



## **Sectoral and Cross-Sectoral Integration of Biodiversity in Jordan**

### **Contents**

Introduction .....	2
Gaps in biodiversity policies:.....	3
National development plans.....	4
National Master Plan Jordan 2010.....	4
State Budget Strategy 2007-2010.....	4
The National Strategy for Agricultural Development 2002-2010.....	4
Sustainable Jordanian Agenda 21 .....	7
National Tourism Strategy 2004-2010: .....	7
Environment: Environmental Strategy .....	8
Environmental Impact Assessment: .....	9

## Introduction

Jordan reported<sup>1</sup> on gaps in biodiversity policies; national development plans, such as National Master Plan Jordan 2010, State Budget Strategy 2007-2010, the National Strategy for Agricultural Development 2002-2010, sustainable Jordanian Agenda 21, National Tourism Strategy 2004-2010; environmental strategy; environmental impact assessment.

**The integration of the CBD concepts into national programs** is in itself a commitment by each signatory state. These main elements include identifying and monitoring of the major components of biodiversity and the processes which affect them, establishing systems for in-situ and ex-situ conservation, attempt sustainable use of components of biodiversity, create incentive measures for the conservation of biodiversity, creating and using national capacities for research and training, promoting public education and awareness, introducing national EIA standards for biodiversity, allowing, within legal limits of intellectual property rights, access to genetic resources and access to and transfer of technology and information as well as mechanisms to create and use equitably of biotechnology.

There are some examples where attention is paid in national policies to the main elements of the CBD. For example, the National Agricultural Strategy placed the “conservation of biodiversity and utilizing it in integrating and supporting agricultural development” as a general objective of the strategy. To this end, the Strategy calls for the use of local species in agriculture, and the use of local medicinal and aromatic plants for the benefit of local cooperative societies. Similarly, the NSAP-Biodiversity calls for the participation of farmers in the conservation of biodiversity.

The National Strategy for Combating Poverty (2002) called for the encouragement of sustainable livelihoods in rural areas. This entails the encouragement of use of natural resources by local communities in ways that can be considered both sustainable and rewarding.

The National Biodiversity Strategy and Action Plan (NBSAP) is the main biodiversity planning policy document. It includes good focus on the conservation and sustainable use of biodiversity in its various elements, but falls short of a clear integration of “access to genetic resources and benefits sharing” which is the third pillar of the CBD. This has been highlighted by another biodiversity-related capacity constraint that will be discussed below.

Some of the protected areas in Jordan, such as Dana and Ajloun, have integrated some of the concepts of CBD concepts, especially ecotourism and sustainable livelihoods into the management programme. This is potentially a very useful tool in integrating local societies into the conservation efforts. This experience may well be used both in official nature reserves and within environmentally sensitive areas which have not been designated as nature reserves.

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<sup>1</sup> Jordan (2009). Fourth National Report on Implementation of the Convention on Biological Diversity, Ministry of the Environment, Amman, March 2009, 109 pp.

None of the national strategies or programmes emphasizes the importance of education and awareness among decision makers to the concepts of community based conservation. This will need to be addressed if successful integration of conservation into poverty alleviation programs is to be realized. This is especially important in areas which have not been designated as nature reserves.

While there are some aspects of the CBD which have not been given enough attention to in Jordan's policies related to biodiversity, as will be clear later, many of the main elements are in fact finding their way to implementation.

## **Gaps in biodiversity policies:**

National policies in Jordan have missed the importance of developing national policy measures and statement on the thematic CBD issues and different types of habitat conservation (inland water biodiversity, mountain biodiversity, marine biodiversity, forest biodiversity, dry land biodiversity, etc...) and it is crucial that national and even local (habitat-level policies) be developed in relation to the various components of biodiversity.

Such an objective can benefit from the various programmes of work developed by the CBD for the different thematic habitats and ecosystems.

Another main missing point in the national policy and planning process related to CBD is the lack of any integration or follow up of the 2010 Biodiversity targets. In decision VI/26, the Conference of the Parties adopted the Strategic Plan for the Convention on Biological Diversity. In its mission statement, Parties committed themselves to a more effective and coherent implementation of the three objectives of the Convention, *to achieve by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national level as a contribution to poverty alleviation and to the benefit of all life on earth.*" In decision VII/30, the Conference of the Parties adopted a framework to facilitate the assessment of progress towards 2010 and communication of this assessment, to promote coherence among the programmes of work of the Convention and to provide a flexible framework within which national and regional targets may be set, and indicators identified. Parties are invited to establish their own targets and identify indicators, within this flexible framework.

The targets are not well known in Jordan and have not been monitored and documented in a satisfactory way. It is important to keep track and evaluate on a continuous basis the progress towards achieving the 2010 Biodiversity targets.

In the last few years, the ecosystem approach has been developing as a main tool of adequate management and sustainable use of biodiversity and habitats supported by a robust operational guidelines developed by the CBD. The ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. Application of the ecosystem approach will help to reach a balance of the three objectives of the Convention. It is based on the application of appropriate scientific methodologies focused on levels of biological organization which encompass the essential processes, functions and interactions among

organisms and their environment. It recognizes that humans, with their cultural diversity, are an integral component of ecosystems.

As described by the Conference of the Parties, the ecosystem approach is the primary framework for action under the CBD. The Conference of the Parties, at its Fifth Meeting, endorsed the description of the ecosystem approach and operational guidance and recommended the application of the principles and other guidance on the Ecosystem Approach (decision V/6). The seventh meeting of the Conference of the Parties agreed that the priority at this time should be on facilitating implementation of the ecosystem approach and welcomed additional guidelines to this effect (decision VII/11).

Jordan is in need to localize the ecosystem approach in its various conservation, sustainable use and restoration plans to implement the ecosystem approach at the national level based on CBD framework and principles.

Based on the Environmental Protection Law 2005, a variety of environmental bylaws were formulated including the bylaw no 29 for the year 2005 specific for “natural reserves and parks”. The bylaw includes procedural and planning guidelines for identification and establishment of protected areas, which includes the necessity for developing a site management plan. The bylaw provides the Minister of Environment with the legal power to declare any area that is rich in biodiversity as a “special protection zone” managed through regulations issued by the Ministry.

**The main directions of national policies are expressed in development plans, action plans made to put them into practice, sectoral policies and other similar documents.**

## **National development plans**

### **National Master Plan Jordan 2010**

### **State Budget Strategy 2007-2010**

### **The National Strategy for Agricultural Development 2002-2010**

#### **☐ The Future Vision for the Agricultural Sector by 2010**

- ✓ Stable and sustainable agriculture in the JV based on advanced production technologies that maximize the return per unit of production (especially water), while protecting and developing agricultural resources and sustaining their productivity.
- ✓ A sustainable irrigated agriculture in the Highlands, within the limits of water resources available for irrigation, based on advanced production technologies that meet local market demand for fruits and vegetables and export opportunities.
- ✓ Agricultural production based on demand, with marketing infrastructure and organizations that are capable of meeting local and export market demand and agricultural industries

- ✓ Strict management of water resources that ensure the quantity and quality of water allocated for irrigation during the period 2001- 2010 to protect current and future investments in irrigated agriculture.
- ✓ Rain-fed agriculture that is based on improved, diversified and integrated agricultural cropping systems using modern technologies, and the expansion in the production of high-value cash crops, depending on family labor.
- ✓ Government adoption and application of national legislation and international agreements for the protection of agricultural resources from deterioration, preventing their misuse and ensuring the continuity of efforts required to maintain resource productivity, and improve their utilization.
- ✓ A stable organizational structure for the development of agriculture based on an organizational approach in planning and implementation,
- ✓ A legislative, financial, and marketing infrastructure that provides a stable and suitable climate for the PS to invest in agriculture,
- ✓ An effective Agricultural Council that coordinates the efforts of the different government institutions, in setting agricultural policies and following up their implementation.
- ✓ An agricultural sector that contributes to the protection of the natural environment and the agricultural resources (including soil, water and biodiversity), maintaining the cleanliness and beauty of the country-side, and surrounding residential settlements with prosperous agricultural areas.
- ✓ Farmers and PS organizations fully and effectively participating in the economic and social progress of the country.
- ✓ - Government policy protecting the interests of all groups working in the agricultural sector, to achieve economic and social equity across the different economic sector, and support integrated development in rural areas.
- ✓ - A stable government policy to develop and improve its programs in agricultural research and extension, marketing, and credit, as well as agricultural services, to facilitate the implementing the National Strategy for Agricultural Development (NSAD).
- ✓ - A government policy that designates the agricultural sector as the basis for socio-economic development of the rural areas.
- ✓ - A committed political will to implement the NSAD and government agencies capable of taking the required measures to implement the legislation and instruction approved by the government for protecting the environment and natural resources, specifically in the fields of preventing illegal extraction of groundwater; the rights in surface-water use and in preventing abuse of rangelands, forestlands, and protecting the environment.

**❑ The Main Objectives of the Agricultural Development Strategy:**

➤ Economic Objectives

1. Provide a suitable environment for the private sector to effectively participate in agricultural development.
2. Increase investment in the agricultural sector.
3. Enhance integration between plant and animal production.
4. Provide new job opportunities and work in the agricultural sector.
5. Increase incomes of farmers and workers in the supporting agricultural activities.
6. Ensure economic equity between agriculture and others sectors of the economy and within the agricultural sector itself.
7. Increase productivity and decrease production costs.
8. Improve the competitiveness of produce in quality and price in local and export markets.
9. Increase agricultural production and increase its contribution to the GDP.

10. Increase the degree of self-reliance in food, and improve the agricultural trade balance.
11. Attain integration between the agricultural sector and the other economic sectors, especially in the area of processing of agricultural products.
12. Link domestic supply with market demand.
13. Develop farmer organizations and other private-sector groups working in the agricultural sector.

➤ Social Objectives

1. Limit migration from rural areas into urban areas.
2. Increase women participation in agricultural development.
3. Enhance the capabilities of farmers and agricultural workers, and develop their knowledge base and abilities to effectively participate in the socioeconomic development of the rural areas.
4. Improve health, educational, social services, and living standards for rural people.

➤ Environmental Objectives

1. Conserve land, water and natural vegetation, and utilize them within their production capacity to ensure sustainable and long-term agricultural production.
2. Conserve Jordan's biodiversity and utilize it in supporting agricultural development.
3. Improve the technical and managerial capabilities in the agricultural sector to cope with probable climate and environmental changes, and absorb their consequences.

➤ Cooperation with Arab Countries Objective

- Achieve integration in agribusiness among Arab countries, including the establishment of joint projects for processing of agricultural procedure based on economic and social feasibility, and the extent they achieve integration between Jordan and neighboring Arab countries.

☐ **The Environmental Dimension of Agricultural Development**

✓ Agriculture affects the conservation of natural resources and their sustainable use more than any other sector. Agricultural development is concerned with the conservation of natural resources and their rational use. If land and natural vegetation (forests and rangeland) are not utilized in a balanced and sustainable way, their properties and productive capabilities will deteriorate. Such degradation reduces their value as an economic resource, and results in an environmental imbalance that leads to non-sustainable development.

✓ Agriculture has an important environmental role to play in conserving bio-diversity, natural vegetation, soil, water, flora, and fauna. The significance of this role is related to its major contributions to reduce the threats of both desertification and environmental degradation, and of land, water resources and biodiversity. Natural resources must be protected to provide the requirements for sustainable agricultural production in the long-term.

✓ Due to the continuous increase in the amount of treated waste water, which is expected to reach 177 MCM in 2010, 219 MCM in 2015, and 246 MCM in 2020, agriculture is the only sector that is expected to accommodate the utilization of this type of water, through systems that ensure environmental safety and public health.

✓ It is obvious that continued neglect of agriculture and reduced government support to its development will result in grave environmental consequences, especially regarding land and water. Degradation of natural resources may reach a level that is deemed too costly to reverse, if indeed it can be.

✓ Regarding environmental benefits, agriculture continues to play a crucial role in protecting land, water, and natural vegetation from deterioration, and in maintaining the productive capacity of these resources for sustainable development and protection of agro-biodiversity. Not less important, agriculture can mitigate the impacts of new environmental problems such as the increasing use of treated wastewater.

## **Sustainable Jordanian Agenda 21**

The national Agenda 21, 2001 addresses conservation of genetic diversity more directly, setting out the following objectives:

1. Assess the species diversity of wild flowering and non-flowering plants
2. Identify rare; endemic and endangered native plant species.
3. Produce Red-Data Book for endangered, rare and extinct plant species in the country.
4. Encourage the development of methods and strategies for propagating and cultivating endemic, endangered and rare plants, with special emphasis on the potentialities of the Badia area as a rich source of plant genetic material.
5. Establish a national center or centers for the conservation of germ plasm (e.g., botanical garden, herbarium, national / regional propagation units, seed bank).
6. Adopt a policy to encourage exchange of germ plasms with regional and international
7. Capacity building for environmental institutions
8. Conduct identification and conservation of aquatic (marine, fresh and brackish water) plants.
9. Establish a special herbarium for algae and fungi.
10. Conserve and manage endemic and relict species and their habitats such sand dunes, the Dead Sea and Jordan River habitats.

### **Coalition agreements of the government**

## **National Tourism Strategy 2004-2010:**

- ☐ The Ministry of Tourism has developed the National Tourism Strategy 2004-2010 with a private-sector led perspective on placing tourism as a major income-generating and revenue based sector. This strategy did not address the need to assess, monitor and measure the impact of tourism on biodiversity.
- ☐ However, the RSCN implements similar activities within the established nature reserves as part of the overall environmental management of these sites. A Tourism development plan is prepared for each reserve; the effect of tourism on certain sites is measured and assessed. The RSCN is concerned with these impacts and intends to address this issue in the coming Integrated Ecosystem Management Project in the Jordan Valley.
- ☐ The Royal Society for the Conservation of Nature (RSCN) runs awareness programmes targeting tourism operators and aiming at promoting ecotourism and increases their awareness of the impacts of tourism on biodiversity and upgrade the technical capacity at the local level to minimize the impacts.
- ☐ The RSCN has already provided special training programs for tourism operators for some private companies and according to their request.
- ☐ The National Tourism Strategy 2004-2010 does address the role of the local community in tourism in general by providing that "Tourism should target the citizens and communities of Jordan as its primary beneficiaries by providing opportunity for income generation and employment, and by positively contributing revenue to Government programmes, supporting quality of life, environmental excellence and the development of society."

❑ Conservation and Sustainable Use of Biodiversity in Dibeen Nature Reserve: The project will also build in-country capacity in forest management and conservation-oriented land use planning. Specific objectives are to designate and establish a nature reserve with the Regional Forest Park; prepare and implement conservation management plan and eco-tourism development plan; develop a competent and effective reserve and forest park management team; and a land use plan for the regional forest park.

❑ It is the RSCN policy to hire and train qualified individuals from the local communities living within or close to forests, thereto, the RSCN hired locals as managers, researchers, eco-tourism guides, and rangers at the established forest nature reserves and parks. The RSCN provided and continue conducting on job training to these employees. Also, the RSCN provides with technical assistance to local civil society organizations, aiming at enhancing their capacities and awareness in order to have them heavily involved in the protection of forests. The RSCN also assists these societies to acquire funds for their activities, and for the establishment of environment friendly small and medium enterprises alternative to some ongoing environmentally unsound economical activities.

## **Environment: Environmental Strategy**

### **CITES:**

Jordan is a signatory of CITES. RSCN is the national body responsible for the convention in the country. Wildlife Enforcement Section at the RSCN has been working in coordination with all related governmental bodies in order to control trade of endangered species of flora and fauna. These bodies include the public security, the army and the customs. Trade in raptors, especially in falcons, is one of the main concerns in Jordan. The control on this type of trade is being considered as a top priority by all related bodies.

RSCN is responsible for giving the CITES permissions, including flora and fauna. There are 4 plant species on the CITES appendix II (one of them includes 4 subspecies). Jordan is committed to applying the convention's conditions. Several national workshops were conducted in the last years for all stakeholders to raise the level of awareness on CITES convention.

### **Conservation of Medicinal and Herbal Plant Project.**

Jordan Government launched the project as it realized the importance of medicinal and herbal plants as a promising sector in the country. The Global Environment Facility (GEF) is funded the Conservation of Medicinal and Herbal Plants Project and is being implemented by the World Bank (WB) and the Ministry of Planning and International Cooperation (MOPIC). The project emerged from the crucial needs of the country to conserve wild medicinal and herbal (M/H) plant resources and to promote an economical promising and value adding M/H plant sector

Thus, it is expected to receive governmental and non-governmental appreciation and support. The project also responds to the feedback obtained throughout preparation from all stakeholders (from subsistence farmers to the private sector). The project will be the first to address the conservation of M/H plants and give priority to the field of M/H plants. Furthermore, it will initiate and strengthen the



institutional and technical capacity of key partners in this area including the Enhanced Productivity Program of Ministry of Planning (EPP/MOP), the National Centre for Agricultural Research and Extension (NCARE), Royal Society for the Conservation of Nature (RSCN) in addition to the private sector.

The Conservation of Medicinal and Herbal Plants Project aims at:

- Identification of species in high demand in the area and available medicinal plants used for human and livestock healthcare
- Identification of primary collectors and all current and potential local users of medicinal plants and the impact on medicinal plant resources
- Estimating the biomass of palatable plant species, including targeted medicinal plants and calculating the carrying capacity for livestock grazing in Mujib reserve.
- Documenting localities and traditional names of medicinal plants used in Mujib Nature Reserve and surrounding area; and the traditional use of these medicinal and herbal plants by the laymen, Hajat and herbalists;
- Documenting method of preparation and conservation used by the primary users and collectors and any wrong use, adverse effects of the plants used by locals and herbalists.

### **Integrated Eco-system Management in the Rift Valley:**

The main objective of the "Integrated Eco-system Management in the Rift Valley " Project is to secure the ecological integrity of the Jordan Rift Valley , as a globally important ecological corridor and migratory flyway, through a combination of site protection and management, nature – based socio-economic development and land use planning .through :

- Establishment of a network of 4 protected areas in the rift valley with management programs, safeguarding key habitats.
- Conservation oriented land use plan for ecologically strategic areas of the rift valley
- Effective institutional and operational systems in place for the enforcement of all environmental laws and regulations governing infrastructure and building development , industrial processes and other land uses and activities of the rift valley.
- New and improved facilities constructed and new operational systems developed for the treatment and reuse of wastewater from the urban, agricultural and industrial sources through the associated proposed rift valley improvement project.

## **Environmental Impact Assessment:**

In accordance with decision VI/7, the current EIA bylaw requires the following for all development projects planned in the country:

1. A screening process whereby the Ministry of Environment determines whether the project requires a comprehensive EIA, a preliminary EIA or no EIA.
2. In case of a comprehensive EIA, a scoping session is required, whereby all stakeholders are invited to participate and express their opinions on the project. The aim of scoping is to determine the significant environmental impacts of the project.

3. If the preliminary EIA showed that it may have a major impact on the environment, then a comprehensive EIA is in order. According to Annex 4 of the bylaw, major impacts include the following:
  - a. Largely affects a rare or endangered species of plant or animal.
  - b. Affects the movements of any kind of fish or wild animals residing or migrating in the area.
  - c. Significantly decreased resources available to fish, wild animals or plants.
  - d. Created a health hazard to animals or plants in the area.
4. According to Annex 5, the EIA report should include the following:
  - a. Policy, legal and administrative framework.
  - b. Project description
  - c. Baseline data
  - d. Environmental impacts
  - e. Analysis of impacts
  - f. Mitigation Plan

#### Environmental Monitoring and Post-Auditing Plan

#### **The National Action Programme (NAP) to combat desertification:**

Most of Jordan arid and semi-arid areas have suffered desertification. Although the rate of desertification was not identified, however several surveys and studies at the country's level indicated that Jordan's land is at the threat of high rate of desertification. The process has been accelerated by unsupervised management and land use practices of overgrazing, cultivation and plowing of marginal soils and woodland removal in the high rainfall zones. The regions of irrigated highlands and the Jordan Valley were also affected by aspects of salinization and alkalinization of soil. In addition to human induced factors, climatic factors of irrational rainfall and periodic droughts are contributing to the problem. According to academic scientific assessments, the transition zone (between arid areas in the east and sub-humid areas in the west) has suffered from a high risk of desertification and is expected to lose its productivity over time.

On 21st October 1996, the Government of Jordan ratified the Convention to Combat Desertification, which entered into force on 16th December 1996. Jordan prepared and organized awareness campaigns and workshops to initiate the preparation of the National Action Plan.

The National Action Programme (NAP) to combat desertification was prepared in 2005 and officially launched in 2006. It includes six major programmes that are mainly "project-based". The programmes include several projects related to desertification monitoring and control, capacity building, natural resources rehabilitation and development. However, these programmes and the proposed projects provide framework for an action plan to combat desertification. The proposed programmes are the following:

1. Desertification Information System (DIS),
2. Drought prediction and desertification control,
3. Capacity building and institutional development,
4. Restoration of degraded ecosystems of rangelands and forests,

5. Watershed management, and
6. Human, social and economic development initiatives.

Each programme has several projects with justification, activities, implementing agencies and initial budget.

### **National Priority Capacity Constraints in Implementing the UNCCD**

The UNCCD stocktaking report identified the following national capacity constraints for implementation of the UNCCD:

1. Lack of a national land use plan and legislation
2. Desertification has little priority in the national development plans
3. Weak linkages between scientific research and policy making
4. Inadequacy of public awareness programs for various target groups on sustainable land management
5. Duplication and absence of roles and responsibilities of organizations working in land management
6. Absence of guidelines and specific directives for land management and rehabilitation in the EIA system
7. Weak capacity of local communities
8. Absence of a national database and system to monitor desertification
9. Lack of a mechanism to evaluate the impacts of economic and agriculture agreements on land management
10. Weak capacity for outreach and networking with regional and global organizations and programmes

### **Climate Change in Jordan:**

As a country characterized with semi-arid climate, high dependence on rainfall and scarcity of water resources, Jordan is one of the countries to be highly affected with climate change impacts. Although Jordan's emissions of greenhouse gases are relatively very low, climate change is a big threat to Jordan since the ecosystem productivity and water resources are highly dependent on the hydrological cycle.

Jordan has ratified the UNFCCC in 1994 and the MoE became the national focal point for climate change issues and UNFCCC. Jordan started its efforts within the framework of the UNFCCC in 1996 with a GEF-UNDP supported programme for national capacity building in documenting national emissions of greenhouse gases and preparing Jordan's national communication to the UNFCCC. The first national communication was submitted in 1998 and it has been the first national communication to be prepared by a developing country party to UNFCCC. The national communication included an inventory of greenhouse gases' emissions from all sectors; energy, industry, transport, agriculture, institutional and residential.

The programme included developing national scenarios for greenhouse emissions for the upcoming 30 years based on various modeling systems. It has also included developing national mitigation measures for reducing the effects of climate change and a national action plan to reduce greenhouse emissions and turning into sustainable energy resources.

Based on this programme, a comprehensive assessment study was conducted in 1999 to anticipate the impacts of climate change on water resources in Jordan within the framework of vulnerability and adaptation to climate change. The study included four sectoral assessments on surface water, groundwater and wastewater in Zarqa basin and marine hydrological systems in the Gulf of Aqaba.

The MoEnv implemented between 2004-2006 the second phase of the capacity building programme under the title of “enabling activity” which included an inventory of current technologies. In 2006, the Ministry of Environment started preparing the Second National Communication (SNL) on greenhouse emissions that will also include suggested adaptation and mitigation measures for the first time in Jordan. The SNC project will develop and enhance national capacities to fulfill Jordan’s commitments to the Convention on a continuing basis; enhance general awareness and knowledge of government planners on issues related to climate change and reduction of Greenhouse Gases (GHG) emissions, thus enabling them to take such issues into account in the national development agenda; and mobilize additional resources for projects related to climate change and mitigation of GHG; projects which may be eligible also for further funding or co-funding by GEF or other multilateral or bilateral organizations.

#### **Jordan and Kyoto protocol:**

Jordan ratified the Kyoto Protocol in 2003 to become only the third Arab country party to the Protocol.

A national committee was formed to develop project proposals and initiatives for the Clean Development Mechanism (CDM) of the Kyoto Protocol. The Protocol entered into force in February 2005 and Jordan has started to mobilize resources under the CDM to implement the Protocol by developing three CDM projects and various projects are now within the CDM pipeline.

#### **National Priority Capacity Constraints for implementing the UNFCCC and Kyoto Protocol:**

The stocktaking exercise identified the following national capacity constraints for implementation of the UNFCCC and Kyoto Protocol:

1. Low capacity for developing National Vulnerability studies and Adaptation measures and guidelines
2. Lack of economic incentives for climate change mitigation and adaptation
3. Inadequate Institutional and technical capacity for the Climate Change focal point at the Ministry of Environment
4. Low Capacity for implementing the CDM
5. Weak linkages between research, systemic observation and policy making
6. Lack of a systemic approach to technology inventory and transfer
7. Lack of clear and systematic integration of the UNFCCC main concepts in the national policy formulation process
8. Weak systematic capacity development for energy efficiency
9. Weak capacity for practical education and training
10. Low capacity for Knowledge management and networking
11. Ineffective enabling environment for renewable energy
12. Low capacity for resource mobilization