

Introduction

This Life project has as a main aim to protect, restore and conserve the Mediterranean Temporary Pond (M.T.P.) priority habitats (Natura code: 3170*) on the island of Crete. This habitat usually occupies depressions, often endorrheic, and is particularly well represented in arid, semi-arid and Mediterranean-type regions. This habitat is defined and characterized by their variability in size, hydrological functioning, ephemeral nature of their wet phase (hydroperiod) and dominant vegetation type that mainly comprises Mediterranean therophytic¹ and geophytic² species.

Five sites are targeted (fig. 1) namely: Gavdos Island (GR4340013), Drapano (North Eastern Coasts) – Georgiopoulos Beach (GR4340010), Nisos Elafonisos – Apenanti paralia (apo Chrysoskalittisa mexri akrotirio Krios) (GR4340002), Imeri and Agria Gramvousa – Tigani and Falasarna – Pontikonisi, (GR4340001), Lefka ori (GR4340008).

In Greece, agricultural intensification during the last 3 decades in combination with public ignorance and lack of environmental education regarding the value of the MTPs, have led to a continuous increase of habitat pressures and consequently to their deterioration. The most significant threats of this habitat in Crete island are: 1) Hydrological alteration due to water overexploitation, artificial drainage and recharge, 2) Overgrazing due to the intense stockbreeding practices, 3) Water pollution and especially eutrophication originating from unsustainable agricultural practices, 4) Solid waste disposal, 5) Public ignorance and tourism (i.e. 4x4 vehicles, horse back-riding, football fields). 6) lack of legally enforced protection.

The **expected results** after the completion of the project will include:

1. Re-establishment of the habitats natural hydroperiod, existing prior to human interventions.
2. Re-establishment of the habitats' original communities controlled grazing through management scheme and protective measures to avoid future overgrazing.
3. Restoration and preservation of ponds' water quality in a favourable state.
4. Clean and protected from solid waste habitat areas
5. Participation of public in the habitat's protection and preservation efforts
6. Non-access areas establishment and controlled eco-tourist development

The project actions involve: Ecological monitoring, habitat mapping, estimation and restoration of the habitat hydroperiod, water / soil quality monitoring and restoration, development of a habitat management plan and respective implementation activities, increase of public awareness and gaining support from the local people for the project objectives.

¹ A **therophyte** is a plant which survives unfavourable seasons in the form of seeds, and completes its life-cycle during favourable seasons

² **Geophytes** are plants that have underground storage organs for storage of energy and water.

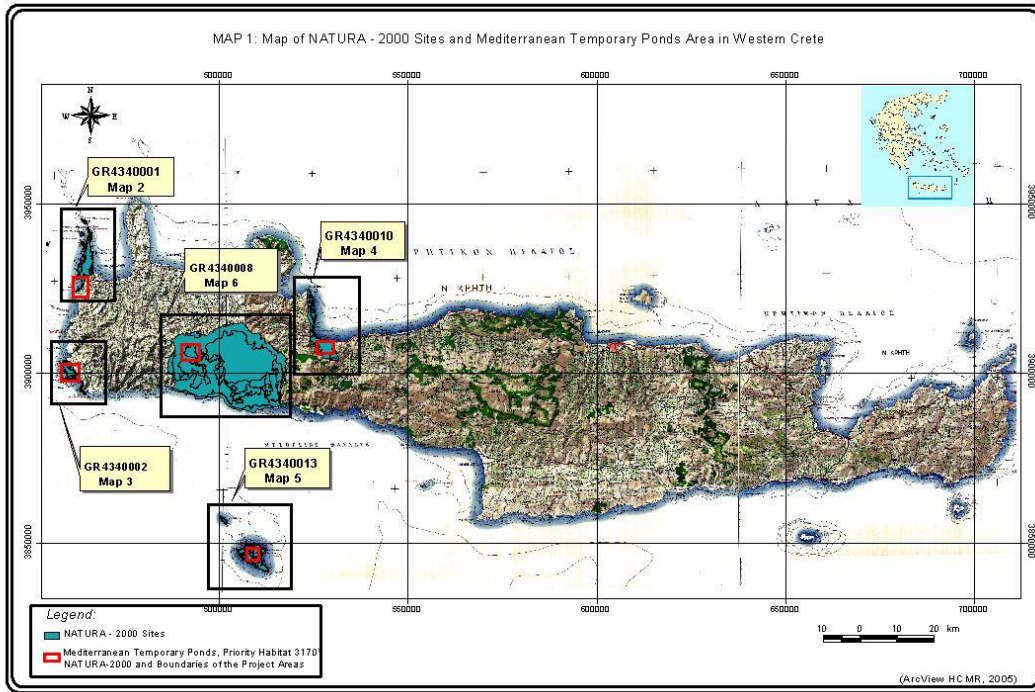


Figure 1. Map of the project sites

Socioeconomic regime and stakeholders at the project sites

Drapano (Northeast coasts) – Coast – Georgioupoli – Lake Kourna (Code: GR430010)

Lake Kourna is located in a highly significant area in terms of tourism (Municipality of Georgioupoli) with large numbers of visitors especially during the summer, and significant number of tourist lodgings reaching 12% of the total number of buildings in this area. Moreover, the relative majority of the economically active population is engaged in the Tertiary sector (45%) while the Primary sector follows with 35% of the population.

Around Lake Kourna and close to the wetland of interest one may find a significant number of taverns / coffee shops operating at least nine months of the year and servicing a significant number of visitors. Also, in this area a high number of ecotourists have been noticed, who come in Lake Kourna to observe the migratory birds. Agricultural and grazing activities near the wetland area do not seem to affect the habitat significantly. The pond in the area of Lake Kourna is located close to the lake’s shoreline and therefore belongs to the shore zone which constitutes State’s land.

Therefore, the main group of interest for the project’s objectives is the owners of the taverns / coffee shops located around the lakeshore, who maintain a cautious attitude towards environmental protection efforts, since they believe that it is possible that constraints in their operation can be

enforced as a result of such measures. On the other side, the aesthetic restoration of the environment along with the development of ecotourism, which are interlinked in this particular Life project constitute positive steps for their enterprising activities and therefore with their consensus about the program activities could be achieved.

Imeri and Agria Gramvousa – Tigani & Falasarna – Pontikonissi, Livadi Bay, Viglia (Code: GR 4340001)

At Falassarna the majority of the population is engaged with agriculture (approximately 41% of the economically active population) while a significant part is engaged in the Tertiary sector (37%). The Falassarna beach, located about 1 km north of the wetland, is one of the much-frequented destinations of W. Crete. Nevertheless, in the coastal zone there is a limited number of touristic lodgings while the greater area is dominated by greenhouses (over 200) and cultivations (mainly olive groves). Pressures on the wetland include the agrochemical pollution and the uncontrolled disposal of man-made materials, which mainly come from the greenhouses. The owners of the greenhouses are very skeptical in the idea of environmental conservation measures since they want to maintain the pre-existing polluting and uncontrolled land use activities. In the beginning of the project, the municipal authorities were supporting the Falasarna farmers but during the course of the project the new Mayor identified the need for eco-touristic development and sustainable exploitation of the local environmental assets. Additionally, a slow and gradual change of some farmers towards tourist activities occurred, taking into account the relative decrease of their profits from cultivations, but also the obvious demand for tourism infrastructure and services. Thereby, initially hostile attitudes from local farmers towards the project have turned into willingness for cooperation, providing opportunities for ecotourism development and socioeconomic benefits from the project. The pond at Falassarna is located along the coastal zone and thus belongs to the State.

Elafonissos Island and coastal zone (Code: GR 43400002)

At Elafonissi, there is also a large number of farmers (69% of the economically active population), engaged with greenhouse cultivations, while another significant activity is sheep/goats grazing. The number of hotels in this area is the lowest compared to the other study areas (0.3% of the total number of buildings), although this area constitutes a very popular touristic destination during the summer (one-day visits).

The Municipality of Innachorio is particularly aware of environmental issues and has actively taken part in many wetland and species conservation programs. Additionally, this municipality undertakes, independently, environmental restoration activities (e.g. cedar forest at Elafonissi beach) while in the particular project had contributed actively.

The most significant interest group in this area is the greenhouse owners and generally the land owners who are potential entrepreneurs of the tourism sector, given the present dynamics (increased demand for tourist services) and the low degree of touristic development to date. The attitude of the greenhouse owners towards the project was cautious but not negative since many of them are already or intend to

be (as mentioned above) tourist entrepreneurs. Nevertheless, the project's significant fostering for ecotouristic development and the excellent collaboration with the Municipality of Innachorio creates favorable conditions for the maintenance of the project activities and results.

The areas of the ponds are mostly private or disputed land while the ownership status is unclear (there are no contracts) in many cases. However, a large proportion (of about 30%) belongs to members or relatives of the Council of Innachorio Municipality, who even offered some of their land for the project demonstration activities (footpath and sign posting).

Islands of Gavdos and Gavdopoula (Code: GR 4340013)

Gavdos Island is a relatively remote area south of Crete with significant infrastructure problems which concern mainly its electricity and water supply. Its population is particularly small (about 65-80 permanent inhabitants), while the economic activities are limited mainly in the Primary and Tertiary sector, since 56% of the economically active population is engaged with agricultural activities and 26% with touristic enterprises. The main agricultural activity is grazing while recently the touristic sector presents a significantly increasing trend. This is also concluded from the proportion of touristic lodgings, which reaches 4% of the total number of buildings (the 2nd largest proportion among the study areas). Moreover, during the summer the number of tourists can get very high resulting in serious problems regarding supplies, as well as power, water and wastewater management. The main group of interest for the project's objectives is the stock-farmers followed by the touristic enterprise owners. The initial view for the project was positive taking into account the high demand for economic and touristic development of the island, although there is a negative preconception for the potential establishment of protection zones, which may offend ownership rights. The Gavdos Community Council maintains a positive view for the project and collaborated very well with the project's team.

In Gavdos the ownership regime is also obscure and many areas fall into the use-occupation regime, due to lack of contracts. The locations of the ponds do not receive significant pressures from private interests, especially those situated away from built-up areas and beaches (accounting for approximately 80% of the total number of ponds in the island).

Lefka Ori – Omalos (Code: 4340008)

The area of Omalos is mountainous with limited touristic infrastructure, since 69% of the economically active population is engaged with the primary sector, and in particular with stock-breeding. In the study area there are about 10,000 sheep/goats, which rest there for about 9 months per year. The area's buildings mainly concern few residences and taverns / coffee shops, since the plateau's local population is not more than 400 inhabitants, who move (due to the weather conditions) into nearby villages during the period December to March. The local Municipality of Anatoliko Selino has a positive attitude towards the project, with the largest proportion of stock-farmers being supporters taking into account that the project will result in the solution of the stock-watering problem during the summer months. The limited extent of cultivations in the greater pond area do not impose threat to the habitat since the

farmers do not have a direct interest for the pond, given the fact that the pond's water is not used for irrigation purposes.

The pond area at Omalos belongs to the Municipality, and the broader area around the pond is mainly composed of grasslands with natural vegetation, receiving, however, some pressure from over-grazing.

Assessment of the situation at the end of the project

In the broader project area the lack of a cadastre system and the extended dispute and illegal occupation of public land create significant problems in the implementation of environmental related policies and conservation efforts. Local people often consider preservation efforts as 'dangerous' for their economic activities in the sense that a protected habitat / species area may eventually end up in attempting to control man-made pressures and thus their activities.

The unwillingness of local and national authorities to come in conflict with the local communities frequently leads to relatively weak law enforcement. Under these particular and difficult conditions gaining the support of the local people and authorities has been attempted and balancing between the demand for economic development and environmental preservation. For this purpose, a careful strategy has been implemented to emphasize the socioeconomic benefits of the project for the local community and avoid direct conflicts and strong opposition that would undermine the ability to implement the project activities.

The project team maintained frequent contact with the local people through regular visits at their meeting points (usually coffee shops) to inform them about the project progress and particularly for the activities that have direct benefit for them (e.g. the borehole in Omalos, the watering network, eco-touristic infrastructure). Additionally, various MTP conservation issues are also discussed such as avoiding specific practices that could have negative impacts on both the habitat and private interests (e.g. extracting soil from the ponds, abstracting significant amounts of water from the MTPs, disposing waste on the habitat, etc.). The outcome of these informal meetings was usually positive and a consensus has been achieved for different aspects of the project that present significance for the local communities (socioeconomic benefits). The many press article publications in dominant local newspapers has been another effort to inform efficiently and analytically local communities about the project achievements and the opportunities provided for both economic development and environmental preservation. These regular publications had very positive impacts for achieving public consensus in favor of the project and for disseminating the project's outcome.

The local authorities were also regularly informed by the project team through official letters presenting the forthcoming project activities as well as through visits to the municipality offices where all the issues of interest for the local authorities were discussed. It is important to state that all the local municipalities are now in favor of the project since they have understood that the undertaken activities will benefit their areas.

In Omalos site, the collaboration between the project team and the local stakeholders was good and there was frequent personal communication (at least once per month) in the area's coffee shop where the project manager informed people about the project's progress and tried to assist them in various water related problems they faced, under the framework of the project. The construction of the borehole and of the watering network that has been completed successfully in spring 2008 assisted significantly in gaining their trust and finally achieving their positive attitude towards the project.

In Elafonisi site, there was also a very good collaboration between the project team and the local municipality while this is the first place in which an informative kiosk from the project has been installed. In this site, an integrated eco-touristic development has been achieved since a lengthy footpath has been established with essential reading stands starting from the kiosk, going through the habitat area and ending in the beach parking lot.

In Kourna and Gavdos sites, the collaboration of the project team with the local stakeholders was satisfactory and the project activities continued according to the schedule. In Kourna, the informative kiosk will constitute also an observatory for the lake ecosystem as the local municipality requested. In Gavdos site an integrated approach in eco-touristic development has been attempted by establishing a kiosk at the port, 3 different footpaths and reading stands (information signs) along the footpaths routes.

After Life continuation of actions

Given the aforementioned status and the project achievements and perspective created in the local societies a series of actions should be continued in order to achieve the long-term objectives of the project. Particularly, from an administrative perspective the Institutional integration and protection of the Natura 2000 sites is an essential step. In Omalos site there is already the National Park of Samaria with the relevant managing authority that is also responsible for the MTP area. The project team was and still is in close collaboration with this managing authority (Vice-president is the leader of Forest Agency of Chania, Dr. Hara Kargiolaki) and the habitat management guidebook as well as all the relevant project studies and measurements have been offered to this Body which is responsible for the after-Life management of the habitat. Additionally, in the Environmental Information Center of Xyloskalo (entrance of Samaria Gorge, 2-3 km from the MTP area), an environmental exhibition will be organized (from May 2009) and the project team has sent informational material (brochures, stickers) and A0 sized posters with the project results to be presented there. Moreover, the keys to the Omalos information kiosk have been also sent to this managing authority for sustainably exploiting the infrastructure since during the summer period a large number of tourists visit the area.

In Elafonisi area a Special Environmental Study for the designation of protection zones and management principles for the Natura 2000 site has been almost concluded (Phase B has finished). The remaining stage (Phase C) is to form and declare the respective Presidential Decree which will give legislative

authorization to the implementation of the study provisions (protection zones, management plan and management authority). The project team has provided significant input (maps, location of the MTPs, management practices, etc), resulting from the project activities, to this study and therefore the MTP habitat has been included as a significant and priority ecosystem in the designated protection zones. The implementation of the aforementioned Decree will offer adequate protection in the habitat since all the granting permission requests for developmental activities in Elafonisi area will be approved by the relevant managing authority and will follow the designated protection zones. Until the production of the Presidential Decree, the Municipality of Innachorio will undertake all the necessary preservation and management activities for the habitat. Moreover, a Spatial Planning Study for mapping and developing a land use system / cadastre is also about to finish in this area.

In Gavdos island a Special Environmental Study is also about to be completed (Phase B has finished) and the project team provided all the necessary input for the inclusion of the MTP habitat in the designation of protection zones and management practices. The habitat management guidebook has been sent to the local municipality for the transitional stage and will be also sent to the relevant managing authority which will be established shortly.

In Kourna area the continuation of the habitat management plan will be done by the Municipality of Georgioupolis that had a very good collaboration with the project team throughout the entire project period. Additionally the Lake's water management which is the most important factor for the preservation of the MTP habitat in this area is planned by the Water Directorate – Region of Crete according to the Water Framework Directive (2000/60/EC). For this purpose, the project team has sent the climate change and water management impact report for the MTP habitat to this authority in order to incorporate it in the relevant water management plans. Further, the Water Directorate of Crete Region will undertake the operation and maintenance of the project's hydrometeorologic stations in the after Life period, in order to continue the relevant monitoring, facilitate the sustainable water management and contribute to the preservation of the habitat (in all the project areas). The Water Directorate has responded positively in this task and agreed officially to undertake this responsibility.

In Falasarna area the project team encountered significant difficulties as mentioned above but the willingness of the Mayor and some local people to change the developmental perspectives of the area and sustainably exploit the environmental assets have led to an agreement (Memorandum of Understanding) between HCMR and the Municipality of Kissamos. This official agreement aims to the continuation in the cooperation between the project team and the local Municipality for maintaining and expanding the eco-touristic infrastructure and foster the development of touristic sector through environmentally –friendly practices. This will be achieved through the National Strategic Reference Framework funds (Structural Fund) which covers such activities and is implemented until 2013.

All the aforementioned activities (apart from the expansion of eco-touristic infrastructure) do not demand significant expenses and can be easily covered by the Municipalities budgets and if needed from Structural Funds (4th EC Support Framework program).

Activities that should be done in favor of the project objectives.

Conservation need	Actor responsible	Possible Funding Sources	Comments
	(actual or foreseen)		
Administrative needs			
Incorporation of the habitat in special protection zones at each site	Municipalities	SF*, Ministry of Environment	In Gavdos and Elafonisi there is such a designation and the MTP habitat is included in the protection zones. The relevant policy paper is expected to be voted in few months
Establishment of management authority at each site	Municipalities and Ministry of Environment	Ministry of Environment	In Omalos there is the Management authority of Samaria National Park which includes the MTP area. In Gavdos and Elafonisi the process has reached the policy development and voting stage.
Preparation of a cadastre system	Municipalities and Ministry of Environment	Ministry of Environment	In Elafonisi there is a Spatial Planning study about to finish.
Optimization of waste management	Municipalities and Prefecture of Chania	SF, Ministry of Internal Affairs	All the uncontrolled waste disposal sites have to close and restored by the end of 2009** while special areas for waste treatment and storage will be created. In Falasarna the municipality started in 2008 to collect the abandoned greenhouses plastic covers and transfer it to another area.
Development of eco-touristic activities	Municipalities	SF, Ministry of Environment, Ministry of Tourism, LIFE+	In Kissamos (Falasarna) a Memorandum of Understanding has been signed with HCMR for the continuation of the actions.
Promotion of agro-environmental measures	Municipalities and Prefecture of Chania	SF, Ministry of Environment, Ministry of Agriculture, LIFE+	In Kissamos (Falasarna) a Memorandum of Understanding has been signed with HCMR for the continuation of the actions.
Construction of wastewater treatment plant in Kourna area	Municipalities and Regional authority of Crete	SF, Ministry of Environment	In Kourna an official document illustrating the need for immediate construction of the Wastewater treatment plant has been offered by HCMR
Core management activities			
Continuation of water quality monitoring	Prefecture of Chania and Regional authority of Crete	SF, State budget	Legal binding with the Water Framework Directive (2000/60/EC)
Implementation of the habitat management plan at each site	Municipalities, management authorities, Forest agency of Chania	SF, Ministry of Environment, State budget, LIFE+	Inclusion of the habitat management guidebook in the Special Environmental Studies of Gavdos, Omalos and Elafonisi

Continuation of hydrologic monitoring	Regional authority of Crete	SF, State budget	Legal binding with the Water Framework Directive (2000/60/EC)
Implementation of sustainable water management plans	Regional authority of Crete	SF, State budget	Legal binding with the Water Framework Directive (2000/60/EC)
Advanced** management activities			
Continuation of livestock watering network operation in Omalos	Municipality of Anatoliko Selino	SF, Ministry of Internal Affairs	
Use and maintenance of the project's eco-touristic infrastructure	Municipalities	SF, Ministry of Environment, Ministry of Tourism, LIFE+	In Kissamos (Falasarna) a Memorandum of Understanding has been signed with HCMR for the continuation of this action and negotiations are about to finish for signing an MOU with Gavdos Community. All the project informational material (brochures, stickers, posters, signs, etc) has been sent to each Municipality in order to reproduce them if necessary.

SF*: structural funds, **: this is a EC legislative obligation

Opportunities – Recommendations

The wetlands of the Mediterranean Temporary Ponds constitute a comparative advantage of the study areas and their conservation may be directly and effectively combined with the existing economical activities (agriculture / stock-breeding, tourism, services) as well as with the future development of the areas under consideration. Specifically, the following opportunities are presented for each sector of activity:

- AGRICULTURE

The present requirements and approaches for the agricultural activities necessitate the alteration of mentality and practices in production by utilising environmental friendly cultivation methods and rational management of the natural resources. In addition, the existing status quo for subsidization and financing of the farmers will change in form and procedure in the context of the recently agreed Common Agricultural Policy (CAP) of the EU and will impose a combination of increasing the products' quality level and reducing the environmental impact from agricultural activity. Therefore, innovative and environmentally- friendly agricultural practices, such as solar remediation of the soils, biological cultivations, reuse of irrigation water, etc. will be promoted and preferentially applied in areas of particular environmental value (e.g. Natura areas). Moreover, the production from these protected areas will constitute an advertising advantage and will have a particular value for the international market, considering the best agricultural practices which will be applied and certified on the product's label.

Therefore, the occurrence of Mediterranean Temporary Ponds in these particular areas of Chania Prefecture represents a significant advantage for the farmers and may return substantial socioeconomic benefits, provided that the proposed changes, which are consistent with the European legislation, be applied. In this context, there is particular interest for the existing possibilities of financing from the CAP framework, regarding the thematic axes: a) integrated interventions in areas under environmental constraints (axis 2), b) agricultural/environmental measures (axis 3) and c) afforestation of agricultural lands (axis 4). All the aforementioned axes are directly linked with the occurrence of the Mediterranean Temporary Ponds and of the Natura protected areas in the study areas and therefore it is possible to directly finance local farmers/growers in order to harmonize their activities with the contemporary market and science requirements. Additional information regarding these financing possibilities can be obtained from:

1. The relevant Departments of Agricultural Development of the Prefectures
2. The web address of the Ministry of Agricultural Development and Foods (www.minagric.gr), in the Paper for Planning of Agricultural Development.

- **TOURISM**

Tourism in Greece and particularly in Crete is one of the more rapidly developed economic activities, which is expected to constitute the main boost for country's development in the forthcoming years. In the last few years, about 14 million tourists visit Greece annually. From this figure about 1.8 million visit Crete and 20% the Chania Prefecture. In Greece, 16.5% of the economically active population is occupied with Tourism, contributing about 14.3% of the GDP, while the figures for agriculture are 16% and 6%, respectively. There is an evident dynamic for touristic development with emphasis on alternative forms (ecotourism, agrotourism, etc). About 35 millions of European tourists are nowadays interested in alternative forms of tourism and the annual rate increases with more than 20%. Moreover, the group of alternative tourists is usually composed of people from high educational and economical level who are in favor of mild human interventions on the physical environment and are ready to pay the cost for the required development and protection. Additionally, this particular type of tourism lengthens the touristic period, since visiting important ecosystems is not constrained in the summer period. Therefore, it is evident that in the study areas, which belong to the NATURA 2000 European network of protected areas and involve the priority habitat of Mediterranean Temporary Ponds, a unique chance of quick but also sustainable development of eco-tourism is apparent and is facilitated by the present LIFE project.

Thus provided an agreement is reached between the involved stakeholders (local administration, the owners of touristic lodgings and stores, agricultural corporations) ecotourism/agrotourism development actions may be promoted which will have immediate and significant benefits for these particular areas. In the context of the Life project wooden educational kiosks, footpaths, ecological footpaths and informational signs have been constructed, while significant quantities of printed informational material have been distributed and an intensive educational campaign has been carried out for all the study areas. Therefore, the essential basis for ecotouristic development has been created, after the

aforementioned project activities, and the essential cooperation has been achieved for some of the areas, through official agreements between the project team and the relevant authorities for the maintenance and expansion of the eco-touristic infrastructure. Furthermore, the existing managing authority of Samaria National Park and the upcoming establishment of managing authorities for the Natura 2000 sites of Elafonisi and Gavdos, will offer the necessary framework for the continuation of the above activities at particular sites.

The development of alternative forms of tourism constitutes a priority according to the contemporary European and international policies and is financed by a series of projects.

The project "THISSEAS" supports the Local Administration Organizations of the entire country and includes four sub-projects, the second of which has as a goal the "local development and protection of the environment". Also, the financing conveyor (Hellenic Ministry of the Interior, Public Administration and Decentralization) enforces the development of environmental infrastructures, setting this as a criterion for the allocation of funds at the Local Administration Organizations (OTA). Thus the occurrence of Mediterranean Temporary Ponds will constitute a comparative advantage for the financial resources absorption effort from "THISSEAS" project but also from the 4th EC Support Framework Program, provided that environmental protection and sustainable development are viewed as priorities when assessing the strategic options.

Thus, it is evident that the existence of the Mediterranean Temporary Ponds in the study areas and the implementation of the particular LIFE project may contribute, besides the aesthetic and environmental restoration, to the future economic development of the areas and the optimum adaptation to the modern principles of agricultural and touristic development, (combining the improvement in products quality and the conservation of environmental values).

The LIFE project has offered significant infrastructure and publicity to the study areas as well as an indicative development plan according to the aforementioned standards, which is expected to be implemented by the local community, in order to maximize the aforementioned socioeconomic benefits. In this context, the ownership issues of the specific areas have to get clear with the implementation of the relevant cadastre system for each Municipality and the relevant land planning studies. The specific LIFE project team has come in contact with the OTA representatives and also with the stakeholders of the project areas in order to attempt official agreements (in some areas are under way, eg. Gavdos) to continue the sustainable environmental exploitation of these areas and take advantage of the added value originating from this LIFE project.