest ethnic group, the Thakali (Tamang, Mawatan and Yhulkasompaimhi Thakali); these politically and financially dominant groups are concentrated south of Jomsom in what is referred to as Thak Khola, i.e., the southernmost part of Mustang. They use well-known clan names. The Towa who originate in Tibet are the second largest group, and have resided all over southern Mustang, including Thak Khola, for quite some time. Some of the Towa call themselves Thakali (which 'real' Thakali do not) and others Gurung. The third most prominent group appear to be what Vinding refers to as people who are 'culturally Tibetan' (Vinding 1998:27), i.e., Tibetan speakers who predominantly reside in northern Mustang, but who, like the Towa before them, increasingly migrate southwards as part of a north–south migration dynamic.

[12] Which was apparently, at some point in time, shifted from a geologically unstable location immediately south of the present location; exactly how old the present village is has been difficult to ascertain, but it is one of the original five settlements of Pacgau ('five villages') in Thak Khola (the area from Cimang in the north to Dhyuda in the south). See Vinding 1984, 1992.

[13] A major flood destroyed the intake in the early 1980s, and securing the intake was, until the DIDP intervention, an extremely labour-consuming task.

[14] Stones and boulders collected from the riverbed and placed into brick-shaped 1-m^3 'boxes' held together by wire.

[15] Maize is increasingly replacing buckwheat as a major crop, apparently because it requires less labour than buckwheat, but probably also because imported rice is replacing buckwheat-based food as a main staple.

Tiri

At 3000 m, this hamlet with 79 people on the western bank of the Kali Gandaki River is one of 12 villages in the area of Baragau ('12 villages'), located four-hours walk north of Jomsom. Tiri is located in the so-called restricted[16] area, beyond the strategically located village of Kag Beni, which demarcates Upper Mustang from Lower Mustang. Eleven households out of 14 have land in the command area of 11 ha, with plots averaging 1 ha. All farmers are Tibetan speakers and, unlike the more syncretic Thini–Jomsom area, Tibetan Buddhism prevails in Tiri, which has an old monastery, perched on a small ridge above the community. The irrigation system, in addition to its agricultural purposes, serves as a source of drinking water (and as such provides the *raison d'etre* for the settlement). Prior to Dhaulagiri Irrigation Development Project involvement from 1992–93, when a water users' management committee was registered, the system had an exposed canal that was often blocked by boulders and subject to substantial water loss from seepage and evapotranspiration (the combined loss of moisture from plants and soils). Under the project, a pipe was laid down from the intake 700 m along a gorge above the village, sink boxes were installed, and a storage tank built close to the village. According to farmers, these works have resulted in a doubling of the water supply. Due to wind erosion, the command area could not be expanded as a result of rehabilitation; however, the naked barley/barley (winter) and buckwheat/maize (summer) cropping regimes have become more secure. Vegetables, apples and other minor crops are negligible. Tiri has a small school.

Khinga

At 3450 m, Khinga with 245 residents is the highest of all the irrigation systems that the DIDP became involved with, and is among the highest in Nepal. Like Tiri, Khinga is located in the Baragau area, five-hours walk from Jomsom. Trekkers and pilgrims pass by Khinga *en route* to the holy site of Muktinath and the Thorung pass, which separates Mustang District from Manang District. While the steady flow of travellers may be a source of entertainment, the economic benefits to Khinga of this transit traffic are limited to the operation by a teashop-cum-hotel by one villager and the sale of some agricultural products to tourist restaurants in adjacent villages. The 34 Tibetan-speaking Gurung households, all possess irrigated land in the 45-ha *khet* and operate 0.76 ha on average.

The irrigation system was constructed when the village was shifted to its present location from a landslide-affected area nearby, some 200 years ago. The 2.7-km channel, which diverts water from the Uungbu River, was rehabilitated under the DIDP from 1992–93 (DIDP 1996), and involved a combination of cement lining and the laying down of pipes in landslide-prone sections of the alignment. The rehabilitation has, according to farmers, resulted in a substantially increased water supply (despite the fact that a number of landslides have occurred recently), although not in any increase in the irrigated area. The valley in which Khinga is located creates protection from the otherwise heavy winds of Mustang District and, despite the altitude, creates a beneficial micro-climate for a cropping regime that (in addition to naked barley)—unlike in Thini and Tiri—allows for the growing of wheat in winter. Buckwheat predominates in summer, and apples, vegetables and

[16] Upper Mustang, which protrudes into Tibet, was until some decades ago a rather 'sensitive' border area because Mustang was home to Central Intelligence Agency (CIA)-sponsored guerrilla forays into Tibet in the 1970s (for details Google 'khampas, cia, mustang or search articles at www.nepalitimes.com); the reason for keeping Upper Mustang as a restricted area these days seems to be money. Foreign visitors pay about US$ 80 per day to the central authorities and, as with other restricted areas, limited access reproduces the Shangri-la myth of the 'forbidden kingdom' of Mustang.

potatoes are common. The people of Khinga are affiliated with the large monastery in adjacent Jharkot, where the school is also located. For other services, Jomsom is the nearest place.

Basic community profile data for the mountains are summarized in table 6 below.

Table 6

Basic Data, Mountain Irrigated Communities, 2004

Community	Total Households	Average Irrigated Landholding Size (ha)	Main Ethnic Groups	Population (Irrigated)
Thini	167	0.56	Thakali, Gurung	1254
Tiri	11	1.10	Gurung	79
Khinga	34	0.76	Gurung	218

Source: Cross-sectional Survey 2004, Key Informant's Survey 2004

Chapter 7: The Workings of the Irrigation Systems

7.1 Introduction

Following the introduction to the irrigated communities in the last chapter, this chapter will contain analysis of the nature, the significance, and the workings of irrigation systems in the study area. In other words, I will now follow up on what was noted in section 5.2, i.e., that the intensity of cultivation and the location of dwellings and fields in the extremely difficult terrain suggested something more than the mere physically tangible. And that, in particular, the terraces and irrigation systems on the sides of valleys suggested dynamics associated with ancient agricultural and engineering skills and, above all, modes of organization.

Analytically, we will remain at the level of the internal workings of the irrigation systems, with a focus on what may be termed enduring features associated with irrigation system organization, and the relationship between irrigation system activities—particularly those associated with water distribution, operation and maintenance—and the agricultural cycle. The use of the term enduring in this context is not meant to suggest stability or stagnancy or even assumptions of homogeneity across systems; indeed, as will be evident later on, emphases and practices vary a great deal across systems and change over time. Rather, the intention is to identify and describe some of the more generic, critical activities that take place in irrigation systems, and enable these systems to function productively. This identification is part of the construction of an analytical framework that enables analysis of performance in the next chapter.

The chapter introduces a framework for analysing irrigation system activities at the internal level. It is based on the highly grounded and pioneering—in the context of Nepal—documentation of the workings of irrigation systems provided by Martin and Yoder (1988b) in their studies of the Raj Khulo and the Thulo Khulo irrigation systems in the hills of Palpa District south of the Dhaulagiri Zone. Martin and Yoder's detailed research, carried out in 1981–83, was seminal in that (at least to my knowledge) it documented the dynamics of 'indigenous' irrigation for the first time in the context of Nepal and, in doing so, provided an analytical and conceptual framework that still holds.

While the focus on analysing activities internal to irrigation systems is akin to the 'internal workings' tendency noted within the collective action school (see section 2.3.1), Martin and Yoder's multi-disciplinary approach[1] differs from that of the neo-institutionalist and public choice approaches of the collective action school by virtue of its emphasis on understanding irrigation institutions as functions of the physical, social and economic environment, rather than the aggregate outcome of the agencies and interests of individuals. They recognize "that institutions are needed for the development and operation of irrigation systems" (1988b:148) as they serve regulatory functions and facilitate aggregation of resources beyond individual capacity, and that institutions are made up of norms and behaviours, persisting over time to serve collectively valued purposes. The analytical framework is explained in more detail in section 7.4

7.2 Irrigation in the Dhaulagiri Zone

It rains a lot in certain parts of the Dhaulagiri Zone. At the weather station in Lumle, less than 20 km (as the crow flies) from Pakuwa (see map 4), rainfall amounts to some 6 m per year

[1] Their works on irrigation may be characterized as socio-technical in nature. However, while using quantitative, natural science methods, their works also contain a great deal of the 'qualitative' characteristics along the lines of what later became known as informal methods (including Rapid Rural Appraisal, Participatory Rural Appraisal etc.).

(Benjamin 1992). While local micro-climatic factors may mean some variation in the six hill communities, not least in the pre-monsoon periods, rainfall during the monsoon is quite a deluge. In the hills, the sharply defined seasons, particularly the four months of monsoon rains from June to September, define the agricultural cycle with wet rice production as a very central element. During the winter season from October, it rarely rains, except sometimes during January when there may be a drizzle for a few days. Intermittent rain starts occurring as the heat builds up in April and May before the actual onset of the monsoon in mid-June, but these violent burst of precipitation that often include hailstorms are unreliable and sometimes do more harm than good to crops. In the mountain communities of Mustang District, located in the rain-shadow of the Himalayas, monsoon rains may 'spill over' from the hills to some extent, but precipitation (often as snow in the winter) rarely exceeds 200 mm per annum[2].

Regardless of the amounts of rain received, irrigation in the hills and mountains of Nepal is, as elsewhere, about water control—about being able to supply water to a given crop when that crop needs it—irrespective of the vagaries of rainfall. Irrigation in Nepal as elsewhere is, as defined by Stern, "any process, other than natural precipitation, which supplies water to crops, orchards, grass or any other cultivated plants" (1989:13). The type of irrigation that characterize the hills and mountains of Nepal is referred to as surface or, more precisely, gravity irrigation: surface because water is applied at ground surface level (as opposed to sub-soil irrigation), and gravity because we are dealing with falling water that is brought to the irrigated surfaces without any need for pumps.

The fact that we are in an environment where water, as a result of topography and climate, is indeed falling—along often steep slopes, in creeks and rivers fed by upstream lakes or glaciers and, of course, directly from the sky—serves to emphasize that the growing of crops depends on the ability to control the flow of falling water. The water has to be directed, retained and drained sensibly. Terraces are effective means of such run-off interception, irrespective of whether the fields on the terraces are upland, i.e., unirrigated (depending on rainfall only), or irrigated, i.e., connected to a system whereby water, in addition to rainfall, is brought to a field by means of a main channel and a subsystem of distributary channels. As explained in earlier chapters, upland types of fields are generally known in Nepali as *bari*, while irrigated fields (or rather interconnected systems of fields) are known as *khet*[3]. In this study, we are concerned with *khet*, where the term is also used interchangeably with the irrigation engineering term 'command area' to denote what is always a concentration of irrigated, fields connected in a hydrological system where the flow of water is controlled.

Yoder, in his 1984 description of the process of constructing irrigated terraces in the hills of Nepal captures the challenges associated with steep terrain and water control:

> "The most striking feature of irrigated agriculture in the hills is the terraced fields. To grow flooded rice, fields must be levelled and bunds build to hold the water. Tremendous labour has gone into reshaping the hill slopes into bunded terraces. This work is usually done by an individual cultivator's family, although a wealthy landowner may hire labour or have it done

[2] According to farmers in Thini, the southernmost of the three communities studied in Mustang.

[3] Aubriot (2000) defines *khet*, in the context of the hills, as a field planted with wet rice at least once a year. Martin and Yoder (1988b) define *khet* as fields that have been terraced for the cultivation of flooded rice. However, in my experience, farmers refer to *khet* as fields that are usually, but not always terraced, it depends on the slope. Because of this and because the current study also deals with irrigation in the mountains, where rice is not grown (but where farmers also refer to their irrigated fields as *khet*), I prefer the latter, broader definition of *khet* that is based on a farmer's perception of what constitutes *khet* land.

on contract. In the past, corvee labour may have been the major input for the construction of terraces. Terrace building usually does not begin until the irrigation channel is complete and it is certain that it will operate. Then year by year the terraces are built as labour is available. Expansion continues to the extent that there is enough water to irrigate or until all the land available to those who have the right to use the irrigation water has been converted into terraces. The terraces are built by constructing a rock or earth wall and then cutting away at the slope to make a level platform. If the hill is steep, terraces must be narrow. The soil type determines to a great extent the slope of the outer wall of the terrace. It is made as steep as possible to minimize the amount of land used by the wall and bund, but if it is too steep it may break when it is flooded" (in Benjamin and Shivakoti 2002).

The process for gaining access to and controlling irrigation water described above was, as mentioned in chapter 5, introduced to the hills of the Dhaulagiri Zone by Parbatiya or Hindu groups as a technology for growing wet (paddy)[4], rice. In that sense, irrigation is intimately associated with agrarian change and agricultural development in Nepal (Pradhan *et al.* 1987), as its introduction heralded intensification of agricultural production, along the lines of Boserup's (1965) observations that, for populations dependent on agriculture, intensification tends to take place in response to population growth. In both the hill and the mountain communities, many of which are characterized by food insecurity, a larger degree of certainty to water supplies is also closely related to a constant struggle to minimize risks in an unpredictable environment.

The history of irrigation in the mountains is not particularly well described; however, it may be assumed that irrigation (although obviously not wet rice technology, as rice cannot be grown at this altitude) has been a feature in even early-recorded settlements[5] in the arid environment. Accordingly, in addition to improved water supply certainty and risk minimization—factors that apply to both hills and mountains—the fact that irrigation is an input without which agriculture is largely impossible is an added dimension for farmers in the mountains. The main characteristics of the study's irrigation systems are summarized in table 7 below.

[4] Originally a Malay word (*padi*) I use the terms paddy rice and wet rice interchangeably

[5] Huttel 1994 (in Vinding 1998) reports that people in the historic settlement of Khalun were engaged in farming around the 10th century. Considering the arid nature of the area, it is difficult to imagine, then as today, farming without some irrigation.

Table 7
Basic Characteristics of Irrigation Systems, 2004

Community	Altitude (m)	Channel Length (m)	Command Area Size (ha)	Age of System
Amalachaur	1100	1200	35	100+
Arjewa	1000	500	20	n.a.
Kurgha	1100	3250	80	71
Pakuwa	1200	3500	55	25
Lampata	900	1500	30	41
Pipalbot	1100	2500	31	100+
Thini	3000	3200	93	100+
Tiri	3000	700	11	100+
Khinga	3450	2700	45	200

Sources: Cross-sectional Survey 2004, Key Informant's Survey 2004

All the systems accounted for in table 7 are small-scale[6], ranging from the 11-ha command area of Tiri to the relatively large 93-ha command area of Thini. In official terms, all systems belong within the category of *farmer-managed irrigation systems* as opposed to *agency-managed irrigation systems*, the latter typically being large scale, and developed and managed in Nepal by the government (within the last 4-5 decades) and usually located in the *terai*. Most farmer managed irrigation systems in Nepal are characterized by diversion structures[7] at the intakes to the irrigation channels that are temporary (and often washed away during floods after which they are repaired again), and earthen channels that may be prone to seepage. However, following DIDP rehabilitation, all the above systems are characterized by more permanent diversion structures and cement-lined channels.

7.3 Irrigation and the Agricultural Cycle

While irrigation is crucial for any agricultural production under the temperate and arid conditions of the mountains, the main direct benefit of irrigation to farmers in the subtropical hills of Nepal is higher and less variable yields per unit of land, particularly as regards wet rice, but, also in the case of other crops (see, for example, Angood *et al.* 2002, Martens 1989, for 'with' and 'without' situations). Another direct advantage (see chapter 8) is the ability to cultivate additional crops over the year. This beneficial role of irrigation has to be understood in the context of the agricultural cycles of the hill and mountain areas, respectively.

[6] In official terms, an irrigation system in the hills with a command area of less than 500 ha is classified as small-scale.

[7] I.e., the structures that divert water away from the river into the irrigation channel (also known as the headworks at the intake) or structures that divert water from one channel onto another (such as weirs).

The agricultural cycle as practiced in the six hill irrigation systems, although in varying mixes, is shown in table 8 below. Natural conditions for irrigated agriculture are quite uniform. The conventional irrigated cropping regime that consists of maize, rice and wheat is divided into three seasons: pre-monsoon, monsoon and winter. Taking the pre-monsoon season as a point of departure, maize is usually sown in March–April. The maize may be irrigated at the time of sowing to facilitate germination, but this is usually not required because the first thundershowers, occurring as the heat builds up, have moistened the ground; furthermore, in the far reaches (the 'tail-ends') of many systems, irrigation during this season is not possible, owing partly to limited stocks of irrigation water after months of dry weather. The maize is harvested in June–July. In a few systems, or parts of systems where water is plentiful, spring rice (also known as early paddy) is planted and transplanted in March, instead of maize[8]. More commonly, however, while the maize ripens on the fields, rice is planted in small beds that allow for careful water control at a time when irrigation water is often in short supply.

In mid-June when the monsoon rains set in, the maize (or sometimes the early paddy) has been harvested, the soil has been prepared (by men) and flooded, and the rice is transplanted (by women). While sometimes rainwater may suffice, supplementary irrigation water normally has to be distributed during what is by far the busiest period in the annual agricultural cycle. The monsoon usually ceases by later September/early October, and the rice is harvested in October-November. The period September to November when the rice ripens could be termed the post-monsoon season, but because additional water or other inputs are not required it is not considered an agricultural season, but rather a 'slack period'; owing to the number of religious festivals, it is also referred to as the 'festival season'. Following ploughing and the application of manure, wheat is planted for the winter season that starts in November/December, and may require several rounds of irrigation, particularly if the January rains fail. When the wheat is harvested in March, the winter season, and the agricultural cycle as depicted here, is complete.

[8] Early rice is a risk-prone crop and, therefore, not universal in the systems. It may be destroyed by hail, or water supplies may become insufficient. On the other hand, farmers who have opted to plant some early rice report that the market premium is fairly high.

Table 8
Agricultural Cycle in the Six Hill Systems, 2004

Crop	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rice (main)						■	■	■	■	■	■	
Rice (early)			■	■	■							
Wheat	■	■	■								■	■
Maize			■	■	■	■	■					
Tomatoes	■	■	■	■	■							
Potato	■	■		■	■						■	■
Cauliflower	■	■	■								■	■
Cabbage	■	■	■								■	■
Oilseeds		■	■	■								

Sources: Cross-sectional Survey 2004 and Key Informant's Survey 2004. Note: Maximum growing periods.

Possibly as an outcome of national ambitions to become self-sufficient in foodstuffs (particularly rice), hill cropping regimes are often depicted in 'productivist' terms (see Wilson and Rigg 2003, also section 8.3) as if they only consisted of staples. In reality, even if staple crops dominate in terms of area, the cropping picture has been quite diverse for some time, and has become even more so in recent years, as discussed in the context of economic linkages in chapters 5 and cropping diversification in chapters 8 and 9. Hence, in addition to the main crops, the pre-monsoon crops include tomatoes and oilseeds, and the winter crops include potato, cauliflower and cabbage, as well as minor vegetables; all of which are in high demand in both local and external markets.

As illustrated in table 9, the agricultural cycle in the three mountain systems is distinctly different from that in the hills, but no less complex. The relatively long cropping periods mean that there are only two cropping seasons, summer and winter. The dominant regime consists of maize (often intercropped with beans) and buckwheat, as summer crops, sown in July and harvested in October. Naked barley (used for making alcohol and as a staple), hull barley (animal fodder) and occasionally wheat is sown in October/November and harvested in the spring. In the early 1990s, buckwheat was the dominant staple in the area but, by 2004, it had given way to maize as the dominant summer crop. Farmer-stated reasons for this regime change include the following: rice, imported from the south, has increasingly become a part of daily meals, so the demand for buckwheat has decreased; maize is less vulnerable to disease than buckwheat; maize has more uses than buckwheat; and maize cob can be consumed by both humans and animals, and the leaves and stems can be used for fodder.

Table 9
Agricultural Cycle in the Three Mountain Systems, 2004

Crop	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Maize												
Buckwheat												
Beans												
Naked barley												
Hull barley												
Wheat												
Potatoes												

Sources: Cross-sectional Survey 2004; Key Informants Survey 2004 and Vinding 1998. Note: Maximum growing periods.

As is also the case in the hills, the cropping portfolio in all systems (but particularly in Thini, located close to the administrative centre of Jomsom) has diversified over the years. The picture in 2004 is shown in table 9: in summer various vegetables (including radish, cauliflower and cabbage) are increasingly grown in response to local demand, as discussed in section 4.6.2. Following harvests, prior to sowing either winter or summer crops, the land is always irrigated.

As in the hills, the most critical period for crops in the mountain systems is in the spring months when rising temperatures and high winds combine to increase levels of evapotranspiration, i.e., the combined loss of moisture from plants and soils. The winter crops are irrigated up to six times during this period. As irrigation sources are augmented by snowmelt at higher altitudes, water supply is usually not a problem at this time of year, but floods may damage irrigation structures. The summer crops require similar frequencies of irrigation and, in the case of Tiri, where the source of irrigation water is a high-altitude lake, this sometimes causes problems if winter precipitation has been low.

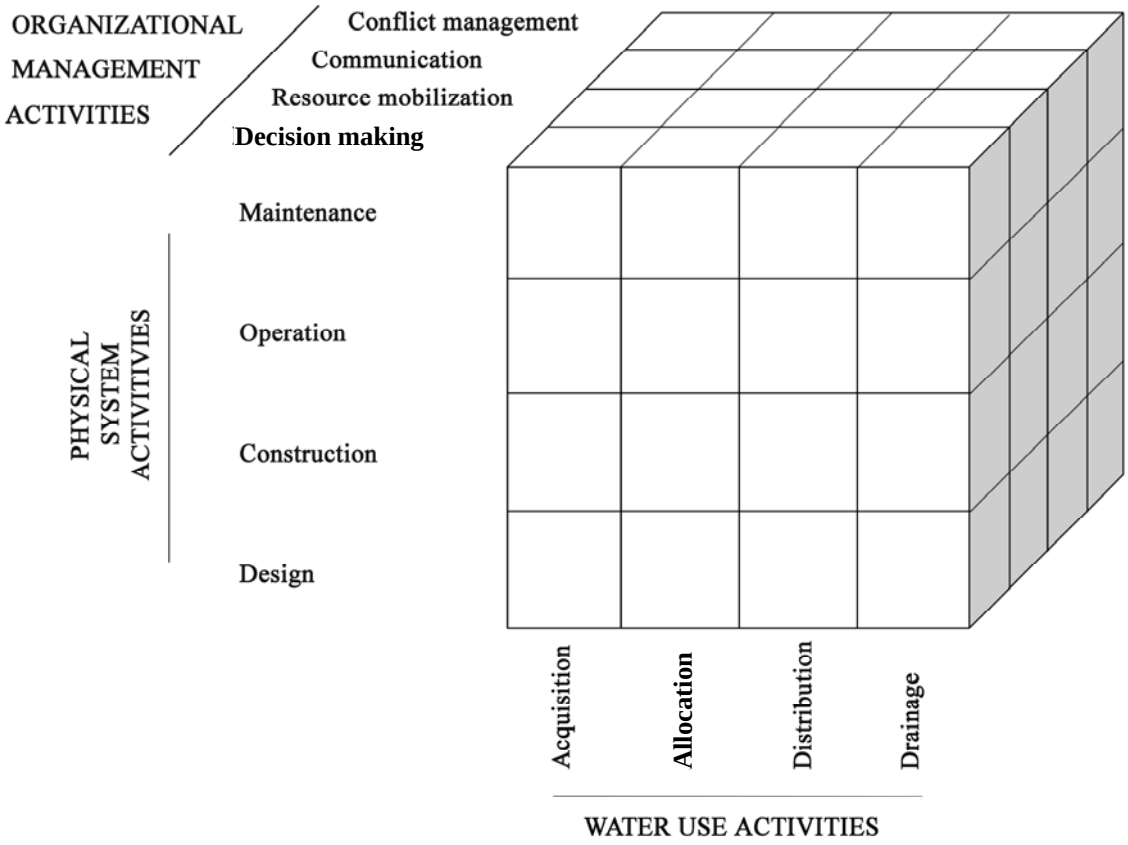
7.4 The Workings of the Irrigation Systems

As mentioned at the beginning of this chapter, Martin and Yoder's work is central in the literature that has drawn attention to the indigenous organization of irrigation, and has thereby contributed to their central place in rural development planning. In particular, their 'Irrigation System Activities Matrix'[9] (Martin and Yoder, 1988b, Pradhan *et al.* 1987; see also Uphoff *et al.* 1985, Pradhan 1989, Ostrom *et al.* 1992) is a useful model for analysing the complexity associated with activities internal to irrigation systems, and the interactions between activities. The matrix may be seen as depicting *the* irrigation institution, with its different levels of activities constituting different institutional scales, and may, as such, be seen as specifying Ostrom's (1992) concept of rules-in-use or working rules. Although it may be seen as a generic model, it is based on (early 1980s) empirical research in the hills of Nepal in the Western Development Region, south of the Dhaulagiri Zone. Hence the

[9] The matrix is referred to as the 'Yoder Matrix' by Ostrom *et al.* 1992.

concepts involved are particularly applicable in the context of this investigation. The matrix is shown below.

Figure 2
Irrigation System Matrix



Irrigation management is explained as consisting of three interrelated level of activities. Starting from the bottom, one level (or set) of activities concerns the water which must be acquired (channelled), allocated, distributed and, particularly during the monsoon when there may be excess water, drained. A second level of activities relates to the physical system, particularly the operation and maintenance of physical structures to acquire and control water. A third level of activities focuses on organizational management activities, such as decision-making, resource mobilization, communication, and conflict management. Obviously, all these levels are interrelated, and the matrix illustrates the interactions, such as the need for the organizational level to decide how to operate the physical systems in order to distribute the water. The matrix is particularly illustrative because it is very comprehensive; each box is a potentially important interaction. It follows from this that not all activities are important in all systems and, in many cases, entire blocks of interaction boxes are not important for particular systems; the relative importance of activities in particular locations is reflected in the activity portfolio of individual irrigation management institutions. These portfolios, as this and forthcoming chapters will show, vary substantially.

The matrix will conceptually inform and structure the analysis of activities internal to the workings of the irrigation systems in the remaining part of this chapter and partly in the next chapter as well.

However, as will be suggested in the following, the model will be nuanced somewhat by creating a clearer conceptual separation between, on the one hand, water allocation as a historically rooted, combined relational and structural access mechanism, and, on the other hand, distribution, operation and maintenance as the basis of irrigation organization and management.

7.5 Conceptualizing the Dynamics of Water Allocation and Access to Irrigation

Water allocation is basically about entitlements of water to individual farmers from an irrigation system. In the first level of Martin and Yoder's model and in much of the irrigation literature in general, these entitlements tend to be presented merely as operational rules for assigning the water to which a farmer is entitled. It may be seen to have two dimensions: one dimension concerns the quantitative allocation of water, i.e., the amounts, the timing. As depicted in the Martin and Yoder model, allocation in this sense is closely linked to distribution, i.e., it is understood as the implementation of allocation principles. The second dimension of allocation is not depicted in model, but concerns the wider circumstances surrounding access to irrigation, i.e., it concerns the distinction between farmers or fields with access to irrigation and those without access (Pradhan 1989) as well as intra-system access to irrigation water.

In the following, I will discuss mainly the access dimensions of water allocation. Conceptually, the point of departure is to see property rights, chiefly land rights as a proxy for water rights. Therefore, water allocation should be understood as more than operational rules, as it is based on access to land as private property. This makes water allocation a fundamental mechanism for gaining access to the benefit streams of irrigation resources as a common property resource. The proxy function of land rights has several implications. One is the exclusion problematic associated with the spatial dimension of gaining access to the benefits of irrigation. In the hills of Nepal, this problematic compounds the targeting of irrigation to benefit the poorest segments of society, as described earlier in its historical context of ethnic geography and elevation.

The problematic is central to understanding why, as noted in a 1994 National Planning Commission review of irrigation policies in Nepal, "irrigation development as yet has rarely been targeted to directly benefit the poor" (National Planning Commission 1994:46) and the equity concerns voiced in the context of implementing the Dhaulagiri Irrigation Development Project (see section 5.8). In addition to the equity problematic vis-à-vis external access to irrigation resources, notions related to access are important for understanding how water is distributed within (i.e., intra-system access) the irrigation systems. Just as land rights are a proxy for water rights, the spatial distribution of land matters: access to more valuable, advantageously located land may be seen to be associated with access (distribution) to water within the irrigation system, and probably system productivity, i.e., the so-called 'tail-end problem', a central concept in the context of irrigation. The 'problem' refers to the fact that farmers in the head-reaches of a *khet* and/or (depending on the design of the system) farmers with fields close to the channel will often have access to water earlier than farmers at the end-reaches of the *khet*; water in the main channel as well as the distribution channels may not only reach tail-end farmers rather late, but it may also become reduced substantially in quantitative terms.

So we know that the historical process of gaining access to irrigation water in the hills of Nepal involved the settlement by Hindu groups in valleys and other suitable low-altitude places; access that was probably mediated by possession of the required technology for wet rice cultivation. We also obtain an idea of how that technology is applied to terracing as a central feature of an irrigation system, and of the labour investments required, when we look at Yoder's description (see section 7.2) of terrace construction. However, the social dynamics of gaining access to irrigation resources, as they have been (and no doubt continue to be) played out in the course of developing the systems

dealt with in this study, have not been investigated in detail, neither in the documentation from the 1990s nor in the 2004/05 investigations[10]. Therefore, clues about the processes and dynamics need to be obtained from elsewhere.

Pradhan (1993), in a study of the process of extending a hill irrigation system in Palpa District (south of the Dhaulagiri Zone), provides an example of such dynamics, the principles of which appear reasonably applicable to elsewhere. He explains that property rights and relations such as water rights were related to pioneer investments in construction, i.e., that such rights were basically a function of groups of landed farmers:

> "… who in each sub-command acquired water rights by virtue of having invested in the system through labour, cash payments, and/or agreeing to future and continuing re-investments. These sub-commands were physically linked to one another through the fact that they drew water from the same intake and made use of a single canal. However, that physical linkage must be seen as the outcome, not the cause of the property structure that underlies it. These property rights, especially water rights, had been negotiated over time among the different groups thus creating and maintaining a common group of users, organized in a hierarchy of senior and junior rights holders" (1993:9,10).

In Pradhan's example, social relations relate mainly to a relatively recent case of groups of farmers vis-à-vis other groups who make claims on water. As such, it is an example of a mechanism of access to a physical resource, which, as Berry reminds us, partly depends on the ability to negotiate successfully, something which involves investment "in the means of negotiation as well as the means of production *per se*" (1993:15). Thus, the investment in access—as suggested historically by the ethnic geography of irrigation as well as Pradhan's example—is likely to depend on social relations, not least patronage and social identity, which in the hills appear to be closely related with caste and ethnicity. Patronage mechanisms of access, it may be speculated, may also be important when irrigation systems are developed at the initiative of (and with the cost borne by) a wealthy individual, as was the case in Kurgha, or with a heavy government component, as was the case of Pakuwa (see section 6.2.2), and even when irrigation systems have been rehabilitated with the assistance of the Dhaulagiri Irrigation Development Project.

The farmers in this particular location had developed a public record of water rights, which included the stipulation that "in the canal, water was common property whose control and use was governed at the community of users' level. It became individual property when it entered a user's field" (Pradhan 1993:10). In irrigation systems, these fields, contrary to other common property regimes such as those associated with forests or grazing lands, are practically always private property, while the water and its conduits constitute the communal element. These private and common property rights combined mean, as Pradhan puts it, that "property rights and relations determine who gets what and how much: it is an instrument of acquisition, distribution and alienation" (1993:4). This 'political economy' of water allocation or rotation principles to the private plots in the irrigation system explains why allocation in proportion to landholding size, combined with certain time limits, is the most common system in the hills (Martin and Yoder 1988b), including the hill systems of this study.

---

[10] What was known at the time of Dhaulagiri Irrigation Development Project intervention, however, was the ownership pattern within the command area of the irrigation system that requested rehabilitation assistance. Farmers were, as part of the application process, requested to come up with a list of landholdings (specifying name and landholding size). The list was then verified with the local land registration office. It would have been interesting to see if ownership patterns changed as the land became more valuable with improved irrigation.

7.6 Water Distribution

With respect to the practical distribution of water, allocation in proportion to landholding size naturally implies (1) that different sizes of plots receive different amounts of water, and (2) irrigation is by turns in a rotational water distribution system, whereby water is directed to blocks of adjoining fields, located along secondary channels. The sequence of these turns has not been investigated in the hill irrigation systems under study[11]; hence we know very little about the social dynamics at play in the process of arriving at a schedule, but it seems appropriate to assume that powers to negotiate and access to authority, defined in whatever way, would matter to some extent. What we do know though, is that adherence to the schedule is considered very important during the monsoon period; and that, in most systems, caretakers (called *chowkidar* in the hills and *katuwal* in the mountains) are employed to monitor the flow of water and see that gates are opened and closed, and that proportioning weirs (*saacho*) are in place to divert a proportionate flow, calculated on the basis of allocations, to specific sections of the command area.

Reflecting the diversity in the organization of water management in Nepal, the means of distribution in the cases of this study show considerable variation, as illustrated in table 10 below. In one system (Kurgha), members of the same family that financed the original irrigation system assume these responsibilities voluntarily. In Arjewa, there is no caretaker and water is obtained on a first-come, first-served basis (something that normally reflects an abundance of water, but which in this case probably reflects institutional erosion combined with the physical nature of water delivery; see section 6.2.2). In Pipalbot, where no caretaker is employed either, an on-demand system is practiced in the water abundant head-reaches of the *khet*, while a scheduled system is practiced in the water-scarce tail-end of the *khet*. However, with these two exceptions, water distribution schedules—reflecting the urgency of water control during the monsoon period—are usually adhered to rigorously. During the winter and pre-monsoon seasons when the more extensive (in terms of labour input and timing) wheat and maize crops are irrigated, distribution is less regulated, and usually contains elements of on-demand.

While also based on landholding size and rotation, the water distribution methods in the three mountain irrigation systems differ substantially from those in the hills. Water is distributed randomly to individual farmers based on water shares that, as in the hills, reflect landholding size but, unlike the hills, have provisions for differential allocation for different crops, with cereal crops receiving the highest priority. While small variations exist among the systems, the following summarizes the general workings of the method. Small farmers receive one share per 28-day cycle, whereas larger farmers with up to 15 *ropani* receive three shares per 28-day cycle. A share corresponds to a specific date within the cycle—decided upon by means of a lottery—on which individual or groups of households are allowed to irrigate their fields.

An actual lottery, a public and fairly lively affair participated in by all households, was observed in the spring of 2004 in Tiri; however, methods vary between the systems, and I was told that in Thini the lottery is more of an administrative procedure. In the small system of Tiri, on the given date 'won' in the lottery, it is the farmers' responsibility to distribute water to their own fields, and to ensure that gates are closed upon completion. In the larger systems of Thini and Khinga, there is also a strong element of individual responsibility to adhere to the schedule, but full-time caretakers appear to monitor distribution closely in all seasons. The employment of a number of full-time

[11] For a good account of the technicalities involved in a rotational system in Nepal (Arghakanchi District) see Aubriot 2000.

caretakers in the mountains reflects the complex and multipurpose nature of resource management (see section 7.8)

It appears that the significance of the lottery system of the mountains is that, compared with the distribution systems of the hills (based as they are on taking turns according to a pre-defined, somehow negotiated system), water is relatively equally distributed across the *khet* with reduced room for controlling access to irrigation water through access to authority. This may help reduce the so-called tail-end problem, explained in section 7.5. This problem is often perceived in irrigation literature as mainly technical or organizational. Sometimes technical problems (such as water scarcity in relation to command area size) are indeed an important part of the problem. However, as also suggested in section 7.5, tail-end problems are—like most resource utilization problems—often multi-causal and interrelated with not only the general social dynamics associated with water allocation and distribution but also economic dynamics. Problems may, for instance, be compounded if head-reach farmers intensify production and start producing early rice or vegetables, as these crops are more water-consuming than those in conventional cropping regimes. This issue is dealt with in more detail in sections 8 and 9. Suffice it to say here that it appears that water distribution in the hills is becoming less and less regulated during the winter and pre-monsoon seasons as vegetable crops are tending to gain in prominence. Finally, it needs to be mentioned that water distribution may also be sometimes influenced by political events. Round-the-clock irrigation turns in Thini, for instance, were until recently disturbed by a night-time curfew aimed at preventing movement by Maoist insurgents. Defiance by those who tried to catch their irrigation turns at night and therefore move about the *khet* with lamps was met with warning shots from the army camp across the valley.

Table 10
Water Distribution Methods in Study Communities

Community	System of Distribution	Means of Distribution
Pakuwa	Time-bound turns/fixed rotation in monsoon. During other seasons, water is acquired on-demand.	Caretaker employed for three months during the monsoon season. Maintains schedules, operates gates, weirs, etc. Paid Nepali Rupees 2000 per month, collected from all households.
Kurgha	Time-bound turns/fixed rotation in monsoon. Committee to be consulted during other seasons.	Handled by the grandson and family of the original benefactors of the system voluntarily. Maintain schedules, operates gates, weirs, etc.
Lampata	Time-bound turns/fixed rotation in monsoon. During other seasons, water acquired on-demand.	Caretaker employed for five months from June to October. Maintains schedules, operates gates, weirs, etc. Paid 4 *mana** of rice per *ropani*** of land, collected from all households.
Amalachaur	Time-bound turns/fixed rotation in monsoon. During other seasons, water acquired on-demand.	Caretaker employed for three months during the monsoon season. Maintains schedules, operates gates, weirs, etc. Paid 2–4 *mana* of rice paid per *hal****, depending on the amount of water required at certain periods.
Arjewa	On-demand in all seasons.	No caretaker employed. During the monsoon, farmers use individual sources of water (springs, rivulets). During winter and spring, farmers line up to use water collected in a tank and released every 12 hours.
Pipalbot	Time-bound turns/fixed rotation during monsoon in the tail-end of the system, on-demand in other seasons. Water on-demand in head-reaches in all seasons.	No caretaker employed. In tail-end, 'trusted' farmers maintain schedules and operate structures. In head-reaches, farmers, acquiring water at any given time, operate the system.
Thini	Differentiated (by landholding size) water shares/lottery.	Households take turns to supply eight caretakers employed permanently at any given time. Under supervision of two head caretakers (who monitor schedules), operate gates, weirs, etc., at a salary of Nepali Rupees 15,000 each per year.
Tiri	Differentiated (by landholding size) water shares/lottery.	Households take turns supplying two caretakers employed permanently at any given time Caretakers conduct routine maintenance and monitor schedules, farmers themselves operate structures on given dates. Salaries undisclosed.
Khinga	Differentiated (by landholding size) water shares/lottery.	Households take turns supplying four caretakers employed permanently at any given time, who monitor schedules, and operate structures. Salaries undisclosed.

Source: Cross-sectional Survey 2004.
*Notes: *A volumetric measure, roughly 0.5 l; ** 0.05 ha; ***0.07 ha (the area that an ox ploughs in a day).*

7.7 Maintenance of Irrigation Systems

The maintenance of physical structures to acquire and control water is an important aspect of irrigation system management. Maintenance activities in both the hill and mountains systems are closely related to the agricultural cycle, and a distinction should be made between regular and emergency maintenance. Both require a collective labour effort, and while the number of times that farmers need to carry out emergency works is unpredictable, regular, collective maintenance efforts are required, in most systems, twice a year, in winter and in summer.

In the hills, the most intense periods for regular maintenance are the pre-monsoon and monsoon seasons. In the pre-monsoon season in May/June, main channels are cleaned of debris and mud collectively and secondary channels are cleaned individually, and head-works and other structures repaired (collectively) if damaged. It is fairly crucial that this happens at the right time so that sufficient water supplies are ensured for the preparation of seedbeds for rice. Additionally, during the monsoon period, the canal is patrolled regularly either by the employed caretakers who also distribute water (see table 10 above) or by farmers. These persons usually carry out minor repairs. Particularly in ecologically fragile systems, regular preventive maintenance and early detection of problems is important, if water is to be kept flowing.

In the mountain systems, the full-time caretakers carry out minor maintenance activities throughout the year on a regular basis. As in the hills, collective maintenance works take place twice a year. The most thorough and intense operation is in spring and summer (May–June), when farmers need to be able take advantage of the warm weather in a timely manner. Hence, regular, collective maintenance is carried out before the irrigation that takes place prior to the sowing of the summer crops. The environment is fairly fragile, and the channels of Thini and Khinga carry a great deal of silt, which has to be removed. Debris, typically rocks, is removed regularly by the caretakers. In Tiri, where water is collected in a tank through pipes, regular maintenance involves cleaning of silt from the tank as well as opening of checkboxes.

Emergency maintenance activities are hard to avoid, although regular maintenance routines, particularly the cleaning of culverts[12], mean that some problems are detected early. Unlike in the hills, the summer period in the mountains does not warrant additional vigilance, as rainfall is limited. However, caretakers increase patrols for detecting problems in the winter, when ice and snow may block channels, and in the spring, when melting snow at high altitudes causes rivers to swell and subsequently damage intake structures. The latter problems are particularly felt in Thini and in Khinga, where relatively large river bodies feed the irrigation systems. Although annual precipitation in the mountains is less than 200 mm per annum, freak rainfall, sudden snowmelt and resultant floods sometimes lead to the breaking of irrigation dikes and the deposit of unproductive, sandy silt in the *khet*. In both the hill and mountain systems, channels often pass through fragile sections that are prone to landslides. This is a particularly severe problem in Khinga, Kurgha, Amalachaur and Lampata, where certain sections tend to sink with resultant high requirements for labour inputs. During the monsoon, landslides—occurring as part of both natural processes and because of human interference—are a generic problem in the hills that occur on all scales. Many irrigation systems experience minor landslides at some point during the rains.

The formal basis for resource mobilization for maintenance differs between the studied hill and mountain systems. The basis for labour contributions to regular maintenance in all hill systems is, in principle, that each household should commit labour proportional to landholding size, but in

[12] A transverse drain that enables surface water to pass above the irrigation channel.

practice each household is expected to send at least one member (the head of household or a representative) to this scheduled event. Some households, presumably the larger ones, claim to send more than one. Some respondents perceive attendance as voluntary, and others complain that defaulting is common, although no one interviewed admits to this on the part of their own household.

For emergency and structural damage, all who are present in the community at the given moment are expected to join, but in practice the number of people who turn up depends on the scale and location of the problem; for minor damage to the channel, for instance, the farmers who are immediately affected will join hands in fixing the problem. The caretaker usually alerts farmers. Provisions for fines do exist but are not actually levied and, in contrast to what is reported from elsewhere in the hills, water taxes are not levied either (see, for example, Yoder and Martin 1983). Subsequently maintenance funds do not exist in any of the systems. For serious damage, assistance is often sought from local authorities for the financing of materials and labour. If funds need to be raised in the community, these are generally collected *ad hoc*, on the basis of landholding size.

Maintenance systems in the mountains are more structured than in the hills (as exemplified by the employment of permanent caretakers). Labour contributions are on the basis of a 'flat rate': each household has to send at least one able-bodied person between 15–57 years of age, irrespective of landholding size or other factors. Abstention leads to fines of Nepali Rupees 100–200 per day, which are reportedly levied; however, abstention is not considered to be a problem because absentees tend to pay labourers to participate on their behalf. In cases of emergency, caretakers inform the irrigation management level (see below), which in turn mobilizes labour from each household and maintains records.

7.8 Organizing it All

The third level of activities in the Yoder Matrix associated with an irrigation institution concerns the level at which decisions are made and enforced. The activities described in the above sections, associated with water allocation, distribution, maintenance and mobilization of labour and materials, suggest not only a management level but also some degree of embeddedness in superjacent governance[13] structures. However, the focus here remains on managerial aspects; understanding of the irrigation institutions in the context of wider institutional landscapes is dealt with in a later section. Again, as may be surmised from the last couple of sections, there is great variation with respect to institutional architecture and managerial activities. Martin and Yoder (1988) observe that

> "… some irrigation systems have only informal management: everyone uses water according to need, with one of the irrigators functioning as a *de facto* leader when problems arise. Other systems exhibit a high level of management intensity and organizational structure: leader, secretary and members of a committee are elected; minutes of meetings are recorded; written records of members' water allocation and work attendance, as well as accounts of the organization are maintained; fines for missing work are imposed. Between

[13] Although sometimes used interchangeably, I define the terms management and governance rather narrowly: management is about internal workings and directly operational (planning, organizing, leading, controlling, etc.) matters, whereas governance systems connote structures of authority. At the 'operational' level, governance connotes allocation of resources and coordination of activities in society; it may, in other words, be thought of as the ways in which power is exercised.

these extremes, there are various systems with more or less complex organizational structures" (pp. 86–88 in Aubriot 2000: 267).

The most complex institutional structures are found in the mountains. In all three Mustang District communities, the irrigation resources are governed through multipurpose village councils whose responsibility is to organize public works, enforce regulations, manage funds, solve conflicts, summon meetings, and impose fines with respect to all physical resource management, including irrigation, forestry, grazing, livestock and infrastructure.

However, even among the Mustang District systems, major differences may be noticed between the relatively large village of Thini and the small villages of Tiri and Khinga. Thini and Old Jomsom, which share the command area, have two councils, with eight members each, each headed by a *mukhya*[14] (village chief) and assisted by one head *katuwal* (caretaker), three deputy *katuwal*, two secretaries and a treasurer. As mentioned in section 7.6, the head *katuwal* appears to receive NRs 15,000 per annum as remuneration; whether the *mukhya* and the deputy *katuwal* receive anything is undisclosed. The *mukhya* are currently elected and the *katuwal* selected (on the basis of merit) for a period of two years, but some years back responsibilities rotated annually (Vinding 1998). In the context of irrigation, *mukhya* keep records, maintain irrigation schedules, take decisions about maintenance activities, mobilize resources, and mediate in conflicts. A general assembly is held annually each spring.

Partly reflecting scale and thus a lower level of complexity, and partly cultural differences[15] between northern and southern Mustang District, the *mukhya* leadership concept does not seem to apply in Tiri and Khinga, with their 11 and 34 households, respectively. Reportedly the structure is more flat, with village assemblies (known as *gempa*) that are characterized by joint leadership, with representation from each household. These assemblies meet at least once a year (Parajuli and Sharma 2000), but interviews with villagers give the impression that this happens more frequently, and usually in connection with practical activities such as irrigation system maintenance and the water distribution lottery already described. The *de facto* authority with respect to irrigation matters in Tiri and Khinga appears to be related with the practical level, and rests with the *katuwal*. Tiri and Khinga have only one *katuwal*, respectively, a duty that rotates between households every year. These *katuwal* do not seem to receive actual salaries as in Thini, but are possibly compensated in kind. In all three villages, the *katuwal* are responsible for routine maintenance of canals and other structures, the organization of routine and emergency works, the collection of fees and fines, etc.

A variety of cooperative systems for the management of natural resources, particularly forests and irrigation, exist in the hill systems (see Pradhan 1989, Yoder 1994). Unlike in the mountains, these consist of single-purpose institutions that deal with only one resource at a time. In the case of irrigation, the more loosely structured maintenance activities noted in section 7.6 also echo a loser structure in general in the hill systems compared with the mountains. On paper, however, all Dhaulagiri Irrigation Development Project systems have a Farmers' Irrigation Association of which all households with irrigated land are members. The Farmers' Irrigation Association is represented

[14] The *mukhya* (also referred to as *amali* in Bista 2000) were appointed by the central government until the end of the Panchayat and were, as tax collectors, quite powerful. One interviewee characterized the Panchayat *mukhya* as mere stooges. For details on the political systems of Mustang see Vinding 1998. In the shared Thini–Jomsom irrigation system, the Thini *mukhya* is superior to the Jomsom *mukhya*. In the words of the present *mukhya*, this is "because Thini is the older of the two settlements."

[15] Thini and Tiri are both located in the Baragaun (12 villages area), and are what Vinding (1998) calls 'culturally Tibetan' (p 27).

by a Water Users' Management Committee[16], headed by an *adhyakshya* (leader), with a treasurer, a secretary, and a number of *ex officio* representatives of block committees (typically head, middle and tail sections of the command area).

This structure (which was also applied in the mountains) was a prescribed part of the Dhaulagiri Irrigation Development Project package, that in addition to physical rehabilitation intervention, included efforts at restructuring 'traditional' irrigation organization. The explicit purpose of this was to formalize the institutions vis-à-vis a reformed political decentralization framework, thus rendering the FIAs legal entities that could be registered with the local authorities (see page xx). The current status of these 'crafted' irrigation institutions is analysed in more detail in chapter 8. Suffice it to say at this point that while all the hill irrigation systems do have identifiable (by other farmers) *adhyakshya* and other people associated with leadership, degrees of management intensity vary tremendously from case to case, as already suggested in sections 7.6 and 7.7.

7.9 Perspectives on the Determinants of Irrigation Organization

The obvious differences in the way that irrigation organization is structured in mountain and hills, respectively, prompts attention to the tendency, within part of the irrigation literature, to explain organizational diversity and characteristics in irrigation management through physical determinism and related structural factors. Vinding, for instance, somewhat akin to Wittfogel (1957) (inasmuch as Wittfogel proposed that irrigation required political institutions, but not in the sense that it also required coercion), states in the case of villages in the Pacgau area of Mustang District that

> "… the political organization at the village level is strong in Pacgau because the fields in the area are irrigated and the construction, maintenance and operation of the irrigation systems require strong political institutions" (1998:283).

Vinding, elaborating his point, characterizes villages in Pacgau (which includes Thini) as democratic because rules are decided upon by voting, and compares them with the 6th century B.C. Greek city states. The strong level of organization, he further notices, is necessitated by the relatively large size of the villages (Thini itself has more than 100 households). Other observers (Furer-Haimendorf 1975, Messerschmidt 1995, Parajuli and Sharma 2000) of mountain communities in the same area find that village councils with consensual leadership and high accountability, along with strong cooperation from villagers in common property management, are critical factors for survival under harsh physical conditions.

Along similar lines, Cederroth in a study of irrigation in Nepal's *terai*, emphasizes the role of the physical environment and states that

> "… in cases where the farmers will face great difficulties, and perhaps even starvation unless they join forces to prevent it, chances that cooperative institutions will arise are, of course, much greater than when this is not the case. All the communal works and all the mobilization of labourers which is involved in constructing and maintaining the Rajapur irrigation systems would perhaps never have been realized had the natural conditions been less severe" (1994:37).

[16] The Farmer Irrigation Associations adopted, as part of the 'package', bye-laws with provisions related to penalties, elections and the representation of women, of which there had to be 20 per cent in the Water User Management Committees (Dhaulagiri Irrigation Development Project n.d.).

While it is difficult not to agree—as in the case of Mustang District—that sophisticated forms of organizing resource management does help under harsh physical conditions, it is more problematic to see such conditions as the main determinants of high levels of organization. I note that Cederroth talks about *chances* rather than applying predictive determinism as such, and perhaps cooperation would not have emerged in the way that it has without a challenging ecology in his specific case. It is not, however, difficult to find examples of highly structured irrigation organization from the Balinese *subak* systems (see Geertz 1980) to some of the more functioning hill irrigation systems (see, for example, Aubriot 2000, Martin and Yoder 1988, for informative cases) in Nepal where ecological conditions may be described as relatively benign.

In the case of Rajapur, other issues associated with social relations and entitlements, such as for instance the social identity of the (landed) irrigated farmers, their shared interests and the processes associated with gaining access to irrigation resources in what is actually one of the most socially differentiated areas[17] of Nepal, seem hard to ignore as factors that would shape institutional structures. Moreover, similar to the weaknesses associated with the tendency in collective action thought to explain institutional dynamics as practically self-propelled internal-level processes, ecological determinism, though part of the picture, appears rather static.

Much of the ecological determinism is related to the powerful Malthusian disaster narratives[18] that also featured prominently in the environmental literature on Nepal in the 1970s and 1980s (see, for example, Gurung 1989, MacFarlane 1976, Eckholm 1976). However, the attribution of disproportionate explanatory value to the role of population pressure, ecologically harmful practices and carrying capacity in relation with organizational characteristics of common property regimes (and associated access and rights) and rural natural resource management in general has been increasingly challenged over the past decades. This does not mean that ecology should be discounted altogether. Mosse (1997) provides a useful example of a multi-factorial explanation that includes ecological conditions. In a specific irrigation context, using examples from Tamil Nadu, he argues that differences in the way water management is organized reflect both ecological characteristics (different soil types) and factors associated with colonial markets, settlement patterns, property rights, etc., in a complexity which "has to challenge any oversimplified ecological deterministic reading of the pattern of collective action" (1997:495). In the more paradigmatic sense, Blaikie (1985), from a political ecology perspective, was among the first to draw attention to the politico-economic contexts of natural resource management and degradation in rural areas, with some examples from Nepal.

I will argue in later sections that indeed multi-factorial pictures of the complexity associated with the trajectories of irrigation institutions need to include understanding of the historical and contemporary basis for the strong resource mobilization dynamics found, for instance, in the mountain communities of this study. These dynamics are associated (in addition to ecology) with "communities of trust" (Blaikie *et al.* 1979:211) and shared interests, as manifest in irrigation, credit associations (*dhikur*) and other forms of social relations through which people gain access to benefits. Likewise, in both the hills and the mountains, the picture includes both structural and

[17] Some of Cederroth's own data suggest that 45 per cent of the population in Rajapur are landless bonded labourers (*kamaiya*). These labourers work the land of the irrigated farmers (Cederroth 1994).

[18] The 'Theory of Himalayan Environmental Degradation' basically postulated that overpopulation and subsequent over-utilization of natural resources in the hills of the Nepal led to soil erosion; the soil eroded from the hills was seen as the cause of flooding in the downstream countries such as Bangladesh (see Ives and Messerli 1989 for an early refutation of the theory).

relational access mechanism associated with ethnic geography, road infrastructure, markets and market forces, development projects, and political events. Some of these mechanisms were dealt with earlier in this chapter as well as in the regional analysis in chapter 5.

I will round off this chapter by suggesting that while the physical factor theme appears at different levels of explanation and for different purposes in the irrigation literature, Bromley's (1992) widely accepted notion of common property regimes is particularly useful. Oakerson (1992) proposes that the management arrangements that surround irrigation and other common property regimes are related to the characteristics of the resource in question. As he explains, "collectives select property regimes on the basis of their suitability for the resource in question—its variability, its productivity and so on" (1992:12). By pointing out that the resource characteristics of, for example, irrigation systems necessitate organization and cooperation, he has created clarification regarding understanding of the basis of institutions for common property regimes. This addresses, as also suggested in chapter 8, the issue at a very useful level of explanation, as it suggests that property regimes change in line with their usefulness to specific forms of production. The role of the physical attributes will continue as a theme in the following chapter, which will focus on performance changes in the political-economic moment.

Chapter 8: Irrigation System Performance Trajectories

8.1 Introduction

The aim of this chapter is to provide a picture of the current status and the trajectory of the irrigation systems in the particular political-economic moment (1990–2005) covered in this over-time study, as regards performance and efficiency criteria. Understanding the status and how it has come about is a prerequisite for investigation of the broader context of factors that may impinge, negatively or positively, on irrigation. This chapter marks a shift in the investigative approach from that of the (relatively speaking) static mode of describing irrigation systems that characterized the preceding chapter to a more dynamic approach involving a temporal dimension. The analysis thus constitutes the backdrop for further analysis of the possible factors that affect performance, directly or indirectly. The data are drawn mainly from the cross-sectional key-effects monitoring surveys of the 1990s and the repeat cross-sectional survey of 2004[1], which contain mainly quantitative questions but also some questions of a qualitative nature. Responses to the latter, meant to substantiate the former through assignment of reasons for a yes or a no response, were summarized from the questionnaires, and have been sorted into manageable categories.

The focus will remain at the level of the internal workings of irrigation institutions, i.e., how water distribution, operation and maintenance, and related resource mobilization are related to performance, as elements that (as established in the previous chapter) form the basis of irrigation organization and management along the lines of Martin and Yoder's irrigation system activities matrix. However, as suggested by the nature of the data to be treated in this chapter and the need to consider physical factors that may impinge on irrigation performance, that framework will be supplemented by Oakerson's (1992) conceptual and analytical framework for analysis of the commons.

8.2 A Framework for Analysing Performance in the Commons

The Martin and Yoder framework, while focusing on the internal workings of irrigation institutions, sees their form and functions as dependent on the social, economic and physical environment[2], with emphasis on the latter in the tradition of natural science/geographical approaches. Institutions, in line with classical institutionalism, are seen mainly as set-ups that regulate the actions of individuals; as 'rules of the game', they consist of practices and relationships. They contribute to production by facilitating the aggregation of human resources, thus enabling required collective management of resources, and may be formalized into, for example, irrigation organizations. This more resource-focused approach precedes approaches to the commons that are influenced by new institutional economics to some extent. While recognizing, as in the Martin and Yoder framework, physical-technological contexts and the regulatory and structuring role of institutions, particularly as rules-in-use (Ostrom 1992), the latter approaches tend to emphasize, to a greater extent, institutions and their activities as functions of the utility-maximizing behaviour of individuals and groups within a rational choice framework (see chapter 2).

However, both of these related approaches are concerned with organization as key to efficiency in irrigation systems, and recognize water distribution and operation and maintenance, in particular, as functions that affect agricultural production. Therefore, in combination with indicators related

[1] Supplemented by the qualitative key-informants survey 2004.

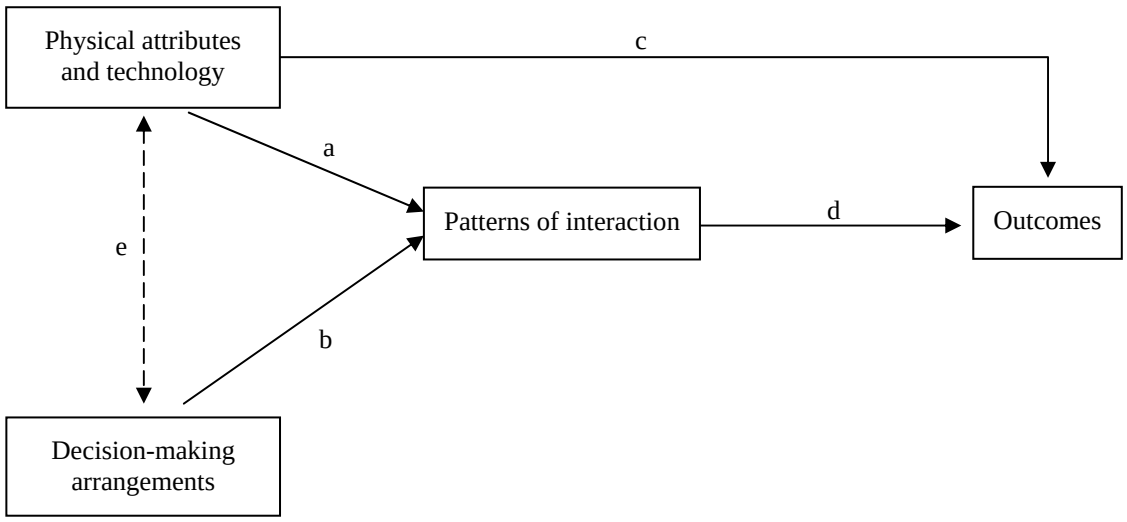
[2] Not much attention is paid to exactly how these environments influence forms and functions.

directly to agricultural output (the *raison d'etre* of irrigation), these functions constitute key indicators of irrigation performance. As the focus in this chapter will be on such performance indicators, a useful supplementary framework for systematically analysing performance that is more firmly rooted in neoclassical economic thought and associated with common-property school approaches than that of Martin and Yoder, i.e., Oakerson's framework for analysing the commons, will be introduced.

Oakerson describes the framework and its function as:

> "A framework that can be used to collect information about the commons and analyze it across a variety of resources and facilities. Such a framework must be specific enough to offer guidance in the field, yet general enough to permit application to widely variable situations. The trick is to develop concepts that identify key attributes shared broadly by the commons in its many manifestations and that take on different values from one circumstance to another. This allows a systemic approach to the study of a phenomenon that has great variation" (1992:42).

Figure 3
A Framework for Analysing the Commons



Source: Oakerson 1992.

The above quote and the model, as depicted in figure 3, suggest a fairly versatile framework. However, Oakerson suggests, as the point of departure for the model, that the "problems of the commons are rooted in constraints given in nature or inherent in available technology" (1992). So while physical and technological attributes obviously matter a great deal, as discussed to some extent in the previous chapter, it also entails a fairly restrictive framework for analysis, probably even more so than that of Martin and Yoder. Then why, in the context of the scope and ambitions of the present investigation, apply such a relatively narrow framework? The reason has to do with the specific nature, purpose and ambition of particularly the qualitative elements of the over-time data, which call for a pragmatic analysis of the commons.

The background for such an 'eclectic' approach is explained in chapter 2, where I also suggest that there is indeed a great deal more to the management of common property than collective action

frameworks are capable of capturing. At present, however, the issue is one of the applicability of conceptual frameworks to specific data contexts. A great deal of the repeat survey data gathered by means of cross-sectional surveys lends itself to and, it may be argued, even necessitate, attempts at causal explanation through the forces of variables that may exist independently of external social and economic forces. In other words, the data have to be dealt with meaningfully and faithfully.

The quantitative data in particular entail identification of relatively isolated factors. In combination with the analytical concepts of the Martin and Yoder framework, developed as they are in the specific empirical context of Nepal, Oakerson's framework is considered a useful tool for dealing with physical and technical factors in the broader analytical sense. Some of these physical and technical factors may be considered potential confounders (broadly understood) and, without analysis of their importance, the risk of constructing spurious arguments is great. Attention to these factors is a prerequisite for subsequent analysis of putative links between broader social, economic and institutional factors, and the possible chain of causality that may have influenced the trajectory of current irrigation systems.

The use of Oakerson's model is not to suggest that complex reality may be reduced to models or even mere graphics, but to engage with an analytical and theoretical framework that contributes to understanding the irrigation commons in the context of specific empirical data. The model itself should, as most other such graphical displays, be considered merely a convenient shorthand attempt at depicting complexity. As mentioned in section 3.3, re-studies are prisoners of the past (Blaikie et al 2002), and it should be recalled that the 1990s data are monitoring data. The use of Oakerson's framework reflects the specific circumstances and spirit under which the Dhaulagiri Irrigation Development Project's monitoring was conceived. These circumstances were characterized by diagnostic purposes and concerns with performance and equity in the commons in relation to physical and technical factors, rather than holistically understood societal processes and their actors. Analysis of the latter indeed requires a much more dynamic framework, in line with the ambitions of this thesis to contribute towards such a framework; that framework will be attempted in the following chapter.

The historical-methodological significance of Oakerson's framework is owing to its role in the early days of 'counter-Hardin' research into common property regimes that initiated a deluge of case study research into the commons, generating empirical evidence of working commons, denoted in a somewhat broad-brush manner as the 'collective action school' in this thesis. The framework, conceived in the early 1980s, was adopted by the Panel on Common Property Resource Management in Developing Countries and used to organize a number of case studies at an international conference in 1985 under the auspices of the (United States) National Research Council of the National Academy of Sciences (Oakerson 1992, Dietz *et al.* 2002). As Bromley explains, the purpose of the said panel was to "determine if indeed there were any reasonably successful common property regimes operating in the world" (1992:5).

The role of the Oakerson framework as a template for documenting common property regimes was restated in Bromley's 1992 collection of common property case studies that originate in the 1985 workshop. The concepts proposed in this generic, archetype 'mother of frameworks' for analysis of the commons feature prominently in many of the subsequent collective action or 'common property school' case studies and models (not least Ostrom 1990, 1992; see also Dietz *et al.* 2003 for a review of approaches). In other words, the framework found resonance in what Nabli and Nugent (1989) identify as the strand of new institutional economics, which deals with collective action in relation to public or collective goods and common property resources (see chapter 2). This will

become evident in the following, where I also draw on the more prominent theorized derivatives of the Oakerson framework[3], particularly Ostrom's (1992) notion of institutions as rules-in-use.

The framework distinguishes between four types of systematically related attributes or variables.

- Physical attributes and technology
- Decision-making arrangements
- Patterns of interaction
- Outcomes

Similar to Bromley's approach to the commons (see section 2.5.1), the physical attributes of the resources in question are an important point of departure in describing a commons, but Oakerson includes, as a related feature, the technology available and used to obtain the yield (benefits) of the resource. These physical and technological attributes (the first variable) determine the degrees to which individuals are able to subtract from the resource, i.e., the subtraction limits for deriving joint benefits. Similarly, the degree of exclusion-cum-access control that is required in a commons depends on the nature of the resource and the technology available, an issue related to allocation, as elaborated on in section 7.5. Indivisibility is another function of mainly the physical attributes of the resource; for example, common resources such as irrigation water are not easily divided among private property holders without impairing their production value.

The decision-making arrangements (the second variable) demanded by the attributes of the resource are understood as the "rules that structure individual and collective choices with respect to the commons" (Oakerson 1992:46) in the shape of the discrete institutions which, as Bromley (1992) suggests, make up a broad set (again depending on the attributes of the resource) of management arrangements which may be referred to as common property regimes. Oakerson sorts decision-making into three subsets that are nested in one another: firstly, operational rules, which are basically rules that serve to "limit user behaviour in the interest of maintaining the yield of the commons" (1992:46), akin to Ostrom's rules-in-use (Ostrom 1992). These operational rules are nested in the second subset, i.e., conditions of collective choice. These are the rules that "establish conditions of collective choice to allow a group of appropriators to manage their commons" (Oakerson 1992:47) in a common property arrangement in which "individuals are no longer entirely free to decide for themselves how to make use of the commons, but participate in a process of collective choice that sets limits on individual use" (Oakerson 1992:47). This subset is somewhat under-theorized in the Oakerson framework, but may be understood as constituting the common property governance arrangement, as determined by the attributes of the resource. The rules include qualifications for access to the resource (e.g., land in the case of irrigation) within the (informal) legal domain of the collective decision-making arrangement.

The subset has, within the common property school, been further theorized to the extent that it is the rules and patterns of behaviour that matter and constitute the common property institution-cum-organization (see Ostrom 1990). This theorizing has been translated in policy guidance (Stern *et al.* 2003) that emphasizes 'getting the rules right' and designing them into institutions. In the practical irrigation context, the institutions have become known by a variety of names, including self-

3 This is not to claim that later theories on the commons are mere derivatives of the Oakerson framework; indeed commons scholars such as Ostrom (and Oakerson himself) draw on earlier contributions within institutionalism and collective action. The Oakerson framework, however, appears to somewhat paradigmatic in the discursive context of placing local natural resource management institutions on the agenda of policy options for managing natural resources.

governing irrigation systems (Ostrom 1992), farmers' irrigation associations (see International Labour Organisation 1995 for a procedural manual), etc. Empirically, this theorizing is, as mentioned earlier, rooted in irrigation experiences (see Ostrom 1990, 1992, Ostrom *et al.* 1992, Ostrom 2002) and has, in many irrigation policies, led to the realization that "without effective institutional arrangements that sustain a pattern of productive working relationships, increasing the amount of physical investment alone is insufficient for improving irrigation performance" (Lam 1998:137).

The third and final subset in which conditions of collective choice are nested is that of external arrangements, chiefly "decision structures outside the immediate group that that impinge on how the commons is organized and used" (Oakerson 1992:46). I consider this subset to refer to what is now more commonly known as formal legislative frameworks, and the presumed 'nestedness' of common property institutions within such frameworks to refer to the notion of legal pluralism, defined as the "coexistence and interaction of different legal orders in a social field" (Pradhan and Pradhan 2000:202). The neoclassical flavour of the Oakerson framework is apparent in the assumption that 'patterns of interaction' (the third variable) emerge from the behaviour of utility-maximizing individuals, who are seen to make rational choices, given the physical attributes of the resource, the technology and the regulating governance arrangements. The choices are based on perceptions of costs and benefits, and result in incentives to act or not to act.

In this context, two contrasting strategies on the part of individuals are central to interactions (or lack of the same) in the commons, and to understanding of cooperative endeavours in general: one strategy is that of reciprocity (i.e., the interaction of individuals who jointly contribute to a common effort)—a notion that is at the heart of collective action theory. Reciprocity is made challenging by the fact that the immediate quid pro quo ('something for something') relations that are seen to regulate exchange relationships[4] in other contexts, depend, in the case of the commons, on what Oakerson calls "mutual expectations of future positive performance" (1992:50). Refining this point, Ostrom *et al.* have later, with trademark emphasis on the role of rules, suggested that incentives are more than quid pro quo rationality:

> "… incentives are more than just financial rewards and penalties. They are the positive and negative changes in outcomes that individuals perceive as likely to result from particular actions taken within a set of rules in a particular physical and social context" (1993:8, quoted in Berthelsen 1997).

The other strategy, or choice, is to free-ride while others proceed with collective efforts. The immediately undermining effects of a free-riding strategy depend, largely, on the subtractiveness of the individual's use of the commons, i.e., the extent to which the commons can cope as a physical system with free-riders. Such behaviour erodes reciprocity-cum-collective action, and the challenge at the decision-making level is to "sustain mutual choices of cooperative strategies among a sufficient number to sustain the yield of the commons" (Oakerson 1992:50). Exactly how to go about doing that has preoccupied a number of collective action scholars, and has been most powerfully theorized by Ostrom and expressed in her already mentioned emphasis on institutions as rules. These rules are not only key to understanding how the commons work, but commons may also be made to work through appropriate rules (see Ostrom 1990, 1992, Vermillion 2001, see also section 2.3.1).

---

[4] Oakerson explains that "while exchange is based on *ex ante* conditions (that is an exchange does not occur until certain conditions are met on both sides), reciprocity is subject to *ex post* conditions (i.e., to conditions that are met following one's contribution to a joint undertaking) (1992:50).

Outcomes (the fourth and final variable) are largely the result of the 'filtering' that stems from patterns of interaction (except when they constitute 'hard constraints'; see below). Oakerson applies two sets of related criteria in this context, efficiency and equity. Efficiency relates to evaluative criteria that are translated into operational measures. These measures, in the case of irrigation systems and the data generated in this survey, include yields and cropping intensity, as dealt with in the succeeding section. Efficiency relates to a number of factors, including the optimal rates indicated by the technical and physical attributes of the resource; both aggregate overuse and underutilization suggest inefficiency. In Oakerson's words "inefficiency of the commons is apt to be closely associated with inequity" (1992:52). The concern relates to inequities in distributional terms, such as whether individuals are "getting a reasonable and fair return on their contribution to collective undertaking that regulates behaviour" (1992:52). As Oakerson explains, asymmetries aggravate equity problems by creating opportunities for some at the expense of others, and the bottom line is that inequities may lead to the collapse of reciprocity as a central mechanism in collective action. Although not mentioned by Oakerson in this general model, equity as an efficiency concern in irrigation is closely related to the notion of the tail-end problem (see section 7.5).

The causal relationships in the model are fairly self-explanatory, but with reference to the particular applicability of the model for the type of data to be analysed in this chapter, solid line 'c' demands special mention. This is because physical and technological attributes are considered 'hard constraints' or factors, which, while also affecting patterns of interaction, have the potential to affect outcomes directly and independently of "human choice and interaction" (Oakerson 1992:52). Examples of this will become evident in the analysis where I refer to, for example, natural calamities as confounding events.

Before going ahead with the analysis it needs to be mentioned that in line with the inductive, case study approach of this thesis, the analysis in this section contains only limited attempts at establishing statistical relationships such as is otherwise common in the treatment of cross-sectional survey data. It is felt that given the multitude and relative nature of factors that influence change in the irrigation commons, and the sometimes-inconsistent nature of the re-study data, attempts at causal inference through the strengths and significance of correlations between variables is not particularly meaningful. Rather, the approach will be one of searching for causal paths and associations through analysis of consistencies and patterns over time, with emphasis on how variables may have mattered to outcomes rather than on how much they may have mattered (Bardhan and Ray 2006). It follows from this that qualifying and explanatory elements (mainly farmers' perceptions of events) are applied to the extent possible.

8.3 Agricultural Productivity: Conceptual and Methodological Issues

Oakerson recommends that in order to use the framework as a diagnostic tool, one should work backwards through the model. Therefore, we begin with outcomes: the analysis of irrigation performance in the period from 1992 to 2004 commences with analysis of agricultural yields for staple crops and of cropping intensities as operational measures that, in accordance with Oakerson's framework, may be used to appraise outcomes specific to irrigation. Both measures are usually considered the most direct means of assessing performance of agricultural systems, including both physical and institutional elements (see, for example, Ostrom *et al.* 1992, Ostrom 2002).

In a wider rural development perspective, the yield and cropping intensity performance indicators are commonly considered to be the two most important measures in the context of notions of

national food security concerns. These concerns, as Wilson and Rigg (2003) note, until recently reflected a general Malthusian pessimism that was couched in what some would call 'productivist'[5] terms, implying that the common use of these indicators, particularly with respect to stable crop performance in the context of national concerns with food security, is rooted in the notion that such security was associated with adequate supplies of basic foodstuffs. The fact that it was the monitoring of the productivity of these crops that was of central concern to the Dhaulagiri Irrigation Development Project in the 1990s reflects this (as did at least partly the interventions with respect to irrigation system rehabilitation). In reality, however, as the analysis of cropping intensities in the command area of the irrigation systems will reveal, the diversity of cropping portfolios warrants a focus beyond that of staple crops. Likewise, the notion of food security, as already suggested in chapter 5, is more complex than household or national-level self-sufficiency in rice.

In terms of data collection methods, agricultural yields are, in principle, a relatively straightforward quantitative performance measure of the output per hectare per annum, and most farmers recall such yields without much hesitation. Therefore, interviews (in line with the general shift towards participatory methodologies over the past decades) have become the preferred method of yield estimation over former costly and often inaccurate practices of crop-cutting[6]. Cropping intensity is not as straightforward a quantitative measure as that of yields per unit of land, as it contains higher risk of recall errors owing to the number of variables involved. Particularly in circumstances of the complex cropping portfolios associated with improved irrigation where, for instance, relay and intercropping is likely to increase. Therefore, this measure often requires a great deal of triangulation as well as patience on the part of both the interviewer and the respondent.

The measure refers to the volume of land under cultivation in specific seasons. There are, as noted in the previous chapter, three 'official' seasons in the hills (summer, spring and winter) and two such seasons (summer, winter) in the mountains. If all irrigated land were planted in all seasons, then the maximum cropping intensities of 300 per cent in the hills and 200 per cent in the mountains are achieved. If all irrigated land were planted in only one season, cropping intensities would be only 100 per cent in both settings. If half of the irrigated land is planted in each season, then the cropping intensity would be 150 per cent in the hills, and 100 per cent in the mountains, and so on. With reference to section 7.3 on irrigation and the agricultural cycle, both the yields and the cropping intensities obviously depend on the extent to which farmers are able to obtain timely and controlled water supplies during the busy monsoon season where water control is essential, and adequate supplies during the following seasons when water becomes increasingly scarce.

---

[5] 'Productivism' and the 'productivist era' is sometimes used to refer to a period when the main "preoccupation of agriculture was maximum food production to ensure national or regional self-sufficiency" (Wilson and Rigg 2003:682), characterized by "the discursive emphasis on production, commodity production maximization and rhetoric focusing on national/regional self-sufficiency" (Wilson and Rigg 2003:688). The notions of 'productivism' and its mirror-image notion of 'post-productivism' are, however, fairly contested, and as Wilson and Rigg suggest, perhaps even analytically inadequate concepts in relation to agricultural reality in developing countries. I use the term here to illustrate a ('productivist') policy context in which the discursive emphasis assigns central place to quantitative performance measures such as yield and cropping intensity. It may be noted in this context that, at least for part of the 1980s, Nepal was an exporter of foodgrains (see, for example, table 16 in Thapa and Rosegrant 1995).

[6] Crop-cutting in Nepal for purposes of gathering national yield statistics has traditionally involved random multi-stage sampling, and the cutting and weighing of sampled crops. The method requires high levels of accuracy, reliable weighing equipment, and high numbers of staff working under close professional supervision; however, financial and institutional capacities do not reflect these ambitions (see Balogun 1989 and Gill 1993 for further discussion of the merits of official yield data). Current official practices for obtaining national data are not known to this author; however, virtually all investigations by donors and others now involve 'recall' methods.

Farmers in all the surveys that form the basis for the data in this section were asked what the yields of the last harvest were and in case of cropping intensity, how much of their irrigated land was planted to various crops during the last relevant season. However, in the figures that will be presented, year refers to the year that the data were recorded. As all surveys were conducted in the spring, from April to early June, the *de facto* yields for rice are those of the harvests of October–November of the preceding year, and for maize they are those of June of the preceding year. However, for wheat the yield denotes March in the reporting year. Considering that the systems were formally completed in July 1993 but had been in operation for some time by then, the 1992 data should be considered 'without project' data for all crops, the 1993 data should be considered 'partly without project' data, and the 1994 data onwards as 'with project' data[7]. In the mountains, where yield data are available for buckwheat (harvested in October) and naked barley (harvested in June), the *de facto* yields are entirely those of the year prior to that of recording. As in the hills, all mountain systems were completed in July 1993.

Yields, in particular, are subject to the 'hard constraints' that Oakerson mentions are imposed in the context of physical and technological attributes. A range of physical and technological factors such as the general conditions for irrigated agriculture, changes in varieties of seeds, the use of fertilizer and pesticides, and the status of physical structures affect yields; likewise, the climate or natural calamities may seriously impact on the yields of specific crops in specific years. The choice of crops to be grown is also influenced by access to technology and markets. Given the potential variety of hard constraints, the DIDP's own monitoring and evaluation guidelines, mentioning that "surveys should be designed and implemented so as to enable the isolation of variables that influence unanticipated effects for output over time" (Berg 1995: 45), seem somewhat unrealistic.

That ambition, if at all attainable, would probable require a more complete time series than has been possible with the present data, possibly in the shape of a rigid cohort approach. I discuss methodological concerns in more detail in section 8.3.5. The role of technical and physical factors in affecting outcomes is further discussed in section 8.3.6. Suffice it to say at this point, that in view of both generic and specific methodological concerns, the ambition with respect to the following data is to provide a picture of the general drift of change with respect to agricultural production.

8.3.1 Hills vs. Mountains

It was established in the preceding chapter that modes of irrigation management vary considerably between irrigation systems, particularly that there is a notable difference between the more structured organization of irrigation in the mountains compared to that of the hills. In view of this, and because agricultural characteristics differ considerably between these regions, the performance data on hills and mountains will for the most part be presented separately. It must be noted though that the scope of the investigation is not one of a comparative analysis between hill and mountain systems (although this would be an interesting exercise in itself). Rather, the comparative perspectives will be addressed within the ambits of the overall problematic of this thesis (i.e., how

[7] The extent to which the 1993 data should be considered 'with project' data for wheat is somewhat uncertain; most projects were actually completed earlier than the formal July 1993 'handing-over' date but were subject to a testing period. Considering that wheat yields of March 1993 (see chart 3) in the 1993 recording show a uniform increase, suggests that 1993 data could be considered 'with project'. In rice and maize, the 1993 data also suggest increases, although not as uniformly. Similarly, in the mountains, it is not unlikely that the October 1992 buckwheat harvest (recorded in June 1993) benefited from an improved system. The 1994 data, recording rice in October 1993, maize in June 1993, wheat in March 1994, buckwheat in October 1993, and naked barley in June 1993 certainly qualifies as 'with project', given that the formal completion date was considerably later than the *de facto* completion date.

socio-economic changes affect irrigation), so as to retain a multi-variation perspective on the investigation of processes of change.

8.3.2 Yield Performance in the Hills

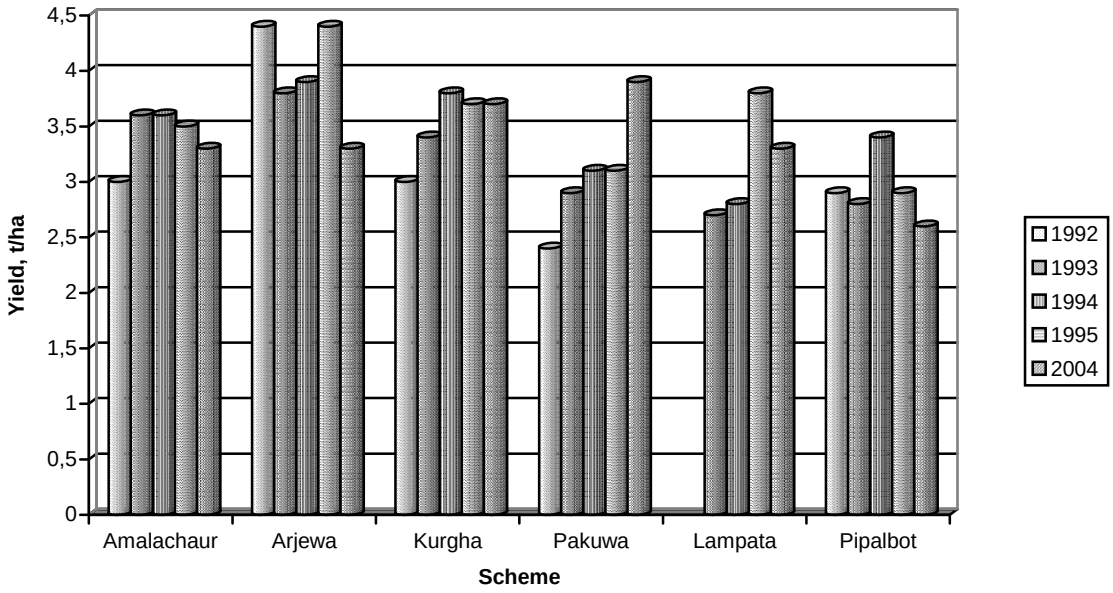
The trends with respect to productivity for rice, maize and wheat are described below. In the case of all three crops, the trends throughout the entire period from1992 to 2004 are interesting for a number of reasons, not least because they depict a performance trajectory with and without external intervention. The trends thus enable comparison of the 'without project' and 'with project' situation, where the 'without project' data may be seen as constituting the benchmark against which 2004 yields should be assessed in terms of overall change. As will be discussed later, the 1994 and 1995 data are relevant in the context of relative change, and concern the investigation in the sense that they suggest optimal productivity potential, i.e., when conditions are optimal in terms of irrigation facilities because "limiting conditions that pertain to the natural replenishment or maintenance of the resource" (Oakerson 1992: 44) had been reduced, following the completion of rehabilitation works. It needs to be emphasized though, that, given the focus and scope of this investigation, evaluation of the effect of the Dhaulagiri Irrigation Development Project's irrigation intervention on productivity is not a central concern, even if the data appear quite telling with respect to the viability of irrigation interventions in hills and mountains. What is of major concern is, as already mentioned, the general direction of change that can be detected from the data.

Chart 1 presents average yields for rice in the years 1992, 1993, 1994, 1995 and 2004. The data in the first and the second column for each system (1992 and 1993) constitute base-data (or 'without project' data), i.e., yields prior to intervention by the project.

Yields in rice have remained relatively steady over the years, with a tendency to peak, or stagnate, in most systems, at some point in the first years following system rehabilitation. In Amalachaur and Kurgha, yields peaked at 3.6 tonnes per hectare (t/ha) and 3.8 t/ha, respectively, in 1994, and dropped only slightly to 3.3 t/ha in Amalachaur and 3.7 t/ha in Kurgha by 2004. Similarly, Lampata witnessed quite a surge from 1994 (2.8 t/ha) to 1995 (3.8 t/ha) but yields dropped to 3.3 t/ha in 2004. Pipalbot also experienced peaking yields at 3.4 t/ha in 1994, dropping to 2.6 t/ha in 2004. Arjewa displayed very high 'without project' yields in 1992 at 4.4 t/ha; these dipped in 1993 and 1994 and rose to 1992 levels in 1995, before dropping to a record low of 3.6 t/ha in 2004. Pakuwa did not experience mid-1990s peaking of rice yields. Rather, yields gradually increased from 2.4 t/ha to 3.1 t/ha in 1994 and 1995 to reach 3.9 t/ha in 2004.

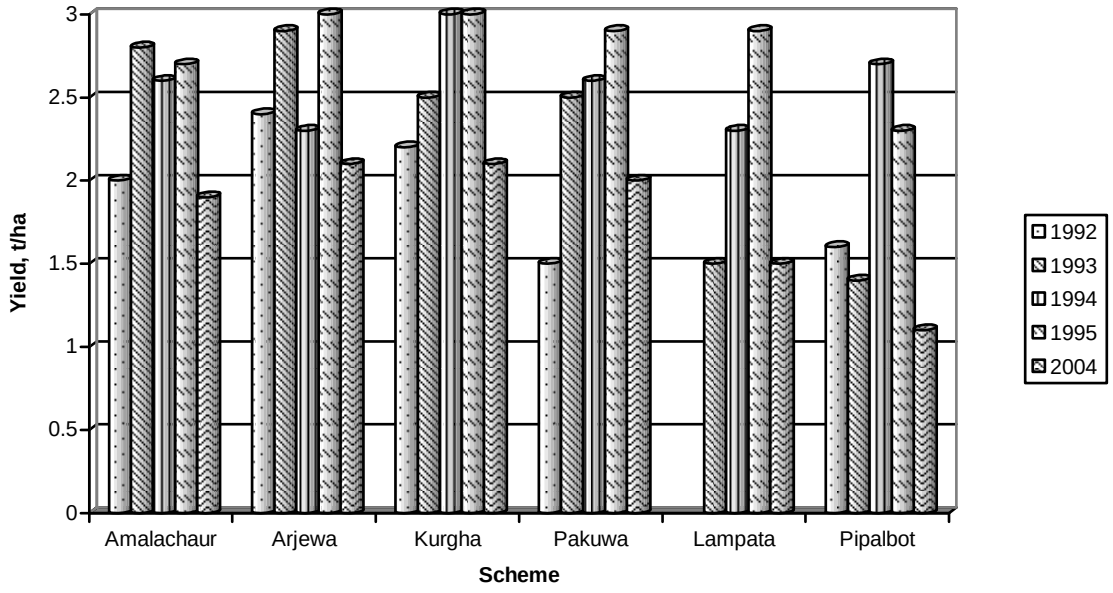
The picture across the systems suggests, in addition to the tendency for yields to peak in the first years following rehabilitation, continuously high yields. In overall, comparative terms, these rice yields that, for the period 1994–2004 range from a lowest average of 3.0 t/ha in Pipalbot to a highest average of 3.9 t/ha in Arjewa, compare favourably with national data that report rice yields by the mid-1990s amounted to an average of 2.5 t/ha, and by 2001 to an average of 2.7 t/ha (FAO 2003, Appendix Table 5). The yields are also high in the regional hills context, where in early 2003, 4.0 t/ha (Department for International Development 2003) were considered high yield levels.

Chart 1
Average Rice Yields, Hill Systems, 1992–1995 and 2004
(tonnes per hectare)



Sources: Key Effects Monitoring Surveys 1992–1995; Repeat Cross-Sectional Survey 2004.

Chart 2
Average Maize Yields, Hill Systems, 1992–1995 and 2004
(tonnes per hectare)

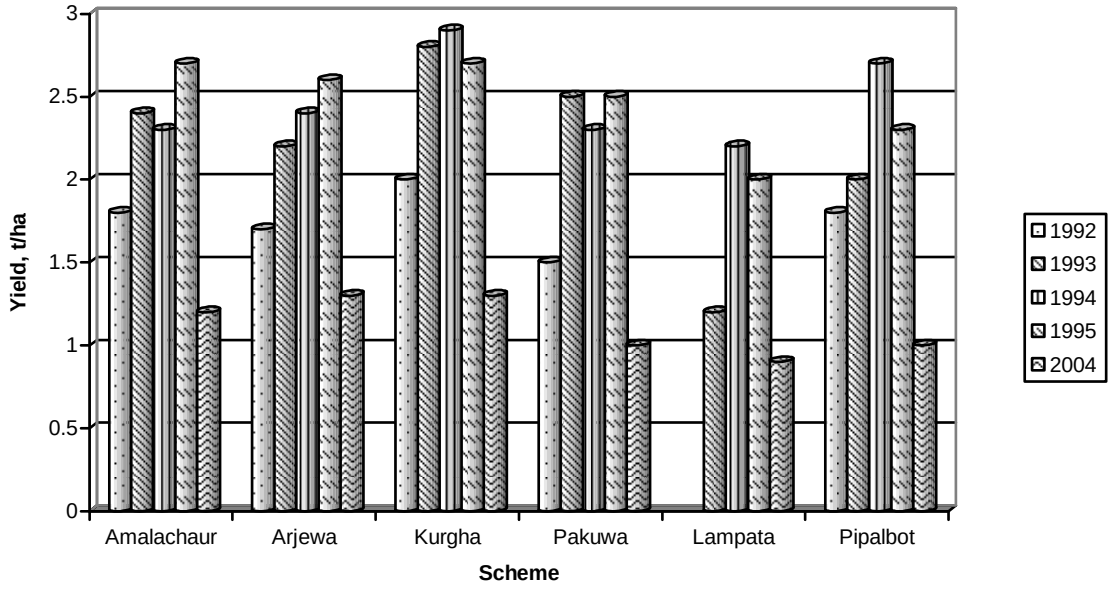


Sources: Key Effects Monitoring Surveys 1992–1995; Cross-Sectional Survey 2004.

The general trend for maize yields (chart 2) resembles to some extent that experienced for rice, i.e., yields peaked at close to 3.0 t/ha in the mid-1990s. However, compared with rice yields the maize yields fluctuate substantially, and drop quite dramatically—in some cases by more than a tonne—between the mid-1990s and 2004.

As was the case with rice, Pipalbot was the worst performer in terms of maize yields in 2004 at 1.1 t/ha, but yields also dropped in those systems that did relatively well in terms of rice yields, i.e., Pakuwa, Kurgha and Amalachaur. In the latter two, as well as in Arjewa, the 2004 yields were lower than in the base year of 1992. The average 2004 yields for these systems at 1.8 t/ha, however, matched the national average for 2001 (Food and Agriculture Organisation 2003, Appendix Table 5), but were obviously far below the potential.

Chart 3
Average Wheat Yields, Hill Systems, 1992–1995 and 2004
(tonnes per hectare)



Sources: Key Effects Monitoring Surveys 1992–1995; Cross-Sectional Survey 2004.

As suggested in chart 3, the general trend for wheat yields resembles that of rice and maize in the sense that yields peaked in the mid-1990s and dropped in 2004. However, the difference between peak yields and those of 2004 is more pronounced for wheat than for the other crops; in all cases, yields were reduced by close to or more than half; in the case of Pipalbot, the reduction was more than 1.5 t/ha, almost two-thirds of the 1994 high. The average 2004 yield performance of just above 1 t/ha appears particularly dismal, not only in the relative context of these systems, but also in the context of national figures, where average yields amounted to some 1.8 t/ha in 2001 (FAO 2003, Appendix Table 5). In sum, the yield trajectory in the hills appears as one in which yields peaked at various points in time in the mid-1990s, following irrigation system rehabilitation. Of the three crops, rice displays the most stable yields over time, with 2004 yields tending to be close to 'without project' yields. Maize and wheat yields in 2004 were drastically reduced in relation to

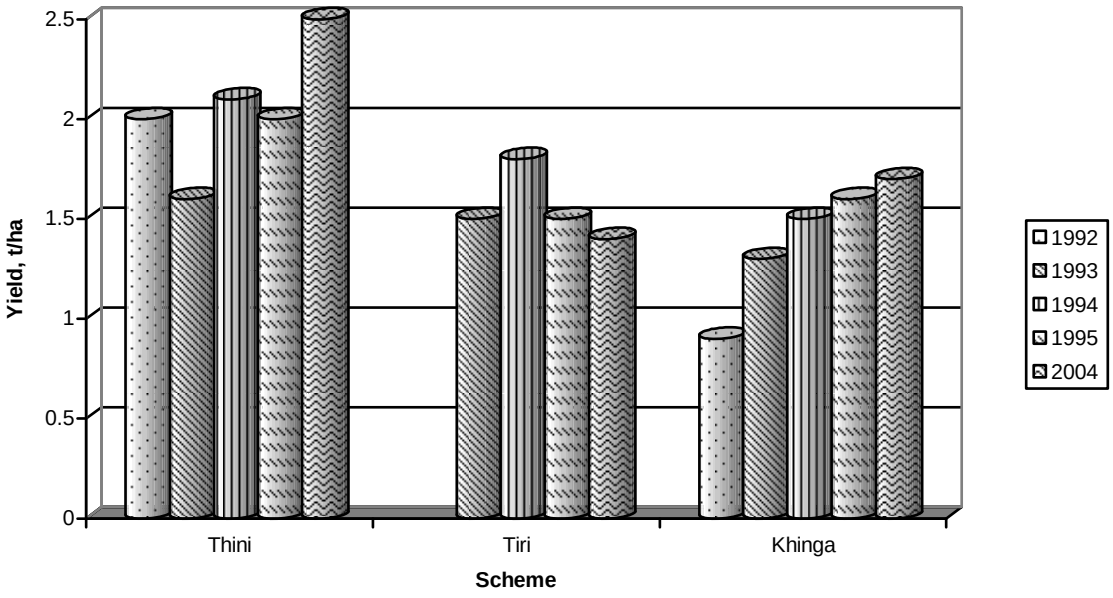
maximum yields and, particularly in wheat, also in relation to ‘without project’ yields and the averages for the 1992–1995 period.

8.3.3 Yield Performance in the Mountains

In the mountains, data have been recorded on buckwheat and naked barley, the two crops that were considered by the DIDP in the 1990s to be the two most important as regards to food security in the area. As mentioned in the previous chapters, naked barley is a winter crop, and buckwheat a summer crop, but both are grown under arid and temperate conditions, and require—somewhat similar to the dry season crops in the hills—water adequacy and care in ensuring comprehensive water distribution during the relatively long growing periods, rather than the acute attention to water control and timeliness associated with wet rice cultivation in the hills.

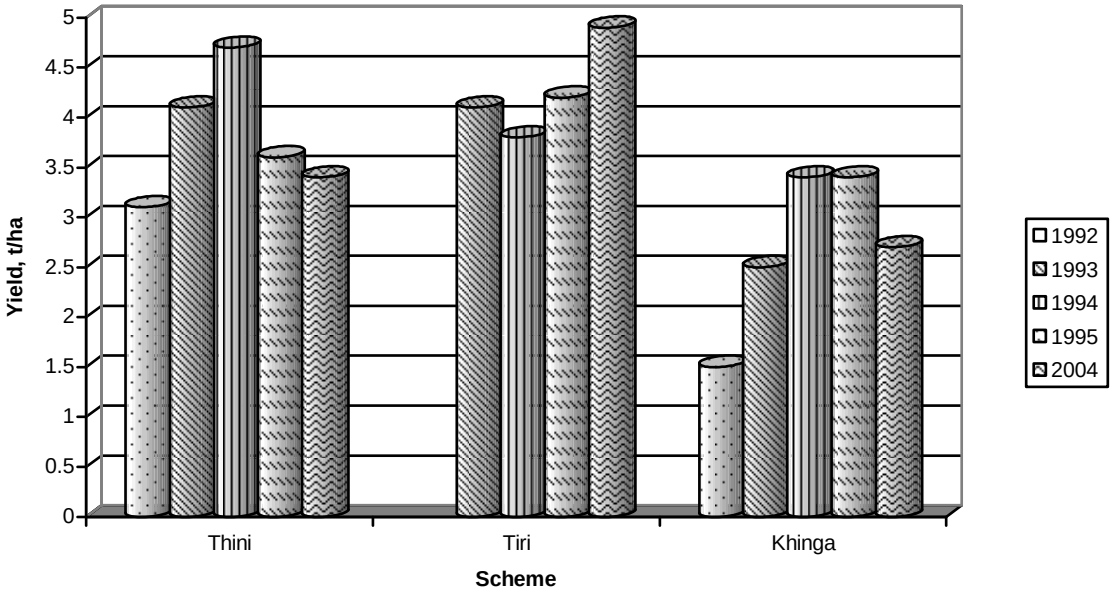
Buckwheat (chart 4) experienced an increasing trend in the cases of Thini and Khinga, from a base in Thini of 2.0 t/ha in 1992 to a high of 2.5 t/ha in 2004 (an increase of 25 per cent), and from a base in Khinga of 0.8 t/ha in 1992 to a high of 1.7 t/ha in 2004 (an increase of over 110 per cent). In Tiri, the first season with a rehabilitated system (1994) saw an increase of 20 per cent with yields up from 1.5 t/ha to 1.8 t/ha. However, overall yields in Tiri were relatively constant, but had declined slightly by 2004. The peaking yields in the years immediately following rehabilitation that were characteristic of the hills are not evident in buckwheat, except in Tiri.With respect to naked barley (chart 5) the effects of rehabilitation seem to be more evident than for buckwheat, particularly in Thini and Khinga. Record yields of 4.7 t/ha were recorded in Thini in 1994, but dropped to 3.4 t/ha in 2004, although they remained higher than the base-level yields of 3.1 t/ha. In Tiri, no such mid-1990s surge was experienced, but yields had increased by 2004 to 4.9 t/ha. In Khinga, a very low base of 1.5 t/ha had more than doubled in the mid-1990s to 3.4 t/ha in 1994; however, by 2004 yields stood at some 2.7 t/ha.

Chart 4
Average Buckwheat Yields, Mountain Systems, 1992–1995 and 2004
(tonnes per hectare)



Sources: Key Effects Monitoring Surveys 1992–1995; Cross-Sectional Survey 2004.

Chart 5
Average Naked Barley Yields, Mountain Systems, 1992–1995 and 2004
(tonnes per hectare)



Sources: Key Effects Monitoring Surveys 1992–1995; Cross-Sectional Survey 2004.

Buckwheat and naked barley are minor crops in the national context of Nepal[8], and as such very little is known about yield levels, be it in the national or regional context. Therefore, and also because of the short timeframe over which yield performance has been recorded (and this obviously pertains to the hill data as well), the extent to which the fluctuations that may be observed from the mid-1990s onwards (when these mountain systems, as in the hills, were seemingly optimal) are 'normal', cannot be verified using official figures. One study, however, while not providing actual comparative figures, notes that yields of these two crops are indeed high in the area in question (Haffner *et al.* 2003).

With respect to the general drift in productivity in both hills and mountains, it appears that trends differ quite substantially between these two ecological regions. The picture appears one of relatively stable yields in the mountains, while in the hills the trend is one of seriously declining yields for dry season crops compared to the mid-1990s, but less so compared to the base-data of 1992. The monsoon rice crop is relatively more stable in overall terms.

8.3.4 Cropping Intensity

The average cropping intensities from 1992 to 2004 for the cropping regimes of the hill systems that include rice, wheat, maize, vegetables, oilseeds and potatoes are shown in table 11 below.

[8] One report notes, with respect to buckwheat, that "very little research has been done and there is practically no extension for this crop" (Khadka 2002:9).

Table 11
Average Cropping Intensities, Hill Systems, 1992–1995 and 2004
(percentage points)

Scheme	1992	1993	1994	1995	2004	Change (Intensity) 1992–2004
Amalachaur	176	227	251	259 (266)	246	70
Arjewa	224	250	230 (233)	293 (296)	275	51
Kurgha	228	233 (241)	272 (282)	269 (290)	266	42
Pakuwa	185	191 (197)	210 (215)	218 (227)	206	21
Lampata	n.a.	189 (198)	207 (214)	241 (251)	237	48
Pipalbot	211	206	259	n.a.	209	-2

Sources: Key Effects Monitoring Surveys 1992–1995; Cross-Sectional Survey 2004.
Note: Figures in brackets denote cropping intensity including potatoes.

The most significant trends with respect to cropping intensities are that—except in Pipalbot—cropping intensities increased in absolute terms between 1992 and 2004, and that cropping intensities tended to peak in the mid-1990s (1994 and 1995). This corresponds with a tendency for yields to peak in the years immediately following rehabilitation. It has to be noted that the area under potatoes was recorded inconsistently in the surveys of the 1990s. For that reason and because the potato crop was not consistently quantified as part of the survey in the hills in 2004[9], the cropping intensities with this crop, where available, are shown in brackets. The figures, without the potato crop—and the absolute change between 1992 and 2004—are therefore an underestimation of changes in cropping intensities.

In terms of the general drift, the cropping intensities (without potatoes) increased in all systems compared with the base-data. The highest increment in absolute terms was in Amalachaur, while in Pipalbot the 2004 cropping intensity was lower than before project intervention. In Pakuwa, the second lowest performer in terms of absolute increment, change was without doubt considerably higher than suggested, as farmers reported a substantial increase in the production of potatoes in 2004. In fact, farmers in all systems except Pipalbot, gave the impression that potatoes were an increasingly popular cash crop, and it seems plausible to assume that the area under potatoes in 2004 was certainly no less than it was in 1995; therefore, the 2004 cropping intensities—again excluding Pipalbot—were probably close to those of 1995.

[9] Owing to an error in the survey design: I had meant to have potatoes included under ‘vegetables’, but in the Nepali context they belong to a separate category and were subsequently not recorded consistently. Interviewers, both during the surveys of the 1990s and for the one in 2004, asked farmers about the area under cultivation with a specific crop (known to be grown in a specific season). I realized, when designing the repeat survey, that perhaps a better method would be to leave things more open, and take season by season, asking what was grown and how much. That way, I would have avoided misunderstandings regarding the classification of potatoes, and would probably also have mapped the cropping regimes more accurately. However, in order to gain consistent data I opted to repeat the method of the 1990s in the 2004 survey.

As mentioned in section 8.3, the recording of cropping intensity is a measure with some risk of recall errors, not least in the context of cropping diversification and increasingly complex cropping portfolios. Considering that maximum attainable yields in the hills (with three seasons) is 300 per cent, the figures, particularly for Amalachaur, Arjewa and Kurgha, should indeed be considered quite high compared with the national average of about 180 per cent in the late 1990s (Sharma 1999) but not implausible when compared with credible studies that record average cropping intensities of 250 per cent for hill irrigation systems (Ostrom *et al.* 1992).

In the mountains (where area under cultivation with potatoes, as well as buckwheat, maize, naked barley, hull barley, wheat, and vegetables, has been recorded), the tendency has been, as in the hills, one of enhanced cropping intensities following rehabilitation, and increases in absolute terms between 1992 and 2004, although only in Thini and Khinga. Tiri, as a result of water shortages, experienced a 25-percentage-point reduction in cropping intensity between 1993 and 2004. Cropping intensities in Thini were relatively stable over the period, while Khinga saw a steady increase in cultivated area from the mid-1990s to 2004 (table 12).

Table 12
Average Cropping Intensities, Mountain Systems, 1992–1995 and 2004
(percentage points)

System	1992	1993	1994	1995	2004	Change (Intensity) 1992–2004
Thini	164	185	184	183	180	16
Tiri	n.a.	191	183	192	166	-25
Khinga	138	163	156	156	171	33

These cropping intensities need to be analysed in the context of cropping diversification and markets; this is done in chapter 9. For now, summarizing the trends, it appears that for the both the hills and the mountains cropping intensities peaked in the years following rehabilitation. Except for two systems (Pipalbot and Tiri), cropping intensities displayed an upward or stable trend over the period.

8.3.5 Limitations of the Productivity Data

One of the problems in repeat surveys, as mentioned in sections 3.3 section and 8.2 of this chapter, is that the 'historical' data are characterized by certain concerns, specific to the project and the period. Another, related problem is that the need for consistent and comparative data compels the researcher to obtain data in the repeat survey in much the same manner as in the first rounds of surveying, or to discard certain elements. I will, in the following, discuss issues relating to the limitations imposed by the latter dimension of 'repeat survey slavery of the past', as well as issues pertaining to the reliability of the yield data. As is evident from the analysis of the yield data so far, reported levels for the mid-1990s in the hill systems are indeed high in comparison with other data, particularly official agricultural statistics. For that reason, the high yields reported were received with some degree of surprise in the Dhaulagiri Irrigation Development Project at the time when I was responsible for supervising the surveys (1992–1995). I therefore initiated a number of efforts to test the reliability of the figures. These included additional spot interviews with farmers, checks

with the District Agricultural Officers, and obtaining second opinions from NGO fieldworkers, in addition to double-checking (both in the 1990s and in 2004) that the teams that assisted with data collection understood local measuring units and their conversion into the metric system. The conclusion to these investigations was that the reported yields were high indeed, but quite probable in irrigated hill agriculture in the region and at the altitude of the systems. The case for relying on micro-level yield data, rather than national-level data, was shored up by donor efforts at the time that aimed to improve the standard of agricultural statistics in Nepal. Commenting on the reliability of official data in the early 1990s in Nepal, one report found that national-level agricultural data were "characterized by unreliability, gaps, over-aggregation inaccuracies, mutual inconsistencies and lack of timely reporting" (Gill 1993: 4; see also footnote 6 in this chapter for the merits of the crop-cutting methodology). While the quality of national-level data might have improved by 2004, it was still the norm for donors to rely on micro-level (or case study) data. The yardsticks offered by the other small-scale surveys that also appear with the data presentation suggest that yields for rice and maize are quite comparable. For wheat, however, they are relatively low.

The second yardstick against which the reliability of the data may be judged consists of the qualifying comments on productivity provided by farmers in the cross-sectional survey itself and in the qualitative surveys that followed. From these comments, it appeared that, in general, productivity had improved compared to the pre-rehabilitation situation. Based on this, I gathered that while the reduced yields for wheat and maize might appear alarming from a production-optimization position, it may actually suggest more of a reduction of yields relative to the optimal potential (see the next section for details), rather than in more absolute terms. Most farmers, when asked about changes to their agriculture over the period—contrary to the immediate impression provided by the data—point out that their production has in fact increased in overall terms since the systems were rehabilitated. With a few exceptions (as noted in the next sections), the fundamental impacts of irrigation rehabilitation have been the cultivation of additional winter and spring crops[10] and diversification in cropping as a gradually growing phenomenon across the various *khet*. These trends would most likely have been more adequately captured if the cross-sectional surveys had been designed to capture total annual productivity (and then have the farmers specify crops) rather than the output for main crops per unit of land.

In the case of wheat, where the tables would suggest that yields had, by 2004, in most systems, dropped to levels below even that of the base level, many farmers still declare that output had increased in absolute terms. This is because most farmers did not grow wheat at all prior to rehabilitation; the few who did were typically those located at head-reaches or those otherwise well endowed with water[11], and their average yields were relatively high. It is not certain how many farmers actually grew wheat prior to rehabilitation, something that renders statistical analysis problematic[12]. However, with a much larger number of farmers growing wheat under the varying conditions of the different reaches of the *khet* in 2004, average yields were likely to be lower than before rehabilitation.

---

[10] As also noted by Angood *et al.* 2002, in a study on the impact of irrigation in a related geographical setting in Nepal.

[11] I.e., those with access to alternative sources such as springs.

[12] The first Key-Effects Monitoring surveys do not report on this in a reliable fashion; it appears that sometimes data had been obtained for both irrigated and non-irrigated areas. However, farmers, across the systems, suggested in the 2004 surveys that some wheat was grown in the command area prior to irrigation system rehabilitation, by farmers with good access to water.

It also needs to be acknowledged that given methodological caveats surrounding yield data collection, the yield trends would no doubt have been more reliable if the time series had been more complete, i.e., if the four years in the 1990s had been compared with several more years in the 2000s. Although farmers consider the cropping seasons on which the 2004 data are based to be average (see the next section), the notion of what constitutes 'average' or 'good' or 'bad' years are, in my experience, fairly subjective, depending among other things on expectations and the temporal perspective applied. The cases of two hill irrigation systems of Kalleritar (Dhading District) and Yampaphant (Chitwan District)—settings that are relatively comparable with the hill systems of my study—illustrate this. In these systems, farmers suggest that yields vary substantially from the mean in what farmers define as 'good' or 'bad' years: during 'bad' years, yields of rice, wheat and maize variations are perceived to range from -34 to -45 per cent, while in 'good' years the variations are perceived to range from +23 to +45 per cent (Angood *et al.* 2002). The point here is not that these perceptions are incorrect, but that notions of what constitutes 'good', 'bad' and 'average' years or seasons are likely to vary considerably, ranging, for instance, from those of old farmers who may recall singular historical crop failure events to younger farmers whose temporal frame of reference may not include similar extremes. The more complete the time series, the better the chance of capturing both these subjective variables as well as variables associated with hard constraints.

8.3.6 Implications of the Trends in the Context of the Role of 'Hard Constraints'

In this section, attention is directed towards the role of the physical and technological variables, and the extent to which, in relation to the yield and cropping intensity data, these influence optimal rates of efficiency and impose limiting conditions on the natural replenishment of the resource, as Oakerson suggests that they may do. In the spirit of the framework, I understand physical and technological factors as 'hard constraints' that affect outcomes directly, along with other influences on agricultural production, such as farming inputs that are not covered in subsequent analyses. In the present context, physical factors are understood as confounding factors[13]. This is because, as relatively isolated and unpredictable factors largely beyond the influence of human actions, they trigger events that undermine the conditions for irrigated agriculture.

These 'lurking variables' need to be considered, so as to reduce the risk of constructing spurious relationships when analysing other factors, that otherwise belong within the sphere of Oakerson's patterns of human choice and interaction, in the attempt at explaining changes in the trajectory of irrigated agriculture. Obviously, as the political ecology literature (see, for example, Blaikie 1985) reminds us, deteriorating physical conditions are indeed often related to the wider social and economic contexts that surrounds farming. Likewise, farm inputs, not least external inputs such as chemical fertilizer and seeds, cannot be understood in isolated terms. However, given the scope of this investigation and the nature of the repeat study data, only limited attention will be provided to the political economy associated with these specific factors.

Climate, as accounted for in the previous chapter, is an important physical variable that interacts with both irrigation and farming technology and affects outcomes. In terms of climate in relation to agricultural production, farmers in the hills did not point to any of the seasons covered by the data as being particularly unusual in climatic terms. With respect to rice, they considered the analytically crucial 2003 monsoon on which the most recent yield data are based to be fairly average in the

[13] In line with a tendency in this investigation to rely mainly on qualitative methodology, I do not use this term in the statistical sense of a spurious relationship that occurs due to a confounding factor, but merely to illustrate the existence of lurking variables or 'killer assumption' events that may constitute causality (a landslide that buries irrigated fields during the monsoon is clearly a reason for low yields).

sense that its onset was timely in relation to transplanting, that rainfall lasted until late September and was sufficient, and that no major calamities (such as landslides) disturbed water supplies. Similarly, for wheat (winter 2003/04) and maize (spring 2003) no excessive droughts (or rains and hailstorms) were reported in the relevant cropping seasons. It is only in the ecologically fragile system of Tiri that a direct climatic factor may be confidently isolated: lower than average precipitation in the high mountains above the village in the winter of 2002/03 affected the spring snowmelt on which irrigation water at lower levels depends; this subsequently affected the buckwheat crop recorded in 2004 for all farmers.

Over the years, heavy rainfall has caused floods and landslides that have affected irrigation structures and outcomes. It is important, in this context, to understand the trajectory of the irrigation structures. Farmers suggest that by 1995 (when yields for all crops were above average in most systems) the communities were in possession of relatively effective irrigation structures for all cropping seasons; this again suggests that the rehabilitated schemes had by then reached their full physical potential. Various teething problems, some more serious than others[14] had, at this point in time, been overcome and the rehabilitated systems were functioning optimally, as witnessed by yield levels. This continued to be the case in all systems until at least mid-1996, when monitoring came to an end with the completion of the Dhaulagiri Irrigation Development Project.

Indeed, the 2004 investigation revealed that a number of disrupting events took place in late 1990s and early 2000s in four of the hill systems. In Arjewa, leaks in the tank had, by 2001, as farmers pointed out, made the rehabilitated system virtually redundant, but that in itself does not appear to necessarily constitute a confounding factor[15]. In Amalachaur, a flood in 1999 affected the canal to the extent that leakages were a problem for some time, but by 2004 the situation was under control; hence, in relation to the yield data, the physical state of the system should not be considered a serious confounder. Landslides and gradually sinking canals have plagued farmers in Khinga over the years, and while this has resulted in high labour inputs, these events should not be considered confounding in relation to output either. However, in two systems natural calamities probably should: the Pipalbot system was seriously damaged by a flood in 2002, and in Lampata a series of minor landslides, also in 2002, affected one of the two channels quite seriously. Farmers explained that this had impacted on the productivity of wheat in particular, but it was not possible to ascertain how many farmers had been affected.

Nevertheless, the factor may be, if not exactly isolated, then at least narrowed down as one variable that may help account for falling yields in these systems. It needs to be mentioned though, as also suggested earlier, that these disruptive physical factors are not necessarily so confounding as to have affected the major gains from system rehabilitation; the majority of farmers continued to produce three crops as opposed to the two crops that were typical prior to rehabilitation. At this stage, what should be noted is that in the remaining hill systems, where disrupting factors pertaining directly to the physical system do not apply, the productivity of the dry season crops had also been

[14] Such as a landslide that occurred during construction in Kurgha, and which required a combination of bio-engineering and the laying down of pipes instead of an open channel. Additionally, the tank at Arjewa, as reported in chapter 6, started leaking in 1996 and was repaired by the DIDP in the same year.

[15] Irrigation water supply in Arjewa actually depends on a number of dispersed sources (springs) and channels, which, it appears, make water control somewhat problematic during the monsoon, but which ensure a relatively reliable supply of water during the dry period. While—in hydro-ecological terms—Arjewa obviously represents a system of sorts, the lack of a common irrigation element means that characterization as a ‘common property regime irrigation’ system is problematic.

drastically reduced, at least relative to optimal yields. This rather uniform reduction in dry season yields obviously means that other impinging factors need to be considered to help account for the observed discontinuities in yield performance. Cropping diversification into vegetable production and the subsequent individualization of water use is a likely candidate, as dealt with in the following chapter.

Ideally, in addition to hard constraints associated with climate and physical structures, analysis of yield levels also requires attention to various inputs including external technological ones such as chemical fertilizer and improved seeds. Changes with respect to these factors have not been investigated in much detail in the present survey[16]. However, changes in seed types are generally not, in the context of hills and mountains of Nepal, considered a particularly important factor—at least not in the period covered in this investigation (see, for example, Thapa and Rosegrant 1995, Brabben *et al.* 2004, Ostrom *et al.* 1992). Fertilizer, though, whether in the form of locally produced farmyard manure and compost or as external chemical fertilizer, is an important input in the context of performance (see Brabben *et al.* 2004). It is known from the cross-sectional surveys of the 1990s that most farmers in the hills, particularly those near transport arteries, apply considerable amounts of chemical fertilizer to rice. In contrast, maize and wheat crops in the hills depended mainly on farmyard manure and compost. As many more farmers than before stated in the 2004 survey that improved access to chemical fertilizer had helped them sustain production, access to (or rather lack of) chemical fertilizer in the hills should not be considered an issue that has contributed to reduced yields, at least not in non-remote hill systems. In the mountain systems, only locally produced organic fertilizer is applied, and there was no indication that this has changed over the years.

Based on the discussions in the last two sections, it appears that the bottom line is one of production having increased in overall terms for the many farmers who point out that yields for winter (wheat) and spring crops (maize) increased for some time (i.e., in the peak years) after rehabilitation. It may be argued in this context that optimal conditions such as those of the mid-1990s are likely, even under ideal conditions, to be followed by stagnation and possibly some degree of downward adjustment of yields. The reduction in yields of both maize and wheat, however, remain striking. In the following, I will continue to assemble pieces of the mosaic in order to detect the overall pattern in which the drift of change may be understood.

8.4 Water Distribution Performance

Moving away from the hard constraints and into the territory of decision-making arrangements and patterns of interaction, it may be recalled from the previous chapter that the organization of water distribution—together with operation and maintenance—forms the basis of irrigation organization and management. It may also be recalled that water distribution methods display great variation across the irrigation systems, ranging from voluntary arrangements and temporary employment of caretakers in the hill systems to permanently employed caretakers in the mountain systems. Likewise, the method of distributing water differs substantially, and variation between hills and mountains is particularly manifest; in the latter, turns are decided by lottery every year, whereas turns in the former are of a more permanent nature. In addition, while the highly regulated method

[16] The repeat survey was not a direct replica of the original survey in all respects. In light of the logistical problems associated with conducting the survey (see the methodology section), I decided to reduce the size of the questionnaire, and questions pertaining to fertilizer use were left out. This was a trade-off that provided more time for qualitative investigations associated with 'direct' livelihoods issues pertaining to migration and incomes, in particular.

of distribution remains the same throughout the year in the mountains, regulation of distribution is more of a phenomenon during the monsoon in the hills.

Water distribution invokes the notion of the tail-end problem introduced in the previous chapter, and is considered an important parameter of irrigation organization and, subsequently, efficiency. This is because the extent to which water is distributed to individual farmers directly influences the extent to which production in the system can be made optimal. Water distribution, therefore, as a critical performance parameter, pertains both to the amount of water available and the extent to which it actually reaches farmers' fields. In Oakerson's terms, it includes dimensions of physically limiting conditions and equity. Inefficiency, particularly when based on equity parameters, is difficult to measure, "compelling reliance on rough and ready indicators such as whether most members of the commons community seem to be relatively satisfied with existing arrangements" (Oakerson 1992: 52).

The DIDP cross-sectional survey questions were indeed phrased along qualitative lines. Farmers were asked two questions. One sought to investigate changes with respect to water availability for individual farmers and went: 'Do you get sufficient water for your crops?' It was included from 1993 in surveys for Amalachaur, Kurgha, Pakuwa and Pipalbot, and from 1994 for Arjewa and Lampata, and again in the 2004 surveys for all systems except Arjewa[17]. The other question was of a more general nature, seeking to uncover potential tail-end problems, namely, 'Do farmers along the head-, middle- and tail-reaches of the canal get fair shares of water?' In the hills, this question was included from 1993 in Amalachaur, Arjewa, Kurgha, Pipalbot, and from 1994 in Lampata, but it was only included in the 2004 repeat survey for Pakuwa. In the mountains, both questions were asked consistently in all systems in 1993, 1994 and 2004.

8.4.1 Water Sufficiency

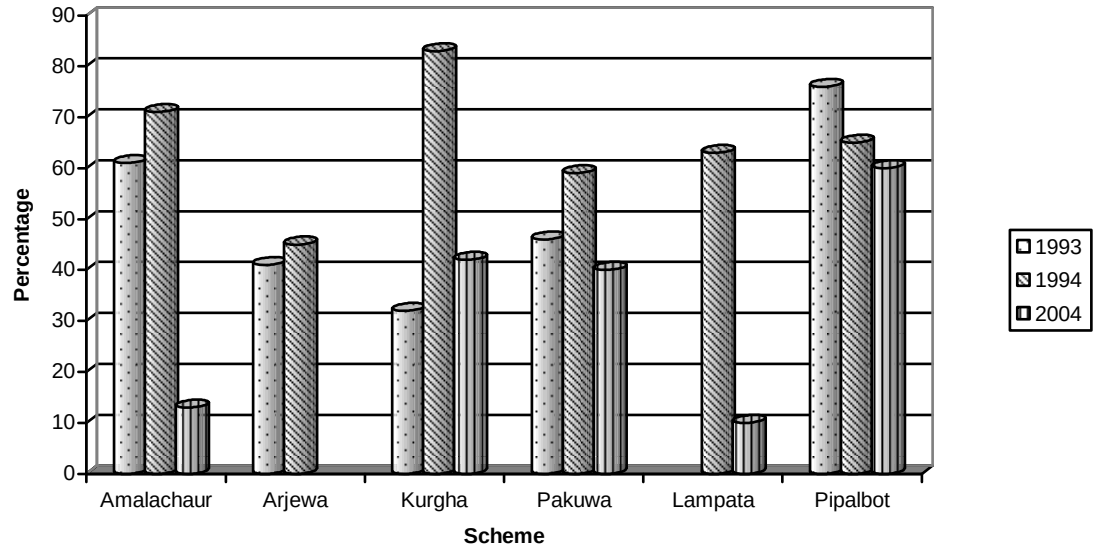
It is evident from chart 6 below that farmers perceive water adequacy as a problem and that the problem has increased over the years. In 1994, when—as the yield data of the previous sections suggest, the rehabilitated systems were reaching their full potential—close to two-thirds of farmers on average expressed satisfaction with water sufficiency. The top three at the time in terms of finding water sufficient were Kurgha, Amalachaur and Pipalbot. The farmers least satisfied with water adequacy in 1994 were those in Arjewa[18], Pakuwa and Lampata. In 2004, many more farmers found water insufficient, with only about one-third of farmers, on average, finding that they had sufficient water for their crops. The top three in terms of being satisfied with water supplies were the farmers of Pipalbot, Kurgha and Pakuwa. The least satisfied farmers were those in Lampata and Amalachaur. In the mountains (chart 7), the vast majority of the farmers—more than 90 per cent—found that water was sufficient as early as 1993[19]. A year later, the farmers of Thini were even more satisfied, but in Tiri and Khinga the number of satisfied farmers had dropped by some 40 per cent. In 2004, the vast majority of farmers in Thini remained almost as happy with supplies as they had been a decade before, while in Tiri (where, as previously mentioned, a physical factor may be clearly isolated) less than one-third of farmers found water sufficient. In Khinga, satisfaction had increased slightly.

[17] Where the question was omitted by mistake.

[18] This suggests that problems with the tank in Arjewa, which according to records started leaking in 1996, may have occurred earlier than 'officially' recorded.

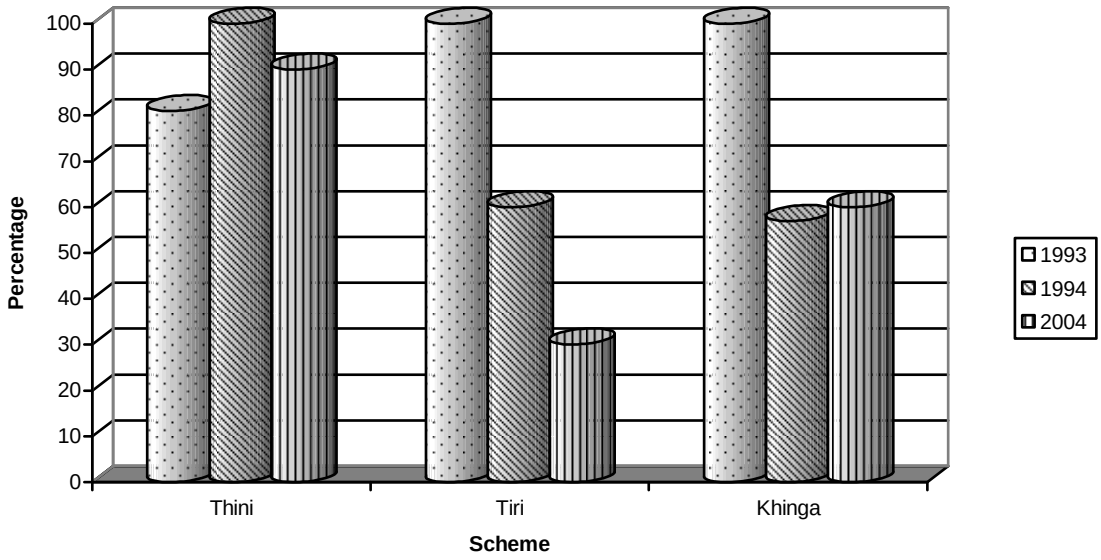
[19] This may suggest that rehabilitation works did not interrupt flows significantly; most of it took place when the need for irrigation water was minimal.

Chart 6
Farmers Finding Water Sufficient, Hill Systems, 1993, 1994, 2004
(percentage)



Sources: Key Effects Monitoring Surveys 1992–1995; Cross-Sectional Survey 2004.

Chart 7
Farmers Finding Water Sufficient, Mountain Systems, 1993, 1994, 2004
(percentage)



Sources: Key Effects Monitoring Surveys 1992–1995; Cross-Sectional Survey 2004.

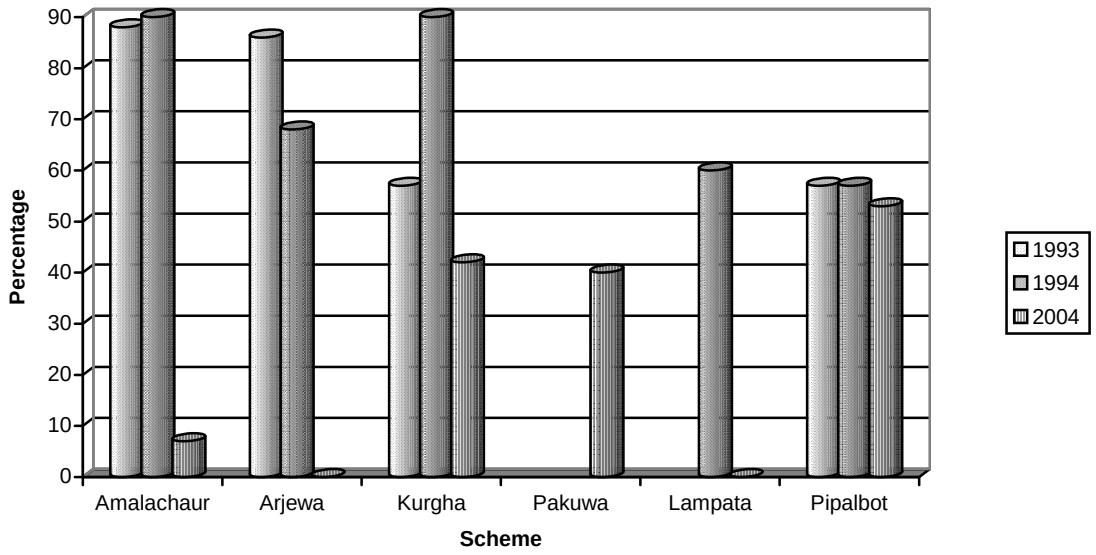
Summarizing the general direction of change with respect to water adequacy, it appears that in both the hills and the mountains—but much more so in the hills—fewer farmers found that water was sufficient in 2004 than in the 1990s.

8.4.2 'Fair Shares' of Water

The avoidance of tail-end problems was a central concern in the DIDP, as a reflection of notions pertaining both to performance and equality in the more social sense. As chart 8 suggests, the vast majority of farmers found that distribution was fair in the 1990s, while in 2004 the number of farmers who found that water was distributed fairly had reduced by some 20 per cent on average, although with substantial variation. Reductions are particularly evident in Amalachaur, Arjewa and Lampata, while Pipalbot showed the smallest reduction. In addition, fewer farmers in the mountains (chart 9) found that water was as fairly distributed along the head-, middle- and tail-reaches of the command area in 2004 than in the 1990s. Nevertheless, the vast majority (some 85 per cent in overall terms) still found, in 2004, that water was distributed fairly. Down from 100 per cent in all three systems in 1993 and 1994, in 2004, 90 per cent of farmers in Thini and Khinga found that water was distributed fairly, while 80 per cent in Tiri found so.

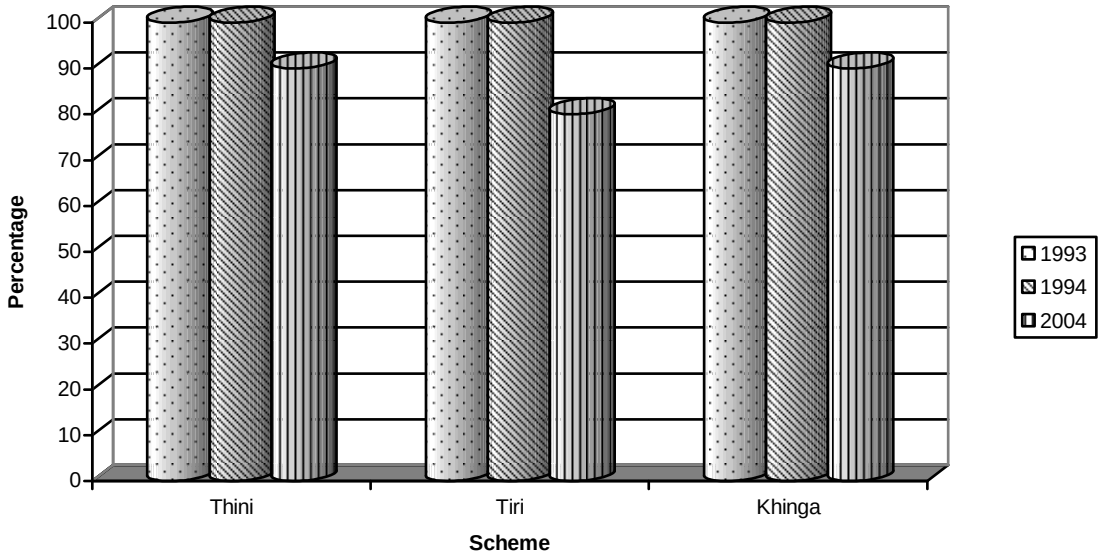
In summary, relatively few farmers in the hills in 2004 found that all reaches of the command areas received fair shares of water. In the mountains, on the other hand, the vast majority continued to find distribution fair throughout the recording period.

Chart 8
Farmers Claiming to Receive 'Fair Shares' of Water, Hill Systems, 1993, 1994, 2004 (percentage)



Sources: DIDP Key Effects Monitoring Surveys 1992–1995; Cross-Sectional Survey 2004.

Chart 9
Farmers Claiming to Receive 'Fair Shares' of Water, Mountain Systems, 1993, 1994, 2004 (percentage)



Sources: DIDP Key Effects Monitoring Surveys 1992–1995; Cross-Sectional Survey 2004.

8.4.3 Interpreting the Water Distribution Trends

As was the case with the productivity data, physical factors also need to be considered with respect to farmers' perceptions of water sufficiency. The relationships are, however, not all that clear, possibly as a reflection—as mentioned earlier—of the fact that the degree to which these factors actually impinge on individual projects is somewhat uncertain. In Arjewa, where the rehabilitated system probably never worked according to intentions, the fact that no one found water sufficient in 2004 indeed suggests that as far as concerns the 'irrigation system' (see footnote 15) as a conduit of water, things had gone from bad to worse. In contrast, Pipalbot displays surprisingly little difference over the years, despite damage to the system in 2002. Conversely, the physical factors mentioned in section 8.3.6 seem to manifest themselves clearly with respect to the farmers of Lampata and Amalachaur; in both places, the dissatisfaction in 2004 was massive compared with 1994. The same may be said for drought-ridden Tiri.

Regardless of the role of physical factors, the important finding with respect to water sufficiency in terms of the general direction towards which the data point may be likened to that of yields. Even in the systems without apparent physical problems (where performance in terms of productivity is relatively good), perceptions of water sufficiency had decreased. Kurgha and Pakuwa in the hills are important cases in point. In table 13 below, the reasons given as to why water was considered insufficient by those farmers who perceived it as such have been categorized.

Table 13
Nature of and Reasons for Water Insufficiency, All Systems, 2004
(percentage)

System	Nature of Water Insufficiency			Reason for Insufficiency				
	Winter, Spring Crops	Summer Crops	Not Specified	Source, Intake	Leakages	System Manage-ment	Location in *Khet*	No Reason Stated
Amalachaur (n=30)	27	0	73	19	55	14	0	12
Arjewa (n=22)	27	0	73	55	40	2	0	3
Kurgha (n=31)	63	13	24	6	38	6	19	31
Pakuwa (n=30)	53	0	47	0	82	0	16	2
Lampata (n=10)	90	0	10	0	0	0	0	100
Pipalbot (n=15)	50	0	50	17	0	0	17	66
Thini (n=30)	0	100	0	0	0	0	100	0
Tiri (n=10)	0	100	0	100	0	0	0	0
Khinga (n=10)	0	100	0	0	60	0	0	40

Source: 2004 cross-sectional survey.

The table shows the nature of water insufficiency as well as the assigned reason for the insufficiency among those farmers who found water insufficient in 2004 (see charts 6 and 7). Most farmers perceived water scarcity as a hard constraint in Oakerson's sense of the term, i.e., as something that relates directly to outcomes. It was seen by most as a problem that was chiefly related to the source of water, mainly the intake, or (as in the case of Tiri) the hydrological source. Relatively few farmers immediately associated the extent to which they had sufficient water for their crops with the way the irrigation system was managed. This could be related to the nature of the inquiry; direct questions that imply criticism of authority are notoriously prone to 'positive' bias in the cultural settings of both the hills and the mountains systems. However, it is also quite likely that farmers simply considered the hard constraints (i.e., that there is only so much water to go around) to be the most important. Only in four systems did some of the farmers (ranging from all of the otherwise proportionally very few farmers who found that water was insufficient in Thini, to the considerably higher numbers in Pipalbot, Kurgha and Pakuwa) associate insufficiency with the location of their fields in the *khet*. There is, in fact, no pronounced relationship between satisfaction

with water sufficiency and location in these four systems; some 28 per cent were head-reachers, 37 were middle-reachers, and 34 per cent were tail-enders—a distribution that corresponds roughly with the distribution across all systems.

Another important finding in the context of performance is that increased dissatisfaction with respect to water supplies over the years is mainly associated with winter and spring crops. Most, but far from all, hill farmers who experienced water scarcity pointed out that it affected winter crops and maize; only in Kurgha, was it mentioned that rice was affected. These perceptions obviously complement what was already suggested with respect to the falling yields of these crops. In the mountains, scarcity affects only summer crops during periods of high levels of evapotransporation. However, water scarcity as perceived by farmers should probably not be understood only in the sense that quantities of water have been reduced compared to the previous situation. Changed aspirations with respect to the farming of marketable winter crops such as vegetables and potatoes, and the limiting conditions imposed by the quantities of water available, may also be an explanatory factor. This would certainly be the case in Lampata and Kurgha, but may also be so in Arjewa which, despite farmers' perceptions of high levels of water scarcity and physical-structural problems displayed relatively high levels of cropping intensities (see table xx). This issue is dealt with in more detail in the next chapter.

The association between increased dissatisfaction and winter and spring crops has institutional performance implications. This is because, as suggested in the previous chapter, irrigation of the more extensive (in terms of labour inputs and timing) wheat and maize crops is less regulated than the more intensive rice crop, and usually contains elements of on-demand. However, in water scarce systems, as pointed out by Martin and Yoder (1988), it should ideally be the other way around; less formal regulation is usually a function of abundant water supply in the agriculturally-speaking less urgent (compared with the monsoon) winter and spring seasons. Subsequently, the situation in the hill cases, where water distribution in these seasons is characterized by both informality and scarcity, would suggest institutional problems.

As a rough indicator, the fact that not all farmers appear to be affected by water scarcity suggests some degree of unequal distribution of water, as is also confirmed by the responses to the question on whether farmers perceived the distribution of water across the *khet* as fair. In table 14 below, the explanatory statements provided by those farmers who perceived distribution as unfair have been categorized.

Table 14
Reasons for 'Unfair' Distribution, All Systems, 2004
(percentage)

System	Water Insufficient (Source, Intake, Leakage)	Management/Operation	No Reason Assigned
Amalachaur (n=30)	61	14	25
Arjewa (n=22)	56	0	44
Kurgha (n=31)	35	12	53
Pakuwa (n=30)	61	0	39
Lampata (n=10)	37	0	63
Pipalbot (n=15)	80	20	0
Thini (n=30)	100	0	0
Tiri (n=10)	100	0	0
Khinga (n=10)	100	0	0

Source: 2004 cross-sectional survey.

The figures in table 14 show the reasons assigned by those farmers who, as illustrated in charts 8 and 9, found water to be unfairly distributed in 2004. Most of the farmers in most of the hill systems confirmed that water was not distributed equally. Somewhat similar to the reasons assigned for water scarcity, as illustrated in the second column of the table, unequal distribution was perceived as mainly a hard constraint. Only in three systems did farmers (all tail-enders) mention 'bad management' and 'influential households take all the water' as reasons for unequal distribution. The farmers' tendency to attribute tail-end problems to hard constraints maybe somewhat surprising when—as discussed in the previous chapter—unequal distribution is often perceived—at least by analysts—as a combined management and technical problem. Oakerson would see it as a symptom of inefficiency, rooted in a lack of congruence between the technological and physical attributes and those related to decision-making that leads individuals into "counterproductive patterns of interaction" (1992:52).

Martin and Yoder (1988), in more nuanced terms, would see it as related to the systems in place for distributing water, the extent to which rules are adhered to, and the sheer availability of water in quantitative terms. In any case, unequal distribution of water is associated with inefficiency because it suggests less than optimal production, for the simple reason that the tail-ends of *khet* are not likely to receive as much water as the head-ends. This again may translate into reduced incentives on the

part of tail-enders to contribute to collective action (see below). On a methodological note, considering that these statements have been recorded as part of a cross-sectional survey without the in-depth triangulation and reflection that could have generated more nuanced responses, the attribution of distributional problems to hard constraints may be expected. In the context of this survey, most farmers preferred to assign an immediate and obvious reason, based on the plain physical fact of there being only so much water to go around.

It seems worth noting that the relationship between the extent to which water is perceived as scarce, and the extent to which it is considered to be unequally distributed, is very pronounced in the hills, i.e., the systems where most farmers consider water scarce, are also the systems where most farmers consider it unequally distributed. This relationship is less pronounced in the mountains, as illustrated in the case of Tiri and Khinga, where proportionally large numbers of farmers find water scarce but far fewer find it unequally distributed, and in Thini, where very few farmers find water either scarce or unequally distributed. These tendencies seem to confirm—as was postulated in chapter 7—that the lottery system of distribution that is practiced in the mountains may ensure more equal distribution and subsequently, efficiency (broadly understood), than the fixed-turn system of the hills.

8.5 Maintenance Performance

The maintenance of an irrigation system chiefly entails the mobilization of both labour and materials, and, as Yoder and Martin point out, "the ability to mobilize resources in a timely fashion is the major factor distinguishing a well-operating irrigation system from an ineffective one" (1983:5). Maintenance is essential in order to ensure that the system continues to produce benefits to farmers. In other words, the ability of an irrigation organization to operate and maintain an irrigation system is closely related to productivity. There are two main modes of resource mobilization for carrying out maintenance activities. One involves, as noted in chapter 5, the employment of caretakers—full-time in the mountains, and part-time (i.e., during the monsoon) in the hills—who carry out minor repairs in addition to performing water distribution functions. As 'mobilized resources' their employment depends on cooperative commitments from all the irrigated households who, according to the system's rules, have to contribute (either in cash or kind) to remunerate them for their work. Another mode—the one that will be focused on in this section — involves maintenance activities carried out by farmers as a cooperative labour contribution, according to rules that typically stipulate the frequency of the activity and the labour to be supplied by each irrigated household.

This mode of maintenance, where the irrigated community 'joins hands', with representatives of households with land in the *khet* being expected to turn up on scheduled days and in cases of emergency, is the one activity in an irrigation system that epitomizes the complexity associated with collective action. It invokes the powerful notion of 'free-riders' whose activities (or lack of the same) are to be avoided, if local institutions are to be perceived as efficient forms of organizing economic activity (see Ostrom 1990, Vermillion 2001, Ostrom 1992). It is a very transparent manifestation of commitment to common interests that exposes community strengths and weaknesses. In the Oakerson framework, maintenance takes place within the 'patterns of interaction' sphere and is—as mentioned earlier—particularly challenging because for rational individuals the incentives to participate in this kind of collective action is based on expectations of future benefits rather than immediate quid pro quo gratification. In Ostrom's theorization (1990, 1992), the ability to apply longer-term perspectives and thus go beyond quid pro quo thinking depends on the rules-in-use, particularly the extents to which they make sense in specific contexts and to which they are enforced.

It was an implicit objective of the Dhaulagir Irrigation Development Project to reduce the number of labour days used in maintenance of irrigation systems (in order to enhance productivity) and, therefore, questions related to the maintenance of the irrigation systems were included in all surveys. Farmers were asked if their household contributed labour to the maintenance of the irrigation system; if so, how many days per year and on what basis; if fines were imposed; and, if they were satisfied with organization of maintenance. The basis for labour contribution was described in chapter 7. In this section, the focus will be on trends with respect to labour days, sanctions and attitudes, with respect to how maintenance is organized. The following tables, based on the entire study population (as everyone claims to contribute labour), suggest the trends, for selected years, with respect to both regular and emergency maintenance works.

Table 15
Labour Contributions for Maintaining Irrigation Systems, Hill Systems, 1992–1995 and 2004
(average person-days per household per annum)

System	1992	1993	1994	2004
Amalachaur	13	9	3	3
Arjewa	12	10	3	3
Kurgha	17	26	4	6
Pakuwa	33	12	5	3
Lampata	n.a.	8	9	4
Pipalbot	4	2	6	4

The questions on maintenance were first asked in the spring of 1992 before any of the systems had been completed. As suggested by table 15 above, Pakuwa, where before rehabilitation, as one farmer put it, “far too much time was spent on maintenance in an unsystematic way”, topped the list in 1992 with 33 labour days per household on average. The abnormally high level of labour contribution in Kurgha in 1993 was owing to the landslide reported earlier (see footnote 14). Labour contributions were never particularly high in Lampata and Pipalbot. By the mid-1990s, when, as suggested earlier, systems were experiencing optimal conditions, labour contributions had been drastically reduced, not just in Pakuwa, but also in the other systems. The trend in the hill systems is for labour contributions to fall steadily over the period, from an average of some 16 days per household in ‘before-project’ 1992, to 11 days in 1993, to five days in 1995 and four days in 2004. The 2004 figures cover some variation; from a low of three days in Amalachaur, Arjewa and Pakuwa, to four days in Lampata and Pipalbot, and six days in Kurgha.

Table 16
Labour Contribution for Maintaining Irrigation Systems, Mountain Systems, 1992–1994 and 2004
(average person-days per household per annum)

System	1992	1993	1994	2004
Thini	16	11	8	4
Tiri	n/a	15	8	8
Khinga	77	9	23	10

Labour contributions in the mountain systems display the same tendency to fall as those of the hill systems but, with the exception of Khinga, the reductions are not quite so dramatic. In Thini, the pre-project labour contribution per household amounted to some 16 days per annum; in 1993 it had been reduced to 11 days, in 1994 to eight days, and in 2004 to four days. In Tiri, in the first year of recording, labour contribution per household amounted to 15 days; in subsequent years, it was reduced to eight days. Khinga was quite an emergency before rehabilitation, with farmers claiming some 77 days per household in 1992. A year later that figure had been reduced to nine days but, as a result of a landslide (see section 8.3.6), labour contributions increased to 23 days in 1994. However, by 2004 they had fallen to an average of 10 days per annum. In average terms, farmers in the mountains contributed slightly more than seven days of labour compared to four days in the hills. When keeping in mind that in addition to collective maintenance activities, permanently employed caretakers also carry out maintenance activities in the mountains, it seems safe to conclude that the level of these activities is considerable higher in the mountains than in the hills.

Ostrom suggests that opportunistic behaviour, or free-riding, may be reduced by means of rules that contain provisions for the sanctioning of free-riders (1992). Possibly based on that insight, the constitutions and bye-laws of the farmer's irrigation associations provided by the Dhaulagiri Irrigation Development Project include provisions for sanctioning those absent from collective maintenance works. In the 1990s, farmers were asked in a direct fashion if they had ever paid a fine for being absent from maintenance works. In the larger hill systems (Kurgha and Pakuwa), a couple of farmers occasionally admitted to having paid some amount, usually around Nepali Rupees 50 (i.e., an amount close to the daily salary of a labourer at the time). In 2004, the question was phrased in more general terms, as, 'Are you fined if you do not contribute labour and, if so, how much?' Therefore, the data are not directly comparable[20], and over-time trends not detectable. However, the 2004 data on their own do provide an idea of the extent to which farmers were aware of rules-in-use with respect to sanctions, and the extent to which these rules were enforced.

[20] I overlooked this rather subtle difference when designing the re-study.

Table 17
Awareness of Sanctions for Abstaining from Maintenance Works, All Systems, 2004

System	Proportion of Farmers who Believe they will be Sanctioned (%)	Types of Sanctions Mentioned
Amalachaur (n=30)	23	Pay NRs* 100–150 per day
Arjewa (n=22)	0	n.a
Kurgha (n=31)	58	Work another day (6 farmers); pay NRs 50–100 per day (12 farmers)
Pakuwa (n=30)	30	Pay NRs 100 per day
Lampata (n=10)	0	n.a
Pipalbot (n=15)	53	Pay NRs 5 per *ropani* of land
Thini (n=30)	83	Pay NRs 150–200 per day
Tiri (n=10)	100	Pay NRs 100–200 per day
Khinga (n=10)	90	Pay NRs 100 per day (8 farmers); payment in kind (1farmer)

**NRs: Nepali Rupees. Source: Cross Sectional Survey 2004*

Table 17 above shows that in the cases of Arjewa and Lampata no one thought that sanctions were an issue. Indeed, there were no records of fines being imposed in the past for these systems. In the remaining hill systems, between a fifth and three-fifths of farmers thought they would be fined if they abstained from collective works. Data from the mountains suggest a high degree of awareness for the provisions of fines in all three systems. Two (large) farmers in Thini claimed that they had paid Nepali Rupees 150 per day to the *mukhya* because they were incapable of sending a representative. In Tiri and Khinga, where everyone (i.e., not just one family member) between the ages of 15–57 years is expected to turn up, no one claimed or admitted to have paid money in lieu of work.

The last issue to be dealt with in this section concerns farmers' attitudes with respect to maintenance activities. Table 18 below shows responses, in the years for which data are available[21], to the question, 'Are you satisfied with the way in which the irrigation system is maintained?'

[21] The data for 1992, 1993 and 1994 are not directly comparable; every year a specific question (e.g., are you satisfied with outlet, the intake, etc.) deemed relevant for process monitoring purposes at the time was asked.

Table 18
Farmers Dissatisfied with Irrigation System Maintenance, All Systems, 1995 and 2004

System	Proportion of Dissatisfied Farmers (%)		Summarized Reason for Dissatisfaction
	1995	2004	2004
Amalachaur (n=30)	14	30	System badly managed/coordinated
Arjewa (n=22)	18	26	Labour contribution not commensurate with shares of water received
Kurgha (n=31)*	37	13	Unequal distribution of efforts, bad coordination
Pakuwa (n=30)	13	13	Penalties for abstention not imposed, bad coordination
Lampata (n=15)	30	0	n.a
Pipalbot (n=15)	n.a.	0	n.a
Thini (n=30)	0	0	n.a
Tiri (n=10)	0	0	n.a
Khinga (n=10)	0	0	n.a

*Note: * 1994 data. Source Cross Sectional Surveys 1995 and 2004.*

In Amalachaur, the proportion of dissatisfied farmers had doubled over the years and in Arjewa it had increased by about a quarter. The increase should possibly be understood in relation to perceptions of water adequacy and fairness of distribution; farmers in both systems were amongst the most dissatisfied on both accounts. In Pakuwa, a system where neither hard nor soft constraints were particularly pronounced, there was no change, and in Kurgha, the other relatively well-functioning hill system, the proportion of farmers who were dissatisfied had been reduced by almost two-thirds. In Lampata, no one appeared dissatisfied in 2004 compared with the 30 per cent who were in 1995. In the mountains, where farmers consistently tended to find water both relatively equally distributed and sufficient, and tended not to assign problems to the way systems were managed, the non-existence of dissatisfaction with respect to maintenance arrangements seems entirely probable.

8.5.1 Implications of the Maintenance Trends

The limited awareness of what Oakerson refers to as the operational rules that limit user behaviour such as free-riding, in the hills, i.e. sanctions is striking. However, because over-time data on awareness of sanctions for abstaining from maintenance works are not available, nothing much can

be said about trends in this regard. In terms of system performance, and the centrality of maintenance in that respect, it is nevertheless worth keeping in mind the words of Ostrom, “Rules are useless unless the people they affect know their existence, expect others to monitor behaviour, and anticipate sanctions for non-conformance” (1992:20). In that sense, the limited awareness of the rules-in-use displayed in many hill systems appear symptomatic of irrigation systems that do not perform optimally.

However, the central questions that need to be answered in the context of maintenance are: to what extent do the reduced maintenance contributions shown in tables 15 and 16 reflect reduced maintenance needs, and to what extent do they reflect reduced commitment to collective action? A few issues need to be discussed in relation to this. Irrigation rehabilitation projects aim—in addition to enhancing system performance—to free labour for productive activities. It is well known that the lining of canals with cement (Lam 1998) and the construction of relatively permanent concrete intake structures protected by gabion boxes particularly reduce the amount of labour time needed to keep an irrigation system in repair (see, for example, Martens 1989, Berthelsen 1997). This is because mud and stone head-works tend to be washed away by floods more easily than concrete ones, and because unlined earthen canals need constant repairs to avoid leakages. Additionally, concrete intake structures are sometimes (in Thini, for instance) designed to serve as de-silting mechanisms that reduce the amount of silt that would otherwise be deposited (and would have to be removed) downstream in the canals.

Lam (1998) in a survey of hill irrigation systems in Nepal has found that in systems with permanent head-works some two days of labour contribution[22] per household per year are required. In systems with partial cement lining of canals but without permanent head-works, some five days are required. In systems that have neither lined canals nor permanent head-works, some 8.5 days are required. Obviously, factors such as the age[23] of what Lam terms “engineering infrastructure”(Lam 1998:73) (as opposed to more indigenous infrastructure), the nature of the technology used, the length of canals, and the fragility of the local ecology influences the requirements for labour contributions. It is therefore somewhat problematic to directly relate Lam’s data to the current data; some systems, for instance have pipes instead of lined canals either along part (Khinga, Kurgha) or most of the conveyance system (Tiri). In other cases, water is not diverted from rivers but springs (Arjewa and to some extent Tiri), and in most cases the canals are only lined in critical sections (Pakuwa, Kurgha, Khinga). However, if we consider that the systems possess a variety of technological attributes—a little of everything under very varying ecological conditions—Lam’s finding of something between 2–5 days for systems with some technological improvement corresponds reasonably well with the 3.8 days that households in the hills contributed in 2004. For the mountains, the average contributions of more than seven days per household in 2004 exceeded Lam’s findings from hill systems.

However, keeping in mind that the ability to mobilize resources for maintenance purposes is a major challenge—and one that is at the heart of the collective action problematic—in irrigation systems, it would be too hasty to conclude that the reduced maintenance contributions were solely the result of improved technology. As discussed earlier, output and other indicators suggest that systems functioned optimally by the mid-1990s. However, cement-lined canals and concrete intakes

[22] It is not clear if these data refer to regular, routine maintenance only, or if they also include emergency maintenance, as in the case for the Dhaulagiri Irrigation Development Project data.

[23] While Lam’s data do show the age of irrigation systems, it is not clear how many years down the line, from the time of the introduction of engineering infrastructure, the survey was undertaken.

that are often referred to in dichotomous terms as permanent or temporary irrigation structures, are in fact far from permanent. As discussed earlier, landslides and floods have affected these 'engineering structures'; but it also needs to be pointed out that even under the most benign of physical conditions (e.g., no landslides, no floods, etc) in the hills and the mountains, these improved structures deteriorate. The cement lining cracks as a result of scouring, exposure to the elements and falling rocks; and intakes, culverts and other structures sink and shift as a result of erosion and other physical impacts.

Repair and maintenance activities rarely entail the use of cement and other engineering infrastructure technology as the skills and financial resources[24] required to use these technologies are not available in the irrigation communities, but require external intervention[25] (see Martens 1989). These issues are obviously central to any discussion of technological change and invoke the concept of social carriers of technology, which entails the idea that the social carrier (for example, an irrigated community) "fosters either implementation, operation or change in the technology by integration of the societal conditions and the technological conditions" (Berthelsen 1997:80). Berthelsen applies the concept in the context of technological change in small irrigation systems in Tanzania[26], where she finds that farmers do not maintain their improved irrigation systems for a number of reasons[27], including variance between different social carriers of technology.

In the current Nepalese context, irrigation systems are, unlike the Tanzanian case, maintained; however, in the absence of external resources, farmers resort to solutions that better match technological and societal conditions than the external technology, i.e., they apply local technology in the maintenance of their systems. This means that expensive cement is replaced by earth, stones and, to some extent, wood, in the course of a process during which the 'new' irrigation systems gradually revert to the technological characteristics of the 'old' irrigation systems. This process, which takes place at a varying pace, depending on local ecological conditions and incidents of floods and landslides, was clearly evident in the projects visited in 2004 and 2005, although I did not recorded it systematically. The point here is that, particularly in systems affected by confounding damage to structures (such as at Lampata and Pipalbot, and to some extent Amalachaur), but also in relatively unaffected systems, requirements have not diminished since the mid-1990s, rather they have increased, and the deteriorating physical state of the systems does, in

---

[24] Martens (1989) estimates, as an example, that to repair 100 m of collapsed canal using cement, etc. in a hill project in 1985 would require US$ 13,000.

[25] The projects of the Dhaulagiri Irrigation Development Project, similar to any other infrastructure projects, were obviously subjected to cost-benefit analysis during which the expected life of a project was factored in. I have not been able to identify the exact project-life assumptions in the project's documents, but a related source (Bhorletar, another International Labour Organisation project in the hills of Nepal) calculates the internal rate of return for a 50-year period (Martens 1989). The risk of creating dependence on outside resources was acknowledged in the DIDP approach (see, for example, Dhaulagiri Irrigation Development Project 1996), and the ambition was to limit external inputs, and for example, use 'appropriate' technologies to the extent possible, and to train local masons. At the same time, however, there was an implicit expectation, on the part of farmers and project staff alike, that the Department of Irrigation would extend services in situations when repairs exceeded local capacity. This has not happened in any systems following the ending of the project in 1996.

[26] These irrigation systems were implemented through a largely similar approach to that of the Dhaulagiri Irrigation Development Project systems.

[27] The time elapsed between implementation of the systems in Berthelsen's investigation is not clearly spelled out; hence the extent of the possible deterioration of the Tanzanian systems and the actual need for maintenance (which in the cases from Nepal is not great in the very early years of an improved system) is not entirely clear.

my opinion and indeed in that of many farmers with whom I inspected the systems, warrant more maintenance than provided, not the reduction suggested by the data.

8.6 Summary of Findings

The cross-sectional surveys that form the basis for the data in this chapter provide a picture of the performance trajectory of the irrigations systems in the socio-economic period from 1992 to 2004, in terms of indicators of agricultural productivity, water distribution, and maintenance. The key findings, with respect to the performance indicators used, are as follows.

Agricultural productivity, hills

Judging from data on three crops, the production of grain crops in the six hill systems peaked in the mid-1990s in the immediate years following rehabilitation, but appeared to have reduced over the period. Cropping intensities, in contrast increased over the period, as a result of an increase in land used for the cultivation of non-grain crops.

- Rice yields peaked in most systems in the mid-1990s, but remained relatively stable over the period, at averages that exceeded 3 t/ha in most systems.
- Maize yields peaked in all systems in the mid-1990s, at close to 3 t/ha. In the 2004 survey, these yields had reduced considerably by about 1 t/ha in most systems. The 2004 yield levels were slightly lower than or equal to the levels of the pre-project situation in five of the six projects.
- Wheat yields also peaked in the mid-1990s (at about 2.5 t/ha in most systems), but had reduced by about half in most systems in the 2004 survey. The 2004 levels were below pre-project levels in all systems.
- While all systems had experienced overall cropping intensity increments during the period, intensities had reduced slightly since they peaked in the mid-1990s. They remain considerably higher than the pre-project situation owing to an increase in vegetable and potato production. Given that the potato crop has reportedly gained in importance recently, cropping intensities may still be increasing in some systems, while they are stagnating in other systems.
- Hard constraints, such as droughts, landslides and floods, appear to have affected production negatively in at least three systems (Amalachaur, Lampata and Pipalbot) in 2004.

Agricultural productivity, mountains

Judging from data on two crops, the production of grain crops in the three mountains systems has, in contrast to the situation in the hill systems, remained relatively stable.

- Buckwheat yields increased steadily by about 0.5 t/ha in two systems over the period. They reduced slightly in one system.
- Naked barley yields increased over the period, but reduced quite considerably by about 1 t/ha in two out of three systems since a peak in the mid-1990s.
- Increments in cropping intensities have been experienced in two of three systems.
- Hard constraints reflected negatively on yields in at least one system (Tiri) in 2004.

Water distribution, hills

- Farmers in all systems increasingly found irrigation water to be insufficient: two-thirds of farmers considered irrigation water to sufficient in the mid-1990s. By 2004, that figure was down to one-third. Water scarcity was mainly associated with dry season crops.

- Similarly, the vast majority of farmers considered that water was distributed 'fairly' in the mid-1990s; far fewer found distribution to be fair in 2004. The proportion of farmers who found water to be unfairly distributed was highest in systems where water was also perceived as insufficient.
- Most farmers ascribed water scarcity and unfair distribution to hard constraints; however, of those who do not, but rather point to water management problems, most are tail-end farmers.

Water distribution, mountains

- Farmers in two out of three systems increasingly found irrigation water to be insufficient.
- While slightly more farmers found water to be unfairly distributed in 2004 than in the past, the vast majority did not. There is no pronounced relationship between farmers' perceptions of water insufficiency and perceptions of unfair distribution. All farmers in all systems ascribed scarcity to hard constraints rather than management problems.

System maintenance, hills

- Household labour contributions to system maintenance fell steadily over the period, from an average of some 16 days in 1992 to four days per annum in 2004.
- Reductions were particularly evident in the mid-1990s, following system rehabilitation, and had continued to decrease in 2004.
- In two systems, more than half of farmers were aware of the existence of sanctions for abstaining from collective maintenance works; in another two systems, between a quarter and a third knew of their existence; while in the remaining two systems, no one was aware of sanctions.
- In two systems, more farmers were dissatisfied with irrigation system management in 2004 than in 1995; in two systems, that number had reduced; and in one system, it has stayed at the same level. Data were lacking for one system.

System maintenance, mountains

- Household labour contributions to system maintenance fell steadily over the period, from an average of some 47 days in 1992 to seven days per annum in 2004.
- A reduction was particularly evident in the mid-1990s, and had by 2004 decreased even further. Compared with the hill systems, contributions remain relatively high and, considering that caretakers carry out *ad hoc* work, the level of maintenance in the mountains systems remained high.
- Practically all farmers were aware of the existence of sanctions for abstaining from collective maintenance works.
- Neither in 1994 nor in 2004 did a single farmer express dissatisfaction with irrigation system maintenance.

8.6.1 Concluding Remarks

In the hill systems, the production of staple grain crops had declined quite considerably, at least compared to mid-1990s data. Hard constraints played a role in this, but the almost uniform reduction in dry season yields implies that factors other than hard constraints need to be considered. Likewise, hard constraints do play a role in explaining the rather strong tendency for farmers to find

water supplies increasing insufficient, but given that the tendency was manifest not only in systems afflicted by calamities, other factors need to be considered as well. Furthermore, the reduction in labour contribution for maintenance—an activity that epitomizes the complexity associated with collective action—is not warranted by the physical state of systems, particularly where these have been subjected to natural calamities, but also where they have not. Moreover, the finding that water scarcity in the hills is associated with mainly dry season crops is particularly indicative of irrigation system inefficiency. So are the findings that many more farmers find water to be distributed more unfairly than in the past, and that awareness or enforcement of operational rules is limited. However, the indicators do not point unequivocally in a downward direction, as it appears that agricultural productivity when measured in terms of cropping intensity is stable, and may even have risen.

Even so, the overall picture of the irrigation system performance trajectory in the hills is one of lowered performance during the political-economic period of recording, particularly since the mid-1990s. In contrast, performance in the mountain systems has remained relative stable: yield fluctuations in overall terms and in terms of the period since rehabilitation have been limited. Quite importantly, because, as Oakerson suggests, inequities tend to lead to the collapse of reciprocity arrangements, experiences of water insufficiency in the mountains are not matched by perceptions of unfair distribution. While labour contributions have been reduced following rehabilitation, they remain fairly high, and there is a high degree of awareness of rules-in-use with respect to maintenance arrangements. These contrasting findings confirm the picture presented in the previous chapter of highly structured irrigation systems in the mountains, and more loosely structured systems in the hills. The findings also raise a host of questions with respect to the causes of reduced performance and institutional erosion, other than hard constraints. Consequently, factors associated with the broader social, economic and institutional context will be investigated in the following chapters.

Chapter 9: Changing Livelihoods, Changing Institutions

9.1 Introduction

In the previous chapter, a picture of the performance trajectory of the irrigation systems was constructed. By applying Oakerson's framework for analysis of the commons, it was established that irrigation system performance, measured in terms of key indicators, had been reduced on a number of accounts during the socio-political period under examination. This reduction was particularly noticeable in hill systems, while mountain system performance had remained relatively stable. Reduced performance in the hills could, to some extent, be linked to 'hard' physical constraints, but it appears that other impinging factors are at play as well. Therefore, the aim of this chapter is to investigate the economic, social and institutional contexts that may be important as additional factors influencing the irrigation system performance trajectory, negatively or positively. The focus of the analytical endeavours, in accordance with the overriding re-study methodology, remains one of studying the processes of change, particularly the relationships between livelihoods change and change in irrigation organizations and related natural resource management institutions in the 1990-2005 political-economic period.

As in most of the previous chapters, I will start with an 'episode'.

9.2 An Episode: From the Village to the Gulf

As noted in earlier chapters, a seemingly timeless atmosphere meets outside visitors to both the hill and mountain village settings. One may still experience, as Matthiessen did (see chapter 5), an initial feeling of being 'a century away'. However, re-visiting villages in the Dhaulagiri Zone in 2004, after almost a decade away, some changes were soon apparent. First of all, people were, thanks to the availability of affordable Chinese garments, generally better dressed and no longer went cold during the winter season. Secondly, the cropping portfolio had been expanded from the predominant stable crop regimes to regimes that included many more vegetables, sometimes grown in the *khet*, and sometimes in the immediate vicinity of the homesteads (where household wastewater provided part irrigation). Thirdly, the young men, their idle restlessness normally very visible in public places of any village, were virtually absent. The latter was possibly the most notable change. The absence of young men was also notable in some villages in the early 1990s, particularly, in Myagdi District, where long-established recruitment of Gurkha soldiers to the British and Indian armies have created migration networks among certain ethnic groups (particularly the Magar) and in Mustang District, where migration is an equally long-established livelihood strategy. However, in the Brahmin villages of the hills known for agricultural livelihoods, migration was not particularly visible in the 1990s, and but had increased significantly, I was told, over the past decade.

A late evening Qatar Airways flight out of Kathmandu in November 2004 elucidated the link between the village situation and migration. I was, seemingly, one of the only foreigners on the flight to Qatar, apart from the person sitting next to me—ironically a Pakistani labour recruitment agent based in Qatar. Not only were my fellow passengers all male, they were all also young. Most of the guys looked tired. Their unkempt hair and ruffled clothes gave the appearance of having slept rough while waiting for final arrangements in Kathmandu. The speed with which the in-flight meals were consumed suggested that they had not come too soon. 'Where are you going?' I asked the guy across the aisle. 'Arab,' (the generic term for countries in the Arabian Gulf area) he replied, and pulled out a roll of papers from inside his clothing to show me. The crumbled paper, with the letterhead of a Kathmandu Manpower agent, mentioned an address in Saudi Arabia. 'What kind of work will you be doing?' I asked. 'Work', the young man replied.

Another event, a few months earlier, also served to place the villages of the Dhaulagiri Zone in a global perspective. In late August, news started seeping into Nepal that a militant group in Iraq had executed 12 Nepalese labourers that they had been holding hostage. The incident went largely unnoticed outside Nepal, overshadowed as it was in western media by the kidnapping of western journalists. It was, however, vehemently noticed in Kathmandu. In the late evening of 31 August, crowds had begun to set fire to tyres in the streets, and by noon the next day the metropolitan area was experiencing some of its worst riots in recent times. Rumours of impending curfews reached my residence, and while queuing for supplies in front of the grocer's shop, the local drunkard's mad ranting against the 'mussulmans and all their evil', although drawing a few discreet smiles, did little to ease the collective feeling of anxious uncertainty.

Curfews were imposed for five days, but barely quelled the looting and arson that were aimed at the more than 100 or so manpower companies in Kathmandu and 'Muslim' institutions and businesses, ranging from the central mosque to the Qatar Airways office to bead shops (a traditionally Muslim enterprise) and the Egyptian Embassy, carried out mostly—judging from newspaper pictures—by young men. When things had calmed down, the media attempted to analyse the genesis and the dynamics of the event, but as is often the case with riots in Kathmandu the analyses were largely speculative, blaming—real or imaginary—Maoist and Hindu fundamentalist 'hands'. Equally speculative, perhaps, I leaned towards believing that at least some of the culprits would have belonged to the body of aspirant labour migrants who, as often reported in the newspapers, faced with the high entry costs of overseas migration, cough up huge fees to beat the red tape on which the manpower industry thrives, and end up feeling cheated and frustrated when their endeavours are unsuccessful. Surely not everyone standing in the long lines in front of embassies or hanging around manpower offices would be lucky enough to end up in a Qatar Airways flight out of Nepal. Whatever the genesis of the riots, most analyses, including my own, probably failed to fully understand what one observer termed "the political economy of popular disenchantment" (Lal, 2004).

9.3 Analytical Approach

The above account may appear somewhat off the track in relation to an investigation into irrigated agriculture. Migration, remittances and social and political upheavals, however, are part of the political, economic, social and institutional contexts of rural change. The young man who will be working in 'Arab' will not, at least not as long as he is away, work in agriculture. The funds that he saves while abroad are, for the most part, likely to be invested outside agriculture[1], at least in the longer run; hence the likelihood that his children will become farmers is slim. But how do we deal, analytically, with these and the many other complexities of diversification? In line with the positioning in the theory chapter (where I discussed the theoretical background for these problematics) livelihoods analysis emphasizing the role of institutions for mediating access to assets is considered a useful framework for informing and structuring such an analysis. Ellis' definition of a livelihood is as follows:

[1] De Haan (1999) in a review of the migration literature concludes that the extent to which re-investment of remittances into agriculture takes place depends, to a large extent, on whether the right incentives for agriculture exist. Even though, as the previous chapter showed, the growing demand for vegetables would seem to constitute such incentives for some farmers, the fact that plots are small and increasingly fragmented, and that there is limited scope for capital investment, combined with the uncertainties associated with the political situation and the lack of educational facilities (to mention just a few factors, some of which are dealt with in more detail in this chapter) would, it seems, appear to outweigh incentives for substantial investment of remittances in agriculture.

> "A livelihood comprises the assets (natural, physical, human, financial and social capital), the activities and the access to these (mediated by institutions and social relations) that together determine the living gained by the individual or household" (2000:10).

It may be noted that Ellis makes a distinction between institutions and social relations. The former are understood by Ellis as rules that shape human interaction (as in collective action thinking), and which govern access to natural resources, markets etc. The latter are understood as gender, kin, family, class, caste, and ethnicity and so on that more indirectly, as social norms, influence options for access (Ellis 2000). This distinction may be seen as being in contrast to the theoretical propositions of chapter 2, which understand all institutions to be subsumed in social relations; however, my recognition of Ellis' separation of institutions into these categories does not imply conceptual 'reductionism'. Rather, it implies recognition of a need for conceptual pragmatism, promoted by a need to make practical distinctions between organizational and more abstract manifestations of institutions, as explained in the following.

The system performance data of the previous chapter lent itself to analysis using an analytical framework rooted in neo-classical economic thinking. The socio-economic and institutional trajectory data of this chapter focus less on the irrigation systems themselves, and more on the livelihoods that are played out by households in irrigated communities. Thereby they lend themselves to analysis within a livelihoods framework that is based on both the operational as well as the more abstract concepts associated with livelihoods and institutions. Social relations denote theoretically abstract and complex relationships, and are not as easily operationalized in the practical sense as are the 'institutions at work' referred to by Ellis and many others within the framework of livelihoods analysis. After all, the collection of the data to be analysed was originally conceived in a development project context of livelihoods improvement that, in the main, recognized organizational manifestations of institutions. In particular, the largely socio-economic data in the first part of this chapter lend themselves to analysis using operational concepts, while data in later parts are better explained through frameworks that more clearly acknowledge institutions as constitutive of social as well as economic relations.

9.3.1 The Analytical Framework

What follows then is a framework (figure 4, below) for thinking through and structuring the analysis of the relationships between social, economic and political change, and changes (other than those deriving from 'hard' technological constraints) in irrigation organizations. The framework is based on Ellis' (2000) framework for livelihoods analysis but has not only been tailored so as to better fit the data context of this research but has also been extended in line with the ambition to understand relationships between livelihood changes and changes in irrigated agriculture. Other sources of inspiration include Seddon and Adhikari's (2003) livelihoods analysis in the context of food security in Nepal, and the access mechanisms described in Ribot and Peluso's (2003) 'Theory of Access' (see chapter 2).

The 'historical political economy of access' in column A constitutes the starting point in the framework. In the context of this framework, the concept is borrowed from Seddon and Adhikari (2003) who, as mentioned above, use it to analyse food security in Nepal. They refer to the

> "… historical political economy of food production, distribution and consumption capable of providing a broad framework within which to examine and explore the key issues of unequal food availability and unequal entitlements to food that together determine the food security of local communities" (2003: 23),

in a context where,

> "… for the majority of Nepalis in rural areas, livelihoods are risky and uncertain at the best of times. They are also highly dependent on a nexus of social relationships with others, both in their immediate locality and beyond, and on the ability (or lack of it) to gain control of and access to resources and income-generating opportunities in the public and private sectors" (Seddon and Adhikari 2003:49).

Notions of food security (which may be achieved either through the production or the purchase of foodstuffs) are thus closely related to livelihoods. I therefore take historical political economy to refer, in the context of livelihoods trajectories in the irrigated communities under investigation, to the 'who gets what and where' aspects of access to opportunity. The historical political economy is made up of the (historical) structural contexts associated with irrigation in Nepal that were presented in chapter 1 as well as, in a more regional context, in chapter 5. Institutions should, in the context of historical political economy, be understood as 'formal' legislative (e.g., land titles), 'informal' legislative (e.g., claims to land) and common property regimes that arose as a result of claims to and appropriation of land. Caste and ethnicity were, in chapter 5, also identified as important institutions, or social relations, in this context.

Including historical political economy in the livelihood analysis frameworks also serves to avoid the historical de-contextualization that has tended to characterize not only analysis of the commons (see chapter 2) but also the 'sustainable livelihoods' analysis of donor agencies (see, for example, www.dfid.com, Ellis 2000, chapter 2), which typically have the assets (column B in this framework) as their starting point. However, access to assets (or entitlements), not least those associated with the natural (water), physical (irrigation infrastructure) and social capital (as networks, associations), by irrigated households has come about, as also suggested in chapter 2, in the context of historical and contemporary processes and dynamics. In the same vein, the use of historical political economy as a contextual backdrop serves to de-emphasize the rational choice and utility-maximizing interpretations of livelihoods analysis[2]. Access to various assets is not only modified (implying both facilitation and constraints), as the framework (column C) suggests, by existing social relations/institutions, but also by the historical political economy under which these social relations/institutions have come about.

Natural and physical capital (column B) are concepts that can be related in a straightforward manner to the earlier analyses of the workings of irrigated agriculture in chapters 7 and 8. Financial capital is also relatively straightforward and typically refers to the stocks of money that a household has access to such as cash, savings or credit (Ellis 2000). It should be noted though, that in the Dhaulagiri cases, savings are often held in other forms such as livestock, firewood, stocks of supplies (mainly in the mountains) or as gold and jewellery (in both hills and mountains) for reasons of inaccessibility to financial institutions, risk-spreading and social status[3]. Compared with the assets already mentioned, the concept of human capital (column B) takes us into somewhat more intangible territory. It chiefly refers to labour, and its education, skills and health (Carney 1998). Government investment in formal education and training is usually seen as the key to increasing human capital. However, increases in human capital may also be seen, as will be the case in the coming analysis, as something that comes about through more informal channels. These channels are associated with reduced information asymmetries in the socio-political period under

[2] Gore, for instance, talks of the "welfarist view of social disadvantage which Amartya Sen has begun, but which, in the guise of the concept of capabilities, still remains wedded to an excessively individualist and insufficiently social view" (1995:9). See also chapter 2 for comments in this regard.

[3] In Mustang District, for instance, vast amounts of firewood placed on rooftops are a visible sign of affluence.

investigation, as well as with the social remittances (see Levitt 1996) associated with migration and the combined changes in ideas and perceptions (see chapter 4).

The last and most intangible asset is that of social capital. It is also in many ways the most controversial because of its association with Putnam's (1993) envisaging of social capital as being largely related to horizontal social activity such as in clubs and associations of like-minded individuals (Ellis 2000), and its ensuing widespread but analytically contested usage (see, for example, Harriss and de Renzio 1997[4]). The most useful definition of the concept, at least in the context of the hills and mountain settings, involves taking a step back from the organizational manifestations of institutions and understanding social capital in terms of the "community and wider social claims [both horizontal and vertical—my insertion] on which individuals and households can draw" (Ellis 2000:36). This connotes notions of communities of trust and shared interests as well as the networks of social and familial relations (Seddon and Adihikari 2003) and reciprocity that contribute to, for instance, explanations of historical economic dynamics in the mountains and in mountain diasporas (see chapter 5). Notions of shared interests and reciprocity are, as the performance analysis of the previous chapter illustrate, also quite central to irrigation system performance.

Using social capital in Putnam's associational terms in the context of the livelihood framework would also tend to overlap with the rubric of institutions (column C). However, just as assets do not merely appear out of nowhere, nor do the institutions in column C. This is regardless of whether they serve to respond to collective action problems by modifying access to resources or are important in playing out other livelihood pursuits. As proposed earlier, these institutions are best understood through some degree of historical political economy and contemporary contextual analysis of, among others, the "socio-economic factors that affect the myriad of relations on which property, common property and other forms of resource entitlement are based" (Johnson 2004:409).

This argument is obviously fairly central to this thesis. So is the more implicit understanding that power relations influence access to resources (as suggested in the context of understanding water allocation and distribution), and that these relations are important for understanding how institutions govern or modify use and access to natural resources (Ribot and Peluso 2003, Beck and Fajber 2006). Ribot and Peluso's proposition, in particular, that "privileged access to the individuals or institutions with the authority to make and implement laws can influence strongly who benefits from the resource in question", suggests that analysis of changes with respect to the meaning and importance of institutions would benefit from analysis of power relations within the realm of the institutional landscape within and surrounding the irrigated communities. The data, however, it needs to be emphasized, do not lend themselves to analysing power relations directly, such as, for example, in the empirical sense of mapping an individual's privileged access to resources. More indirectly, power is understood as subsumed in social relations and political economy, including the

[4] Harriss and de Renzio (1997) argue that that Putnam's 'associational' use of the term—"attractive to both the neo-liberal right…and to those committed to ideas about participation and grassroots empowerment" (1992:920)—which celebrates the role of 'civil' society as a determinant of socio-economic development and 'good' government, is an over-simplification because it does not distinguish different forms of capital and power relations, and poses 'civil society' against the state (rather than recognizing that the state and its political institutions may also produce 'social capital'). They contrast Putnam's usage of the term with that of Coleman (1990) and Bourdieu (1980), and argue that the latter two authors' emphasis on the accumulation and reproduction of social capital, its relationship with social-structural resources and how it "inheres in the structure of relationships between persons and among persons" (Coleman 1990:302), among other things, creates analytically sounder foundations. The purpose of Harriss and De Renzio's critique is to counter the widespread usage of Putnam's interpretations of social capital in development policy.

ability of communities and individuals to utilize the pluralistic institutional and legal settings that emerged in the socio-political period to enhance livelihoods.

Figure 4
Framework for Analysing Relationships Between Livelihoods Changes and Irrigated Agriculture/The Commons

A	**B**	**C**	**D**	**E**	**F**	**G**
Historical Political Economy/Space	Livelihood Platform	Access Modified By:	In Context Of:	Resulting In:	Composed Of:	With Effects On:
Structures (Location, landownership, etc.) **Institutions** (Caste, ethnicity, legislation, land tenure, common property regimes, etc.)	**Assets/Entitlements** Natural Physical Human Financial Social	**Social Relations** Gender Caste Class Property Land tenure **Institutions** Organizations: Irrigation *Parma* *Dhikur* Associations User groups NGOs Local government Development projects	**Trends and Shocks** Democratic policies Decentralization Migration Technology Education Agricultural policy Local economy National economy World economy Civil war/regression	**LIVELIHOOD STRATEGIES**	**Agric-based Activities:** Cultivation (for food or cash) **Non Agric-based Activities:** Trade Public/army service Tourism Remittances/ Migration	**Livelihoods:** Incomes Sources Security Priorities Perceptions ↓ **Irrigated agriculture:** Organization Maintenance Productivity Sustainability

Adapted from Ellis (2000: 30), Seddon and Adhikari (2003:23)

It should be noticed that unlike the Oakerson framework of the previous chapter the number of arrows in the present framework is limited. This is because there is not necessarily a linear order of causal links in the framework, particularly not between columns B, C and D. For instance, social relations and other institutions may be seen to influence access to and configurations of assets, and also the other way around, in many cases. Likewise, trends and shocks may influence claims and actual access to assets and the institutions that mediate such claims and access. Some of the trends and shocks (column D) have already been touched upon as hard constraints in the previous chapter; the major themes that will appear in the coming analysis (but which have also been touched upon in earlier chapters) are those of democratic policies (trend), civil war and democratic regression (shocks), migration and globalization (trends), and the local economy (trend).

While the historical political economy forms the longer-term contextual backdrop, the relationship between assets, modifying processes, trends and shocks, and livelihood activities unfolds in the shorter term. As Ellis points out,

> "… the manner of this unfolding and the stresses and strains that result in new patterns of activities emerging are influenced by trends and events that are in varying degrees exogenous to the household and to local circumstances" (2000:39).

In this case, the political-economic period in which these relationships unfold is between the early 1990s and the early 2000s. This pointing towards dynamic interactions, rather than a clear order of causality, it may be argued, is symptomatic of post-modern claims to complexity. Indeed, as the analysis will suggest, the relationships are multi-causal, multi-factorial and changeable. What matters in the context of the framework and its ambitions is that assets, institutions and exogenous factors in various combinations result in the "adoption and adaptation over time of livelihood strategies" (Ellis 2000:40), i.e., strategies for coping, survival and improving the quality life (column E).

In rural contexts such as the hills and mountains of Nepal, these strategies translate into a combination of natural-resource-based activities (in the context of this investigation the cultivation of irrigated crops, but forestry, livestock, collection, etc. are other such activities) and non-natural-resource-based activities (column F). Closely related to the hypothesis of this thesis (see below), it will be argued that diversification has taken place within and between the two categories. As already suggested in chapter 8, cropping portfolios have diversified, as have livelihoods in general, which now include sources other than natural resources. Both categories have effects on livelihoods (column G) and livelihood security, through income levels and the degrees of risk associated with, for example, seasonality.

Deviating from conventional livelihood analysis frameworks, I add the rather subjective notions of priorities and perceptions as the sum of columns A–F. This is to suggest that livelihood changes lead to changed priorities with respect to education and other social aspirations as well as perceptions of what constitutes well-being. I suggest a causal relationship between such change with respect to where people see themselves in the future and of irrigated agriculture, as illustrated by the vertical arrow in column G. This strong nod in the direction of recognizing people's agency as a prominent element in livelihoods strategies (column E) is in line with Sen's arguments that people's own perceptions, in their own social contexts, of notions such as well-being matter a great deal with respect to strategies for livelihood construction (see Bagchi *et al.* 1998). In sum, the vertical arrow in column G from livelihoods to irrigated agriculture denotes the putative causal relationship that is central to the hypothesis of this thesis, i.e., that increasingly diversified livelihoods affect irrigated agriculture in a number of ways, from organization to cropping patterns to maintenance levels and productivity.

9.3.2 Methodological Considerations

The framework encourages the focus of attention towards assets/entitlement. Not as qualities in their own right, but rather as resources whose functions depend on historical 'access conditions' and a wide range of dynamic interactions with institutions and the trends and shocks of the politico-economic moment. Assets and entitlements that, when transformed by interactions, may affect irrigated agriculture. As mentioned above, the framework does not claim to represent in a linear fashion, cause and effects relationships. Obviously though, the framework does imply an overall drift from the structural 'historical political economy' conditions of column A towards the effects on irrigated agriculture of column G.

The nature of the data, based as it is on an over-time study and the limitations imposed by this approach (the prisoner of past data 'slavery' described in chapters 3 and 8), would, in any case, mean that a mechanical or linear approach is problematic in that the available data do not—something that Ellis notes is a general problem with livelihood frameworks—meet the "apparent information requirements of complying with the framework in its entirety" (2000:47). As the recognition of the fluidity of relationships implies, multiple factors influence the livelihood trajectories of a specific social, economic and cultural segment within a given socio-political period. Nonetheless, the framework enables the structuring of the analysis and the inductive search for explanation that characterizes this investigation, but it is not meant as a totalizing framework. As another disclaimer, it must be mentioned that not all the factors listed in the framework will receive equal attention in the analysis. Some factors, such as the 'world economy' and the 'national economy' of column D, are understood to be structural factors that influence, for example, labour migration but are not dealt with in much detail.

9.4 Improved Livelihoods

The visible changes in the studied villages, described in section 9.2, had (in the context of this study) taken place in a socio-political period characterized by considerable trends and shocks including democratic reforms, the Maoist insurgency, the democratic regression following the royal takeover, and considerable social, economic and cultural upheavals (see chapter 4). In order to throw light on the somewhat contradictory courses of events during the politico-economic moment, I posed the broad question: 'Has life in (village name) become better or worse over the last 10 years?' The question was asked to key informants, all of whom were farmers with a record of being active in water users' associations (see methodology section for details). Somewhat surprisingly, not least given the accelerating pace of the civil war in 2004, practically all respondents found that life in their villages—except in Tiri in Mustang District—had improved. Explanations as to how and why this was the case may be summarized as follows.

In the mountains (i.e., in Khinga and Thini) 'improved conditions for agriculture' competes with 'more business opportunities' as the main reason for finding that life had improved. Better conditions for agriculture have come about as a result of more stable (and ample) supplies of water, while business opportunities are explained in terms of improved conditions for trade and tourism. In Tiri, where life, had apparently became worse over the 10-year period of the study, deteriorating physical conditions for agriculture is assigned as the main reason, and increased competition within traditional areas of trade, as the secondary reason for this state of affairs.

In the hills, 'improved agriculture' competes with 'foreign employment' as the principal reason for finding that life had improved. Improved agriculture is understood holistically as related to irrigation, production, diversification, extension, and market access/transportation. Migration in search of greener pastures is not—at least not by those who stay back and certainly not openly—

considered painful or an act of distress, but rather as the fulfilment of long dreamt of opportunities. Indeed, lives are seen to have improved considerably because "these days our boys can go abroad" and because "most men are now working abroad". These typical statements are fairly telling of the almost mythical light in which foreign employment (particularly in countries other than India) is viewed. While a long established livelihood strategy for army families and other groups, particularly in the mountains, foreign migration has now become accessible to new groups, including Brahmin farmer families.

In the element of the survey that sought more specifically to establish livelihoods trajectories, a related personal question was asked purposively—and sometimes randomly (see methodology section)—to selected farmers: 'Are you and your family better off these days than when you were a child?' The responses reveal a picture of longer-term improving livelihoods trajectories. All respondents found that their livelihoods and quality of life in general had improved tremendously compared to their childhoods. While the personal nature of the question prompted a variety of, as well as more nuanced, qualifying comments, the themes that had also been emphasized by the key informants in response to the 'has life become better or worse' question, remained dominant, as expressed in table 19 below, which sums up responses to both questions.

Table 19
Reasons for Improved Livelihood Trajectories, 2004, (n=18+11)

General, short-term themes (decade)	Better conditions for agriculture (irrigation, transport, markets)
	More opportunities for trade and business*
	Access to foreign employment/remittances
Personal, longer-term themes (generation)	Better conditions for agriculture (irrigation, land, transport, markets)
	More opportunities for trade and business*
	Access to non-agricultural sources of income, including foreign employment/remittances
	More (and more varied) food available
	Less drudgery (walking, carrying) owing to bridges, roads, water supply
	Availability of clothes, shoes
	Sanitation, hygiene
	Education

Sources: Key-Effects and Livelihood Trajectory Survey 2004.
*Note: *In the mountain communities.*

Many farmers were quite resounding in their judgment of changes since childhood, stating that 'well, you just cannot compare', and 'differences are like night and day'. A low-caste farmer with a small plot of land in Kurgha whose parents had been landless labourers even exclaimed that in comparison with the past 'life today is bliss' because, as she explained:

> "We did not own land. There was the 50 per cent system where we had to give half of the harvest to the owner. We used to survive like that; there was no way of earning just a few

rupees. We had nothing. Now my brothers have grown up and gone to India. Compared to our parents, we are in a better position."

At the other end of the social scale, a high-caste farmer in the same community with considerable landholdings and a son working in the Gulf explains that:

"My parents had to carry, for example, things like sacks of salt on their backs for 10 days to get here, just to survive. It is available here now. In those days, there were no bridges across the rivers and that caused all sorts of problems, but now we have these facilities. Particularly thanks to transportation all the necessary items are available here. We used to have to hire teachers to come here, but now schools have been opened. All my daughters have their School Leaving Certificate, and so does my son. But we have to constantly think about how to increase our income."

Advances with respect to physical, natural and human capital are matched by larger stocks of financial capital, as shown in tables 20 and 21 below.

Table 20
Average Annual Household Incomes, Mountain Systems, 1995 and 2004
(Nepali rupees)

System	1995	2004	2004 (adjusted)	Percentage change
Thini	72,667	178,345	115,284	58.6
Tiri	51,400	170,000	109,890	113.8
Khinga	66,000	114,625	74,095	12.3

Sources: DIDP Key Effects Monitoring Surveys 1992–1995; Cross-Sectional Survey 2004.

The incomes, which in the tables have been adjusted for inflation[5], should chiefly be considered indicators of magnitude, as information on income is notoriously prone to bias[6]. Income differentials between the hills and the mountains are striking, with the 2004 mountain incomes—ranging from Rupees 74,095 (US$ 1015)[7] in Khinga to Nepali Rupees 115,284 (US$ 1579) in Thini—amounting to double and even triple of hill incomes. Hill incomes range from Nepali Rupeess 31,674 (US$ 433) to Nepali Rupees 43,956 (US$ 602). It is also in two of the mountain communities (Thini and Tiri) that increases over the period have been the most significant.

[5] The incomes in the tables have been adjusted by taking into consideration the total change in the price index while comparing the 1995 and 2004 income levels, as follows. *The Economic Survey* published annually by the Ministry of Finance considered 1995/96 as the base year for computing consumer price indices (CPI) for successive years. Compared to the average CPI for 1995/96, the index is 154.7 for 2003/04 (Ministry of Finance 2004). This means that there has been a total change in the price index of about 54.7 per cent over the period. This is the total inflation for the period whereas annual average inflation is about six per cent for the period.

[6] In order to offset bias, the information was arrived at indirectly, by asking first of all about expenditures such as food, school fees, etc. (which people tend to be happy to disclose) and then about the ways that the expenditure was met. This method is probably still prone to under-reporting, as savings and emergency expenditures are not included.

[7] Exchange rate used: US$ 1=Nepali Rupees 73.

The increase in Tiri of 114 per cent is particularly spectacular, and appears to contradict the above-mentioned perceptions of deteriorating livelihood conditions; in that particular location, the distribution of income, however, is very uneven and the increases appear to have primarily affected two rich households. The increase in Khinga is relatively modest. Income changes in the hill communities, as shown in table 21 below, range from a modest 19 per cent in Kurgha to 77 per cent in Pakuwa.

Table 21
Average Annual Household Incomes, Hill Systems, 1995 and 2004
(Nepali rupees)

System	1995	2004	2004 (adjusted)	Percentage change
Amalachaur	27,000	61,000	39,431	46.0
Arjewa	28,000	51,000	32,967	17.7
Kurgha	31,000	57,000	36,846	18.9
Pakuwa	23,000	63,000	40,724	77.1
Lampata	25,000	49,000	31,674	26.7
Pipalbot	n.a.	68,000	43,956	–

Sources: Key Effects Monitoring Surveys 1992–1995; Cross-Sectional Survey 2004.

Official figures also suggest considerable income differentials between mountains and hills, with reported household incomes (2004 figures) of Nepali Rupees 84,896 (US$ 1163) for Myagdi District, Nepali Rupees 85,820 (US$ 1176) for Parbat District, Nepali Rupees 80,517 (US$ 1103) for Baglung District, and Nepali Rupees 173,498 (US$ 2377) for Mustang District. The national average household income amounted to Nepali Rupees 92,154 (US$ 1262) for the same year (United Nations Development Programme 2004[8]). Another official source, the Nepal Living Standard Survey[9], found average household incomes in 2003/04 for the 'Western Mountains and Hills'[10] to be NRs 64,677 (US$ 885) (Central Bureau of Statistics 2004). So while the data of tables 21 and 22 do reflect proportional variations between mountains and hills, as well as limited variation in the hills communities, in line with official data, the incomes are not particularly impressive in comparison with the aggregate data available, either for the hills or the mountains.

However, there is reason to be cautious with respect to using official data as a yardstick. Firstly, official figures include the urban areas of districts. The increasing concentration of wealth in urban areas (see chapter 4) would, as concluded in another micro-level study (Angood *et al.* 2002) that compares incomes in two irrigated hill communities in the hill district of Dhading with official data,

[8] While not specified in United Nations Development Programme 2004, the figures are assumed to be net incomes. Exchange rate used: US$ 1=Nepali Rupees 73.

[9] Supported by the World Bank, the Nepal Living Standard Survey were undertaken by the Central Bureau of Statistics in 1995/96 and in 2003/04. They are based on a cross-sectional survey of 3345 households across Nepal, and are considered reliable (see Blaikie *et al.* 2002).

[10] Which includes the Western, Mid-Western and Far Western Development Regions.

mean that such aggregate data are likely to be biased by higher urban incomes. Secondly, it appears that the methodology applied to obtain income data differs: both the United Nations Development Programme and the Nepal Living Standard Survey figures appear to include the value of own farm produce consumed in the household, in addition to what is sold. The data of tables 21 and 22 only count the value of agricultural products that are sold (i.e., cash incomes from agriculture) as well as wages, remittances, etc., and are therefore likely to be lower than the yardstick data.

In any case, the main focus of interest in the context of this investigation is the relative changes in income and livelihood conditions that have taken place for irrigated farmers over the course of the political-economic period, as witnessed both by people's perceptions and the income data. The trend that is evident in the micro-level surveys is in line with the positive changes shown in more aggregate terms by the Nepal Living Standard Survey, which finds that national average household incomes grew by more than 80 per cent from 1995/96 to 2003/04 (Central Bureau of Statistics 2004), a period that roughly corresponds with that of tables 21 and 22. Average household incomes in the western hills and mountains grew by more than 85 per cent over the same period (Central Bureau of Statistics 2004). Also according to the Nepal Living Standard Survey, 'self-reported welfare' for Nepal as a whole has improved. Inadequacy in food consumption has declined by 21 per cent, housing by 23 per cent, clothing by 22 per cent, health care by 31 per cent, and access to schooling by 24 per cent (Central Bureau of Statistics 2004). For the Western Mountains and Hills category (which includes the Dhaulagiri Zone), perceptions of inadequacy appears to have declined even more; in food consumption by 24 per cent, housing by 25 per cent, clothing by 29 per cent, health care by 35 per cent, and access to schools by 34 per cent (CBS 2004). These also happen to be the themes highlighted by farmers in figure 19, above.

These improving livelihood trends in rural Nepal are confirmed by the acclaimed (see, for example, Murray 2002, Rigg 2006) repeat study made by Blaikie *et al.*, which, also explained in chapter 3, sought to understand the

> "… construction of livelihood trajectories (or the course of individuals and households through time, in terms of occupation, income, investment and consumption decisions and other key economic variables) and the implications for class composition and agrarian change" (Blaikie *et al.* 2002:1256).

With a focus on the hill and *terai* areas immediately south of the Dhaulagiri Zone, the authors—using a repeat cross-sectional survey combined with qualitative investigations—compared patterns of rural lives between 1974/75[11] and 1996/97. They found that not only had 'middle peasants'[12] (the category that best seems to match the irrigated farmers of this study) as a class category grown, they had also fared quite well over the 20-year period that saw higher incomes, more resilient livelihoods, and generally better standards of living. Blaikie *et al.* observe:

> "… a large core of households… have coped tolerably well on the whole over the past 20 years. Coming from a production base involving the ownership of very small plots of land, they have prudently bought and sold small parcels of land, experimented with fertilizer and improved seed, increased irrigation, borrowed or lent moderate amounts of money for investment and consumption, put more children (including some daughters) into formal

[11] See Blaike *et al.* (1980) for the first study (see also chapter 3 where considerable reference is made to this publication).

[12] The sample was divided into categories of labourers, labourers and peasant producers, small employers and large employers with or without non-agricultural income. The 'middle peasant' refers to peasant or 'domestic' producers.

education, and maintained basic consumption patterns based on self-provisioning food security. But most important, rural households in western Nepal have been active in encouraging individual migration and securing remittances from those migrants" (2002:1267).

In sum, it appears that certain groups such as the 'middle (i.e. typically irrigated and landed) peasant' have experienced improved access to a variety of assets, resulting in improving livelihoods trajectories, not just in the political-economic moment covered by my investigation, but also in the longer term covered by Blaikie *et al*. In the following, the character of changed livelihoods in the nine irrigated communities under study, with a focus on the proportional differences between agricultural and non-agricultural incomes, will be analysed.

9.5 Sources of Livelihoods

The cross-sectional surveys of the 1990s and that of 2004 sought to highlight the composition of incomes. Agricultural income was defined as sale of grains, vegetables, fruits, livestock, etc., whereas sources of non-agricultural income were defined as hotel/tourism, remittances, government service/army, shop-keeping, agricultural labour, trade, portering or transportation. Tables 22 and 23 below show the share of income derived from agriculture by quartiles in 1995 (the year for which data are most complete) and 2004, in mountain and hill communities, respectively.

In Thini, it appears that the importance of agricultural incomes has decreased. Whereas 53 per cent of households earned between one-quarter and three-quarters of their income from agriculture in 1995 that figure had been reduced to 37 per cent in 2004. There had been a matching increase from 47 per cent to 63 per cent in the proportion of households that earned up to one-quarter of their income from agriculture. In Tiri, on the other hand, more households in 2004 (60 per cent) earned between one-quarter and a half of their income from agriculture than in 1995 (50 per cent). This was matched by a decrease from 50 per cent in 1995 to 40 per cent in 2004 in the proportion of households that earned up to one-quarter of their income from agriculture. In Khinga, the proportion of households that earned between one-quarter and a half of their income from agriculture had decreased from 30 per cent to 20 per cent over the period; however 10 per cent of households in 2004 depended for up to three-quarters of their income on agriculture, compared with none in 1995. The proportion of households that only depends for up to one-quarter of their income on agriculture was high and had remained stable at 70 per cent over the years. In sum, the tendency had been one of decreasing importance on agriculture as a source of income in Thini, but of increasing importance of agricultural incomes in Tiri and to some extent in Khinga as well. The latter community, however, remained the one in which the least proportion of households depend on agricultural incomes. However, agriculture still constituted an important part of incomes in all three communities.

Table 22
Proportion of Total Income from Agriculture by Household, Mountain Systems, 1995 and 2004
(percentage)

Percentage of Income from Agriculture	Thini		Tiri		Khinga	
	1995	2004	1995	2004	1995	2004
0–25	47	63	50	40	70	70
26–50	50	37	50	60	30	20
51–75	3	–	–	–	–	10
76–100	–	–	–	–	–	–

Sources: DIDP Key Effects Monitoring Surveys 1992–1995; Cross-Sectional Survey 2004.

Compared with the mountains, agricultural incomes in the hills constituted a relatively higher share for many more households, and a minority had no other sources of income. In Amalachaur, the proportion of households who earn between one-quarter to three-quarters of their income from agriculture had increased from 43 per cent in 1995 to 67 per cent in 2004, and there had been a concomitant reduction in households where agriculture only constituted up to one-quarter of their income from 46 per cent to 20 per cent. In Arjewa, agricultural incomes also appeared to be increasingly important for a number of households, while in Kurgha and Pakuwa the shares of income from agriculture had increased dramatically. Households earning between one-quarter and a half of their incomes from agriculture had increased in Kurgha from 43 per cent in 1995 to 87 per cent in 2004, and in Pakuwa from 30 per cent in 1995 to 60 per cent in 2004. In Lampata, the proportions had remained relatively stable over the years. 1995 data from Pipalbot is not available.

Table 23
Proportion of Total Income from Agriculture by Household, Hill Systems, 1995 and 2004
(percentage)

Percentage of Income from Agriculture	Amalachaur		Arjewa		Kurgha		Pakuwa		Lampata		Pipalbot	
	1995	2004	1995	2004	1995	2004	1995	2004	1995	2004	1995	2004
0–25	46	20	59	41	50	7	67	27	20	20	n.a.	13
26–50	39	54	41	46	43	87	30	60	50	50	n.a.	60
51–75	4	13	–	13	–	3	–	10	30	20	n.a.	20
76–100	11	13	–	–	7	3	3	3	–	10	n.a.	7

Sources: Key Effects Monitoring Surveys 1992–1995; Cross-Sectional Survey 2004.

While the original survey design does not allow for the provision of exact ratios of agricultural to non-agricultural incomes, it appears that agricultural incomes in most of the hill communities were

more important in 2004 than they were in 1995. The results of two follow-up questions in the qualitative survey on livelihood trajectories on the share of income from agriculture/non-agriculture are, if no more exact, then indeed more illustrative of changes over the 10 years of the study and the circumstances involved. Table 24 below provides some examples.

The cases in table 24 are fairly representative of the variation in income composition and income sources across a spectrum of households, ranging from those for whom agricultural incomes constitute almost the only source to households for which agricultural incomes are negligible. Two aspects should be noted. Firstly, that most farmers had experienced changes in the composition of their income over the decade of the study, either as a result of the sale of vegetable products, remittances or local non-farm employment. Only in one of the cases (the blacksmith from Thini) had agricultural incomes decreased; for the vast majority, the changed composition reflected enhanced overall incomes in absolute terms and higher levels of economic activity in general, as also suggested in the previous section.

Secondly (and here I also refer to tables 22 and 23), the continued importance of agricultural incomes among these irrigated farmers is at variance with Nepal Living Standard Survey yardstick data which suggest that at the aggregate level the share of 'farm'[13] income in total income for Nepal declined from 61 per cent in 1995/96 to 48 per cent in 2003/04 (CBS 2004). Summing up these last sections it is evident that—at some variance with national-level data but not the observations made by Blaikie *et al.* (2002)—agricultural share of incomes has not declined, except in a few communities; rather income portfolios have been expanded with increasingly diversified ('within' and 'without' agriculture) livelihoods and progressively improving livelihoods trajectories as an outcome. In the following, the composition of these livelihoods, within their respective agriculture-based and non-agriculture-based categories (column F in the analytical framework), will be examined.

[13] Which, as already mentioned, includes the value of crops consumed in the household.

Table 24
Agricultural vs. Non-agricultural Incomes, 2004

Characteristics	Agricultural to Non-Agricultural	Source for Non-Agricultural	Change?
Medium farmer, female, Brahmin (Arjewa)	50/50	Teaching	Increased agricultural income from vegetables
Large farmer, male, Chettri, ex-serviceman (Arjewa)	50/50	Army pension	No change
Medium farmer, female, Brahmin, widow with sons (Lampata)	90/10	Sons' remittances	Increased agricultural income from vegetables; remittances recently
Medium farmer, male, Brahmin (Amalachaur)	85/15	Son's remittance	Remittance recently
Large farmer, male, Brahmin (Amalachaur)	70/30	Teaching/ sons' remittances	Remittances very recently
Medium farmer, male, Brahmin, ex-policeman in India (Pakuwa)	55/45	Police pension	No change
Medium farmer, male, Brahmin, politician (Pakuwa)	50/50	Government pension	No change
Large farmer, male, Brahmin, ex-army in India (Pipalbot)	35/65	Army pension	Increased agricultural income from vegetables
Small farmer, female, low-caste (Kurgha)	50/50	Husband's remittance	Remittance increased
Small farmer, female, Thakali (Thini)	5/95	Husband's army salary	Increased salary income
Small farmer, male, low-caste (Thini)	10/90	Blacksmith work	Increased non-agricultural income/decreased agricultural income

Sources: Livelihood Trajectory Survey.

9.5.1 The Role of Agricultural Activities as Sources of Livelihoods

What appears in section 9.4 to be a situation of augmented incomes with high agricultural shares calls for further attention to diversification of 'within-agriculture' activities. Therefore, in the following, the over-time drift within crop diversification, and its possible effects on irrigated agriculture will be discussed. Except, of course in the statements of farmers, this drift is not well captured in the repeat cross-sectional survey of chapter 8, characterized as it is by a 1990s 'productivist' focus on staple (grain) crops as opposed to horticultural crops; hence the discussion

will draw on data collected outside the core surveys, on international evidence, and on revisiting relevant cross-sectional data.

Starting with the latter, the cropping intensity data (which in chapter 8 was presented as averages, unspecified by crop)—table 25 shows the proportion of land planted to different crops in the mid-1990s and in 2004. Lampata, Amalachaur and Kurgha are prominent examples of systems in which production has intensified and diversified substantially, with the land under vegetables more than quadrupling in the latter system. The water supply problems of Arjewa (see chapter 8) have seemingly caused low levels of vegetable adoption, and the reduction in area under vegetables in Pipalbot should, according to farmers, be ascribed to the insurgency and the resultant reduced market access in this the most-geographically remote of the hill communities. It needs to be noted that the table does not show the full extent of diversification, as the area under potatoes, as also discussed in chapter 8, was not quantified as part of the survey in the hills in 2004. It is known though, that in 1995 the potato crop was grown on nine per cent of the land in Pakuwa, 21 per cent in Kurgha, 10 per cent in Lampata, seven per cent in Amalachaur, three per cent in Arjewa and six per cent in Pipalbot (DIDP 1995). It became clear, during interviews with key farmers in 2004 that potatoes have gained further ground in recent years, particularly in road-near Pakuwa from where substantial amounts are shipped to Pokhara. This probably explains the limited growth in the area under vegetables (excepting potatoes) in this otherwise—in terms of road access—well-endowed location.

Table 25
Total Irrigated Area Planted to Various Crops, Hills Systems, 1995 and 2004 (percentage)

System	Rice		Wheat		Maize		Vegetables	
	1995	2004	1995	2004	1995	2004	1995	2004
Pakuwa	98	95	39	45	73	62	1	3
Kurgha	100	97	58	54	86	89	5	23
Lampata	95	100	50	42	87	74	8	22
Amalachaur	99	100	60	57	85	87	2	7
Arjewa	100	100	95	79	99	95	0	1
Pipalbot	98	97	56	60	54	52	6	1

Sources: Key Effects Monitoring Surveys 1992–1995; Cross-Sectional Survey 2004

As is evident from table 25, the areas under rice show limited variation. The areas under wheat and maize appear, though, to have been slightly reduced in four of the six systems, most probably as the result of an increase in the areas under vegetables and potatoes. The latter crop is increasingly grown in the pre-monsoon season, thereby competing with maize.

As in the hills, the cropping portfolio in all three mountain communities (but particularly in Thini) has diversified to some extent over the years, as shown in table 26. In summer, various vegetables (including radish, cauliflower and cabbage) are increasingly grown in response to local demand. Similar to the hills case, the table does not represent the full picture of cropping diversification; in

2004, apple cultivation, representing an earlier wave of cropping diversification[14], took up some 15 per cent of (the fringes) of the command areas in Thini, 10 per cent in Tiri, and 11 per cent in Khinga. In the latter location, areas under apples reportedly increased during the timeframe of the repeat study, under conditions that are quite favourable due to a sheltered microclimate. As an indicator of diversification that involves a staple crop, maize was not found in the 1990s, but has now been introduced to the area. It may also be noted that the cultivation pattern in Khinga differs from that of Thini and Tiri on a number of accounts: in the former, the two 'old' crops of the mountains still dominate, with buckwheat as the main summer crop and naked barley as the main winter crop, grown parallel with wheat, a crop that is no longer grown in Thini.

Table 26
Total Irrigated Area Planted to Various Crops, Mountain Systems, 1995 and 2004 (percentage)

	Naked Barley		Hull Barley		Buckwheat		Wheat		Maize		Vegetables	
	1995	2004	1995	2004	1995	2004	1995	2004	1995	2004	1995	2004
Thini	61	54	19	28	62	31	0	0	22	53	2	12*
Tiri	73	69	13	15	74	18	1	15	13	42	3	6
Khinga	78	62	0	7	76	53	24	24	0	9	3	6

Sources:Key Effects Monitoring Surveys 1992–1995; Cross-Sectional Survey 2004.
*Note:*The figure includes both potatoes and vegetables.*

Even though the share of agricultural income is not particularly high in Thini in relative terms (see table 22), the sale of agricultural products (cereals, vegetables, apples, alcohol) and livestock products is important. Its close proximity (45 minutes) to the district headquarter, tourist centre and transport hub (airport) of Jomsom Bazaar creates a great deal of demand for agricultural products. The importance of Jomsom Bazaar has increased significantly since it became a district headquarters in 1975, with army and government personnel representing considerable demand. In Tiri, conditions for agriculture are relatively harsh, and irrigation water supplies are critical at times. In Khinga, cropping conditions are relatively more benevolent, but in both places the dynamics of the regional economy have less of a positive effect on agriculture than in Thini. This would, it appears, partly explain not only lower levels of diversification into marketable crops, but also lower incomes in absolute terms, compared to Thini.

9.5.2 The Extent of Diversification

In line with competitive advantage notions (see section 4.4) of the Agricultural Perspective Plan (National Planning Commission 1995), degrees of cropping diversification in the irrigated communities and the mixes of crops often reflect, in addition to sufficient irrigation and location-specific growing conditions, access to roads and urban markets. The combination of improved

[14] Introduced some decades ago with Japanese technology, apples are now used for the production of brandy and as animal fodder. Also, in season, when the price of apples is very low, they virtually become a 'main staple', not least for labourers and porters in the area.

infrastructure and increased urban demand means that produce from the hill communities is sold in local markets, and in the town of Pokhara and beyond.

The following data are based on a survey of consumers, vegetable-cum-grain wholesalers and retailers and government officials, carried out in Baglung Bazaar—the largest and economically most important in the study area—in early 2006, and throw some light on changes in cropping patterns. One consumer, asked about the difference in availability of horticultural crops a decade before, reminisced about how his family's move to Baglung Bazaar in the late 1980s, from a village 10 km away had been a dietary shock; compared to the village very few vegetables (only onions, potatoes and sometimes spinach) had been available in the market. This previous scarcity of vegetables was echoed by many, some of whom also commented that the eating of a variety of vegetables and fruits was a rather recent, 'modern' habit. One of the main differences between the situation then and now is that a variety of fruits and vegetables is now available in these 'urban markets of rural towns', and that many of them are produced locally as shown in table 27.

'Local' in the context of the table means that vegetables are supplied from roadheads within an estimated 10-km radius of Baglung Bazaar[15]. Produce is brought to town by a combination of trucks and public transport, usually by wholesalers. The actual production areas are often one or two hours further away, above the roadhead. This spatial supply pattern roughly repeats itself with respect to all the four district headquarters of the Dhaulagiri Zone, and involves a great many of the irrigated communities that are included in this study.

[15] Main production areas include: Bakunde, Sigana, Lekhnath, Malika, Nalibang, Farse, Mallajh and Banskarka from where they are carried to the nearest roadhead (such as lower Mallajh, Milanchok or Sallyan/Dahiring).

Table 27
Fruits and Vegetables in Baglung Bazaar by Source, March 2006

Fruits and Vegetables	Source
Papaya	Local
Orange	India (but local in season)
Apples	India (but also from Mustang District in season)
Grapes	India
Bananas	India
Tomatoes	Local
Ginger	Local
Carrot	Local
Cauliflower	Local
Radish	Local
Chili	Local/Indian
Onion	Local
Garlic	Chinese

The vegetable wholesalers, of which there are at least five in Baglung Bazaar, asserted that demand for fruits and vegetables has increased dramatically over the last 10–15 years. It is, however, only in the last decade, following road access, that local produce has begun to replace imports, but the respective local and import contents vary considerably by season (and these are more defined in the hills than in the *terai*). Particularly cabbages and cauliflower are known as 'off-season' vegetables, denoting the post-rice-harvest autumn/winter season. Customers generally prefer local products due to their freshness and quality, but local supplies are unable to meet demand. Therefore, in a context of increasing overall demand, the proportion of imports remains slightly higher, and on the increase, compared with local produce. This state of affairs is blamed on a dispersed local marketing pattern that results in irregular supplies. Not surprisingly, the local content increases considerably during general strikes (*bandh*) when vehicular movement is prevented. Such disturbances, however, increase supplies from farmers in urban fringe or 'peri-urban' areas who carry produce to town in the morning, and sell directly to consumers.

The dispersed marketing channels and the seasonal nature of vegetable production make assessment of the volume of local production difficult. In addition to what is consumed in local towns, a great deal of the seasonal surplus production is exported to Pokhara and sometimes beyond. In fact, much more than what passes via Baglung Bazaar is actually exported from the district, as wholesalers from other towns buy from farmers at the nearest roadhead to the farms, and transport produce from there. While trucks carry some of the produce, buses are a more important means of transportation,

and there is widespread agreement that further export potential is severely hampered by the stoppage of night bus services[16]. The main exported products include cauliflower, tomato, cabbage, chillies and potatoes.

Again, the dispersed marketing channels make assessment of the amounts problematic: one wholesaler claims to send vegetables worth Nepali Rupees 150,000 to Pokhara monthly, and another claims that in season he sends some 7–8 tonnes of tomatoes to Pokhara. A representative from the Department of Agriculture suggests that 200 tonnes of winter vegetables are shipped out of the district per annum. What this means in the context of, for example, overall supplies to Pokhara is somewhat uncertain, but it would constitute some eight per cent using 1999 figures, suggesting that in total 2400 tonnes of winter vegetables are imported to Pokhara per annum (Adhikari and Seddon 2002)[17]. Nevertheless, considering the dispersed marketing channels and the fact that the figures presented in this section represent only one district in the Dhaulagiri Zone, it is reasonable to assume that the role of the zone and the farmers in it as exporters of agricultural produce is growing.

9.5.3 Crop Diversification as an Impinging Factor to Cooperative Management of Irrigation

The mounting evidence of considerable crop diversification in central areas of the Dhaulagiri Zone, including many of the irrigation systems in this study, renders this form of diversification a major impinging factor in relation to irrigation as common property regimes. The collective action school's notion of exit options (or earning opportunities not closely tied to the commons) usually connotes non-farm livelihoods as alternatives to cooperating in the commons (see Stern *et al.* 2002 and figure1, section 2.6.4). However, exit options may also, as Bardhan and Dayton-Johnson note, and as will be discussed in this section, be found "outside the commons but not outside of agriculture" (2002:100). The role of crop diversification as an impinging factor in the performance of common property regime irrigation is complex. It stems from the fact that vegetable production is relatively intensive with respect to water and labour, and in order to be successful, depends on individual rather than the collective water-use regimes associated with staple (cereal) crops. In realization of this, Gyawali and Dixit note in the context of the Tinau basin in the hills to the south of the Dhaulagiri Zone that a shift towards more vegetable crops requires more intensive use of water, and they contemplate that this may lead to "change in existing arrangements of allocating water and to increased disputes" (1999:79). The speculative nature of the comment is fairly representative of the stage at which research into this issue finds itself in Nepal, something that in turn reflects the relative novelty of commercialized agriculture in the western hills and mountains[18], as the data from Baglung District also suggest.

In the context of performance, tail-end problems should be considered a corollary of the issue. Recalling the Oakerson framework, tail-end problems connote unequal distribution of water, and as such constitute a critical performance factor with implications for 'patterns of interaction' in the commons. This was touched upon in chapter 8, where some farmers reported water shortages as head-reach farmers intensified production and started producing highly water-consuming early rice

[16] The authorities until recently had prohibited night bus services for security reasons.

[17] That figure, however, is likely to have increased because of population growth in Pokhara.

[18] Two factors appear important here. At the academic level, it would appear that notions of dependency discussed in chapter 5 have until recently informed much research on the western hills and mountains. At the same time, commercialization is indeed a relatively recent phenomenon, compared to, for example, the eastern hills, where the commercialization of agriculture is well-documented (see, for example, Sharma 1997).

or vegetables. The role of crop diversification as an impinging factor in this context appeared again in the same chapter, where it was found that the number of farmers who considered water to be distributed in an unfair fashion had increased over a period when crops in the community had diversified. It was further found that increased dissatisfaction was associated with winter and spring crops, i.e., the seasons when vegetables compete with wheat and maize in the hills.

On the whole, it appears that water is indeed a main constraint to the expansion of vegetable production in many systems. This is likely to mean that those who grow vegetables at a significant scale are often either located in the head-ends of command areas, have access to other surface water sources, or have invested in water storage or well facilities (or all three). Those who merely grow vegetables for home consumption tend to depend on household wastewater for irrigating minute plots. Close proximity to water sources is of essence given the labour intensiveness of vegetable production and the scarcity of labour in the hills.

Consider the case of a vegetable-growing household, headed by a widow, in Lampata, a one-hour walk from the road between Kusma and Baglung. In 2003, the household earned Nepali Rupees 60,000 (823 US$), some 90 per cent of its cash income, from the production of vegetables. The family of 14 persons includes one son, his wife and their small children. The son, the daughter-in-law and the widow herself represent the only members of the household of working age who live at home. The neat vegetable plots of some 2 *ropani*[19] extend from the homestead into the upper portion of the command area immediately below. The son explained that expansion of the production of vegetables is constrained mainly by lack of labour, not demand for produce. With only three working persons in the household, there are limits to how much they can produce, and labourers are not readily available.

What enables the household to operate a relatively large plot of vegetables is a relatively reliable water source that serves both domestic and agricultural purposes, i.e., a private spring connected with a pipe. The spring does not yield the required amounts of water during the winter season; hence the pipe is connected to a covered water storage tank from where water is carried to the vegetable plots. The son of the house explained that most of the households that have success in producing vegetables have similar, individualized sources of water such as springs, small streams or ponds. Many farmers in Lampata, he added, would like to adopt, or expand vegetable production, but face a combination of labour and water constraints.

The individualization of water use has come about in order to overcome shortcomings in community-operated irrigation systems, geared organizationally towards the fixed schedules demanded in rice production, but unable to meet the demands for flexibility required by vegetable-producing farmers. In that sense, the effects of crop diversification and the commercialization of agriculture resemble the drastic reduction of the cooperative element in irrigated agriculture as a result of the widespread use of pumps for groundwater irrigation by individual farmers noted throughout Asia (see, for example, Shah 1998, Barker and Molle 2002). As the extent of crop diversification emerged as a relatively late, important theme in the research process, the present study has not examined the extent and effects of individualization of water in detail. We may, however, find some clues in some of the most illuminating regional research on the effects of the commercialization of agriculture from the highlands of northern Thailand. Here the relationship between market access and erosion of communal forms of irrigation organization (known as

[19] 1 Ropani=approximately 500m2

muang-fai) has been documented. Elstner and Neef observe, in a village with good market access that supplies vegetables to the city of Chiang Mai and beyond[20], that:

> "… until the mid-1980s farmers in Muang Kham[21] produced mainly wet rice with the traditional *muang-fai* system… with the economic and infrastructure development and improved market access, farmers changed their cropping patterns which induced the individualization of water management. With this development, the quantities of water used and the requirements on water quality have increased" (2004:11).

However, commercialization in Muang Kham, located some 30 km from the markets of the provincial capital of Chiang Mai, has not led to individualized water management completely; in addition to accessing water through streams, springs and private wells, it is also accessed through one of the canals that originally supplied water for wet rice cultivation. Here, farmers benefiting from the canal still perform collective maintenance activities at the call of a caretaker, but with respect to distribution the collective element has disappeared; farmers withdraw water individually in accordance with their requirements. Elstner and Neef compare the situation in Muang Kham with a more remote village, that of Mae Lana, where poor infrastructure and limited market access has meant the continuation of wet rice production as the main source of agricultural livelihoods, and the continuation of relatively stable community-based water management arrangements. The water management situation in the market-oriented village of Muang Kham and many other villages like it is described as one of legal and institutional pluralism (Elstner and Neef 2004, Heyd and Neef 2004), a concept denoting the co-existence of different tenure systems, as well as legal orders in a social field such as a community or irrigation organization (Pradhan and Pradhan 2000) characterized by heterogeneity of stakeholders.

As already mentioned, the extent of individualization of water management has not been studied in detail in this investigation, so its prevalence across the communities in the Dhaulagiri Zone is unclear. However, considering the increasingly vibrant regional economic linkages (see chapter 5) and the Baglung data of this section there seems to be little reason not to assume that dynamics resembling those observed in Thailand are at play in the Dhaulagiri Zone, albeit at a much more nascent stage. There would seem to a particularly strong relationship between the growth of agricultural diversification and market access in the cases of Lampata, Kurgha, Amalachaur and Pakuwa in the hills, and to some extent in Thini in the mountains. If the case of Lampata, where the vegetable-growing marketing cooperative has 75 members, is anything to go by, then the individualization of water sources is probably a rather common corollary of increased vegetable production, as indeed the farmer from Lampata suggests.

Therefore, the prevalence of vegetable production, and the ambitions of farmers to expand such production (as illustrated in the case of Lampata) may well explain, to a large extent, why perceptions of water deficiency (see e.g. table 13, section 8.4.3), mainly associated with winter crops, are particularly pronounced in some of the high-level vegetable production communities (particularly Kurgha, Lampata and Amalachaur). To the extent that vegetable production entails the appropriation of water by farmers in privileged locations of the command area, the pronounced increase in the number of farmers who find water unequally distributed in these high-vegetable-producing villages also appears quite telling. Likewise, the decreased productivity in maize and wheat may well be related to the increase in vegetable production. After all, these crops are grown

[20] Farmers in this village are even engaged in contract farming of capsicum with multinational companies.

[21] In the Mae Sae watershed in Chiang Mai province.

in roughly the same seasons as vegetables and compete, during these seasons, for labour, water and fertilizer. However, the relationship between individualized water management and the erosion of community-managed irrigation is likely to vary a great deal from community to community depending, to a large extent, on the ability of specific institutional arrangements (such as those associated with water distribution, see chapter 7) to secure equality in the irrigation commons in the face of heterogeneity of stakeholders and legal pluralism.

Climate also needs to be factored into the equation. In the context of the individualization of water management, it would go a long way in explaining how wet rice cultivation in the hills of the Dhaulagiri Zone continues to be an important and universal crop in all hill communities with relatively stable yields. It would also help in explaining the legal and institutional pluralism associated with accessing water through both common property water management regimes and individual water management regimes. Nothing much other than rice—and certainly not high-value vegetables[22]—can be grown during the monsoon. It is tempting then to suggest that as long as peoples' 'within-agriculture' livelihood strategies include both wet rice and vegetables as important crops, with climatic factors as a 'hard constraint' that hampers the expansion of one at the expense of the other, then legal pluralism, including the common property management regimes associated with wet rice cultivation, will continue. However, other factors play a role as well, as analysed in the following sections.

9.5.4 Non-Agricultural Activities as Sources of Livelihoods

Shares of incomes from agricultural and non-agricultural sources were dealt with in section 9.4, where it was established that while income portfolios had expanded and diversified over the years, this was not necessarily at the expense of agricultural incomes. Table 28 shows the sources of non-agricultural income in the irrigated communities but only for 2004, as earlier survey data have proven not to be comparable[23]. Hence, while it appears from previously presented data that incomes from non-farm activities have increased, the figures in table 28 do not reveal actual changes in the composition of non-farm income sources.

The differences in shares of sources of income to total non-farm income and in the composition of income in the hills and the mountains reflect variation in livelihood strategies between these areas. While remittances are important in the hills, they are much less so in the mountains. Conversely, trade is important in the mountains but not in the hills, where, however, government service and labouring play significant roles. Culled from both the quantitative and the qualitative surveys, as well as informal conversations, these variations in non-farm income portfolios will be discussed in the following, with an initial focus on the highly diversified mountain communities.

[22] Only common, cheap spinach types may be grown during the rains.

[23] Disaggregating non-agricultural income sources from total income sources has not been feasible.

Table 28
Sources and Average Share of Non-Agricultural Income to Total Non-Agricultural Income, 2004
(percentage of households)

System	Non-Agricultural Income Sources* (n=188)							
	Hotel	Remittances	Govt. Ser	Shop	Labouring	Trade	Portering	Other
Amalachaur	–	57	20	13	3	–	–	3
Arjewa	–	64	23	9	23	–	–	18
Kurgha	–	10	58	26	23	–	–	3
Pakuwa	–	33	50	7	17	–	–	10
Lampata	–	20	50	–	30	–	10	10
Pipalbot	–	40	13	–	27	–	–	13
Thini	7	–	23	7	10	13	–	33
Tiri	–	20	–	–	–	100	–	40
Khinga	10	–	–	–	–	70	–	10

Sources: Cross-Sectional Survey 2004.
Note: Percentages do not necessarily add up to 100; not all households have non-agricultural incomes (some two per cent), and some have more than one source.

Starting in Thini, trade, a source of income for at least 13 per cent of households, chiefly connotes the buying and the selling of livestock (*jho*[24], horses) purchased in the northern part of Mustang District. For seven per cent of households, the running of hotels for tourists is another source of income, while for another seven per cent the operation of shops, mainly catering to the same tourists is another source. The relatively large proportion of households that claims to have 'other' sources of income covers over a vast range of activities, ranging from irrigation caretaking, private teaching and, most importantly, (predominantly winter) business activities outside the district. These activities include the sale of woollen garments (on the decrease) and taking care of 'interests' (hotels, inns, manufacturing industries) outside the district, with a concentration in the districts immediately to the south, mainly along the trade route described in chapter 5, but also in other economically dynamic areas, including Chitwan District, the road corridor from Pokhara to Kathmandu, and Kathmandu itself. Government service is also a source of employment for nearly a quarter of households in Thini; members typically work as either an assistant in the administration or as teachers.

In Tiri and Khinga, some 4–6 hours walk to the north of Thini, the main non-agricultural sources of income are associated with seasonal trade. This involves the spatial extension of the southwards trading patterns described in chapter 5. Sons and sometimes daughters from most households go to

[24] A cross-breed between yak and common cattle.

Guwahati in Assam (India) to trade for 3–4 months every winter where they sell woollen garments. Woollen garments used to be made from local sheep and taken for retail to India, but they are now purchased wholesale in India and retailed in markets and through other channels. Furthermore, people in Khinga and Tiri are involved in the buying and selling of livestock and Chinese consumer goods from across the border with Tibet (a pattern that bears some resemblance to the salt trade described in chapter 5); some of the latter are also traded on to India. However, both forms of trade are under threat. Particularly in Tiri, concerns were voiced about increased competition in the Himalayan trade pattern; in essence, the traditional winter trade in India faces increased competition from people in southern districts of Nepal who have also started to go to India to sell (Chinese) garments. Additionally, the north–south trade in non-garment Chinese goods is not as lucrative as it used to be, as Chinese goods are increasingly abundant in both Nepal and India through other channels.

Hence, the non-farm livelihood strategies and the challenges to these strategies in the three communities should be understood in both their local and global contexts. The relatively dynamic economy of Mustang District, exemplified by increasing flows of goods, services and tourists, affects Thini's (as a central place) economy positively, chiefly because of its close proximity to the district headquarters, the tourist and transportation hub of Jomsom. In Tiri and Khinga, the effects of local demand are less deeply felt, and as a consequence trading activities are focused on both northern and southern markets. The competition for 'indigenous Himalayan products', with which the people of Tiri and Khinga (along with other mountain peoples) are traditionally associated in India, may be seen as one consequence of globalization, at least in the sense that the term connotes increased flows of goods and mobility of people. Regardless of these perceived threats, the important thing to note in the context of the possible effects of livelihoods diversification on irrigated agriculture is—with respect to all three communities—that these highly diversified livelihoods, where the non-farm shares of total income are higher than the farm shares, are long established (see chapter 5) and, as the income data of table 20 suggest, relatively lucrative.

These livelihood patterns stand in stark contrast to those of the hills, where total incomes are not only comparatively meagre, but where higher shares of agricultural incomes to total incomes also suggest a lower degree of diversification than in the mountains. In the hills, trade and other commercial activities are restricted to the keeping of shops, usually outlets for basic goods. Government service is a major source of income for many households in Kurgha, Pakuwa and Lampata, sometimes gained from work as assistants in local administrations, but more often as teachers, either in their own or in neighbouring localities[25]. In Amalachaur, Arjewa and Pipalbot, it is remittances that make up the most important share of the non-agricultural income portfolio.

9.5.5 Remittances and Labour Migration

While other non-agricultural sources of income may potentially impinge on irrigation as common property regimes, I will in the following focus on the role of migration and remittances, as the latter—as shown in table 29—feature prominently in the non-farm income portfolios of the hill communities, in particular and have, as mentioned in chapter 4, emerged as a major theme in diversification discourses in Nepal. With the numbers of people and transfers of funds involved having increased significantly over the past few decades, migration and the remittances that follow may be categorized under 'trends' (as in tendency) and 'shocks' (see column D) in the analytical framework. However, the long-established nature of labour migration as a livelihood alternative

[25] Most farmers are hill Brahmin, something which typically entails a cultural background of learning and teaching.

(the 'trend'), historically associated with colonial relations[26] and socio-politically induced hardship (the 'shocks'), means—as also touched upon in chapter 3—that the phenomenon also belongs within the category of 'historical political economy' in the analytical framework. In this and the next sections, I will examine how migration and remittances as a major theme in livelihood diversification are manifested in the nine case communities, and will discuss the meaning of the phenomenon in the context of agricultural livelihoods and collectively managed irrigation systems.

Migration as a livelihood strategy takes two major forms: entire households may leave remote areas for more central places, and individuals may migrate, either temporarily or more permanently, as wage earners or as traders and the destinations may be both national and international. With respect to the first form, key informants (n=11), believed to have overviews of changes at the community level, were asked about household migration patterns as reflected in tables 29 and 30. With respect to the second form of migration, farmers in 1995 and again in 2004 were, as part of the cross-sectional survey, asked if any members of their household lived and worked outside the locality for more than six months of the year[27] and, if so, where. That data are reflected in table 31.

Household-level rural–urban migration is often understood as being historically incorporated into wider processes of agrarian change involving the structural transformation of predominantly rural and agricultural societies to predominantly urban and industrial ones. In Nepal, however, rates of urbanization are high, but are not directly accompanied by transfers of people and resources from the agricultural sector to the (urban) industrial sector. As Seddon *et al.* (1998) note, linkages are more indirect and rural–urban transfers take place largely as a result of the remittances that are associated with individual-level migration, and do not come in the shape of conventional growth-linkages. Incomes from the remittances that result from individual migration may be ploughed back into rural communities in the short run, as Seddon *et al.* (1998) point out (see also de Haan 1999, footnote 1 this chapter), but more than anything they serve to induce household-level migration. I was unable to ask in much detail about the reasons behind the household migration shown in tables 11 and 12, but it seems likely in the regional context, as also suggested in chapter 5, to be linked to remittances, where urbanization is fuelled by a tendency to invest remitted funds in urban areas. Seddon *et al.* note that in Myagdi District:

> "All remittance-earning households were reported to have invested their savings in land and housing in Kusma, Baglung and Beni, the growing urban centres. The price of land in these centres is reported to be exceptionally high—higher than in Pokhara" (1998:105).

Viewed in this light, both types of migration—to the extent that the movement is rural–urban—should probably be understood in the context of a trend towards structural and, subsequently, demographic change that is not restricted to Nepal, and which—according to one estimate—may see urban populations surpass rural populations in a number of developing countries within a couple of decades (Pinstrup Anderson *et al.* 1999). For some, particularly the wealthier households, the decision to leave the village may have been the result of 'distress' factors such as the insurgency. For others, the decision may have been more 'opportunity' driven. However, the distinction between what constitutes 'push factor'-cum-'distress' decisions and 'pull factor'-cum-'opportunity'

---

[26] Although Nepal was never colonized, the British and Indian Gurkha connection should be understood in the context of British India (see, for example, Whelpton 2005).

[27] In both the surveys of the 1990s that form the comparative base for the repeat survey, and consequently in the 2004 repeat surveys, distinctions were made between temporary (less than six months) and permanent (more than six months) migration, in line with Central Bureau of Statistics practice.

decisions, both in the context of looking for greener pastures at the household level and in the context of individual migration, is blurred[28].

It needs to be noted as well, as de Haan (1999) points out in the international context, and as table 29 below shows in the mountain context, that household migration is not just a rural–urban dynamic but is also rural–rural. Over the 10 years of the study, Khinga saw no household migration. However, six households had emigrated from Thini (apparently to Pokhara and Kathmandu). In line with established practice, they had not actually sold their property; rather, their houses and agricultural land had been leased out, in this case to immigrants from areas to the north, i.e., Upper Mustang, and the population had remained stable. Tiri, on the other hand, had seen a reduction of households, and in 2004 had 14 households compared to 16 households some 10 years before. Five households had emigrated south, out of the district, while three have immigrated from the neighbouring mountain district of Dolpo and also from Upper Mustang. While, as Vinding (1984) observes, the rate of emigration from Mustang District may have slowed since the 1970s, a north–south migratory dynamic[29] remains evident.

Table 29
Migration patterns, Mountain Systems, 1995–2004
(households)

System	Households Emigrated	Households Immigrated	Change (HH)	Households (2004)
Thini	6	6	0	190
Tiri	5	3	-2	11
Khinga	0	0	0	34

Sources: Dhaulagiri Irrigation Development Project Key Effects Monitoring Survey 1995; Cross-Sectional Survey 2004.

The pattern of migration is somewhat different in the hill communities where, as shown in table 30 below, a total of 38 households or some five per cent have emigrated over the decade of the study. While agricultural land is leased out, immigrant households, unlike in Mustang District, have not replaced the vacating households; rather the drift suggests slow depopulation of the villages and increasing urban populations along the lines of the already-mentioned dynamics associated with remittances as well as the civil war and the changing nature of the regional economy, as described in chapter 5. Some households, however, have also left for the *terai*[30], but whether they have settled in urban or rural areas is unknown. Over the period 1995–2004, Lampata was the most severely

[28] I find the notions somewhat shallow and most useful in the macro-structural context of the relationship between the geographical origin and the destination of migrants; I would, for instance, not hesitate to characterise the (seasonal) labour migration from impoverished and food-deficient regions such as Far Western Nepal to India as distress migration.

[29] Messerschmidt (1995) also mentions this dynamic in connection with the village of Marpha close to Thini.

[30] Migration from the hills to the *terai* has been a feature of rural–rural migration since the *terai* (initially Chitwan District) was 'opened' for settlement in the 1950s. The contribution by Agergaard (1998) provides a thorough account of the dynamics of this form of migration in Nepal. Somewhat ironically, one objective of the DIDP was to halt migration to the *terai*, an area that by the 1980s was perceived as having reached 'carrying capacity'.

afflicted community, with a net household emigration of some 14 per cent, followed by Arjewa with seven per cent, Pipalbot with six per cent, Pakuwa with close to four per cent, and Kurgha and Amalachaur with some two per cent each. It appears that the recent focus on the dynamics of the remittance economy in Nepal (and elsewhere) has turned attention away from the permanent household-level migration from rural areas that preoccupied earlier migration research in Nepal (see, for example, Gurung 2005, Agergaard 1998, see also footnote 30). Hence, no contemporary 'yardstick' data with which these data may be compared have been identified.

Table 30
Migration Patterns, Hill Systems, 1995–2004
(households)

System	Households Emigrated	Households Immigrated	Change	Households (2004)
Amalachaur	3	0	-3	119
Arjewa	10	0	-10	127
Kurgha	5	0	-5	234
Pakuwa	5	0	-5	122
Lampata	10	0	-10	60
Pipalbot	5	0	-5	75

Sources: Dhaulagir Irrigation Development Project Key Effects Monitoring Survey 1995; Cross-Sectional Survey 2004.

Turning to individual migration, the final project evaluation of the Dhaulagiri Irrigation Development Project noted in 1996 that:

> "… the number of people migrating to India or the *terai* is very different from village to village. In certain villages it is very high: 1 to 2 persons per household (Arjewa) are migrating, while in others this phenomenon is almost non-existing (Pakuwa)" (Dhaulagiri Irrigation Development Project 1996).

Such non-existence of migration from Pakuwa is no longer the case; while more households in Arjewa still have members that migrate than in Pakuwa, the latter community seems to be catching up, as shown in table 31 below (as well as in table 30 above). Over-time comparative cross-sectional data on individual migration exist only for Thini, where the proportion of households with migrated members has increased from 53 per cent in 1994 (Dhaulagiri Irrigation Development Project 1994) to 60 per cent in 2004. In all communities though, respondents claimed unanimously that migration, particularly to foreign countries, had increased substantially over the 10 years of the study, a factor that, as previously mentioned, is assigned as a key reason for perceptions of 'improved lives'.

Table 31
Households Affected by Individual Migration, All Communities, 2004
(percentage)

System	Proportion of households with migrants	Main migrants	Destinations (proportional among households with migrants)		
			Nepal	India	Others*
Amalachaur	50	Husbands, sons	8	79	13
Arjewa	50	-do-	20	63	17
Kurgha	32	-do-	57	36	7
Pakuwa	37	-do-	50	29	21
Lampata	40	-do-	57	36	7
Pipalbot	33	-do-	17	17	66
Thini	60	Sons, daughters	56	11	33
Tiri	60	-do-	10	50	40
Khinga	10	-do-	0	0	100

*Source: Cross-Sectional Survey 2004. *Note: Mainly Gulf countries.*

The figures provided in table 31 confirm reports of high levels of individual migration from this region (see Seddon *et al. 1998,* Seddon *et al*. 2001 and chapter 5). They also confirm that in the case of migration abroad, India—with its relatively low entry costs—represents the most important destinations for migrants from hill communities, as also suggested by both regional and national figures. Pipalbot is the exception among the hill communities; 66 per cent of its migrants travel to 'other countries' in line with the more general picture from Myagdi District (see chapter 5). In comparison with most of the hill communities, the mountain communities also have fairly high shares of migrants in what is often perceived as lucrative 'other country' labour markets.

There is an ethnic geography to this kind of mobility that reflects the national picture. Generally, in the overall ethnic geography of migration in Nepal, the proportion of jobs taken by Brahmins in lucrative labour markets is less than their proportion in the population (Seddon *et al.* 1998, Seddon *et al*. 2001). The Brahmin-dominated communities of Amalachaur, Kurgha, Pakuwa and Lampata also display this characteristic; as relative newcomers to migration overseas, securing access to lucrative labour markets appears relatively problematic in the absence of established networks. The Magar, Thakali and Towa of the remaining communities, on the other hand, are able to draw on long-established trail-blazing networks associated both with recruitment for the overseas Gurkha regiments (the Magar) and the dynamic diasporas of mountain people, particularly for the Thakali and Towa (see Fisher 2002). Chettri-dominated Arjewa also has army migration networks that mainly secure access to India.

Linked to the role of networks, there seems, at least for the hill communities, to be a relationship between the share of remittances in the non-farm income portfolio (see table 28) and the proportion of households with migrants. In Amalachaur and Arjewa, where the proportion of households with

migrants is high, the remittance shares of the non-agricultural incomes are also relatively high, at 57 per cent and 64 per cent, respectively. In Kurgha, which has the least number of households with migrants, remittances make up only 10 per cent of the non-agricultural income portfolio, and in Pakuwa and Lampata the shares are 33 per cent and 20 per cent, respectively. It seems reasonable to assume a self-propelling effect; the higher the number of households with migrants in the community, the more established the pattern and the networks that facilitate migration. Considering that households with migrants tend to have more than one migrant member (the average is 1.5 persons), these dynamics may also be present at the household level.

There does not, however, in the hill communities, seem to be much of a relationship between the shares of remittances in the non-farm portfolio and the proportion of migrants in lucrative markets. The high shares of the portfolios in the cases of Amalachaur and Arjewa derive from India, and even in the case of Pipalbot, where 66 per cent of migrants are in 'other countries', a 40 per cent share of the portfolio seems meagre. The relationship may be clearer when it comes to total household income: Pipalbot (with a high number of migrants in 'other countries') has the highest average household income (Nepali Rupees 44,000) of the hill communities, whereas Arjewa (also with a high number of migrants, but in India) has the lowest income (Nepali Rupees 33,000). The picture becomes more blurred in the remaining hill communities, where the livelihood portfolios are more strongly agriculture-based as a characteristic of Brahmin-dominated communities. However, the two 'extreme' cases of Pipalbot and Arjewa would suggest that the destination of migrants matters a great deal, as does a recent contribution to the debate on the importance of remittances in Nepal. It suggests considerable 'qualitative' differentiation depending on migrants' destinations: for Nepal, the average annual remittances from a Gulf country is said to amount to Nepali Rupees 90,000, while from India it is only NRs 9000. For 'western countries' (including Japan), it is said to be a relatively massive NRs 450,000 (Kollmair *et al.* 2006).

It became clear during the course of the fieldwork that the amounts remitted not only depend on the destination of the migrants, but also on whether their relationship to the household is that of sons or husbands. The amounts remitted by sons, even when in overseas markets, do not necessarily constitute large income components, but rather small (albeit important) income supplements, either because the sons remit funds to their 'own' spatially separate households or save the funds for themselves to set up households. As one farmer responded when asked what he received from his three sons who all worked in presumably lucrative overseas labour markets, "Nothing much; they are all detached from my house." Remittances matter a great deal more to household incomes when it is husbands who are the source of earning. In the same context, it needs to be kept in mind though, that while children working overseas may not send back vast amounts to their parental households, they have nevertheless become—to use a phrase commonly heard in rural Nepal—'earners instead of eaters'. They are no longer the burdens to the household that young males with School Leaving Certificates and professional ambitions that do not include farming often represent in rural Nepal. This issue will be touched upon later.

Turning to the mountains, it may be noted that Thini has a relatively large share of migrants in Nepal itself, something which should be chiefly attributed to the business activities (inns, hotels, contractor business, etc.) for which the people from this area are historically renowned (see chapter 5). The large share of migrants is not reflected in remittances; most migrants appear to invest outside the area rather than remit funds, and some are students. The relatively large share of migrants in 'other countries' from the mountain communities has already been touched upon; these migrants also appear to invest savings outside the area. For the most part, these 'other countries' include the highly lucrative labour markets of Japan, the United States, and Malaysia. It may be noted though, that unlike in the hills, most individual migrants from the mountains are sons (and

daughters), as opposed to the husband-and-sons pattern of the hill. This is, as mentioned above, likely to have effects on remittance flows, and contributes to explaining why remittances play much less of a role than do trade and, to some extent, agriculture. However, considering that remittances from western countries amount to fairly large amounts, as reported above, it does seem likely that remittances contribute significantly to the high average incomes of mountain households when they do occur, as shown in the case of Tiri (see table 28).

It appears that the different patterns of migration that characterize the hills and mountains reflect, more than anything, vastly different and to a large degree, historically rooted livelihood strategies. In the hills, increasingly diversified agriculture combined with foreign employment and indeed employment within Nepal are the main livelihood strategies, but remittances tend to supplement agricultural income. In the mountains (excepting Tiri), it is agriculture that tends to supplement other forms of income. Agriculture—diversifying, but far from the extent seen in the hills—is combined with commercial activities both within and outside the immediate community. Spatial livelihoods diversification as typified by seasonal trade migration of individuals has historically been important in earning livelihoods in the mountains[31], and continues to be a central, long-established livelihood strategy, unlike in the hills, where labour migration is a relatively novel element in the livelihood portfolio.

9.6 Migration and Remittances as Factors that Influence Cooperation in and Performance of Irrigation Systems

To what extent do migration and remittances, as dominant themes in livelihood diversification, affect the irrigation commons? The already-proposed macro-perspective that migration should be understood as a form of livelihood diversification that is part of structural change leading to reduced importance of agriculture and increased urbanization is, as touched upon earlier, supported by near consensus in the migration literature that very little remitted money is reinvested into agriculture (thus affecting its institutions) in the long run (de Haan 1999, see footnote 1). This also appears to be the long-term drift in the Dhaulagiri Zone, albeit not in the conventional growth-linkages sense of structural transformation; the drift stimulates vegetable production for an urban market where demand is fuelled by remittances. There is more disagreement with respect to the three related 'micro' themes, on the possible direct effects of migration on agriculture that dominate in the literature (see de Haan 1999 for a review): first of all, the effects of (male) migration on local labour availability; secondly, its effects on labour allocation in the gender-dimensional sense; and thirdly, the extent to which migration affects incentives and 'investment' decisions in natural resource management (David 1995), broadly understood.

In the specific Nepalese context, these themes resonate with concerns raised regarding the ability of communities to manage water, owing to reduced repair and maintenance activities as a result of labour shortages (Gyawali and Dixit 1999, Pradhan 2003). Failing institutional memory in situations where decision-making and management decisions with respect to collective property are the domain of men, who are increasingly absent, is another concern (Meinzen-Dick *et al.*1997). The latter aspect is related to concern with respect to increased feminization of rural life (Blaikie *et al.* 2002) and subsequent increased livelihoods vulnerability (Cameron 1998), because women's rights

[31] Prior to the 1970s, emigration was particularly high for various reasons, including the collapse of the traditional salt trade, thus explaining the presence of Thakali in Kathmandu, Pokhara and along the trading routes southwards from Thak Khola, most of whom are engaged in hotel and restaurant business. Vinding (1984) suggests that this emigration, rather than resulting from distress only, was also to a large extent opportunity-driven.

to property are more loosely defined than those of men (Meinzen-Dick *et al.* 1997). Additionally, concerns with respect to disintegration of the 'moral economy' (Blaikie *et al.* 2002) and the social capital (Macfarlane 2002) of villages as a result of migration have been voiced.

9.6.1 Migration and Labour Shortages

Pradhan proposes, in an article that seeks to take stock of the status of farmer-managed irrigation systems in Nepal, that:

> "Able-bodied youths from rural areas have migrated to urban centres and other countries in search of employment. Because the maintenance of FMIS [farmer-managed irrigation systems] is a labour-intensive task, without the muscle power of young men, the tasks of repair and maintenance have been neglected in many systems" (2003: 332).

There appears to a shortage of labour in general in the Dhaulagiri Zone. Migration and remittances in Parbat District are, as noted by Seddon *et al.* considered to have created labour shortages—to the extent that "those who remain behind find it difficult to recruit labour to perform some of the farm work normally done by men—such as ploughing and digging" (2001:105)—as well as wage increases. In the present study labour shortages were identified in Mustang District, particularly Thini, where it appears that labourers that traditionally came from Baglung District for the summer harvest have now failed to turn up in the required numbers, possibly as an effect of improved employment opportunities in southern districts. Reportedly, labourers from Dolpo District to the west of Mustang District only fill the seasonal labour gaps to some extent. There seems to be little reason not to believe that leaving women behind, with all household and productive responsibilities, would for many, particularly poorer, households exacerbate a labour division that is already skewed in favour of men[32]. However, it also appears that the women who are left behind hire more labour than before, not least for tasks that convention dictates should be done by men in the Brahmin communities of the hills. As a women farmer from Amalachaur, whose husband works a teacher in another district, explains, "We are now growing three types of crops a year as well as vegetables. That means an added workload in our family. I am single, so I have had to use more hired labour." Indeed, a majority of farmers report that mainly owing to an increase in agricultural production they now hire more labour (at a higher cost) than they did in the past.

We know from chapter 8 that labour contributions for irrigation system maintenance have been reduced in most systems, while the physical status and the performance of the systems do not seem to justify such a reduction. To what extent may labour shortages, resulting from migration, be a factor in this context? Judging from farmers' responses probably not very much: only one farmer (in Pakuwa) commented that fewer hands mean reduced ability to maintain the systems. Apart from this comment, the issue does not feature in either the reasons stated for farmers' dissatisfaction with irrigation system maintenance (see chapter 8) in the cross-sectional survey, or in the related questions posed as part of the qualitative surveys; farmers in general point to symptoms (leakages, location, etc.) and to some extent institutional problems (management), but not to labour shortages as such.

Female-headed households of the hills claim not to hire labour for operation and maintenance of the irrigation system. The criterion of sending an able-bodied person from the household (see chapter 7) is reportedly adhered to strictly. In households where an adult male is present, this generally means male attendance, but in the absence of such males, the (temporary) female head of the household

[32] In overall terms, women are reported to work 30 per cent longer than men in Nepal (Central Bureau of Statistics 1998/99).

attends. It seems more common for farmers in the mountains, probably owing to seasonal migration patterns that may sometimes overlap agricultural schedules, to send representatives for operation and maintenance tasks when absent; however, these representatives tend to be relatives rather than outside labourers, probably so as to adhere to stipulations about sending someone from the household. So while migration may create some degree of labour shortage in some areas, and most probably stimulates the hiring of labour in most areas, it does not appear to directly affect operation and maintenance activities in the sense suggested by Pradhan. Rather, prestige, status and reputation—the desire to be visibly *not* free riding—seem to play a major role. Berry's observation, in an African context, that

> "… individuals contribute labour on compound fields or to village work parties, not in exchange for immediate remuneration, but rather to validate or strengthen their position within the group—and hence their ability to draw on its support or assistance in other contexts" (1989:48)

seems to also apply in the livelihood context of the hills and mountains of Nepal.

There also seems to be a case for questioning the extent to which the migrant group, particularly the 'young men' that Pradhan refers to, would have contributed with their 'muscle power' to operation and maintenance activities in Brahmin communities, had they remained in the villages. I noted early in this chapter that young men were 'normally very visible in public places of any village' in the 1990s. I also found, in the 1990s, that these groups of young men, though present in the village, were not sent as representatives of the household at times of collective action to any significant extent. Women farmers though, not least young women along with older, married male farmers, were always present in great numbers.

While obviously rooted in wider gender relations, this phenomenon should also be understood in the sense noted by Blaikie *et al.* in their previously mentioned analysis (see section 9.3) of change in the hills that "it is human capital which has shown a profound upheaval" (2002: 1268) over the past decades. This upheaval has come about partly because, as observed by the same authors, more children have been put into schools. Secondary school enrolment has in fact doubled in Nepal over the past 30 years but for girls the number of years of schooling is still half that of boys (Asian Development Bank 2004). In Brahmin communities such as those of the hills, where educational achievement is both part of a strong cultural tradition and an important livelihood strategy, boys with secondary school aspirations are intended for jobs outside the village. They are not usually expected, and do not themselves expect, to take part in agricultural activities.

In addition to education, upheavals are also thought to have come about through enhanced exposure to the outside world, facilitated by, among other things, reduced information asymmetries (see chapter 3) that also involve the social remittances of migrants in the political-economic period in question. This has, as touched upon earlier, raised aspirations on the part of both parents and children for livelihoods that do not seem to include farming. Very little research seems to have been done on the educational levels of overseas migrants, but it seems quite credible that for this particularly well-exposed but largely superfluous group of young men, most of whom cannot be absorbed into the economy—given that the labour market sees 300,000 new entrants each year (International Labour Organisation/UNICEF/World Bank 2003)—overseas migration is *the* option. Coming from 'middle farmer' Brahmin households that have been able to invest in education, this group is probably better able to pay the entry costs of gaining access to overseas markets than are other groups.

9.6.2 The Feminization of Rural Life

In the context of the effects of labour migration on a community's ability to manage water resources collectively, it is interesting to note, as I did in section 9.5.5 (see also table 31), that practically all migrants in the hill communities are reported to be husbands or sons, while in Mustang District it is sons and daughters who tend to migrate. The importance of the existence of a productive base consisting of both husband and wife 'back on the farm' is not entirely clear, but it seems to counter the increased feminization of agriculture that seems to be a consequence of the migration of husbands and sons in the hills. This feminization does not necessarily, as already argued, affect the maintenance aspects of irrigation but may, in the longer run, affect institutional memory in a social context where men usually take irrigation decisions.

In the hills, the make up of Water Users' Management Committees and/or the groups of men who informally play active roles in organizing irrigation seems to have changed very little over the past decade or so. I was struck during fieldwork by the frequency with which I found myself interviewing older versions of the same key informants (i.e., people on irrigation committees or otherwise active in relation to irrigation) that I had last interviewed some nine years before. In some cases it appeared that this continuity was the result of clinging on to positions of power, in other cases it seemed that respondents continued their tasks somewhat acquiescently. In none of the cases though did the institutional settings appear dynamic or even contested, and women, though obviously constituting a higher proportion of farmers than ever before, were no more institutionally active than in the 1990s. It was difficult to assess if institutional ageing without replacement by younger people had any impact on institutional performance, since institutional memory was retained in the still active male farmers that I interviewed. However, it does not seem unlikely that institutional problems, as probably already witnessed by the increasing dissatisfaction with both operation and maintenance and distributional aspects of irrigation that was accounted for in chapter 8, will be compounded by age and gender-related aspects in the coming years.

The last issues to be dealt with in this section are those associated with vulnerability aspects, the 'moral economy', and social capital aspects of migration in relation to irrigation. This is a fairly mixed cocktail with potentially indiscernible ingredients, but notions of heterogeneity, inequity and differentiation seem to cut across variations in meanings.

9.6.3 Migration, Remittances and Vulnerability

In livelihoods frameworks, vulnerability is defined as a high level of proneness to shock (column D in Figure 4). The vulnerability context is related to the feminization of agriculture, and is closely associated with female-headed households in a social and legal realm such as the villages in the hills, where women's access to property is less defined than that of men and, more broadly, where access to resources and opportunity leaves women disadvantaged compared with men. In this context, female-headed households are particularly vulnerable if they change from being temporarily female-headed into *de facto* widow-headed households when remittances cease to flow from migrant husbands (Blaikie *et al.* 2002). Such change in status may come about for various reasons, including the growing HIV/AIDS epidemic that is typically associated with widespread 'distress' migration to India from the impoverished regions of the Far West of Nepal (see chapter 3, and *Nepali Times*, Vol. 224, 2004). While these aspects were not investigated in this investigation, there seems to be little reason why increased male migration should not, even in the relatively well-endowed irrigated communities of this study, increasingly make some households vulnerable.

How this may affect the commons in the Dhaulagiri cases is largely speculative at the moment. On the one hand, increased feminization of agriculture, involving a growing number of households with limited 'in-house' human resources and capabilities to engage in maintenance activities and

institutional responsibilities in general, is unlikely to improve institutional performance. On the other hand, the feminization of agriculture may also create possibilities for women to access opportunities hitherto restricted to them and this, in turn, may create new institutional dynamics. With reference to the findings of section 9.6.1, it does not seem plausible, at this stage, to assume that increased vulnerability will affect commitment to cooperative tasks. *De facto* female-headed households without the ability to gain access to opportunities other than (conventional) farming are likely to pursue strategies that not only entail consolidation of group membership but also serve to secure the conditions for irrigated farming.

9.6.4 Remittances and Inequality

The focus in the following remains on the labour-migration-affected hills. Seen as a 'middle farmer class', these irrigated farmers have—as noted by Blaikie *et al.* (2002) (see section 9.4)—in general managed to secure remittances over the past decades. The immediate livelihood benefits from migration—i.e., the remittances—are, for households that invest in this livelihood option, to a large extent determined by the ability to pay high entry costs, and/or take advantage of other mechanisms of access such as emerging networks, to lucrative labour markets. While employment generation in local economies may have certain had certain 're-distributional' effects in terms of employment generation, it follows that the rewards of migration are unevenly distributed.

In general terms, but certainly not everywhere in the Dhaulagiri Zone[33], the households who do not have migrant family members (see table 31) are, with average annual incomes of Nepali Rupees 37,360, at the bottom of the income ladder. The second-lowest group consists of households with migrant members in Nepal only, earning average incomes of Nepali Rupees 54,600. With average incomes of Nepali Rupees 80,306, households with members in India (often more than one member) come close to the highest-earning households, i.e., those with migrants in 'other countries' where average incomes amount to Nepali Rupees 81,533. Considering that migration has accelerated over the years, these findings would then to a large extent confirm a general conclusion on the part of Seddon *et al.* 1998 and 2001) on migration and equity in Nepal that the tendency, is for foreign labour migration to deepen social and economic inequalities.

Equity and inequity in the commons may be understood, on the one hand, in the relatively uncontested, 'tail-ender' and internal context of Oakerson, which associates unequal returns to contributions to collective undertakings with inefficiency. The issue here, however, which is one of the relationship between 'exit-option'-induced economic inequality and the use and management of commons, is contested indeed (see Bardhan and Dayton-Johnson 2002 for a review of the issues), and, it appears, very context-specific. Two relatively large research contributions from the hills and *terai* of Nepal may serve as relevant comparisons to the present study: Varughese and Ostrom (2001) suggest a modest correlation between wealth disparity and problems of cooperation in forest use in 18 villages, while Lam (1998) in his previously cited study (see section 8.2) of irrigation systems in Nepal unequivocally finds that income inequality is negatively related to water delivery performance and productivity.

There seems little reason not to assume that Lam's findings in particular may be transferable to the hill systems of this study. However, social and economic inequality should be considered indicative

[33] Although not included in any of the surveys in this study, it is reported from the community of Salyan in Parbat District, located close to the highway to Pokhara, that landless farming households (who rent land) earn around NRs 60,000 per annum from the sale of vegetables. Some (landed) farmers in Salyan earn up to NRs 250,000 per annum on vegetables. Apparently, these income opportunities have reversed the wave of overseas labour migration (see Aasted 2005).

of, rather than an explanatory factor of, relatively low performance in the hill communities of this study, for the very basic reason, expressed by Bardhan and Dayton-Johnson, that:

> "If resource users have relatively lucrative earnings outside the commons, this can affect their individual incentives, as well as the power of social cohesion to promote cooperative behaviour" (2002:94).

However, while earnings outside of the commons no doubt *can* affect incentives for some households (and probably do to the extent that some may eventually move out of the village), the findings so far provide little evidence that this is the case in overall terms. As the income data suggest, the importance of agriculture as a source of livelihoods has not been reduced; rather it is characterized by shifts towards 'within agriculture but outside the commons' diversification that seems to affect the importance of cereal crops, and hence cooperation in the associated common property irrigation regimes.

9.6.5 'Moral Economy' and Social Capital

Migration and remittances may, as alluded to above, be associated with the power of social cohesion (Bardhan and Dayton-Johnson 2002) and associated notions of moral economy and levels of social capital in the sense that reciprocal arrangements, networks and social fabric disintegrate if livelihood interests are no longer shared. Macfarlane suggests that this has happened at practically all levels of human interaction in a strongly migration-affected Gurung village near Pokhara over the past decades, with the help of external cultural influences (Macfarlane 2002). If we, along the lines of Ostrom directly and with a singular focus, associate cooperation in irrigation with social capital in the sense that the rules that make up the institutions for cooperation *are* the social capital (Ostrom 1990, 1992), then that social capital in irrigation, i.e., the reciprocal arrangements that are central to cooperation in irrigation, appear to have been reduced in the studied communities, as witnessed by reduced performance on a number of accounts. However, in a broader sense—notwithstanding that some 'left behind' households (such as those that are female-headed) may experience 'exclusion' in spatially separated families and in terms of access to commons resources—levels of these somewhat hazy notions appear not to have been reduced in general terms in the cases here, at least not as a result of 'exit options'. Applying a broader, institutional-dynamics, 'no condition is permanent' (Berry 1993) perspective, it appears that cooperative arrangements may simply have taken on other forms. This will be discussed in coming sections.

9.7 Changing Institutional Landscapes

As argued earlier, the dominant rural development and collective action discourses have assigned important places to local resource management institutions—including irrigation institutions—as central institutions to safeguard livelihoods in rural economies thought to depend on agriculture as the central source of livelihood. Likewise, it is generally assumed, that external sources of income will negatively affect the institutional mechanisms that ensure the success of the commons and other cooperative endeavours. This tends to be associated with reductions in social capital, usually understood as trust, shared norms and interests, and associational life.

In contrast to the singular focus on commons institutions, livelihood thinking recognizes to a greater extent the diversified nature of rural livelihoods and the notion that livelihoods are pursued within matrices made up of a variety of institutions, i.e., that diversified rural livelihoods and the existence of an array of institutions go hand-in-hand. In the following, I will attempt to map the institutional landscapes and trace institutional trajectories in the irrigated communities with a view to assessing the extent to which the institutional landscapes may be seen to impinge on, otherwise affect, or explain the trajectory of the common property regimes in irrigation. This element of the

investigation is purely based on qualitative surveys without the benefit of 'hard' comparative over-time data.

9.7.1 Institutional Landscape of the Communities

An overview of the institutional landscape within the nine irrigated communities is provided in tables 32 and 33. The list draws on the qualitative surveys across the communities: key informants (n=14) were asked about their involvement in committees and boards within the communities, as well as the existence of agricultural institutions in the community; additionally, randomly selected farmers were asked which institutions were present in the community in two surveys that sought to trace institutional (n=16) and livelihoods trajectories (n= 18). The listed institutions, which probably should not be considered exhaustive, are divided into socio-economic (Table 32) and socio-cultural institutions (Table 33) so as to suggest their relevance in a livelihood context.

Table 32
Socio-Economic Institutions at Community Level

Institution	Amalachaur	Arjewa	Kurgha	Pakuwa	Lampata	Pipalbot	Thini	Tiri	Khinga
1. Irrigation (*adhyakshya*)	•	•	•	•	•	•			
2. Irrigation (*mukhya*)							•	•	•
3. Savings/Credit Association(s)	•	•	•	•	•	•			
4. Vegetable Cooperatives	•		•	•	•				
5. Mothers' Group	•		•	•	•	•	•	•	•
6. Forest Users' Association	•	•		•		•	•	•	
7. *Dhikur* Groups	•	•		•		•	•	•	•
8. *Parma*			•		•				•
9. Beekeepers' Association				•					
10. Goat Farmers' Association				•		•			
11. Coffee Traders Association				•					
12. Seed Production Group						•	•		
13. Health Post Committee	•	•		•					
14. Drinking Water Committee			•						
15. Motor Road Committee						•			
16. Energy Group						•	•	•	

17. Post Office							•		
18. ACAP (i)							•	•	•
19. NEWAH (ii)				•	•				
20. PDDP (iii)					•				
21. Lumle Project (iv)				•					
22. Small Farmers' Association			•						

Sources: Key Informants' Survey (n=14); Institutional Trajectory Survey (n=16); and Livelihood Trajectory Survey (n=18).
Notes: (i) Annapurna Area Conservation Project; (ii) Nepal Water for Health; (iii) Participatory District Development Project; (iv) Project from Lumle Regional Agricultural Research Centre.

Table 33
Socio-Cultural Institutions at Community Level

Institution	**Amalachaur**	**Arjewa**	**Kurgha**	**Pakuwa**	**Lampata**	**Pipalbot**	**Thini**	**Tiri**	**Khinga**
1. Youth Clubs					•	•			
2. *Gompa* (i)							•	•	•
3. Temple Group			•						
4. School Committee	•	•	•	•	•	•	•		

Sources: Key Informants' Survey (n=14); Institutional Trajectory Survey (n=16); and Livelihood Trajectory Survey (n=18).
Note: (i) Buddhist monastery.

The division of these institutions into socio-economic and socio-cultural categories does not mean that they are mutually exclusive in terms of pursuing livelihoods; youth clubs, for instance, often constitute entry points for the mobilization of young people by Non-government Organisations and therefore may serve as institutions that attract external resources; and mothers' groups, as suggested in the next section, serve both important cultural and economic functions. As social capital—defined as networks of social relations—all the listed institutions would appear to constitute assets that may affect bargaining and other forms of power, and probably levels of shared norms and identity among entire communities or among those affiliated with specific institutions. With respect to norms and identity, it would also appear that the *gompa* or Buddhist monasteries of Thini, Tiri and Khinga are particularly bonding socio-cultural institutions.

Avoiding dichotomizations does not mean that the historical context of these institutions should be disregarded, as the age of institutions usually relates to the degree to which they are rooted in a community. However, rather than referring to deeply embedded institutions as 'traditional' (which may be taken to connote something old and static) and more recent institutions as 'modern' (which may be taken to connote upgraded versions of the traditional), it makes more sense to refer to these institutions in more neutral terms as 'customary' and 'non-customary', respectively. The customary institutions featuring among those listed in table 32 above, include, in addition to the irrigation management institutions described in chapter 7 (the customary *mukhya* system of Mustang District

and the *adhyakshya* system of the hills), *dhikur* (credit groups) and *parma* (exchange labour). In the literature, *parma* is considered a central institution in the context of irrigated agriculture. Miller, in a study of decision-making in the Jhadewa Valley of Palpa District immediately south of the Dhaulagiri Zone, describes its basic functions and significance:

> "This system, called *parima* in Jhadewa and *parma* elsewhere in Nepal, is of special importance at the time of rice planting. A family asks its relatives and friends to send workers to its fields on a fixed day. It is possible to refuse, but one must have a very plausible excuse in order to avoid bad feelings… *Parima* workers receive no payment in cash but are repaid in labour when it is time for their own rice planting. Even though twenty to thirty workers may be involved in the exchange-labour process, and no written records are kept, the families experience no difficulty in recalling the names of the people to whom they are now indebted for repayment of labour… Though it is physically exhausting for the ploughmen and the other men and women to repay all their *parima* debts during the planting season of about six weeks, they value the system because it makes possible for each family to get all its rice transplanted in one day without a large outlay of scarce cash for hired labourers" (2000:112).

As Miller further explains, the *parma* system is also in place with other work that is desirable to have completed within a short time, such as harvesting and threshing. Such reciprocal arrangements are found throughout Nepal (but are not at all unique to Nepal[34]), but performed, according to Messerschmidt, most elaborately among the Gurung ethnic group, where, organized around cultural institutions[35] this "form of cooperation plays an important role in village and intra-ethnic unity, reciprocity, stability and communality" (1995:8). In both the hills and the mountains, *parma* should be understood as a predominantly risk-spreading arrangement closely associated with the agricultural cycle of irrigated grain production regimes, usually performed—as also observed by Bishop (1990) in the Karnali area—in combination with other labour mobilization arrangements. The fact that this institution only features in three of the communities should be considered indicative of recent changes related to non-grain crops as discussed earlier (see also next section).

Other labour mobilization arrangements have not been investigated in detail in the present study. However, 'vertical' institutions based on access to and control of productive means and, subsequently, caste and class, would—as in other rural areas of Nepal—range from the hiring of labour on market terms to semi-feudalistic[36] arrangements as well as sharecropping and other land-renting arrangements. Class and caste relationships in the Kali Gandaki corridor and elsewhere in Nepal that, as Seddon and Adhikhari put it, "provide the basis and the ideological justification for exploitation and oppression, for social discrimination and exclusion, for degradation and deprivation as well as for employment and patronage" (2003:55), are indeed important determinants

---

[34] Messerschmidt (1995) reports that they are found in North India, China and Tibet. I would suggest that they exist, or have existed, in most agricultural societies in some form.

[35] It "typically involves young men and women in agricultural field work and is organized around an age-graded female dormitory association called *rodi*" (Messerschmidt 1995:7).

[36] While payment in kind for labour probably occurs frequently, actual *jajmani* systems of caste-specific task specializations in hill agriculture (see Bishop 1990) or anything resembling the *kamaiya* bonded-labour system of the *terai* do not appear to be particularly prominent in the communities studied. First of all, demand for such labour outstrips supply and Brahmin who are not supposed to plough often have to do so anyway, faced with the requirement for a wage premium. Secondly, the presence of Maoists in the area appears to subdue outright exploitative practices. With respect to backward linkages to agriculture (implements), however, production is still organized along distinctly caste-specific tasks.

of the livelihood conditions of the poor. However, the scope of this study, with its focus on socio-economic change among landed, irrigated farm households, means there is less emphasis on 'vertical' institutional relationships between richer and poorer as well as kinship-based institutions that—similar to "money, markets, marriage and the law" (Leach *et al.* 1997:237)—have no direct organizational manifestations (Meynen and Doornbus 2004).

Staying within the realm of customary institutions, and directly related to financial resources mobilization, *dhikur*, or rotating credit associations, are particularly important in Thini, Tiri, Khinga and Pipalbot. *Dhikur* tend to operate at disaggregated levels, made up of members who contribute to a fund at predetermined rates and frequencies, in order to raise capital for individual investment. Messerschmidt explains that

> "… each *dhikur* rotates annually or biannually for as many rounds as there are members. At each turn, every member contributes a prescribed amount of cash plus 10 per cent interest compounded incrementally. The member who takes the lump sum in his turn pays it back with interest which grows incrementally. Thus the overall fund grows turn by turn and those who take the sum at or near the end receive proportionately more than those near the start. In essence, those at the end are proffering a loan to the others; as lenders they accept deferred payment but receive a larger profit" (1995:6).

While the *dhikur* principles that, as suggested above, "tend to distinguish early borrowers from late lenders" (Seddon *et al.* 1979:210) are related to roughly similar principles around the globe (Messerschmidt 1995), their significance in the context of this study relates chiefly to the origin and concentration of *dhikur* in the northern part of the Dhaulagiri Zone. From there, the practice has been spread to many locations, particularly the towns and bazaars along the trade route to the south (see Seddon *et al.* 1979 as well as chapter 5), by migrating Thakali from Mustang District and other northern peoples who do business along the trade route and beyond. While predominantly an entrenched resource-mobilizing practice of 'northerners', other groups, including Parbatiya, increasingly make use of it. Even if not listed in figure 32 as a community-level institution in all communities, *dhikur* exist at disaggregated levels in all communities, in some form and scale, reflecting a pattern throughout Nepal where everyone from business people to professional groups[37] engage in it. Though largely speculative, it does not seem unlikely that migration endeavours may benefit from *dhikur*.

Geertz (1962) (quoted in Bingen 2000:18) saw such rotating credit associations as 'intermediate' institutions that were "essentially a device by means of which traditionalistic forms of social relationships are mobilized so as to fulfil non-traditionalistic forms of economic functions", i.e., as vehicles for capital formation for farmers. *Dhikur*, in the context of the Kali Gandaki corridor, it may therefore be argued, contribute a great deal to the historical regional economic dynamics outlined in chapter 5. Additionally, as institutional fabric in the specific regional context, based on the dynamics associated with 'communities of trust' and shared interests upon which they depend for existence and successful operation (Seddon *et al.* 1970), *dhikur* should not be underestimated.

Except for post offices, health centres and schools the bulk of the non-customary institutions are either direct products of, or spin-offs from, projects implemented by the government or Non-government Organisations, usually with the assistance of international donors in the period from 1990 onwards. Depending on the project, but in line with the emphasis on participation and the

[37] A lecturer from the university campus in Pokhara once told me that it was common for university staff, including those in his own department, to engage in *dhikur*.

'local' in the dominant discourse of the time, these institutions featured as community-based organizations or users' groups in most project and policy documents, as well as in Nepalese legislation. Some, such as the savings and credit groups and the vegetable cooperatives, stem (as elaborated on in the following section) from the tripartite collaboration between the Dhaulagiri Irrigation Development Project, the District Irrigation Office line agency and local Non-government Organisations. Others, such as the seed production and goat farmers' associations, are among a plethora of groups initiated as part of the Participatory District Development Programme (PDDP) of the United Nations Development Programme which, as the name suggests, aimed to promote decentralization through District Development Committees. Yet other 'institutions' such as Nepal Water for Health (NEWAH) and the Annapurna Area Conservation Project (ACAP) are projects that, because of their recent nature, are still referred to by the name of the external agent and not yet to the name of the Community-based Organisation or Non-government Organisation offspring.

These non-customary institutions differ substantially from customary institutions by virtue of their origin and internal architecture. Their structural-political origin in a liberal environment, emphasizing incentives, choice and (designed) decentralized collective action in the context of the decentralization policies of Nepal in the 1990s, was mentioned in chapters 2 and 4. In its practical local manifestation, the democratic basis has typically been a so-called mass meeting organized and conducted by a project 'mobilizer', who would in many cases, have identified potential stakeholders as part of a rapid rural appraisal exercise. The mass meeting serves as a general assembly where principles and objectives are discussed and a constitution-cum-bye-laws agreed upon. In line with democratic principles, a committee made up of both (pre-nominated) women and men, with as a minimum a treasurer, a secretary and a president, would be elected; every 'association' listed in figure 32 has a committee that is often, by many nominal members of the association, seen as the actual institution.

The standard formula involved formal, recorded membership and enabled registration with and incorporation into the legal framework of local levels of government, the currently suspended Village Development Committees (see chapter 4). Partly because, at the time of writing, these committees were not in formal existence, and partly because they cover several villages, these formal, elected bodies are notably absent from the list. This does not, however, as shown in the next section, mean that they are not important to people. Registration as a legal Community-based Organisation or Non-government Organisation entity in theory created eligibility (what many respondents refer to as 'recognition') with respect to access to resources (projects, funds, etc.) through local line agencies, as well as District and Village Development Committees. In practice, in the context of irrigation and other infrastructure projects the awarding of legal status to these community-based institutions marked a departure from previous centralized (small) project implementation practice that involved only line agencies and a hierarchy of contractors, and was made possible as a result of amendments to the government's Financial Rules that assigned "priority to users' committees formed by local users for the construction of projects to be implemented in rural areas up to a cost ceiling of Nepali Rupees 10 *lakh* (one million)" (Nepal Gazette, 1 March 1993, ch. 42, no. 46, p. 9). These amendments followed wording in the Eighth Plan (1992–1997) emphasizing that:

> "… rural communities will be encouraged to organize user groups for building community infrastructure and to organize beneficiary groups in order to strengthen receiving mechanisms at the grassroots level. All projects within the technical and managerial competence of the local people will be implemented by local user groups with assistance from local and district committees" (National Planning Commission 1992: 41).

9.7.2 Institutional Priorities in a Changing Institutional Landscape

Compared with the monolithic Panchayat institutions (SAPPROS 2001), the post-1990 democratic era in Nepal witnessed increasing institutional dynamics and access to opportunities for certain groups such as irrigated farmers in privileged locations. As argued in chapter 4, this should be understood in the context of the conducive political space provided by democratic policies in general, along with agricultural policies and dominant discourses of decentralization and poverty reduction that provided a central place to local, natural resource management institutions.

The Dhaulagiri Irrigation Development Project was a key player in engineering new institutions in the Dhaulagiri Zone in the political-economic moment; its 66 irrigation projects involved a substantial amount of institutional engineering during the 1990s. In addition to the 66 Farmers' Irrigation Associations and Water Users' Management Committees, the period between 1992 and 1996 saw the formation of some 43 functional literacy groups and 90 women's savings groups/mothers' groups (under the heading of 'irrigation-related income-generation'). The trajectory of the latter form of group is particularly illustrative of the dominant approach of the time: savings were seen as an entry point for other income-generating activities and the groups received training on everything from environmental awareness creation and vegetable nurseries to smokeless stove construction and financial management. While a pioneering player that may be seen to have created a critical mass of activities, the Dhaulagiri Irrigation Development Project was not the only one; national and international Non-government Organisations, bilateral and multilateral donors worked on related themes, with forestry users' groups as the most prominent and widespread activity in natural resources management. Upon the departure of the Dhaulagiri Irrigation Development Project, local Non-government Organisations, some of them erstwhile partners of the project, created new alliances with new donors, and continued what they were by then good at, often in the communities where they were good at it, with 'beneficiaries' who were equally good at it. The effects of this intensive, often complementing, input of a battery of 'soft' resources is illustrated by one farmer:

> "As individuals we are not recognized, so we need to establish relations. Our vegetable-growing cooperative is most important because we share ideas and get information from outside. It has been possible to change our living standard this way" (woman farmer, Lampata).

These comments on the role of institutions in relation to 'recognition' (vis-à-vis authorities, those with information, those who monopolize trade in commodities, etc.), the breaking of information asymmetries (through the sharing of experiences on, for example, the cultivation of new crops), and the linkage with livelihoods are fairly representative of the meanings that farmers attach to their institutions.

This particular farmer's statement, expressed in 2005, as she pointed towards her dense, well-maintained vegetable plots which her son was busy weeding, would please any promoter of local groups for poverty alleviation. The vegetable cooperative that she refers to has 75 member households in a locality of 122 households (70 of which are irrigated, communally or individually). Two other groups in the area have nine and 14 members, respectively. Many farmers, like her, earn Nepali Rupees 60,000 (approximately US$ 1000) per annum from the sale of vegetables in nearby Kusma and beyond. In line with what was the original Dhaulagiri Irrigation Development Project 'entry point' philosophy, this farmer's involvement started in 1992 when project resident social

mobilizers, as they were known, encouraged the formation of a mothers' group (*Ama Samuha*)[38], of which she was elected treasurer. Based on that group, a women's savings group was formed and registered with the authorities in 1993 and she continued as treasurer, in close interaction with the social mobilizer.

Members of the 'entry point group', while benefiting from interaction with the social mobilizer, received (among a number of training activities) formal 'skills development training', 'off-season vegetable production training', and the farmer herself, together with the chairperson of the savings group, received financial management training together with other leaders in Kusma, the district headquarters of Parbat. When the Dhaulagiri Irrigation Development Project mobilizer left in 1996, a local Non-government Organisation[39] assisted a number of women from the savings group to set up a livestock group, and when the same Non-government Organisation, in 1997, received a grant from a bilateral donor, it also assisted in creating the present vegetable cooperative. Most of the members are also members of the savings group (which continues to exist), except for a number of households who, in the face of labour shortages and sources of irrigation, find themselves unable to adopt the rather labour- and water-intensive vegetable cultivation. Similar institutional trajectories are found in most of the irrigated communities; the mothers' group in particular appears to have been a successful entry point for credit provision.

These examples illustrate that irrigation institutions are just one among a number of interacting institutions that shape people's resource access and control in the institutional landscape. In the following that landscape will be further mapped by means of an exploration of institutional priorities and meanings among farmers, based on the understanding that "different institutions may carry different meanings for different social actors" (Leach *et al.* 1997: 10). Table 34 shows a summary of replies to the question, "Which is the most important institution for farmers in your community?", in the livelihood trajectory survey as well as relevant responses in the key informants survey. The respondents were representatives of Farmers' Irrigation Associations (six, all male), persons otherwise 'active' in the community (five, of which four are female), and ordinary farmers (eight, of which two are low caste, one male and one female, and one other is female).

The focus is on 'tangible' associational activities (*sangh* in Nepali), and for that reason customary institutions mentioned earlier are conspicuously absent from the list, except in the case of the mountains. It should be noted though, in this context, that farmers consider *parma* activities, whose functions were described in the previous section, to have been reduced significantly in all communities, but mainly so in communities with good market access and subsequent diversification into crops with less uniform labour requirements. This would confirm that *parma* is primarily a function of the rice–wheat–maize cropping regime, with its relatively fixed and uniform periods of peak labour requirement.

[38] Eligibility for membership is not necessarily motherhood but marriage.

[39] The Baglung-based Dhaulagiri Community Resource Development Centre (DCRDC).

Table 34
Institutional Priorities, All Communities, (n=19)

Rank	Institution	Reason Assigned
1	Farmers' Irrigation Association/ Village Irrigation Governance[40]	Survival, livelihood, dispute resolution, water and natural resource management
	Vegetable Cooperative	Livelihood
	Farmers' Association	Power (political)
2	Village Development Committee	Protection of water rights, conduit to access resources, registration, link to resources and formal recognition
	Mothers' Groups	Role in solving social problems, checks social vices, savings and income-generation, encourages women's participation, credit
	Drinking Water Committee	Safe drinking water
	School	Access to education
	Gompa[41]	Guidance (spiritual, astrological)
3	Health Post	Access to medical services
	District Agriculture Office	Canal maintenance assistance
	District Development Committee	Assist in resolution of water rights disputes
	Post Office	Convenience
	Forest Users' Group	Livelihood
	District Irrigation Office	Occasional advice
	District Administration Office/ Magistrate	Not specified

Sources: Key Informants' Survey, Livelihood Trajectory Survey.

Institutions that are directly associated with livelihoods, such as the vegetable cooperatives mentioned above, are the most highly prioritized. Within this category, Farmers' Irrigation Associations/village irrigation governance institutions are considered to be of utmost importance. There is a tendency for male respondents, particularly those who represent irrigation institutions to singularly focus on this institution; however, female respondents, including those active in other institutions, also consider irrigation institutions the most important in overall terms. The functioning of the irrigation system is strongly associated with its governance in all responses. As the representative of a mothers' group in Kurgha states:

[40] It needs to be noted that for the purpose of illustrating an aggregate picture of institutional priorities, distinctions between the governance systems of hills and mountains are not made, even if differences are substantial. However, in the present context, it is worth noting that villagers in the mountain communities saw the customary village institution for managing natural resources as the most important.

[41] In the mountain communities.

> "If there is no irrigation, my family cannot grow enough food. If we cannot grow enough food, my family gets in trouble… The irrigation cannot work without the Water Users' Management Committee. They make rules and regulations and users have to follow them."

A low-caste woman farmer in the same locality, when asked if she thought the irrigation system could work without a committee, adds an equity perspective:

> "Well-managed irrigation is important for our livelihoods. Without irrigation we cannot produce crops, and without rules we cannot run the system: we get disputes among ourselves. If the system is managed well, we can irrigate even with little water. The committee is important for equal distribution, and without it the people who are strong and clever are able to benefit more than others."

This assignment of importance to a regulatory body and the relationship with livelihoods is even more pronounced in the communities in Mustang District where the *mukhya* institution covers all aspects of natural resource management, with irrigation as an important element. As the local blacksmith in Thini, with a small parcel of land, emphasizes:

> "We need the *mukhya* for settling disputes… we need him for managing the irrigation system."

The Village Development Committee ranks among the second most important institutions in the hills. This came as a surprise, considering that both Village Development Committees and District Development Committees were suspended in 2002. It appears, however, that despite its temporary burial, the memory of the 10-year life of particularly the Village Development Committees, the smallest units of administration in the democratic sense, is very much alive on the institutional map, and that people expect it to be restored to full life in the coming future. The high prioritization is associated mainly with what the representative of the vegetable cooperative in Lampata called 'recognition'. The following exchange, with the same woman farmer, illustrates this:

Respondent: Before, nobody liked to establish relations. It was difficult to mobilize even 200 rupees. Now that we have the vegetable group we have more recognition, also the Village Development Committee and the District Development Committee recognize us. People also recognize our group.

Interviewer: Why is it important to get recognition from the Village Development Committee?

Respondent: Because a group can be registered and we received a grant.

Interviewer: A grant from where?

Respondent: From the organizations down there [points downhill, in the direction of Kusma]. When we formed the group, we received a grant; it came through the Village Development Committee. It is an important institution because we get legal recognition from it.

Interviewer: So the Village Development Committee is important because of the legal recognition?

Respondent: Yes, there is the legal status; that is why it is important, it has authority and can give us legal status.

Interviewer: I still do not quite understand why legal status is important.

Respondent: Legal means that if we want to work as a group and get benefits, we have to get a recommendation from the Village Development Committee, we have to register. We

cannot coordinate work with the Village Development Committee or other organizations if we are not registered.

Interviewer: Okay, I understand. Then what is the relationship with the District Development Committee?

Respondent: Village Development Committee does not have sufficient budget for doing much work at village level, so they bring plans to the District Development Committee. For example, for the grant and also our drinking water project, we went to the District Development Committee through the Village Development Committee.

This tendency to assign importance to the role of the Village Development Committees for obtaining legal status, and for receiving approval for projects is echoed in all hill communities. While people also complain about political conflicts associated with the Village Development Committees, its suspension is generally seen as a major problem. As another woman farmer, this time from Pipalbot, says:

> "When we had a problem the Water Users' Management Committee went many times to knock on the door of the Village Development Committee office, which was located in our village. Three years ago they provided funds for repairing damage to the irrigation system. We influenced the use of funds and their planning, and had dialogues with the chairman on how to spend Village Development Committee funds. Now that both the chairman and the vice-chairman are absent, it is no longer possible to do this. Because of the Maoist insurgency the office has also shifted to the district headquarters. Still, the Village Development Committee supports us for solving some problems, particularly the issuing of recommendation letters for line agencies"

As this farmer says, the Village Development Committee may have been officially suspended in 2002, but it continued to operate at a limited level in the hill communities for quite some time after its cessation, end even after seeking refuge in the district headquarters from Maoists it continued to perform minimum functions. There is no escaping the impression given by respondents that stripping the Village Development Committee and District Development Committee administrative layers from the local administrative maps left a vacuum with respect to any sense of connection that people had between the micro-setting and the state. At district level, the latter is now represented by the Chief District Officer (the Magistrate), the Local Development Officer (of the same office), the police and army, as well as the traditional line agencies, all of which are accountable, as in the pre-democracy days, only to the central level.

Institutions, as suggested in the introduction to this section, hold different meanings to different social actors, and while 'simple' livelihood concerns predominate, power, acquired through local institutions as platforms for gaining influence in the wider institutional landscape, hold meaning in a number of communities. Particularly in the hills, the emerging connection between the village and district levels through users' groups such as the Farmers' Irrigation Associations, the Village Development Committees and the District Development Committees held opportunities for power for some groups, typically male, Brahmin farmers often with sizeable landholdings. These farmers, some of whom had held political office during the Panchayat era, were quick to realize the advantages offered by the formal Water Users' Management Committees introduced as part of the Dhaulagiri Irrigation Development Project intervention, and used these as platforms for gaining political influence. These power relations have not been investigated in much detail. It is, however, my clear impression that the ability to establish links between community organizations and local authorities (the 'recognition' mentioned above), and thus access to external resources, to a large

extent depended on the presence of politician farmers, along the lines of Seddon and Adhikari's observation on the effect of democracy at local level:

> "….at the local level at least the shape of political competition had important implications for the deployment of social capital, and ultimately, for the distribution of economic and other resources. Increasingly, one's political alignment affected one's access to resources and the dominance or otherwise of a particular political tendency at the national, regional and local level determined the volume and direction of benefits" (2003:58).

The suspension of the Village Development Committee/District Development Committee administrative layers severed the opportunity structures that were on offer during the democratic period.

In the three mountain communities, government institutions never held the same meaning as the *mukhya* customary governance institutions (listed as 'village irrigation governance' in figure 6). The role of the Village Development Committee is generally seen as subordinate to that of the *mukhya*, and acknowledged mainly for the annual grant allocation, the use of which (generally for road building) was decided upon by the *mukhya*. Hence the absence of these administrative layers is not felt to be as great a loss in the mountains as it is in the hills, apart from the grant element. The democratic era nevertheless made its mark. As an ex-member of parliament and farmer from Thini explains:

> "During the Panchayat regime and even before, during the Ranas, the central authority would designate the *mukhya*. The villagers did not have the right to choose their *mukhya* at that time. During the democratic period, the villagers could choose their *mukhya*, but often there would be some political interference. It was like: his father was the *mukhya*, the son also became the *mukhya* and the grandson also. It got better under democracy. Now there is a good relationship between the *mukhya* and the villagers because the District Development Committees and the Village Development Committees are vacant. Now it is much better, and the present system where *mukhya* are elected is no doubt democratic. We no longer make a person *mukhya* on the grounds of his wealth or influence in politics; our experience with elected VDCs has made us more democratic."

Symptomatic of the limited importance of the formal administrative structures of the state, most mountain respondents—not just the women, but also the men—assign the second highest priority to the mothers' groups (*Ama Samuha*) and see them as a powerful institution. Biswa Thakali, one of the (male) Thini *mukhya*, expresses this somewhat laconically:

> "The mothers' group is powerful. They handle garbage and we have to pay them, even if we do not throw any garbage. But they keep the trails clean."

A woman farmer and former executive member of the mothers' group in Thini goes beyond the practical meaning, and throws light on why the men also sees the mothers' group as something to be reckoned with:

> "Whenever we have a practical problem with our land, we go to the *mukhya*. And whenever we have a personal problem, we call the mothers' group. They persuade husbands to give up gambling and drinking alcohol."

The previously quoted ex-Member of Parliament from Thini further explains about this institution that gained strength in the 1990s.

Respondent: The mothers' group was set up with the goal that women could do something to wipe out social evils and malpractices. At first they had a lot of problems but now

they have shown what they can do and people give them much importance. They have opened libraries and information centres, and in most villages in Mustang they are playing vital roles in the communities. Now they are invited to participate in most activities. We have problems in the villages, you know, with violence against women and other kinds of victimization. But these disputes, between husbands and wives, parents and children and so on, are settled in the village, not taken to court. Not after the mothers' group became strong.

Interviewer: What happens? What are the sanctions?

Respondent: There are different types. Warnings are given if it is a first offence, and the perpetrators are told to apologize. The women come along in a group. If the perpetrators do to again, they are fined.

The role of mothers' groups as a form of social reform movement is known from other parts of Nepal, particularly with respect to the question of alcohol; throughout the past decades, women have successfully campaigned for the banning of the sale of alcohol in a number of districts[42]. However, in the hill communities of this study, meaning is attributed less to the social justice functions of these groups, than to their economic function, particularly the savings and credit functions already narrated from Lampata. It is quite evident that the latter functions have made the potentially controversial (from a gender power perspective) activities associated with women's rights, awareness creation, safe motherhood, etc., palatable to men in conservative Hindu society. The secretary of the mothers' group in Lampata gives a fairly representative account of the origin and meaning of these groups in the hills context:

> "After the change in 1990, different Non-government Organisations came here. Then the Dhaulagiri Irrigation Development Project came to the village and formed women's groups. We got a feeling of unity. Before, women were only doing household activities and did not have permission to go out alone. If a woman had to [go out], she had to take a man for security. During the Dhaulagiri Irrigation Development Project, women got the opportunity to go and observe things outside and learn new things. Those who quarrelled were persuaded to unite in the groups. The sanitation situation improved. After observation and visits to different places, a number of income-generation activities started. Vegetable seed production has been important for our livelihoods."

Health post and school feature lower down the list of important institutions in both the hills and the mountains. The reason for including them as relative priorities is fairly obvious, namely, as access to medical treatment and education. The latter in particular is generally highly prioritized in Brahmin society, where educational attainment carries a great deal of status. As in many other parts of the world, the ambition in these irrigated communities is to have at least one child (often a son) completing higher education, and preferably becoming a doctor, an engineer or—a relatively new ambition—"someone who knows about computers" and who, as mentioned earlier, will become an "earner, not just an eater". That earning, a number of farmers express, should—as made clear earlier in this chapter—preferably take place abroad. It needs to be noted that schools seen as important institutions include first and foremost government schools—the last remaining public entity in

[42] The Maoists, through their 'women's wing', have capitalized on the anti-alcohol sentiments of women who, particularly in the poverty- and alcohol-stricken Far West of Nepal, had been successful in banning sales of alcohol. A campaign, taken to national levels in 2001, threatened to close down any establishment selling alcohol and promoting other 'social vices' even in Kathmandu. While bans apparently remain in place in many rural districts, cities have, however, not been affected to any significant extent (see *Nepali Times*, Vol. 55, 2001).

many villages—whose importance has increased in recent years, concurrent with Maoist drives against the proliferation of private schools run by, among others, government school teachers on the side. Other relatively less prioritized institutions include the *gompa* (monasteries in the mountains), drinking water committees and forest users' groups, as well as government offices such as the District Agricultural Office, the Post Office, the District Irrigation Office, and the District Administrative Office.

This overall picture of the priorities suggests that—with the notable exception of the 'justice and morals' meaning of the mothers' groups—the economic, livelihood and resource access functions of institutions are central to the attribution of meaning to institutions in these irrigated communities.

9.7.3 The Role of the Maoists and the Insurgency

I mention in chapter 5 that at the time of fieldwork for this thesis (2004–06) the Maoists arguably constituted the single most important institutional presence in the Dhaulagiri Zone, measured in terms of ability and ambition with respect to the exercise of power and control over institutional, social, economic and political life. In light of this, it is somewhat conspicuous, that the Maoist movement is absent from the list of (and priority) attached to institutions in the communities. The effects of the Maoist presence and the insurgency have been touched upon in a couple of the statements in the previous section; in this section I will elaborate on this in more detail.

I discuss, in chapter 4, the position of donors with respect to the Maoists, as well as the ambiguity surrounding the effects of the crisis. Keeping in mind these perspectives, investigation into the effects of the crisis on institutional life for a relatively better-off segment of rural society in a relatively well-endowed area of Nepal, is particularly interesting. Much more so than more remote and unirrigated communities, they may be seen as a segment that managed to reap certain benefits associated with the agricultural and democratic policies of the democratic era of the 1990s, as witnessed in the previous sections of this chapter. On a methodological note, it needs to be mentioned that direct questions regarding the effect of the crisis were not included in the questionnaires; the issue, however, usually appeared in connection with more general discussions on livelihood conditions.

The direct effects of the crisis are mainly felt in the hills. Mustang District never saw a noticeable Maoist presence. In this arid, sparsely populated district with few places to hide from a disproportionately large military presence, "there are no Maoists, they only begin at Ghasa" (a one-day walk to the south) was the uniform answer to any query on Maoist activity. People's responses with respect to how the crisis had affected life (in the context of livelihoods, institutions, threats, the community) tended to be framed in terms of how their own livelihoods had been affected directly, rather than wider contexts. Here is a typical response:

> "It is difficult to travel at night; the security people stop us on the way and do not allow us to continue home. We waste money."

These are the words of a blacksmith in Thini. Travel (by foot or horse) at night along the trails beside the Kali Gandaki River was affected by an 8-p.m. curfew, and this was considered a serious problem for people who, like the blacksmith and most others men in the area, migrate seasonally to southern districts during the winter period. The problem apparently also affected the mobility of labourers originating in the south, who have traditionally come to Mustang District for the buckwheat harvest.

The curfew also, as mentioned in chapter 6, affected irrigation where, following centuries of tradition, water allocations follow strict turns around the clock. "We have to catch our turns to irrigate our land and the curfew has become a nuisance. Even in times of drought we cannot irrigate

at night," said one of the caretakers of Thini's irrigation system who, like his neighbours, had been scared off by warning shots from the army camp across the valley. Both the travel restrictions and the inability to work in the fields at night, however, were considered mere nuisances rather than severe threats to livelihoods. Further north in the district, in the tiny hamlet of Tiri, the crisis was, however, perceived as a major threat to livelihoods. Traditionally, as mentioned earlier, the economy is heavily based on winter trade in sweaters in India, but increasingly that trade meets competition from lowlanders who—so the theory goes in Tiri—seek alternative sources of income through migration to India, in the face of the problems imposed by the Maoists.

Unlike Mustang District, respondents in the hills, particularly the key informants, tended to place their evaluations of the crisis in a wider, community context. Their ability to do so possibly reflects their roles as leaders in communities under influence of formal administrative systems and policies. Additionally, a number of the informants had been—as also mentioned earlier—able to utilize the opportunity structures of the democratic era, with user groups often being used as platforms for gaining influence within local government. Both the suspension of local government and the suppression of politics at the village level other than those promoted by the Maoists are outcomes of the crisis.

A woman farmer, active in the mothers' group of Pipalbot, exemplifies this ability to articulate effects in a broad context:

> "No institution functions freely in our community because of the Maoist insurgency. We only have the health post, the post office and the school left. We are instructed by the Maoists not to work for the community without their approval. Maoist leaders do not like local institutions, NGOs and government agencies. They have closed the suspension bridge project, and they have declared that all women's groups, forestry groups and other activities be registered with them, otherwise they will not allow them to run. But we cannot run meetings, pay visits, or invite outsiders such as NGO representatives. The Maoists have already kidnapped two District Development Committee staff and kept them for a long time in their so-called labour camp."

The same woman farmer goes on to lament that the Village Development Committee is inactive and that representatives of government line agencies are unable to visit the community:

> "We had good relations with the agriculture office, and the livestock office for providing seeds and technical support. Now their staff cannot come because of the Maoist threat."

This lamenting of the loss of contact with government offices is echoed in a number of interviews, and reflects the fact that farmers have increasingly diversified their cropping portfolios away from grains to also include cash crops. Government extension, however rudimentary, plays a pivotal role in sustaining production, particularly with respect to the provision of seeds. Village Development Committees were, as established in the previous section, the key facilitators of contact with line agencies. Their inability to operate is considered particularly problematic, as two male farmers from Amalachaur explain:

> "After the political change [in the early 1990s], we got a right to speak and the decentralization process gave power to the Village Development Committee. The government allocated Nepali Rupees 500,000 per Village Development Committee for development activities. The motor road was constructed. Various organizations were established, and there were women's groups. This contributed to our livelihoods. But the present conflict situation means that Village Development Committee activities are not functioning at the village level. It has become very hard to run activities without elected

representatives. The Village Development Committee Secretary now only carries out legal work and stays in the district headquarters."

A wealthy farmer in Pipalbot, an ex-serviceman, provides a more personal account of events:

> "We are punished from two sides. Since 2002, the government has not been able to implement any programmes in our village. But these days we suffer more at the hands of the Maoists. I have to pay 12 days pension per month to the Maoists. From time to time, I have to donate additional funds. People who come back from abroad on leave have to pay a special tax, ranging from Nepali Rupees 10,000 up to Nepali Rupees 150,000 (US$ 142–2150). We have to provide food and grains for free. Parents send their children to town for schooling because the local boarding schools have been closed. Our agricultural production and sales have gone down because the Maoists call us for frequent meetings and programmes of up to seven days. But if we do not participate, we are called anti-revolutionary and maybe killed or expelled from the village."

The problem of being squeezed between the demands of the Maoists and for being suspected as a Maoist by the army is heard in virtually all communities. As a woman in Pipalbot says on the role of the army:

> "They misbehave with us. They have also arrested the forestry users' committee chairperson and keep him in Baglung jail, charging him with meeting with the Maoists. He met them with a view to having two of his staff released from their custody."

In addition, the more active the Maoists are in an area, the more vulnerable the area is to open fighting. People in a number of communities in Myagdi District had for quite some time when I visited in 2004 only gathered for meetings inside houses, following an incident where an income-generating group, gathered in a courtyard, were shot at from an army helicopter. Babiachaur, a community near Pipalbot, has been particularly affected. A woman farmer from the area, encountered at a government office in the district headquarters, was visible traumatized by a recent shoot-out between the army and the Maoists where she and her family were caught in the crossfire. Unable to talk about the event itself, she simply mentioned that:

> "The problems have seriously affected our lives, because we cannot do what we wish to do. We are unable to sell our products in the market and the Maoists have chased away the agriculture office."

What is it exactly that this farmer and others like her actually wish to do? Most farmers who have experienced progressively rising incomes throughout the past decade obviously wish to continue along what was, until quite recently, an advancing livelihood trajectory, fuelled, for most people, by a combination of cash crop sales and remittances from abroad. Even in the face of the current crisis, the vast majority finds that lives and livelihoods have improved compared to their childhoods and conditions before democracy.

Most of the upwardly mobile have invested heavily in their children's education, as witnessed by the number of private schools that shot up in rural (and indeed urban) areas in the 1990s (and were closed by the Maoists in the 2000s). I mentioned earlier that, like parents everywhere, the dream is for the children to become doctors or engineers, and many parents were, in 2004 and 2005, in the face of the crisis ready to sell land in order to reach this goal. Hardly anyone imagined a future for their children in the village "because of the lack of opportunities" was the common refrain. These ambitions—that may be further illustrated by statements along the lines of "life is easier in the city", "the children do not want to work as we do" and "they have already passed their exams"—obviously go beyond the present insurgency situation. However, the determination behind giving up

rural life is no doubt exacerbated by the present crisis which, as one farmer puts it, “has increased fear, worry, misery and expenditure”.

9.7.4 Concluding Remarks: Institutional Plurality and Democratic Regression as Factors that Influence the Common Property Regime Irrigation

The last sections have revealed that the institutional landscape in the communities is much more diverse than a singular focus on irrigation institutions would warrant. Multiple livelihood interests are accompanied by expanded matrices of institutions. The trends and shocks of the past decade have severely influenced farmers’ abilities to pursue livelihoods and livelihood strategies through institutions. On the one hand, the diversification of livelihoods, both ‘within’ agriculture (with subsequent legal pluralism) and outside of agriculture, has been accompanied by an institutional landscape that expanded within the ‘trend’ of the democratic policies of the politico-economic moment between in the 1990s and early 2000s. On the other hand, that landscape, and the space that it provided for progressive livelihood trajectories, has been curtailed in recent years by the ‘shock’ of armed conflict, particularly by Maoist attempts at controlling institutional life.

How does this relate to irrigation and its institutions? If we accept, in the face of the data on lowered performance, dissatisfaction with institutional arrangements, reduced labour contributions, within-agriculture diversification, etc., that cooperation in irrigation is on the wane, the following question emerges: Does an expanded institutional landscape contribute to the relative institutional erosion of irrigation institutions? Mosse (2006) argues, using examples from south India, that the growth of associational life does tend to erode collective action in irrigation management. In the south Indian case, collective action was never, he argues, a matter of trust and reciprocity; rather it was embedded in social relations of rank, power and control. Therefore, the rise in associationalism, i.e., in caste associations, NGOs, user groups and other more or less horizontal expressions of struggles for autonomy, can be directly linked to the decline of coordinated control of commons resources, mainly because these associations (emerging in much the same way as in the Dhaulagiri Zone as an outcome of democratic policies) undermined the “hierarchical orders of community collective action” (2006:716).

While relations of rank, power and control most certainly matter in the irrigated communities in the Dhaulagiri Zone, I will argue that because of the much more homogenous social context (in terms of caste and access to land, etc.), the rise in associational life should not to any great extent be associated with intra-community struggles for autonomy on the part of specific subordinate groups. For the same reasons, it would be incorrect to dismiss trust and reciprocity as elements in collective action. It seems more plausible to argue, as has been shown empirically in this thesis, that the rise in associational and other forms of institutional and organizational life—in addition to being related to enhanced democratic space and interventions by external agents—mainly reflects a wider diversity of livelihood interests, and that multiple livelihood interests and institutional plurality go hand-in-hand. Collective action in the irrigation commons declines, in relative terms, because of shifts in livelihood interests; thus the extent to which other institutions are strengthened vis-à-vis irrigation institutions reflects changed interests.

It is important to note, however, that amid growing institutional plurality, irrigation institutions are still considered among the most important institutions in livelihood terms. This, no doubt, reflects the continued importance of irrigated agriculture, based on conventional cropping regimes that depend on collective action cooperative elements, as a source of livelihoods, despite both ‘within- and without-agriculture’ diversification. However, the decrease in importance of other cooperative arrangements such as *parma* seems symptomatic of a relative reduction in the importance of the cooperative arrangements that surround irrigated agriculture and conventional cropping regimes.

The aging of irrigation association representatives and the apparent inability to attract younger farmers seems equally symptomatic of the growing institutional problems that have been discussed in earlier chapters, relating to hill farmers' dissatisfaction with water distribution, among other issues.

While collective action and cooperation over water may decline, it seems improbable to assume that cooperation in agriculture and in communal life in general declines; rather, the data examined in the previous sections imply, as already suggested, that cooperation merely takes on other forms. Vegetable farmers, owing to the more individualized water requirements of their crops, may reduce their involvement in collective action in the irrigated commons, but at the same time they form marketing cooperatives and farmers associations that help in linking them to markets and the surrounding government institutions. Likewise, the rise in importance of mothers' groups, although not directly related to productive activities, certainly represents increased levels of engagement in civil society and cooperation with respect to social matters at the community level.

This leaves us with the role of the Maoists and the army. The effects of the attempts on the part of the Maoists to control institutional life may—even if it was not reported to be the case by farmers—affect the operation of these irrigation institutions in both the short and the long term. In the short term because irrigation leaders with non-Maoist political affiliations are likely to keep low profiles, and because Maoist ambitions with respect to co-opting institutional life has the general effect of discouraging public positions. It is my impression that this has already created leadership voids in irrigation committees. In the longer term, in a more indirect sense, it is the continued stifling of institutional and economic life combined with an atmosphere of fear that is of concern. Disruption of the progressing livelihood trajectories of these middle farmers is likely to have a considerable impact with respect to accelerating a tendency to abandon the pursuit of agriculture-based livelihoods and hence the institutions on which they are based.

Chapter 10: Conclusion and Perspectives

10.1 General Conclusion

It was proposed at the beginning of this thesis that the central role provided to community-based resource management institutions in rural development policy and planning requires re-thinking. Such re-thinking is, I suggested, needed because dominant thinking on community-based irrigation institutions as effective ways of organizing agricultural production fails to capture current contexts of rapid and heterogeneously changing roles of agriculture in rural economies and livelihoods. It has been the ambition of this thesis to contribute to the re-thinking by exploring the extent to which common property regimes in irrigation are affected by changes, and by identifying the specific factors that may be affecting the performance of irrigation institutions and the cooperative arrangements that are associated with the management of common property regime-based irrigation.

Underlying this ambition to re-think the situation was growing evidence from Nepal (and indeed elsewhere) that livelihood diversification and changing forms of agriculture have become major elements in rural socio-economic change. I suggested that, if the role of agriculture as a central livelihood has been reduced, then incentives for investing time and labour in collective operation and maintenance of irrigation systems were also likely to be affected, and that this, in turn, was likely to have negative implications on the performance of common property regime-based irrigation. I also pointed out that assumptions about the centrality of agriculture and rural institutions as stable entities and a subsequent tendency to understand irrigation institutions at internal levels restricted the ability of collective action thinking to capture dynamic 'ground-level reality'. Therefore, that 'reality', I proposed, warranted the re-thinking of irrigation institutions and their responses to change in terms of broader empirical and theoretical contexts.

The broad empirical circumstances that I have analysed have involved repeat-study data on irrigation system performance, institutions and socio-economic conditions in nine irrigated communities; and contextualization of irrigated agriculture and its institutions in Nepal in a 'political economic' period, in political economy, and in a regional framework. It has also involved the generation of livelihood and institutional trajectories, based on the notion that livelihoods are formed within the context of various matrices of institutions. The theoretical and analytical approach has been somewhat pragmatic: for performance analysis I applied a framework that is central to collective action thinking, but in overall terms the investigation has been informed by theoretical and analytical elements that moved beyond the relatively narrow rational choice and methodological individualism realms of collective action.

This entailed the integration of concepts associated with property, entitlements and particularly access into a livelihood framework. This not only served to balance the rational choice and agency elements of livelihood approaches with the more structural concerns associated with diversification, but it also provided scope for analysis of the dynamic relationship between livelihood trajectories in relation to irrigation institutions, and the consequences of changing economic, social and political contexts on these institutions and the institutional landscape in general.

So to what extent and how is irrigated agriculture affected by changes in economic, social and political contexts?

It has been established that irrigation system performance, measured in terms of key indicators, has been reduced during the political-economic period under examination, particularly in the hills. The reasons for this include 'within-agriculture diversification' which has emerged as an important determinant of changes in the way irrigation is organized. Cropping patterns characterized by more vegetables, potatoes and to some extent fruits in the dry season have increased at the expense of grain crops such as wheat and maize (in the hills) and buckwheat (in parts of the mountains). Vegetable production is relatively water intensive, and depends on individual, rather than collective water-use regimes associated with staple crops. The collectively managed irrigation systems are unable to meet many farmers' demands for water; this seems to explain why farmers increasingly find water insufficient and even unfairly distributed in the dry season. The fact that staple crops compete with vegetables and other 'cash' crops during the dry season for labour, water and fertilizer explain, to some extent, the falling yield levels of maize and wheat. Within-agriculture diversification and subsequent reduced incentives to 'invest' in the common property regime also contribute to explaining lowered institutional performance, characterized by reduced labour contributions and system maintenance.

However, the impinging role of within-agriculture diversification on the performance of common property regimes in irrigation does not extend to rice production, which continues to display stable levels of productivity. This is largely owing to climatic conditions (e.g., a defined and prolonged monsoon) that render wet rice production the main, if not only, cropping option during the rainy season. Hence, the collective action on which wet rice production depends is likely to continue in a situation of legal pluralism, i.e., in co-existence with different tenure systems and legal orders in the social field of irrigation organization.

'Outside-agriculture diversification', another potentially impinging factor in the management of irrigation as common property regimes, has increased quite dramatically in the irrigated communities. While this form of diversification that is chiefly manifested in male labour migration should be understood in the context of wider structural changes in the economy, its direct effects—contrary to speculation on the subject—on cooperation in, and performance of, the irrigation systems are not great, at least not in the short term. Farmers do not see labour shortages resulting from migration as the problem with respect to the performance of maintenance tasks; this seems to be because (female-headed) households attach priority to such tasks, because more labour is hired, and because, at the level of the community, it would appear that those who migrate would not have participated in agriculture in the first place.

The feminization of agriculture that results from migration, however, may be leading to institutional memory loss in the longer run, as women farmers do not replace ageing men in irrigation committees. However, while migration is likely to lead to the existence of a number of vulnerable *de facto* female-headed households whose status leaves them disadvantaged in respect to access to common property, these households are also likely, in the absence of other income opportunities, to pursue strategies that secure group membership and conditions for irrigated agriculture.

The limited, direct effects of outside-agriculture diversification are related to one of the most important findings of this study, namely that the role of agriculture has not decreased over the years in the vast majority of the irrigated communities. This finding is important because it runs counter to what it is implicitly assumed in the study's problematic, as indeed in much of the literature, i.e., that as rural households construct increasingly diverse portfolios of economic activities, the role of agriculture will decrease. The collective livelihood trajectories reveal that households in this study

have experienced changes in the composition of their income over the years, and that remittances appear to have played a major role in changing this composition. Remittances, however, it should be recalled, are far from important to all households and, overall, the situation is one of augmented incomes with agricultural sources of livelihoods constituting very important elements.

The finding strongly suggests that any reduced incentives for investing time and labour in collective operation and maintenance of irrigation systems are not necessarily the result of a demise of agriculture, let alone migration and remittances. This prompts a focus on the more indirect effects associated with economic change on irrigation management. The finding thus brings us back to how both outside-agriculture diversification and within-agriculture diversification are linked to dynamics of urbanization and urban demand: with respect to urbanization we know from the literature that remittances tend not to be reinvested in agriculture and agriculture-based livelihoods, but rather stimulate urban-based investment and urbanization. The net household emigration figures from the hills suggest that this may also be the case as regards to the studied communities. With respect to urban demand, we know that the vegetable production that takes place in the irrigated communities is in response to growing urban markets where demand is, at least partly, fuelled by remittances.

The finding therefore compels a focus on the effects of economic dynamics of within-agriculture diversification and the legal pluralism that such diversification implies, if a better understanding of the future of community-based irrigation and its role in rural development is to be arrived at. In other words, it appears that the focus could be less singularly on the demise of agriculture and its institutions and more on agriculture's changed dynamics.

The first part of the political-economic moment witnessed a proliferation of economic and social institutions, propelled by external agents and a democratic environment. The second part of the politico-economic moment saw a stifled institutional landscape, as a result of the civil war, particularly the Maoist's attempts at controlling institutional life. Concluding remarks on the effects of these opposing directions on irrigation management are put forward in section 9.7.4.

Suffice it to say here that agriculture's continued importance as a source of livelihoods is reflected in the importance that farmers attach to institutions that are directly associated with agriculture, such as Farmers' Irrigation Associations and vegetable cooperatives, and the wider institutional landscape that these institutions are part of.

10.2 Perspectives: The Emerging Conundrum

In the final section of this thesis, I will draw attention to the conundrum that has gradually emerged from the analysis of the last two chapters. The conundrum is as follows: diversification of livelihoods and integration with market forces in the mountains, so much more pronounced there than in the hill communities, does not appear to have had markedly negative effects on cooperation on the commons. In the mountain communities, shares of non-agricultural incomes have been continuously higher over the years than agricultural incomes and migration levels are generally higher than in the hills. 'Exit options' from agriculture have been available to the mountain farmers for centuries and the mountain communities, by any standard, are much more integrated into the regional and global economy than the hill communities. Yet the indicators on performance and other institutional health in general, from yield levels to labour contributions and to satisfaction with water distribution and other arrangements, do not seem seriously affected.

In the context of this thesis, this conundrum is an outcome of the grounded research methodology that has characterized the investigation. It raises a host of new questions and problematics that go beyond the scope of this thesis. It also confirms earlier assertions regarding the complexity associated with capturing, theoretically and empirically, the directions of rural change in general, and common property regimes in particular. Thus, in my drawing attention to this question, I will not address it in analytical detail, but rather offer pointers and perspectives as regards the direction that additional research on factors that influence common property regime irrigation could take. As the mountain cases suggest, the negative effects of external factors on common property regime irrigation experienced in the hills, whether directly or indirectly, are not universal. Revisiting figure 1 of section 2.6.4, which presents three possible paths in the face of increased exit options, the situation in the mountains resembles path A, where wealth is seen to lead to incentives to contribute, to investments in resources and to resource maintenance.

'Within-agriculture diversification' has emerged as one determinant of reduced performance in the common property regimes of the hills. Hence, less of such 'within-agriculture diversification' in the mountains compared to the hills could, to some extent, be considered one explanatory factor in remote Khinga and Tiri where conventional cereal crops prevail. However, this is not the case in Thini, which is a major supplier of vegetables to the district headquarters. In any case, even if less crop diversification were a major factor, it would not fully explain the differences between mountains and hills, as the more remote hill systems with limited vegetable production also display comparative lower performance trajectories than the mountains.

I suggest that attempts at explaining the different paths that common property regimes may take, as illustrated by the mountains versus hills cases, should firstly focus on the historical and political context of the irrigation institutions. Secondly, it should engage with the debate on democratization and ('good') governance in natural resource management that, as I mention in chapter 2, has emerged in recent years. This debate focuses on the public and private spheres of institutions, and includes equity aspects (Meynen and Doornbus 2004), democratic versus 'privatization' decentralization (Ribot 2005), as well as the effectiveness of single-purpose institutions versus multipurpose institutions (Manor 2004) in addressing livelihoods concerns and wider development issues that require democratic engagement with the wider political system.

It is pointed out in that debate, that single-purpose ('private club') institutions are characterized by 'exclusive' membership (such as irrigated farmers), that committees are not always elected, and that their functions typically relate to singular concerns such as irrigation. Multipurpose councils, or local government, on the other hand, tend to belong within the public sphere, have more democratic structures and to concern themselves with a multitude of interests. The debate questions the wisdom of donor-driven proliferation of single-purpose institutions, such as the irrigation institutions that, as demonstrated in this thesis, have gained central places in rural development policy over the past decade or so.

It would appear that the hill irrigation institutions possess characteristics of single-purpose institutions, while their mountain counterparts possess characteristics of multipurpose institutions. These characteristics appear to have been influenced by events during the political-economic moment. Most markedly in the hills, where privatization and decentralization as two major themes of the1990s helped to transform what had hitherto been informal irrigation institutions (in a government–administrative sense) into formal, legally recognized institutions. This occurred in the context of the Dhaulagiri Irrigation Development Project's irrigation rehabilitation interventions, in

line with collective action design principles and government efforts to promote local natural resource management. The standard formula involved recorded membership, (s)elected committees, bye-laws, and registration with local authorities.

These committees have disappeared in two of the six hill communities that have been investigated. Existing committees show signs of coping problems and members point to the severance of links with local authorities, along with the civil war, as a couple of the reasons. As a sign of both, renewal of registration with Village Development Committees ceased in the early 2000s, as political life became increasingly problematic, not least for elite village politicians, some of whom had used committees as platforms for advancement. Additionally, local authorities had become increasingly unresponsive to local institutions in the face of the growing political crisis that culminated in the suspension of local authorities in 2002. This left the hill communities with an institutional landscape made up of the army, the local magistrate and the Maoists, the occasionally active line agency, and irrigation systems that appear to be managed increasingly informally. Moreover, the irrigation institutions are faced with challenges of increasing livelihood diversification, away from crops that require common property regime irrigation and away from agriculture as the central livelihood in general.

In the mountains, some degree of integration between what have historically been village councils, that dealt with a wide range of natural resource concerns, and government administrative systems was a feature of both the (pre-1990) Panchayat structures (when *mukhya* where appointed by the central authority) and the post-1990 democratic decentralization structures. Farmers generally recollect the interfaces with both pre-democratic and democratic structures as negative (except for the annual grant allocation) because nepotism and co-option/corruption of traditional leadership was seen to divert attention away from local concerns. Efforts at institutional crafting in the 1990s by the Dhaulagiri Irrigation Development Project were based on a standard formula, similarly applied as in the hills, that completely ignored the existence of traditional governance structures. Hardly any trace of these devised institutional structures remains today; the committees that were set up were abolished once construction had been completed. However, as mentioned earlier, the democratic period did leave its mark; unlike the Panchayat times, *mukhya* are now elected. Farmers generally perceive the current village councils, based on accountability and self-reliance, as more effective than those of the past.

This movement in opposing directions of hill and mountain institutional trajectories is interesting. It is particularly interesting to note that the multipurpose institutions of the mountains appear better suited to dealing with broad livelihood portfolios than their single-purpose counterpart institutions in the hills. Could this be because multipurpose institutions are better able to accommodate multiple livelihood interests that require expanded institutional matrices than are single-purpose institutions? Does the wider remit of multipurpose institutions provide more room for crafting and playing out diversified livelihood interests within natural resources and beyond? Are single-purpose institutions, equipped as they are to handle singular interests only, more vulnerable in a rapidly changing livelihood context? It appears that the institutional vulnerability of the hill institutions extends to the political context. While the partly ‘crafted’, single-purpose, user-group institutions of the hills did enjoy some success within the democratically decentralized landscape of the 1990s and early 2000s, the severing of links to that landscape also exposed dependency on a wider portfolio of institutional concerns beyond the capacity of the single-purpose institution. During the same period,

the mountain institutions re-invented themselves and became not only more effective than before but also more democratic.

Obviously, conditions for these institutions have been very different, particularly with respect to the very limited effects of the insurgency on institutional life in the mountains. Likewise, it may not be sensible to compare the deeply entrenched village councils of the mountains that have evolved over centuries under specific social, cultural and ecological circumstances with the irrigation institutions of the hills that have evolved under totally different circumstances. However, notwithstanding these factors, the cases illustrate the relevance of questioning rural development strategies that promote the exclusive logic of single-purpose institutions, as opposed to the more inclusive logic of multipurpose institutions and democratic decentralization in general. In the present case of the mountains, such inclusion certainly appears to be a supportive factor for continued community-based collective action under changing social, political and economic conditions.

Bibliography

Aasted J, 2004, Vi Bliver!. *Kontakt*, 57 (1), p 19. Mellemfolkeligt Samvirke

Asian Development Bank, 2002, *Nepal Agricultural Sector Performance Review*, Asian Development Bank.

Asian Development Bank, 2004, *Country Strategy and Programme 2005–2009*, Asian Development Bank.

Adhikari, J., Seddon, D., 2002, *Pokhara—Biography of a Town*, Mandala Book Point, Kathmandu.

Agergaard, J., 1998, *Unsettled Settlement: A Study of the Process of Migration from Lamjung District and Settlement in Chitwan District of Nepal*, PhD Thesis, Faculty of Science, University of Copenhagen.

Agrawal, A., 2001, Common property institutions and sustainable governance of resources, *World Development*, 29(10), 1649–72.

Agrawal, A., 2003, Common resources and institutional sustainability, in Ostrom, E., Dietz, T., Dolsak, N., Stern, P.C., Stonich, S., Weber, E.U., eds, *The Drama of the Commons*, National Academy Press.

Agrawal, A., Gibson, C., 1999, Enchantment and disenchantment: the role of community in natural resource conservation, *World Development*, 27, 629–649.

Angood, C., Chancellor, F., Hasnip, N., Morrison, J., Smith, L., 2002, *Contribution of Irrigation to Sustaining Rural Livelihoods: Nepal Case Study*, HR Wallingford, Department for International Development (DFID), Imperial College London.

Ashley, C., Maxwell, S., 2001, Rethinking rural development, *Development Policy Review*, 19(4), 395–425.

Aubriot ,O., 2000, Irrigation as a mirror of kinship: the example of Aslewachaur, in Ramirez, P., ed., *Resunga—the Mountain of the Horned Sage*, Biblioteca Himalayica, pp. 265–288.

Bagchi, D.K, Blaikie, P., Cameron, J., Chattopadhyay, M., Gyawali, N., Seddon, D., 1998, Conceptual and methodological challenges in the study of livelihood trajectories: case studies in eastern India and western Nepal, *Journal of International Development*, 10, 453–468.

Baland, J.M., Platteau, J.P., 1996, *Halting Degradation of Natural Resources*, Food and Agriculture Organisation, Rome.

Balogun, P.K., 1989, A *Review of Published Agricultural Statistics in the Western Development Region of Nepal*. Lumle Agricultural Centre, Kaski District, Nepal.

Bardhan, P., 1995, Rational fools and co-operation in a poor hydraulic economy, in Basu, K. *et al.*, eds, *Choice, Welfare and Development*, Oxford Clarendon Press.

Bardhan, P, 2000, Irrigation and Cooperation; an Empirical Analysis of 48 Irrigation Communities in South India, *Economic Development and Cultural Change*, Vol 48, 845-865

Bardhan, P., Dayton-Johnson, J., 2002, Unequal irrigators: heterogeneity and commons management in large-scale, multivariate research, in Ostrom, E., Dietz, T., Dolsak, N., Stern, P.C., Stonich, S., Weber, E.U., eds, *The Drama of the Commons*, National Academy Press.

Bardhan, P., Ray, I., 2006, Methodological approaches to the question of the commons, *Economic Development and Cultural Change*, 54(3), 655–676.

Barker, R., Molle, F., 2002, Perspectives on Asian Irrigation, paper presented at the *Conference on Asian Irrigation in Transition*, International Water Management Institute.

Beck, T., Fajber, L., 2006, Exclusive, moi? Natural resource management, poverty, inequality and gender in South Asia, in Tyler, R., ed., *Communities, Livelihoods and Natural Resources—Action Research and Policy in* Asia, International Development Research Centre (IDRC).

Benjamin, P., Shivakoti, G., 2002, Farming in the Himalayas and a history of irrigation in Nepal, in Shivakoti, G., Ostrom, E., eds, *Improving Irrigation Governance and Management in Nepal*, ICS Press.

Benjamin, P., 1992, Farming in the Himalayas: living in a perilous environment, in Benjamin, P., Ostrom, E., Shivakoti, G., eds, *Institutions, Incentives and Irrigation in Nepal*, Workshop in Political Theory and Policy Analysis, vol. 1, Nepal Irrigation Sector Project (NISP).

Berg, T.R., 1991, *Rural Small-scale Industries and Non-Governmental Institutions in the Philippines*, International Development Studies, Roskilde University Centre. Unpublished Master Thesis.

Berg, T.R., 1994, *Poverty and Irrigation: Introductory Notes for the 1994 Planning Workshop*, Dhaulagiri Irrigation Development Project. Unpublished.

Berg, T.R., 1995a, *Monitoring and Evaluation of Community-Based Irrigation in the Hills of Nepal*, Nepal Special Public Works Programme Manual No. 5, International Labour Organisation, Geneva.

Berg, T.R., 1995b, *Draft Working Paper on NGO–GO Relationships in the Dhaulagiri Irrigation Development Project*, Dhaulagiri Irrigation Development Project, International Labour Organisation, Unpublished.

Berg, T.R., 2003, *Local Water Resources Management in Nepal: Socio-economic Change and Institutional Responses*, research proposal, unpublished.

Berry, S., 1989, Access, control and use of resources in African agriculture: an introduction, *Journal of the International Africa Institute*, 59(1), 1–5.

Berry, S., 1993, *No Condition is Permanent: The Social Dynamics of Agrarian Change in Sub-Saharan Africa*, University of Wisconsin Press, Madison.

Berry, S., 1994, Resource access and management as historical processes—conceptual and methodological issues, in Lund, C., Marcussen, H.S., eds, *Access, Control and Management of Natural Resources in Sub-Saharan Africa-Methodological Considerations*, Occasional Paper No. 13, International Development Studies, Roskilde University Centre.

Berthelsen, S., 1997, *Traditional Irrigation and Technological Change: Operation and Management of Farmer-Managed Irrigation Systems in Northern Tanzania*, PhD Thesis, Department of Development and Planning, Aalborg University.

Bhattachan, K.R., 2001, *NGOs, Civil Society and Government in Nepal*, Central Department of Sociology, Tribhuvan University/Friedrich Ebert Stiftung.

Bhattachan, K.R., 2002, *Traditional Local Governance in Nepal*, paper presented in a national seminar on Strengthening Decentralization and Good Governance in Nepal organized by the Political Science Association of Nepal (POLSAN) and Friedrich-Ebert-Stiftung (FES), Kathmandu, 21 April 2002. www.nepaldemocracy.org/institutions/traditional_local-governance.htm

Bingen, J., 2000, *Institutions and Sustainable Livelihoods*, Michigan State University, available on www.livelihoods.org.

Bishop, B.C., 1990, *Karnali Under Stress: Livelihood Strategies and Seasonal Rhythms in a Changing Nepal Himalaya*, University of Chicago.

Bista, D.B., 1991, *Fatalism and Development, Nepal's Struggle for Modernization*, Orient Longman, Calcutta.

Bista, D.B., 2000, *People of Nepal*, Ratna Pustak Bhandar, Kathmandu.

Blaikie, P., 1985, *The Political Economy of Soil Erosion in Developing Countries*, Longman.

Blaikie, P., Cameron, J., Seddon, D., 1979, *The Struggle for Basic Needs in Nepal*, Adroit Publishers.

Blaikie, P., Cameron, J., Seddon, D., 1980, *Nepal in Crisis: Growth and Stagnation at the Periphery*, Adroit Publishers.

Blaikie, P., Cameron, J., Seddon, D., 2001, *Nepal in Crisis: Growth and Stagnation at the Periphery*, (revised and enlarged edition) Adroit Publishers.

Blaikie, P., Cameron, J., Seddon, D., 2000, *The Struggle for Basic Needs in Nepal*, revised edition, Adroit Publishers.

Blaikie, P., Cameron, J., Seddon, D., 2002, Understanding 20 years of change in west-central Nepal: continuity and change in lives and ideas, *World Development*, 30(7), 1255–1270.

Blaikie, P., Cameron, J., Seddon, D., 2005, *Nepal in Crisis: Growth and Stagnation at the Periphery*, revised edition, Adroit Publishers.

Blaikie, P., Coppard, D., 1998, Environmental change and livelihood diversification in Nepal: where is the problem? *Himalayan Research Bulletin*, 2, 28–39.

Boserup, E., 1965, *The Conditions of Agricultural Growth: The Economics of Agrarian Change under Population Pressure*, Aldine, Chicago.

Brabben, T., Angood, C., Skutch, J., Smith, L., 2004, *Irrigation Can Sustain Rural Livelihoods: Evidence from Nepal and Bangladesh*, 2 volumes, HR Wallingford, Department for International Development (DFID), Imperial College London.

Bray, F., 1991, Rice economies: the rise and fall of China's communes in an east Asian perspective, in Breman, J., Mundle, S., eds, *Rural Transformation in Asia*, Oxford University Press, pp. 193–217.

Bromley, D.W., 1991, *Environment and Economy: Property Rights and Public Policy*, Blackwell Synergy.

Bromley, D.W., ed., 1992a, *Making the Commons Work*, ICSG Press.

Bromley, D.W., 1992b, The commons, common property, and environmental policy, *Environmental and Resource Economics*, 2, 1–17.

Bromley, D.W., 2006, *Sufficient Reason*, Princeton University Press.

Bryceson, D., 2001, Peasant theories and smallholder policies: past and present, in Bryceson, D., Kay, C., Mooij, J., eds, *Disappearing Peasantries? Rural Labour in Africa, Asia and Latin America*, Intermediate Technology Development Group (ITDG).

Cameron, J., 1998, The agricultural perspective plan: the need for debate, *Himalayan Research Bulletin*, 2, 11–14.

Campbell, B., 2000, Locating population and resources, *European Bulletin of Himalayan Research*, 20(1), 110–112.

Campbell, J.L., Pedersen, O.K., 2001, *The Rise of Neoliberalism and Institutional Analysis*, Princeton University Press.

Carney, D., 1998, Implementing the sustainable livelihood approach, in Carney, D., ed., *Sustainable Rural Livelihoods: What Contribution can we Make*, Department for International Development, London.

Caterino, B., **Schram, S.F.**, 2006. Introduction: Reframing the Debate, in Schram, SF, Caterino, B, (eds), *Making Social Science Matter: Debating Knowledge, Research and Method*. New York University Press.

Central Bureau of Statistics, 1992, *Population Census 1992*, Central Bureau of Statistics.

Central Bureau of Statistics, 1997, *Nepal Living Standards Survey Report 1996*, Central Bureau of Statistics.

Central Bureau of Statistics, 2004, *Nepal Living Standards Survey 2003/04*, Central Bureau of Statistics.

Central Bureau of Statistics, 1998/99, *Nepal Labour Force Survey*, Central Bureau of Statistics.

Central Bureau of Statistics, 2003: *Population Census 2001*, Central Bureau of Statistics

Cederroth S., 1994, *Managing the irrigation : Tharu farmers and the image of the common good*. Copenhagen, Nordic Institute of Asian Studies, 1994. 41 p. (NIAS report; no. 23)

Chambers, R., 1983, *Rural Development: Putting the Last First*, Longman.

Coleman, J.S., 1990, *Foundations of Social Theory*. Harvard University Press, Cambridge.

Collinson, S., 2003, Introduction, in Collinson, S., ed., *Power Livelihoods and Conflict: Case Studies in Political Economy Analysis for Humanitarian Action*, Report No. 13, Humanitarian Policy Group.

Cousins, B., 1993, *A Political Economy Model of Common Property Regimes and the Case of Grazing Management in* Zimbabwe, Pastoral Network Paper No. 34b, Overseas Development Institute (ODI), available at www.odi.org.uk/pdn/papers/paper34b.html.

David R., 1995, *Changing Places: Women, Resource Management and Migration in the Sahel.* London, SOS Sahel

Davis, J.R., 2004, *The Rural Non-Farm Economy, Livelihoods and their Diversification: Issues and Options*, Report No. 2573, Natural Resources Institute.

de Haan, A., 1999, Livelihoods and Poverty: The Role of Migration—A Critical Review of the Migration Literature, *Journal of Development Studies*, 36(2), 1–47.

de Haan, L., Zoomers, A., 2005, Exploring the frontiers of livelihoods research, *Development and Change*, 36(1), 27–47.

de Sales, A., 2002, The Kham Magar country: between ethnic claims and Maoism, in Gellner, D., ed., *Resistance and the State: Nepalese Experiences*, Social Science Press, New Delhi.

DASU, 2002, *Status Note on Decentralisation Policy*, Decentralisation Advisory Support Unit (Danida), unpublished.

Dey, I., 1999, *Grounding Grounded Theory: Guidelines for Qualitative Inquiry*, Academic Press.

Dhaulagiri Irrigation Development Project, 1992, 1993, 1994, 1995, *Key-effects Monitoring Survey Reports*, Dhaulagiri Irrigation Development Project, International Labour Organisation, Kathmandu, 4 volumes, unpublished.

Dhaulagiri Irrigation Development Project, 1992, 1993, 1994, 1995, *Executive Summaries of Key-effect Monitoring Surveys*, Dhaulagiri Irrigation Development Project, International Labour Organisation, Kathmandu, 4 volumes, unpublished.

Dhaulagiri Irrigation Development Project, 1996, *Final Project Evaluation*, Dhaulagiri Irrigation Development Project, International Labour Organisation, Kathmandu, unpublished.

Dhaulagiri Irrigation Development Project (no date), *Model Bye-laws for Farmers Irrigation Association*, Dhaulagiri Irrigation Development Project, International Labour Organisation, Kathmandu, unpublished.

Dietz, T., Dolsak, N., Ostrom, E., Stern P.C., 2002, Introduction, in Ostrom, E., Dietz, T., Dolsak, N., Stern, P.C., Stonich, S., Weber, E.U., eds, *The Drama of the Commons*, National Academy Press.

Durga K.C., Pradhan U., 1992, "Indigenous Knowledge and Organisational Processes: Experiences and Lessons from Local Nepali Irrigation Systems", in Gill J, Thapa GB, *Indigenous Management of Natural Resources in Nepal*, HMG Ministry of Agriculture/Winrock International.

Eckholm, E., 1976, Losing ground, *Environment*, 18(3), 6–11.

Economist Intelligence Unit, 2006, *Country Report Nepal*, Economist Intelligence Unit.

Ellis, F., 2000, *Rural Livelihoods and Diversity in Developing Countries*, Oxford University Press.

Ellis, F., Biggs, S., 2001, Evolving themes in rural development 1950s–2000s, *Development Policy Review*, 19(4), 437–448.

Elstner, P., Neef, A., 2004, Dynamics of community-based water management in the highlands of northern Thailand, paper prepared for the *International Conference on Security and Sustainability in Water Resources*, Kathmandu, Nepal, September 2004.

ESAP, 2002, *Baseline Survey of Baglung District*, Energy Sector Assistance Programme, Micro-hydro Component, DANIDA, unpublished.

ESAP/East Consult, 2000, *Micro-hydro Area Selection Study*, Energy Sector Assistance Programme, Micro-hydro Component, DANIDA, unpublished.

Feeny, D., Berkes, F., McCay, B.J., Acheson, J.M., 1990, The tragedy of the commons: twenty-two years later, *Human Ecology*, 18(1).

Fisher, W.F., 2001, *Fluid Boundaries: Forming and Transforming Identity in Nepal*, Columbia University Press.

Fisher, W.F., 2002, The politics of difference and the reach of modernity: reflections on the state and civil society in central Nepal, in Gellner, D., ed., *Resistance and the State: Nepalese Experiences*, Social Science Press, New Delhi.

Food and Agriculture Organisation (FAO), 2003, *Agricultural Policy and Strategies for Poverty Alleviation and Food Security*, Food and Agriculture Organization.

Flyvbjerg, B., 2001, *Making Social Science Matter: Why Social Inquiry Fails and How it Can Succeed Again*, Cambridge University Press.

Franks, D.R., 2004. Surface Water Management and Poverty Alleviation in the Indian Subcontinent, pp 179-208 in Pradhan P, Gautam U, (eds) *Farmer Managed Irrigation Systems and Governance Alternatives: Proceedings of the Third International Seminar, 09-10 September, Kathmandu.*. Farmer Managed Irrigation Systems Promotion Trust.

Furer-Haimendorf, C.V., 1975, *Himalayan Traders—Life in Highland Nepal*, John Murray, London.

Fuys, A., Mwangi, E., Dohrn, S., 2006, *Securing Common Property Regimes in a 'Modernizing' World: Synthesis of 41 Case Studies on Common Property Regimes from Asia, Africa, Europe and Latin America*, CGIAR Systemwide Program on Collective Action and Property Rights (Capri), Washington DC.

Galtung, J., 1969, Violence, peace and peace research, *Journal of Peace Research*, 3, 167–192.

Geertz C., 1963, *Agricultural Involution: The Process of Agricultural Change in Indonesia.* University of California Press

Geertz C., 1980. Organisation of the Balinese Subak. In Coward W.E Jr. (ed): *Irrigation and Agricultural Development in Asia. Perspectives form the Social Sciences.* Cornell University Press pp 70-80.

Giddens, A., 1984, *The Constitution of Society*, Polity Press, Cambridge.

Gill, G., 1993, *O.K., The Data's Lousy, But It's All We've Got (Being a Critique of Conventional Methods)*, International Institute for Environment and Development (IIED).

Gore, C., Figuereido, J.B., Rodgers, G., 1995, Markets, citizenship and social exclusion, in Rodgers, G., Gore, C., Figuereido, J.B., eds, *Social Exclusion: Rhetoric, Reality Responses*, Institute for International Studies, Geneva.

Gurung, H., 1989, *Nepal: Dimensions of Development*, Awarta Press, Kathmandu.

Gurung, H., 2005, *Nepal—Regional Strategy for Development*, Asian Development Bank Working Paper Series No. 3, Nepal Resident Mission.

Gyawali, D., 2001, *Water in Nepal*, Himal Books, Kathmandu.

Gyawali, D., Dixit, A., 1999, Fractured institutions and physical interdependence: challenges to local water management in the Tinau basin, Nepal, in Moench, M., Caspari, E., Dixit, A., eds, *Rethinking the Mosaic: Investigations into Local Water Management*, Nepal Water Conservation Foundation, Institute for Social and Environmental Transition, pp. 57–123.

Haffner, W., Benachib, H., Brock, C., Gerique-Zipfel, A., Merl, K., Morkel, S., Park, M., Phole, P., Titz, A., Werning, K., 2003, Sustainable development in southern Mustang District, in Domroes, M., ed., *Translating Development—The Case of Nepal*, Social Science Press, New Delhi, pp. 282–312.

Hagen, T., 1972, *Nepal: The Kingdom in the Himalayas*, Oxford IBH Publishing Co., New Delhi.

Hall, A.W., 2005, Water and Governance. In Ayre, G., and Calway, R., eds, *Governance for Sustainable Development: A Foundation for the Future.* London: Earthscan, pp. 111-129.

Hardin, G., 1968, The tragedy of the commons, *Science*, 162, 1243–1248.

Harriss, J., de Renzio, P., 1997, Policy arena—'missing link' or analytically missing? The concept of social capital, *World Development*, 9(7), 919–937.

Heyd, H., Neef, A., 2004, *Participation of Local People in Water Management: Evidence from the Mae Sa Watershed, Northern Thailand*. EPTD Discussion Paper no 128, International Food Policy Research Institute.

Himal South Asian, Jan/Feb 1997, Special feature on migration.

Himal South Asian, Nov 2001.

Himal South Asian, Mar 2003, Special feature on HIV/AIDS.

International Centre for Integrated Mountain Development, Central Bureau of Statistics, SNV, 2001, *Nepal Census Indicators and Trends*, International Centre for Integrated Mountain Development, Kathmandu.

International Centre for Integrated Mountain Development, Central Bureau of Statistics, SNV, 2003, *Districts of Nepal—Indicators of Development*, International Centre for Integrated Mountain Development, Kathmandu.

International Labour Organisation, 1995, *A Manual for the Formation and Management of Farmers' Irrigation Associations*, Nepal SPWP Manual No. 3, International Labour Organisation.

International Labour Organisation/UNICEF/World Bank, 2003: *Understanding Children's Work – an Analysis of the Determinants of Child Labour in Nepal, the Policy Environment and Response.* Kathmandu.

Ives, J,D., Messerli, B, 1989. *The Himalayan Dilemma: Reconciling Development and Conservation.* London. Routledge.

Jest, C., Galode, J., Lecomte-Tilouine, M., Ramirez, P., 2000, The populations of Gulmi and Argakhanchi, in Ramirez, P., ed., *Resunga—the Mountain of the Horned Sage*, Biblioteca Himalayica, pp. 51–74.

Johnson, C., 2004. Uncommon ground: the 'poverty of history' in common property discourse, *Development and Change*, 35(3), 407–433.

Johnston, B.F., Kilby, P., 1975. *Agriculture and Structural Transformation: Economic Strategies in Late Developing Countries.* Oxford University Press

Johnston, B.F., Kilby, P., 1982: Unimodal and Bimodal Strategies of Agrarian Change, in Harriss J., ed, *Rural Development: Theories of Peasant Economy and Agrarian Change.* Hutchinson

KC, D., Pradhan, U., 1992, Indigenous knowledge and organisational processes: Experiences and lessons from local Nepali irrigation systems, in Gill, J., Thapa, G.B., eds, *Indigenous Management of Natural Resources in Nepal*, Ministry of Agriculture/Winrock International, pp. 227–249.

Khadka, B.B., 2002, *Coarse Grains and Pulses in Nepal: Role and Prospects*, Centre for Research and Development of Coarse Grains, Roots and Tubers, United Nations Economic and Social Commission for Asia and the Pacific.

Kollmair, M., Manandhar, S., Subedi, B., Thieme, S., 2006, New figures for old stories: migration and remittances in Nepal, *Migration Letters*, 3(2).

Korten, D., 1980, *Community Organization and Rural Development: A Learning Process Approach*, The Ford Foundation, Asian Institute of Management, Manila, The Philippines.

Kuznets, S., 1966, *Modern Economic Growth*, Yale University Press.

Kvale, S., 2004, *Interview: En Introduktion til det Kvalitative Forskningsinterview*. Hans Reitzels Forlag.

Lal, C.K., 2004, Self-immolation, *Nepali Times*, No. 213.

Lam W.F., 1998, *Governing Irrigation Systems in Nepal: Institutions, Infrastructure and Collective Action.* Oakland, CA: ICS Press.

Lansing J.S., 1980, Water Temples and the Management of Irrigation. *American Anthropologist* 89 (2) pp. 326-341

Lapple, D., 1973, Staten og de Almene Produktionsbetingelser. *Kurasje*, København.

Leach, M., Mearns, R., Scoones, I., 1997, *The Institutional Dynamics of Community-based Natural Resource Management: An Entitlement Approach*, International Association for the Study of the Commons, www.indiana.edu/~iascp/.

Leach, M., Mearns, R., Scoones, I., 1999, Community-based sustainable development: consensus or conflict, *IDS Bulletin*, 28(4), 1–3.

Levitt, P., 1996, *Social Remittances: a Conceptual Tool for Understanding Migration and Development*, Working Paper Series No. 96-04, Harvard University.

Department for International Development, Livelihood and Forestry Programme (LFP-DFID), 2003, *Hill Livelihoods Baseline Study*, Department for International Development.

Lillesø, J.-P.B., Shrestha, T.B., Dhakal, L.P., Nayaju, R.P., Shrestha, R., 2005, *The Map of Potential Vegetation of Nepal—a Forestry/Agro-ecological/Biodiversity Classification System*, Forest and Landscape, Development and Environment Series 2-2005, Copenhagen University.

Long, N., Roberts, B., 1984, *Miners, Peasants and Entrepreneurs: Regional Development in the Highlands of Peru*, Cambridge Latin American Studies no. 48, Cambridge University Press.

Long, N., 2001, *Development Sociology: Actor Perspectives*, Routledge.

Luintel, K.B., 2000, Micro truth—but what about the macro? *European Bulletin of Himalayan Research*, 20(1), 112–113.

Lund, C., 1994, Tinkering methodology, in Lund, C., Marcussen, H.S., eds, *Access, Control and Management of Natural Resources in Sub-Saharan Africa—Methodological Considerations*, Occasional Paper No. 13, International Development Studies, Roskilde University Centre.

Lund, C., Sikor, T., 2006, *Property and Access to Resources: Fuzzy Concepts?, Fuzzy Realities?*, paper presented at Property Access Seminar, International Development Studies, Roskilde University, Denmark, 22–24 September 2006, unpublished.

Macfarlane, A., 1976, Resources and Population: A Study of the Gurungs of Nepal, Cambridge University Press.

Macfarlane, A., 2002, Sliding down hill: some reflections on thirty years of change in a Himalayan village, *European Bulletin for Himalayan Research*, July, 105–110.

Manor, J., 2004, User committees: a potentially damaging second wave of decentralisation? *European Journal of Development Research*, 16(1), 192–213.

Martens, B., 1989, *Economic Development that Lasts. Labour—Intensive Irrigation Projects in Nepal and the United Republic of Tanzania*, International Labour Office, Geneva.

Martin, E.D., Yoder, R., 1988, *Organizational Structures for Resource Mobilisation in Hill Irrigation Systems*, International Irrigation Management Institute (IIMI), Colombo.

Martinussen, J., 1990, General introduction to the theme in the context of development studies, in Martinussen, J., ed., *Selected Approaches to the Study of Institutions in Development*, Occasional Paper No.1, International Development Studies, Roskilde University Centre.

Martinussen, J., 1997, *Society, State and Market—A Guide to Competing Theories of Development*, Zed Books.

Matthiessen, P., 1978, *The Snow Leopard*, Viking, New York.

Maxwell, S., Heber-Percy, R., 2001, New trends in development thinking and implications for agriculture, in Stanoulis, K., ed., *Food, Agriculture and Rural Development: Current and Emerging Issues for Economic Analysis and Research*, Food and Agriculture Organisation.

Meinzen-Dick, R.S., Brown, L.R., Feldstein, H.S., Quisumbing, A.R., 1997, *Gender, Property Rights and Natural Resources*, International Food Policy Research Institute.

Meinzen-Dick, R., Bruns, B.R., 1997, *Gender, Property Rights and Natural Resources*, International Food Policy Research Institute.

Mellor, J., 1976, *The New Economics of Growth: A Strategy for India and the Developing World*, Cornell University Press.

Messerschmidt, D., 1995, *Development Studies—Collection of Essays*, Bibliotheca Himalayica.

Meynen, W., Doornbos, M., 2004, Decentralising natural resource management: a recipe for sustainability and equity? *European Journal of Development Research*, 16(1), 235–254.

Mihaly E.B., 1965, *Foreign Aid and Politics in Nepal: A Case Study.* Oxford University Press.

Mikkelsen, B., 2005, *Methods for Development Work and Research: A New Guide for Practitioners*, Sage Publications.

Millard, C., 2002, Perceptions of democracy and dissent in the valley of Dhorpatan, in Gellner, D., ed., *Resistance and the State: Nepalese Experiences*, Social Science Press, New Delhi.

Miller C.J., 2000, Decision-*Making in Village Nepal.* Kathmandu, Sahayogi Press.

Ministry of Finance, 2004, *Economic Survey Fiscal Year 2003/04*, Government of Nepal.

Ministry of Water Resources, 1992, *Irrigation Policy 2049*, Government of Nepal.

Moench, M., 2002, *Local Water Management in a Changing World—Making Theory Fit Practice*, report prepared for International Development Research Centre (IDRC), unpublished.

Ministry of Population and Environment (MOPE), n.d., *Population Statistics*, www.mope.gov.np.

Mosse, D., 1997, The symbolic making of a common property resource: history, ecology and locality in a tank-irrigated landscape in south India, *Development and Change*, 28(3), 467–504.

Mosse, D., 2006, Collective action, common property, and social capital in south India: an anthropological commentary, *Economic Development and Cultural Change*, 54(3), 695–724.

Murray, C., 2002, Livelihoods research: transcending boundaries of time and space, *Journal of Southern African Studies*, 28(3), 489–509

Nabli, M., Nugent, J.B, 1989, The New Institutional Economics and its Applicability to Development. *World Development*, Vol 17 (9) 1333-1347.

National Planning Commission (NPC), 1992, *Eighth Plan 1992–1997*, National Kathmandu.

National Planning Commission, 1994, *Irrigation Development: Where is the Breakthrough*? National Planning Commission, Kathmandu.

National Planning Commission/APROSC, 1995, *Agricultural Perspective Plan*.

Nepal Gazette, 1993, 1 March, Ch. 42, No. 46.

Nepali Times, Vol. 55, 2001.

Nepali Times, Vol. 103, 2002.

Nepali Times, Vol. 114, 2002.

Nepali Times, Vol. 161, 2003.

Nepali Times, Vol. 224, 2004.

Nicol, A., 2002, *Adopting a Sustainable Livelihoods Approach to Water Projects: Implications for Policy and Practice*, Working Paper No. 133, Overseas Development Institute.

North D.C., 1989, Institutions and Economic Growth: An Historical Introduction. *World Development* 17 (9):1319-1332

North, D.C., 1990, *Institutions, Institutional Change and Economic Performance*, Cambridge University Press.

Oakerson, R.J., 1992, Analyzing the commons: a framework, in Bromley, D., ed., *Making the Commons Work: Theory, Practice and Policy*, ICS Press, San Francisco.

Olson, M., 1965, *The Logic of Collective Action: Public Goods and the Theory of Groups*, Harvard University Press.

Ostrom, E., 1990, *Governing the Commons: The Evolution of Institutions for Collective Action*, Cambridge University Press.

Ostrom, E., 1992, *Crafting Institutions for Self-Governing Irrigation Systems*, Institute for Contemporary Studies, San Francisco.

Ostrom, E., 2002, The Challenge of Underperformance. In Shivakoti, G., Ostrom, E**.**, eds, 2002, *Improving Irrigation Governance and Management in Nepal*, ICS Press.

Ostrom, E., Benjamin, P., Shivakoti, G., 1992, *Institutions, Incentives and Irrigation in Nepal*, NISP/Workshop in Political Theory and Policy Analysis, Indiana University.

Ostrom, E., Schroeder, L., Wynne, S., 1993, *Institutional Incentives and Sustainable Development—Infrastructure Policies in Perspective*, Westview Press.

Paerregaard, K., 2002, The vicissitudes of politics and the resilience of the peasantry: the contestation and reconfiguration of political space in the Peruvian Andes, in Webster, N., Engberg-Pedersen, L., eds, *In the Name of the Poor—Contesting Political Space for Poverty Reduction*, Zed Books.

Pandey, B., 1996, Local benefits from hydro development, *Studies in Nepali History and Society*, 1(2), 313–345.

Parajuli, U.N., Sharma, C., 2000, Study of a local water harvesting system in a micro-watershed in the Upper Mustang region of Nepal, in Banskota, M., Chalise, S., eds, *Waters of Life—Perspectives of Water Harvesting in the Hindu Kush–Himalayas*, ICIMOD, Kathmandu, pp. 261–306.

Parajuli U., Sharma, C., Panta, D., Gautam, S.R., Yadav, R.P., 2001: *Hill Irrigation: The Question of Rehabilitation.* Winrock International Research Report Series No. 46.

Pigg, S.L., 1992, Inventing social categories through place: social representations and development in Nepal, *Comparative Studies in Society and History*, 34(4), 491–513.

Pinstrup Andersen, P., Pandya-Lorch, R., Rosegrant, M.W., 1999, *Food Prospects: Critical Issues for the Early Twenty-First Century*, International Food Policy Research Institute.

Popper, K, 1957, *The Poverty of Historicism.* London, Routledge

Pradhan, P., 1989, *Patterns of Irrigation Organisation in Nepal*, International Irrigation Management Institute (IIMI) Nepal.

Pradhan R., Pradhan U., 2000, Negotiating Access and Rights: Disputes Over Rights to and Irrigation Water Source in Nepal. In *Negotiating Water Rights*, Bruns B.R, Meinzen-Dick R.S (eds). International Food Policy Research Institute.

Pradhan, P., 2003, Farmer-managed irrigation systems (FMIS): a mode of water management, *Water Nepal*, 9/10(1–2), July 2001–July 2003.

Pradhan, P., Yoder, R., 1990, *Irrigation Development: The Management and Use of Irrigation in the Mountains of Nepal*, ICIMOD MFS Series No. 16, International Centre for Integrated Mountain Development.

Pradhan, P., Yoder, R., Pradhan, U., 1987, *Guidelines for Rapid Appraisal of Irrigation Systems: Experiences from Nepal*, International Irrigation Management Institute (IIMI) Nepal.

Pradhan, U., 1993, Farmers' water rights and their relation to data collection and management. Paper prepared for the workshop entitled 'From Farmer's Fields to Data Fields and Back – A Synthesis of Participatory Rural Appraisal for Resource Information Systems. Rampur, March 21-26.

Putnam, R., 1993, *Making Democracy Work: Civic Traditions in Modern Italy*, Princeton University Press.

Ramirez, P., ed., 2000, *Resunga—the Mountain of the Horned Sage*, Biblioteca Himalaiyca.

Ramirez, P., 2000a, Introduction, in Ramirez, P., ed., *Resunga—the Mountain of the Horned Sage*, Biblioteca Himalayica, pp. iii–x.

Ramirez, P., 2000b, From the principality to the nation-state, in Ramirez, P., ed., *Resunga—the Mountain of the Horned Sage*, Biblioteca Himalayica, pp. 103–142.

Rana, J., 1992, Organisation and decision-making processes in a large farmer-managed irrigation system: the Chattis Mauja irrigation system in Nepal, in Gill, J., Thapa, G.B., eds, *Indigenous Management of Natural Resources in Nepal*, Ministry of Agriculture/Winrock International, pp. 250–264.

Regmi, M.C., 1978, *Thatched Huts and Stucco Palaces—Peasants and Landlords in 19th Century Nepal*, Adroit Publishers, New Delhi.

Regmi, M.C., 1999, *A Study in Nepali Economic History 1768–1846*, Adroit Publishers, New Delhi, first published 1972.

Ribot, G., Peluso, N.L., 2003, A theory of access, *Rural Sociology*, 68(2), 153–181.

Ribot, J., 2004, *Waiting for Democracy. The Politics of Choice in Natural Resource Decentralisation*. World Resources Institute.

Rigg, J., 2006, Land, farming, livelihoods and poverty: re-thinking the links in the rural south, *World Development*, 34(1), 180–202.

Rostow, W.W., 1960, *The Stages of Economic Growth—A Non-communist Manifesto*, Cambridge University Press.

Sadeque, Z., 1999, *Social Institutions, Local Governance and Social Capital*, Issues in Mountain Development No. 99/1, International Centre for Integrated Mountain Development (ICIMOD).

Saleth, R.M., Regassa, E.N., Samad, M., 2003, Dynamics of irrigation–poverty linkages in rural India: analytical framework and empirical analysis, *Water Policy*, 5 (5/6), 459–473.

SAPPROS, 2001, *Hill Options Study: Institutional Arrangements for Rural Development*, International Fund for Agricultural Development (IFAD), unpublished.

Schendel, W.V., 1991, Rural transformation in Asia: models and interpretation of local change, in Breman, J., Mundle, S., eds, *Rural Transformation in Asia*, Oxford University Press, pp. 281–309.

Scott, R.W., 2001, *Institutions and Organisations*, Sage Publications.

Seddon, D., 1987, *Nepal—A State of Poverty*, Vikas Publishing House, New Delhi.

Seddon, D., 2001. The Contradictions of Rural Transformation in Nepal. In *European Bulletin of Himalayan Research*, 20 (1) (double issue) pp 117-124.

Seddon, D., 2005, *Armed Violence and Poverty in Nepal—A Case Study for the Armed Violence and Poverty Initiative*, Centre for International Cooperation and Security, University of Bradford.

Seddon, D., Adhikari, J., 2003, *Conflict and Food Security in Nepal—a Preliminary Analysis*, Rural Reconstruction Nepal.

Seddon, D., Adhikari, J., Gurung, G., 2001, *The New Lahures: Foreign Employment and the Remittance Economy of Nepal*, Nepal Institute of Development Studies.

Seddon, D., Blaikie, P., Cameron, J., 1979, *Peasants and Workers in Nepal*, Vikas Publishing House, New Delhi.

Seddon, D., Gurung, G., Adhikari, J., 1998, Foreign labour migration and the remittance economy of Nepal, *Himalayan Research Bulletin*, 2, 3–10.

Sen, A., 1981, *Poverty and Famines*, Oxford University Press.

Shah, S., 2002, From evil state to civil society, *Himal South Asian Magazine*, November.

Shah, T., 1998, Water against poverty: livelihood-oriented water resources management, *Water Nepal*, 6 (1) 117–143.

Sharma, K.R., 1999, *Final Assessment of Key-Effects Monitoring Survey Reports*, Dhaulagiri Irrigation Development Project, International Labour Organisation.

Sharma, S., 1997, *Agricultural Transformation Processes in the Mountains of Nepal: Empirical Evidence from Ilam District*, ICIMOD Technical Paper, International Centre for Integrated Mountain Development, Kathmandu.

Shivakoti, G., Ostrom, E., eds, 2002, *Improving Irrigation Governance and Management in Nepal*, ICS Press.

Start, D., 2001, The rise and fall of the rural non-farm economy: poverty impacts and policy options, *Development Policy Review*, 19(4), 491–505.

Start, D., Johnson, C., 2004, *Livelihood Options? The Political Economy of Access, Opportunity and Diversification*, Working Paper No. 233, Overseas Development Institute.

Stern, P., 1989, *Small-scale Irrigation: A Manual of Low-cost Water Technology*, Intermediate Technology Publications.

Stern, P.C., Dietz, T., Dolsak, N., Ostrom, E., Stonic, S., 2002, Knowledge and questions after 15 years of research, in Ostrom, E., Dietz, T., Dolsak, N., Stern, P.C., Stonich, S., Weber, E.U., eds, *The Drama of the Commons*, National Academy Press.

Subba, B., 2000, *Himalayan Waters: Promise and Potential, Problems and Politics*, Panos Institute, South Asia.

Tan-Kim-Yong, U., Bruns, P.C., Bruns B., 2005: The Emergence of Polycentric Water Governance in Northern Thailand. In Shivakoti G.P., Vermillion, D.L., Lam W.F., Ostrom E., Pradhan U., Yoder R., eds, *Asian Irrigation In Transition-Responding to Challenges*. International Water Management Institute. Sage Publications.

Tang, S.Y., 1991, Institutional arrangements and the management of common pool resources, *Public Administration Review*, 51, 42–51.

Tang, S.Y., 1994, Institutions and Performance in Irrigation Systems, in Ostrom, Gardner and Walker eds, *Rules, games and Common Pool Resources"*, Ann Arbor, MI

Thapa, G.W., Rosegrant, M.W., 1995, *Projections and Policy Implications of Food Supply and Demand in Nepal to the Year 2020*, Research Report Series No. 30, Winrock International, Kathmandu.

Thapa, M., 2005, *Forget Kathmandu: An Elegy for Democracy*, Penguin, New Delhi.

Tulachan, P., 2001, Seasonal migration and trade: a strategy of survival by Lobas of Lo Manthang, in Heide S.V., Hoffmann, T, eds, *Aspects of Migration and Mobility in Nepal*, 43-72. Ratna Pustak Bhandar, Kathmandu

United Nations Development Programme, 2004. Annual Development Report

United Nations Development Programme, 2007. Annual Development Report

Uphoff, N., Meinzen- Dick, R., St. Julien, N., 1985, *Improving Policies and Programs for Farmer Organization and Participation in Irrigation Water Management*, Water Management Synthesis II Project, Cornell University, Ithaca, New York.

Vandergeest, P., 2006, CBNRM communities in action, in Tyler R, ed., *Communities, Livelihoods and Natural Resources—Action Research and Policy in Asia*. International Development Research Centre (IDRC).

Varughese, G., Ostrom, E., 2001, The contested role of heterogeneity in collective action: some evidence from community forestry in Nepal, *World Development*, 29, 747–765.

Vermillion, D.L., 2001, Property rights and collective action in the devolution of irrigation system management in collective action, in Meinzen-Dick, R., Knox, A., di Gregorio, M., eds, *Property Rights and Devolution of Natural Resource Management—Exchange of Knowledge and Implications for Policy*, Consultative Group on International Agricultural Research (CGIAR), pp. 183–220.

Vinding, M., 1984, Making a Living in the Nepal Himalayas: The Case of the Thakalis of Mustang District, *Contributions to Nepalese Studies, Journal of the Research Centre for Nepal and Asian Studies*, Tribhuvan University.

Vinding, M., 1992, *La Phewa—The Thakali 12-year Festival*, Ratna Pustak Bhandar, Kathmandu.

Vinding, M., 1998, *The Thakali—a Himalayan Ethnography*, Serindia Publications, London.

van Meijl, T., von Benda-Beckmann, F.,eds 1999. *Property Rights and Economic Development: Land and Natural Resources in Southeast Asia and Oceania.* London and New York, Kegan Paul International.

Wade, R., 1988, *Village Republics: Economic Conditions for Collective Action in South India*, Cambridge University Press.

Webster, N., Engberg-Pedersen, L., 2002., *In the Name of the Poor: Contesting Political Space for Poverty Reduction*, Zed Books.

Whelpton, J., 2005, *A History of Nepal*, Cambridge University Press.

Wiggins, S., Proctor, S., 2001, How special are rural areas? The economic implications of location for rural development, *Development Policy Review*, 19(4), 394–425.

Wilson, G.A., Rigg, J., 2003, 'Post-productivist' agricultural regimes and the South: discordant concepts? *Progress in Human Geography*, 27(6), 681–707.

Wittfogel K.A, 1957. Oriental Despotism, Yale University Press New Haven

World Bank, 1991, *Nepal: Relieving Poverty in a Resource-Scarce Economy*, World Bank (2 volumes).

Yoder, R., 1994, *Locally Managed Irrigation Systems: Essential Tasks and Implications for Assistance*, Management Transfer and Turnover Programs, International Irrigation Management Institute (IIMI).

Yoder R., Martin E.,1983, Identification *and Utilisation of Farmer resources in Irrigation Development: A Guide for Rapid Appraisal.* Nepal Irrigation Research Project, Cornell University. Rapti Zone Project (unpublished).

Zoomers, A., 1999, *Linking Livelihood Strategies to Development: Experiences from the Bolivian Andes*, Centre for Latin American Research, Royal Tropical Institute, Amsterdam.

Annex 1

KEY-EFFECT MONITORING SURVEY 1993
QUESTIONNAIRE

1. BASIC INFORMATION:

1. District_____ 2. Sub-Project Name_____

3. Date of Interview_____ 4. Interviewer's Name_____

5. Farmer's Name_____ 6. Farmer's Caste/Ethnicity_____ 7. Age_____

8. Male___ 9.Female___ 10. Village Ward No.___ 11. Location: Head___ Middle___ Tail

12. Total Operational Holding (Ropanis) in CA_____

2. AGRICULTURAL INDICATORS:

1. How many ropanis of your **3 main crops** as well as **other crops** did you cultivate in the CA **last year** (last crop) ? Indicate how these areas compare to the areas of **2 years ago**:

s.n.	Crop	Ropanies Cultivated Last Year	Area Cultivated 2 Years Ago Compared to Area Last Year (Tick)		
1	_____	_____	Less_____	Same_____	More_____
2	_____	_____	Less_____	Same_____	More_____
3	_____	_____	Less_____	Same_____	More_____
4	_____	_____	Less_____	Same_____	More_____
5	_____	_____	Less_____	Same_____	More_____

In case of a change in cultivation pattern, please elaborate:

_____

2. What was the approximate yield for your **3 main crops** grown in the CA last year (last crop) ? Indicate how these yields compare to the areas of **2 years ago**.

s.n.	Crop	Yield Last Year (Unit:.....)	Last Year's Yield Compared to Yield 2 Years Ago (Tick)		
1	_____	_____	Lower_____	Same_____	Higher_____
2	_____	_____	Lower_____	Same_____	Higher_____
3	_____	_____	Lower_____	Same_____	Higher_____

3. Who, in your household decides about the crops to be cultivated in the CA? (1-3 main crops; 4,5 other crops)

s.n.	Crop	Decision taker in the household
1		
2	_____	_____
3	_____	_____
4	_____	_____
5		

3. AGRICULTURAL PRACTICES:

1. In your opinion, which are the **4 most important inputs** that can lead to **higher yields** ?(with A being the most important

A
B
C
D

2. What do you consider the proper amount of chemical fertilizer (kg/ropani) and compost for the 3 main crops? Also indicate the approximate amount that you have applied for these 3 crops last year

s n	Crop	**Chemical Fertilizers (kg/rop)**		**Compost (doko/rop)**	
		Proper Amount	Applied	Proper Amount	Applied
1					
2					
3					

3. Do you think that the **quality** of your compost is good ? (tick)

Yes No Don't Know

4. When you apply compost to the field, approximately how **many days** do you leave it before it is ploughed under ? (tick)

0 - 3 Days 4 - 7 Days 7 - 10 Days More than 10 Days

If compost is left for more than 3 days, please explain why

5. Do you think that the quality of the compost **changes** when it is left on the field for the number of days that you mentioned ? (tick)

Quality Improves Quality Remains the Same Quality Decreases Don't Know

6. Have you ever heard about **improved** methods for compost preparation ? (tick) Yes
No

If the answer is yes, where did you hear about it: (tick)

A. DIDP training Was this training useful ? Yes No (If not, explain on back)
B. From Farmers who had been to this training
C. From Other Source (which)

If the answer is no, would you like to hear about improved methods? Yes No

7. Have you heard of a system of planting **potatoes in furrows**? (tick) Yes No

If the answer is yes, where did you hear about it?(tick) JT/JTA DIDP Other Farmers
Other Source

8. Do you plant potatoes in furrows?(tick) Yes No If No, please tell why not

9. Compared with broadcasting, do you think that

A. Yields are (tick) Higher Same Lower Don't Know
B. Labour Requirements are (tick) Higher Same Lower Don't Know

10. Did you participate in the 1993 DHDP training on **Pest Control** ?(tick) Yes No

11. Can you identify the **major pests/diseases** in your main crops? (tick)

All Most Half Few None

12. Which of the following **pest/disease control methods** have you heard of and possibly applied?(circle answer).

PRACTICE	HEARD OF		APPLIED IN CASE OF PESTS	
A. Uprooting and destruction of infested plants	Yes	No	Yes	No
B. Location of eggs of stemborers, collection and destruction	Yes	No	Yes	No
C. Spraying with chemicals	Yes	No	Yes	No
D. Cutting of stubbles near ground	Yes	No	Yes	No
E. Use of early maturing variety	Yes	No	Yes	No
F. Collect stubbles from infected field and burn	Yes	No	Yes	No
G. Rotate cereal with non-cereal crop	Yes	No	Yes	No
H. Timely weeding	Yes	No	Yes	No
I. Maintain 2" - 3" of water on paddy fields	Yes	No	Yes	No
J. Use of Disease-free or treated seeds	Yes	No	Yes	No
K. Plant in rows or furrows	Yes	No	Yes	No
L. Avoid excessive use of urea	Yes	No	Yes	No
M. Use ofdisease-free varieties	Yes	No	Yes	No

If any **other** method is used, please describe:

---

4. OPERATION AND MAINTENANCE OF THE IRRIGATION SYSTEM:

1. Do you know **approximately** how many days of labour your household contributed to the maintenance of the irrigation scheme during the last year ?(tick) Yes _____ No _____

If yes, please indicate the number of labour days: _____ Approximately how big a proportion of the labour was contributed by women ? (tick): Days: _____ (If farmer is **not able** to indicate women's contribution in terms of **days**, then (tick) <1/4 1/4 1/2 2/3 > 2/3

2. How many **times** a year is the canal cleaned ?(tick) Times Don't Know

3. On which **basis** do you contribute labour for canal maintenance? (tick)

Size of landholding Area of land actually cultivated Size of your household
Fixed no. of labourdays per household, irrespective its size Other (specify)

---

4. Are you satisfied with the **present system** of labour contribution ?(tick) Yes No If not, explain why not

---

5. Do you pay an **annual water fee** (tick) Yes No If Yes, how much (Nrs)_____

On which basis do you pay (eg per ropanis cultivated, total holding etc)?

6. Do the farmers pay any **fines** if they do not A Contribute labour (tick) Yes No
If Yes, how much (Nrs): B Pay water fees (tick) Yes No If Yes, how much (Nrs): Do farmers pay fines for any **other** reasons? (explain)

Have **you** ever paid any fines? (tick) Yes No If **Yes**, for what?(explain)

7. Are there any **female members** of the WUMC? (tick) Yes No Don't know
If Yes, how many?

8. Do you think that **women** should be members of WUMC's? (tick) Yes No
If not, why not ?

9. Are there any major **seepage problems** in the canal? (tick) Yes No

10. Are there any major **landslide problems** along the canal (tick) Yes No

If the answer is Yes to questions 9 and 10, elaborate on the back of the questionnaire.

11. Indicate for the 3 main crops that you grow in the CA if the amount of water received from the canal is enough:

s.n.	Crop	Enough	Not Enough
1			
2			
3			

If the farmers faces a **shortage for water for any of the 3 crops**, state the **reasons** for the shortage

	Crop	Reason (s) for shortage
1		
2		
3		

12. In your opinion, do farmers along the **head, middle and tail portions of the canal** get their **fair** shareof water ? (tick)
Yes No If the answer is no, indicate which farmers receive less water and explain why (elaborate on back if space is not enough:

13. In your opinion, do **female farmers** receive a fair share of water from the irrigation system ?(tick)
Yes No If not, why not?

14. Are you satisfied with the **location, type and size of the outlet** from the main canal from which you receive irrigation water ?(tick) Yes No If not, why not ?

15. Indicate what kind of **water distribution you prefer** for your 3 main crops (tick)

		Preferred Water Distribution			and Flow		Actual Water Distribution			and Flow	
s.n.	Crop	Demand	Continuous	Rotation	Big	Small	Demand	Continuous	Rotation	Big	Small
1											
2											
3											

If there are any **discrepancies** between **preferred** and **actual** water distribution, explain why: _____

16. If you are not fully satisfied with the operation & maintenance of the irrigation system, what do you think could be done to improve the situation?: _____

ELABORATION/COMMENTS SHEET

1. Comments relating to the interview (*possible bias introduced, reliability of answers , was the farmer supported by others , farmers status etc*):

2. Elaboration on individual points under the separate headings (*eg 1.3, 3.11 etc*) :

3. Summary of problems/conflicts (if any) related to the sub-project and revealed in the interview:

Annex 2

IRRIGATION SURVEY 2004
QUESTIONNAIRE AND CHECKLIST

Key: Characters written in **bold types** inside brackets (…..) are directions to the interviewer.
The questionnaire must be completed in English.

1. Basic Information

1.Subproject Name:_____2. Size of Command Area (**Ropanies**):_____

3 No HHs with (**tick**) Land in the CA_____ No HHs in the Village[1]_____

4. Date of Interview:_____ 5. Interviewer's Name_____

6. Farmer's Name :_____ 7. Male_____ 8. Female_____9. Family Size_____

10. Total Operational (**Ropanies**) Holding in CA_____

11. Location of land in CA: Head_____ Middle_____ Tail_____

2. Agricultural Indicators

1.How many ropanies of all your crops did you cultivate in the CA last year[2]

S.N	Crop Name	Ropanies Cultivated Last Year	Area Cultivated Last Year Compared to Ten Year Ago
1	_____	_____	Less Same More
2	_____	_____	Less Same More
3	_____	_____	Less Same More
4	_____	_____	Less Same More

(**In case of a change in cultivation pattern over the years please explain**):_____

_____

[1] In the actual physical unit.
[2] I.e. from Baisakh 2060 – Chaitra 2061

3. What was the yield for your 3 main crops grown in the CA in the last harvest?

s.n.	Crop	Yield (**unit**:_____)
1	_____	_____
2	_____	_____
3	_____	_____

3. Labour Inputs

Please specify the use of labour (**no.of people**) for your last crops for the following crops:

Crop	**Family (own) Labour**	**Hired Labour**	**Parma Labour**	**Total**
Buckwheat	_____	_____	_____	_____
N. Barley	_____	_____	_____	_____
Barley	_____	_____	_____	_____
Maize	_____	_____	_____	_____

(**In case of hired labour where did it come from**) (**tick**)? VDC____ Outside _____ Why do you hire labour (**explain**)?_____

_____

4. Income and Livelihoods

1. What was approximately your household cash income last year (**NRs**)?_____

2. Approximately, how much of this income came directly from agriculture (**sale of grains, vegetables, fruits, livestock etc**) (**circle**)?: < 1/4 1/4 1/3 1/2 2/3 1/1

3. What was the source of the non agricultural income (**circle**)?:
a. Hotel/Tourism b. Remittances c. Govt. Service or Army d. Shop

e. Agricultural Labour f. Trade g. Portering h. Other (explain): _____

4. (**Apart for remittances**) Did you work (**tick**) Outside_____ or Inside_____ this District?

4. Has the proportion of your household income that comes from outside/inside agriculture changed over the last ten years
(explain)_____

---

5 Migration and Employment:

1. Household Data:

Relation	Place of Work	Main Occupation	Secondary Occupation	Age

COLUMN ONE
1.Head of HH
2.Wife
3. Son
4.Daughter
5. Daughter-in-Law
6. Son-in-Law

COLUMN TWO
1. District
2. Nepal
3. Abroad (India)
4. Abroad (mention country)

COLUMNS THREE AND FOUR
1. Farming
2. Agricultural Labour
3. Govt. Service
4. Army
5. Shop
6. Trade
7. Portering

2. Do any members of your household live away from home more than 6 months of the year (**tick**)?:

Yes_____No_____ (**If yes**) Who?_____

3. Do you get any financial support from relatives living outside (**tick**?) Yes____No____

5. Operation and Maintenance of the Irrigation System

1. Does your household contribute labour to the maintenance of the irrigation system (tick)?

Yes____ No_____

2. (**If Yes**), approximately how many days per year?_____

3. (**If Yes**) on which basis is the labour organised (**tick?**):

A. Size of Landholding in CA _____ B. Size of your HH _____ C. Other_____

4.(**If Yes**) Are you fined if you do not contribute labour (**tick**)? Yes____ No____ How Much____

5. Do you Pay an Annual Water Fee (**tick**)? Yes_____No_____ (**If Yes**) How Much_____

6. (**If yes**) Are you fined if you do not pay your water fee? Yes____No____ How Much_____

Who Collects the fines?_____

7. (**If No Labour is Contributed**) How is the maintenance organised (**describe**)? _____

_____

8. In case of an emergency (**eg flood, landslide**) how are cash/labour resources mobilised (**describe**)?

_____

_____

9. Are you satisfied with the way in which the irrigation system is maintained (**tick**)? Yes___ No__

10. (**If No**) What is the problem (**describe**)_____

_____

11. Do you get sufficient water for your crops (**Tick**)? Yes_____ No_____

(**If No**) Explain:_____

_____

12. In your opinion, do farmers along the Head, Middle and Tail Reaches of the canal get their fair share of water (**tick**)?

Yes_____ No_____

(**If No explain problem**):_____

_____

Annex 3

IRRIGATION SURVEY 2004

Questionnaire for Key Informants

1. Basic Information:

1. No. of Households in the Village_____2. No. of Women **(+18**)_____ 3. No. of Men **(+18**)_____

4. Total Village Population (**incl**. children) (tick): Permanent **(>6 month a year**)_____

Temporary (< 6 month a year) _____

5. What is the proportion of children who attend school outside the district? (**circle**):

< 1/4 1/4 1/3 1/2 2/3 1/1

2. Institutional Information

1.How old is the irrigation system?:_____

2.How is the irrigation system governed (**describe**)?_____

_____

_____

3. How long has the committee existed?_____ 4. How many members does it have?_____

4. What are the designations of the committee (**chairman, treasurer, secretary** etc):

_____

6. Are members (**tick**) Elected? _____Selected?_____ (Describe system):_____

_____

7. What is the local name for the chairman?_____ Is he (**tick**) Elected? _____ Selected? _____

How long is his term in office (**years**)_____

Is he also a member of other committees? Yes_____ No_____ (**If yes, mention which ones**)_____

Does the committee keep written records? Yes_____ No_____

8. Do by-laws exist **(tick)**? Yes_____ No_____

9. How often does the committee meet?_____ What typically has to be decided on?_____

_____

10. How is the irrigation system operated and maintained ? (**labour contribution, chowkidars etc**) (**describe**)?_____

_____

_____

(**If Chowkidars**) How are they paid (**kind,cash**) (**describe**)?_____ How much are they

paid?_____

11. Is the committee (**tick**) stronger _____or weaker_____ now than it was 10 years ago?

(**Explain**) _____

12. Are there any women on the committee (**tick**) Yes_____ No _____ (**If yes**) How many_____

13. What is the average age of committee members? _____

14. Is the average age (**tick**) Higher _____ Lower than 10 year ago

12. Is or was the committee represented in other assemblies (VDC, DDC etc) (describe)?:_____

_____

13. Which other agricultural institutions exist in the community ("village council" parma, cooperatives etc) (**describe**)?

_____

_____

3. Migration:

In how many households does the husband live away from home for more than six months of the year?_____

Is this more than 10 years ago (**tick**) ? Yes_____ No _____

Are there any households where the wife lives away from home for more than six months a year (**tick**)? Yes_____ No_____ (**If yes, how many**)?:_____

How many households have migrated to (**name of subproject**) over the past 10 years?_____

How many HHs have migrated out of the subproject over the past 10 years?_____

What happens to their agriculture when HHs move away (explain) _____

4. Livelihoods:

1. What are the main sources of income for people in (**name of village**) (**rank**):

A._____ B _____

C_____D_____

E _____ F_____

2. Has life in (**name of village**) become **(tick**): Better_____ (**or**) Worse_____ over the past ten years? (**explain**)_____

_____

Annex 4

CHECKLIST: FOLLOW-UP INTERVIEWS.
LIVELIHOOD TRAJECTORIES:

1. Basic Information:

Name_____ Male_____Female_____

Family Size_____ Size of Holding in CA (**Ropanies)_____**

Location of Land in CA: Head_____Middle_____Tail_____

2. Land and Agriculture:

2.1 Has the size of land has increased or decreased over the years?:

2.2. Has the cropping pattern changed over the last ten years?:

2.3. Agricultural work: have you been using more or less hired labour over the last ten years?

2.4 Is there more or less parma now compared to ten years ago?

2.4 Who from this household contributes labour to irrigation canal maintenance?

3. Irrigation and Institutions

3.1 Which institutions/organisations in this area are important for you and your family?

3.2 How important is irrigation to your livelihood?

3.4 The households here need to do quite a lot of maintenance of the irrigation system. Is it worth doing it? Do you benefit?

3.5 Is the irrigation system well managed? What are the problems, if any?

3.6 How important is it that the irrigation system is managed well?

3.7 Has the irrigation system always been managed in the same way?

3.8 Could the irrigation system work without a WUA?

3.8 In some parts of Nepal the Government manages the irrigation systems. Would that be a good idea?

3.9. Do the DDC or VDC matter to your livelihood?

3.9.1 How are VDC funds spent?

3.9.2 How about other government institutions? Have they assisted the community?

4. Income and Income Sources

4.1 Proportion of income from agriculture:

4.2 Source of Non-agricultural income:

4.3 Has the proportion of income (agriculture/non-agriculture) changed over the years (explain?

4.4 - and compared with his/her parents days?

5. Education

5.1 Interviewee's level of education:

5.2 Husband/wife's level of education:

5.3 Parents level of education:

5.4 Is education is important for you and your family?

5.5 Strategy for children’s education

5.6 Strategy/expectation for children’s work

6. Quality of Life

6.1 Are you and your family better off these days than when you were a child (explain what has changed)?

6.2 Have the political changes in 1990 affected you family’s livelihood?

6.3 Have they affected the community in general?

6.4 Does the present insurgency affect your livelihood?

6.5 What are the reasons for change?

6.6 Future income generating strategies

6.7 Will your children live in the community when they grow up?

Annex 5

CHECKLIST: FOLLOW-UP INTERVIEWS[1]
INSTITUTIONAL LANDSCAPE

1. Basic Information

Name_____ Male_____ Female_____

Designation_____

Size of Landholding in CA_____

2. History

History of Involvement in Public Affairs

Why is he/she active in Public Affairs?

3. Institutional Relationships

To what extent are those people who are active in WUC's also active in local politics?

Which is the most important local institution (local govnt, organisation, association etc) ? Rank and explain:

1

2

3

4

5

6

[1] For farmers active in WUA's etc

Which is the most important local institution for the farmers in Thini-Jomsom? Rank and explain:

1

2

3

4

5

6

Explain the relationship between WUC and VDC

Explain the relationship between WUC and DDC

Explain the relationship between WUC and HMG line agencies

Does the community have a traditional government system?

4. Various

What are the threats to community strength?

SPIRIT PhD Series:

1	Christina Fiig	A Feminist Public Sphere - An Analysis of the Habermasian Public Sphere in a Danish Gender Political Context	2004
2	Bjørg Colding	Education and ethnic minorities in Denmark.	2004
3	Camilla Elg	Set og overset. Unge kvinder med indvandrerbaggrund.	2005
4	Lærke K. Holm	Folketinget og Udlændingepolitikken – diskurser om naturaliserede, indvandrere og flygtninge 1973-2002.	2006
5	Trine Lund Thomsen	Immigrant Entrepreneurship as Gendered Social Positions - A study on motivations and strategies in a biographical perspective.	2006
6	Lars Andersen	Politik og forvaltning i arbejdsskadeforsikringen i Danmark 1898-1933.	2006
7	Helene Pristed Nielsen	Deliberative Democracy and Minority Inclusion in Australia and New Zealand.	2006
8	Berhanu Balcha	Restructuring State and Society: Ethnic Federalism in Ethiopia.	2007
9	Kirsten Hviid	"No Life"- om gadelivsstil, territorialitet og maskulinitet i et forstadskvarter.	2007
10	Anette Kanstrup Jensen	Development Theory and the Ethnicity Question - The Cases of Lao People's Democratic Republic and Thailand.	2007
11	Poul Duedahl	Fra overmenneske til UNESCO-menneske. En begrebshistorisk analyse af overgangen fra et biologisk til et kulturelt forankret menneskesyn i det 20. århundrede.	2007
12	Jens Eistrup	Enhed og inkongruens.	2007
13	Sune Q. Jensen	Fremmed, farlig og fræk. Unge mænd og etnisk/racial andenhed - mellem modstand og stilisering	2007
14	Louise N. Kallestrup	Trolddomsforfølgelser og trolddomstro: En komparation af det posttridentine Italien og det luthersk protestantiske Danmark i det 16. og 17. århundrede.	2007

15	Corrie Lynn McDougall	Why Food Aid Persists and Food Security Recedes	2008
16	Torsten Rødel Berg	Irrigation Management in Nepal's Dhaulagiri Zone: Institutional Responses to Social, Political and Economic Change	2008