



GUIDELINE FOR MAINSTREAMING ADAPTATION OPTIONS IN IWRM PLANS

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Abbreviations and Acronyms

AMCOW	African Ministers' Council On Water
CBA	Cost-benefit analysis
CC	Climate Change
CDM	Clean Development Mechanism
CEA	Cost-effectiveness analysis
DRR	Disaster risk reduction
EIA	Environmental Impact Assessment
GCM	Global climate model
GEF	Global Environmental Facility
GHG	Greenhouse gas
INC	Initial National Communication on Climate Change
IPCC	Intergovernmental Panel on Climate Change
IWRM	Integrated Water resources Management
LDC	Least developed country
MDG	Millennium Development Goals
NAPA	National Adaptation Program of Action
NGO	Non-governmental organization
PPPs	Policies, plans and programs
SEA	Strategic Environmental Assessment
UNDP	United Nations Development Program
UNEP	United Nations Environment Program
UNFCCC	United Nations Framework Convention on Climate Change
WRI	World Resources Institute
CBA	Cost-benefit analysis
CC	Climate Change
CDM	Clean Development Mechanism
CEA	Cost-effectiveness analysis
CEDARE	Center for environment and development of the Arab Countries and Europe
DRR	Disaster risk reduction
EIA	Environmental Impact Assessment
GEF	Global Environmental Facility
GHG	Greenhouse gas
INC	Initial National Communication on Climate Change
IPCC	Intergovernmental Panel on Climate Change
IWRM	Integrated Water resources Management
LDC	Least developed country
MDG	Millennium Development Goals
NAPA	National Adaptation Program of Action
NGO	Non-governmental organization
OECD	Organization for Economic Co-operation and Development
PPPs	Policies, plans and programs
SEA	Strategic Environmental Assessment
SMCs	Southern Mediterranean Countries
UNDESA	United Nation Department of Economic and Social Affairs
UNDP	United Nations Development Program

Executive Summary

Adaptation is an essential element of human response to climate change (CC). The adverse impacts of climate change on the water sector will be experienced worldwide and are often projected to be most severe in water stressed countries such as in the South Mediterranean region. The impacts of climate change on water resource in South Mediterranean Countries (SMCs) might affect a wide range of socioeconomic sectors including agriculture, health, food security, public safety, biodiversity, eco-tourism and hydropower production. In general, the impacts of CC on the water sector in the SMCs will undermine national development plans, and affect human security and livelihoods.

Adaptation should not be understood as simply implementing the correct technology or practice. It should be part of a coherent, inter-sectoral strategy to ensure sustainable water resources. Integrated Water Resource Management (IWRM) could be an overall decision-making framework for climate change adaptation in water resources through mainstreaming climate adaptation into its plans. However, adaptation measures in water management are often under-represented in many national plans. Therefore, significant policy shifts are needed. These should be guided by mainstreaming adaptations within the broader development context, strengthening water governance, enhancing data collection and knowledge management on climate and adaptation measures, building long-term resilience through stronger institutions, and leveraging additional funds through both increased national budgetary allocations and innovative funding mechanisms.

Adaptation measures can be classified into no regret; low regret and high regret investments depending on the low to high impact of future climate change uncertainty. The magnitude and location of climate change impacts in the water sector are uncertain. Therefore, “no regrets” adaptation strategies are especially appealing under all climate scenarios including “no-change” scenario”. No regret actions address the problem associated with the present climate change variability while at the same time build the adaptive capacity for addressing the impact of future climate change.

Adaptive capacity is the ability to design and implement effective adaptation strategies or to react to negative climate impacts. The capacity to adjust and readjust as climate conditions change and as new climate change knowledge emerges is more important than any responsive efforts to a particular climate risk. Therefore, there clearly is a need to place climate change and its impacts into the mainstream of economic policies, development projects, and international aid efforts.

Mainstreaming climate change adaptation is the iterative process of integrating considerations of climate change adaptation into policymaking, budgeting, implementation and monitoring processes at national, sector and sub-national level.

This report composed of two parts: Part I is a summary of a desk-top survey of most updated literature on climate change adaptation plans and water resources management strategies within the South Mediterranean Countries (SMCs). This part of the report provides an overview of the current policy framework for the water sectors to adapt to potential climate changes including institutions, legislations and policies. The survey revealed that the water-related legislations in the region are often inadequate, technically inappropriate and/or economically unaffordable, and they are not effectively enforced. Stakeholders’ involvement and participatory management approaches have been facing many constraints and challenges in the region due to lack of coordination amongst major water-related institutions.

Several water institutions in the region are suffering from inadequate technical, institutional and legal capacities due to severe shortage of skilled Multi-discipline human resources. Another constraint has been the lack of data and information exchange that impedes the implementation of IWRM. Additional factors were indentified that constrain the development of water institutions include inadequate equipment, overlapping in the roles and responsibilities among different institutions, ambiguous mandates, poor governance, and underfunding.

Vulnerability and adaptation of water resources to climate change in the region was generally conducted as part of the preparation of the national communications to the UNFCCC. All SMCs have submitted their initial and second national communications, except for two countries (Syria and Tunisia), which only submitted their initial

communications. Through those communication reports, SMCs provided qualitative and/or quantitative information on the impacts of climate change on their water resources. All SMCs stated that they already experience severe water supply problems caused by a rapid increase in population, growing demands from agriculture and industry, expanding urbanization, unabated pollution of water bodies and the effects of climatic variability and extreme events.

Some of the adaptation options described in the national communications included introduction of water policy reforms focusing on water conservation, desalination, flood management, development of drought-tolerant crops, improvement of early warning systems, enhancement of erosion control, training and assisting farmers, integrated coastal zone management, and strengthening of environmental legislation. Additional adaptation measures include recycling water or upgrading water networks, reducing water pollution, changing cropping schedules to reduce demand for irrigation, improving of monitoring and forecasting systems and promoting awareness of climate change impacts. It is noticeable that large number of the reported adaptation measures is from the “non-regret” type such as management and dissemination of climate information, early warning systems, water conservation, water use efficiency, and modern irrigation systems.

Most of the SMCs have instituted multi-sectoral committees to coordinate climate change related activities at the national level. This new institutional arrangement started to play a leading role in integrating climate change issues into national public policy agendas. However, horizontal coordination between different players is still in the early stages.

The second part of the report contains a guideline on how to mainstream no-regret adaptation measures into IWRM plans. This process is described in four major steps:

- 1) Situational analysis aiming to assess the current institutional setup at the national level to address climate change risks, mapping major stakeholders and their respective roles, reviewing national development policy making process and products, and identifying capacity gaps and capacity needs of the current institutional setup.
- 2) Creating an enabling environment conducive to mainstreaming adaptation into IWRM plans. Building on the first step of situational analysis, this second step aims to establish an effective governance structure, fostering horizontal coordination between sectors, enhancing existing practices and experiences, secure funding of adaptation in national and sectoral budgets, and building capacity to bridge existing capacity gaps.
- 3) Planning and policy structure. This third step aims to secure integration of the climate change considerations including adaptation into the national public policy process.
- 4) Developing institutional structure conducive to mainstream adaptation into IWRM. This step recommends three different options to establish a coordinating mechanism to enhance integrating no-regret adaptation options in the IWRM plans.

The last section of the guideline (section 6) explain how strategic Environmental Assessment (SEA) can help to assess different strategies to identify which is most sustainable under different climate change scenarios, and how SEA can help to analyze whether a sectoral policy/strategy might lead to increased resilience of the sector to climate change, and thus prevent maladaptation. This section is providing a step-by-step approach on how to use SEA to integrate adaptation options into policies plans, and programs.

Introduction

Climate change is the development challenge of the 21st century and beyond. Climate change is already under way and will increasingly affect the basic elements of life for people around the world – access to water, food production, health, and the environment. If left unchecked, climate change could cause significant economic and ecological disruptions (IPCC, 2007). The negative impacts of climate change will disproportionately hit poor people and poor countries. For example, climate change is expected to bring greater water stress and scarcity and will pose a real threat to food security in many countries in Africa, Asia and Latin America. Additionally, climate change is having a significant impact on water availability, quality, accessibility and demand in many contexts. These impacts are, in turn, affecting many other sectors such as agriculture, energy and health, seriously undermining development.

Water is fundamental to well-being, socio-economic development and the healthy evolution of ecosystems. In many countries, water access and management is a constant challenge. Climate change is likely to pose an additional burden to their management especially in areas where water resources are already under stress due to meteorological conditions and demand pressures from society.

Climate change is having a significant impact on water availability in many contexts by changing rainfall patterns, river flows, and groundwater recharge (Box 1). In some places, water sources are becoming more depleted, while floods are hitting other areas. The uncertainty regarding where and how climate change will impact water hampers effective water management. Globally, river basins and wetlands are becoming damaged and are less able to provide the conditions and processes that result in a water supply of adequate quality and quantity to ensure sustainable development and maintain vital ecosystems. Fisheries are becoming depleted and degraded and food security is eroded as climate change and climate variability, combined with other pressures, make it increasingly difficult to yield good harvests. Furthermore, the effects of climate change on water resources could significantly affect hydropower in many developing countries such as in Egypt, placing stress on the energy infrastructure. More erratic river flows will affect water quality and consequently human and animal health. Higher water temperatures, and an increase in droughts with lower stream flows, will adversely affect water quality due to pesticides, pathogens, sediments, dissolved organic carbon, and thermal pollution.

The impacts of CC on water resource in South Mediterranean Countries (SMCs) might affect a wide range of socioeconomic sectors including agriculture, health, food security, public safety, biodiversity, eco-tourism and hydropower production. SMCs will be required to carry out more adjustment of its water resources than in other region of the World, as over the three quarters of its resources are being used for human purpose. In general, the impacts of CC on the water sector in the SMCs will undermine national development plans, and affect human security and livelihoods.

The situation is further complicated by the heavy reliance of some SMCs on international fresh waters resources from upstream countries. Water scarcity might trigger international conflicts and disputes among SMCs sharing water resources at inter and intra regional levels. Furthermore, CC scenarios for the water sector in SMCs cannot be discussed in isolation from fast population growth in some countries (such as Egypt, Syria, Palestine and Jordan); industrial development; urbanization and the need for irrigation water to feed an ever-growing population (European Union, 2010).

The effects of climate change will continue to emerge – in fact, they will become progressively more significant in the years and decades to come. In principle, a range of activities oriented towards reducing poverty, improving nutrition and education, environmental management and promoting sustainable livelihood opportunities would help reduce vulnerability to many climate change impacts. A healthier, better-educated population with improved access to resources is also likely to be in a better position to cope with climate change. The development choices made and pathways followed will influence the vulnerability of countries to the future impacts of climate change.

Therefore, there clearly is a need to place climate change and its impacts into the mainstream of economic policies, development projects, and international aid efforts.

Box 1: Potential impacts of climate change on water resources

Climate change will provide an additional stress on water resources through increased evaporation losses and water demands as a result of rising temperatures; reduced coastal freshwater supplies because of sea-level rise and Stalination; increased precipitation extremes in certain regions (such as high latitudes) which has implications for flooding risks; initial increase and eventual reduction in glacial melt water as glaciers recede and possibly disappear in certain regions; reduced rainfall in other regions (such as southern Africa and the Mediterranean rim) leading to enhanced drought risk; displaced rainy seasons; and decreased water quality in many regions as a result of higher temperatures, increased loadings of pollutants from more intense precipitation, and lower flow conditions during some seasons.

Food production, meanwhile, is closely linked to water availability and will face increased stress in regions where water stress is exacerbated. Although higher concentrations of carbon dioxide are projected to increase yields for many crops, changes in temperature and precipitation may modify and even limit the direct effects of “carbon dioxide fertilization”. Overall, climate change is expected to lead to declining cereal production in developing countries, with risks of decreasing yields particularly high in Africa, South and South-East Asia, and Latin America (except for mid-latitude areas such as the pampas).

Source: (OECD, 2009a)

Objectives and scope of this guideline

This document aims to develop a stepwise guideline on mainstreaming water sector climate change no-regret actions into IWRM national policies and plans. It will provide water policy makers, stakeholders and planners with the proper tools to integrate no-regret actions for adaptation of the water sector into current IWRM plans, policies and programs, such that no-regret actions have a high likelihood of being implemented, lay the groundwork for future adaptation efforts and ensure consistency and support to the overarching development objectives of SMCs. The report draws heavily on the published work and lessons learned by many national, regional, and international institutions.

Structure of the guideline

This guideline is divided into four major steps:

Step I: Situational analysis of the policy and legislative framework (Section 2)

Step II: creating enabling environment to mainstream adaptation options in IWRM plans (Section 3)

Step III: Planning and Policy structure (Section 4)

Step IV: Developing institutional structure conducive to mainstreaming adaptation into IWRM plan. (Section 5), and Section 6: Mainstreaming Climate Change Considerations into Sectoral Policies, Plans and Programmes through Strategic Environmental Assessment.

Part 1: Survey of climate change adaptation plans of the water sector in the SMCs

Although there are many similarities among the policy issues and challenges faced by the SMCs, there are also differences in the specific socio-economic contexts of each country. Different countries are adopting different approaches to national water management that reflect important differences in their socio-economic and cultural conditions and in their legal and administrative systems. National water policies and strategies differ also between countries, depending on their hydrological, hydro-geological and socio-economic conditions.

Several studies have been undertaken to examine the progress of adopting IWRM in the Arab region including the SMCs. In 2006, CEDARE conducted a more elaborate survey study based on a questionnaire designed by the Danish Hydraulic Institute in cooperation with the United Nations Environment Program (UNEP). The questionnaire addressed the status of IWRM at the national level including the availability and maturity of national water policies, legislation, and regulations; institutional frameworks, capacity, and constraints; and awareness of IWRM among different stakeholders (Wagdy, 2006). The study indicated that all SMCs have national water policy and institutional frameworks at different levels of development. The study further showed a low level of awareness on part of stakeholders, weak institutional capacity, and weak enforcement capacity of water legislations.

1. THE WATER POLICY FRAMEWORKS

Legislation establishes the powers, responsibilities, and rights of different stakeholders in water resources management. In particular, it gives authority for the government to take action to implement and enforce water regulations. It also clarifies the role of different stakeholders and sets the rules for managing water resources (AFED, 2010). Water-related legislations in the region are often inadequate, technically inappropriate and/or economically unaffordable. For instance, the existing legal and regulatory framework in the region mostly doesn't promote economic instruments such as fines associated with excess pollution loads, incentives for good practices, etc. The existing laws need to be updated especially with regard to environmental standards to protect water quality. Furthermore, the lack of credible, comprehensive and effective enforcement in many SMCs has led to a marginal success in compliance with water-related environmental regulations. This is another key issue associated with the implementation of IWRM plans in the region.

Despite the fact that stakeholders' involvement and participatory management approaches have been widely accepted worldwide, these approaches have been facing many constraints and challenges in the region. For instance, the overlap of roles and functions of current water-related institutions within the context of IWRM and lack of coordination and integration means, among concerned stakeholders, hinder the implementation of IWRM policies. Most of the existing coordination instruments are related to short-term activities/projects and lack sustainability and empowerment. Some actors that have a vital role in water management do not participate in IWRM plan formulation. For example, at the central level, ministries of planning and finance that are responsible for allocating and providing the required investments to implement national water plans have marginal roles during the formulation phase of water policies. Ministries of interior and foreign affairs that are responsible of enforcing water laws and regulation

and strengthening cooperation between riparian countries, respectively, are not consulted at the early phases of water policy development. In addition, absence of environmental agencies in the early stages of water policy formulation leads to many inter-agency conflicts or competition.

Generally, several water institutions in the region are suffering from inadequate technical, institutional and legal capacities due to severe shortage of skilled Multi-discipline human resources especially professions such as environmentalists, agronomists, economists, sociologists, lawyers, environmental health experts, etc. Another constraint has been the lack of data and information exchange that impedes the implementation of IWRM. Data collection and monitoring programs are often carried out by various government authorities without coordination and integration which leads to inefficient utilization of available data across different economic sectors. Additional factors were identified that constrain the development of water institutions. They include poorly maintained infrastructures, inadequate equipment, overlapping in the roles and responsibilities among different institutions, ambiguous mandates, poor governance, and underfunding (UNDP, 2009).

2. VULNERABILITY AND ADAPTATION OF WATER RESOURCES TO CLIMATE CHANGE

Vulnerability and adaptation of water resources to climate change were included as integral components of the national communications to the UNFCCC. All SMCs have submitted their initial and second national communications, except for two countries, which only submitted their initial communications. Reviewing those communication reports, it is evident that almost all SMCs provided information on the impacts of climate change on their water resources. Many countries presented qualitative considerations on how projected climate change and sea-level rise would affect water availability and quality. Some countries (e.g. Israel) presented an estimation of the effect of changes in their water resources on the future water supply and demand balance. Other negative impacts predicted included saltwater intrusion into coastal water resources caused by sea-level rise (e.g. Egypt) leading to degradation of water quality. All SMCs stated that they already experience severe water supply problems caused by a rapid increase in population, growing demands from agriculture and industry, expanding urbanization, unabated pollution of water bodies and the effects of climatic variability and extreme events (e.g. Morocco).

Some of the adaptation options described in the national communication reports included introduction of water policy reforms focusing on water conservation, desalination, flood management, development of drought-tolerant crops, improvement of early warning systems, enhancement of erosion control, training and assisting farmers, integrated coastal zone management, and strengthening of environmental legislation.

Many Countries reported on options to increase domestic water supply; these included extraction of deep groundwater, increasing storage capacity by building reservoirs and dams, and improving watershed management. Countries also considered outreach and technological options to reduce demand for water. These options involved measures to increase efficiency either by recycling water or upgrading water networks, or by finding ways to decrease demand, such as by changing cropping schedules to reduce the demand for irrigation. SMCs also mentioned the need to improve and monitor water quality. Some measures included research and outreach activities, such as improvement of monitoring and forecasting systems and promoting awareness of climate change impacts. Some Countries proposed developing national drought policies to mitigate the adverse impacts of reoccurring drought episodes and indicated their need for a warning system to monitor the effects of drought. Few Countries considered reducing water pollution as an option for adapting to climate change. Several countries proposed changing water management policies to provide incentives to use water efficiently, or referred to the use of economic incentives through water pricing, taxes and subsidies.

Countries also highlighted some barriers to implementation of adaptation strategies and measures. These included technological, financial and human resource constraints in addition to inadequate information, which are prevalent in most developing countries. Many countries emphasized their needs for adaptation research, particularly to address key vulnerable sectors, such as water resources management, including use of groundwater resources and development of drought-tolerant and disease-resistant crops. Many countries (e.g. Israel) also reported on plans to incorporate or integrate climate change concerns and issues into their planning processes as a strategy for adaptation to climate change over the long term.

It is noticeable that large number of the adaptation measures included in these national communications is from non-regret kinds such as management and dissemination of climate information, early warning systems, water conservation, drought management, water use efficiency, modern irrigation systems, and development of new drought and heat resistant crop varieties.

3. MAINSTREAMING CLIMATE ADAPTATION IN IWRM

Water plays an important role in different sectors including energy, housing, tourism, and commerce. Consequently, overall planning for water resources should involve different ministries to ensure an optimal allocation of water resources, coordinate public spending on water resources development, and avoid conflicting policies. For example, ministries responsible for urban development, irrigation, and environmental protection should coordinate their policies and activities to ensure an optimal socio-economic and environmental allocation of water resources. The vulnerability to climate change adds extra burdens to policymakers of water resources management. Planning for adaptation to climate risks needs to be integrated early into IWRM practices at the national level.

Some SMCs countries adopted a sectoral approach to integrate climate change concerns into development planning. The selection of priority sectors for each country was based on economic and environmental significance, cost-effectiveness, contribution to other development goals, and contribution to climate risk minimization. Most countries described the institutional structure and arrangement to foster integration of climate change considerations into development. The institutional framework for environmental management in general, and climate change in particular, was set up relatively recently. Countries had either used existing institutions or created national committees for coordinating sustainable development and climate change. An inter-ministerial committee for climate change was often chosen as the forum to discuss, and as the means to coordinate, climate change policies and activities with those of development, in many cases, water institutions were represented in those committees. The committees were designed to institutionalize the exchange of information and coordination among key stakeholders. Generally, it is too early to measure the effectiveness of such committees in mainstreaming climate change into development plans (Box 2).

Box 2: Climate Change Institutional Settings in the SMCs

As part of their commitments within the UNFCCC, all SMCs have established climate change national focal points. These focal points are in most of the cases represented by the environmental agencies, which supposedly have to coordinate national level responses to climate change. Some countries such as Morocco, and Egypt have established a climate change institutional unit within the structure of the environmental agency. In addition, several other organizations are extensively involved at the national levels in climate change-related activities. These organizations include academic and research institutions, other relevant government agencies such as those in the energy, water, agriculture, tourism and health sectors, nongovernmental organizations and the private sector. Moreover, this new climate change institutional arrangement started to play a leading role in integrating climate change issues into national agendas. It should be noted that horizontal coordination between those different players, though at different levels amongst SMCs, is still in the early stages. For example, Egypt established a National Climate Change Committee with a Prime Ministerial Decree in 2007.

Source: (Osman-Elasha, 2010)

Part 2: Guideline on mainstreaming climate change adaptation into IWRM

This is a step-by-step guideline on how to mainstream no-regret adaptation measures into IWRM plans. This process is described in four major steps (Fig.1):

- 1) Step I: Situational analysis aiming to assess the current institutional setup at the national level to address climate change risks, mapping major stakeholders and their respective roles, reviewing national development policy making process and products, and identifying capacity gaps and capacity needs of the current institutional setup.
- 2) Step II: Creating an enabling environment conducive to mainstreaming adaptation into IWRM plans. Building on the first step of situational analysis, this second step aims to establish an effective governance structure, fostering horizontal coordination between sectors, enhancing existing practices and experiences, secure funding of adaptation in national and sectoral budgets, and building capacity to bridge existing capacity gaps.
- 3) Step III: Planning and policy structure. This third step aims to secure integration of the climate change considerations including adaptation into the national public policy process.

- 4) Step IV: Developing institutional structure conducive to mainstream adaptation into IWRM. This step recommends three different options to establish a coordinating mechanism to enhance integrating no-regret adaptation options in the IWRM plans.

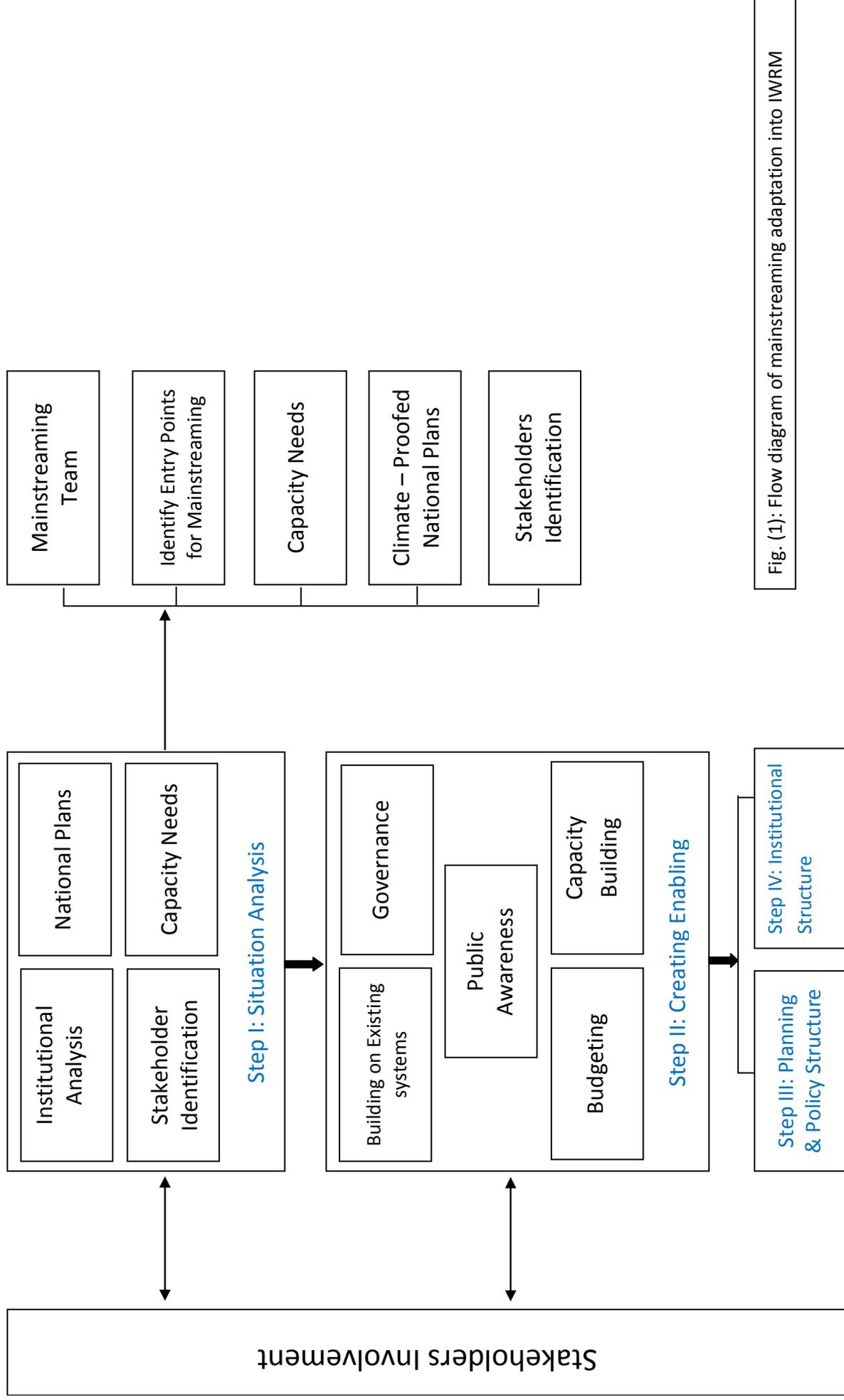


Fig. (1): Flow diagram of mainstreaming adaptation into IWRM



In addition, The last section of the guideline (section 6) explain how strategic Environmental Assessment (SEA) can help to assess different strategies to identify which is most sustainable under different climate change scenarios, and how SEA can help to analyze whether a sectoral policy/strategy might lead to increased resilience of the sector to climate change, and thus prevent maladaptation.

1. NO-REGRET ADAPTATION IN IWRM

Adaptation to climate change is urgent. Water plays a pivotal role in it. As a consequence, adaptation measures in water management are often underrepresented in national plans. Therefore, significant investments and policy shifts are needed. These should be guided by the following principles:

- Mainstream adaptations within the broader development context;
- Strengthen governance and improve water management
- Invest in data collection, improve and share knowledge and information on climate and adaptation measures.
- Build long-term resilience through stronger institutions, and invest in infrastructure and in well-functioning ecosystems
- Invest in cost-effective and adaptive water management as well as technology transfer;
- Leverage additional funds through both increased national budgetary allocations and innovative funding mechanisms for adaptation in water management.(UN-Water)

Adaptation options are strongly related to the level of uncertainty in which future climate change will happen. Adaptation measures can be classified into no regret; low regret and high regret investments depending on the low to high impact of future climate change uncertainty. Low and high regret options require data and information on future climate such as General Circulation Models (GCMs) which are powerful tools for accounting for the complex set of processes which will produce future climate change. However, similar to any prediction models, GCMs suffer from varying levels of uncertainties which represent unprecedented challenges to decision makers in the SWIM countries. On the other hand, no regret actions are likely to occur irrespective on how the climate change would vary and therefore the availability of climate change information is not crucial. No regret actions generate benefits under all future scenarios of climate change, including the 'no change' scenario. No regret actions address the problem associated with the present climate change variability while at the same time build adaptive capacity for addressing the impact of future climate change. Examples of no regret actions include investments in development, particularly those that enhance the capacity of a society to adapt to climate change. This category also includes other measures, such as reduced water pollution, water conservation and enhanced sanitation and public health systems, dissemination of climate information and access to early warning systems, conservation of agricultural practices that protect soils against erosion and runoff and conserve water; water use efficiency and improved water delivery for irrigation systems, improve access to new crop varieties which would increase the overall production and would diminish risks from droughts and floods.

No regret actions have several benefits. They could reduce the socio economic vulnerabilities and enhance the resilience of the affected communities in SMCs. Investment decisions can be implemented immediately without the risk associated with climate change uncertainty. These investments are cost effective irrespective of the climate change variability.

The evidence from past experience suggests that adaptation is best achieved through mainstreaming and integrating climate responses into development and poverty eradication processes, rather than by identifying and treating them separately. The rationale for integrating adaptation into development strategies and practices is underlined by the fact that many of the interventions required to increase resilience to climatic changes generally benefit development objectives. Adaptation requires the development of human capital, strengthening of institutional systems, and sound management of public finances and natural resources. Such processes build the resilience of countries, communities, and households to all shocks and stresses, including climate variability and change, and as such they are good development practices (Box 3).

Box 3: Mainstreaming climate change adaptation

Is the iterative process of integrating considerations of climate change adaptation into policymaking, budgeting, implementation and monitoring processes at national, sector and sub-national levels. It is a multi-year, multi-stakeholder effort grounded in the contribution of climate change adaptation to human well-being, pro-poor economic growth, and achievement of the MDGs. It entails working with a range of government and non-governmental actors, and other actors in the development field.

Source: (UNDP-UNEP, 2011)

2. SITUATIONAL ANALYSIS OF THE POLICY AND LEGISLATIVE FRAMEWORK (STEP I)

The overall national approach to dealing with climate change across sectors and the water sector policy itself provide the context and the platform from which actors make their implementation decisions. Strong national policy frameworks in relation to climate change will better enable strong and climate-resilient water sector programming and mainstreaming adaptation into IWRM plans. Conversely, weak national policy that is not influenced by an understanding of climate risks undermines water sector and water-related sectors' resilience.

As a development challenge, climate change adaptation needs to be mainstreamed into the national governance structure and processes. This will require adjustments to the national governance framework – its structures, policy formulation processes, systems and procedures – to make it responsive to the new challenges of climate change. It is about putting in place a more flexible and forward-looking process whereby policies are formulated and investment decisions are taken bearing in mind the risks posed and opportunities offered by the changing climate.

2.1 Institutional Analysis

The first step to form a mainstreaming team and to secure mainstreaming of no-regret options is to conduct an institutional analysis in order to collect needed information on the current institutional structure (UNDP-UNEP, 2011). Institutional analysis may also provide a valuable tool for clarifying the roles and relationships between the key agencies, government and non-government, which have an interest in water management.

This step aims to also identify institutional counterparts that, depending on the circumstances, are most likely to effectively take the lead on mainstreaming adaptation to climate variability and climate change in national planning or on implementing adaptation measures, especially in water-related sectors (Table 1). This helps identify a number of entry points within existing processes, which offer the possibility of factoring in consideration of no-regret adaptation measures.

The institutional analysis can also have broader objectives, such as assessing the institutional capacity and implementation effectiveness of relevant institutions at different administrative levels for managing and implementing climate risk management programs.

A starting point could be investigating the process of developing the national communications submitted under the UNFCCC. This starting point would seek answers to some questions such as:

- a. Who is the national climate change focal point in the government?
- b. Is there a national climate change committee as part of the implementation processes for the national communication?
- c. Who chairs it (e.g. senior civil servant, UNFCCC focal point, president, prime minister or deputy prime minister, ..etc)?
- d. What government institutions are relevant to mainstreaming climate change adaptation? What are their mandates?
- e. Who is the focal point of the national water resources management within the government?
- f. Are there overlapping mandates?
- g. Are there any specific mandates that are missing (e.g. in areas such as flood risk management)?
- h. How do the government institutions coordinate and make decisions on the issue of adaptation?
- i. Are there any coordination gaps?
- j. Are institutional changes necessary in the context of mainstreaming climate change adaptation?
- k. How can such changes be fostered?

Answering the above questions would help identify the best composition of the mainstreaming team relevant to the current national institutional setup. Generally, no single recipe exists for identifying the most appropriate institutional setting. Every country has a different internal dynamic and thus institutional entry points will differ as well.

To mainstream no-regret adaptation actions in IWRM policies and practices, it is obvious that the Ministry of water resources management or equivalent would play the champion's role. An inter-ministerial task force at the national level could play a catalytic role towards mainstreaming.

Table 1: Impacts of Climate Change on Water Resources in Various Sectors (TearFund, 2010)

Sector	Impacts
WATER RESOURCES MANAGEMENT AND WATER SUPPLY & SANITATION	<p>Drought-affected areas are likely to increase and extreme precipitation events, which are very likely to increase in frequency and intensity, will increase flood risk.</p> <p>Higher water temperatures, increased precipitation intensity and longer periods of low flows exacerbate many forms of water pollution, with impacts on ecosystems, human health, and water system reliability and operating costs.</p> <p>Climate change reduces the predictability of water availability and increases the likelihood of damage and disruption to drinking water and sanitation infrastructure. Current water management practices are very likely to be inadequate to reduce the negative impacts of climate change on water supply reliability, flood risk, health, energy and aquatic ecosystems. With less runoff and water for sewage treatment, the effectiveness of sewage treatment may be reduced.</p>
AGRICULTURE	<p>An increased frequency of droughts and floods negatively affects crop yields and livestock. Impacts of climate change on irrigation water requirements may be great, with the potential for higher water needs.</p> <p>Sea-level rise, reduced recharge rates and higher evaporation rates will extend areas of salinisation of groundwater and estuaries, resulting in a decrease in freshwater availability. This will affect crop yields and ultimately the type of crops cultivated (as a shift to more drought-resistant varieties may be necessary). Added to this, water sources used for irrigation are likely to become more saline, and this will increase salt concentrations of groundwater.</p>
INDUSTRY	<p>Infrastructure, such as urban drinking water supply and sanitation, is vulnerable to sea-level rise and reduced regional precipitation, especially in coastal areas. Projected increases in extreme precipitation events have important implications for infrastructure: design of storm drainage, road culverts and bridges, levees and flood control works, including the sizing of flood control detention reservoirs.</p>
HEALTH	<p>In some populations, climate change is expected to exacerbate problems of access to (safe) water at the household level, thus increasing the negative health impacts of drinking unsafe water. An increase in food-insecurity due to the impact of climate change on crop yields will also have negative health impacts. Flooded sanitation facilities can result in the distribution of human excreta across neighbourhoods and communities, with clear health impacts. Habitats may change, which consequently alters the spread of vector-borne diseases such as dengue fever and malaria, as mosquitoes spread to new areas.</p>
EDUCATION	<p>In some rural areas, greater distances walked to collect water due to a lack of availability and quality more locally mean children have less time at school, particularly girls who are most commonly required to undertake this task.</p>
ENERGY	<p>There will be impacts on existing and planned hydropower due to changes in water availability and flow, damage to infrastructure due to flooding, and reduced potential from increased siltation. This is especially valid for those countries, which receives most of their renewable water resources across their borders. This is compounded by water scarcity in Arab region, raising regional concerns about shared water resources and its implications on the energy system. The significant amounts of water that are needed to cool thermal power facilities make them vulnerable to fluctuations in water supplies.</p> <p>Oil refining is also a large water consumer and is thus affected by water shortage. Water demand in oil refineries can also rise as a result of higher temperatures and its use in cooling units.</p> <p>North Africa's countries have been identified as well placed to provide huge amount of solar electricity using CSP technology enough to meet the region's electricity demand as well as Europe's. Climate-induced water scarcity would severely impact these plans.</p> <p>The Energy-water-climate nexus should be paid special attention in the region.</p>

Tourism	Tourism sectors demanded a reliable water supply. Increasing tourism will also increase demand on wastewater treatment, increase the demand for safe and high-value agricultural products, and encourage recreational uses of water. Thus climate induced water shortages would definitely severely affect tourism activities.
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2.2 Review of national development plans to identify areas for coordination

Adaptation measures, in general, should be systematically incorporated into the design and implementation of national development plans, poverty reduction strategies, rural development plans, and sectoral policies and strategies (water, agriculture, health, ..etc), if these are to be sustainable in the face of climate change. Because adaptation to climate change risks is still in its early stage of development, it is no surprise that most of the national development plans, poverty reduction strategies, sectoral strategies and project documents in climate-sensitive sectors generally pay little or no attention to climate change. Even when climate change is mentioned, specific operational guidance on how to take it into account is generally lacking. Adaptation should not be viewed as a separate 'sector' with separate frameworks, tools and approaches. Currently, water resources' planning is implicitly only tackling climate variability and operating on a response-led basis. There is also a need to support the development of legal and regulatory structures that support adaptive change.

To secure mainstreaming of no-regret options, adaptation, at the macro-level, should be incorporated at several stages of the national policy making cycle. Climate change, especially in most vulnerable countries, should find its way to the top of the public policy agenda; a climate lens should be applied at the policy formulation stage to national visions, strategies and policies (Box 4). The application of a climate lens to national policies and to planning and regulatory frameworks can allow, inter alia, the identification of particularly vulnerable geographical zones or sectors. In addition, a climate lens can be applied at the planning stage to bottom-up sectoral proposals, which would lead to better "climate-proofed" plans (OECD, 2009a). Mainstreaming adaptation in these early stages of national development policy formulation would facilitate and catalyze introducing no-regret adaptation practices in climate-sensitive sectors.

Box 4: Defining the Climate Lens

A climate lens is an analytical tool to examine a strategy, policy, plan or policy measure (e.g. law and regulation) during its formulation or review stage. It involves examining the following:

1. The extent to which a strategy, policy, plan or policy measure under consideration could be vulnerable to risks arising from climate variability or change
2. The extent to which climate risks have been taken into consideration in the course of formulating the strategy, policy, plan or policy measure
3. The extent to which the strategy, policy, plan or policy measure could increase vulnerability, leading to maladaptation (e.g. for certain population groups, regions or sectors)
4. What amendments might be warranted in order to address climate risks ?

Source: (UNDP-UNEP, 2011)

For the mainstreaming adaptation team, it is necessary to undertake a review of the existing national plans and water related sectors as described in Table (1) in order to find answers to some basic questions such as:

- Is there a national climate change strategy in place?
- Is there any reference to climate change adaptation needs in the national development plans, poverty reduction strategies, rural development strategies, water management strategies, sectors' strategies, ...etc?
- What are the planning and programming mechanisms in place? What are the operating procedures of the government institutions?
- Do the mechanisms and procedures need to be strengthened? How?
- What are the institutional needs in terms of technical capacities (e.g. for monitoring or sector-relevant expertise)?
- What are the budget allocations of these institutions?

The answers of these questions would identify the existing gaps in different national strategies/plans that need to be bridged. The team should then focus on the water related sectors to identify whether no-regret practices are integrated in their strategies/plans/programs/ projects. For example, does the agriculture sector use modern

irrigation techniques, and/or other practices that make it resilient to climate risks?, does the urban planning or tourism planning programs take into consideration flood control measures, which would be justified under all climate change scenarios?, is wastewater reused in public buildings, commercial buildings, etc?.

As well as analyzing specific documents, plans and events, it is important to note that processes are also conducive to mainstreaming. For example, preparing National Communications, which involve the engagement of multiple stakeholders, particularly those at the national level, has been a good step forward for the integration agenda.

Identifying the existing gaps in the national/sectoral plans would make it easy for the mainstreaming team to identify opportunities of coherence of water policies and other development policies, and recommend necessary no-regret actions that need to be included in different plans at the early stage of the planning cycle. This analysis would also allow for identifying constraints, legislative or otherwise, that could inhibit effective implementation of the no-regret actions.

2.3 Stakeholders identification and analysis

Stakeholder analysis is a methodology used to facilitate institutional and policy reform processes by accounting for and often incorporating the needs of those who have a 'stake' or an interest in the reforms under consideration. Information on stakeholders, their interests and their capacity to influence outcomes will help to assure processes of change are politically realistic and sustainable (AMCOW, 2012)

As stakeholders in the water sector act to manage water resources to achieve their own objectives, their actions have consequences on other sectors, for example agriculture, health and energy. Through its impacts upon water resources, climate change also affects related sectors. Due to the connections between sectors, stakeholders' response to climate change impacts on the water sector will have consequences for development more generally, even if the response is that no action should be taken. Table (1) provides a clear indication of the interconnectedness between climate change, water and a wide range of different sectors. Developing an adaptation strategy in the water sector, without considering agriculture, health or energy sectors, for instance, is not really feasible or valid due to the relationship between them all. No-regret measures should be integrated in the plans/programs/projects of those sectors.

It is essential to clearly identify major stakeholders, and have them engaged from the early beginning of the mainstreaming efforts. Crucial stakeholders to be involved include relevant water-related government bodies, ministries of finance, planning and development, members of parliament, to help the legislative and regulatory processes, and strengthening NGOs and civil society organizations concerned with IWRM.

As indicated above, while a multitude of actors will need to adapt to climate change, governments and public agencies have a particularly important role to play in this regard. Adaptation must be integrated in development activities across all sectors and levels. Effective adaptation to climate change is a 'whole-of-government' issue. So adaptation cannot be addressed by individual sectors acting in isolation from one another, nor can it be adequately addressed in isolation at separate levels: for example, local projects that are not supported by national policies. Thus, the role of government cannot be understated because, first, governments are the custodians for public assets (such as clean water, health care and sanitation), which may be affected by climate change. Secondly, governments establish rules and regulations that can enhance or constrain the ability of other actors to adapt to the impacts of climate change. These could include, for example, policies to promote more efficient water use in areas that might face greater water scarcity, and modified building regulations in areas that may be at enhanced risk of floods. Finally, governments are also responsible for investments in "public goods" such as monitoring of weather and climate, provision of weather forecasts, and research and development that could affect the ability of other actors to better adapt to the impacts of climate change.

All of the actors detailed in Table (2) will have a role to play to facilitate the integration of adaptation at the national level. Ministries of Planning and Finance will be central to the mainstreaming of climate change adaptation into the policy planning process, as well as the management of public finances to support adaptation. An active engagement by members of parliament on adaptation policy debates will be essential to the drafting of an appropriate regulatory framework. Civil society organizations can play a vital role in strengthening public awareness on the need for adaptation and in bridging gaps between scientific research and policy making. Donor agencies can contribute by mainstreaming adaptation into their development co-operation programs (e.g. their country assistance strategies), by screening their funded operations for climate risks, by providing access to new adaptation technologies and by channeling new resources to help national governments absorb the additional costs of adaptation.

Table 2: Roles and responsibilities of stakeholders

Stakeholder	Roles and reasons for involvement
Ministry of water resources	<ul style="list-style-type: none"> • National policies/strategies/action plans • Management of Water resources
Agriculture	<ul style="list-style-type: none"> • Water abstraction, • Irrigation efficiency • Water conservation in crop production, and • Competing priorities with drinking water
Infrastructure	<ul style="list-style-type: none"> • Implications regarding climate change trends affecting water availability and quality
Environment	<ul style="list-style-type: none"> • Impacts on water quality, sanitation and environmental sustainability
Health	<ul style="list-style-type: none"> • Changes in water patterns affecting water-borne diseases and vector-borne diseases such as malaria
Energy	<ul style="list-style-type: none"> • Implications for the availability of water for hydropower schemes, and cooling for power plants and refineries.
Finance	<ul style="list-style-type: none"> • National budget and prioritization
Planning	<ul style="list-style-type: none"> • The role of water and climate change within general development vision and plans
President or Prime minister's office	<ul style="list-style-type: none"> • High-level authority for securing political commitments
Disaster Management unit	<ul style="list-style-type: none"> • Overlaps with climate risk and experience in related systems, mechanisms, processes and implementation
Meteorological services and institutes	<ul style="list-style-type: none"> • Climate trends and predictions
Members of parliament	<ul style="list-style-type: none"> • Regulation and standards • National policies • Public finances • Fiscal policy
Research community	<ul style="list-style-type: none"> • Research and development • Best Practices • Awareness-building and lobbying
Civil society and non-governmental organizations	<ul style="list-style-type: none"> • Local level expertise • Awareness-building • Lobbying
Media	<ul style="list-style-type: none"> • Framing of issues such as climate change, risks and disaster • Public awareness-raising • Early warning dissemination • Lobbying • Excreting political pressure
Private sector institutions	<ul style="list-style-type: none"> • Often water is provided by private sector or public/private partnerships, as well as industrial and business use of water
Donor agencies	<ul style="list-style-type: none"> • Finance • Research and development • Technology transfer • Capacity building

Source: (TearFund, 2010)

2.4 Capacity needs assessment

The Situational analysis is also inevitable step to undertake capacity needs assessment of different government institutions and other relevant stakeholders. A SWOT analysis could be undertaken to identify weakness and strengths of the current enabling environment and gauge whether it is conducive to mainstreaming. Table (3) exhibits a matrix

for assessing the existing policy and institutional framework, and how conducive the enabling environment is for mainstreaming adaptation.

Table 3: SWOT analysis of the policy and institutional framework

Topic	Levels			
	Level 1 (very poor)	Level 2 (poor)	Level 3 (Good)	Level 4 (very good)
Policy framework	No policy relating to climate change	Little evidence of integrating climate change in development policies and practices	Legal framework for climate change established	Climate change is a major theme of national development plan
Institutional setting	NO institutional setup to deal with climate change	An institutional mechanism for climate change integration in development is still under development	Establishment of institutional mechanisms for coordination across sectors	Institutional arrangement for mainstreaming climate adaptation into development plans is well established
Budgetary support	Serious lack of budget in different sectors	Donor-driven adaptation funding	Government is providing budget for adaptation	Experience of delivering climate-proofed development based on a full range of budgetary alternatives
Involvement of stakeholders	Little or no participation of major stakeholders.	Only selected/ favored groups regularly engage in policy and planning processes	Openness and experience in integrating top-down and bottom-up approaches	Decentralized decision-making, with budgetary support for participation of major stakeholders and appropriate mechanisms established
Institutional capacity	Adaptation initiatives are dependent upon external, donor-funded expert intervention	Capacity exists among key individuals at a national level of government	Government at the national level is strongly linked with national, regional and international best practice through partnership with key institutions	Capacity at the national level has linked through a decentralization process with capacity at the local level

Sources: (TearFund, 2010)

In the matrix (Table 3), it could be decided that levels 1 and 2 indicate areas of weakness and levels 3 and 4 indicate areas of strength. In which case, through dialogue between the mainstreaming team and other concerned stakeholders, the SWOT analysis would form the basis of an attempt to seek ways of using the strengths to improve or overcome the weaknesses.

It is worth to note that adaptive capacity at the national level will increasingly affect whether and how communities are able to respond to climate risks. Adaptive capacity is the ability to design and implement effective adaptation strategies or to react to negative climate impacts. The capacity to adjust and readjust as climate conditions change and as new climate change knowledge emerges maybe more important than any one effort to respond to a particular climate risk.

One useful tool to assess adaptive capacity of institutions is the National Adaptive Capacity (NAC) framework launched by the World Resources Institute (WRI) in 2008. The NAC framework provides a straightforward approach to assess how well national institutions are performing a core set of critical functions that underpin adaptation. These functions are introduced in Table (4)

Table 4: Institutional Functions for Adaptation

Function	Description
Assessment	Assessment is the process of examining available information to guide decision-making. Adaptation is likely to require iterative assessments over time, including assessments of a country's vulnerability, climate change impacts, adaptation practices, and the climate sensitivity of development activities. Through such iterative process, no-regret adaptation options could be assessed in different water-related sectors.
Prioritization	For adaptation, prioritization at the national level usually takes into account where climate impacts will be most severe and who among the country's population is the most vulnerable. Effective prioritization will engage a wide range of stakeholders, will be made transparent to the public, and will enable review and adjustment of priorities as circumstances change. Countries can have different approaches for setting priorities and may incorporate a wide range of values and concerns in this prioritization process. Though prioritization, adaptation of water resources might prove to be on top of the priority list.
Coordination	Adaptation requires action by disparate actors at multiple levels, both within and outside of government. Coordination of their activities helps avoid duplication or gaps and can create economies of scale in responding to challenges. Coordination may begin as a process of establishing relationships, sharing information, and raising awareness but may move toward the management of joint decision-making and action. It may be horizontal (e.g., among ministries), vertical (e.g., among national, global, and sub-national actors), or among stakeholders (e.g., between government and business). Coordination is a vital step for mainstreaming no-regret adaptation practices in different water related plans, programs, and projects.
Information Management	Information management consists of collecting, analyzing, and disseminating information in support of adaptive activities. Relevant information will vary across sectors, countries, and climate-change impacts but, at a minimum, typically covers climate variables, the status of natural and human systems, and existing coping strategies. Providing or accessing existing information for conducting vulnerability assessments is critical for most adaptation activities. Good information management will ensure that information is useful and accessible to stakeholders. It may also involve general awareness raising or building the capacity of stakeholders to use information for adaptation. It is essential that this information is not retained for use solely at a central level and is accessible to poor and vulnerable communities.
Climate Risk Management	The four functions above assess aspects of adaptive capacity relevant to a broad range of climate-related challenges in a country. However, most countries face specific climate risks that loom larger than others. The Climate Risk Management function provides an opportunity to examine institutional aspects of the specific capacities needed to address such risks. Addressing climate risks requires a process of identifying the specific risks to a given priority, evaluating the full range of options for addressing the risks, then selecting and implementing risk reduction measures. Countries typically treat risk management on a sector-by-sector or issue-specific basis. For example, many countries have highly climate-sensitive agriculture and water sectors and may focus adaptation investments on building the capacity for managing climate risks in these sectors.

Source: (WRI, 2012)

It should be noted that the NAC framework evaluation system relies heavily upon expert judgments as good practices in adaptation is still emerging, and may vary significantly depending upon the country contexts. The NAC framework provides limited guidance as to what constitutes good or poor performance of an institution. Users of NAC framework must rely on their expertise to decide on how to score performance of institutional adaptive capacity.

Another aspect of capacity assessments is assessing the capacity of non-government stakeholders. This means appraising different adaptation options from their perspectives. In other words, the potential capacity of an actor is high if it would be rational from his perspective to take adaptation actions. Assessing the potential capacity generally refers to assessing the economic, financial, and skill resources available to an actor objectively. When a non-government stakeholder has a low capacity, it will not adapt on its own. The government must then consider either

incentives to encourage adaptation in the form of providing resources through economic incentives or training, or they may consider options to regulate adaptation. Which type of options might be considered is determined by the relative costs of the option (Box 5).

Box 5: Policy Instruments for adaptation: Examples

	Regulatory	Economic	Information-based
Risk of water shortage (including drought)	Restriction on water use Administrative allocation of water	Water pricing Water trading Abstraction taxes, charges Payments for ecosystem services (PES) Insurance schemes Microfinance schemes	Information and awareness campaigns to promote water saving
Risk of inadequate quality	Water quality standards Pollution discharge permits	Pollution taxes, charges Tradable pollution permits PES	Information and awareness campaigns Technical assistance for improved farming techniques
Risk of excess water (Including flood)	Land use planning/ zoning restrictions Building codes/ standards	Insurance schemes Public private partnerships (e.g. for flood defense structures) PES Microfinance schemes	Flood risk mapping Early warning systems

Source: (Dominican, 2012)

3. CREATING ENABLING ENVIRONMENT TO MAINSTREAM CLIMATE CHANGE ADAPTATION INTO IWRM PLANS AND POLICIES (STEP II)

The next step following the situational analysis is making sure that an enabling environment conducive to mainstreaming adaptation is in place. The mainstreaming team should then work on creating or strengthening enabling environment conducive to mainstreaming adaptation plans including no-regret options into IWRM plans and policies.

3.1 Understanding Mainstreaming of Climate Change Adaptation as an Integrated Policy Approach

As noted before, considerable efforts are under way in all countries to prepare national communications in line with the United Nations Framework Convention on Climate Change (UNFCCC) reporting modalities. This can provide useful information and processes on which a mainstreaming effort can build—for example, by making use of engaging stakeholders from these processes, making use of vulnerability assessment findings, or following up on and integrating priority adaptation actions. While mostly recommending mainstreaming as a priority intervention, these national reports generally do not focus directly on mainstreaming climate change adaptation into development planning.

Given the cross-cutting nature of climate change impacts—that is, cutting across economic sectors, geographic and administrative boundaries, and time scales—it is essential that adaptation policies or strategies are formulated as part of broader policies for development. Thus, there is a need to mainstream adaptation options, especially no-regret ones, into IWRM plans. Implementing specific adaptation measures (geared to specific problems, sectors or population groups) may be effective in certain circumstances, but in the long run, a project-based approach to adaptation planning and financing may not produce the scale of results that is needed. In this respect, efforts to formulate national adaptation policies or climate change strategies will need to be supported by a cross-cutting, integrated policy approach (UNDP-UNEP, 2011). It is evident that mainstreaming no-regret adaptation options into IWRM plans can not be undertaken in isolation of the efforts needed to mainstream climate change considerations in development planning. It must be an integral part of the national efforts towards a climate resilient development.

3.2 Establishment of transparent and effective governing structures

To incorporate climate change adaptation within the governance of water resources, mandates and management functions may need to be clarified and institutions strengthened at various levels. Adaptive water governance will call for more inter-sectoral planning and links between institutions responsible for agriculture, land tenure and use, forestry, energy, environment and water. As explained before, the role of water in climate change adaptation should be mainstreamed into the work of all ministries. To avoid maladaptation, all development projects need to be resilient and all adaptation measures assessed for adverse effects on the environment and on human health. Maladaptation is defined by OECD as “business-as-usual development, which, by overlooking climate change impacts, inadvertently increases exposure and/or vulnerability to climate change (OECD, 2009). Maladaptation could also include actions undertaken to adapt to climate impacts that do not succeed in reducing vulnerability but increase it instead”. Additionally, (UNDP, 2004) defines maladaptation as “An action or process that increases vulnerability to climate change-related hazards. Maladaptive actions and processes often include planned development policies and measures that deliver short-term gains or economic benefits but lead to exacerbated vulnerability in the medium to long-term”.

Good governance that supports participation, particularly of vulnerable groups, is the first step towards integrating climate risk assessment and management into development decision-making. True integration requires not only participation of the most vulnerable groups but also: freedom of, and access to, information on policies, rights and major decisions; decentralization for stronger local governance; legally enforceable responsibilities; access to justice; equity; gender balance; and accountability (UNFCCC, 2008).

Transparency in public decision-making about adaptation policies and programs is crucial to improve efficiency and equity. Participation by different stakeholders and civil society allows vulnerable groups that might be affected by climate change to help steer the process towards more equitable outcomes. Governments should ensure that all stakeholders have a voice in order to guarantee the transparency of the process, exchange information and experiences on the relevant issues related to the policies and actions on water management and climate change (HLPE, 2012). “Transparent governance based on the rule of law, cooperation among government agencies and involvement of stakeholders (including the local communities) in the decision-making process is a prerequisite for effective adaptation to climate change” (UNDP, 2006).

Another important aspect of good governance is the effective decentralization of water resources management that has the potential to tap into successful community-based experiences in dealing with climate variability, and hence positively support no-regret adaptation. Good decentralization requires a number of core elements including a guarantee of transfer of political power and adequate budget from the centre, a strong institutional framework, a solid legal and regulatory framework, and technical capacity in local government. (Tearfund, 2008)

3.3 Promotion of dialogue and coordination between water-related sectors

A coordinated governance structure is essential to implement climate change adaptation measures. This structure must promote strong degrees of collaboration between different levels of government, different sectors, and the public, private and not for profit sectors national, regional and international.

As water cannot be dealt with in isolation, but requires a high degree of collaboration and engagement between and among the water ministries and the ministries responsible for driving social and economic development. The adoption and implementation of an integrated approach to water resources planning at the national level, is one key strategy to be followed. Similarly as highlighted before, a broad range of stakeholders should be involved in climate change policymaking. Identified no-regret options for adaptation involves many sectors shown in **Table (1)** including water resources management; land management; agriculture; health, tourism and others. Climate change was thought usually of as a stand-alone environmental issue. Many countries have now moved to more complex, integrated legislative and institutional systems that coordinate actions through a range of sector departments and ministries at different territorial scales. This is an important step forward for the integration of adaptation into national policies and programs. Setting up inter-sectoral systems and frameworks would not automatically resulted in inter-sectoral actions; strong and clear coordination mechanisms amid such a complex web of stakeholders are needed so as to avoid the emergence of numerous isolated, dispersed and ad hoc initiatives (Box 6). It is crucial to identify existing forums where climate change impacts are regularly discussed and make sure that the water sector is actively engaged in these forums.

Box 6: Multi-Stakeholder Processes

Engaging stakeholders means recognizing that each and every actor has a valid view and relevant information to contribute to a task. Multi-stakeholder processes are increasingly encouraged as they encourage better decision-making by ensuring that the views of main actors are incorporated and that a consensus is reached. Facilitating multi-stakeholder processes requires willingness to participate on the part of the stakeholders. It also requires a sensitive and delicate process of facilitation. The facilitator must, therefore, be able to adapt to varying circumstances and be willing to deviate from a plan, if needs arise, whilst still ensuring that the end goal is achieved. Source: (Hammati, 2002)

3.4 Building on existing practices, tools and systems

Although adaptation must be a locally driven process, national policies and frameworks should support it. The primary objective of adaptation activities must be to build resilience and adaptive capacity in vulnerable local communities, which already need to adapt to climate change. Local approaches for adaptation could be further developed and built upon.

It is worth noting that actions to cope with issues such as environmental sustainability, water stress due to deteriorating water quality, droughts, floods and other extreme events could all be relevant adaptation experiences, even if not labeled as such. Ensuring that these experiences are analyzed in relation to climate risks over different timescales and then using them, as a basis to build upon is likely to have several advantages over introducing new top-up measures. Adaptation to existing climate variability and extreme events serves as a starting point for reducing vulnerability to longer-term climate change. As such, disaster risk reduction experience and progress should be built upon wherever relevant.

Furthermore, both water and climate change does not respect geographical or sectoral boundaries and coordinated responses to strengthen climate resilience are essential. It follows that water should not be seen as single sector issue, and nor should adaptation to climate change. The experience gained through implementation of IWRM plans and many of the lessons learned are equally valid for mainstreaming climate adaptation, which should be built upon. Additionally, mainstreaming of a subject in support of sustainable development is not a new concept. The environment and gender, for example, are increasingly accepted as important issues that cut across – and influence – different sectors of development at all levels. It is crucial that climate risk assessment and management draw on existing experiences of mainstreaming in public policy development. Mainstreaming no-regret options should also draw on the same experiences, which differ from one country to another.

It should be emphasized that the ultimate purpose for mainstreaming is to enable development to be resilient in the face of climate change. The setting up of institutions, systems and planning should not become a goal in itself, it is the effects that they may, or may not, cause that provide the basis for considering success. The emergence of climate change as an additional burden on development requires a pragmatic approach that makes use of existing mechanisms in support of sustainable development, such as national long-term development planning mechanisms. Such an approach should be expanded to incorporate the added tasks of integrating no-regret actions wherever possible (UNFCCC, 2008).

It is important for the mainstreaming team to develop an understanding and awareness of who is working on adaptation to climate change at national and local levels, and what progress has been made. This would entail review adaptation activities at both levels. Key questions to consider are (TearFund, 2010):

- Are there any existing mechanisms for documenting best practice adaptation, including no-regret adaptation measures?
- Are there any existing policy measures in place for promoting adaptation?
- Is there a national mechanism tasked with coordinating adaptation across sectors and ministries?
- What adaptation measures are being promoted within national development plans?
- What information exists on historic climate variability and change and how have any extreme events (such as floods) been addressed?
- Who is involved?
- Have any lessons been learned or best practices been determined?

Technical and financial support is needed to help develop long-term sustainable adaptation solutions by building on current local approaches. Additional technical advice and access to micro-credits to fund investments are examples of

resources required to support communities to adapt their water usage. Examples of local interventions that could potentially be replicated and developed, include:

- Development of rain-fed agricultural systems that are easy to operate and maintain locally
- Improved management of soil moisture in rain-fed areas
- Increased investment in water harvesting and small storage schemes
- Small-scale community-based irrigation schemes
- Improved smallholder-based irrigation schemes
- Development of water supply to meet multiple and diverse water users
- Improved water access for livestock in arid and semi-arid areas (Tearfund, 2008).

3.5 Integration within development budgets

The no regrets investments that were identified will require detailed planning for funding and implementation. The ownership of detailed planning and management of implementation should be transferred to the appropriate responsible implementing bodies. This will ensure that no regrets investments form part of their existing portfolio of investments. It is helpful to integrate investments into departmental plans/budgets through alignment with their goals, targeting those plans/budgets during periods of renewal.

Governments will need to mainstream climate change into national budgets including for example in Ministries of water management. Moreover, current and future climate change impacts need to be taken into account in planning and costing investments particularly long-term investment. Financial resources for climate change will need to come from domestic and international sources.

Assigning a budget for adaptation in general across different sectors of development, and especially water-related sectors helps to ensure that they will be appropriately funded in the long term. However, these activities are balanced against other priorities, particularly when seen as additional stand-alone activities rather than adjustments to existing development operations. Therefore, when making the case for adaptation, the economic argument should be communicated widely to policymakers and other stakeholders. No-regret options by definitions would bring numerous economic, social, and environmental benefits under all climate risks scenarios (Tearfund, 2006).

There is also needs to develop or leverage existing financing options, including external sources, which are becoming increasingly available as donors develop initiatives and funding mechanisms for adaptation (Box 7).

Box 7: examples of Multilateral Funds for Adaptation in Developing Countries

Adaptation Funds

-The Strategic Priority on Adaptation (SPA) is an ecosystem-focused fund ensuring that climate change concerns are incorporated in the management of ecosystems through GEF focal area projects. The aim is to increase the resilience and adaptive capacity of ecosystems and communities vulnerable to the adverse effects of climate change. Projects must focus on reducing vulnerability to climate change impacts as their primary objective.

-The Adaptation Fund is administered by the GEF and began to generate significant resources in 2010. The fund was principally established to finance concrete adaptation projects and programs in developing countries that are parties to the Kyoto Protocol. The fund is financed with a share from the proceeds of Clean Development Mechanism (CDM) project activities; it can also receive funds from other sources.

Development-Focused Funds

-The Least Developed Countries Fund (LDCF) is operated by the GEF and provides support to least developed countries as they prepare NAPAs. Support for national communications for non-Annex I parties is also available through the GEF.

-The Special Climate Change Fund (SCCF) is concerned primarily with activities, programs and measures in the development sectors most affected by climate change. The SCCF was established in 2001 to finance projects relating to adaptation; technology transfer and capacity building; energy, transport, industry, agriculture, forestry and waste management; and economic diversification.

Climate Investment Funds

-Climate Investment Funds (CIF) to be managed by the World Bank includes the Clean Technology Fund and the Strategic Climate Fund, which will support various programs.

Climate Mainstreaming-Related Funds

- Under the Strategic Climate Fund, the Pilot Program for Climate Resilience will focus on mainstreaming climate change into development planning and budgeting, through technical assistance and investment programs.
- The Spanish MDG Fund includes mainstreaming of climate into development as a means for adaptation.
- The Global Climate Change Alliance (of the European Commission) will focus on integrating adaptation plans into poverty reduction and development strategies.

Source: (UNDP-UNEP, 2011)

3.6 Building capacity of the required institutional frameworks

In order to successfully carry out a country-driven approach and to integrate adaptation and no-regret actions in IWRM strategies across, all sectors of national sustainable development policymaking, it is vital to set up legal and institutional frameworks. A significant gap in capacity-building efforts lies in building and strengthening these frameworks in many developing countries. In this regard, efforts to create enabling environments at the national level through the promotion of national legislative, economic and institutional frameworks that are adequate to address climate change challenges need further attention.

As stated before, at the forefront of methods deployed and recommended to facilitate climate risk assessment and management may be the establishment of a multi-stakeholder coordination committee to increase the scope of activities at various levels and sectors and to manage and oversee national adaptation strategies.

Capacity development of national, sectoral planners, and multi-stakeholder planning processes and establishment of mechanisms to promote national dialogue among relevant sectors is essential. Government institutions need to build capacity on enhancing negotiations skills, mediation and conflict resolution among relevant stakeholders. Government agencies need to enhance their capacity on integrated planning, policy development, and analysis. Institutional capacity of academic and research institutions to deal with different aspects of climate change such as monitoring, climate data collection and management, systematic observation and modeling is generally needed. To enhance the role of media in education and awareness rising, capacity development should target media people and organizations on the necessity of mainstreaming and multi-disciplinary approach in addressing climate change adaptation issues. Parliamentarians should enhance their capacity on institutional and legislative reforms necessary for mainstreaming climate change adaptation plans into sustainable development and IWRM plans.

3.7 Raising Public awareness on climate change

One challenge for mainstreaming climate change adaptation is the lack of awareness and knowledge among policy makers and other stakeholders about the risks posed by climate change. Climate change and its potential impacts should thus be brought into discussions on water resources management in order to raise awareness of the links between water and other related sectors. The adaptation mainstreaming team might then continue the effort to engage those stakeholders to ensure integrating no-regret adaptation practices in relevant sectors, and strengthening institutional capacities. This national dialogue should also include non-governmental actors (e.g. civil society, academia, business and industry, the general public and local communities). Awareness rising at the national level can include activities such as national media campaigns on climate impacts, internal government campaigns on the linkages between climate change, water and other sectors. Awareness on adaptation to climate risks should also be raised among a number of different local stakeholders, such as households, local organizations, opinion leaders and educators. This highlights the importance of targeted messaging and the use of appropriate communication tools (local radio, drama, flyers, posters, workshops, video, and so on). Awareness rising about climate change at the local level must be balanced and delivered through appropriate mechanisms. This means striking a balance between providing too little and too much information; either situation can end up disempowering people, as they may feel they do not have enough information to act or feel overwhelmed by too many details and options. This raises the question of how much information to convey, since climate change is a relatively complex issue, and how best to do so. (OECD, 2009a)

4. PLANNING AND POLICY STRUCTURES (STEP III)

Mainstreaming climate change adaptation at the strategic level addresses the policy framework in which policies and programs are developed and implemented. A strategy to integrate climate change concerns into programming must be accompanied by, as noted before, a strategy to ensure that the working environment is sensitive to climate change

issues (e.g. consideration of climate related issues in budgets), and sufficient technical capacity and human resources to successfully mainstream climate change adaptation must be made available.

In addition to national co-ordination mechanisms and regulatory processes, there is also a need to integrate considerations of adaptation within various stages of the policy cycle at the national level. This is particularly critical as it affects the way resources are allocated and therefore has significant downstream implications. Real-world policy-making processes are subject to intense political pressures from different stakeholders, often with conflicting interests. Typically, the policy-making cycle begins with policy formulation stage, where long-term vision and objectives were identified. Before, this stage, it is essential to include adaptation to climate change in the government policy agenda from the outset. Improved public awareness of different stakeholders would help push climate change concerns to the public policy agenda.

The specific interventions that are required at the policy formulation stage within the national policy cycle would consist of clear recognition of climate risks and the need for adaptation within relevant national policies and applying a climate lens in the formulation of national policies and strategies (Box 4).

Climate change risks and the need for adaptation to climate change should be clearly recognized and incorporated within national policies. It would hopefully lead to a trickle-down effect to the downstream levels of decision-making and to a systematic consideration of climate risks and need for adaptation at all levels of decision-making. As these policies provide the overall framework within which the lower levels operate, the inclusion of adaptation considerations within them can shape downstream priorities and help provide the framework to facilitate adaptation at the lower levels (sectoral and project levels). Sectoral plans and policies have to conform to national policies, strategies and visions. If these national policies, strategies and visions mention climate change and adaptation as key national considerations, then sectoral plans and policies will have to integrate those concerns. In addition, the inclusion of adaptation within these national policies could then influence the way the national budget is allocated by highlighting adaptation as a key element to be considered in investment decisions. Furthermore, the explicit consideration of climate change risks and adaptation within national policies may enable interested stakeholders operating at lower levels to hold governments accountable for their actions and policies relating to climate change. Within this national policy framework, adaptation of water resources related sectors to climate change, including no-regret options would be easily integrated into those sectoral plans/programs/projects.

5. DEVELOP INSTITUTIONAL STRUCTURES CONDUCTIVE TO MAINSTREAMING CLIMATE CHANGE ADAPTATION INTO IWRM (STEP IV)

A typical arrangement for the co-ordination of adaptation strategies at the national level is for the Ministry of Environment or environmental agency to assume overall responsibility for climate change. However, environmental institutions in most of developing countries tend to be politically weak. This can be attributed to several factors, including: (a) comparatively recent establishment and restructuring; (b) power politics; (c) limited institutional mandate; (d) comparatively smaller roles as advisors or coordinators; (e) limited budgets; and (f) overlapping institutional jurisdictions (Abdel Gelil, 2012). Thus, experience suggests that this arrangement leads to weak inter-sectoral co-ordination.

The second option might be a powerful central body, such as the office of the President or Prime Minister, which can better co-ordinate implementation by line ministries, review legislation and hold implementation agencies accountable for their results. It is critical that ministries that play a key role in development, such as Ministries of Planning, Finance, Water resources, Agriculture, Tourism, and Trade, are also engaged in the development of adaptation strategies.

To mainstream no-regret options into IWRM plans and policies, the ministry of water resources, which is generally leading coordinating efforts on IWRM, could play a central role. A multi-stakeholder council/committee could be formed with representation from all the stakeholders identified in Table (2). This multi-stakeholder mechanism would benefit from the existing established processes of mainstreaming IWRM in national and sectoral plans. This third option for institutional setup is to use the existing governance structure of IWRM to ensure mainstreaming no-regret adaptation options. In some countries, inter-ministerial committees or national water councils have been established, which is responsible of supervision of implementation of the national water resources plan and involves all concerned ministers and chaired by the Prime Minister. The mandate of these councils is to coordinate Government policies, to follow-up the implementation of national IWRM plans and to set policy priorities for the implementation of developed strategies and programmes. In some other countries, a national water resources authority was established to consolidate water resources management activities under one central agency.

Such high level national councils/committees would be an effective vehicle for integrating no-regret options into IWRM plans and programs at the early stages of planning.

6. MAINSTREAMING CLIMATE CHANGE CONSIDERATIONS INTO SECTORAL POLICIES, PLANS AND PROGRAMS THROUGH STRATEGIC ENVIRONMENTAL ASSESSMENT

There is a need to identify the appropriate points at which to introduce climate change adaptation into development activities. The same valid for finding the right entry points to mainstream no-regret adaptation options into IWRM plans. Potential entry points include land use planning, agriculture strategies, disaster response strategies and infrastructure design. Environmental impact assessments could be another entry point and a mechanism for mainstreaming climate change adaptation. However, guidelines for environmental impact assessments would need to be broadened to include climate change impacts. Current guidelines consider only the impact of a project or activity on the environment, not the impact of the environment on the project. It is also important to incorporate climate change considerations in planning mechanisms and to ensure that the responsibility for co-ordination lies with appropriate implementation agencies. Furthermore, attention should be given not only to EIA at the project level but also to Strategic Environmental Assessment (SEA) at the policy levels.

SEA refers to “a range of analytical and participatory approaches that aim to integrate environmental considerations into policies plans and programs (PPPs) and evaluate the inter-linkages with economic and social considerations” (OECD, 2006). It is a process to estimate the environmental impacts of legislation, policies, plans and programs. SEA offers a structured approach to integrating environmental considerations into PPPs at different levels, including the sector level.

In areas facing increasing water stress, SEA can help to assess different strategies to identify which is most sustainable under different climate change scenarios. This is accomplished on a multi-sectoral basis. In addition, SEA can help to analyze whether a sectoral policy/strategy might lead to increased vulnerability of the sector to climate change, and thus prevent maladaptation. Benefits of SEA include:

- The ability to alert decision-makers to problems that might arise from climate risks at a very early stage.
- A broad consultation process facilitating stakeholders’ involvement in the early stages of planning, which consequently facilitate mainstreaming adaptation options.
- The unveiling of capacity gaps and highlighting of priorities of capacity development, another facilitator of mainstreaming.
- A strong mechanism for enhancing co-ordination between different relevant sectors, which is a pre-requisite for mainstreaming.

The OECD Good Practice Guidance document on Strategic Environmental Assessment (OECD, 2006) suggests the following key stages for carrying out an SEA: establishing the context, implementing the SEA (including by undertaking the needed analysis with appropriate stakeholders), informing and influencing decision making, and monitoring and evaluation.

Step 1: Establishing the context

a. Assessing the need for climate change considerations in the context of SEA

The context of a PPP will determine whether or not climate change adaptation is a relevant consideration in the SEA process. For example, this will depend on how sensitive the affected sectors are to climate change. In some instances it will be clear that adaptation to climate change is highly relevant to a PPP, as the associated development activities are inherently sensitive to climate variability and change (e.g. agriculture, water resources). The nature or extent of the risks posed by climate change to development activities may only become evident if projected development trends are examined in parallel with projected changes in climate.

This stage would try to find answers to the following questions in order to trigger the identification of potential relevancy to climate change adaptation.

- a. What are the main risks from climate change to the sector in question? (e.g. reduced runoff and recharge for water, increased rainfall variability for agriculture).

- b. Is there any reference to climate change adaptation needs in the national development plans, poverty reduction strategies, or IWRM plans?
- c. Is there a national climate change strategy in place (e.g. a National Adaptation plans) that the PPPs would need to be fully aligned with or at least consistent with?
- d. Is reference made to climate change in the PPPs?
- e. Have climate change risks been taken into account in the PPPs?

b. Setting objectives

Based on the general assessment, if climate change is a relevant consideration in the SEA process, the objectives of the SEA could include assessing the viability of sectoral PPPs under different climatic scenarios, or identifying vulnerabilities of natural and human systems to the sector in question.

c. Identifying stakeholders

Stakeholders' identification is also a crucial step within the SEA process. This is to be done through seeking answers to the following questions:

- a. Which decision-making bodies are most involved with affected sectors or activities?
- b. Which groups (e.g. demographic or socio-economic groups) and geographical areas experience highest exposure to existing climate-related risks? (e.g. for a PPPs related to sanitation, communities in rural and remote areas will be key stakeholders).
- c. Which groups will be most affected (both positively and negatively) by possible adaptation interventions? (e.g. poor households would be most affected by water pricing).
- d. Are there other stakeholders and decision-making bodies that have been dealing with climate risks for the sectors or activities of interest? For example, links to the disaster risk reduction/management community could be identified at this stage.

Step 2: Implementing the SEA

Implementing the SEA requires scoping the work to be undertaken for the SEA, collecting baseline data, and identifying how to enhance opportunities and mitigate risks. In a climate change adaptation related SEA, implementation will depend on what country-specific climate change data and projections are available at scales relevant to the PPP and where there are major information gaps, and what capacities exist for the collection, management, interpretation and dissemination of information needed to assess the climate change risks that might affect the PPP.

a. Scoping

Questions to consider during the scoping step include:

- a. Are climate change signals already apparent, and if so, do they affect social and economic development? (e.g. impacts of rainfall variability on food production, or changes in rainfall or temperature correlated with increased incidence of climate-sensitive diseases).
- b. Do existing studies based on extrapolation of current trends or climate change projections identify specific likely or plausible impacts on development? If so, through which mechanisms? (e.g. future loss of productive land or Salinization of groundwater due to accelerating coastal erosion and sea-level rise).
- c. How is the exposure and vulnerability to existing and anticipated climate change risks and hazards distributed over different groups?

b. Collecting baseline information

The same as in conducting EIA, baseline information is essential for assessment. Questions to consider during this step include:

- a. What data are available at scales relevant to the sectoral PPPs (e.g. projections from global and regional climate models; specialized models as for water resources, agricultural productivity)?
- b. Are there any major information gaps?
- c. If crucial information is not available or is inconsistent, which ad hoc studies should be commissioned to fill these critical information gaps?
- d. Is there sufficient institutional capacity for the collection, management and interpretation of information?

c. Analyzing the potential effects of the proposals

Baseline information would then be used to assess the effects of climate change on the proposed PPP and relevant alternatives. Questions to consider during this step include:

- a. Are the development objectives of the proposed PPPs at risk of being undermined by projected climate change impacts?
- b. Is there any risk that the PPPs may lead to increased vulnerability of the affected natural and human systems?

d. Identifying how to enhance opportunities and mitigate impacts

In this step, opportunities to mitigate negative impacts are identified and proposed. Questions to consider during this step include:

- Could measures to reduce climate risk (e.g. no-regret measures) support adaptation to climate change? (e.g. preparedness planning, risk education and early warning systems).
- How can the proposed PPPs help to enhance the resilience of people affected by climate change impacts?

e. Identifying alternatives

As part of the SEA, different alternatives to the proposed PPP should be identified and assessed to select the best viable alternative. Questions to consider during this step include:

- a. Where PPPs proposed might fail to deliver their development outcomes because of climate change impacts, are there any alternative options that are likely to be more effective under the given climate change scenario? (e.g. where reduced rainfall may affect viability of hydropower generation, hydro could be substituted or complemented with biogas or solar, etc.).
- b. Which measures could be built into the proposed PPPs to enhance its sustainability under climate change scenarios?
- c. What key policy and legislative changes are required to promote adaptation in the context of the PPPs?
- d. What mechanism or structure could be established to prompt lower-level decision makers (e.g. regional, project levels) to adopt climate change responses?
- e. To what extent are the different adaptation options robust under different climate change scenarios?
- f. Do they represent “no regrets” interventions, particularly where climate change impacts are associated with high levels of uncertainty?

Step 3: Informing and influencing decision makers

Questions to consider during this step include:

- a. Is there sufficient awareness among decision makers and stakeholders of climate change, its impacts, and appropriate adaptation responses?
- b. How can relevant information be communicated to decision makers?
- c. Are there any reasons why decision makers may be likely to neglect (long-term) climate change impacts or to object to integrating adaptation measures into sectoral PPPs?
- d. What incentives can be set to ensure that the identified adaptation measures are integrated? (e.g. policy instruments, new legislation, development and enforcement of regulation, etc.).

Step 4: Monitoring and evaluation

It is essential to integrate adaptation in the national monitoring system to track emerging trends related to climate change as well as the implementation and impact of adaptation policies and practices.

In many cases, the evaluation of adaptation activities requires the refinement of existing monitoring and evaluation (M&E) frameworks rather than building completely new frameworks. However, adaptation does have a number of features that make it more challenging to evaluate including developing appropriate indicators, baselines and targets given the longer time-horizon of many adaptation initiatives. Monitoring and evaluation tools can be used to identify

good practices and learn from less effective approaches. The long-term perspective of most adaptation initiatives means that it is particularly important to clearly differentiate between outcomes, outputs and activities. Examples of outcome indicators are exhibited in Box (8).

The M&E stage would seek answers to the following questions:

- a. What tools and indicators might be used to assess adaptation measures in terms of development outcomes?
- b. How and by whom (e.g. those responsible for developing the PPPs, climate change experts, an independent commission) should these indicators be tracked?
- c. Are any capacity development measures needed to ensure effective monitoring and evaluation?
- d. Did any climatic event or trend affect the attainment of the PPPs' objectives? If so, had the SEA taken such risks into account?
- e. Are there any indications that the PPPs led to increased vulnerability to climate change impacts of the recipient system? Were such impacts anticipated? (Feedback should be solicited from stakeholders throughout the SEA and PPPs implementation process so that negative or counter-productive impacts may be identified at an early stage).
- f. Did the SEA improve the capacities of senior decision makers, civil servants and other stakeholders to understand climate change issues and management?
- g. Did SEA enhance the transparency and accountability of decision-making processes on climate change issues in general and those specifically related to the PPPs

Box 8: Examples of outcome indicators for Mainstreaming Climate Change Adaptation

- Percentage of sector staff equipped and trained to incorporate climate change considerations into their work (vulnerability and risk assessment, economic analysis, policy aspects, adaptation measures)
- Number of policies, programs, and projects that incorporate adaptation issues
- Number of adaptation measures (climate-proofed) at the national level (economic incentives such as insurance, subsidies or low-interest loans, capacity- building initiatives, infrastructure, sustainable land tenure, etc.)
- Level of enforcement of policy (e.g. on land and water rights)
- Creation of an academic, private sector, NGO, public sector, civil society and government partnership for developing, implementing and up-scaling adaptation efforts (e.g. establishment of inter-institutional committees)
- Percentage of households at risk due to floods or droughts
- Rise in groundwater level

Source: (UNDP-UNEP, 2011)

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