CHAPTER 6

POLICY RESPONSES

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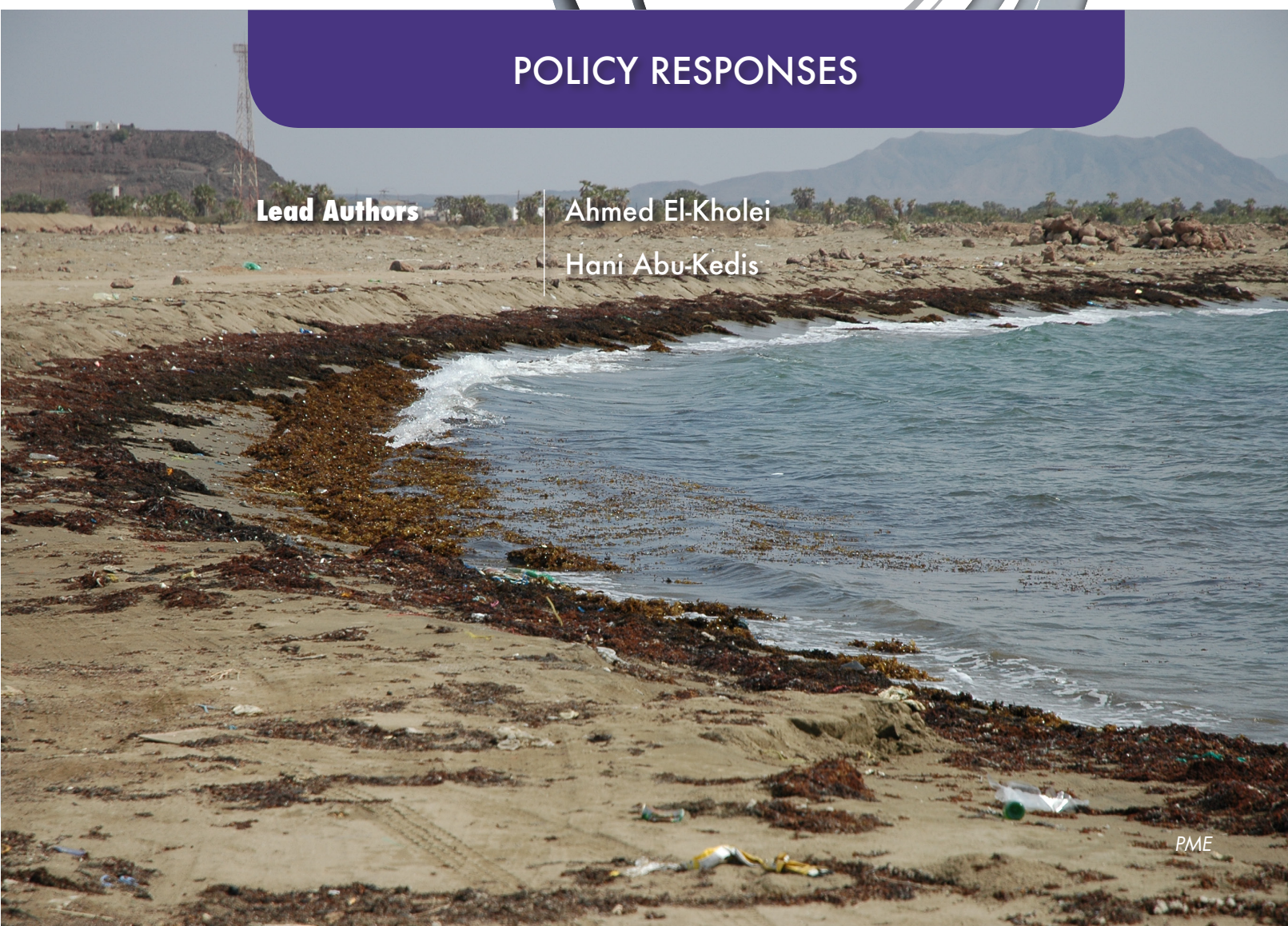

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Main Messages

The assessment indicated that the local environment of Tafilalet, ANP and El Maghara cannot sustain its development. Accordingly, there are four main categories of triggers for action: economic, social, environmental and institutional.

The economy of these areas depends on their ecosystems as they provide services that support both production and consumption. Tafilalet and El Maghara are both subject to scramble for resources. In contrast, ANP's forest and terrace agriculture, agricultural and grazing land, coastal and marine ecosystems provide and sustain the livelihoods of the locals.

Social factors constitute pressures on the local ecosystem. Poor people will continue to overexploit their environment in an attempt to support their living regardless of the future of their children.

Harsh environmental conditions accelerate the processes of impoverishment. The assessments of ANP, El Maghara and Tafilalet indicate common environmental issues. Water scarcity, hot arid climate, loss of biodiversity, drought and desertification are among the shared environmental issues and problems.

Often, problems arise within the institutional framework. Public institutions in many cases do not advertise planned action in advance in order to avoid opposition. These institutions do not consider long-term objectives; unlike sustainable development which by nature is long-term. Decision-makers at public agencies are often reluctant to consider fundamental alternatives.

The solution for the environmental sustainability of ANP, El Maghara and Tafilalet is to induce institutional transformations within which the current problems resulted. The solution rests on ecosystem awareness campaigns, empowerment of natives, capacity building and the cooperation and coordination between private sector, public sector and the inhabitants in the formulation and implementation of development plans.

Sustaining Arab ecosystems for both economic returns and social gains within the coming decade is considered a main objective. This means, first, to initiate and support economic growth without jeopardizing the environment or the society. Second, to enlighten and empower the local community to be in-charge of action plans that will allocate equitable distribution of costs and benefits of development and growth. Third, to conserve and protect the environment, and if possible, to regenerate damaged ecosystems. This is possible through planned interventions on the economic, social, environmental and institutional fronts.

Current responses in ANP, El Maghara and Tafilalet are mostly technical in nature. Governments of Egypt, Morocco and Saudi Arabia have planned and implemented a number of responses including training cadres and declaring the assessed site as a protectorate.

Proposed response actions are based on regeneration of the ecosystem; development of human resources and reformation of the institutional setup. Response actions will take place through a number of interventions that include information and monitoring measures, corrective and preventive actions, and supportive procedures to assure the successful Arab ecosystem management.

6 POLICY RESPONSES

6.1 INTRODUCTION

Responses are reactions to external and/or internal stimulus. In the field of environmental planning, there are three integrated responses:

1. **Monitoring, information generation and knowledge sharing:**
   Baseline assessments, such as the local MA assessments covered in this report monitor the improvement or deterioration of environmental conditions in any given site due to interventions or lack thereof. This requires technical capacities for monitoring the ecosystem(s), inferring the linkages between the different variables and parameters, and then computing the needed indicators. The collected data is necessary for defining the problem in terms of causes and consequences, thus supporting decision making and raising awareness.
2. **Corrective and/or preventive measures:**
   These are interventions that stakeholders have executed in an attempt to improve conditions, and/or to prevent further degradation.
3. **Supportive measures:**
   These are measures needed to sustain the two above measures. There is a wide range of supportive measures including, but not limited to, raising awareness, education and training, economic and financial instruments, institutional transformations, and command and control.

Levels and nature of responses differ, they could be international, national or local. For example, Tafilalet and ANP have a unique biological significance, and the international community regards its environmental significance. Levels could also be divided into two categories it can be either sectorial or holistic.

Reponses could be addressed through certain interventions, for example, technological, impact assessments, whether environmental, economic or social and institution transformation. Cultural problems and social preferences are potential obstacles to the implementation of such interventions. For example, technological interventions some times are associated with limited problems, such as intellectual property rights. Technology can be transferred, and adapted to fit local conditions, but cultural norms and social preferences are hard to change. Impact assessments are essential regardless of the nature of the intervention, in order to avoid any irreversible impacts. Institutional transformation, which is essential for sustainability, is also difficult to induce as it is deeply rooted in local cultures. Responses could also arise from addressing stakeholders, structure and function of environmental management, and implementation of environmental policies.

Based on the assessment presented in the earlier chapters, the question that poses itself is "What are we going to do next?". It is important to address the external context of the assessed ecosystems that influence decision making through the following:

- Interventions required to improve the situation at Tafilalet, ANP and El Maghara as a result of the assessment.
- Identifying stakeholders and relationships: Decision-makers, influencers, media, information and knowledge body, implementing body, and NGOs. Earlier chapters identified the stakeholders at Tafilalet, ANP and El Maghara.
- How to update the knowledge gathered through the assessment? This will require monitoring the ecosystems at Tafilalet, ANP and El Maghara, and preparing periodic reports to measure improvements or degradation.
- What are the opportunities? Publishing, conferences and workshops and news articles.

6.2 PROBLEMS ADDRESSED

The assessment indicated, that the local environment of Tafilalet, ANP and El Maghara cannot sustain its development. Figure 6.1 indicates, there are four main categories for action: economic, social, environmental and institutional, as follows:

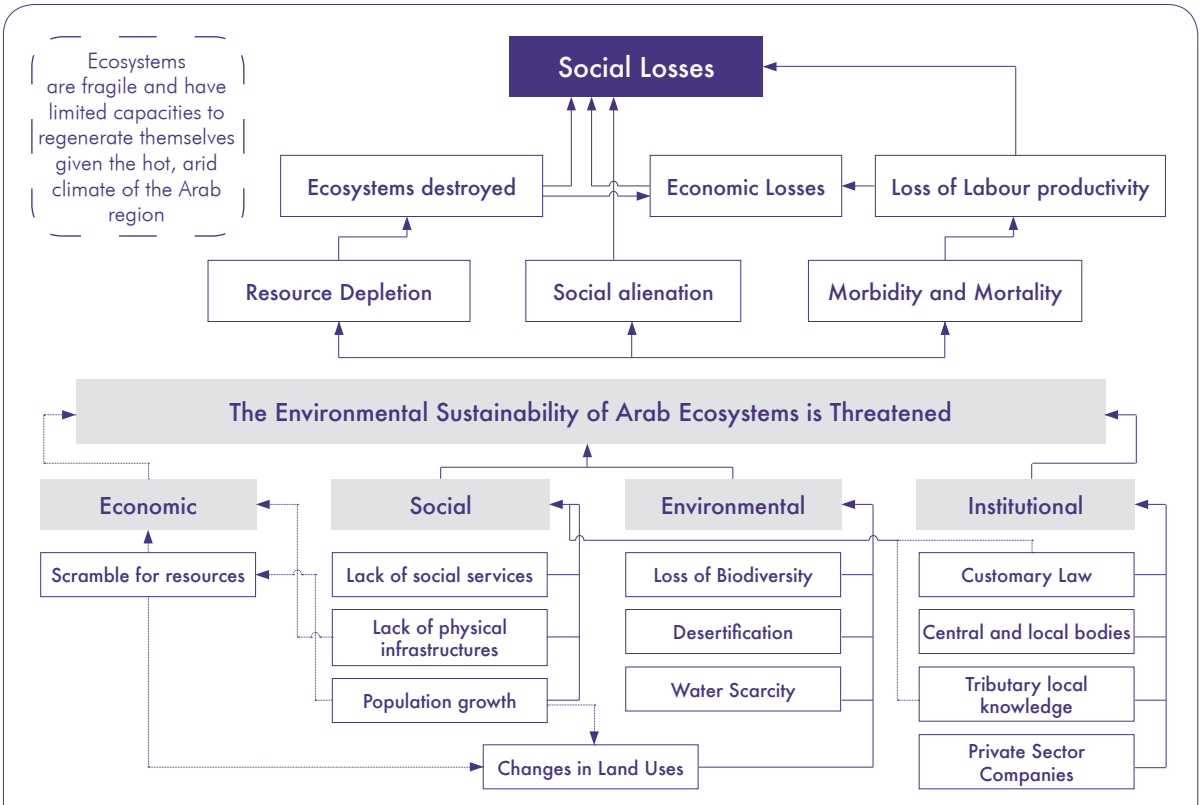

Figure 6.1 Problem Tree

Source: UNEP, 2010

6.2.1 Economic

Ecosystems provide services that support both production and consumption. Both Tafilalet and El Maghara are subject to scramble for resources. On the contrary, forest and terrace agriculture, agricultural and grazing land, coastal and marine ecosystems in ANP, Saudi Arabia, sustain the livelihoods of the locals.

In Tafilalet, Morocco, with a total area of 60 000 km^2, or nine per cent of the national territory, accommodating a population of approximately 0.81 million inhabitants, or 2.7 per cent of the national population of Morocco, their lives depend on four water sheds.[1] Meanwhile, ecosystems at Tafilalet, ANP and El Maghara are also in the interest of private sector companies, including land developers, and mining companies. In addition to economic expansion, the assessments of Tafilalet, ANP and El Maghara indicated population pressures in the form of natural population growth and the sprawl of human settlements, thus changes in land use at each site were induced, which in turn contributed to the environmental degradation of local ecosystems.

6.2.2 Social

The residents of a number of countries in the Arab region, particularly those living near ecosystems of environmental value, such as El Maghara and Tafilalet, high poverty levels. They lack physical infrastructure, such as safe drinking water, wastewater collection and treatment, as well as integrated schemes for solid waste collection and disposal. They also lack other municipal services such as, access to proper social services like educational facilities and health care units. There are a number of reasons for their state of poverty. Foremost of these reasons is the inferior quality of human resources in the study areas as a result of lack of both physical and social infrastructure. Rapid population growth, the scramble for natural resources, migration, and gender inequality are among the socio-economic drivers of environmental degradation, especially in Maghara and Tafilalet. Equally important is the view that administrators hold regarding the natives, as in the case of El Maghara, which affects decisions concerning the community and its future. The result is social alienation with its repercussions, such as losing pride in national identity, thus resisting State authority and pledging allegiance to the tribe. In the latter years , the Sinai Peninsula witnessed tensions between natives and the police force.

These social factors constitute pressures on the local ecosystem. Poor people will continue to overexploit their environment in an attempt to support their living regardless of the future of their children. They will not accept attempts to raise their awareness regarding the importance of the local ecosystem, as they hold limited confidence in their officials.

1. Millennium Ecosystem assessment (2009). Sub-Global Millennium ecosystem assessment: Morocco Millennium ecosystem assessment, Evaluation of the oasis ecosystem Tafilalet, State secretariat of the Minister of Energy, water and environment, Kingdom of Morocco

6.2.3 Environmental

The assessments of the case studies presented in earlier chapters indicate common environmental issues like, water scarcity, hot arid climate, loss of biodiversity, and drought and desertification.

These harsh environmental conditions, population growth, economic growth, the absence of law implementation and resource conservation accelerate impoverishment. The result is a number of issues of economic and social costs. For example, without protecting natural resources from pollution, and lacking health care facilities, epidemic diseases cannot be combated, and outbreak of disease is possible. This condition leads to increased rates of morbidity, which in turn affects labour productivity and income. Polluted environments without proper health care services will often lead to increased rates of mortality. If the family loses the head of the household, there are a number of social and economic burdens which occur, such as a child's dropping out of school in order to support the family, which can increase cases of child labour.

6.2.4 Institutional

Often some of the identified public institutions of the study area's problems arise within their framework and planning schemes unlike private sector companies and non-profit organizations, such as syndicates, NGOs, and CBOs. Among the elements that make the difference between these institutions is the mission and mandate of the institution itself, and as a result influences how decisions are made within the institution.

Planning is about setting ends and goals and the means to reach them. For these public bodies planning often ends vague, broad, implicit, and fragmented. Most of the decisions made within them usually are based on "political" rather than "technical" considerations. Among the reasons for this situation is that the future is often uncertain. Conditions within these public institutions – and outside it – always change; therefore, precise prediction, projection and forecasting are not always possible.

When a public institution engages with public, private or non-profit institutions the element of change is probably of particular importance. Other institutions usually try to impose change on the public institution, thus forcing it to consider serious counter-measures. Examples of this situation include, but are not limited to, controlling and management of land resources that lead to cases of adverse possession. Without clear, acknowledged, secured property rights, the land market will not be perfectly competitive. According to theories of environmental economics, environmental degradation is a sign of imperfect competition in markets.

These public institutions often do not advertise planned action in advance, in order to avoid opposition. They do not consider long-term objectives; rather are often after a "quick" fix. Sustainable development is about avoiding temporal discontinuities, such as inter-

generational discontinuities. Sustainable development by nature is long-term, while decision-makers atop the public agencies are often in pursuit of the "quick" fix, and thus will be reluctant to consider fundamental alternatives. This is probably the reason why public institutions prefer present rather than future effects and outcomes. In other words, they heavily discount the future in order to maintain the status quo. Keeping the institution running, on many occasions, is more important than fulfilling the mission and meeting the mandate. In many cases, the result of interventions turned out to be a financial burden, an economic problem, and an output that the community did not accept.

To a great extent, private sector companies are radically different. Decisions are made to maximize profit and minimize costs. For this reason decisions are based on technical considerations, as well as on political and social acceptances. Often, private sector companies have the "agility" to respond to changes within and outside the company. Private sector companies always have the shareholders, clients, competitors and collaborators, such as financial institutions, in perspective. Thus, advertising is important, and the image is crucial to test ideas, target specific groups, and so forth. Private sector companies have various solutions to deal with competitors, such as mergers and acquisitions. Private sector companies might consider re-structuring in order to survive the competition.

Non-profit organizations are flexible in reaching those less fortunate. For this reason they go beyond the State and the Market (the Private Sector Companies). In addition to considering the views of their constituents, they have to consider the interests of their sponsors.

The study areas have a unique rich culture. Most of the inhabitants of the study areas are Bedouins which have their indigenous knowledge and customary laws and regulation that should be considered by the public institution during the decision making process.

The solution for the environmental sustainability implementation of ANP, El Maghara and Tafilalet is to induce institutional transformations within the institutions where current problems resulted. The solution rests on: a) enlightening the locals about the significance of local ecosystems; b) empowering the natives to be in-charge of their future and that of their children; c) reaching a win-win agreement with private sector companies to respect local contexts including the carrying capacities of local ecosystems, and the traditions and values of the natives; and d) open central and local government to accept the views of locals as partners in development, and in the meantime, public institutions have to assume the roles of honest regulator and catalyst for local development.

6.3 OBJECTIVES

The overall objective is to sustain Arab ecosystems for both economic returns and social gains within the coming decade. This means, first, to initiate and support economic

growth without jeopardizing the environment or society. Second, as was mentioned before, is to enlighten and empower the local community to be in-charge of action plans, and thus be resilient to shocks, and gain equitable distribution of costs and benefits of development and growth. Third, to conserve and protect the environment, and if possible, to regenerate damaged ecosystems. This is possible through planned interventions on the economic, social, environmental and institutional fronts as indicated in Figure 6.2.

6.4 EXISTING RESPONSES

Most of the current responses in ANP, El Maghara and Tafilalet are technical, such as construction of dams to collect water from flash floods and rain, and afforestation, or supportive measures (institutional), such as establishing a committee to manage a protectorate, building the capacities of government employees, applying polluter pay principles and so forth . For example, Saudi Arabian authorities have already applied some of these measures, and Egyptian authorities are considering declaring

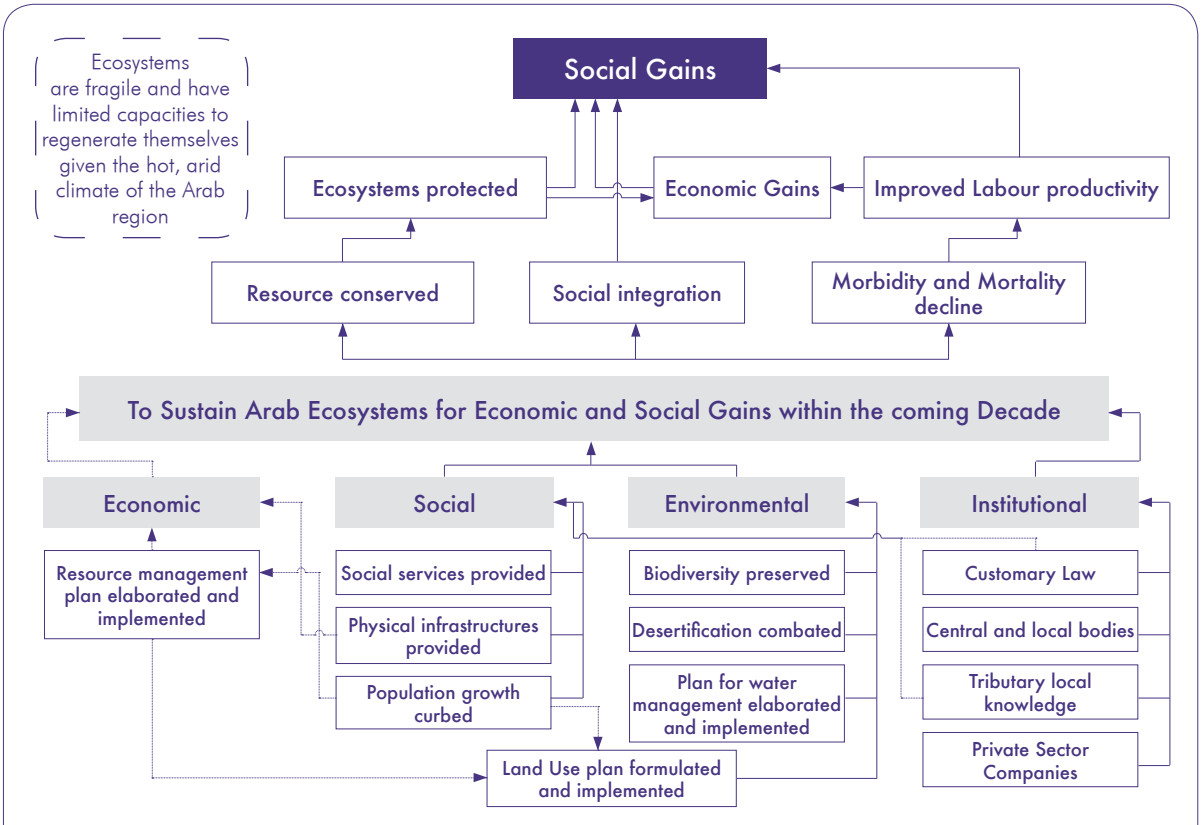

Figure 6.2 Objective Tree
Source: UNEP, 2010

El Maghara a protectorate. Often these responses are sporadic and executed with little synergy due to lack of a framework for action. Moreover, there is a lack of attention paid towards monitoring and reporting on the status of these ecosystems. This section of the chapter is reviewing the currently planned and executed efforts in Tafilalet, ANP and El Maghara.

El Maghara known for its rich ecosystem and arid nature, but there are no clear records for past or ongoing attempts to protect its ecosystem. There are some existing elements that can improve the area's situation considerably, the Egyptian strategy and action plan for protecting biodiversity, as well as an action plan for combating desertification and managing drought. Additionally, the high potential is clear in the El Maghara ecosystem assessment. The latter could attract the attention of international and national agencies to protect and regenerate the ecosystem of El Maghara. Moreover, the existing offered proposal for policy responses which consider the role of international and national agencies in the improvement of the area. There is also a proposal to declare El Maghara area as a protectorate. Most of the responses in El Maghara were community based responses. Using indigenous knowledge, the local community initiated and implemented responses to adapt to local circumstances.

The case of ANP is different; Saudi Arabia public institutions had taken actual sustainable steps towards not only the protection of the ecosystem but had also served the inhabitants of the areas. The government of Saudi Arabia has paid great attention and concern towards forest conservation and development. This was reflected in the preparation of the National Forest Strategy (NFS) and National Forest Programme (NFP). The afforested area reached 143.6 hectares.[2] In the year 2000 a Royal Decree was issued banning the issuance of any licenses for wood collection or charcoal making for five years. The Decree also allowed the import of firewood and charcoal from abroad.

The Presidency of Meteorology and Environment (PME) established a "Regional Training Centre" in Al-Soda to train Saudi graduates in the field of environmental management. In addition, the Ministry of Agriculture required conserving ANP through sustainable initiatives. For example, It used local raw materials to build ANP management buildings. Additionally, it also had offered young citizens a chance to operate and maintain conservation of the park.

It had also established, The Raydah Reserve to preserve a relatively pristine example of Asir juniper, woodland habitats, and their associated wildlife. In 1989, the Raydah escarpment was declared a Special Nature Reserve. Raydah provides one of the few intact examples of virtually pristine escarpment juniper woodland, and serves as a habitat for a high density of south-west

2. Sub-global Arab Millennium Ecosystem Assessment for Asir National Park, (2009). Saudi Arabian Millennium Ecosystem Assessment for Asir National Park. Kingdom of Saudi Arabia, 2008

Arabian endemic and near endemic bird species. The inhabitants of Raydah and As-Suqah village - members of the Rejal Al-Ma and Baalahmer tribes - private sector companies in the field of tourism, together with the local administration at Abha and the central body, that is the Ministry of Agriculture, Department of National Parks which administers ANP, are engaged in the administration and management of the park – an example of a collaborative effort toward environmental sustainability for the benefit of the locals and future generations.

The Saudi Arabian government provided the local population with both social and physical infrastructure. For example, it supplied primary health care services by building health care centres at city and village levels in ANP to ensure adequate health services for its citizens and residents. In addition, the government provided specialist hospitals with the latest equipment and technology. It also constructed a number of dams in ANP to collect and store rain water. The new dam capacity of Abha is 2 130 million m^3. The dam water is used generally for irrigation purposes, while Al-Shuqaiq desalination plant produces potable water. Expansion of water collection and storage includes building dams at Atood, Maraba, Heli and Yeba, as well as expanding the capacity of the Abha Dam capacity to almost 2 450 million m^3. Furthermore, efforts to secure fresh water include the increasing abstraction of groundwater to reach 2.7 million m^3 a year (Ministry of Water 2004).

In Morocco, the case is not any different, responses are sectorial. The Regional Office of Agricultural Investment of Tafilalet organized rangelands and the grazing process, established 17 agricultural cooperatives for 4 450 farmers, raised awareness and trained farmers on the sustainable use of natural resources, and distributed barley at both the time of drought and planting crops. To protect date-producing palms, the Government of Morocco passed Law No. 06-01 in 2007, associated with a bundle of interventions, such as assistance on producing and packing dates. The assistance extended to other crops and agricultural activities, such as the production of olives and beekeeping. The latter initiatives not only sustained the use of natural resources, but also the livelihoods of the inhabitants.

The government executed other interventions aimed to protect natural resources. For example, The UNDP-GEF supported a number of projects that associations implemented to protect vegetation cover. In 1996, a site of significant biological diversity was demarcated, but further action was not taken to protect it, hoping that legislation for protection of the environment would pass and give this site legal protection.

The assessment of Tafilalet suggests rarity and wasteful use of fresh water resources which have led to depletion of reserves. This is the case of many oases in Morocco; consequently, the government responded with a number of legal and technical interventions. An example of these legal measures is Law 10-95 whose regulations include measures

to induce rational use of water by reducing consumption, and protecting fresh water resources from sources of pollution. The government provides up to 60 per cent of the cost of projects for modern on-farm irrigation techniques, such as drip irrigation. The results obtained, from a financial point of view are encouraging due to water savings. The depletion of surface water during recent years has prompted the Regional Office of Agricultural Investment of Tafilalet to invest more in managing floodwaters by building hydraulic facilities along rivers. In line with these technical interventions, the Regional Office of Agricultural Investment of Tafilalet has embarked on rehabilitating the hydro-agricultural infrastructure, and will probably augment it by establishing a hydraulic basin agency in Tafilalet - an example of a quasi-integrated intervention - as linkages to other aspects such as biodiversity are not clear.

In Morocco, there is a legal arsenal for the management of natural resources, such as: forestry laws that date back to nearly a century; hunting laws; water laws; the law for protecting and enhancing the environment; the law for environmental studies, the law for solid wastes management; and the law for air quality. Why then does environmental degradation take place – as indicated in earlier chapters – if these laws are enforced? In reality, the environment cannot be protected by only command and control; there are other tools needed, including but not limited to, economic instruments, financial mechanisms, environmental education and training. This is not the case in Morocco only, but occurs in many Arab countries. Morocco is eager to meet the MDGs, and is therefore implementing a number of cross-sectorial initiatives, such as the National Initiative for Human Development (NIHD), which is being implemented in all Moroccan regions, particularly in the poorest communities. Some macro-economic projects are implemented in the region of Tafilalet. These responses are more integrated because they involve many players and various economic sectors. However, the real outcomes of these initiatives are not clear for a number of reasons, such as idle trickle-down mechanisms responsible for equitable distribution of wealth and dividends of development, which is the case in many Arab countries. Furthermore, the long-term impacts of these initiatives, both social and environmental, might not be properly assessed as governmental institutions tend to heavily discount the future.

6.5 PROPOSED RESPONSES

In addition to the above planned and implemented response, there are a number of proposed interventions that could be generally implemented on the Arab region situation. These proposed responses occur in three spheres of action: a) regenerating the ecosystem; b) human resources development, which includes both social and economic interventions; and c) institutional reforms. Under each sphere there are a number of interventions proposed in three different, but complementary, components: a) information and monitoring measures;

b) corrective and preventive actions; and c) supportive procedures to assure the successful attainment of the sub-goals of each component.

The St. Catherine's Protectorate, Egypt, is an example to emulate. The entry point was to improve the income of inhabitants, by making use of the tourism industry and agricultural activities. The community use the indigenous medicinal plants in the area to heal and treat diseases. Capitalizing on the assets in the area and indigenous knowledge, the project introduced a number of interventions, such as establishing an NGO, establishing a school for educating the locals in the use of medicinal plants, beekeeping, greenhouses to produce shoots to generate endangered plants, and a seed bank, to turn the protectorate into a source of income generation that the locals own.[3]

A. Regenerating the Ecosystem

Actions to regenerate the ecosystem are grouped into the following seven areas:

1. Environmentally Friendly Management of Water Resources

The Arab region is one of the most arid regions, where water scarcity is a priority issue. However, water issues in the region do not stop with its scarcity, but also extend to the threats faced by freshwater resources pollution, such as untreated human wastes and agricultural drainage.

3. These include both economic and financial returns capturing social benefits, and conserving biodiversity.

Water quality and quantity are direct drivers of environmental change in the Arab region. Lack of clean, fresh, and regular water supply is the main reason for a variety of diseases that affect the community at all stages of life. It is also the main reason for the successive waves of out-migration of young generation.

Water scarcity is the most important and serious driver in the study areas. Water shortage has its impact on a wide variety of issues that include agriculture, health, education, out-migration of youth, and many others. Agriculture is mostly sporadic because of water shortage and the failure of many crops to grow. The impact of this issue on other environmental issues, such as biodiversity and desertification, is profound. The aim of this proposed programme is to protect water resources from both irrational use and pollution.The aim of the water resources management programme is to: a) increase water resources to meet growing demands and needs; b) make efficient use of available water resources; c) protect water resources from pollution and wastes; and d) contribute to the equitable distribution of water among the various users both socially and spatially.

Information and Monitoring Measures

Many Arab countries need to strengthen their water resources information base through water resources assessment, starting with an inventory of all basins and wells that will eventually lead to a water census.

Corrective and Preventive Actions

Protecting Water Resources (Quality and Quantity)

The optimal use of all available water resources is possible through an integrated plan that translates the overall policy targets into long-term programmes. The main actions proposed to minimize water loss include, but are not limited to, use of pipelines to transfer water, particularly at locations of high porosity soils; replacement of the level-based water distribution system to the flow-based water distribution system, through calibration of control structures; and use of new technologies for irrigation system maintenance and operation.

Irrigation improvements entail enhancements of the efficiency of water use at farm level. They also initiate user participation in the operation and maintenance of the irrigation system. The framework of irrigation improvement includes rehabilitation and renewal of water structures, use of pipeline, use of one point collective pumping, and land levelling using modern techniques. Other actions include redesign of the field irrigation systems. It is crucial in this regard to consider formulating/supporting water user associations that reflect the new vision for water distribution management process.

Reuse of drainage water is an option in order to meet part of the irrigation water demands. The re-use of drainage water increases the overall efficiency of the water system, but requires strict regulation to prevent negative environmental impacts.

To achieve better water quality, protecting water resources from pollution is a must, and thus pollution abatement programmes have to be set in place. The proposed preventive measures include enforcing measures in laws and regulations for protection of water resources and other legislation, as well as a regular assessment of the water quality status and suitability for various uses.

Actions are also needed to improve drinking water and wastewater management through:

Safe, Clean Drinking Water:

Despite rapid population growth in the Arab world, the percentage of the population with access to municipal water supply has increased over the past two decades, due in part, to sizeable investments in the water sector (EOAR 2010). Even though development of the overall water supply coverage has been rapid and impressive, service coverage varies widely throughout Egypt and Morocco. The parts of the population that have no access to piped water obtain their water from public standpipes (often connected to groundwater wells) and street vendors.

Poor quality drinking water is a concern in many parts of the Arab region. This is due, in part, to the fact that sources of water in many areas have become increasingly polluted, and therefore require more sophisticated treatment to produce drinking water of adequate quality. Furthermore, water treatment units do not always function properly as a result of lack of maintenance and proper operation. Even when water treatment is satisfactory, drinking water is

sometimes contaminated by leaks in the distribution network, which may be infiltrated by sewage. Another source of bacterial contamination of drinking water is the poorly maintained rooftop water storage tanks.

The proposed action is to develop a water treatment plant and a distribution network of piped water to residential, commercial, and other production facilities in El Maghara and Tafilalet. The capacity of the production plant and pumping stations should be suitable to provide safe drinking water to the population today and into the future. Establishing a system for monitoring the quality of the produced water is central to this proposal. The local administration can offer similar proposals as an investment package or an opportunity for the private sector as a Public-Private Partnership (PPP) modality.

Wastewater Management

According to the Joint Monitoring report 2012 data analysis, 77 per cent of the urban areas in the Arab countries are covered with household sewage connections. Although rural population densities are often high, coverage rates are very low. In areas without sewage networks, wastewater is often collected in septic tanks, or in other on-site disposable systems. These installations frequently leak, due in part to poor construction and maintenance, and are a major source of water pollution and unhygienic living conditions. The activities of the wastewater management programme include:

- Developing and implementing low-cost technologies for domestic wastewater treatment, such as small bore holes, taking into account some traditional and indigenous practices; and
- Devising an equitable system to finance the cost of extending sanitary services to non-served areas in order to close the gap between rural and urban areas.

The output of such a programme serves areas such as El Maghara and Tafilalet that lack sanitation, improving the quality of life of the local residents and attracting investments. This will have its own economic and financial gains, once a system that deals with sanitation as a revenue generating activity is in gear. The supportive measures for this programme include addressing the existing institutional and financial constraints to enhance the inspection authority of the specialized public body to ensure the effective implementation of the law.

Supportive Measures

Countries of the region have to expand strategies for developing and rationally using fresh water resources including, but not limited to, groundwater. It is not enough to have a strategy, equally important is to have policies, plans, programmes and projects implemented and evaluated to assess the impact, effectiveness and efficiency of the strategy.

These proposed interventions aim to encourage agricultural development of desert areas, which are to be the basis for

initiating new communities that can attract part of the populous areas and primate cities, such as Cairo, Rabat, Beirut and Riyadh. The expected increase in future demand for groundwater requires continuous monitoring and evaluation of the groundwater aquifers to avoid any possible deterioration as a result of misuse or overuse, as well as pollution. Groundwater may be very deep and needs vast investments to be utilized. Therefore, future strategies for best utilizing groundwater include:

- The use of modern technologies for determining the main characteristics of each aquifer, its maximum capacity, and safe yield. This data should provide the basic criteria for selecting the most suitable projects that could use such aquifers as a sustainable source of water;
- The use of non-conventional sources of energy such as solar and wind energy to minimize the costs of pumping; and
- The use of new technologies for farm irrigation in desert areas to minimize field losses, especially deep percolation due, in part, to the high porosity of such soils.

Raising environmental awareness through organized campaigns, media (particularly TV and radio), festivals, etc., is another supportive measure for any action to conserve and rehabilitate an ecosystem.

Central bodies and local administrations have to consider the use of economic incentives in addition to command and control systems. Some implemented and suggested economic instruments include:

- Encouraging private sector participation in environmental management through financial packages that promote compliance;
- Adopting the polluter pays principle;
- Introducing incentives (tax exemption) for promoting the adoption of clean technologies;
- Encouraging recycling efforts through deposit recycling schemes, tax incentives for recycled material, and grants and soft loans for recycling industries; and
- Reducing fresh water pollution resulting from industrial effluents through effluent charges, soft loans, and grants to finance the purchase of wastewater treatment equipment.

2. Environmentally Sound Management of Land Resources

A growing population and an expanding economy trigger competition of land use and tensions among various users. The sustainable use of land means finding a balance that attains the greatest benefits for social and economic development while still protecting and enhancing the environment.

Proper land management is necessary to protect biological diversity and to utilize the land in a sustainable way. Securing property rights, accounting for protected areas and habitats, and the rights of local communities, including local indigenous groups such as nomads, are necessary to reach sustainable use of land.

A number of factors, such as aridity, weather events, mobility of sand encroachment, and water scarcity cause land degradation. Development activities such as mining for coal and quarrying for building materials has accelerated deterioration of natural vegetation in general, and grazing plants in particular, leading to an accelerated rate of land degradation (desertification).

The proposed programme aims to:

- Prevent and/or reduce land degradation;
- Rehabilitate partly degraded land;
- Reclaim desert land; and
- Expand and execute an environmentally sound management of agricultural and rural development.

Information and Monitoring Measures

Establishing a database on traditional and indigenous systems in agriculture is imperative. This will facilitate in the assessment of land affected by salinity in terms of area, locations, and types of salinity. It will also ease the process of measuring levels and magnitude of degradation in rangelands, thus making the assessment of rural-urban migration possible.

Corrective and Preventive Actions

For all environmentally sensitive areas a master plan should be prepared to protect cultivated and range areas, and to formulate integrated measures for the conservation and sustainable use of land and water resources of fragile agricultural areas.

Supportive Measures

Supportive measures include: a) capacity building and training on improving traditional seed selection; b) outreach and extension for proper use of available resources; and c) institutional transformations, including a system of information generation and dissemination and financial incentives.

3. Drought Management and Combating Desertification

The assessed sites are endowed with a wealth of diversified natural plants adapted to the varied ecosystems and varied terrain. Many of these natural species are of high economic value aside from their value as genetic resources. Many of these species face serious ecological threats. Despite the relative scarcity of appropriate developmental activities and appropriate investigations, the study areas need major efforts to combat desertification and introduce appropriate sustainable development of the available resources.

Information and Monitoring Measures

Many Arab countries do not have a fully functional time-series data of desertification in these countries. Furthermore, they did not submit their reports to the convention. Several Arab countries have put together strategies and action plans for combating desertification, but few have been able to implement the elaborate schemes. There is a need for information on the trends of desertification in order to assess economic and social costs.

Corrective and Preventive Actions, and Supportive Measures

The plan to combat desertification and manage drought has two main objectives: a) to avoid the damaging flash floods, and the use of these floods as inputs for development through appropriate water spreading and water conservation techniques; and b) to conserve, manage, and utilize the highly valued and diversified natural flora and fauna resources in the area. Actions proposed include:

- To review the National Action Plans for Drought Management and Combating Desertification to find investments and projects in the pipeline to be implemented in the study area;
- To develop a project for the study area in case the National Action Plan lacks actions designed for this specific area. The project has to address the specific agro-ecological attributes of the study area;
- To address and focus on the varied natural attributes, specific desertification processes, and action priorities;
- To facilitate the identification of suitable indicators of development and appropriate techniques for monitoring ongoing and future desertification processes in this agro-ecological zone; and
- To improve the identification of projects, research needs, and public awareness campaigns geared and tailored to the needs of this agro-ecological zone.

4. Improving Air Quality

High speed windstorms result in an increased suspended particulate matter, including materials emissions. Massive amounts of mining and quarrying tailings have accumulated as loose sediment cover vast open surface areas in El Maghara. Furthermore, heavy trucks loaded with building stones and blocks release large volumes of particulate matter and dust into the atmosphere. All these factors affect the air quality in the study areas. Indirectly, this particulate matter could have adverse effects on human, faunal, and floral diversity as well as on soil.

The overall objective is to reduce emitted gases and suspended particulate matter in and around Tafilalet and El Maghara. Achieving general air improvements will have its positive impacts on improving the quality of indoor air. The actions to attain this objective include:

Information and Monitoring Measures

- Establishing an inventory of "pollution sources" in human settlements;
- Establishing an inventory of wind speed and directions, seasons, etc.
- Preventive and corrective actions:
- Formulating and enacting a strategy for air pollution abatement;
- Establishing and operating a network for monitoring air quality to collect information pertaining to proper decision making. If this is not possible, a mobile laboratory for assessing air quality should be used;

- Formulating a contingency plan for controlling pollution; and
- Imposing self-monitoring programmes for air quality around large sources of pollution by applying the law, such as having an environmental registry at the coal mines and the quarries.

Supportive Measures include

- Use of available funds, such as Global Environment Facility (GEF), to encourage the use of control technologies, and
- Implementation of public awareness and education modules.

5. Protecting Biodiversity

Almost all Arab countries have a strategy and action plan for biodiversity. The aim of biodiversity conservation is to set the basis for rational use and sustainable development of the national natural biological resources. The purpose is to keep these resources fit for use and capable of production in ways that provide for the legitimate requirements of the present, as well as for the basic needs of future generations.

There is, however, a need to fulfill four integrated objectives: a) conservation of natural resources; b) sustainable use of natural resources; c) integration and mainstreaming of biodiversity issues in Tafilalet and El Maghara into sectorial development plans at both national and local levels; and d) setting a framework conducive to implementing activities that ultimately protect biodiversity in Tafilalet, ANP and El Maghara. A number of suggested activities are designed to attain these goals.

Information and Monitoring Measures

Establishing a biodiversity scientific database and an information system for the assessed sites through the following measures:

- Conducting surveys and assessments of the region, natural ecosystems, and productive (managed) ecosystems within Tafilalet, ANP and El Maghara;
- Conducting surveys and assessments of species (particularly those that have a restricted range and are globally threatened);
- Searching for genatic resources and associated medicinal, pharmacological, and chemical potential resources (particularly the secrets and knowledge of women in the use of medicinal plants in the area to heal wounds and treat various types of illnesses and diseases);
- Developing a complete reference of collections and taxonomic research related to species native to ANP, Tafilalet and El Maghara;
- Initiating a project to establish monitoring stations and schemes; and
- Putting together an inventory list of indigenous knowledge related to living species in the study area.

Corrective and Preventive Actions

- Conserving and rehabilitating key endangered species through law enforcement, information gathering, and implementation of community-based in-situ conservation programmes of key endangered flora and fauna;

- Establishing an effective control and monitoring system backed up with an information system and legislative framework for the trade, use, and control of alien invasive species.
- Engaging in in-situ[4] conservation of rare and endangered native taxonomic groups of plant species by improving knowledge and understanding of species and ecosystems, and by establishing and strengthening gene banks, seed banks, green belts, botanical gardens and public gardens;
- Conserving biological resources through adopting ecologically sustainable agricultural and pastoral management practices, including control of fertilizer and pesticides, terrace management, traditional land-use and water management systems, and introducing modern irrigation systems;
- Reducing adverse impacts on habitat and ecosystem infrastructure and industry through eco-tech introduction, EIA enforcement, and effective regulating policy;
- Reducing adverse waste impact on ecosystems through adopting an ecological policy and introducing new techniques such as recycling, treatment and, green technology; and
- Mitigating the impacts of greenhouse gas emissions and the subsequent climate change on biodiversity and desertification through the energy mitigation strategy included in the national Intergovernmental Panel on Climate Change (IPCC).

Supportive Measures

- Raising the environmental awareness of local society through integrating environmental themes into university and school curricula, promoting green media, and supporting youth clubs and eco-industry;
- Reviving traditional biological knowledge, innovations, and techniques in conserving biological resources;
- Strengthening productive capacities of individuals, agencies, and communities in the planning, implementing, monitoring, and evaluating of biodiversity conservation programmes;
- Enabling communities and individuals to conserve and to use sustainable biological resources by facilitating their participation in planning and managing natural resources, and providing the local population with secure access to biological resources and sufficient financial and technical funding for community-based environmental programmes; and
- Maintaining and strengthening relations of Arab countries, and cooperating with international and regional partners in the field of biodiversity, thus attracting attention to Tafilalet, ANP and El Maghara.

6. Solid Wastes Management

Solid wastes include all domestic refuse and non-hazardous wastes such as commercial

4. It is a Latin phrase that literally means "In position"

and institutional wastes, street sweepings, and construction debris. Unsustainable consumption is increasing the amount and variety of produced wastes. Consequently, waste disposal costs will increase.

Industrial solid waste, emanating from coal and other extractive industries, is another major problem in the assessed areas. Serious problems are being caused as a result of the magnitude of industrial solid waste in El Maghara. Policies of cleaner production should be introduced to facilities operating in the area in order to minimize the generation of such waste.

Information and Monitoring Measures

The best way to cope with waste problems is by means of a waste-prevention approach, focused on changes in lifestyles, and on production and consumption patterns. The first step is to prepare an inventory of sources of waste generation in both qualitative and quantitative terms.

Corrective and Preventive Actions

- Developing transit stations;
- Founding plants for composting and co-composting of solid wastes; and
- Developing sanitary landfills

Supportive Measures

- Waste management charges should require those who generate the wastes to pay the full cost of environmentally safe disposal. This will make waste recycling and resource recovery cost effective.
- Establish guidelines for the safe reuse of waste.
- Financial and economic measures include providing incentives for proper management of solid wastes, which includes recycling, re-use, and recovery; encouraging markets for recycled and re-used products; funding pilot programmes such as small-scale and cottage recycling industries; and lastly, composting production and recovery of energy from wastes.

7. Climate Change Eco-Based Adaptation[5]

Climate change is an issue of great concern in the Arab region, with most Arab countries falling within the hyper-arid, arid and semi-arid zones. Although the Arab region contributes less than 5% of the total global greenhouse gas emissions, scientific assessments indicate that the Arab region will be one of the most vulnerable regions in the world to the potential impacts of climate change. The changes observed in the regional climate have already affected many of the physical and natural systems and there are indications that social and economic systems have also been affected.

The impacts of climate change may range from threats to coastal areas, increased drought and desertification, to scarcity of water resources, increased salinity of groundwater and the spread of epidemics, pests and diseases in an unprecedented manner. This

5. IDB & CEDARE (2012). Increasing Adaptive Capacities to Climate Change in the Arab Region. Cairo, Egypt: CEDARE

will likely lead to a decline in agricultural production, vegetation cover and food security, loss of biodiversity, increase water stress, and sea-level rise that could flood crop fields and coastal settlements and threaten the existing vulnerable marine ecosystems.

Vital economic investments will also be affected by climate change, which may have social and security implications and may also be the cause of migration of citizens from affected areas to other areas within the same country or to neighbouring countries.

Negative repercussions may accrue on the sustainable development process and increase the vulnerability of all sectors of development, with serious socio-economic implications, and a low resilience of the majority of stakeholders.

Information and Monitoring Measures

- In order to differentiate between the consequences of climate change and natural climate variability the need for consistent and dependable time-series data is required for accurate decision making and policy formulation against climate change impacts.
- Climate adaptation programs should focus on monitoring and understanding the patterns of climate variability and change, developing methodologies for the exchange of data and information, and conducting research related to climate change. Capacity-building is needed to accomplish the objectives including strengthening of monitoring networks. It should also include the possibility of establishing an Arab / regional center for long-term forecasting.
- There is a need for the development of a Climate Change Environmental Data Portal to provide key information to support decision making by providing climate change related information about the Arab region, particularly those concerned with improving livelihoods of the poor environments.

Corrective and Preventive Actions

- International action and solidarity is required in the context of the goals of sustainable development. This is based on the principle of common, but differentiated responsibility, that benefits all nations and pays particular attention to protecting the ecosystem and assisting the developing countries most vulnerable to climate change.
- Immediate adoption of urgent and decisive actions on issues of political, social, economic and environmental implications is needed to avoid losses that are likely to be very large in the future, and perhaps to the extent of deeply affecting the region's economy and threatening its security.
- It is possible to avoid many of the negative impacts of climate change on the ecosystems and productive sectors in the Arab region, and to reduce people's vulnerability and exposure to the risks of economic and social marginalization by being well prepared to manage the

risks of climate change. This should be conducted through the implementation of adequate adaptation measures to address the potential risks of climate change.

Supportive Measures

- Protection and conservation of existing natural resources against impacts of climate change through the implementation resource management strategies.
- The implementation of pilot initiatives to demonstrate the feasibility of alternative resources and develop necessary standards and guidelines.
- Adopt sustainable practices and integrated pest management techniques; enhance genetic selection of local breeds; and promote mixed exploitations.
- Develop policy and legislation options, research topics for improved vulnerability assessment and monitoring, and adapted infrastructure.
- Encourage investment in more sustainable activities; develop and promote alternative and sustainable types of economic activities.
- Adjustment of current settlements and infrastructure to future climatic changes mainly through better land-use planning; adopting protective measures against sea level rise and other extreme weather events and anticipating floods in vulnerable areas through hard and soft engineering measures.
- Raise the awareness of the impacts of climate change on health, both within and outside the health sector, and develop the capacity to respond to the hazards and risks of climate change on health.
- Enhancing an Early Warning Alert and Response System (to improve the capacity of the current system to respond to unexpectedly occurring disasters.
- More specific measures against sea level rise consist of pulling back human activities from the coast through the creation of buffer zones, moving sources of urban, industrial and agriculture activities and investments from the coast, introducing effective early warning systems for coastal hazards, and creating protective structures to limit potential damage.

B. Developing Human Resources

Achieving sustainable development is political - it requires major institutional transformations, and cannot be done without political acceptability. The paradigm shift to sustainable development is sustainable human development, which rests on expanding people's choices and capabilities by forming social capital. Sustainable development, therefore, starts with people, and will occur only when people are in charge of their future. Achieving sustainable human development in Tafilalet, ANP and El Maghara will require good governance, which will result from institutional transformation, but it also requires specific steps with respect to the development of human resources. These steps

involve poverty alleviation, extending social services, and achieving economic growth that is sustainable.

Corrective and Preventive Actions, and Supportive Measures

Poverty Alleviation

Poverty is considered the result of a set of natural and human factors, domestic policies, and external factors that come together to create an environment conducive to the occurrence and spread of poverty and its increase in severity. Reasons for poverty include the lack of skills to be competitive in the labor market, inefficient management of natural resources, and an unfriendly business environment that is overloaded with regulations and complicated procedures. Poverty in the some of the Arab region is also the result of lack of social justice and an inefficient economic system, and not the result of lack of natural resources (El-Naggar 2005a, El-Naggar 2005b).

The relationship between poverty and the environment is complicated, due in part to the fact that the poor are essentially reliant on the environment for their livelihood. In addition, they are affected by the methods by which natural resources are exploited. Since most parts of the region's natural resources are limited and susceptible to deterioration, the improvement of environmental management and regulation of the management of natural resources leads to benefits for the population at large, and for the poor in particular.

Although population growth, if not managed in a rational way, may initially lead to environmental deterioration, what occurs long-term is more subject to policies. One of the ways to alleviate poverty is to give the local population more responsibility and access to resources, particularly youth and women. As NGOs, grassroots organizations, and women's groups are important sources of innovation and action at the micro-level. In many cases, they have proven their ability to promote sustainable livelihoods.

For example, in order to participate in protecting and sustainably managing their natural resources, the people of Tafilalet and El Maghara need to have access to these resources and share the benefits that they provide. They also need funds, education, health services, and training to be more productive.

Community-based organizations can be the means toward localizing sustainable development in Tafilalet, ANP and El Maghara. Finally, they need to network their experiences with similar communities in Egypt and abroad to share lessons learnt and best practices.

Another means of poverty alleviation and development is the urgent need for family planning and relief from debt. Adopting such programmes has positive impacts on the health of women, and better child care. Equally important is to relieve the national economy from foreign and domestic debts.

Extending the Social Infrastructure

The mechanism of social infrastructure in many areas in the Arab region reflects the poor state of the inhabitants and the ecosystem. Enhancing social infrastructure can ensure the sustainability of the area's communities. It refers to the range of services that could be offered by organizations to support the formulation, development and maintenance of the community.

For example, human health depends on a healthy environment including clean water, sanitary waste disposal, and an adequate food supply. Good health depends on social, economic, and spiritual development, as well as a healthy environment. People need health care facilities, properly equipped and staffed with qualified physicians, dentists, nurses, and other health care service professionals to provide the people in the areas with the utmost attention and concern.

Another example is education. Many children at Tafilalet and El Maghara are still not enrolled in primary school; especially girls, for numerous reasons. Primary school education costs, such as uniforms, books, copybooks, and tutoring, are a major barrier to access, and the opportunity cost of child labour is still higher when compared to educating a child. Under severe poverty, a family will be reluctant to send children to school rather than send them to the field, the rangeland, or the workshop to earn a living and help support the family.

Furthermore, many primary school teachers lack adequate qualifications. Many people aged fifteen and older live without basic literacy skills. There is a need to give priority and finances to youth and adult literacy programmes by:

- Expanding quality primary and lower-secondary education;
- Expanding youth and adult literacy programmes

Scaling up literacy programmes for youth and adults requires:

- Active government responsibility for adult literacy policy and financing as part of planning the education sector;
- Clear frameworks to coordinate public, private, and civil society provision of literacy programmes;
- Increased budgetary and aid allocations;
- Programmes based on an understanding of learners' demands, especially their language preferences and their motivations for attending class, determined in consultation with local communities;
- Curricula that build on these demands, with clearly stated learning objectives and the provision of adequate learning materials; and
- Adequate pay, professional status, and training opportunities for literacy educators.

Literacy is associated with a wide spectrum of benefits. Human benefits are closely related to an individual's self-esteem, confidence,

and personal empowerment. Participation in literacy programmes brings a wide range of benefits, including increased civic participation (whether in labour unions, community activities, or politics) and enhanced cultural diversity, as it improves people's ability to engage with their own culture.

Research shows that women who participate in literacy programmes have better knowledge of health and family planning, and are more likely to adopt preventive health measures like immunization, or to seek medical help for themselves and their children. The correlation between education and lower birth rates is well established. Educated parents - especially mothers (whether they receive their education through formal schooling or adult programmes) - are more likely to send their children to school and to help them with their studies. The economic returns to education include increased individual income and economic growth.

Promoting Economic Growth without Sacrificing Sustainability

Changing Production and Consumption Patterns

One of the major causes of environmental deterioration in Tafilalet and El Maghara is the unsustainable pattern of consumption. Poor families are unable to meet food, health care, shelter, and educational needs. They have to "dig" their environment and exploit the ecosystem. This pattern aggravates poverty in the area. There is a need to seek ways of using natural resources in ways that minimize depletion and reduce pollution. These new concepts underline the importance of following economic objectives that account for the full value of natural resources. Achieving sustainable development in the surveyed areas requires efficient production processes and changes in consumption patterns. This entails changing the production and consumption patterns that have developed in the past.

Using Economic Instruments to Induce Changes

A market-based approach to environmental management utilizes offering incentives to producers and consumers to make better use of resources. Economic instruments, together with regulations and voluntary agreements can all be part of this strategy. There is a need for the cooperation of private sector companies and both the central and local bodies responsible for environmental management and economic growth. Significant changes in consumption and production patterns will occur once prices of materials and goods reflect the cost of environmental degradation.

Economic instruments fall into seven broad categories: a) property rights; b) market establishment; c) fiscal instruments; d) charge systems; e) financial instruments; f) liability instruments; and g) performance bonds and deposit refund systems (Panayotou 1994). The lowest per capita incomes of the people in Tafilalet and El Maghara imply higher marginal utility of income and lower willingness to pay for environmental improvements and amenities. Whenever

development opportunity and environmental protection are in conflict, existing levels of income, as well as other factors such as preferences, and environmental awareness, influence the choice between the two. Thus, economic instruments to be developed for improving local ecosystems have to be set according to estimates of marginal damages or marginal benefits and hence of people's willingness to pay for a benefit (or accept compensation for a damage). This is particularly important at low levels of income, such as in the case of El Maghara, where a small change in prices or a reduction in income can threaten the survival of native households.

C. Transforming the Institutional Framework

In the Arab Region, the need to achieve economic growth while closing the gap between social classes during the 1960s and 1970s, and the need to meet the basic needs of a rapidly growing population exerted great pressures on the natural resource base, and led to environmental deterioration. With the government as the major player in the development process, civic society organizations including the private sector remained largely weak, with little capacity to participate in the development process. Accordingly, the institutional framework for effective compliance and enforcement remained largely undeveloped (EOAR 2010).

The 1990s marked a turning point toward more effective environmental management as several Arab countries, such as Egypt, Morocco, Djibouti, Tunisia and Yemen, started the Economic Reform and Structural Adjustment Programme (ERSAP) that expressed commitment to pursuing the goal of sustainable development. Currently, the principles of sustainable development and UN conventions such as Agenda 21 and the WSSD (World Summit for Sustainable Development) Johannesburg Action Plan are the basis for environmental policy making in many Arab countries (EOAR 2010).

The strategic objective of environmental activities in Arab countries is to mainstream, introduce, and integrate environmental concerns relevant to protecting human health and managing natural resources into all national policies, plans, programmes, and projects. The medium-term objective aims to preserve natural resources, biodiversity and national heritage within a context of sustainable development. The short-term objective is to reduce current pollution levels and minimize health hazards to improve the quality of life in Arab countries (EAOR 2010).

Policy making in many Arab countries to date has largely been based on the sectorial approach. This has resulted in fragmented economic, social, and environmental policies. Issues such as poverty, unemployment, health, and the environment, have been addressed independently with little consideration to the interrelationships among these issues and their causes and solutions.

The development of environmental regulations has followed the traditional regulatory approach, which focuses on end-of-pipe

controls implemented through command-and-control regulations. Legislation in many Arab countries are, to a large extent, reactive to emerging environmental problems and enforcement oriented. In other words, the emphasis is on output rather than outcome. The substance of Saudi and Egyptian environmental regulations appears to be single-based emission limits, with little consideration to variations among point sources or to ambient carrying capacity, and with weak links to any land-use planning regulations.[6]

Laws for protecting the environment and nature in many Arab countries concentrate on informing the polluter of a violation. However, these laws have few provisions for phasing in compliance measures after the violation has been announced. This most likely results from the fact that the law is being implemented in gradual steps and is probably why industries have been given an extended grace period (EOAR 2010).

Environmental Affairs Agencies in Arab countries set environmental policy after consultation with legislative, political, and public representatives. Compliance with the above-mentioned laws are usually weak because enforcement is still not efficient enough. There is a need to strengthen the institutional mechanisms necessary for effective environmental management (EOAR 2010).

6. Please read the Egyptian Law for protecting the Environment 9/2009 http://www.eeaa.gov.eg/arabic/law4_text_en.doc and the Saudi law http://www.pme.gov.sa/EnvARules.pdf

Most sectoral ministries, such as the Ministries of Health, Water Resources, and Agriculture, are involved in administrating laws and numerous decrees with environmental components. These central bodies undertake work that has very strong environmental implications, such as new crop varieties, chemicals, land zoning, tourism development, water issues, and infrastructure projects.

Information and Monitoring Measures

Developing Information for Decision Making

The most significant constraint to effective environmental policy making and implementation in the Arab world is lack of reliable and timely information. Another constraint is that existing data and information are not adequately managed due to a host of factors, including the lack of financial resources, trained workforce, awareness and availability of information, and/or institutional setup. Other constraints relating to the processes of environmental information collection, production, and dissemination are evident. Furthermore, monitoring organizations do not feed their results into a common information system, and there is no comprehensive methodology for data collection (EOAR 2010).

Policy-makers need environmental information to prioritize problems and take necessary actions. Most environmental problems are complex and decisions are often made with great uncertainty. No effective planning and decision making can be achieved and implemented without

a solid and dynamic information base that is based on monitoring. The design of environmental monitoring systems should be systematic and compatible with the planning and decision making process. It should be based on a unified methodological framework that facilitates the development of environmental quality objectives, targets various media and sectors of the economy, as well as development of both regulatory and non-regulatory policy instruments (EOAR 2010).

There are substantial inventories of statistics in Arab countries, but they are not shared and they are not comparable. However, it is also the case that additional data of different types are required for collection at the local, regional, national and international level to elucidate a more detailed, accurate story of environment and development nexus.

Furthermore, there is a need for standardizing data collection and storage, and making it accessible to technical and managerial levels. Reports and related information tend to be located in different bodies between which there is little or no coordination, cooperation, or exchange, resulting in gaps, duplication, incompatibility, and limited utilization of data. This situation hinders policy development, planning, implementation, and follow-up. In order to improve decision making, it is imperative that enhancements be made in data collection and analysis. The Ministries of Finance, Planning, Higher Education, and Environmental Affairs, bureaus for statistics, academia, and the private sector all have some responsibility towards promoting environmental statistics and information.

The proposal to establish a programme of environmental information management system has two main objectives: a) to strengthen local, regional, and national capacity to collect, analyse, and use multi-sectorial information for decision making by better identification of users, both public and private, and of their information needs at the local, regional, and national levels; and b) to improve overall quality, such as, validity and reliability, coverage, and timeliness of and access to environmental information.

The required activities include:

- Carrying out inventories of environmental, resource and development data for determining gaps and organizing activities to fill those gaps;
- Developing a coordinated, standardized data collection and assessment framework;
- Establishing systems to verify the quality of data gathered, in other words, a source check;
- Establishing procedures for measurement and evaluation;
- Organizing continuous and accurate data collection systems, making use of GIS, databases, expert systems, models, and the like; and
- Cooperating with the private sector and international bodies to facilitate transfer of technology and technical know-how.

Improving the quality of environmental data and statistics requires strengthening institutional capacity, promoting ongoing education, awareness, and training while ensuring financial commitment as well. There are many sources for statistical information, including government archives, academic institutions, UN documents, the World Bank, as well as other international bodies. Efforts should be made to gather information from various sources to form a more complete profile that can be the basis for a better decision making process.

Monitoring and Evaluating

Monitoring, evaluation, and other feedback-generating activities play important roles in assessing programme performance, achievements, and shortcomings. Monitoring begins during, not after, the implementation phase; as regular documentation of both implementation activities and effects allows for comparison and evaluation of action strategies, approaches, and impacts on local conditions for use in future performance evaluation. Certain programmes, such as biodiversity protection, depend heavily upon diligent monitoring activities to gauge and maintain system health.

Generally, monitoring is required for internal management purposes, whereas evaluation and feedback activities have both external and internal applications and are important for guiding planning and resource allocation, maintaining accountability to stakeholders, informing the public, and signalling when a project must change. The logical framework (log frame) approach is now being widely adopted. Its purpose is to provide a clear, rational framework for planning the envisioned activities and determining how to measure a project's success, while taking external factors into account. The strength of the log frame is in the analysis. Under the log frame approach to project management, objectively verifiable indicators are an important element of project design, implementation, and evaluation. Therefore, one of the most important aspects of monitoring and evaluation (M&E) is the choice of suitable and meaningful indicators. An indicator is a qualified/quantified parameter that details the extent to which a project objective has been achieved within a given timeframe and in a specified location. For instance, an indicator measuring conservation of biodiversity might look at the change in the area (km^2) of habitat protected.

Above all, indicators must be practical and realistic and should, whenever possible, be meaningful and consistent with the main objectives of the project. An indicator can also be considered a signal that shows the change in a parameter compared to a baseline or a future target. Due to the empirical nature of indicators, a project proponent and an external observer will both reach the same conclusion about the project's progress. By specifying project objectives in more concrete and verifiable terms, indicators allow an impartial and indisputable assessment of whether a particular objective has been achieved. The

project team should go one step further and interpret what the indicator means in the context of the project.

Monitoring and evaluation methodologies are dependent on well-developed sets of indicators. The indicators provide the basis for before and after analysis, and describe the effects of project interventions (positive and negative), anticipated and unanticipated, intended and unintended. They can be grouped into two categories:

- indicators of implementation progress, that is, the delivery of technical services, capital inputs with related disbursements, and the resulting outputs generated (facilities created, activities and participatory processes organized, and people trained); and
- Indicators of environmental impact in local and global terms that demonstrate environmental accomplishments.

The choice of indicators and their source of verification are governed, among other things, by considerations of the costs involved in collecting the relevant data. Excessively complex or numerous indicators lead to high costs, which could be a reason to seek other, more indirect indicators, for which the data are easier to obtain, so requiring less research and entailing less expense. For example, instead of conducting a survey on income, the number of bicycles sold in the village might be counted.

When in doubt, a "common sense" approach should be used. The choice of indicators should never take up so much time that project managers lose sight of why they are establishing the indicators in the first place. It is far more important to direct resources toward project implementation than to come up with scientifically precise, detailed indicators. In other words, the project should not be driven by the indicators, but rather by its objectives.

While it is not possible to establish a particular set of indicators for all projects, it is possible to provide general guidelines on how to formulate indicators during the planning stage of a project. In particular, the following questions should be answered as part of the process of establishing indicators:

- Are the objectives and outputs clearly stated?
- What changes are anticipated as a result of achieving the project objectives and outputs?
- What are the criteria for judging the success of the project?
- Anticipating the end of the project, how would one know if the objectives have been achieved?
- Are the key stakeholders participating in the establishment of indicators?
- Is the data, which is necessary to measure change against a baseline or target, available at reasonable costs?

An ideal set of indicators would include indicators of implementation progress and impact. One must make sure that changes

in an indicator are attributable to project activities and not an external factor. The monitoring and evaluation section of a project brief or project document should include the following:

- Brief descriptions of standard M&E procedures, such as APR (annual percentage rate), PIR (project implementation review), midterm and final evaluation, inception report, financial reports, updating and revising work plan and budget, terminal report, and terminal reviews;
- Brief descriptions of specific M&E procedures, such as substantive review or steering committee meetings, submission of progress reports, and technical reports; and
- An M&E plan outlining in detail the following:
  - Timetable: When are the crucial M&E activities supposed to take place during the lifetime of the project (APR, PIR, audit, evaluations)?
  - Reporting requirements: What are the formats and frequency of reporting?
  - Data collection: What kind of data will be collected, when, by whom and where?
  - Responsibilities: Who will be responsible for the M&E tasks?
  - Budget: What are the costs for each of the M&E tasks?

Compliance with the tasks specified in the M&E plan should be monitored and adjustments should be made as appropriate.

For each of the standards and specific procedures, the following issues should be addressed:

- What mechanisms and tools will be used?
- What is the schedule and who has what responsibility (who is preparing reports and convening meetings, composition of the steering committee, identification of target groups)?
- What resources are allocated for each M&E task?

Furthermore, the M&E section should refer to the indicators and benchmarks documented in the log frame matrix and specifically address the question of provisions, costs, and methodologies for baseline data collection, data collection at regular intervals during implementation, and ex-post data collection and monitoring. Last but not least, some insights should be given on how lessons that have been learnt elsewhere are incorporated into the project design and how the project is going to extract, document, and disseminate its own lessons learnt. Learning and feeding back lessons are crucial to "closing the loop" of the project cycle. In turn, these lessons will be applied to the next project.

Corrective and Preventive Actions and Supportive Measures

The following are proposed interventions in the field of institutional transformation:

Making Decisions for Sustainable Development

Moving decision making from the narrow, sectorial approach towards mainstreaming

the environmental dimension in the decision making process requires the adoption of a participatory, bottom-up approach that will help develop partnerships and enable stakeholders to be in charge of their futures.

Prices, markets, and governmental fiscal and economic policies also shape attitudes and behaviour toward the environment. The local administration and central bodies responsible for licensing economic activities in the assessed sites have to consider actions that encourage protecting and regenerating the degraded ecosystem. Encouraging economic growth at the expense of social equity and the environment, hoping that one day after economic take-off that trickle-down processes will take place, is a fatal assumption.

Discontinuities are not just in temporal terms, but in many cases they are spatial, where ecosystems are exploited for the development of another locality, most probably where the headquarters of coal mining and quarrying companies are.

Applying Principles of Good Governance

Good governance will provide a strong foundation for transforming governments in ways that can make it effective at achieving sustainable development. Basis for such good governance are:

1. *Participation*. Participation by both men and women is a key cornerstone of good governance. Participation can be either direct or through legitimate intermediate institutions or representatives. Participation needs to be informed and organized. This means freedom of association and expression on the one hand and an organized civil society on the other hand. Governments of Arab countries have to expand the framework within current legislation and establish for each facility, such as schools and health care centers, a Board of Trustees whose members are prominent figures of the local community. The government has to empower and authorize the Board of Trustees to take control of the finances and management of the facility to produce services that meet the needs of the local population. The Board of Trustees will serve as a forum for participation and decision making.
2. *Rule of Law*. Good governance requires fair and legal frameworks that are enforced impartially. Accordingly, the norm in El Maghara has been to make no exceptions whatsoever. The local administration has to penalize any violator, collect fines and deposit them in special funds to improve the environment. There is always a grace period during which the local administration provides other options, after which the law and regulations are imposed.
3. *Transparency*. Transparency means that decisions are taken and enforced in a manner that follows rules and regulations. It also means that information is freely available and directly accessible to those who will be affected by such decisions and their enforcement. It also means that the information is provided in easily understandable forms and media.

Moreover, before making a decision, local and central administrators have to meet with the people and present their ideas. Consultations take place, and based on the inputs of the public and their legitimate representatives and natural leaders, the authorities can make a decision. This process is flexible and should include a loop for monitoring, evaluation, and verification.

4. *Accountability.* Accountability is a key requirement of good governance. Not only governmental institutions, but also private sector and civil society organizations must be accountable to the public and to institutional stakeholders. Accountability is an issue that varies depending on whether decisions or actions taken are internal or external to an organization or institution. In general, an organization or an institution is accountable to those who will be affected by its decisions or actions. Accountability cannot be enforced without transparency and the rule of law.

5. *Responsiveness.* Good governance requires that institutions and processes try to serve all stakeholders within a reasonable timeframe. In Sinai, the governor periodically has to hold an open session that members of the Executive Council are required to attend as members of the public to present their case, and decisions have to be made on the spot.

6. *Consensus-oriented.* All decisions are the output of a participatory process for decision making. Participation generates information necessary to clearly define the situation, the reasons for the status quo, and the means to transform into a desirable future situation. Consensus building is at the crux of the development process. There are several actors and as many viewpoints in a given society. Good governance requires mediation of the different interests in society to reach a broad consensus on what is in the best interest of the whole community and how this can be achieved. It also requires a broad and long-term perspective on what is needed for sustainable human development and how to achieve the goals of such development. This can only result from an understanding of the historical, cultural, and social contexts of a given society or community.

7. *Effectiveness and efficiency.* Good governance means that processes and institutions produce results that meet the needs of society while making the best use of resources at their disposal. The concept of efficiency in the context of good governance also covers the sustainable use of natural resources and the protection of the environment. Today all projects and new developments are obliged by law to perform environmental impact assessments (EIAs), and an environmental management system (EMS) is central for economic establishments operating in the assessed areas. Adopting EMS at the local level, and the role government and local authorities can play in this respect is one of the means of achieving effectiveness and efficiency in Tafilalet, ANP and El Maghara.

8. *Equity and inclusiveness*. All decisions have to be made aiming to achieve equity, and there is room for all sub-population groups to present their concerns and defend their interests. A society's well-being depends on ensuring that all its members feel they have a stake in it, and do not feel excluded from mainstream society. This requires all groups, but particularly the most vulnerable, to have opportunities to improve or maintain their well-being.

Implications of the Scenarios

Implementing the proposed actions is expected to have a number of implications:

1. *Good governance promotes information sharing*. The reform process will stimulate local players representing different interests to share information. Participation, building partnerships, and increasing capacity of the Bedouin to enable them to participate in running their own affairs is a process that will emerge as a mechanism that is essential to attain effective developmental progress.
2. *Environmental concerns can be part of the local development agenda*. Adopting a participatory mechanism will bring environmental concerns to the development agenda and sharpen the focus on managing natural resources. The proposed process for decision making will clearly show the success of, and the need to continue, cross-sectoral coordination and interested party participation.
3. *Participation, partnership, and empowerment will cause institutional transformation*. Inviting the representatives of different interest groups in the assessed areas to participate in decision making and implementation will persuade the masses to adopt this innovative modality as a process for urban planning and management, and take decision making outside the rigid governmental institutions into more spacious popular institutions that are grounded in the realities of both the Governorate and the community.

To implement the prescribed actions, several trade-offs have to be kept in mind. First, there is no way to stop economic activities in the area and return the ecosystem to its original status. The only way to regenerate the ecosystem is to encourage sensible economic growth and expansion without sacrificing the quality of life of the locals. This is possible by weighting economic growth against both social equity and conserving the ecosystem and balancing the three goals of economic growth, social equity, and conserving the ecosystem.

Second, private and public sector companies operating at Tafilalet, ANP and El Maghara require government interventions in the form of extending physical infrastructure, such as roads, and social services such as health care facilities, but do not want strict regulations. This contradiction is inherent in the market system. Governing bodies need to reach win-win solutions, in which they focus

on the interests of both the production establishments and the community. The use of economic instruments will be of great importance in reaching such agreements, which can only be done if natural resources are properly priced to reflect the cost of current development to present and future generations.

Third, the terrain, land, and other natural resources are subject to property contradiction. In other words, the dilemma that will confront the implementation of the proposed programmes is the contradiction between market value and the use value of land. The owners of the land see only its market value - its exchange value on the market; while the society sees its use value - what the land means to the local population.

The solution involves applying command and control regulation and using proper economic instruments that enable reaching a win-win agreement - economic growth and expansion without damaging the environment and/or threatening the stability of the local community.

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