

# **Optimum Response Strategy Report**

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## 1. Scope and objectives

The defining of Optimum Response Strategies (ORS), which is the final task of the ResManMed Research, will be carried out with the objective of identifying possible deficiencies in the environmental resource policies and/or means to achieve their more effective implementation.

More detail (description and discussion) on the existing Environmental Resources and Policies may be found in the *First Annual Progress Report, Annex 1 Environmental Resources Report - Section 3 Malta* and *Annex 2 Environmental Resource Policy Report - Section 2 Malta*, respectively.

As can be derived also from the Comparative Analysis of Environmental Resource Policies in Lebanon, Malta and Turkey (see *First Annual Report, Annex 3*), the approach to legislating the use, conservation and protection of the environmental resources, i.e. including:

- Water - surface water, groundwater and seawater (bathing quality)
- Soil
- Geology
- Forest
- Karst heritage, e.g. caves, gorges, sinkholes and other geological monuments
- Biodiversity, through habitats and regulations concerning protected species

will necessarily vary from country to country and from resource to resource, depending on the actual resources and the legislative systems involved. Nonetheless, it remains in each country's interest to ensure that valuable or strategic resources receive equal and effective protection on a national basis.

In the context of the ResManMed research, the defining of ORS will be done in relation to the priority scenarios that were identified for the Gozo Study Area: uncontrolled urbanization and seasonal influx of tourists (See Annex - *Validation and Assessment Report - Formulation of Impact Scenarios using the SAGE methodology for the Gozo Study Area*). In other words, the proposed approach is to link each of these scenarios to:

- a) the Environmental Resources affected, and to
- b) the Environmental Resource Policies controlling these resources,
- c) including the Socio-economic Impact that each is going to have

as applicable to the Gozo Study Area.

## 2. ORS for the Gozo Study Area using the SAGE methodology

The two future scenarios related to the Gozo Study Area (see also *Annex Validation and Assessment Report*) as shown in the diagram below, concern:

- The continued urbanization of the Village of Xlendi and
- The development of an Airstrip in Gozo.

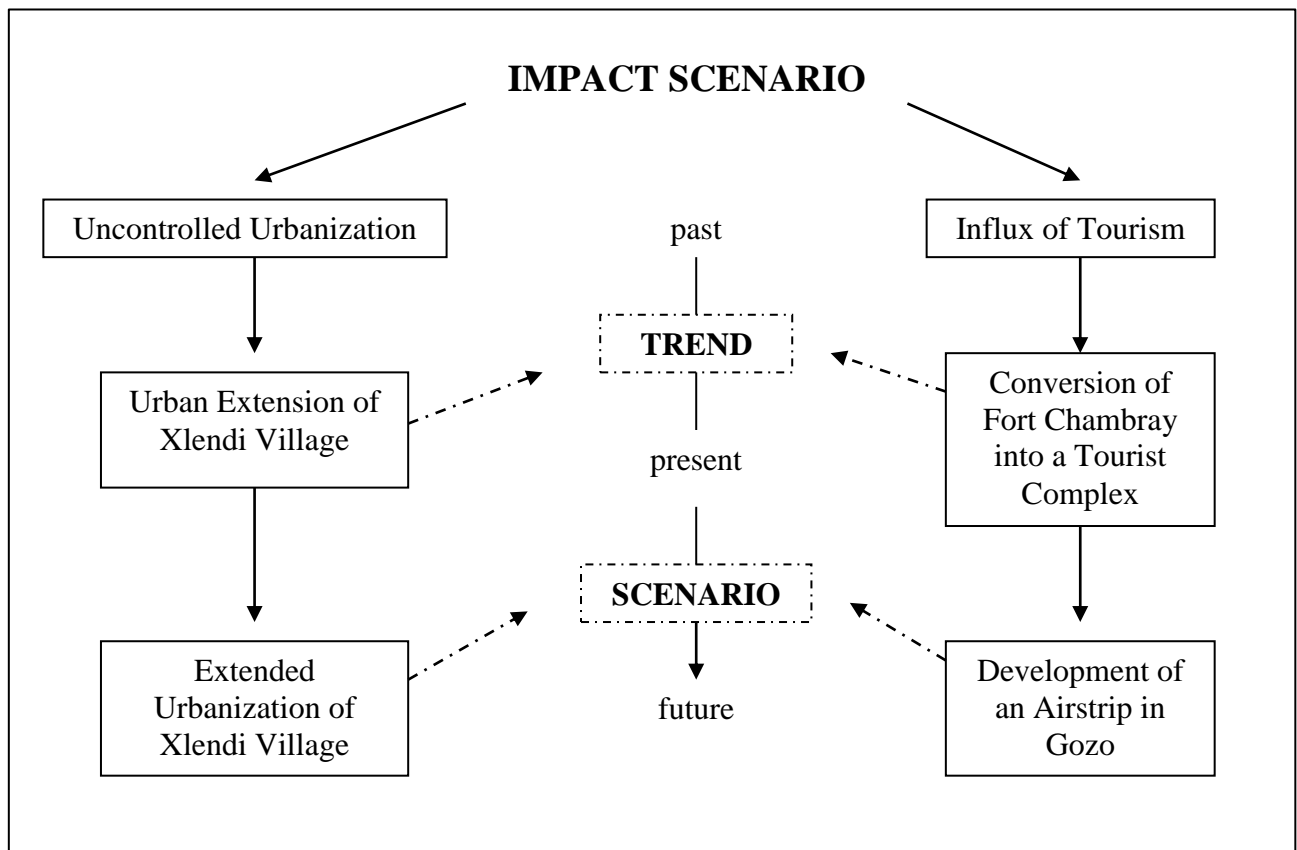


Table 1 Schematic presentation of Impact Scenarios selected for the Gozo Study Area

These future scenarios result from a realistic expansion of the trends that were identified using the SAGE methodology. The continued urbanization of Xlendi village represents a direct extrapolation of the trend which saw the development of an originally small hamlet into a fully fledged seaside resort. The second scenario, i.e. the construction of an airstrip in Gozo, is envisaged as a likely development to accommodate a further increasing influx of tourists during the summer months.

The impacts on the environmental resources resulting from an uncontrolled extension of urbanization and a highly seasonal (summer) influx of tourists has been discussed extensively in the Annex - *Validation and Assessment Report*.

To avoid, or at least to mitigate the negative impacts of future developments on the environmental resources will require sustainable environmental planning and management, based on both:

- adequate environmental resource policies, and
- their effective implementation.

Again, the approach proposed in the SAGE methodology, which was adopted - and adapted to cater for the management of all the environmental resources in the Gozo Study Area - offers a most valuable starting point.

The **Selection of a Strategy** is defined as the fourth step in the SAGE methodology (see Annex *Test Methodology Formulation*). According to this methodology, the selection of strategy concerns the reaching of a consensus among the Members of the Steering Group on so-called "collective objectives". These collective objectives are then formulated by means of several "indicators", which can be qualitative or quantitative.

Moreover, the SAGE methodology advises that these indicators will generally be defined around three main inter-related themes:

1. Resource conservation
2. Resource use optimization
3. Land use planning

One of the most important SAGE Outputs - Step 5 in the methodology - concerns the formulation of guidelines concerning e.g. landuse planning, agricultural practices etc. that are compatible with the collective objectives defined in the previous step.

Clearly, this logical output is directly equivalent to the formulation of "Optimum Response Strategies" in the ResManMed research. In fact, this observation is seen to be valid for each and every output resulting from the application of the SAGE methodology. A distinction can be made between the following outputs:

1. Management directives (for both resource use and protection)
2. Planning Directives
3. Monitoring Scheme (tableau de bord)
4. Increased Awareness Campaigns

By completing these remaining steps in the ResManMed research on the Gozo Study Area, a type of preliminary SAGE will have been finalized - comparable to the 'pre-Sage' that is carried out in France for the planning and management of the water resources.

The final step - Step 6 Final Validation - relates to a validation when SAGE is fully operational. Obviously, this interpretation cannot be applied to the present research effort. However, if the present research is viewed more realistically as an effort to increase the understanding and acceptance of a most valuable and innovative approach to environmental planning and management, then a final validation would clearly translate into the adoption and implementation of this approach by the relevant authorities in the Gozo Study Area. These observations have been considered in the formulation of the Technology Implementation Plan (TIP) for the Gozo Study Area.

### **3. Environmental Resource Management Policies as a Response Strategy**

Environmental Resource Management Policies are taken in their broadest sense, that is policies dealing with resource use, conservation and/or protection. Evidently, if these are to serve as Response Strategies, any proposed changes to the existing policies cannot be less stringent than the existing policies. In addition, the Validation and Assessment Report demonstrated the need for a new planning and management framework that is based on extensive dialogue among all the stakeholders.

Interactive planning is needed also to ensure careful monitoring of the development occurring in the Gozo Study Area. The approach will ensure that all of the various demand and supply factors are assessed in a co-ordinated manner. This is considered essential in order to achieve a harmonious approach to developing a sustainable local and tourist product. This co-ordination method will also help to integrate tourism and related development into the overall development policies and plans for the Local Study Area.

#### **3.1 Existing Legislation**

At the national level, this type of interactive planning would be concerned with tourism development policies and how these could be integrated into the development policies of other sectors and vice versa.

The environmental resources that have been identified to be at risk from exploitation, mostly fall under the Environment Protection Act (which includes the Structure Plan).

The **Environment Protection Act** (1991) was introduced with the aim of establishing the necessary legislative power required for emergency protection of the environment and also to establish a framework within which to verify and to enforce these rules. It also protects the environment by providing for a system of licenses for effluent discharges, air emissions and waste transport and disposal.

The **Structure Plan** of the Maltese Islands (1992) states that, *“the general strategy is to encourage economic development, constrain further urbanisation and give much greater importance to conservation and the quality of the environment.”*

During the latter part of the 1980’s urbanisation increased exponentially and the Structure Plan was introduced with the aim of putting a stop to this, and other, largely uncontrolled development. The Structure Plan designated areas, within which development could occur, and areas where development could not progress, namely ‘green areas’. Further information may be found in the *First Annual Progress Report, Annex 2 Environmental Resource Policy Report, Section 2 Malta*.

The continued trend of an increasing rate of uncontrolled urbanisation, driven by the desire to satisfy a large, seasonal influx of tourists, suggests that there is not enough enforcement of the Structure Plan legislation. Although in principle the basis of this legislation focuses on sustainable development, the end result is far from perfect and the impacts on the environmental resources are envisaged to become even more acute.

With reference to further (future) tourist-oriented development, the Structure Plan provides for the expansion of tourist facilities and accommodation at Marsalforn, Mgarr and Xlendi Villages in Gozo. The Structure Plan also states that any further development of tourist accommodation should be confined to the conversion of property in favoured positions in existing built-up areas. This section of the Plan certainly has not been adopted for the extension of the Xlendi village (and valley). Similarly, does this make a legal basis for the conversion of the historical Fort Chambray into a tourist complex?

It is also worth viewing what role the **Tourism Master Plan** has identified for the Gozo Study Area (Tourism in Gozo : Policies, Prospects and Problems, 1994): *“Gozo offers the whole Maltese Islands, its main opportunity to create a quality resort and attract a high spending and different type of tourist.... The role of Gozo in the Tourism Plan is to offer an alternative experience to the tourist within the overall Maltese tourism product. Gozo is more tranquil than Malta (mainland) and it now has the opportunity to develop as a complimentary destination. The development of Gozo should not be rushed.”*

### **3.2 Limitations of Existing Legislation**

The existing legislation presents a number of limitations, starting from the absence of any reference to internationally accepted guidelines that were used to model the standards defined in the said legislation (e.g. water quality standards). Similarly, there is no reference to internationally accepted guidelines on procedures to be followed to assess such standards.

Nonetheless, it must be pointed out that the single most important problem lies not with the legislation itself, but with a serious lack of its enforcement. The extent of urbanisation that is found in Malta (mainland) today, is clearly exceeding what can possibly be considered acceptable from the perspective of sustainability.

These observations indicate that before the upgrading of existing legislation can be carried efficiently, it is essential that a Carrying Capacity Assessment be conducted first.

### **3.3 The Need for a Carrying Capacity Assessment**

The Carrying Capacity with respect to tourism can be defined as the level beyond which visitor satisfaction starts to drop and which will, in turn, bring unacceptable changes and impacts to both the host community and the cultural and natural resources.

To date, there have not yet been any definite Carrying Capacity Studies carried out. Thus, also no thresholds have as yet been identified.

Before embarking on any new development, an in-depth research should be performed, aimed at assessing visitor satisfaction, community attitudes towards tourism development, and to determine the foreseen impacts on the various resources.

Through such scientific research, one can monitor the consequences of increased development and sense whether visitor satisfaction is decreasing and/or the host community's tolerance limits may have been exceeded. Evidently, there should also be a physical component in the carrying capacity assessment, which looks into the infrastructure available and its limitations, particularly the supply of water and electricity.

It should be born in mind also that the Carrying Capacity can vary from one season to another and depends on tourist behavioural patterns, facility design, and management, the dynamic character of the environment and a changing attitude or perception of the community.

Through careful management and planning of tourism flows, the island can increase its carrying capacity, besides using this management tool as a means to identify critical thresholds in need of attention, leading to an adaptation and application of the necessary controls.

A report commissioned by the Ministry of Tourism entitled "Carrying Capacity Assessment of the Maltese Islands" (April 1999), was reviewed and found to include a good statistical assessment of various tourism related topics, including the frequency and distribution of tourists, the preferred type of tourist accommodation and the number of tourists at the most popular attractions. However, the report does not establish any threshold levels as required for an explicit formulation of the carrying capacity of these destinations.

### **3.4 Choosing between a Market or an Asset Led approach for future development**

Sustainable development of an area, should be achieved through an Asset-Led approach rather than a demand or Market-Led approach. The Market-Led approach physically increases the facilities to meet the continual demand for more beds during the summer months. The Asset-Led approach on the other hand, first examines the destination's assets and resources available and then seeks to develop market segments that are attracted by such resources. This means that tourist influx and development should stem from the destination's product on offer rather than from an emphasis on promotion. This approach will ensure the appropriate use of and not the degradation of the resources.

### **3.5 An Integrated Policy Framework**

Each of the aforementioned observations, including the need for a carrying capacity assessment, the adoption of an asset-led rather than a market-led approach to future development, indicate the need for an integrated policy framework.

Such a framework would facilitate a harmonized effort between the different departments and institutions with the responsibility to define:

- the resources which are to be protected, including priority areas
- the means by which the relative vulnerability of these resources is to be determined
- the activities which can be permitted, or should be prohibited or controlled according to the area designation (e.g. protected area, green area, urban area etc.)
- the agency/agencies that will be responsible for the implementation and the means of implementation

Another important factor is education. It is essential that the public in general, and potential polluters in particular, are made aware of the importance of the environmental resources and of the vulnerability of these resources to pollution.

Specific recommendations for legislative and management improvements for each individual environmental resource considered in the ResManMed Research are the object of the next chapter.



## **4. Specific Recommendations for Legislative and Management Improvements for each Environmental Resource**

### **4.1 Water**

It is generally recognized that due to their special hydrogeological characteristics, karst aquifers are particularly vulnerable to pollution, especially pollution from agricultural practices. At the same time, for most of the Mediterranean countries, this type of resource represents the optimum (and in many regions the only) alternative for drinking water supply. For the Gozo Study Area, all its aquifers are karst aquifers, with only the largest of these being used to satisfy part of the drinking water supply requirements. From an economic point of view, the term 'optimum' source evidently will continue to apply to the groundwater, considering that the remainder of the drinking water supply requirements is derived from the desalination of seawater through reverse osmosis. It is essential that the groundwater is provided with adequate means for its conservation and protection against pollution. The pollution of karst groundwater can be avoided or significantly reduced by proper preventative measures. Proper landuse planning is a basic requisite for the protection of karst groundwater, both from the point of view of its quality and quantity.

To do so, it is necessary to determine which type of human activities, including new developments, can be permitted or should be prohibited or controlled. This should be carried out with regard to both the water resources as a whole (the different aquifer systems) - serving as resource protection measures - and in relation to the vicinity of specific sources of drinking water supply (springs, galleries, boreholes etc.) - resulting in source protection measures.

In both instances, this will require an assessment of the vulnerability. No vulnerability index should be considered static, it should rather be taken as an index that will merit revision and updating as more data becomes available.

It is of the utmost importance that legislation is not limited to the requirement for such vulnerability assessments to be carried out. The specific method or approach to be adopted for such an assessment should be specified as an integral part of the water conservation and protection legislation. Obviously, such legislation should be flexible enough to allow for the alteration or re-defining of protection zones, aquifer boundaries and their hydraulic characteristics, resulting from additional investigations performed prior to a particular development or change in landuse.

In conclusion, the recommended strategy for landuse planning with regard to water resources, lies with the establishment of groundwater protection schemes made up of, at least, a landuse map and a code of practice. Groundwater protection schemes should be based on groundwater pollution risk and risk management.

The Surficial Cover Infiltration (SCI) Map that was prepared for the Gozo Study Area shows the relative ability for rainwater to infiltrate the surface. Hence, the map can be considered as a means to represent the spatial distribution of the relative vulnerability of the underlying groundwater resources to contamination infiltrating from the surface. Hence, areas that were identified to have a higher SCI index should be made the object of stricter protection measures compared to areas with lower SCI index.

Similarly, the SCI map offers a scientifically valid means to start an assessment of the spatial distribution of the risk for groundwater pollution in the Study Area. It is most worthwhile to remember that the SCI approach is particularly suited to karst areas, given that the SCI index results from a combined evaluation of the surface lithology, fault density, drainage density and the karst features present in the study area.

## 4.2 Soil

The importance of soil as an essential for all natural ecosystems and thus the link between the inanimate geosphere and the living biosphere is increasingly being recognized. Consequently, this is the reason why concerns over the protection of soil are globally on the increase. The continued mining of soils for the growing of food in an unsustainable manner coupled with a liberal use of fertilizers is commonly known to degrade and exhaust topsoil, making it more prone to erosion. Similarly, the use of excessive amounts of irrigation water should be avoided to guard against soil salinization and the depletion of the water resources in general.

Soil erosion, compaction, contamination, acidification and the loss of soil biological diversity are identified as significant processes affecting soils. The contamination of surface waters and the contamination of ground waters by nitrate, phosphate and biocides, are associated concerns, whose solutions require changes in soil management.

Hence, from a general point of view, recommendations for improved soil resources management include:

- to establish and publish maximum acceptable concentrations of heavy metals and other toxic substances in soils, which would serve as guidelines for use by local farmers and pesticide-residue inspection laboratories carrying out their duties.
- to create investment opportunities / incentives so that the farmer would opt to go for organic farming, including the use of biological controls instead of chemical pesticides, which may bio-accumulate up a food chain.
- to advise farmers on the merits of crop rotation as an alternative farming technique to pesticide and to fertilizer use. This management practice reduces the chances of soil overuse, and hence the exhaustion of soil resources through overuse, besides reducing pollution of the water resources.

In addition to these recommendations, it is important to address the specific impact scenarios that were identified and analyzed for the Gozo Study Area. The uncontrolled urbanization that continues to be witnessed is clearly affecting the area available to agricultural activities.

Another observation that was made possible from the storage of parameters affecting the state and use of the soil resources in a GIS for the Gozo Study Area, concerns the occurrence of soil erosion. A map showing the surface water induced land degradation features proved to correlate significantly with a map showing the physical condition of the rubble walls. These loose stone walls provide a form of terracing, thereby acting as an effective means to guard against soil erosion, apart from their purpose to delineate field ownership. Many of the localities where a poor to very poor condition of these walls was found, match closely the areas characterized by a high incidence of soil slumps.

A programme aimed at the restoration of these rubble walls serves as an explicit conservation and protection measure to guard against soil erosion. Yet, the condition of the rubble walls is evidently not the only cause of soil erosion in the Study Area and more research is needed into management practices of the soil resource resulting in soil erosion.

Effective legislation has to tackle *all* these issues, not only by protecting certain areas from uncontrolled urbanization, where the soil as a resource is considered to be ideal for crop production. Indeed, legislation should be extended to specify the measures that should be adopted to use this resource in a sustainable manner.

Legislation in the form of a code of good agricultural practices for the protection of soils, should at least, include the following action plans:

- A national review of soil quality to establish the current status of soil should be carried out. Contaminant levels in soils are poorly established other than for sites that have attracted particular attraction, this should be extended further, and updated whenever necessary. The establishment of a national monitoring framework for the monitoring of soil quality should be considered as a second phase to the review exercise.
- Incorporation of soil conservation into the considerations of conservation and planning agencies should also include a review of the need for designated and managed soil reserves to conserve particular types of soils and soil biological communities. The results of these reviews should be the basis of resource protection policy formulation.
- It is recommended that a national landuse policy be drawn up, similar to the already available Structure Plan. This should take the natural functions and capacities of soil into perspective.

- Furthermore, it is recommended that the national landuse policy would form part of a National Sustainability Plan. The latter plan should be a result of interdepartmental discussions and would influence land use decisions across all public and private sectors. The reason for highlighting this recommendation in relation to soil as an environmental resource, is in response to the limited extent to which the environment capacity of soil has influenced land use to date, leading to widespread environmental degradation which does not equate with the accepted principles of sustainability.

### 4.3 Geology

The influence of geology in providing the substrate for ecological habitats and as a prime determinant of the character of the countryside has become more widely recognized and appreciated. In this context, the ResManMed research has offered the opportunity to give a wider dimension to the need for landscape conservation in the Gozo Study Area.

The identification of prime Earth Heritage sites is fundamental to most approaches of Earth Science conservation. It is most positive therefore that such Sites have already been identified for the Gozo Study Area and have been included in the Environment Protection Act on the basis of their scientific, educational and scenic importance. A major problem has remained though concerning their proper management.

Specific recommendations that would serve to assist the sustainable management of these Earth Heritage sites include:

- The landowner or occupier of a Site of Special and Scientific Importance should be notified with a short scientific Statement of interest derived from the Geological Conservation Review by the Conservation and/or Planning Agencies. This report should not only include the reason why such a site has been characterized as a Site of Special and Scientific Importance, but also accompanied by a list of Potentially Damaging Operations. A map detailing the boundary of the site should also be made available with this report.
- The occupier or landowner needs to apply to the Planning Agency (the Planning Authority in the case of the Gozo Study Area) for consent to carry out any activity included in the list of Potentially Damaging Operations. This process ultimately results in discussions between the area staff and the landowner or occupier concerning the management of the site. The area staff dealing with the notification, should be Earth Science specialists so that they can justify why particular sites should be preserved. Experience in other countries on Earth Heritage conservation has shown that it is of the utmost importance for the Planning agency to ensure that (1) the significance of the site is explained in detail to the owner/occupier, and that (2) this is done only through qualified specialists.

#### 4.4 Forest

In the absence of "forests" in the Gozo Study Area, comparable to the tree cover that is present in the study areas of Lebanon and Turkey, the terminology "forest" was given a very specific meaning in the Gozo research project.

The definition of "forest" was modified following extensive consultations with the agriculture department to incorporate "wooded areas", areas with shrub vegetation and areas covered by *Arundo Donax* (or cane). In fact, at level 3 of the landcover legend for the Gozo Study Area, the "wooded areas" were subdivided further with the introduction of a distinction between native and non-native wooded areas. Reference can thus be made for example to the distribution of Eucalyptus trees, which have been planted only over the last 20 years. This shows the location of artificially created bird-hunting areas.

Since *Arundo donax* serves as an indicator for the presence of fresh water, mapping its distribution and occurrence proved most useful to establish or improve on other water-related maps (surface drainage, watercourses and delineation of valley systems).

In addition to these "forest and shrub areas" applicable to the landcover mapping exercise, the relative occurrence (isolated, dominant or abundant) was mapped for each of the following tree species: carob, walnut, fig and the prickly pear. Each of these were at some time in the past connected to well established industries (carob honey, prickly pear jam etc.) and hence the interest to enable an appraisal of these cottage industries' use of the "forest areas". (A more detailed write-up can be found in the *Second Annual Progress Report, Sub-Report on Databases for Study Areas*).

Up to the collation and digitizing of the above data for the ResManMed project, there were no existing maps of wooded areas, nor of the distribution and type of trees growing in Gozo. The results obtained from the surveys that were carried out constitute a novel and most valuable reference for the various Agriculture, Planning and Management Agencies.

From a legislative point of view, existing legislation dictates that only native types of vegetation can be planted in rural areas, and that the introduction of non-native species is allowed only in urban areas. In principle, this policy falls under the ideals of sustainable development, and its actual enforcement will help both Planners and Managers achieve sustainable development of the Gozo Study Area.

#### 4.5 Karst heritage (e.g. caves, gorges, sinkholes and other geological monuments)

Karst heritage sites should be top on the list of resources conservation priorities due to extent of invaluable knowledge and information they store about geological and evolutionary history. The karst limestone terrain in the Mediterranean contain the

key to its sea-level history for the last few million years and thus deserve special attention. This observation is particularly valid also for the Gozo Study Area.

Prevailing systems for decision-making in many countries tend to separate the economic, social and environmental factors at the planning, policy and thus management levels. The relatively small size of the Gozo Study Area further aggravates the situation, rendering it ecologically more fragile and often geologically vulnerable. Any efforts towards the effective preservation of the karst landscape compete with demands to make productive use of this resource. Since the entire Study Area is made up of limestone, all development that is occurring affects the karst landscape.

However, it is considered that this can be addressed through the adoption of an Integrated Resources Management approach, in which the appreciation of the karst heritage is given its due importance. In such an approach, the karst landscape can be valued not just from an aesthetic point of view, but also from a habitat (biodiversity) and geological perspective. Indeed, a 'bare' landscape may be void of biota, but may also represent an attractive and/or valuable geological landscape. The uniqueness of such landscapes may vary in human-use parameters, and range from educational, research, historical, aesthetic, touristic to recreational. Each of these parameters may be used to notch up the degree of conservation and protection that should be assigned to karst heritage sites.

Recognition of the opportunities in eco- and agro-tourism may lead to a more sensible competition for land area between the development of a hotel and the preservation of karstic landscape for tourist (and local) appreciation. This could be achieved by integrating the karst heritage sites that have been earmarked for conservation and protection into a sustainable tourism plan. Such a tourism plan should also incorporate the requirements and measures to be taken for the effective conservation and protection of the karst heritage sites.

The implementation of such a tourism plan is unlikely to achieve its desired results unless such a plan is incorporated in the National Sustainability Plan that was put forward earlier (see Soil), in which the sustainable management of all environmental resources is considered.

#### **4.6 Biodiversity**

Biological diversity refers to the variety of the world's biological resources and is a function not only of the number of ecosystems or organisms within that ecosystem, but also the genetic differences within the individual species. The great diversity of the world's plant and animal species has intrinsic value, simply for existing, besides also being an important biological resource essential to human existence and commerce.

Conservation of biological diversity is therefore a form of natural resource management which has as its primary goal, maintaining the long term potential of world biological resources to meet the needs and aspirations of future generations. This is a fundamental principle of sustainable development.

Natural resource management should not only seek to maximize short-term productivity, but sustainable long-term productivity, without threats to the biota involved. Legislation should be aimed at preventing this short-term form of economics or development. There is extensive loss of biodiversity wherever development has not planned in a sustainable manner, largely due to the demands of growing populations on biological resources and habitats. These losses are so significant, because they are also irreversible. Scientists estimate that extinction is occurring 1,000 to 10,000 times more rapidly today than during the millions of years before human intervention became a significant force.

This provides an additional reason why legislation should be aimed at preserving this global heritage through the sound management of natural resources and especially for the conservation of biological diversity in the work of Planning and Development agencies worldwide.

Policies related to the biodiversity resource should mainly be of two types:

- Preservation of endangered species and critical habitats, and
- Conservation and management of land habitats.

Projects that cause severe or irreversible environmental degradation including species extinction without mitigation measures should not be allowed. This policy should also be applicable to projects that would significantly modify natural areas designated by international conventions, such as World Heritage Sites and Biosphere Reserves.

Such areas should not only be designated as green areas, over which no detrimental type of development can occur, but also be preserved and valued as national parks, wildlife refuges or other protected areas.

The protected areas found in the Study Area of Gozo are limited and although cited as protected areas, are significantly affected by the uncontrolled rate of urbanization and seasonal influx of tourism. The scenarios that were selected for the Study Area, i.e. the Extension of Xlendi Village and the Construction of an Airstrip, both fall in very sensitive habitats. Xlendi village boasts one of the most scenic and biologically diverse valleys in the whole Study Area, which is now under threat by the extension of the village. The airstrip poses the threat of both noise pollution to the bird nesting sites in its vicinity, and also the loss of precious land habitat that supports genetically varied and indigenous organisms.

Conservation of biological diversity depends entirely on the preservation of sufficient tracts of representative land habitats and the introduction of measures to manage, conserve and protect these to sustain their viability as plant and animal community habitats.

## **5. A new Environmental Resource Planning and Management Scheme**

The scheme that is proposed includes :

- Management directives (for both resource use and protection)
- Planning Directives
- Monitoring Scheme (tableau de bord)
- Increased Awareness Campaigns

In fact, each of the above are direct outputs from the application of the SAGE methodology that was used and adapted to cater for the management of all environmental resources (see *Annex Test Methodology Formulation: Adaptation of the SAGE methodology for the Gozo Study Area*).

It is important to remember that the innovative character of the SAGE approach lies with the emphasis on a process of active consultation between all stakeholders. The principle objective of such consultation is to reach a consensus on a set of collective objectives. Gaining the understanding and acceptance of this aspect of the approach is clearly the single most important priority.

### **5.1 Management directives**

In the previous chapter, specific recommendations for legislative and management improvements have been made for each of the environmental resources. From these, it can be concluded that there is need for management directives covering both resource use and protection, that are formulated with a view to conserve the environmental resources.

If resource use directives are to achieve the sustainable management of each of the environmental resources, it is imperative that such directives are accompanied by clear specifications concerning the design, operation and management requirements of any development that impacts on the use of the environmental resources.

Specifications concerning the use of water and energy, for example, should be drawn up with a view to encourage the use of water saving techniques and alternative energy sources.

Specifications with regard to visitor flows should also be provided with regards to the management of heritage sites.

### **5.2 Planning directives**



Planning directives are needed concerning the formulation of a priority programme of actions to be undertaken. The programme should deal with the construction and/or rehabilitation of roads, water, drainage and energy networks, water and solid waste treatment plants, solid waste disposal facilities, aquifer remediation plans, etc.

From an environmental resource planning point of view, it is essential that such directives are based on a sound understanding of the intrinsic vulnerability of the various resources and also of the risks associated with the human activities, in terms of environmental resource degradation.

The existing Structure Plan does call for environmental impact assessment studies to be carried out, however, as expanded in the previous chapter, it is recommended that planning directives are accompanied with further specifications concerning e.g. the standards, methods or approaches to be used in such studies.

The Planning Authority has very recently issued a Policy and Design Guidance (2000). This document provides planning directives for residential development and to a lesser extent, industrial and commercial development. It contains a series of policy statements and performance standards that any future development should achieve. The main aim of these guidelines is to promote the creation of high quality development and also to safeguard existing development in urban conservation areas.

A similar set of directives, accompanied by specifications with respect to development planning in rural conservation areas would be most valuable.

### **5.3 Monitoring schemes**

A continuous and rigorous monitoring of the environmental resource planning and management directives is essential. Apart from their priority purpose to verify whether these directives are indeed implemented, monitoring schemes should be designed to provide feedback to the planner and the decision-maker. Hence, they should be designed to verify whether the originally intended objectives have been achieved and which, if any, unintended consequences have materialised.

It is of the utmost importance for such schemes to use objectively verifiable indicators. The research carried out with regard to the monitoring of surface water quality in the Gozo Study Area provides pollution indices through the field surveying of vegetation type, size and distribution along the watercourses. Repeat surveys using this approach offer a scientifically valid basis to monitor changes in the surface water quality. The results from such monitoring should be used to update the relevant GIS database layers, thereby providing the possibility to examine further trends and scenarios.

Finally, the scheme should also be designed to enable a monitoring of the functioning of the Steering Committee suggested by the SAGE Methodology.

#### **5.4 Awareness Campaigns**

The implementation of the proposed environmental management and planning scheme requires the understanding and acceptance by the different stakeholders. Already within the framework of the present research, a number of workshops were organized at which the functioning of the scheme was explained. Demonstrating the various outputs of the GIS proved most helpful to substantiate the need to monitor the state and use of the environmental resources in an integrated manner, i.e. by having all the stakeholders involved at the same time.

It is essential to add though that no scheme will prove successful unless the public actively supports it. Several campaigns aimed at raising awareness on environmental issues, have been conducted in recent years by public institutions and NGO's. It is promising to note, for example, that the need for the protection of the natural environment was the main focus on the occasion of World Tourism Day in Malta this year.

### **6. Conclusion**

Tourism and the development associated with it, needs to be seen from a different angle to the one adopted in the past. Rather than a means to achieve immediate economic stability, tourism and touristic development should be activities that seek to protect the social character and the environmental resources of the island.

This is not to allege that the Gozo Study Area does not have a potential for becoming an ideal tourist destination, however, it is important for this growth to follow a carefully planned approach. It is important that tourism relates with other sectors of development and vice-versa, to avoid pressures on the existing infrastructure and a situation where sectors compete for scarce resources. This can only be achieved if the actors involved discuss between and inform each other.

Development should be sensitive to the environment, respect the character of the island and its inhabitants. Minimising the impacts on the environment can be achieved only by adopting a sustainable tourism and associated development approach, thereby ensuring the survival of the resource in the long term.