Guidance for integrating climate change considerations into the SEA of urban and Construction plans in Vietnam

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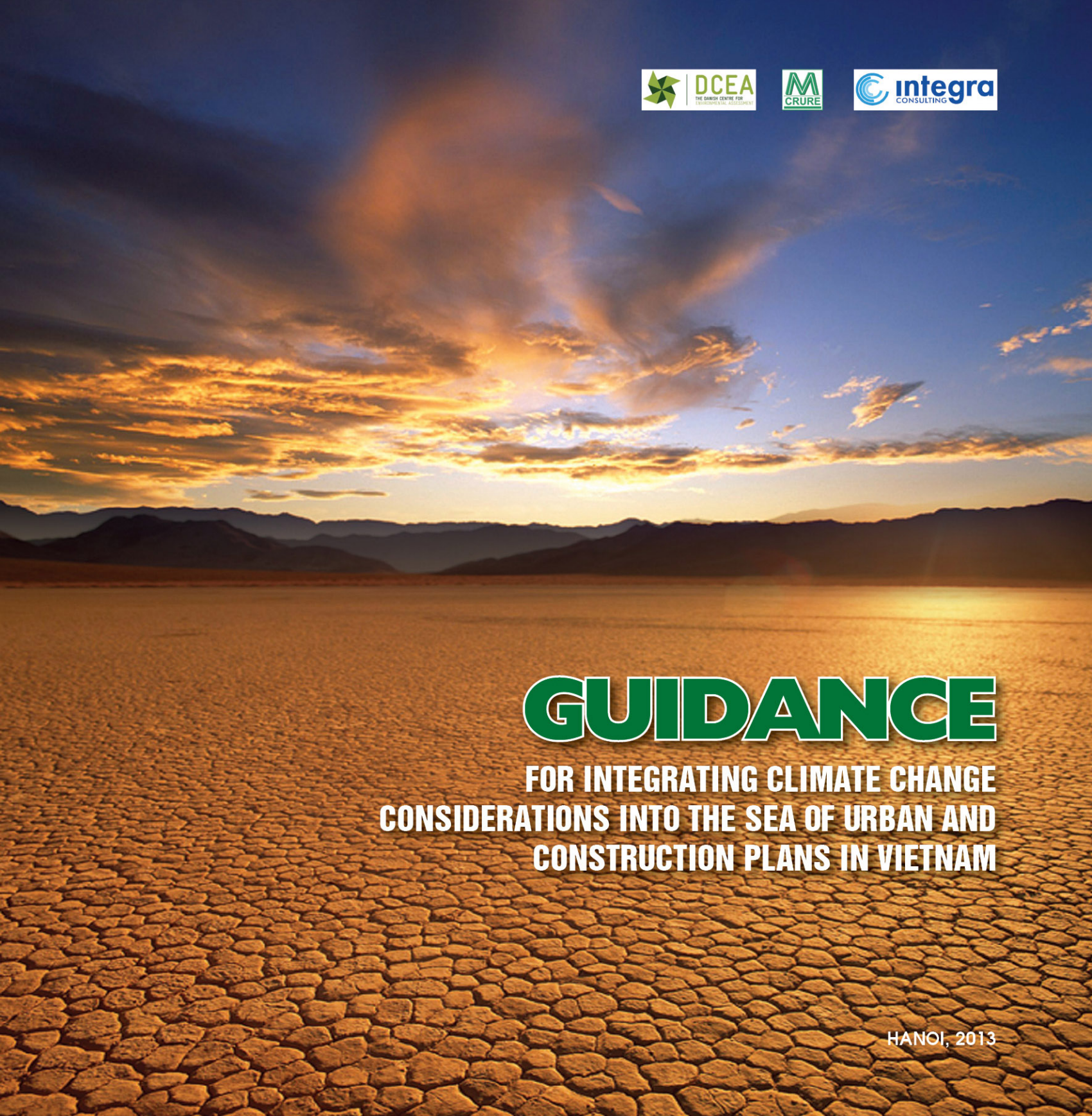

GUIDANCE

FOR INTEGRATING CLIMATE CHANGE CONSIDERATIONS INTO THE SEA OF URBAN AND CONSTRUCTION PLANS IN VIETNAM

HANOI, 2013

Adapting Urban& Construction Plans to Climate Change in Vietnam
using Strategic Environmental Assessment
(Funded by the Nordic Climate Facility)

GUIDANCE

FOR INTEGRATING CLIMATE CHANGE CONSIDERATIONS INTO THE SEA OF URBAN AND CONSTRUCTION PLANS IN VIETNAM

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CLIMATE CHANGE

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GLOSARY OF TERMS

Climate change adaptation: Adjustments in natural or human systems in response to actual or expected climatic stimuli or their effects that moderate harm or exploit beneficial opportunities.

Climate change mitigation: Actions to prevent or reduce emissions of greenhouse gases.

MOC SEA Guidelines: Technical guidelines on Strategic Environmental Assessment for Construction & Urban Planning in Vietnam, published in 2011 by the Ministry of Construction

SEA mitigation: Measures proposed as part of an SEA to reduce, offset or compensate for predicted adverse impacts or to enhance positive impacts.

Project: NCF-funded project 'Adapting Urban Construction Plans to Climate Change in Vietnam by the use of Strategic Environmental Assessment'

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CLIMATE CHANGE

ACRONYMS

ADB	Asian Development Bank
CRURE	Centre for Research and Planning on Urban and Rural Environment, Vietnam
DCEA	The Danish Centre for Environmental Assessment
GIZ	German International Cooperation
GoV	Government of Vietnam
KAP	Knowledge-attitude-practice mapping
LEP	Law on Environmental Protection, 2005
MOC	Ministry of Construction, Vietnam
MONRE	Ministry of Natural Resources and the Environment, Vietnam
MOST	Ministry of Science and Technology, Vietnam
NEFCO	Nordic Environment Finance Corporation
NDF	Nordic Development Fund
NCF	Nordic Climate Facility
IPCC	Intergovernmental Panel on Climate Change
SEA	Strategic environmental assessment
SD	Sustainable development
TNA	Training needs assessment
UNFCCC	United Nations Framework Convention on Climate Change
NIURP	National Institute of Urban and Rural Planning, Ministry of Construction
WB	World Bank

Chapter I: INTRODUCTION

I. Introduction

Aims and objectives of this guidance

This guidance addresses the integration of climate change related concerns into the Vietnamese SEA system for urban & construction plans. It focuses, in particular, upon using SEA as a tool to facilitate climate change adaptation in forward planning through a focus on the impacts of climate change. It also identifies how climate change mitigation can simultaneously be integrated in plan making through the application of SEA. This involves consideration of the impacts of urban & construction plans on climate change trends.

The principal objective of the guidance is to demonstrate how SEA can be used in Vietnam to ensure climate change mitigation and adaptation are given appropriate consideration in the production of urban & construction plans.

More specifically, the guidance aims to:

- Raise awareness about the importance of addressing climate change adaptation and mitigation in the development and appraisal of urban & construction plans;
- Explain how climate change adaptation and mitigation can be integrated into SEA practices based on the requirements laid out in the MOC SEA guidelines;
- Provide inspiration about the types of climate change adaptation and mitigation measures that might be relevant to consider in urban & construction plans; and,
- Provide a framework for analysing whether an SEA report has adequately addressed climate change related concerns.

The legal and policy framework for SEA of urban & construction plans

SEAs undertaken for urban & construction plans must comply with: the stipulations of the 2005 Environment Protection Law, the Construction Law, the Urban Planning Law, Decree No. 29/2011/ND-CP; and Circular No. 01/2011/TT-BXD.

Climate change objectives are outlined in the National Strategy on Climate Change; the National Climate Change Action Plan; and, the National Target Program responding to Climate Change. Over half of the provinces in Vietnam have also established regional climate change objectives through the publication of provincial climate change action plans. These may also contain policy objectives that can inform an SEA.

An overview of the key legal provisions on urban & construction plans, SEA and climate change is provided in the Box 1.1.

Box 1. 1: Overview of the legal framework

Urban & construction planning

- The Construction Law 16/2003/QH11 dated 26/11/2003 stipulates construction activities, urban development and management in general and urban-rural planning in particular
- The Urban Planning Law 30/2009/QH12, dated 17/6/2009 stipulates urban planning activities, including development of urban plans, appraisal, approval and revision of urban plans; implementation of urban plans and management of urban development
- Decree No. 08/2005/ND-CP dated 24/1/2005 by the Prime Minister on Construction Planning. The decree stipulates the process of conducting, appraisal, approval and management
- Decree No. 37/2010/ND-CP dated 7/4/2010 by the Prime Minister on Formulation, appraisal, approval and management of urban plans.
- Circular No 07/2008/TT-BXD dated 07/4/2008 by the Minister of Construction guiding on formulation, appraisal, approval and management of construction plan
- Decision No. 03/2008/QD-BXD dated 31/3/2008 by the Minister of Construction stipulating the contents and drawings of initial planning reports (representing planning tasks) and planning ones
- Circular No. 10/2010/TT-BXD dated 11/8/2010 by the Minister of Construction stipulates the contents and files of different types of planning including master, zoning, detailed, specified infrastructure planning and urban design.

Strategic Environmental Assessment

- The Environment Protection Law dated 12/12/2005
- Decree No 29/2011/ND-CP dated 18/04/2011 by the Prime minister on SEA, EIA and environmental commitment
- Decree No. 140/2006/ND-CP dated 22/11/2006 by the Prime minister stipulating environmental protection in formulation, appraisal, approval and implementation of strategies, plans, programs and development projects
- Circular No. 26/2011/TT-BTNMT dated 18/7/2011 by the Minister of Natural Resources and Environment stipulating some articles of the Decree No 29/2011/ND-CP
- Circular No.06/2007/TT-BKH dated27/8/2007 by the Minister of Planning and Investment guiding implementation of Decree No. 140/2006/ND-CP
- Circular No.01/2011/TT-BXD dated 27/01/2011 by the Minister of Construction guiding SEA for urban & construction plans

Climate change

- Decision No. 158/2008/QD-TTg on Approval of the national target program to respond to climate change issued on 02/12/2008 by the Prime Minister
- Decision No. 2139/QD-TTg on Approval of the national strategy on climate change issued on 05/12/2011 by the Prime Minister
- Decision No. 1474/QD-TTg issued on 05/10/2012 by the Prime Minister on the national action plan on climate change of the 2012-2020 period
- Decision No. 1183/QD-TTg issued on 30/08/2012 by the Prime Minister on Approval of the national target program to respond to climate change of the 2012-2015 period

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The role of SEA in integrating climate change adaptation and mitigation into decision-making

In Vietnam, SEA has been defined as the "analysis and prediction of potential impacts of strategic projects and development planning and plans prior to approval, in order to ensure the achievement of sustainable development" (Law on Environment Protection, 2005, Article 3, point 19). The overall aim of SEA is to integrate the consideration of environmental issues into planning processes and to facilitate transparent and participatory decision-making.

SEA is at the moment the only formalized tool in Vietnam that can readily be used to verify whether proposed urban & construction plans adequately consider climate change issues. It is for this reason that MONRE considers SEA to be the main tool for mainstreaming climate change into strategic decision making in Vietnam.

The MOC views SEA not only as technical tool, but also as a management instrument that can play an important role in facilitating environmental protection activities for urban & construction planning. Although not currently a legal requirement, the consideration of climate change in SEAs constitutes a key mechanism for adapting to climate change.

Role of SEA for integrating climate change adaptation and mitigation into urban and construction planning

SEA is a key instrument for integrating environmental concerns and sustainable development principles into the strategic planning and decision-making of urban & construction plans. It provides a systematic framework for reviewing how aspects of a plan may impact upon priority concerns related to the environment and/or sustainability.

SEA provides a framework for considering whether climate change concerns have been properly integrated in urban & construction plans. Specifically, the SEA allows analysts and planners to:

- Assess whether a proposed urban & construction plan enhances or limits vulnerability and adaptive capacity for the region concerned;
- Consider whether a proposed urban & construction plan enhances or reduces the direct and indirect impacts of climate change;
- Explore the potential contribution of an urban & construction plan to greenhouse gas emissions, with the aim of avoiding or reducing such emissions where possible (i.e. climate change mitigation);
- Explore synergies between climate change and other sustainability concerns in order to support win-win outcomes and avoid trade-offs, with gains in environmental quality in one area accompanied by losses in another.

Box 1. 2: Synergies and trade-offs in climate change adaptation and mitigation

Synergies and trade-offs are important concepts to consider when assessing climate change impacts, adaptation and mitigation. A synergy exists where a climate change adaptation or mitigation measure complements another planning goal. For example, planting trees, creating urban parks or green roofs can reduce rainwater runoff rates and provide shading (climate change adaptation). It can also reduce the need for air conditioning (climate change mitigation) and lead to improvements in air quality.

A trade-off exists when a climate change adaptation or mitigation measures adversely affects another planning goal. A similar concept used increasingly in the literature on climate change is the notion of 'maladaptation'. This term is used to describe a situation where particular adaptation measures have adverse effects for certain social groups or components of the socio-ecological system. For example, new flood defences to protect an upstream town can potentially increase the flood hazard faced by downstream communities.

Source: Larsen et al. 2012

Relationship of this guidance to existing MOC guidance on SEA for urban & construction planning

This guidance is a supplementary document to the existing MOC Technical Guidelines on SEA for construction & urban planning in Vietnam, which were published in 2011. This guidance provides advice specifically on the integration of climate change into the SEA of urban & construction plans. The approach suggested in this guidance has been designed to integrate with the procedural and methodological approach laid out in the MOC guidance.

It is recommended that the following analyses should be undertaken in order to integrate climate change adaptation and mitigation into SEA:

- Initial scoping and preparation of terms of reference for the relevant climate change analyses;
- Engage stakeholders with climate change related mandates and responsibilities;
- Identify climate change related concerns (i.e. the impacts of climate change and the ways in which the plan might affect climate related trends);
- Understand and describe existing and future baseline trends using scenarios;
- Assess the consistency of the proposed urban & construction plan objectives with relevant national and/or regional climate change objectives;
- Assess the potential impacts of the proposed urban & construction plan and their likelihood, and the impacts of climate change on planning policies;
- Propose measures to adapt to climate change in the urban & construction plan or to increase resilience to change;
- Prepare for adaptive management; and,
- Communicate climate change related assessments to stakeholders through the SEA Report.

The linkages between the approach proposed in this guidance and the MOC Technical Guidelines on SEA

are summarised in Table 1.1. The procedural steps for integrating climate change adaptation and mitigation are explained in detail in Chapter 4 of this guidance.

Table 1.1: Linkages between the approaches proposed in this guidance and MOC Technical Guidelines on SEA in urban & construction planning.

Procedural steps set out in the MOC Technical Guidelines on SEA	Linked recommendations for climate change integration made in this guidance
Scoping and preparation of terms of reference for the SEA	Initial scoping and preparation of terms of reference for climate change analyses
Identification of key stakeholders and issues for the assessment	Engage stakeholders with climate-change related mandates and responsibilities
Determination of key environmental issues and objectives related to the construction & urban planning	Identify climate change-related concerns
Analysis of future trends without the plan	Understand and describe existing and future baseline trends using scenarios
Assessment of orientations and objectives	Assess the consistency of the proposed urban & construction plan targets with relevant climate change targets
Assessment of trends in key environmental issues with the construction & urban planning	Assess the potential impacts of the proposed plans and their likelihood
Determining priorities among proposed mitigation and enhancement measures and environmental monitoring arrangements	Propose changes in the urban & construction plan and provide other relevant recommendations
	Prepare for adaptive management of future risks
Compilation of the SEA report	Communicate climate-change related assessments in the SEA Report

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Target groups

This guidance will be most useful to planners, SEA practitioners, and regulators responsible for the urban & construction planning in Vietnam. It can also be used as a resource by civil society and other interested parties to raise awareness about 'good SEA practice' in relation to climate change adaptation and mitigation.

Development of the guidance

The guidance has been developed through an iterative process incorporating field testing and review by interested stakeholders at a national workshop. The national workshop was organised to provide a formal opportunity for interested parties to comment on the guidance. It took place in March 2013 and was organised under the auspices of the Viet Nam Urban Forum and the National Institute for Urban and Rural Planning.

Seven pilot studies were undertaken between 2012-2013 to examine different approaches to, and methods for, addressing climate change adaptation and mitigation in the SEA of urban & construction plans. The pilot studies also provided an opportunity to assess what type and level of information needed to be included in the guidelines.

The pilot studies were selected to incorporate a variety of urban & construction plan types. The seven pilot studies were:

- Ha Long city (Quang Ninh province) Master Plan to 2030
- Ba Ria - Vung Tau province Solid Waste Management Plan to 2020
- Can Tho city Green Space Plan to 2030
- Cam Ranh town (Khanh Hoa province) Master Plan to 2025
- Hong Van town (Thua Thien Hue province) Master Plan to 2030
- Song Cau Town (Phu Yen province) Master Plan to 2020 and Vision to 2030
- Quang Binh province Regional Plan to 2030.

The pilot studies were also chosen to reflect a variety of geographical settings, climate conditions, vulnerabilities and risks, and policy types. The locations of the pilot studies are shown in Figure 1.1.

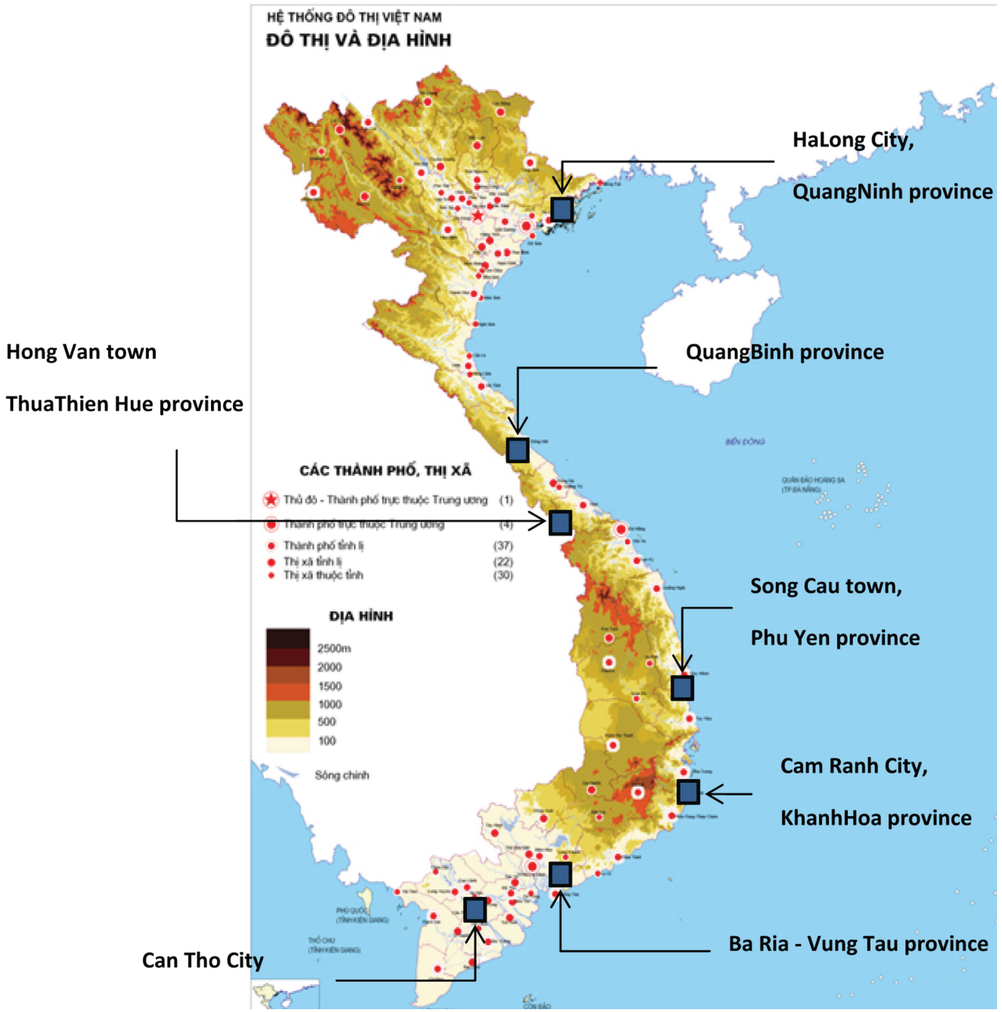

Figure 1.1: Location of the pilot studies

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CHAPTER II

CLIMATE CHANGE IMPACTS, ADAPTATION AND MITIGATION IN CONTEXT OF URBAN AND CONSTRUCTION PLANNING

II. CLIMATE CHANGE IMPACTS, ADAPTATION AND MITIGATION IN CONTEXT OF URBAN AND CONSTRUCTION PLANNING

The importance of considering climate change in urban and construction planning in Vietnam

Scientific analyses indicate that Vietnam will be amongst the five countries most affected by climate change. This chapter provides an overview of the key impacts of climate change under differing scientific assumptions ('scenarios'). The guidance focuses, in particular, on the types of impacts that will be experienced in urban areas.

Climate change will cause or contribute to a number of adverse impacts upon Vietnamese society, including sea level rise, flooding, and the increased occurrence of extreme weather events.

MONRE published revised climate change and sea level rise scenarios for Vietnam in 2012. These scenarios are more detailed than those published in 2009 and contain climate change projections for the provincial level, as well as data on seasonal variations and extreme events. Three scenarios are employed to accommodate uncertainty about development trends and the nature of climate change. They are termed the low, medium and high scenarios.

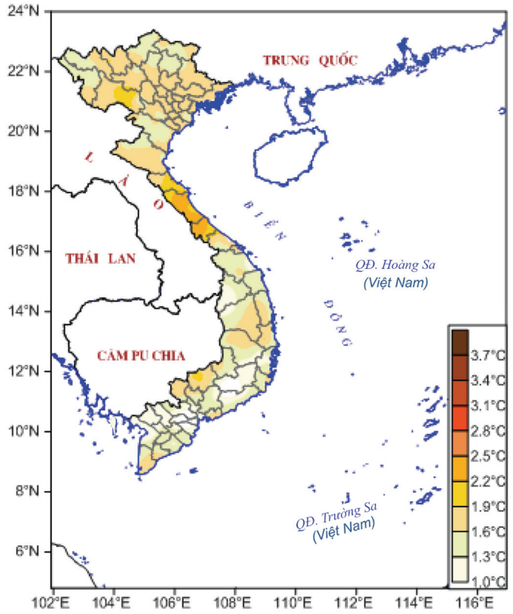


Figure 2. 1: Annual average temperature increase (°C) by the end of 21st century according to low emission scenario

Temperature trends

The maximum and minimum temperature is projected to rise 2°C by 2100 as compared to the base period of 1980-1999. The number of days when the temperature is expected to exceed 35° C will increase by between 15 to 30 days a year.

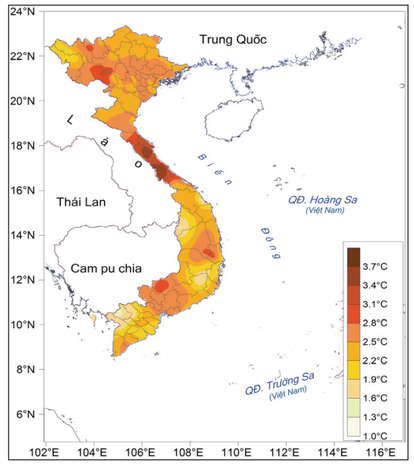


Figure 2. 2: Annual average temperature increase (°C) by the end of 21st century according to medium emission scenario

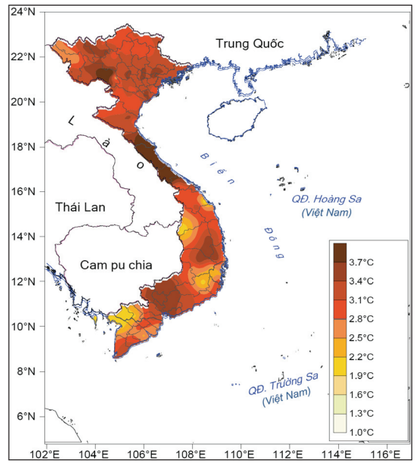


Figure 2. 3: Annual average temperature increase (°C) by the end of 21st century according tohigh emission scenario

- Under the low scenario: By 2100 average temperature increases by 1.6 to 2.2°C in the north of Vietnam and less than 1.6°C in southern areas (from Danang city to the south);
- Under the medium scenario: By 2100 average temperature increases by 2 to 3°C; and,
- Under the high scenario: By 2100 temperature increases by 2.5 by 3.7°C.

Precipitation

- Under the low scenario: precipitation increases by 5% and 6% by 2050 and 2100, respectively;
- Under the medium scenario: precipitation increases by 1-4% and 2-7% by 2050 and 2100, respectively;
- Under the high scenario: precipitation increases by 1-4% and 2-10% by 2050 and 2100, respectively.

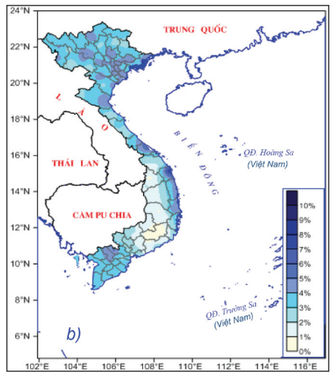


Figure 2. 4: Change in annual rainfall (%) by the end of 21st century according to low emission scenario

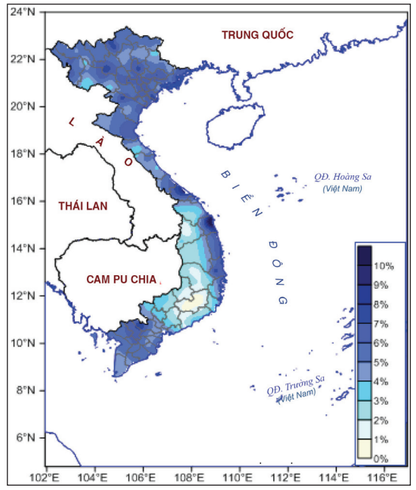


Figure 2. 5: Change in annual rainfall (%) by the end of 21st century according to mediumemission scenario

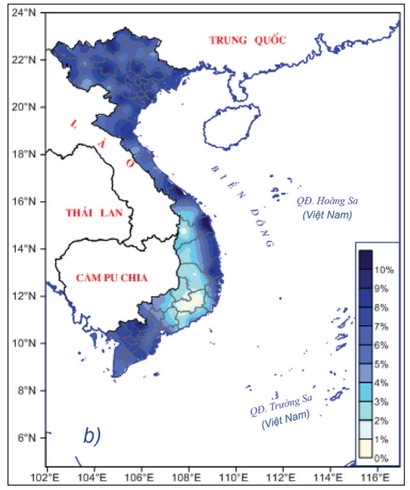


Figure 2. 6: Change in annual rainfall (%) by the end of 21st century according to high emission scenario

Sea level rise

Projections of sea level rise by region and over time are shown in Tables 2.1 to 2.3:

Table 2.1: Sea level rise (in cm) under the low scenario

Region	Milestones during 21st century								
Khu vực	Các mốc thời gian của thế kỷ 21								
	2020	2030	2040	2050	2060	2070	2080	2090	2100
Móng Cái-Hòn Dáu	7-8	10-12	14-17	19-22	23-29	28-36	33-43	38-50	42-57
Hòn Dáu-Đèo Ngang	8-9	11-13	15-17	19-23	24-30	29-37	34-44	38-51	42-58
Đèo Ngang-Đèo Hải Vân	7-8	11-12	16-18	22-24	28-31	34-39	41-47	46-55	52-63
Đèo Hải Vân-Mũi Đại Lãnh	7-8	12-13	17-18	22-25	29-33	35-41	41-49	47-57	52-65
Mũi Đại Lãnh-Mũi Kê Gà	7-8	11-13	16-19	22-26	29-34	35-42	42-51	47-59	53-68
Mũi Kê Gà-Mũi Cà Mau	8-9	11-13	17-19	22-26	28-34	34-42	40-50	46-59	51-66
Mũi Cà Mau-Kiên Giang	9-10	13-15	18-21	24-28	30-37	36-45	43-54	48-63	54-72

Table 2.2:Sea level rise (in cm) under the medium scenario

Region	Milestones during 21st century								
Khu vực	Các mốc thời gian của thế kỷ 21								
	2020	2030	2040	2050	2060	2070	2080	2090	2100
Móng Cái-Hòn Dáu	7-8	11-12	15-17	20-24	25-31	31-38	36-47	42-55	49-64
Hòn Dáu-Đèo Ngang	7-8	11-13	15-18	20-24	25-32	31-39	37-48	43-56	49-65
Đèo Ngang-Đèo Hải Vân	8-9	12-13	17-19	23-25	30-33	37-42	45-51	52-61	60-71
Đèo Hải Vân-Mũi Đại Lãnh	8-9	12-13	18-19	24-26	31-35	38-44	45-53	53-63	61-74
Mũi Đại Lãnh-Mũi Kê Gà	8-9	12-13	17-20	24-27	31-36	38-45	46-55	54-66	62-77
Mũi Kê Gà-Mũi Cà Mau	8-9	12-14	17-20	23-27	30-35	37-44	44-54	51-64	59-75
Mũi Cà Mau-Kiên Giang	9-10	13-15	19-22	25-30	32-39	39-49	47-59	55-70	62-82

Table 2.3:Sea level rise (in cm) under the high scenario

Region	Milestones during 21st century								
Khu vực	Các mốc thời gian của thế kỷ 21								
	2020	2030	2040	2050	2060	2070	2080	2090	2100
Móng Cái-Hòn Dáu	7-8	11-13	16-18	22-26	29-35	38-46	47-58	56-71	66-85
Hòn Dáu-Đèo Ngang	8-9	12-14	16-19	22-27	30-36	38-47	47-59	56-72	66-86
Đèo Ngang-Đèo Hải Vân	8-9	13-14	19-20	26-28	36-39	46-51	58-64	70-79	82-94
Đèo Hải Vân-Mũi Đại Lãnh	8-9	13-14	19-21	27-29	36-40	47-53	58-67	70-82	83-97
Mũi Đại Lãnh-Mũi Kê Gà	8-9	13-14	19-21	27-30	37-42	48-55	59-70	72-85	84-102
Mũi Kê Gà-Mũi Cà Mau	8-9	13-14	19-21	26-30	35-41	45-53	56-68	68-83	79-99
Mũi Cà Mau-Kiên Giang	9-10	14-15	20-23	28-32	38-44	48-57	60-72	72-88	85-105

Regional impacts of climate change

The principal impacts of climate change for different regions of Vietnam are summarized in Table 2.4.

Geographical area	The impacts of climate change
Coastal and islands	Sea-level rise; Increasing number of storms and tropical depression; Increasing number of floods and landslides; Change in natural disaster frequency.
Plain	Sea-level rise; Increasing number of storms and tropical depression; Increasing number of floods and landslides (in the North); Saline intrusion.
Mountains and midland	Increasing number of floods and landslides Increasing number of extreme weather phenomena; Rising temperature and drought (the Central Highlands and the northern mountains And in the Central region)

Table 2.4: Regional climate change impacts in Vietnam

Climate change adaptation

Global analyses indicate that the cost of damage caused by unavoidable climate change (that which will occur regardless of political action to mitigate climate change) will be substantial. Anticipatory - adaptive measures - can however reduce future economic, environmental and social damage caused by the climate change.

Climate change adaptation has been defined by the IPCC as: "Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities." The goal of adaptation is summarized succinctly on the UNFCCC website as: "Practical steps to protect countries and communities from the likely disruption and damage that will result from effects of climate change".

The IPCC divides climate change adaptation into measures which are reactive (i.e. those undertaken in response to an existing impact) and those which are anticipatory (i.e. undertaken before impacts are apparent).

In practical terms for urban & construction plans, adaptation measures may take many forms and are limited only by the creativity of the SEA and planning teams. A key means of integrating adaptation into SEA practices will be through its contribution to the identification of development zones and siting options for infrastructure. The SEA consultant should ensure that zoning and siting decisions made in urban & construction plans are robust in light of changes in flood frequency and magnitude, possible reductions in potable water availability, etc. It is important to use a long time frame (e.g. based on scenarios of change in 2050 and 2100) in assessing the robustness of zoning and siting decisions. Additional guidance on the practical adaptation measures is provided in Table 2.6.

Resilience thinking

Adaptation to climate change should not be treated as a static one-off exercise but rather as a continuous process of learning and responding to arising threats. This entire process is called adaptive management and it represents a core element of adaptation and resilience thinking (see Box 2.1).

Box 2. 1: Adaptation and resilience thinking

Climate change involves changes in linked social-ecological systems that are poorly understood and hence uncertain. Resilience thinking provides a structured way of examining such complex, unpredictable and dynamic systems.

Resilience is understood as the ability of a system to accommodate disturbances or changes whilst maintaining function and structure. It is also sometimes used to describe the ability to build capacity for learning and adaptation. It is important to protect and enhance resilience wherever possible.

A key concept underpinning resilience thinking is adaptive governance. This involves new institutional and organizational arrangements (including new policy approaches), a willingness to experiment and learn, and novel approaches to cooperation amongst stakeholders.

Source: Resilience Alliance 2010

Mitigation of climate change

Mitigation is a better known and understood concept than adaptation. It is defined in the UNFCCC as interventions that either reduce sources of greenhouse gas emissions (i.e. abatement) or enhance their removal from the atmosphere by capture in so-called 'sinks' (i.e. sequestration). Natural carbon sinks include forests, vegetation, soil and the oceans.

In an urban context, climate change mitigation measures might include spatial and infrastructure planning policies that help to limit dependency on private transport or limit distances between residential and employment areas; improved building design standards to reduce energy consumption; provision for the generation of renewable energy; etc.

Additional guidance on the practical mitigation measures is provided in Table 2.5.

Key questions that urban areas can ask about adaptation to climate change

The table 2.5 below presents many ideas and adaptation and mitigation options that urban areas may consider.

A question will naturally arise of how to select the key issues of concern or how to ensure that one solution does not cause different problems which can be more severe than those solved or that they are simply not misplacing problems from one area to another.

Our simple advice is to encourage urban plans to start asking the following simple but important questions:

- What are the likely future climate change phenomena in the study area?
- What are key issues of concern – now and in the future?
- Are proposed developments enhancing or reducing resilience of the study area to expected changes the climate?
- How should the proposed urban developments change – in short-term and long-term planning horizons?
- How to improve the plan, ensure adaptive management and "living with change"?

Ideally, questions such as these should be asked during the elaboration of urban and construction plans or in their appraisals. In this context, the SEA arises as useful tool for analysing whether and how urban areas address questions related to CC adaptation and possibly also mitigation. Chapters 3 and 4 provide detailed suggestions for using the SEA for this purpose.

Table 2.5: Examples of potential climate change adaptation and mitigation measures for urban & construction planning

Basic questions and options to consider regarding climate change adaptation (i.e. preparation for changing climatic conditions) in urban and construction planning and management

Main concerns	Key questions that could be asked about developments proposed in the plan	Illustrative examples of potential mitigation and adaptation measures in urban planning	Illustrative examples of potential mitigation and adaptation measures in urban management
Risks because of heat waves (take into account that heat waves are usually associated with water scarcity episodes – see also the suggestions in the next item)	• Can it be damaged by the heat waves? • Will it increase energy demand for cooling of industrial processes and air conditioning?	• Ensure that any existing or planned essential infrastructure is protected from heat exhaustion • Encourage design for environmental performance and reduce the need for cooling	• Initiate preparation and periodic updates of heat wave early warning systems and response plans for industrial processes • Suggest possible measures to alter behaviour changes for the population during heat-wave episodes (changing dress codes, not working with temperature higher than 40 degree etc.)
	• Will it restrain air circulation or reduce open spaces in the cities?	• Promote expansion of green areas, open water surfaces and wind paths (along rivers and waterfronts) in urban cities • Encourage the use of green roofs • Increase air-humidity in urban centers during heat waves? (e.g. fountains to cool oneself) • Change in green spaces to be more functional rather than visually pleasing	• Change composition of plant species used towards those that provide shelter and can withstand periods of droughts
	• Will it increase local temperatures through absorption or generation of heat?	• Reduce thermal storage in roads and buildings/roofs (by use of different materials and colouring).	• Reduce man-made exhausts during heat waves (industries, and car traffic) • Improve forecasting and warning systems and initiate strategies to increase resilience to heat waves.
	Will it emit volatile organic compounds (VOCs) and nitrogen oxides (NOx) and hence contribute to tropospheric ozone formation during sunny and warm days?	• Reduce local transport and man-made exhausts from car traffic through e.g. public transport, promotion of walking and cycling, etc. •	• Initiate efficient strategies and related programs to reduce emissions of VOCs an NOx pollutants, in particular in urban and sub-urban areas
Risks of droughts due to long-term changes in precipitation patterns (consider also possible synergistic effects with intervention for enhancing water retention capacity of the watershed for the flood management)	▪ Will it increase water demand?	• Use of rainwater and grey water for irrigation of urban green areas, fire protection and possibly through management measures such as tariff policy for rainfall discharge into sewer, etc. • Measures to retain water in the landscape: promote groundwater infiltration in the landscape , adopt multipurpose retention strategies which use storm-water as a source of water supply– such "rainwater harvesting" can be particularly useful in semi-arid areas	• Encourage water efficiency measures (pricing, monitoring water use etc.) • Ensure supply of good quality drinking water for population and water availability for cooling of essential industrial processes
	• Will it adversely affect the aquifers?	• Enhance infiltration and promote groundwater recharge	• Enlarge and better protect the catchment areas • Enhance the protection of aquifers
	• Will it worsen water pollution – especially during periods of drought with reduced dilution rates, increased temperature and turbidity?	• Adopt more stringent water treatment standards to ensure sufficient water quality even reduced during dry season flows (corresponding reduction in dilution rates)	• Minimize low-flow withdrawals to ensure minimal ecological flows • Restrict effluent discharges into water bodies during droughts
Risks because of extreme rainfall events, riverine floods and flash-floods	• Will it be at risks because of location in riverine flood zones?	• Ensure that new settlements are not located in areas exposed to flood hazards – e.g. through restrictive regulations (prohibitions, penalties, resettlement), economic incentives (preferential taxation for desired land use, extra taxation for undesired land uses), knowledge enhancement (information about flood risks, awareness campaigns) • Ensure that any existing or planned essential infrastructure (road segments and intersections, water supply infrastructure; energy infrastructure; waste management sites, the storage of dangerous substances) is protected from future flood risk • Adjust land-use plans to accommodate need for flood passage (mandatory measures for all developments) • Consider changes in construction design that allow for raise in water levels (and ground water levels) – building on pillars, etc. • Support relocation of settlements (long-term adaptation tool) and building of flood management measures (e.g. dykes…)	• Establish, implement and regularly evaluate the Early Warning Systems to generate time-sensitive information about flood risk that need to be communicated to the communities at risk. In high risk areas, consider arrangements for supply of goods and services that may be disturbed by floods.
	• Will it change the capacity for flood passage?	• Restrict urbanization of flood plains and of riparian zones and maximize open public spaces along rivers (e.g. parks, squares, etc.) • Avoid linear developments that may have barrier effects on flood regime & ensure floodwater passage (e.g. do not design roads that go in parallel to rivers and cause barrier effects in flood plains) • Design natural bypass channels, widen streams and channels and leave them in natural or semi-natural state instead of using hard surfaces and engineering structures	• Adjust design standards (e.g. flood demarcation, flood frequency, use extreme rainfall scenarios rather than historic rainfall data, etc.) • Prepare mobile flood walls to be used when needed
	• Will it alter the water retention capacity in the watershed?	• Do not decrease storage volumes of flood plains • Expand permeable surfaces and unsealed green spaces in urban areas, • Consider structural measures for storm-water retention - e-.g. through system of reservoirs (open or covered, wet or dry, online or offline) that temporarily store the surface runoff and release it subsequently at a controlled rate and or provide water for infiltration and recharge of aquifers	• Promote land management that increases water retention capacity of the watershed (e.g. preserve or enhance woodland cover and wetlands, deconstruct drainage system son agricultural lands, promote good agriculture practices that enhance water retention capacity of the soil, etc.)
	• Will it change vulnerability of landscape or woodlands to wild fires?	• Maintain biological diversity • Increase landscape diversity -- increase large-scale resilience, size of management • Plan for post-disturbance management – do not permit changes of land-use after the fires • Incorporate climate change into restoration -- avoid trying to replicate historical conditions, but continue to learn lessons from historical variation.	• Design corridors that limit spreading of fires

Main concerns	Key questions that could be asked about developments proposed in the plan	Illustrative examples of potential mitigation and adaptation measures in urban planning	Illustrative examples of potential mitigation and adaptation measures in urban management
	• Will it affect the capacity of drainage networks to cope with the potential extreme rainfall? Can it channel the drainage rainwater water into lower laying areas?	• Reduce sealed surfaces that limit infiltration (e.g. using open and green drainage) • Design roads that do not direct the run-off of floodwater into one point where the flood streams converge • Separate the sewage and storm-water drainage systems, equip them with adequate capacities, protect them against floods, etc. • Consider separation chambers and measures that prevent backflow during extreme floods • Improve the drainage of highways and roads • Consider underground storage tanks	• Change of construction/design rules to cope with en extreme rainfall - use extreme rainfall scenarios rather than historic rainfall data, • Ensure periodic cleaning and maintenance of sewer network • Introduction of proper monitoring systems and flood management
	• Is there any need to revise or update emergency or response plans for flood management?	• Determine locations for emergency facilities and services • Determine evacuation routes	• Improve on-time monitoring and early warning systems • Encourage design for health emergency and disaster risk management (incl. strategies, plans, consultation and documentation for emergency preparedness and risk management) to minimize vulnerabilities and disaster risks throughout a society, to avoid (prevention) or to limit (mitigation and preparedness) the adverse impacts of hazards • Ensure sufficient amount of pharmaceuticals, medical products and health services • Enhance capacity of health authorities for coping with crisis situations (e.g. training courses for people working in emergencies that allow direct transmission of knowledge and skills)
Risks because of storms and winds	• Will it be at risk because of storms and strong winds?	• Ensure new infrastructure considers increased high winds and storminess • Burry electric cables in high risks areas	• In high risk areas, consider arrangements for supply of goods, services and energy supply that may be disturbed by increased storm events
Risks because of landslides and erosion	• What property, persons or environmental assets will be at risks because of landslides?	• Avoid new development in areas at risk from landslides and erosion, • Protect and expand native woodland cover	• In high risk areas, consider arrangements for supply of goods and services that may be disturbed by land-slides
Risk because of sea level rise, extreme tide and storm surge	• Is it located in areas that may be affected by sea level rise or sea water surge during storms?	• Avoid development in coastal areas at risk • Consider development of floating structures • Adjust drainage and sewer systems to expected sea level rise to ensure their functionality for draining the effluent • Where necessary consider dykes in coastal areas (and their possible adverse environmental impacts)	• In high risk coastal areas, consider arrangements for supply of goods and services that may be disturbed during storms
	• Will it reduce or enhance risks of coastal erosion?	• Where necessary consider coast defence projects (and their possible adverse environmental impacts)	
	• Is it located in areas that may be affected by saline intrusion?	• Move water intakes away from areas that will be affected by saline intrusion – either during droughts, extreme tide or due to storm surge. • Move economic activities that depend on supply of clean water or ground water (especially agriculture) away from areas that will be affected by saline intrusion	

Basic questions and options to consider regarding climate change mitigation (i.e. reducing greenhouse gas emissions) in urban and construction planning and management

Main concerns about proposed developments	Key questions that could be asked about the proposed developments	SEA mitigation measures for urban planning	SEA mitigation measures for urban management
Is the plan suggesting changes in construction sector	• Will the plan increase or decrease demand for energy in residential sector or energy demanding materials? • Will the plan encourage or restrict opportunities for low carbon housing and construction?		• Changes in the building codes • Improve the energy performance of buildings through voluntary or regulatory standards: Rating energy efficiency of buildings - audits and certificates • Reduce demand for air-conditioning - using traditional systems of home cooling, expanding green roofs, parks, etc. • Voluntary fuel switching
Is the plan significantly influencing travel demands, travel intensities and travel patterns?	• Will the plan induce transport? • Will the plan increase use of fuel per km? • Can the plan significantly change personal travel – i.e. the number and length of journeys made and the mode of travel? • Will the plan significantly change freight transport - the volume of transported goods, length of journeys and the mode of travel?	• Encourage use of public transport, provide an effective and integrated public transport system • Adopt capacity restrictions in order to reduce transport • Promote development patterns that reduce need to travel - prioritize a high density urban developments (ideally smaller housing units at higher density because of climate proofing and adaptation concerns about high-rise buildings) and reuse of brown-field land • Support car free developments (e.g. shopping malls located on rail stations and serviced only by public transport, etc.) • Encourage walking and cycling	• Reduce vehicle energy use through improved traffic flows and speed mgmt. • Transport demand management schemes (fiscal measures, charging, etc.) • Encourage car sharing • Improve monitoring of transport in order to optimize infrastructure planning and transport management
Is the plan changing waste volumes or is it dealing with waste management approaches?	• Will the plan increase or decrease waste generation? • Will the plan influence the waste management hierarchy?	• Adhere to the usual waste management hierarchy (reducing, reusing, recycling, etc.) • Support CH4 capture and recovery wherever economically feasible • Support anaerobic digestion with energy recovery • Consider economic and environmental feasibility of incineration with energy recovery	

Chapter III

PRINCIPLES FOR ADDRESSING CLIMATE CHANGE CONCERNS IN THE SEA OF URBAN & CONSTRUCTION PLANS

III. PRINCIPLES FOR ADDRESSING CLIMATE CHANGE CONCERNS IN THE SEA OF URBAN & CONSTRUCTION PLANS

Addressing climate change concerns does not require any significant changes in the basic management principles for effective SEA processes.

This guidance respects all principles of good SEA practice presented in the MONRE and MOC guidance documents (such as conduct assessment early in the planning process, ensure close cooperation with the planning team, etc.) and suggests following additional principles for considering climate change:

- Link climate change assessments with assessments of environmental impacts
- Combine climate change assessment with consideration of disaster risk management issues
- Consider information available from related studies on climate change and adaptation in Vietnam
- Combine inputs of external assessment experts with knowledge of government officials

Each of the above key principles is briefly outlined below.

Link climate change assessments with assessments of environmental impacts

It is important to link the assessment of climate change considerations to other environmental analyses within an SEA. This is necessary because, as Figure 3.1 illustrates, there are climate change is closely linked to other environmental and social phenomena.

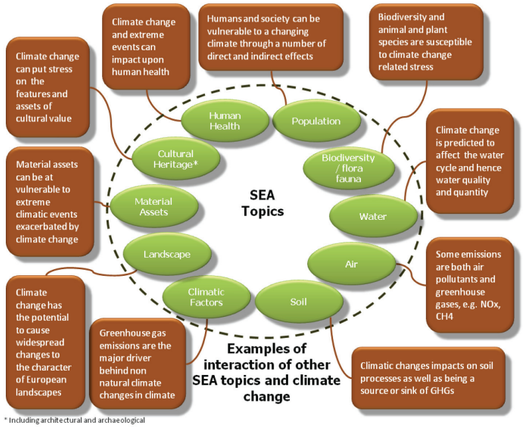


Figure 3.1: Examples of the linkages between climate change and other environmental issues considered in SEA (Source: European Commission, 2013)

The interlinkages that exist between climate change-related impacts and other environmental impacts necessitate that experts conducting a climate change assessments closely co-ordinate their work with other members of the SEA team.

Combine climate change assessment with consideration of disaster risk management issues

Vietnam is one of the most disaster risk prone countries in Asia. Since many climate change adaptation concerns (riverine or coastal flooding, land-slides, forest fires, droughts, etc.) are directly addressed in the provincial and local disaster risk management strategies and plans that are prepared in line with the Vietnam Government's new National Strategy for Natural Disaster Prevention, Response and Mitigation to 2020.

Given the strong linkages between climate change adaptation and disaster risk management in Vietnam, it is highly recommended to consider both issues together and closely involve authorities involved in disaster risk management in the assessment process.

Box 3. 1: Disaster Risk Management in Vietnam

An estimated 70 percent of Vietnamese people are exposed to risks from natural hazards—specifically in rural communities where livelihoods are most threatened. Infrastructure and people have been increasingly concentrated in vulnerable areas such as floodplains and coastal areas, suggesting that disaster-related losses will even increase in the future.

Natural hazards have resulted in average annual economic losses estimated between 1 and 1.5 percent of gross domestic product (GDP) between 1989 and 2008. For instance, the Typhoon Xangsane in 2006 caused damage of US$1.2 billion in the 15 provinces in the Central Region.

Source: http://www.worldbank.org/en/results/2013/04/09/vietnam-disaster-risk-management-project

		Added value of assessment		
		Provides information to SEA experts and planners on what to consider	Supports discussions on opportunities to optimize the plan design	Checks whether the proposed plan and SEA adequately consider climate change issues and provides advice for decision-makers
Timing of the assessment	Starts simultaneously with the revision of a plan	X	X	X
	Conducted after a draft plan has been produced		X	X
	Conducted before a plan has been submitted to decision-making			X

Table 3.1: The effect of timing on the potential benefits of conducting a climate change assessment
Added value of assessment

Conduct the assessment early in the planning process

It is important that the SEA is integrated with certain other decision-making processes. Effective integration produces a variety of beneficial outcomes. This is illustrated in Figure 3.1, which shows how the timing of the assessment affects its overall value in the plan formulation.

Ensure close cooperation with the planning team

The effectiveness of SEA is greatly enhanced through close co-operation and integration with the planning team responsible for the urban & construction plan. Close co-operation is important to effectively mainstream all environmental issues, but is particularly significant where relatively new and sometimes poorly understood concepts like climate change adaptation are involved.

It is recommended that regular meetings are organised with the planning team as soon as the SEA commences. Particularly critical points at which meetings should take place includes the setting of the scope of the SEA (i.e. establishing what issues it should consider), the prediction of the impacts of climate change and their effects on particular planning policies, and the identification of potential climate change adaptation and mitigation measures (the solutions).

A number of other options can be pursued in order to promote strong buy-in from the planning team. For example, the planning team could be formally requested to sign off the Terms of Reference for the assessment process. This places a visible commitment on them to follow through on the issues identified for further consideration in the Terms of Reference.

Consider information available from related studies on climate change and adaptation in Vietnam

SEA is an important tool for integrating climate change considerations in urban & construction planning. However, mainstreaming climate change involves the use of other tools and techniques and also takes place in additional policy contexts. For example, many provinces in Vietnam have produced local climate change action plans. These plans include information on the expected impacts of climate change under different scenarios and potential adaptation measures for various development sectors (e.g. water resources, transport, etc.). Plans might also be produced that focus more on issues of vulnerability and resilience.

Sectoral planning efforts might also be relevant to the integration of climate change in SEA. For example, hydrological assessments and disaster risk management studies may also address climate change adaptation.

There are many additional examples of relevant tools and policy and planning contexts which could be listed, but the important point is that SEA is only one element of climate change mainstreaming efforts. It is important when conducting SEA to recognise this and, to the greatest extent possible, co-ordinate with other relevant planning and assessment activities. Co-ordination promotes efficient resource use (e.g. using data from existing sources) and integrated planning and decision making across the government bureaucracy. Good SEA practice is thus as much about co-ordination skills as it is about analytical skills.

Choose suitable assessment approach based on availability of information for different issues

Emphasis of the climate change assessment will depend availability of information, resources and time available for the assessment and priority concerns of decision-makers and stakeholders.

SEA may generally assess whether:

- the plan objectives and orientations support or conflict with the relevant CC objectives and DRM objectives
- the proposed plan takes dully into account solutions proposed by previsous climate change and DRM studies in the study area
- the proposed plan will make the future state of environment (which will change because of the climate change) even worse or better or whether the proposed plan can be significantly adversely affected by the future climate change trends

In reality, most assessments will combine different approaches based on availability of information for different issues. The available data and information for the SEA will be determined during the SEA scoping and SEA team can prepare a simple table such as an example below to facilitate assessment process.

Table 3.2: Determination of available information through the scoping process

Key issues of concern	Sources of data	Solutions proposed in related studies	Relevant objectives	Key stakeholders to be consulted
E.g. Flash flooding in area XYZ	*Sources of information on trends or scenarios for the issue*	*Suggestions for solutions or mitigation measures proposed in related studies*	*Relevant objectives established for such issues by the national or provincial government policy documents*	*Key stakeholders (government authorities, provincial or local government, etc.) that are interested in this issue.*

Combine inputs of external assessment experts with knowledge of government officials

Most SEA are conducted by external experts. In this regard it is important to note that although external have expertise in the SEA process management, they will frequently lack important local knowledge and the time or contacts to access important information. They also may not be able to create the linkages within the administration that are needed to secure integration of SEA and planning processes.

It will therefore be beneficial if the assessment involves, as much as possible, local government officials and experts. Any external consultants can act as advisors or coaches who ensure that the assessment process complies with relevant regulations and properly considers key issues, including those concerning climate change. This will also enhance the building up knowledge and experience within the regional and national administration and facilitates a proper implementation of recommendations formulated within such collective assessment approach.

INTEGRATING CLIMATE CHANGE CONSIDERATIONS INTO THE SEA OF URBAN AND CONSTRUCTION PLANS IN VIETNAM

CHAPTER III: PRINCIPLES FOR ADDRESSING CLIMATE CHANGE CONCERNS IN THE SEA OF URBAN & CONSTRUCTION PLANS

Chapter IV

STEPS IN THE INTEGRATION OF CLIMATE CHANGE CONCERNS INTO SEA

IV. STEPS IN THE INTEGRATION OF CLIMATE CHANGE CONCERNS INTO SEA

The approach recommended to integrate climate change into SEA involves the following nine steps:

1. Initial scoping and preparation of terms of reference for the relevant climate change analyses;
2. Engage stakeholders with climate change related mandates and responsibilities;
3. Identify the specific climate change-related concerns for the urban & construction plan
4. Understand and describe existing and future baseline trends for key issues of concern using scenarios;
5. Assess the consistency of the proposed urban & construction plan objectives with relevant national and/or regional climate change objectives;
6. Assess the potential impacts of a proposed urban & construction plan and their likelihood;
7. Propose changes in the urban & construction plan and provide other relevant recommendations;
8. Prepare for adaptive management of future risks; and,
9. Communicate climate change related assessments in the SEA Report.

This chapter provides a detailed explanation of the aims, methods and practices for each of these steps. It also includes examples from the pilot SEAs undertaken as part of the development of this guidance. The linkages between these nine steps and stages of, firstly, SEA and, secondly, urban & construction plan preparation are illustrated in Figure 4.1.

Step 1: Initial scoping and preparation of terms of reference for the relevant climate change analyses

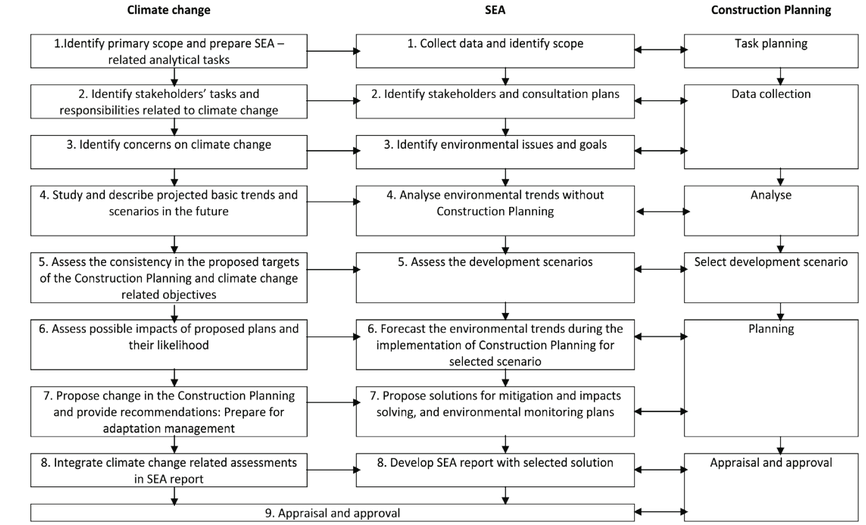
Scoping should determine the key issues that need to be considered in the SEA so that clear terms of reference for the assessment can be prepared. Issues to be considered during scoping include: consultations to be held; baseline analyses to be undertaken; alternatives to be considered; and, methods to be used in assessing impacts. Scoping should also involve identifying the necessary expertise, inputs and budget required to undertake the SEA. If done well, scoping can promote focused and high quality SEA practices and the efficient management of the SEA.

In relation to climate change, scoping should:

- Identify the climate change scenarios and time-horizon(s) to be considered. It is important to consider long term time horizons when addressing climate change. It is recommended that 2050 and 2100 are used as reference points for the analysis of future trends.
- Define the spatial boundaries of any necessary climate change assessments. For example, will the SEA examine only local concerns or upstream/downstream issues of concern where the planned area is located in a river basin;
- Consider the objectives and focus of the planning process, and the time available for the climate change assessment;
- Identify the expertise required to undertake the climate change assessment and prepare terms of reference for the impact analyses.

The exact contents of the scoping exercise should be confirmed in the decision for approval of urban & construction plan design tasks, following discussion between the SEA team and the urban & construction planning agency.

Figure 4.1: Linkages between climate change assessment, SEA and urban & construction planning



Step 2: Engaging stakeholders with climate change-related mandates and responsibilities

Key stakeholder groups to be consulted in the SEA are:

- Agencies assigned to complete the urban & construction plan;
- Government agencies with an interest in urban & construction planning and its impacts upon the environment;
- Non-government organizations and civil society organizations; and
- The private sector.

With regard to climate change, it is suggested that consideration is given to involving the following actors in scoping:

National level Plans

- The Ministry of Natural Resources and Environment
- Institute of Meteorology, Hydrology and Environment
- The Ministry of Construction
- The Ministry of Agriculture and Rural development
- Department of Water Resources
- The Ministry of Trade and Industry
- The Ministry of Transport
- The Ministry of Planning and Investment
- The Ministry of Information and Communications

Local level Plans:

- Department of Construction
- Department of Natural Resources and Environment
- Department of Agriculture and Rural Development
- Department of Trade and Industry
- Department of Transport
- Department of Planning and Investment
- Department of Information and Communications
- Climate Change Coordination Office
- District/city people's committees (Divisions related to environment, irrigation, natural disaster, urban management)
- Commune/ward people's committees
- Interested consultants
- Interested Social and professional associations/organizations such as Environmental Protection Association, Association of Planners and or Architects, etc.

It should be noted that the formulation of sound advice on climate change adaptation and mitigation may also require engagement of authorities that have responsibility for large-scale environmental phenomena: e.g. watershed management authorities who will deal with climate change concerns for a watershed as a whole, and not only for the area addressed in an urban & construction plan. This may require engagement of authorities beyond those with jurisdiction over the proposed plan.

An example of the stakeholders involved in the climate change assessment undertaken for the SEA of Halong City Master Plan is provided in Box 4.1.

Box 4. 1: Stakeholders involved in the assessment of climate-related concerns during the SEA of Halong City Urban Construction Plan

Quang Ninh provincial level:

- Department of Construction (Divisions of Architecture and Planning; Technical Infrastructure; Institute of Planning and Construction Design)
- Department of Natural Resources and Environment (Divisions of Marine and Island; Environment Protection; Water Resources; Meteorology and Hydrology)
- Department of Agriculture and Rural Development (Divisions of Irrigation; Science and Technology; Construction Management)
- Department of Planning and Investment
- Department of Transport
- Department of Trade and Industry
- Department of Culture, Sports and Tourism
- Department of Information and Communications
- Department of Health Care
- Provincial Climate Change Co-ordination Office
- Provincial Centre of Meteorology and Hydrology
- Halong Bay Management Division

Ha Long city people's committee:

- Division of Urban Management
- Division of Natural Resources and Environment
- Division of Economic and Infrastructure
- Division of Culture and Information
- Division of Construction Project Management
- Centre of Architecture and Planning
- The People's Committee of 20 wards (under Halong city)
- Other stakeholders
- Halong People Council
- The consultant conducting the Halong Master Plan

Step 3: Identify the specific climate change issues

The MOC SEA Guidance recommends that the following approach is used to define the key issues of concern that should be addressed in the SEA processes:

- Review the main recommendations from related studies or previous SEAs;
- Identify the priority concerns of key stakeholders;
- Prioritise issues and determine the focus of the assessment.

With regard to climate change, it is suggested that good SEA should not only consider historic climatic data, but also future scenarios of climate change and its impacts. A clear description of the climate change scenario creates an enabling setting for discussions on whether the expected climatic factors should be considered in the plan design and how they may affect the environmental context of the project.

It is important to clearly identify and present the climate change scenario(s) used in the SEA. It is recommended that scenarios for the year 2050 and 2100 are used as a reference points for the assessment of future impacts. Such a long term forecast may seem discordant with the development of plans which have only a 10 or 20 year lifespan. Nevertheless, it is critically important to consider long term trends because they will bring large-scale changes that must be considered when planning future uses of the territory. Consideration of long term trends also helps to understand the nature of the key risks and to ensure short term adaptation actions do not curtail longer term options.

To support the process of identifying climate change adaptation concerns, it is important to review national and local adaptation strategies (where the latter exist) and any other relevant studies on climate change. It is also important to identify what information is available on relevant climate-related effects in the context of the urban & construction plan under consideration.

In identifying climate change-related concerns, the SEA team should ask relevant stakeholders the following questions:

- What climate change studies (general climate change reports, flooding, disaster management, etc.) are available for the study area?
- What are stakeholders' key concerns about climate change?
- What data are available for the priority concerns and where is that data held?
- How might the urban & construction plan affect the priority concerns?
- What are the possible adaptation or mitigation measures that could be considered within the SEA?
- How can the SEA facilitate the selection of adaptation and mitigation measures?
- Are there additional stakeholders with whom meetings should be held?

The above questions are illustrative and can be customised for the needs of each particular assessment process. The Box 4.2. presents an example of questions asked during the HaLong City scoping workshop.

Box 4. 2:Questions asked during the Ha LongCity scoping workshop

1. What are the current pressing environmental issues in Halong City (e.g. environmental pollution, resource extraction, changes in ecosystems, etc.)?
2. How has climate changed in recent years in Halong City (e.g.changes in temperature, rainfall, change sea level fluctuations, storms and tropical depressions, etc.)
3. What effects has climate change caused (e.g. flooding, droughts, river erosion, salinization, loss of ecosystems, etc.)?
4. What research related to climate change in the study area or related ecological zones has been conducted (e.g. river basins, coastal areas, etc.)?
5. How might the proposed urban construction plan impact negatively on the environment and climate change (e.g.regional planning A, project B, etc.)?
6. What climate change adaptation measures should be considered to cope with climate change (e.g. Building dikes, dams, coastal eco system conservation, etc.)?
7. What climate change mitigation measures are relevant to the urban & construction plan?

The scoping outcomes can be summarized using a simple tables – see for instance a summary of scoping outcomes from the Cam Ranh and Song Cau pilot studies in Table 4.1.

Table 4.1: Summary of scoping outcomes from the Cam Ranh and Song Cau pilot studies

Key issues of concern	Sources of data	Solutions proposed in related studies	Relevant objectives	Key stakeholders to be consulted
ADJUSTMENT OF GENERAL URBAN PLAN OF CAM RANH CITY, KHANH HOA PROVINCE TO 2035				
Temperature increase causing drought and flow discharge reduction during dry season	- Study climate change impacts, and adaptation and responsive solutions in Khanh Hoa (Department of Science and Technology of Khanh Hoa, 2012) - Climate change responsive action plan of Khanh Hoa province during 2011-2015 (Decision No. 1113/QĐ-UBND dated 5 May 2011) - Water resources planning for Central region during 2012-2020 and orientation to 2050 with climate change conditions (Decision No. 1588/QĐ-TTgdated 24 October 2012)	The study points out required actions on climate change and water resource but does not provide specific solutions such as: - *Assessment of climate change impacts to water resource* - *Study on climate change responsive solutions to water resource* - *Study on the management of urban water resource usage demand* - *Study on rain water collection and underground water supply* Proposed plans: - Coordinate in operating inter-reservoirs to explore effective use of water source and ensure benefits between sectors - Develop and upgrade water resource and reservoir systems	- Regulate water discharge during rainy and dry seasons - Upgrade reservoir capacity -Recycle water usage - Regularly complete water resource systems, ensure water supply for agriculture, industry and household usage.	- DARD, DONRE, DOC, Hydro-meteorological centers; Water supply companies
GENERAL PLAN FOR SONG CAU TOWNSHIP AND ITS OUTSKIRTS BY 2020 WITH VISION TO 2030				
Land erosion and sea erosion due to sea level rise and floodtide	Action plan to response to climate change of Phu Yen province (Phu Yen DARD)	- Plant and strictly conserve protection forests along the coastal line to prevent seashore and river bank erosion. - Build regulating lakes and damp system - Build damps and dykes to prevent salinity intrusion, plant trees to prevent wind and wave; construction work to prevent erosion - Planning/ improve dyke systems in coastal and river mouth areas (Project on building Tam Giang dyke towards the downstream of Da Vai dyke; Project on Road construction in Tam Giang – My Hai (Song Cau township)	- Protect coastal areas - Sustainable urban development - Disaster management	- DONRE, DARD, DOC, Hydro-meteorological centers

Step 4: Understand and describe the baseline trends

MOC guidelines require an analysis to be carried out of the key environmental issues without the proposed construction & urban plan. This analysis, among other issues, should focus on "analysing past trends and the current status of key issues", "identifying the driving forces" and "forecasting or predicting the likely future evolution of the trends". This information is useful in order to determine long-term environmental trends in the absence of the urban & construction plan. It therefore forms the basis for accurately predicting the impacts of different construction options over time.

Trend analyses

Trend analysis is essentially an interpretation of changes over time with and without the proposed plan or programme.

In climate change related assessments, trend analysis is used, firstly, to analyse current climatic conditions and to predict future baseline trends in the absence of the construction & urban plan.

In order to ensure that the assessment of baseline trends is focused, it is recommended to concentrate on the main environmental and climate change issues that have been identified during scoping. As previously recommended, scenarios for the year 2050 and 2100 should be used as a reference points for analysis of the baseline trends.

Where possible, the analysis of trends should be based on data from existing monitoring systems and studies. If it is deemed necessary to collect further data, the SEA may rely on use qualitative data (e.g. collective expert opinions obtained through interviews or workshops).

Box 4.3 provides information on the ways in which information on the trend analysis can be effectively communicated to stakeholders.

Box 4. 3:Analysis of Trends

Information on trends needs to be effectively communicated. This can be achieved via various methods, including:

1. Story-lines that describe the overall trends, their main drivers, their territorial dimensions and key concerns and opportunities arising from these trends;
2. Maps showing spatial patterns of trends;
3. Graphs may range from relatively simple charts that use available data sets to illustrate key issues and/ or their drivers over time, to complex graphs that provide comprehensive overview of correlation between drivers and the corresponding (sometime delayed) changes over time.

Source: Dusik (2007)

It should be noted that SEA is not an academic study and it should outline the future trends as fully as possible, but without imposing undue resource requirements or costs. SEA practitioners can outline the trends qualitatively (e.g. 'a trend may grow but it is unlikely to exceed a threshold value of X') or by using best- and worst-case scenarios illustrating possible extremes that may occur. Terms such as 'strongly suspected' or 'suspected' can be used to convey the level of confidence in the outcomes of a scenario, although such terms should always be carefully defined where they are used.

If it is difficult or unproductive to analyse trends for some issues which are less important or lacking data, it is also possible to only outline current situation and problems and possibly also emerging threats and refer to the fact that detailed data are missing. Assessment of impacts can only then analyze whether the proposed plan will make the current situation and problems and/or arising threats worse or better.

Box 4.4 provides an example of trend analysis from one of the pilot studies conducted in developing this guidance.

Box 4. 4: Example on analysis of changing trend of land erosion in Ha Long city

As per statistics, the land erosion in Ha Long city over the past 5 years has changed as follow:

- 2005: Due to rainstorm and heavy rain, a number of barrier walls and households' fence walls were collapsed, landslide happened in some areas of Hon Gai, Bach Dang, Tran Hung Dao wards of Ha Long city.
- 2006: Heavy rain during the rainy season at the end of July and early of August caused severe landslide in Bai Chay Bridge area, Hon Gai ward, and Yet Kieu ward and affected more than 100 households living in these areas.
- 2008: Prolonged heavy rain caused land erosion in some areas of Ha Long city: one house in 2A complex, one fourth-class flat in group 26, 2B complex of Cao Xanh ward were collapsed and one person was killed; one fourth-class flat and one attached area of Ha Phong ward were collapsed.
- 2009: Landslide in Ha Long City damaged one barrier wall of a household in group 9, complex 3, Hong Hai ward, 7 persons killed and one injured. One house in 2A complex of Cao Xanh ward was collasped and one person was killed in the incident.
- 2010: Heavy rain caused hill land erosion of a household in group 2, complex 7, Hong Hai ward that killed two persons

According to previous statistics on landslide/ erosion in Ha Long city, it is found that the incident could happen without any certain trend and mainly come from heavy rain, leading to severe damages to people's lives and assets. The locations suffering from the disasters are usualy slopy and have construction work undertaking by local people who built barrier walls to protect their sites. This construction led to many landsliding risks and they would easily happen during heavy rain. Therefore, landslide/ erosion will continue to be a threat during heavy rain in the future, especially on slopy construction sites such as in Hon Gai, Bach Dang, Tran Hung Dao, Yet Kieu, Cao Xanh and Hong Hai wards...

Managing uncertainty through scenarios

The trend analysis should give an overview of the likely future development of current trends. However, accurate description of future trends for climate change will, even with the relevant reports and projections available, often be constrained by numerous uncertainties.

One way of working with these uncertainties is to construct multiple scenarios for a particular issue and its

temporal baseline trend. This means that the analysis will not rely on the predictions from a single trend analysis (and the uncertainties this incorporates), but will provide a number of representations of future trends based on different assumptions. This can help to improve the robustness of decision-making (see Box 4.5 for an example).

Box 4. 5: IPCC emission scenarios

A well-known example of the use of scenarios to model future trends in the face of uncertainty is the IPCC emission scenarios. These scenario allow scientists to model human emissions of carbon gases under different development scenarios. For example, one group of scenarios assumes the global population of the future will be relatively affluent, there will be high levels of economic growth across the world, and that demand for energy will be comparatively high. In another scenario it is assumed that demand for energy will be comparatively modest due to technical innovations and the dematerialisation of economic activities. The assumptions underpinning these scenarios result in differing predictions being made about emissions of greenhouse gases. This has important implications, of course, for projections of the magnitude of climate change in the future and its consequential effects.

A practical example of the ways in which scenarios and uncertainty can be managed in relation to climate change trends for urban & construction plans is presented in Box 4.6.

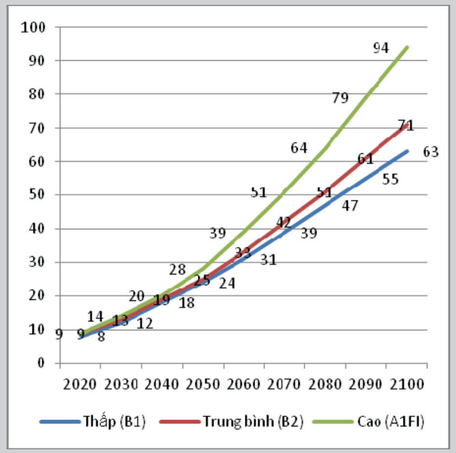
Box 4. 6:Management of unceratainty in sea level rise scenario in Ha Long City area.

As per the low level scenario, the sea level rise in Ha Long city will increase of some 42-57cm by mid 21st century. According to the medium level scenario., this increase will be of 49-64cm, and of 66-85cm as per high level scenario.

In order to response to sea level rise, the planners proposed to raise foundation step to 0.3m higher in construction work in Ha Long city (for residential areas) and 0.5m (for important construction areas such as industrial zone…). This is in accordance to the medium scenario by planning time at 2050.

However to response to uncertainties in forecasting the sea level rise, the assessment team suggested some following measures:

- Protect and plant mangro forests in combination with high dyke construction. This could respond to the low and midle sea level rise scenarios.
- Strengthen dykes' bases to allow raising the height of dykes' top when necessary (in high level scenarios)



Step 5: Assess the consistency of proposed spatial planning orientations with relevant climate change objectives

One of the key tasks in the preparation of an urban & construction plan is the selection of its intended orientation. The selection of an orientation will normally include an assessment of alternative orientations and priorities. The SEA team should assess these different development orientations and judge their appropriateness in connection to climate change objectives.

When doing so, they can analyse how the proposed urban development orientation supports or contradicts relevant climate change and/or disaster risk reduction objectives. These objectives provide a benchmark for assessing whether the proposed urban & construction plan moves development in an appropriate direction or not.

Box 4.7 provides examples of sources of climate change objectives that might be used in SEA. It is also a legal requirement that the contents of the National Strategy on Natural Disaster Prevention, Fighting and Reduction are integrated into development plans. This National Strategy includes objectives that have high potential to be affected by climate change and, therefore, should also be drawn upon in the consistency analysis.

Box 4. 7:Sources of information on climate change objectives in Vietnam

- Decision No. 158/2008/QD-TTg on Approval of the National Target program to respond to climate change issued on 02/12/2008 by the Prime Minister.
- Decision No. 2139/QD-TTg on Approval of the National strategy on climate change issued on 05/12/2011 by the Prime Minister.
- Decision No. 1183/QD-TTg on Approval of the National Target program to respond to climate change of the 2012-2015 period issued on 30/08/2012 by the Prime Minister.
- Decision No. 1474/QD-TTg on promulgation of the National Target program on climate change of the 2012-2020 period issued on 05/10/2012
- Official Dispatch No. 1443 on approval agenda projects on National Target program responding to climate change issued on 19/09/2012 by the Deputy Prime Minister.
- Decision No. 2148/QD-BNTMT dated on 20/12/2010 by the Minister of Natural Resources and Environment on promulgation of the climate change Action Plan of the Ministry of Natural Resources and Environment (2011-2015)
- Decision No. 199/QD-BGTVT on promulgation of the climate change Action Plan of the Ministry of Transport (2011-2015) issued on 26/01/2011
- Decision No. 4103/QD-BCT on promulgation of the climate change Action Plan of the Ministry of Industry and Trade issued on 03/08/2010
- Decision No. 543/QD-BNN-KHCN on promulgation of the climate change Action Plan of 2011-2015 period and vision to 2050 of the Ministry of Agriculture and Rural Development issued on 23/03/2011
- Provincial Climate Change Action Plans

The actual assessment of the consistency of the proposed plan with the relevant climate change objectives may be conducted using matrices or analytical text that identifies synergies and/or conflicts with the objectives and priorities of proposed plan. An example of a simple matrix approach is provided in Figure 4.2.

Table 4.2:Assess the consistency between planning objectives and climate change adaptation objectives within the Regional Construction Planning of Quang Binh province

	Climate change adaptation objectives			
Planning objectives	Develop spatial urban model adapting to climate change	Enhance capacity for technical infrastructure system adapting to climate change	Protect and develop ecological systems	Enhance the capacity to response to emergency natural disaster
Create high quality living, working and entertaining environment. People's life is continuously improved and enhanced in all aspects	++	++		+
Develop marine economy (sea port, industry, tourism, fishery...)	-	+	--	-
Preserve heritages, biodiversity and geology			++	+
Strengthen urban – rural area linkage, improve living conditions in rural areas	+	+		++
Develop motive development Northern region on the basis of responding to climate change	+	+		
Maintaining forestry-agriculture ecological region in combination with natural conservation			++	+
Monitor urban development in coastal areas and seashore areas to mitigate negative impacts to the environment	++	+	+	+
Improve urban area in mountainous region to enhance the living standards of people living in rural areas	+	+	-	++

Legend:

--	Major conflict/ limitation
-	Considerable conflict/ limitation
+	Considerable positive impacts or cooperation
++	Comprehensive cooperation – proposed objectives to solve environmental and sustainable concerns are achieved
	Unimportant impact

This assessment is likely to benefit from iterative discussions between SEA practitioners and those who preparing or adopting urban & construction plan. Such discussions can identify broad environmental risks and benefits associated with different development options, and may aid the development of alternatives.

It may be that climate change objectives in national and provincial action plans are not sufficiently detailed in order to be used in a consistency analysis. Where this is found to be the case, the SEA team may recommend that the action plan is further developed and made clearer, more focused and more practically oriented. This would create a valuable feedback loop for the continual improvement of climate change action plans.

Step 6: Assess the possible impacts of the proposed urban & construction plan and their likelihood

SEA involves the identification of the environmental effects of the planning policies and the assessment of their cumulative effects. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time. Consideration of cumulative effects is essential in order to take into account interactions between multiple planning policies or activities, and their environmental effects.

As previously discussed, SEA practitioners should use trend analysis to assess complex relationships between the actions proposed in urban & construction plans and climate change. This analytical approach is baseline-led: i.e. it focuses on specific issues (e.g. vulnerability to flooding) and it identifies those proposals contained in the plan that may significantly affect an issue, plus describes the characteristics of the impact.

The impacts of each plan proposal can be described by outlining: assumptions underpinning the prediction: e.g. when or under what circumstances will the impact occur; impact magnitude; geographical scale; duration or frequency; probability of occurrence; and, uncertainty associated with a prediction. It is also important to specify clearly and precisely which social groups will be affected by particular impacts, as vulnerability will vary amongst different sections of society.

At the end of this analysis, the SEA practitioner may review all the identified impacts on a baseline trend and draw conclusions on any expected changes that will cumulatively result from a plan. They should also draw conclusions on who may be affected by these impacts and whether the impacts affect the feasibility of the proposed plan or particular policies contained therein.

Such conclusion will inevitably involve uncertainties and it is important that SEA practitioners outline key assumptions made in predicting impacts. There are many ways in which information on uncertainties can be managed and communicated. One approach is to use scenarios to illustrate, for example, impacts arising under best- and worst-case assumptions. Residual uncertainties in an impact prediction should be communicated as clearly and precisely as possible (see Box 4.8).

Box 4. 8: Describing uncertainty for impact predictions

A clear and precise description, and possibly quantification, of uncertainty can play a valuable role in informing decision-making. It will not eliminate uncertainty, but it can help actors to understand the levels of uncertainty that impact predictions incorporate.

It is important to be consistent in the application of terms used to describe levels of uncertainty. Table 4.2 illustrates the importance of clarity and precision using a typology developed by the IPCC. Each descriptive term used to characterise levels of uncertainty is qualified in terms of a numerical probability of occurrence.

Defining terms used to describe uncertainty

Term	Likelihood of the outcome
Virtually certain	99 - 100% probability
Very likely	90 - 100% probability
Likely	66 - 100% probability
About as likely as not	33 - 66% probability
Unlikely	0 - 33% probability
Very unlikely	0 - 10% probability
Exceptionally unlikely	0 - 1% probability

Step 7: Propose changes in the urban & construction plan and provide other relevant recommendations

The next step in the SEA process involves formulating proposals for climate change adaptation and climate change mitigation based on the assessment of climate change issues and impacts. This can be interpreted as part of the process typically referred to as impact mitigation in SEA. We subsequently refer to this as SEA mitigation to differentiate it from the concept of climate change mitigation.

The term SEA mitigation is broadly defined in this report to include not only ways to reduce the negative effects of development plans, but also the search for enhancement options which can accentuate the positive impacts of development. The consideration of alternatives is also often part of the consideration of SEA mitigation measures.

When considering climate change adaptation as a component of SEA mitigation, it is particularly useful to give attention to:

- ***"Win-win-win" options*** that have desired impacts on climate change, biodiversity and ecosystem services but also have other social, environmental or economic benefits (e.g. rehabilitation or restoration of magroves that protect the coast from erosion and storm surge, or rehabilation of forests in upland watershed)
- ***"No-regret" or "low-regret" options*** that yield benefits under different scenarios (e.g. ensuring permeability of cities for safe passage of flood waters, etc.);
- ***Adding "safety margins"*** to new investments to ensure they are resilient to a range of future climate impacts (e.g. developing dykes with sufficiently solid foundations to allow for their future upgrading);
- ***Defining "no-go areas"*** (e.g. moving important infrastructure away from flood risk zone)
- ***Delaying proposals*** that may have adverse impacts and/or their beneficial impacts are uncertain and subject to various assumptions (e.g. building dykes to protect one settlement from flood waters and worsening the flood severity downstream)

Since most assessment will be based on many uncertainties and assumptions, it appears wise to generally prefer flexible options that can be modified if significant impacts start to occur (e.g. not urbanising areas that may be flooded - use them instead for agriculture and later possibly aquaculture, etc.). In this regard, SEA should mainly promote "adaptation thinking" and adaptive management and prioritize flexible and robust developments that can cope with a range of possible impacts and delaying projects that are risky or whose beneficial impacts are uncertain and subject to various assumptions.

Box 4. 9: "No regrets" SEA mitigation measure

A 'no regrets' SEA mitigation measure is one where there is no reason to regret the decision to implement it even in the absence of climate change. The implementation of 'no regrets' measures can therefore provide a cost effective first step in climate change adaptation.

Precisely what constitutes a 'no regrets' SEA mitigation measure depends on the specific characteristics of the plan and geographical area under consideration in an SEA. However, in many circumstances a living shoreline approach can form either a "win-win" option or "no-regrets option" for coastal areas of Vietnam.

A living shoreline approach seeks to protect, restore or enhance vegetated shoreline habitats, notably mangroves and dune ecosystems.

It is estimated that Vietnam has lost around 80% of its mangrove forests. Their restoration creates multiple benefits, including biodiversity benefits, protection against erosion, and potentially socio-economic benefits (e.g. due to increased fish stocks). It also can reduce on-going expenditure on the maintenance of coastal defences as the living shoreline will be largely self-sustaining.

Mangrove forest in Quang Ninh province

It is important to think broadly and creatively about the types of measures that may be appropriate for SEA mitigation. Table 2.6 in Chapter 2 outlines a number of possible mitigation measures covering both climate change adaptation and mitigation. Further practical examples of techniques for climate change adaptation and mitigation are provided in Boxes 4.10-4.12.

Box 4. 10: Making space for flood water retention in urban areas

Flood water retention areas allow for the capture, storage and gradual release of water during periods of heavy rainfall or tidal flooding. Flood water retention capacity in urban areas can be increased through a variety of measures. The restoration of existing river channels can often generate additional water storage capacity by, for example, reinstating meanders, removing artificial obstructions or reconnecting a river with its natural floodplain (e.g. by setting back dykes). Such measures can also generate benefits for biodiversity: i.e. the can form 'win-win' measures.

Recreational areas, sport stadiums, school playgrounds, car parks, and even low value industrial land can be designed as temporary flood water retention areas. The pictures below provide an example of such a

dual use feature: an urban amenity water plaza. The water plaza consists of seating, sports pitches, and other features to create amenity value. It also comprises of multiple channels and levels that progressively fill up with water during periods of heavy rain, creating new features over time. Flood water drains slowly out of the water plaza through a central drainage point. Filters attached to drains feeding into the water plaza ensure water quality in the plaza is suitable for recreational activities.

Box 4. 11: Fresh air ventilation corridors

Fresh air ventilation corridors are green or undeveloped corridors that allow an unimpeded flow of air from rural areas in to urban areas. The establishment of a fresh air ventilation corridor can have numerous environmental and social benefits. Computer modelling indicates that it can help to reduce the urban heat island effect. Cooler air from the surrounding countryside will reduce heat build up in the central regions of a city. This can help to reduce adverse consequences for human health during periods of very warm weather. A fresh air corridor can also function as a cool refuge during hot weather.

Fresh air corridors are 'win-win' options in that not only do they provide climate change adaptation benefits, but they also have other positive effects. For example, they can provide habitat for biodiversity, reduce air pollution, and create recreational opportunities for the urban population.

Ventilation corridors in the new city of Ningbo, China

Box 4. 12: Additional measures for construction planning

The overall urban construction planning of Song Cau township and its outskirt by 2020 and vision to 2030 has a number of climate change adaptation measures including:

- Plant forest trees combined with protected forest on high altitute moutainous areas to reduce erosion and landslide
- Prioritize to plant green trees on a surface of 50-100m width to function as protected forest for moutain base and coastal areas during rainy and flood seasons and to prevent tsunami.
- Encourage people to raise their house floor up to H≥3,0m at their current living place; in new settlement areas, the house floor height should be limited at 3m – 4,5m
- Design transportation system with a slope along the roads of 0,4% ≤ i ≤ 4; apply technical measures to ensure effective drainage from road surface.
- Respect natural terrain and landscapes, do not cause damage to the natural landscape, water surface, rivers, lakes and streams; Ensure reasonable slope of the construction work for automatic drainage
- Build open cannal systems to receive water flowing from moutains and avoid water overflowing to projected land areas; build dykes with foundation steps in high and slopy mountainous areas to prevent landslide; construct barrier walls in areas having potential landslide.
- Continue to use existing ground water sources and additional water supply from Xuan Binh lake.
- Construct road and lagoon embankment in Cu Mong.
- Dredge to clear river flow for water drainage in rainy and flooding season

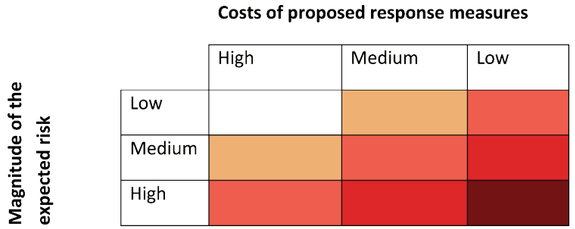
To strengthen climate change responsive capacity, a number of measures on urban management and planning however are recommended as follow:

- Water use planning towards recycling of waste water and use of rainfall to reduce the pressure on water supply.
- Revitalizing and developingmangro forest systems in heavily erosed areas instead of building dykes, and at the same time, providing natural water drainage method when heavy rain happens.
- A number of old residential areas in Xuan Thanh, Xuan Yen and Xuan Dai wards are prone to flooding. It is therefore necessary to upgrate drainage systems in old residential areas, allocate propriate water pumping services to ensure drainage capacity during rainy and flooding seasons.
- Investment to raise foundation steps of construction areas proning to comprehensive flood namely Long Binh, Van Phuoc and Dan Phuoc.
- Limit the construction work that prevents the flow such as roads cutting accross the rivers, and limit the use of concrete surface which may affect rainfall absorption capacity.
- Open to maximum width the drainage to Xuan Dai bay, Cu Mong lagoon to allow fast water drainage during heavy rain.
- Plant green trees along slopy tranpsortation roads to prevent road surface erosion.
- Buil more reservoirs at the upstream to maintain water during rainy season, prevent flash flood and flood in the downstream and at the same time, provide water when drought happens.
- Increase density and size of resevoir to enhance capacity of water stocking and reduce flood risk.

Although some mitigation and enhancement measures proposed by the assessment teams may be cost effective or even save money, many recommendations for adaptation or mitigation measures will entail additional costs.

In this regard, it is important to note that the MOC Technical Guidelines on SEA require that proposed mitigation measures are clearly prioritized. Prioritisation can be undertaken using simple qualitative criteria. For example, cost, importance, urgency, etc., for individual mitigation measures can be assessed using a scale of high, medium and low. In this guidance we propose to use a simple framework based on impact scale and costs of proposed mitigation measures. An example of such framework is presented in Table 4.3.

Table 4.3:Framework for prioritising proposed responses based on risk magnitude and costs



When presenting the mitigation measures for final consideration, it is useful to clearly "package the proposals" for decision-makers. This can be achieved by outlining:

- ***Main recommendations for immediate consideration in this planning process*** - these should include win-win options, low-regret options or other proposals that reduce important risks and do not entail excessive costs
- ***Other priority recommendations for long-term consideration in future planning processes*** - these should present suggestions for further studies and consideration of possible high-cost investments or their beneficial impacts are uncertain and subject to various assumptions
- ***Recommendations for other useful remedial actions - these should include suggestions for relevant planning processes*** - e.g. higher or lower level planning document, planning in relevant areas (e.g. upstream or downstream) or decision-making in related sectors (e.g. operation of hydropower plans, irrigation planning, water supply planning, support to transformation of agriculture etc.)

Presentation of these proposals can benefit from simple tables and forms; see Table 4.4 for an example.

Table 4.4:Framework for presenting priority recommendations formulated within the assessment process:

A. Main recommendations for immediate consideration in the proposed plan	Explanation of why this is important
Recommendation A1: ...	
Recommendation A2: ...	
....	

B. Other priority recommendations for long-term consideration in future planning processes	Explanation of why this is important
Recommendation B1: ...	
Recommendation B2: ...	
....	
C. Recommendations for other useful remedial actions	Explanation of why this is important
Recommendation C1: ...	
Recommendation C2: ...	
.....	

Step 8: Prepare for adaptive management of future threats

This step provides SEA experts with a final opportunity to raise issues for consideration by decision-makers and to outline outstanding issues that have not so far been incorporated in the urban construction planning.

The MOC Guidelines on SEA require that the proposed monitoring arrangements are outlined in the SEA report to enable environmental impacts that may arise during implementation of the urban construction plan to be identified and effectively managed. Such monitoring also provides a feedback mechanism on the state of the environment and generates data for the next iteration of plan development. It thus leads to more informed decision-making during implementation of urban & construction plans and provides a sound basis for future policy decisions and development activities.

This guidance has emphasised the importance of analysing longer-term trends related to climate change, acknowledging uncertainty and working with multiple scenarios. It has also proposed to consider soft adaptation options that build adaptive capacity for coping with a range of possible impacts (e.g. warning systems and management responses, behavioural changes, etc.). All of these issues reinforce the importance of adaptive management.

If the assessment experts conclude that they cannot provide detailed advice because of data gaps or major uncertainties, they should propose such approaches to implementation that provide for flexibility and adjustments as and when new information becomes available. In such case, the SEA should answer the following basic questions:

- ***What uncertainties, assumptions or knowledge gaps are contained in the SEA analysis?*** It is especially useful to clearly acknowledge which climate change scenarios were used in the assessment process and

what are they assumptions and uncertainties.

- ***What are the overlaping or conflicting data that are gathered by different authorities and what are the priorities for improved exchange of information?*** SEA can raise the need for improved exchange of information among relevant government agencies and possible changes in the monitoring systems.
- ***What studies or monitoring programmes should be undertaken to manage uncertainties and allow for more informed planning and assessment in the future?*** In this regard, it is important to note that new monitoring should be established only if the assessment finds out that some crucial data are missing and this seriously limits understanding of environmental problems in the planning area. There is little point in establishing new monitoring systems if the the existing ones can be improved and the data obtained can be shared and better used.

Step 9: Communicate climate change related assessment in the SEA Report

The outcomes of the SEA must be compiled in a consolidated SEA report that forms an integral part of the proposed urban & construction plan.

In order to ensure adequate documentation of how the climate change issues were considered in the SEA process, it is important that the SEA Report does not only provide technical information but in the executive summary also explain how the SEA process was managed - i.e.:

- How climate change issues have been identified;
- How climate change impacts have been assessed and ranked by importance;
- How alternatives have been assessed and chosen against climate change impacts;
- How consultation and public inputs relevant to climate change issues have been taken into account;
- How uncertainty has been managed; and
- How adaptation and mitigation measures have been selected.

To effectively communicate the results to stakeholders it is suggested that, firstly, individual issues are covered in an integrated manner within self-contained chapters in the SEA report. For example, there might bechapters on impacts upon biodiversity, water resources, air quality, etc. Secondly, a final chapter should summarise and facilitate cross comparison between the issues addressed in the SEA.

Appraisal of the SEA Report

The SEA reports will normally be submitted for appraisal to the competent authority responsible for the urban & construction plan. Their task is to ensure the SEA report meets quality standards.

A structured set of review criteria that can be used to assess whether climate change has been adequately considered in an SEA report are included in Annex 1. The review criteria can be used by those preparing the SEA to ensure they have covered the relevant issues or by the competent authority upon formal receipt of an SEA report.

To complete the appraisal process, firstly, the entire SEA report should be read. Secondly, use each criterion to grade the performance of the report. This may involve re-reading relevant parts of the report. Grading can be conducted on a simple pass/fail basis. Alternatively, a more detailed scale can be used (see

Table 4.4) if a greater level of rigour is required. It should take approximately 45 minutes to complete the application of the criteria to the SEA report.

Table 4.5: Assessment grades for use in the review of the SEA Report

Symbol	Explanation
A	Relevant tasks well performed, no important tasks left incomplete.
B	Generally satisfactory and complete, only minor omissions and inadequacies.
C	Can be considered just satisfactory despite omissions and/or inadequacies.
D	Parts are well attempted but must, as a whole, be considered just unsatisfactory because of omissions or inadequacies.
E	Not satisfactory, significant omissions or inadequacies.
F	Very unsatisfactory, important task(s) poorly done or not attempted.
NA	Not applicable. The Review Topic is not applicable or it is irrelevant in the context of the Statement.

Source: Lee et al., 1999

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ANNEX 1: CRITERIA FOR REVIEWING THE SEA REPORT

A. Scoping

- Have reasonably foreseeable impacts (direct, indirect, cumulative, etc.) on climate related concerns been considered during scoping?
- Has the affected baseline environment for climatic conditions and climate influenced trends (e.g. sea level) been described?
- Are the methods and investigations undertaken for the description of baseline climatic conditions and climate influenced trends appropriate to the size and complexity of the task?
- Are systematic methods (e.g. network analysis, scenarios, etc.) used to identify and assess impacts on climate related concerns?
- Are the methods used to evaluate the significance of impacts on climate related concerns clearly described and the rationale for using them explained?
- Are clear, transparent justifications given for choices about the scoping in (inclusion) or scoping out (exclusion) of impacts on climate related concerns?
- Are uncertainties associated with the description of the baseline climate and climate influenced trends and the significance of impacts upon these clearly stated?

B. Terms of reference

- Do the terms of reference clarify the nature and level of consideration that should be given to positive and negative impacts upon climate and climate related concerns in the SEA?
- Where relevant, is the temporal scope specified for considering positive and negative impacts of and upon climate?
- Is provision made for the inclusion of relevant expertise on climate change in the SEA project team?
- Do the terms of reference, where relevant, highlight the need for inclusion of monitoring of impacts of and upon climate trends?

C. Identification of key stakeholders

- Is there evidence that stakeholders (e.g. Government ministries, Government agencies, NGOs, civil society groups, etc.) with an interest in climate related concerns have been considered during the identification of key stakeholders?
- Have climate change and adaptation been integrated into the stakeholder engagement plan?

D. Analysis of future trends without the construction plan

- Have probable future climatic trends been described and/or analysed?
- Has a long-term timescale (e.g. 50-100 years) been used in the analysis of future climate trends?
- Have elements of the environment that could be influenced by climate change been identified using a systematic approach (e.g. network analysis, etc.)?
- Have the characteristics of future impacts of and upon climate and climate related concerns been clearly described in terms of, for example, whether they are cumulative, permanent or temporary, their magnitude and significance?
- Are the drivers/causes of positive and negative changes in climate and climate related concerns clearly described?
- Have the key factors affecting future climate change been clearly identified and described?

E. Assessment of plan orientations & objectives

- Have the negative and positive impacts of alternative orientations and objectives been compared, where relevant, with national or regional climate change policy objectives?

F. Assessment of impacts, alternatives and SEA mitigation and enhancements

Assessment of impacts

- Does the assessment of impacts of and upon climate and climate related concerns give consideration to direct, indirect, cumulative, synergistic, and both positive and negative impacts?
- Are the characteristics of impacts of and upon climate described in adequate detail (e.g. in terms of their probability, magnitude, geographic scale, timing, frequency, duration, etc.)?
- Is the type and level of analysis given to impacts of and upon climate and adaptation proportionate to their projected size, complexity and significance?
- Has uncertainty about impacts of and upon climate been explained, through, for example, the use of best and the worse case scenarios or confidence limits?
- Have the methods used to assess the significance of impacts of and upon climate, vulnerability and adaptation been clearly stated and adequately justified?
- Is the significance of impacts of and upon climate clearly stated?

G. Alternatives, mitigation and enhancement

- Have SEA mitigation and/or enhancement[2] measures been prioritized?
- Have alternative development options been considered as potential ways to mitigate the impacts of and upon climate?
- Have changes in environmental or social trends due to the implementation of proposed measures for SEA mitigation and/or enhancement been identified and assessed?

H. Monitoring and management

- Have adequate management commitment and resources (e.g. financial, project management, etc.) been made to the implementation of SEA mitigation /enhancement measures, and to monitoring their effectiveness?
- Is there a clear commitment to cycles of auditing of impacts, mitigation/enhancement measures using appropriate evaluation criteria (e.g. cost efficiency, etc.)?

I. SEA Report

Does the layout of the report allow the readers to find and assimilate information on the impacts of and upon climate easily and quickly?

[2] Mitchell (1997) defines mitigation as comprising measures taken to avoid, reduce, repair or compensate for impacts, and to enhance the positive dimensions of development.