# COASTAL AREA MANAGEMENT PROGRAMME:

# SARAFAND

**ACRONYMS**

| | |
|---|---|
| CAMP | COASTAL AREA MANAGEMENT PROGRAMME |
| CAS | CENTRAL ADMINISTRATION OF STATISTICS |
| DGUP | DIRECTORATE GENERAL OF URBAN PLANNING |
| DGA | DIRECTORATE GENERAL OF ANTIQUITIES |
| EPA | ENVIRONMENT PROTECTION AGENCY |
| EU | EUROPEAN UNION |
| GOL | GOVERNMENT OF LEBANON |
| ICAM | INTEGRATED COASTAL AREA MANAGEMENT |
| IWRM | INTEGRATED WATER RESOURCE MANAGEMENT |
| LBPs | LEBANESE POUNDS |
| LRA | LITANI RIVER AUTHORITY |
| MAP | MEDITERRANEAN ACTION PLAN |
| MoE | MINISTRY OF ENVIRONMENT |
| MoEW | MINISTRY OF ENERGY AND WATER |
| O&M | ORGANISATION AND MONITORING |
| SLWWE | SOUTH LEBANON WATER AND WASTEWATER ESTABLISHMENT |
| UNEP | UNITED NATIONS ENVIRONMENT PROGRAMME |
| USAID | UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT |
| WB | WORLD BANK |

## PRELUDE

The CAMP-Lebanon Project is one of the national Coastal Area Management Programmes of the Mediterranean Action Plan-UNEP (MAP/UNEP). CAMP is the MAP component for sustainable coastal management, integrating environmental concerns into development planning and management, oriented at understanding and resolving practical environment, development and management problems in Mediterranean coastal areas.

CAMP immediate objectives call for:

- Identifying and elaborating strategies, solutions, tools and actions for sustainable development, environment protection and rational utilization of coastal and marine resources of the national coastline, in particular related to the Southern Coast of Lebanon,
- Applying methodologies, tools and practices of sustainable coastal management and of Integrated Coastal and Marine Areas Management (ICAM),
- Contributing to the upgrading of the relevant national and local capacities,
- Providing for the application in practice of the Project results and experiences, creating conditions for and implementing the post project activities, as envisaged by the Project Agreement, and
- Using the experiences and results achieved by the project in other areas at national and regional levels.

The decision to implement a CAMP project for Lebanon was adopted at the Meeting of the Contracting Parties to the Barcelona Convention held in 1995 following a request presented by the Government of Lebanon. The Agreement to effectively execute CAMP Lebanon was signed in April 2001 (Decision no. 921/B, date April 6, 2001). CAMP project area was defined at two levels:

- The national coastal area located to the South of Beirut, the Capital, and
- The three municipalities of Damour, Sarafand and Naqoura, as the operational level.

By applying the principles of sustainable development, as well as the methodologies and tools of Integrated Coastal and Marine Areas Management (ICAM), CAMP-Lebanon was executed through selected thematic and sub-thematic activities, some of these thematic activities being divided into sub-thematic components, with the intent to boost the benefits expected from project outputs, whether during its implementation or after its phasing out. These thematic activities are:

- Integrated Coastal Area Management, which covered the following components:
  - Urban management (land-use planning)
  - Diagnostic analysis of the environment, agriculture and fishery
  - Cultural heritage
  - Socio-economic overview
  - ICAM National Law
  - ICAM National Strategy;

- Integrated Water Resource Management (IWRM);
- Tourism and sustainable development;
- Participatory Programme;
- Systemic and Prospective Sustainability Analysis (SPSA);
- Marine Conservation Areas;
- Urban management and sustainable development;
- Data and information management.

The three municipalities of Damour, Sarafand and Naqoura chosen for the purpose of CAMP-Lebanon project were selected derived from a number of criteria, the most important ones being:

- The environmental situation at the municipality level;
- The level of cooperation of the municipal council;
- The presence of active non-governmental groups and/or local community;
- The relevance of CAMP methodologies at the municipal level;
- The capacity to replicate results and lessons learned obtained to other coastal towns and cities.

The present document is a sequence of three distinct reports targeting the coastal towns of Damour, Sarafand and Naqoura, drawing together key analysis and findings acquired throughout the various CAMP-Lebanon thematic activities at the level of every municipality, thus aiming to assist the newly elected municipal councils along with other coastal towns in attaining sustainable development while properly set up and put into practice sustainable municipal development plans.

Last but not least, CAMP-Lebanon duration effectively extended between May 2002 (date of CAMP inception workshop) and December 2003 (Project phasing out). Therefore, information included within this document does not account or refer, by any mean, to impending recent events that might have occurred following the project closing.

## MUNICIPALITY OF SARAFAND: GENERAL DATA

| | |
|---|---|
| Population | 12,000 residents |
| Main Economic Driver | Agriculture, fishing, tourism and trade. Considered a medical centre for the neighbouring areas due to the presence numerous medical facilities. |
| Health Services | 2 hospitals (100 and 75 beds) and 3 clinics. |
| Educational Services | 9 Schools (3 elementary, 4 intermediate, one baccalaureate and one technical school) |
| Priority of the municipality and surveyed members of the community | Construct a waste water treatment plant<br>Proper solid waste disposal<br>Construct public green areas<br>Infrastructure<br>Reduction of sea pollution |
| **Fishing** | |
| Fishing | A fishing COOP made up of 162 members was conceived in 1991.<br>Presence of two fishing bays that include 200 boats. |
| **Agriculture** | |
| Farms (Livestock) | One farm that contains 30 heads of cattle, 10 of which are dairy. The farm generates three trucks per year of manure (approx.11,000 kg). |
| Crops | Banana and citrus and wheat. |
| Irrigation | Litani river and private wells. |
| **Industry** | |
| Industry | Five (5) industries including nylon bags and glass, and two marbles (sawmills) and numerous car mechanics. |
| Gas Stations / Lube Oil and Car Mechanics | 6 gas stations, 2 of which offer car wash services and all offer oil change services. Four car wash and oil change services shops.<br>Used oil is sold for 10$/200L to cement mixers and bakeries. Some used oil is dumped into the sewer systems. |
| **Tourism** | |
| Restaurants/Resorts | 3 hotels, 15 restaurants and 5 cafes along the shoreline |
| **Waste Management** | |
| Waste Water | Presence of a wastewater network that covers 90 percent of the main street and that is discharges into the sea. |
| Solid Waste | Production of 10 tons per day.<br>Municipality collects and disposes the waste in an open dump within a 10,000m$^2$ public property. |

Table 1. Municipal questionnaires- CAMP Office (2001)

**Sarafand**

During the years of sixties and seventies, Sarafand was among the rare Lebanese localities to own a glass artisan factory. Besides, the Lebanese citrus production, main products of the Sarafand agricultural plain, used to find key outlets in the Arab markets. The development of the internal tourism was also favoured by the proximity of the town to the seashore. The geographical position of Sarafand at mid-road between Saida and Tyre converted the municipality into a commercial centre which feeds the surrounding localities. All of these factors enabled Sarafand to witness a particular prosperity, and consequently, to settle down the inhabitants within their villages. This village did not observe any rural exodus neither immigration during the civil war.

Nowadays, Sarafand keeps on depending on agriculture, fishing and tourism for sustenance. However, these sectors are not as productive and efficient as they used to be. Prior to the building of Beirut-South highway, car service shops and retail business were sources of income for the town inhabitants. In addition, Sarafand is increasingly witnessing an urban disorder. To the east of the road, an urban encroachment over the agricultural plots is slowly developing. To the west of the road, and all along the seaside, and from the northern edge to the southern periphery of the village, intensive small-sized commercial and industrial shops took place during the years of war. The development of the inner town itself does not make exception to the overall situation, added to that:

- The discharge of wastewater effluents into the sea without any prior treatment;
- The illegal houses that are spread along a significant portion of the seashore;
- The lack of aesthetics due to cemented or unfinished multi-level expansions of restaurants and facilities;
- The development of private tourism compounds to the border of the remaining beaches prohibiting the free access to the beach;
- The creation of three fishing harbours on important portions of the coast, without any finishing works; and,
- The lack of public green areas.

The locals blame this predicament to various causes, some are environmental, other economic and or political. The return of the old Sarafand would unquestionably necessitate pressing measures of regulatory, social and economic dimensions.

Photo 2. Sarafand, view of the original village nucleus

### *1. Geographical context*

The municipality of Sarafand is bordered to the west by the seaside (altitude zero) and covers the piedmont until 200 meters altitude to the east. The original core village is located inland on a hillock. The circumscription comprises two plains, a coastal plain located on an altitude of less than 50 meters and the upper plain situated between 100 and 200 meters altitude.

### *2. Altitude*

The surface area corresponding to the altitude [0 – 5 meters] represents 6% of the total surface area of the land circumscription. The largest part of the circumscription (42%) is located to an altitude ranging between 5 and 50 meters. 11% of the surface is comprised between 50 and 100 meters which corresponds to the traditional core of the village; while 34% of the surface are being located between 100 and 150 meters. The higher altitude [more than 150 meters] encompasses 7% of the surface

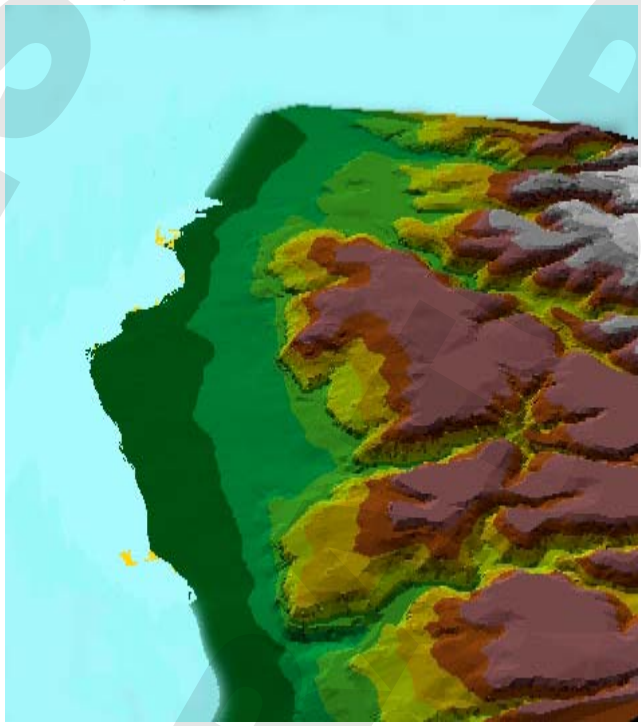


Photo 3. 3D simulation of Sarafand relief

### *3. Population*

According to estimations established based on the buildings survey that was carried out by the Central Administration for Statistics in 1996, resident inhabitants count approximately 12.500 persons. It is worth mentioning that the building survey carried out for the South *Mohafazat* (or governorate) showed that 45.4% of total inhabitants are aged less than 20 years, while youth category represents 38.9% of the total governorate population. At the level of Sarafand municipality, 5.500 persons are aged less than 20 years, an indicator which translates the imperative requirements in terms of scholar equipment, as well as public and leisure areas. As for the population density, one can observe a disparity in the population distribution within Sarafand, concerted within the main core area (with a risk of over-concentration), while inhabitants are haphazardly dispersed in the village extensions with a risk of increased utilization of space per inhabitant.

Consequently, it is necessary to ensure the minimum needs for green and leisure spaces in the central area by reducing concentration levels in order to enhance quality of life and reinforce its attractiveness. Oppositely, the establishment of public spaces in extension areas would lead to restructure these scattered and dislocated zones.

***4. land-use patterns***

Between 1975 and 2002, one can observe a significant transformation in the land-use structure of Sarafand land circumscription which surface area corresponds to 9.5 km². The urban development along the coastal line as well as the encroachment on the public maritime domain have increased from 21% to 52% on the coast [0 – 5 meters], which corresponds to a multiplication by 2.5 of constructed surface areas.

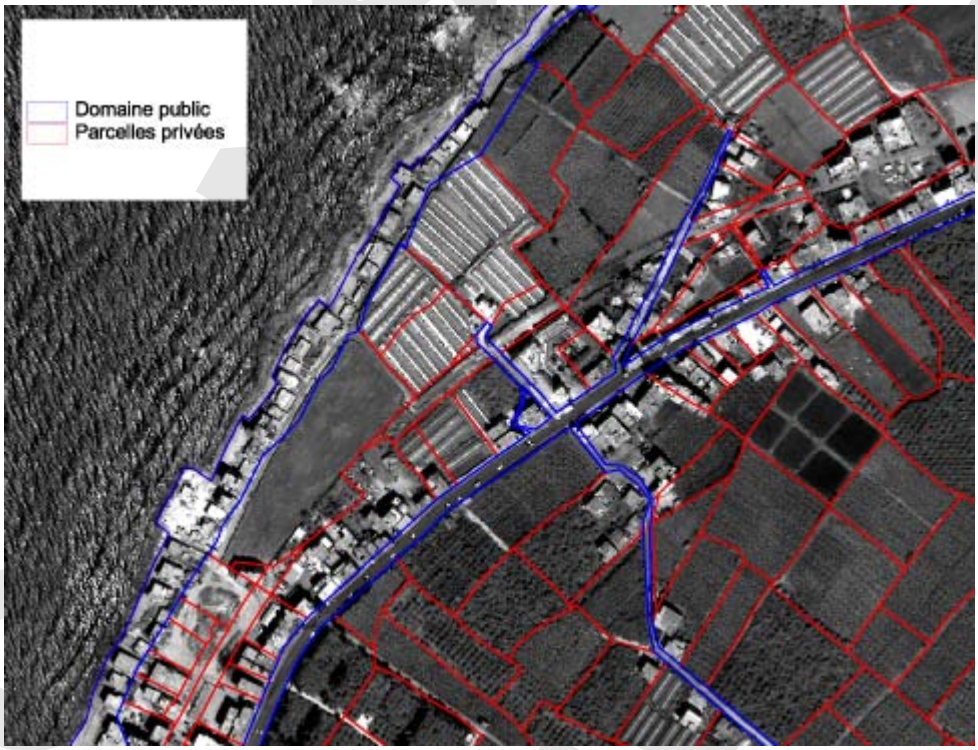
Photo 4. Sarafand, urban development all along the coastal road

Similarly, the constructed surface area on an altitude of [5 – 50 meters] has multiplied by 3.2, thus increasing from 3.5% to 11.5%. The urban areas at higher altitude [50 – 100 meters] occupy 26% of the corresponding surface areas, while in 1975 the equivalent proportion did not surpass 11%, a proportion which corresponds to an increase by 2.4 of constructed areas. Besides, the [100 – 150 meters] altitude witnesses the uppermost expansion of urban areas (+ 480%). It is to note that in 2002, the urban zones occupied 25.5% of total surface area against only 4.5% in 1975. This percentage corresponds to the urbanisation of the higher plain. Finally, and at higher altitudes [more than 150 meters], the fraction related to constructed areas is still low (8.3%).

Between 1975 and 2002, the distribution of urban zones was subject to modifications, but this was not equally spread among altitudes. In 1975, the urban zones were spread more or less evenly within the first four altitudes reaching 150 meters; they were almost inexistent on higher altitudes (more than 150 meters). The expansion of urban zones has modified this distribution: the part corresponding to urban areas located between 100 and 150 meters altitude has increased from 27 to 43%, corresponding to an increase by 5.8 of urban zones within this altitude. The urban areas were equally but limitedly developed at higher elevations (3% of the urban areas).

*4.1 Land-uses*

At the level of land divisions, 7.4% of lands were reported to be public or governmental ownership. This significant component of public and municipal domains may enable certain flexibility in terms of real estate control, as well as opting for sound urban management schemes (establishment of designated activity areas, urban processes in terms of lodgements, identification of waste treatment sites, etc.). Indeed, and to date, public lands have served to implement road networks and some educational facilities, and to host the communal waste discharge. Lands are equally rented for agricultural investment purposes, or for the implementation of tourism-related facilities on the seashore. A non negligible part is still not attributed to a specific activity. Moreover, illegal encroachments were produced on public maritime domains. Actually, there are 77 constructed buildings.

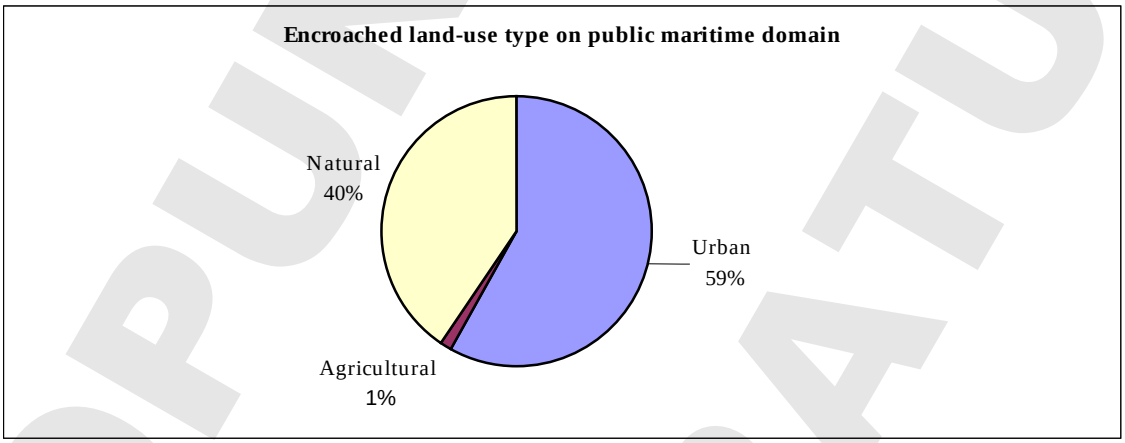



Map 1. Private and public land ownerships

In terms of construction, and consequently of urbanisation, Sarafand locals were the main actors behind the scattered urban development, while land owners non-originating from Sarafand have maintained and still a steady traditional agricultural system. In fact, lands owned by Sarafand locals constitute 30% of the constructed lands (human settlements), 58% of agricultural parcels and 12% of natural plots. Conversely, owners non-originating neither living in Sarafand own 80% of agricultural lands, 11% of natural zones and only 9% of constructed plots. Accordingly, land ownership highly impacts the choices of land-use schemes and the trends to be adopted towards achieving sustainable socio-economic development of Sarafand.

Photo 5. Illegal constructions all along Sarafand shore

On the other hand, land circumscription of Sarafand witnessed an increased urban encroachment on the public maritime domain. Reasons behind this encroachment reside in the arrival of displaced populations coming from other southern villages running away from the Israeli occupation. This settlement was facilitated by the weak government authority and the paralysis of the municipal role during several decades of war. This fact has led to an increase in illicit constructions.




Urbanised areas represent 59% of encroached surface area on public domains. Agriculture is marginal (1%) while the remaining 40% remain intact for the moment.

The urban areas are composed of human settlements (77 buildings) as well as other touristic equipment and resorts (2 resorts); It is worth mentioning that the surface area occupied by the two tourism resorts is equivalent to the area in use by more than 160 families. 7% of these buildings were constructed prior to 1950. 39% were built during the civil war (1975-1990) while 12% of the buildings are of post-1991 era. Consequently, one can observe a slow down in the construction process at the end of the war, which is the opposite process witnessed in other coastal localities such as Damour.

Table 2. Distribution of housing number according to the type of use

| Use type | Main | Secondary | Empty | Other | Total housing |
|---|---|---|---|---|---|
| Number of housing | 2,193 | 39 | 371 | 57 | 2,660 |

| | | | | | |
|---|---|---|---|---|---|
| % | 82% | 1% | 14% | 2% | 100% |

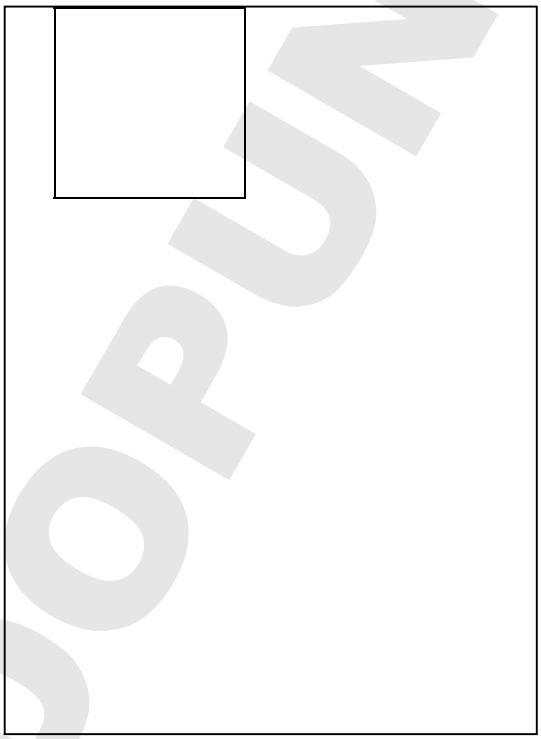
Source: Central Administration of Statistics, Buildings surveys, 1996

In 1996, 82% of housings were used as main residences. 14% of lodgements were empty. The space consumption per inhabitant is estimated to be 159 m² per inhabitant if only non-natural spaces are taken into account.

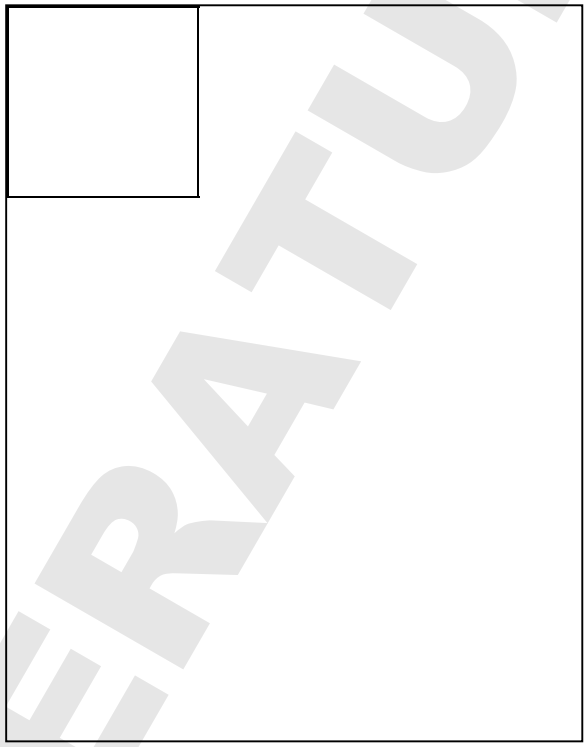
*4.1.1 Land-use change between 1975 and 2002*

Based on the above-mentioned findings, urbanised areas were multiplied by 3.6 in 27 years of time. It currently occupies 21% of surface area while it was only 6% in 1975. This expansion was made at the expense of agricultural zones (- 15%) and natural zones (- 19%) previously occupying respectively 64% and 15% of surface area in 2002.

**Land-use in 1975**



**land-use in 2002**



*4.2 Urban zones*

One can observe a similitude between the distribution of urbanised areas and the land configuration. Accordingly, 53% of urbanised areas are located in zones endowed with a slope lower than 5%. 20% of constructed plots are located in lands characterized by slopes comprised between 5% and 10%. The surface areas constructed on slopes exceeding 30% are insignificant (2.4%). Two reasons could be attributed to this distribution:

- The first, of technical aspect, is associated to the construction difficulties faced in lands characterised by strong slopes. Large scale works have high cost and are complicated, a fact that is not feasible to Sarafand inhabitants who build their houses by themselves.
- The second is due to the fact that zones endowed with 30% slopes are generally located away from the road network.

Zones having strong slopes correspond to the herbaceous districts of Sarafand. The absence of urban pressure exerted on these zones during the last decades allows envisaging measures of protection or reforestation. Belvederes ensuring panoramic views of the coastal plain and seaside on one hand as well as the inland and the mountains deserve to be valorised.

2.5% of lands belong to the municipality or to the commune. 1.6% of land ownership is attributed to waqfs, familial or religious. 30.1% of lands are the property of Sarafand nationals; 49.5% are lands owned by individuals and families non-originating from Sarafand. The part of lands belonging to strangers, being higher than those owned by locals, is an indicator revealing to different logics behind land-use control.

Photo 6. Land conversion in the higher plain

*4.3 Natural areas*

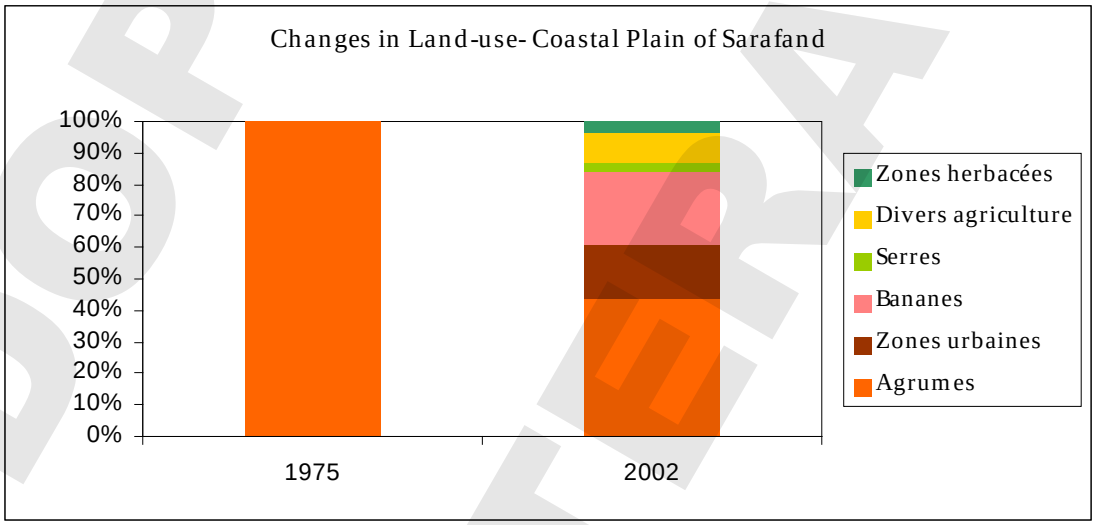
The coastal line measures approximately 5 kms. Sarafand owns beaches extending over 45 000 m² of surface area, a large part of it is sandy. These beaches have important touristic potential and historical vestiges. Beach access for Sarafand inhabitants is an important indicator reflecting village quality of life as well as the awareness raising targeting inhabitants on environmental stakes.

Herbaceous areas are present in strongly inclined areas. These spaces are considered as buffer zone among urbanised areas.

Photo 7. Panoramic view of the agricultural plain as seen from the Sarafand village

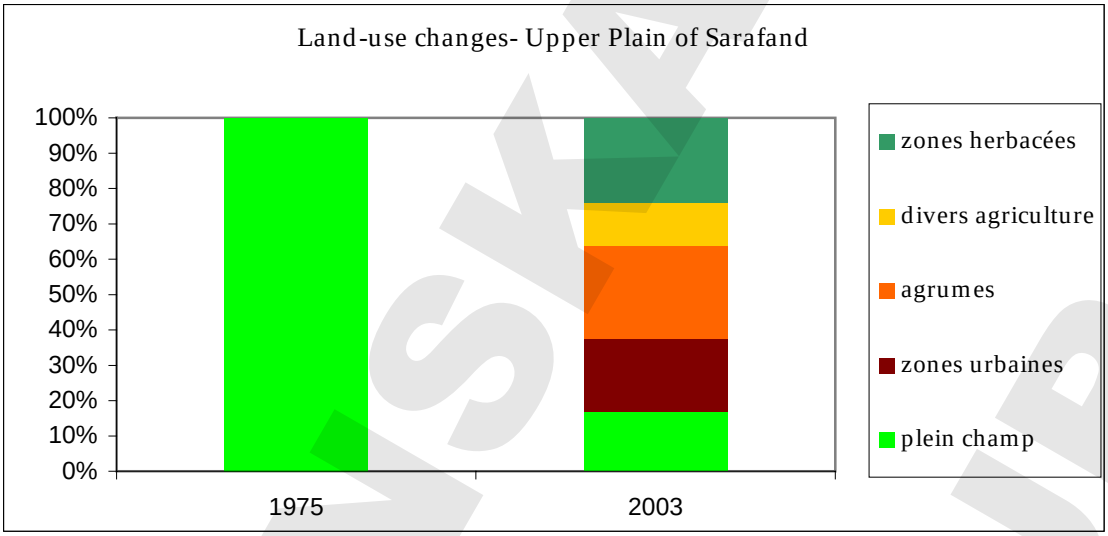
*4.4. Agricultural lands*

Two agricultural plains are present within the land circumscription: the coastal plain as well as the upper plain located above the traditional village. Combining the surface areas of both plains, one can observe an increase in urban encroachment (+18.5% of the cumulated surface area). The decrease of citrus trees in coastal plain is partially compensated by the appearance of these cultivations in the upper plain (-15%).




In 1975, citrus trees used to represent 40.4% of total area. In 2002, they decreased down to 29%, a proportion equivalent to a reduction of 32% of the total area planted with citrus. Urban areas increased of 269% and currently occupy 21.1% of the surface area. Open field cultivations decreased of 42% to occupy 17.1%. The area dedicated to banana trees increased to 125% to reach nowadays 14.9%. Herbaceous areas decreased of 21% to occupy 13.1% of the total circumscription surface area.

In 2003, agricultural land conversion has increased to 10.7% of total agricultural surface area. This may lead to a potential shift of additional agricultural plots into urban settlements in the coming years. This phenomenon is worth to be studied and monitored as it was inexistent in 1963.




In 1975, the upper plain of Sarafand was entirely used for open field cultivations. Currently, these cultivations do not represent more than 17% of the plain surface area, with the remaining surface area occupied by 26% of citrus trees, 20% of urban areas and 14% herbaceous zones.

The analysis of the different indicators related to Sarafand shows:

- A very fast increase in urban areas, in 28 years of time, which had as consequences a decrease in agricultural surface areas and an increase in land conversion.
- Despite some advantages (beaches, historic ruins, harbours, tourism complexes), tourism activities were scarcely developed.
- Despite obvious efforts realised between 1996 and 2002, the proportion of buildings linked to the wastewater network is still insufficient (5%) since hospitals and some economic activities are not attached yet. The establishment of a wastewater treatment plant would undeniably have a quite positive environmental impact. Nevertheless, the choice of the plant location should be carefully studied.
- Urban management tools (urban development control, creation of adequate public areas) are not efficiently utilised.
- The core village is over condensed while extended zones witnessed high urban encroachment at the expense of natural and agricultural areas.
- The under concentration of extended areas would lead to an overcharge in terms of infrastructure, a matter which the locality cannot handle.

Therefore, it is recommended to:

- Increase in urban areas

Urban areas will witness an increase in the coming years, mainly as a result to the natural population increase (+2% per year according to SDATL previsions). Constructible areas are limited by the land configuration. The upper plain is already swallowed up by scattered urbanisation. In order to reduce such dispersal, an increase in land-use ratio on the first urban ribbon surrounding the original core area would enable a re-densification of this zone. Highly sloppy areas which are weakly urbanised could be preserved and reforested. Public maritime domains should be protected against all types of additional illicit constructions in order to maintain beach access.

- Highway passage and relocation of economic activities

The complete execution of the southern highway will significantly modify the mobility in and around Sarafand village. This would have a direct impact on the economic activities and their locations currently located all along the coastal area. Indeed, a large number of shops and car repairing workshops have passing trade. This clientele will reduce due to the highway. A part of merchants and craftsmen should delocalise to avoid closure of their clients unless they manage to create a commercial

*4.5 Parking*

According to CAS survey in 1996, 360 buildings (equivalent to 22% of the surveyed buildings) are equipped with a car parking. Subsequently, most of inhabitants park their cars along the roadsides, thus reducing the spaces allocated to roadways as well as impacting the traffic smoothness by increasing its congestion.

Photo 8. The necessity to allocate spaces for green or public areas

*4.6 Impact of urban regulations*

The master plan entitled "southern beaches of Lebanon" (decree 5450/73) governing the entire CAMP coastal area, crosses Sarafand municipality at the level of its coastal plain, thus leaving the remaining part of the territory non-regulated. More critical is the state of areas sited outside the extent of the master plan, or in other words, the areas including the core village and the upper plain which have both witnessed further significant urban development in the absence of any regulation except the law 17/83. In 2003, the municipality of Sarafand requested the Directorate General of Urban Planning (DGUP) to put in place a master plan for the entire town. Sarafand is currently subject to an "under study" decision, leading later to the land-use master plan design and implementation.

***5. Socio-economic activities***

*5.1 Agriculture*

Sarafand village used to be a village strongly impregnated by agriculture whereby the dominating cultivation was citrus trees, namely orange and lemon. Indeed, almost two third of the town was used for agriculture. Crops include mainly citrus and banana, in addition to crops such as corn, wheat, exotic fruits and vegetables. Cultivations within greenhouses are very prevalent. The farmers of Sarafand complain about the lack of governmental assistance and guidance, and the non-existence of a well-structured market which constantly limit the agriculture.

Greenhouses are actually limited in number:

The presence of the Litani Canal is an explanatory factor for the important presence of bananas, highly water consuming plantations, and more generally for conserving an intensive agricultural activity within this zone.

Photo 9.
Agricultural plains of Sarafand, noting the urban sprawl

Among the most important agricultural constraints expressed by the community of Sarafand is the high cost of irrigation water from the Litani River. This fact has led the farmers to attempt using the underground water for that purpose by digging artesian wells and pumping the water into the surface that in turn has resulted in two new constraints that were clearly expressed by the community, namely the high cost of fuel and electricity and the scarcity of underground water, reflecting the overuse of this precious water source.

*5.2 Industry*

Industrial activities encompass five establishments (plastic bags and glass production), two workshops for marble cutting as well as several activities linked to cars (electricity, car repair or maintenance, etc.). In 1996, 86 buildings were used in this sector.

Table 3. Number of establishments based on economic use

| | **Agriculture** | **Industry** | **Commerce** | **Services** | **Others** | **Total** |
|---|---|---|---|---|---|---|
| Less than 5 workers | 128 | 69 | 377 | 72 | 130 | **776** |
| More than 5 workers | 16 | 17 | 20 | 9 | 19 | **81** |
| **Total** | **144** | **86** | **397** | **81** | **149** | **857** |

Source: Central Administration for Statistics, Building survey, 1996

Commercial shops (bakeries, furniture, others) were located all along the coastal area and inside the village. Around 400 shops were available in 1996.

*5.3 Services*

At the tourism level, one can tot up three hotels, fifteen restaurants and five coffee shops, all of them located on the coast. On the other hand, nine schools are present in Sarafand.
Finally, two hospitals and three clinics are operational.

*5.4 Fishery sector*

The fishery sector is one of the main economic sectors in the Sarafand since it sustains the livelihood of about 700 fishermen in the area. Fishermen from Ghazieh, Adloun, and Saksakiyeh towns come as well to Sarafand to practice their profession. The ages of the fishermen range from 16 years old up to 70 years old, fishermen from the Sarafand start young as part of their social inheritance.

*T*here are about 167 boats of different sizes in the Sarafand area (Mr. Khalil Taha, personal interview, 2003). Three fishing ports exist in Sarafand; these are the "Zahrani" port, the "Ain el-Antara port" in addition to the Mounes Hotel.

***The Zahrani port****:* It is the major port which holds the largest number of boats. The construction of the Zahrani port began in the year 1995; however it is not completed yet.

Photo 10: The Zahrani fishing port

*The Ain Antara port:* Being the first fishing port in Sarafand (constructed forty years ago), this port is much smaller in surface area than the Zahrani port and hosts about twenty boats. The port is in need for immediate rehabilitation. The walls separating the bay from the boats are completely destroyed, enabling the waves to reaching the boats and causing their destruction. Finally, a wastewater outlet discharges directly into the port, leading to a deterioration of the water quality.

Photo 11: The Ain Antara port

*The Mounes Hotel port:* It is a ten-year old port, which includes some twenty boats.

Photo 12: The Mounes Hotel port

*5.4.1 Cooperative of Sarafand fishermen*

A cooperative for fishermen is present in Sarafand, which is situated next to the Zahrani port. The cooperative is considered as a fish market where 85% of the fishermen exhibit their fishing stocks. It is to note that fish markets are widespread trade in Sarafand, with seven markets reported in town. There are also two fridges in the area which are used to store the imported frozen fish.

*5.4.2 Fishing techniques used*

A variety of fishing techniques is used in Sarafand ranging from nets, trawls, hooks but the most common technique is the boat seines.

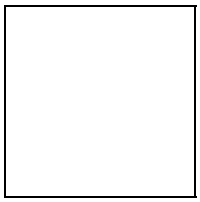


Photo 13: Boat seine found in Sarafand

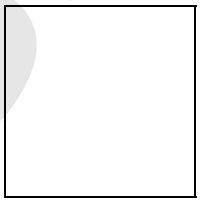


Photo 14: Fish market in Sarafand

Fishermen claim sustainability is becoming harder due to the degradation of marine biodiversity and the lack of assistantship to fishermen in order to purchase appropriate tools and equipments. Fishery production is constrained mostly through the dumping of wastewater, solid and hospital wastes into the sea, thus polluting the water, negatively affecting the quality and survival of marine life and interfering with the fishing process (solid wastes caught within the fishing nets). A constraint to this sector expressed only by this community is the inability of fishermen to teach the young generation the profession as the law prohibits children under 18 years of age to accompany their parents to the sea.

Finally the fishing ports, with their scenic locations are worth of being capitalized on as a touristic attraction.

***6. Transportation network***

The coastal area (national road) separates the coastal band from the rest of the village circumscription. It links the cities of Saida and Tyre. Secondary roads link Sarafand village to the villages of Saksakyeh, Daoudyeh and Nabatyeh. Since

1998, the Southern highway bypasses the eastern part of land circumscription, thus separating one section from the remaining part of the village.

In 2000, a study carried out on road traffic showed that the coastal area witnessed an annual daily average of 15.900 cars per day. The traffic Sarafand-Nabatiyeh via Msayleh is estimated to 6.649 vehicles per day. Finally, 3.008 vehicles cross daily the road linking Sarafand to Bablyeh.

Table 4. SWOT Analysis of Sarafand

| Strengths | Weaknesses |
|---|---|
| - Strategic geographical location between Saida and Tyre (Sour)<br>- high number of educational and medical services<br>- diversity in agricultural products<br>- presence of the Litani Canal enabling irrigating agricultural lands<br>- Strong involvement of the civil society (NGOs, clubs, etc.)<br>- presence of unexploited natural zones<br>- existence of traditional know-how (glass factory) | - encroachment on public maritime domain<br>- different perception of land ownership between Sarafand locals and non-locals<br>- lack of public and leisure spaces<br>- inadequate wastewater network<br>- lack of urban aesthetics<br>- over-density in core area and under-density in peripheral zones<br>- lack of municipal financial means<br>- unstructured road network |
| opportunities | Threats |
| - Tourism potential: beaches as well as religious and cultural heritage<br>- reorganisation of commercial activities due to the highway passage<br>- possibility of financing heavy infrastructure (European Union, World Bank)<br>- Encouragement for communal projects (wastewater treatment plant, landfill, etc.)<br>- awareness of the municipality towards environmental issues<br>- town under study in the context of establishing a land-use master plan | - increased agricultural changes<br>- Continuation in the process of public maritime domain encroachment<br>- difficulty in controlling new economic zones linked to the highway passage and decreased use of coastal road (old one)<br>- under and over-dimensioning of demand for housing and/or commercial areas<br>- risk of linear urbanism all along the highway in the absence of legal enforcement . |

**Threatened economic development**

The main comparative advantages of the Sarafand locality have nowadays disappeared. Few people come these days to Sarafand to swim or enjoy a lunch. The construction of huge sea resort complexes corresponds to outdated concepts about tourism product and supply. Most of the restaurants and tourism locations witness few crowd. The re-management of the whole shoreline is the only remedy to restore the previous tourism activity and compensate for the lost job opportunities. It is worth to mention that the more controlled development of both Tyre and Saida cities has already captured most of the clients used to frequent Sarafand in old days.

One should mention that the few available boutiques, shops and restaurants will increasingly witness a noticeable decrease in their turnover due to the circulation deviated since the establishment of the new highway behind the village.

**Urgent actions**

*A- Regulatory actions*

***Agriculture and natural landscape:*** It is advised to elaborate a land-use plan which ensures the protection of the agricultural plain of Sarafand situated to the east of the highway. The zones of the coastal area comprised between the current coastal road and the sea which are not yet affected by the urban encroachment are declared as agricultural areas.

***Tourism:*** The access to the beach shall be public and free of charge; it shall be also subject to strict regulations enacted by the municipal council aiming at securing the public comfort and security. Due to the proximity of the residential and touristic area, no constructions shall be envisaged on the beach. The archaeological resources should be valorised; their vicinities should be stated as *non-aedificandi* in conformity with the regulations in force.

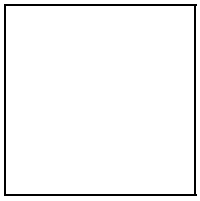


Photo 15.

Main wastewater outlet in Sarafand.

As for the solid waste management, the municipality itself p collection within Sarafand. Estimated at 10 tons per day, wast off haphazardly in an open dump within a 10,000m² public pr eastern part of the municipality. Field visits to the open dump and direct observation revealed that large amounts of unmarketable vegetables and fruit are being disposed off, uncontrolled, at the site. Access to the dumpsite is not controlled. Although probably viable, no small-scale agro-food industry is operating in Sarafand. Additionally, no composting operation of organic material (segregated at the source) is taking place. Such operations seem logical in Sarafand. One waste recycling operation was identified in Sarafand, namely an artisanal ornamental glass production family-run enterprise. The production of this enterprise is being sold across the whole country. The raw material used is mainly broken and used glass bottles.

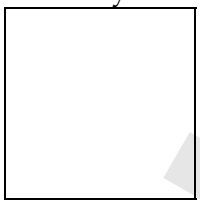


Photo 16.

Burning garbage in open dump in Sarafand

Having a mixture of a sandy and rocky beach had enabled this village i a tourism sector by constructing beaches, hotels and restaurants along the shore. The revitalization of such an industry is essentially dependant on the cleanliness of its beaches, i.e. the containment and treatment of wastewater prior to discharge into the sea and development of strict rules to stop littering.

With the municipality doing the collection of solid waste, and local farmers and merchants at times directly disposing of organic waste in the open dump, three issues related to the solid waste dump in Sarafand come to questioning: 1) there is no control on what is being dumped at the site; and 2) there can be control over waste reduction since the parties delivering most of the waste can be approached directly (as farmers, merchants, municipal employees and the local officials) to capitalize on the possibility of developing local composting facility, and possibly small scale food industry at least in relation to the unmarketable produce.

Regarding the issues of wastewater and solid waste, there seem to be the need for a systematic and direct lobbying with the central government regarding the proper management disposal of solid

the SLWWE will be responsible to manage domestic and waste water issues only, since the LRA is already taking care of irrigation projects in the South region.

*8.2 Water Supply*

*8.2.1 Groundwater*

The two aquifers outcropping in Sarafand are the Eocene and Quaternary Aquifers. The Quaternary Aquifer outcrops along the coast and in the valleys. The Eocene and Sannine Aquifers are under unconfined conditions. Previous studies (UNDP, 1970) show that the Sarafand area is characterized by the

presence of seawater intrusion due to the direct contact of Sannine Aquifer with the sea. Furthermore there are few abandoned wells exceeding 500 meters in depth, present in the Zaatare farmland in Dhour El Sarafand and tapping the Sannine aquifer. All the pumping wells in the Sarafand area are tapping the Eocene aquifer. This aquifer is slightly affected by saltwater intrusion since brackish water was reported in some wells. Moreover the Eocene aquifer is characterized by a relatively low discharge.

A total of 153 wells were surveyed in the Sarafand area. The total estimated amount of ground water extracted from those wells ranges from 4 to 6 $Mm^3$/year. One of the wells is public and owned by the Nabaa Tasseh Water Authority. The public well is mainly being used for domestic purposes. The private wells are being used for both irrigation and domestic purposes.

Six springs are present in the Sarafand area. Ain el Qantara and Ain el Hemma are coastal Quaternary springs discharging 371.5 and 86.4 $m^3$/day, respectively. Ain el Qantara is being used to fill a swimming pool in a beach resort. Ain el Hemma is not being currently used. Few fishermen use it for drinking purposes. Spring Bou Daynayn and Ain el Jdideh are small springs having discharges of approximately 4.3 and 2.9 $m^3$/day, respectively. Both are discharging from the Eocene Aquifer and are being used locally for domestic purposes. The Ain el Dellieh is a very small seepage zone. Note that there exists a sixth spring called Ain Mahmoud located in the village. This spring flows in significant quantities especially after a heavy rainfall. This spring discharges on the main street and it is locally used, when available, by few houses.

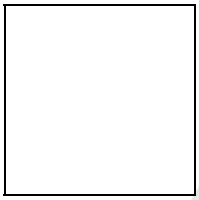


Photo 17. Ain El Hemma Spring

*8.2.2* *Water Supply Infrastructure*

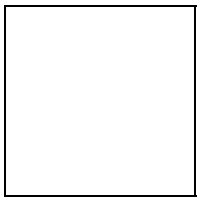
Domestic water is supplied to Sarafand primarily through Teffahta wells, which provide about 1,000 $m^3$ of water per day according to Nabaa el Tasseh water authority. Moreover the municipality well located in Dhour El Sarafand provides 300$m^3$ of water per day that are mixed with the quantity that is supplied by Teffahta and distributed through the Water supply Network.

However despite the fact that the totality of the village is connected to the water supply network, only 1200 housing units, i.e. less than 50% of the total number of housing units is subscribed to the Water Authority service. In order to subscribe to the main public network, each housing unit in Sarafand has to pay 250,000 LBP[2]s for the connection and 220,000 LBPs as an annual fee. Hence those

[2] One American dollar is equivalent to 1500 Lebanese pounds.

who cannot afford to pay such fees prefer to use their private wells, especially that operating these wells costs annually between 150,000 LBPs and 180,000 LBPs, which is less than the subscription fee to the public network. Note that more than 50% of the Sarafand is using private domestic wells located throughout the village, and few springs with low discharge.

The Litani Irrigation Canal provides water for the agricultural plains situated close to it, whereas private irrigation wells provide water to the irrigated areas of Dhour El-Sarafand, Jlali El Naouar, and a small section of the coastal plain. There are 300 subscribers to the Litani Canal supply system, and they pay 60,000 LBPs per 1000 $m^2$ of irrigated land. This fee is reduced to 40,000 LBPs in case they irrigate their land using more efficient irrigation techniques such as the trickle technique instead of surface irrigation.



Map 2. Illustration of Water Supply Infrastructure in Sarafand

*8.3 Water Demand*

*8.3.1 Domestic Water Demand*

The use of private wells is widespread in the Sarafand area. Estimations showed that domestic water consumption in Sarafand ranges between 190 L/c/day and 210 L/c/day. Domestic water consumption was estimated using data such as diameter of the rising pipe, pump power, hours of operation of the wells, and number of persons using the well. On the other hand, for the portion of the population using water coming for Teffahta, water consumption was deduced from the reservoirs capacity, the number of times the reservoirs are filled per week, and the number of persons in the housing unit using this water resource. Estimation of losses was difficult to perform because the number of people using the public water supply system is not well defined due to many illegal connections to the system.

*8.3.2 Agriculture Water Demand*

The CAMP team surveyed an area of 1,044,500 $m^2$ of agricultural lands (about 20 percent of total agriculture land area in Sarafand). Actual values exceed theoretical values by 40 to 300 percent, indicating a significant potential for water savings. This is probably due to inadequate use of the water because of its availability from the Litani Canal, even though water is not regularly supplied by the LRA, according to the farmers. Note also that the highest levels of over use are related to surface irrigation techniques, which are more difficult to control the water consumption.

Table 5. Irrigation Water Consumption in Sarafand

| Mode of Irrigation | Irrigated Surface ($m^2$) | Actual Irrigation Water Consumption ($L/m^2/day$) | Theoretical Irrigation Water Consumption ($L/m^2/day$) | Type of Irrigated Crops | Over use (%) |
|---|---|---|---|---|---|
| Surface | 877 000 | 12-13 | 3.5-4.5 | Vegetables Citrus | 150-300 |
| Sprinkle | 12 000 | 6-7 | 3.5-4.0 | Citrus Banana | 70-100 |
| Trickle | 155 000 | 5 | 3.5 | Banana | 40 |

*8.4 Water Quality*

Water quality data is not abundantly available for the water resources in Sarafand. A limited number of samples was collected and analysed to fill as much as possible the lack of information, and at least provide an indication of the level of water pollution in the area. Results indicate the possible presence of biological, agricultural and seawater contamination.

Ain El Hemma, Ain El Qantara on the coast, and Ain Bou Daynayn springs show values of fecal coliform that exceed the admissible value for domestic use. It is worth noting that Ain Bou Daynayn is being used for drinking and domestic purposes by three nearby houses. It has been noticed that children from these houses have stomach-aches and bad digestive behaviours probably due to the high values of faecal coliforms in the drinking water. This spring is probably contaminated by the wastewater that is being discharged upstream in Hay Es Sarassir where the sewage network is missing.

Other samples, particularly the Spring El Qantara sample and the irrigation well sample show relatively high values of nitrate that exceed the admissible values. These excessive levels of nitrates, especially in the irrigation well (S1) located in the agricultural field, are most probably due to the use of fertilizers and inadequate agricultural practices.

Table 6. Water Quality Results for Sarafand Samples

| Sample ID | TDS (mg/L) | Chlorides (mg/L) | Nitrates (mg/L) | O-Phosphates (mg/L) | Fecal Coliforms (CFU/ 100 mL) |
|---|---|---|---|---|---|
| S1 | 553 | 82 | 82 | 0.29 | 0 |
| S2 | 453 | 77 | 67 | 0.2 | 2.7 |
| S3 | 377 | 50 | 7 | 0.28 | 0 |
| S4 | 435 | 80 | 35 | 0.38 | 4 |
| S5 | 532 | 78 | 64 | 0.22 | 17 |
| S6 | 304 | 31 | 17 | 0.15 | 0 |
| S7 | 313 | 33 | 18 | 0.18 | 0 |

| | | | | | |
|---|---|---|---|---|---|
| S8 | 630 | 207 | 5.4 | 0.32 | 0 |
| Guidance Value[3] | | 25 | 25 | 0.4 | 0 |
| Maximum Admissible Value[4] | 500 | 200 | 50 | 5 | 0 (domestic)<br>200 (irrigation) |

Moreover the sampling shows that the municipality well that is tapping the Sannine aquifer exhibits values of chlorides that exceed the maximum admissible value for domestic purposes. Furthermore a well that has been drilled down to 500 m in Dhour El-Sarafand was abandoned because it had penetrated the salt water wedge. As for the Eocene aquifer, there is no clear evidence of saltwater intrusion from the sampling however some wells in the village pump brackish water from the Eocene aquifer.

*8.5 SWOT Analysis for water management*

The SWOT analysis presents the strengths and weaknesses of the Sarafand municipality in terms of water management, as well as the opportunities and threats that could promote or disfavour, respectively, a sound water management in the area.

| Strengths | Weaknesses |
|---|---|
| - Available water infrastructure<br>- Good coordination with relevant water authority (Nabaa El Tasseh)<br>- Active municipal members<br>- Increased awareness of farmers (use of trickle irrigation in the area) | - Poor availability of local water resources<br>- Relatively high population density<br>- Incomplete sewage infrastructure and lack of domestic wastewater treatment<br>- Limited financial resources<br>- High reliance on private wells for domestic consumption<br>- Lack of monitoring in water consumption<br>- Inadequate water pricing to promote efficient water use (on a lump sum basis for domestic and area of land basis for irrigation)<br>-Water pollution (bacteriological and agricultural pollution) |
| Opportunities | Threats |
| - Available water resources from Brake and Teffahta well fields<br>- Nabaa El Tasseh water authority project to distribute water meter devices<br>- Council for the South as a source of financing and implementation of water-related projects | - Further uncontrolled development of the area (increase in population density, additional industries, agriculture areas) |

Table 7. SWOT Analysis for Water Resources Management in Sarafand

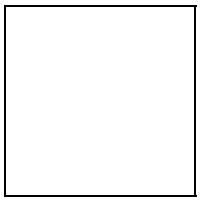
[3] All values according to Ministerial Decision 52/1 issued by the MoE, except for TDS where EPA standards are included and fecal coliforms where EPA standards for irrigation are used.

[4a] All values according to Ministerial Decision 52/1 issued by the MoE, except for TDS where EPA standards are included and fecal coliforms where EPA standards for irrigation are used.

*8.6 IWRM in Sarafand*

Integrated water resources management involves projects and actions aimed at increasing the conservation of water and the efficiency in its use and by increasing complementarity and/or decreasing conflicts between competing uses, both in quantity and in quality, by managing both supply and demand and enabling adequate organizations, regulatory frameworks (laws, policies, strategies, plans, programs and rules) and human resources

To achieve a sound and integrated water resource management in Sarafand, four major categories of recommendations are proposed pertaining to: 1) water monitoring; 2) water quality protection; 3) conflict resolution; and 4) community participation.



*8.6.1 Strengthening Monitoring Capabilities*

Water monitoring needs in Sarafand can be grouped into three categories: 1) monitoring water consumption; 2) monitoring water quality; and 3) monitoring private wells.

Table 8. Pressing Water Monitoring Needs in Sarafand

| **Monitoring Need** | **Recommended Actions** |
|---|---|
| Domestic water consumption | ***Objective***: Monitoring domestic water consumption is important to control water losses in the networks and as a tool to enforce more effective pricing schemes that promote water conservation.<br>***Means***: Installation of a metering system covering the main lines and housing connections.<br>***Investment cost***: The average cost of an installed meter is USD 300; if economies of scale are considered, installing a comprehensive metering system in Sarafand would cost more than USD 500,000; at the same time the socio-economic situation in the area does not allow to place this cost on the population; the municipality is encouraged to coordinate with the water authority, which is planning to install a metering system in their networks; a proactive approach from the municipality is important in this issue.<br>***O&M***: Once the metering system is connected, the municipality will secure, in coordination with the water authority, enough staff to monitor the counters and report the results. |
| Water quality | ***Objective***: Monitoring the quality of groundwater in the area with especial emphasis on bacteriological pollution, agriculture pollution, and salt water intrusion.<br>***Means***: Sampling and analysis of specific samples and parameters;<br>Recommended Sampling Program: |

| | |
|---|---|
| | 1) Springs Ain Hemma, Ain Quantara and Ain Bou Daynan<br>Parameter: fecal coliforms<br>2) Spring Ain Quantara and Irrigation well (S1)<br>Parameters: nitrates<br>3) Municipality well<br>Parameters: chlorides, TDS<br>***Frequency***: monthly sampling programme as a minimum<br>***Investment costs***: none<br>***O&M***: one staff for sampling; transportation costs for samples;<br>Sampling analysis costs: 1) 15,000 LL per sample<br>2) 15,000 LL per sample<br>3) 30,000 LL per sample<br>Monthly sampling analysis cost: 105,000 LL (USD 70) |
| Private wells | ***Objective***: monitor the illegal sources of abstraction of groundwater in the area and promote centralization of the domestic and irrigation water supply systems<br>***Means***: maintaining and updating a list of wells in Sarafand; Recommended actions: 1) update the list of wells prepared during this study; 2) perform an yearly update of the list to monitor changes<br>***Investment cost***: comprehensive survey campaign to update list of wells (USD 2,000)<br>***O&M***: municipality staff for yearly monitoring |

Monitoring water quantities used for irrigation is also a very important monitoring need in the area; this would set the framework to introduce more effective pricing structures based on volume of water consumed in order to promote an efficient use of the water; this should however be coordinated with the LRA, which is currently responsible for providing irrigation water to the area; the LRA believes that it is technically difficult to install and monitor water discharge systems in the irrigation canals used by the subscribers of the service

### *8.6.2 Water Quality Protection*

Water quality protection measures should focus on the following areas: 1) stopping pollution from domestic sewage; 2) minimizing pollution from agricultural practices; and 3) controlling pumping from groundwater.

Table 9. Recommended Water Quality Protection Measures in Sarafand

| **Water Quality Issue** | **Recommended Measures** |
|---|---|
| Bacteriological contamination of groundwater from untreated domestic sewage | ***Short term measure***: stop contamination of spring Bou Daynan<br>1) halt consumption of Bou Daynan resource until source of pollution is contained<br>2) provide alternative source of water to local community using the spring<br>3) divert the sewage coming from Hay El Sarassir which is contaminating Bou Daynan spring<br>***Long-term measure***: complete sewage infrastructure in Sarafand and prioritize construction of a domestic wastewater treatment plant |
| Groundwater pollution from agricultural practices | Pollution from agriculture activities originate primarily from inadequate use of fertilizers and agro-chemicals; the municipality should promote best management practices (BMPs) to farmers; it is important to setup an information center where farmers can learn about the use of agro-chemicals (quantities to use, application timing, etc.); this should be organized by the farmers union of the area |
| Saltwater intrusion in aquifer from | The amount of water pumped from the local aquifers should be regulated to avoid further deterioration of groundwater quality; a centralized water supply |

| | |
|---|---|
| uncontrolled pumping | system should be promoted in Sarafand since the water supply network is available and the water authority can provide the required water; the fees issue remains to be solved yet |

The major challenge towards controlling domestic wastewater pollution is to secure the funds to build a wastewater treatment plant; the GoL is planning to build a treatment plant in the area of Sarafand; no specific time table is however set for the project since funds were not yet secured. The municipality should therefore adopt a proactive approach towards the problem by insisting with the government on the urgency of the matter, while at the same time exploring the possibility of building its own treatment plant upon securing the necessary funds. The municipality needs therefore to seek assistance from international donors such as USAID and bilateral donors; the MoE maintains a roster of funding agencies that could possibly be of assistance; coordination with the MoE is hence strongly recommended.

### *8.6.3 Conflict Resolution*

Two major conflicts related to water use were identified, and consequently to be dealt with, in the Sarafand area involving: 1) Nabaa Tasseh Water Authority and local residents; and 2) LRA and local farmers. As such, the existing conflicts are of the type supplier-user, whereby the user faces a problem regarding the existing water service.

Table 10. Conflict Resolution in Sarafand

| **Type of Conflict** | **Conflict Resolution Elements** |
|---|---|
| Nabaa El Tasseh and local residents | ***Issue***: only a fraction of the households in Sarafand is connected to the Nabaa Tasseh water authority service; despite the fact that the water authority is able to provide a good quality domestic water, local residents claim that the fees are not affordable, and prefer to use private wells instead.<br>***Conflict resolution***: it is recommended that the Sarafand municipality takes the lead in solving this issue; it is desirable that all the households be connected to the water authority service to: 1) control groundwater abstraction from private wells and prevent further deterioration of the water quality; 2) ensure a safe water quality to the residents; and 3) set the stage for future water pricing schemes that would promote water conservation. Unfortunately, the water authority can not provide payment facilities as a means to alleviate the problem and encourage the residents to subscribe to the service. There are two options in this sense: 1) either the municipality obtains a loan, settles the required amount with the authority, and provides payment facilities to the residents; or 2) or the municipality delegates the issue to the private sector (a bank for example). This situation also reveals a lack in awareness that should be provided to the community to facilitate the conflict resolution process. |
| LRA and local farmers | ***Issue***: the local farmers claim that they to do not always receive water when they need, and that delays occur quite often; on the other hand, the LRA states that their service is of the highest quality.<br>***Conflict resolution***: a local committee should be formed to reach a consensus on this issue and adjust the situation; the municipality could organize the formation of this committee and coordinate the efforts. |

The conflict between the Nabaa El Tasseh Water Authority and Sarafand local residents highlights one important issue that needs to be considered seriously by GoL if the process of privatization of the water sector is successful: the socio-economic situation of different areas affects the pricing of the water service. The water service needs to be affordable to everyone. This is one of the major challenges in treating water as an economic product rather than a commodity: how to provide facilities to the less privileged communities.

*8.6.4 Community Participation*

The local community in Sarafand should become more involved in the water-related activities of the municipality. It is important first that the community builds a sense of identity, pride, accomplishment and ownership so that the local residents get more involved in the management of natural resources. The community can help in many aspects such as:

- Awareness on the importance of placing water meter devices to monitor water consumption and losses;
- Awareness on water conservation needs and methods;
- Follow-up water protection and monitoring activities; for instance, the committee would ensure that sewage is diverted from Bou Daynan Spring;
- Organizing the establishment of an information center for agricultural practices, which could be expanded to cover other water/environment-related topics;
- Follow-up on the wastewater treatment issue (identification of sources of funds, treatment technologies);
- Assisting in conflict resolution.

***9. Environmental pollution***

The coastal strip of Sarafand, as many coastal cities, has witnessed over the past years the proliferation of illegal constructions that can be literally described as "visual pollution." On the other hand, the sandy beach of Sarafand has endured over the precedent years the illicit activities of sand extraction.

The current situation of basic infrastructure directly affects the coastal resources, since waste water discharge directly without prior treatment, thus causing pollution affecting marine water and biodiversity.

The main source of noise and air pollution is the traffic along the Beirut-South coastal road. At present, actual data regarding the level of noise and air pollution do not exist. In addition, the problem of air pollution is aggravated by the presence of the open dump in Sarafand where uncontrolled fires occur every now and then. On the other hand, some noxious odour problems were reported from the fields where compost (resulting from solid waste) has been used.

***10. Cultural heritage***

Sarafand is characterized by a wide spectrum of cultural wealth including:

- Ancient archaeological mound,
- Religious tradition,
- Defensive military architecture,
- Culinary fish-degustation,
- Surviving old traditional craft and industry.

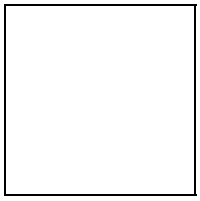


Figure 2 Relative proportions of Sarafand's heritage resources.

*1o.1 Characteristics of the Cultural Resources*

The heritage resources of Sarafand are related to the archaeological and the religious legacies of the place:

**Archaeological heritage:** the ancient tell of Sarafand dates back to at least the Bronze Age period and consists of an accumulation of settlements of several periods. This mound represents the urban history of Sarafand from ancient times. The Phoenician period is represented and can as a result play a significant role in the development of associated cultural products for boosting local identity and tourism.

**Religious tradition:** Sarafand is a place with an important biblical tradition linked to the passage of Jesus Christ and Virgin Marry to the town. It is also related to the presence of a shrine dedicated to the Muslim Jurisprudent Abu Zar al-Ghafari and the mosque which commemorates the religious significance of the place.

**Defensive military architecture:** associated with the Crusader-Arab defensive tower that guarded the coast of Sarafand from sea attack in the medieval period.

Photo 18. Traditional glass manufacture at Sarafand. A surviving craft with a high historical significance.

**Surviving old craft and industry:** in particular the glass industry with its roots in high antiquity. The Phoenician coast was famous for the quality of its blown glass since ancient times and well into the medieval period. Glass industry at Sarafand is an important local tradition which continues until this day and is unique in the area. It is currently flourishing as a artisan production but the trade is handled only by one family consisting of a master glass-maker and his apprentice son. The rest of the family helps in support activities around the workshop.

**A famous location for fish-related degustation:** renowned for its fish-cuisine, Sarafand is second to Khayzaran in its delicious fish-related cuisine. Restaurants in the town need nevertheless to be upgraded and the inhabitants and local authorities should spend more efforts on reviving and marketing their culinary tradition and cuisine.

*10.2 Assessing the cultural significance of Sarafand*

Located 28 kms north of Tyre, Sarafand is the site of ancient Sarepta, mentioned in the Bible. References to Sarepta in ancient literary sources confirms the existence of this important city during the late Bronze and Iron Ages, and occasionally provide clues to its relative size and significance among the city-states of the Phoenician coast.

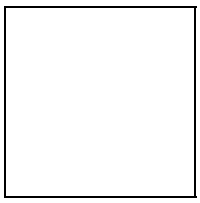


Photo 19 Aerial photo of Sarafand archaeological mound prior to its partial destruction by modern development and intensive agricultural activity.

Sarafand's main values can be summarized to the following:

**Religious significance:** Modern Sarafand is the biblical Zarephath, later known as Sarepta. The place is famous for the two miracles performed there, in the ninth century, by Prophet Elijah in reward for the hospitality shown to him by a widow of Sarepta. The miracles, the resuscitation of the widow's dead son and the multiplication of her olive oil and grain supplies are accounted for in the biblical text of the Book of the Kings 17: 8-28. In it there is specific mention to the "gate of the city". In the miracle of the flow of oil in the time of famine, one can see a reflection of the reputation the city of Sarafand had at the time for the production of this vital commodity.

During Crusader times, the town was the seat of a bishopric, home to a Carmelite order and had a Crusader church commemorating St. Elijah in its centre.

**Historic continuity:** Archaeological evidence revealed that Sarafand was first occupied in the middle of the second millennium B.C., eventually becoming an important trading town and remaining a powerful coastal town throughout antiquity. During the Crusader period, Sarepta, as it was then called, was a large, well-fortified town with an important castle. The place has been continuously inhabited since it was first settled in antiquity.

**Archaeological importance:** Sarafand has little, yet very important, archaeological remains, testimonies of the place's rich historic heritage. Unfortunately, most of them are in bad condition or ravaged by modern development. Among them are traces of the old port, the ruined Phoenician masonry of houses and cisterns visible on the shore, the remains of the place's Crusader castle and the Tell, accumulation of settlements of various dates. Besides these, the town has important religious and residential buildings such as:

- The shrine of Abou Zar al-Ghafari, an important Muslim jurisprudent who taught there in the first century of Hijra.

- Residential buildings of traditional vernacular architecture dating back to the early 20th century.
- The mosque of the Prophet al-Khodr, originally a Medieval building although nothing much of its old structure remains nowadays. Nevertheless, the religious significance of the place is still very strong.

**Trading centre:** The town of Sarafand was well known in Phoenician-Roman times for its glass industry, which made the place famous as an important trading post. It is believed, in fact, that the town took its original name from the word *seraph* which means "to melt" in Hebrew.

**Survival of ancient crafts:** The glass-making industry for which Sarafand became so famous in Phoenician and Roman times survives until this day. The modern town has a workshop where glass blowing is performed and where a master glass maker and his family produce high quality glassware just as his Phoenician ancestors did thousands of years ago. The workshop is the only surviving center for glass production in the country; a uniqueness that emphasizes even further the significance of the historic craft.

**Natural beauty of the place:** Despite of Sarfand's uncontrolled urban development and the poor condition of the archaeological mound, one can still find some attractive unspoiled spots in town. The remains of the Crusader watch tower, reminiscent of the warfare period between the Franks and the Arabs, is a good example situated on a steep promontory overlooking the sea.

*10.3 Assessment of the conditions of the cultural resources of Sarafand*

The heritage resources of Sarafand suffer from a number of serious problems, which require some urgent measures. These problems are:

| Heritage Resources | State of preservation and condition |
|---|---|
| Defensive military architecture | Very bad, continuous loss of fabric and collapse of structure |
| Archaeological mound | Very bad, the site is constantly getting truncated and ravaged by modern development and unsympathetic plowing. Moreover, access to the centre of the old excavation is causing regular abrasion and erosion of the surface of the mound. |
| Vernacular and traditional architecture | Very bad, due to neglect, lack of maintenance and unsympathetic repairs and additions |
| Religious buildings | Bad to stable, due to demolition of old parts and new building. |

Based on the assessment of the condition of these resources, a number of interventions are necessary in order to plan for their conservation:

| Heritage Resources | Proposed actions/interventions |
|---|---|
| Defensive military architecture | Structural consolidation and conservation of fabric; provision for a regular program of maintenance. The significance of this type of architecture can be improved by staging a limited salvage excavation particularly at the site of the Crusader-Arab tower. |
| Archaeological mound | Protection of perimeter, removal of harmful vegetation and conservation and presentation of the exposed remains |
| Vernacular and traditional architecture | Repair and improvements using traditional materials and methods |
| Religious buildings | Repair and improvements using traditional materials and methods |

The five main key issues that must be dealt with in the context of an integrated management of these resources are:

- Extending legal protection to what remains of the cultural resources.
- Conserving the few remaining attractions.
- Providing for regular maintenance of the resources based on proposals for adaptive re-use or presentation.
- Enhancing the quality of the heritage resources, increasing people's appreciation and enjoyment of their heritage.
- Making sure that the management of these resources is carried out in a sustainable way and that local economic benefits are extracted from the use of these resources in a sympathetic and sustainable manner.

Accordingly, management proposals for the cultural resources of Sarafand should try to accommodate these needs within the existing constraints and the available opportunities.

Photo 20. Tell of Sarafand, S. Masri, CAMP, 2003

*10.4 Management Policy for Sarafand*

Based on the special character of Sarafand and the nature of its cultural resources, the main policy for managing the heritage consists in:

- Providing legal and municipal protection to the archaeology and the deposits that survive intact.
- Enhancing the quality of the religious legacy and heritage and develop themes for interpretation and presentation to visitors.
- Make sure that the traditional glass industry and craft remains alive and well sustained.

The management policy requires a set of practical measures and strategies for its implementation, these have been detailed below:

| | |
|---|---|
| **Identifying what remains of the archaeology of the mound** | The archaeological tell or mound of Sarafand enjoys high significance which is currently undermined by uncontrolled building and the piece-meal destruction of the site by new development and the construction of an asphalt road that truncated large sections of the mound. Delimiting the extent of the |

| | |
|---|---|
| | archaeology is an important task that needs to be undertaken in order to assess what is feasible in terms of management of the site. |
| **Conservation of the resources** | Very little remains of the traditional architecture and historic buildings at Sarafand. Nevertheless, a program of regular maintenance of the surviving traditional buildings is needed. |
| **Extending legal protection** | Legal protection should be provided to the archaeological remains of the mound in order to halt further aggression. |
| **Encouraging Research** | Research at the archaeological mound of Sarafand started in the seventies under the form of scientific excavations. There I need to re-evaluate the archaeology in order to better understand the importance and significance of the place. |
| **Visitor information and management** | Upgrading the archaeological mound and the water front are possible tasks that need to be undertake to raise the quality of the environment at these particular locations. |
| **Building capacities** | Providing training sessions for staff that will care for the preservation and management of the resources of the place, such as the archaeological park and the religious heritage. |

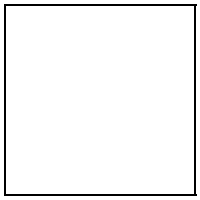


Photo 21.

Ornamental glassware made from recycled glass in Sarafand

***11. Sustainable tourism***

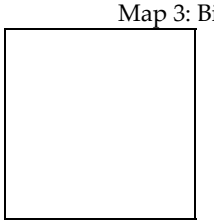
Ecotourism is defined as the "*tourism that consists in traveling to relatively undisturbed or uncontaminated natural areas with the specific objective of studying, admiring, and enjoying the scenery and its wild plants and animals, as well as any existing cultural manifestations (both past and present) found in these areas*" (Hector Ceballos-Lascurain). Accordingly, ecotourism involves a broad spectrum of activities related to nature. At one end of this spectrum, some market segments are relatively small and well defined such as a specialized ornithologist or those who seek out rare species. At the other end, one might have people who casually observe and enjoy scenic beauty while on trips taken primarily for another purposes (Munasinghe, 1994). Ecotourism is seen as a form of alternative tourism. The more widely accepted understanding of alternative tourism is a one involving modes of tourism thought to be more benign with respect to their impacts upon the destination.

Despite the fact that the current situation of Sarafand does not enable a proper launching for a nature-based alternative tourism, mainly due to the lack of proper land-use planning, the available natural assets, combined to the cultural heritage ones, could open the floor towards initiating an alternative way of attracting tourists to the town, provided of course that willingness to improve Sarafand aesthetic and land-use patterns are guaranteed.

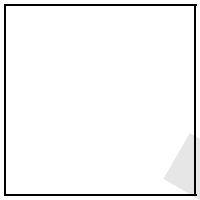
**The coastal plain** of Sarafand, located between the coastal road and the village, encompasses an area of around 4,000,000 square meters. The agricultural roads of this plain, with a total length of around 25 km, offer a good opportunity for biking activities, especially during the flowering season of citrus. With its nice smelling

citrus flowers, the plain of Sarafand has an advantage over other coastal plains of the South in attracting bikers.

Map 3: Biking roads in Sarafand



**The natural beach** of Sarafand is, in its current status, heavily altered by household constructions and resorts. Unfortunately, the beach is not attractive anymore for tourism. The radical changes that have occurred on this beach are irreversible. The remaining natural part of this beach can serve as a destination for swimming and sunbathing activities for the local community of Sarafand. The geographical location of Sarafand near the touristic city of Tyre reflects positively on the future development of tourism because, at least, a part of the tourists to Tyre can be considered potential tourists to Sarafand.



*11.1 Touristic infrastructure and superstructure:*

The existing support services for tourism in Sarafand[5] are as follows:

- 6 gas stations, 2 of which offer car wash services and all offer oil change services
- 2 hospitals and 3 clinics
- 3 hotels, 15 restaurants and 5 cafes

Map 4: Land-use in Sarafand

Regarding touristic accommodation units, the conceived k
simple superstructure integrated in the natural setting an
locals. This does not apply to the large-scale sea resorts i
destroyed irreversibly a part of its natural beach and of its agricultural coastal plain. However, the preserved inland part of Sarafand could be potentially invested.

*11.2 Threat and constraints:*

The major threat for potential alternative tourism in Sarafand is the irreversible loss of the remaining part of the agricultural coastal plain in favour of construction. The main current physical constraints facing tourism development is the lack of touristic accommodation units and of organized parking places. In addition, the bad urban planning, unfinished buildings and illegal housings reflect negatively on tourism potential. The inland highway splitting the area of Sarafand in two affects negatively the development of any potential inland nature-based tourism. However, it is

[5] Reference: Questionnaires to CAMP municipalities, CAMP project, 2001.

expected to result in less pressure on the agricultural coastal plain regarding future construction activities. Such constructions (mainly for business activities) will most likely take place nearby the highway.

*11.3 Strategic objective and policies:*

In order to enhance and sustain alternative tourism as a strategic choice for the sustainable use of natural resources and as an economic activity which can complement other economic activities taking place in Sarafand, the following points have to be taken into consideration:

- *Concerning land use:*
- The agricultural plain, located between the coastal road and the village, has to keep its agricultural character and for this purpose, it has to be protected by legislation against construction. This could be through a low coefficient of land use for construction (less than 5% for example).
- The remaining 562,000 square meters of natural beaches and agricultural areas bordering the sea have to be strictly protected against any construction activities. They present the last non-artificial areas of the whole seashore of Sarafand.
- The non-artificial areas of around 2,900,000 square meters (mainly agricultural land), located in the hill side between the plain and the inland highway, have to be regulated by legislation for construction (appropriate coefficient of land use for construction, appropriate number of floors, etc.) in order to minimize the visual pollution.

- *Concerning supportive policies for the preservation of the agricultural character*

The preservation of the agricultural coastal plain in Sarafand would imply definitely a social benefit but also a private cost to land owners, which is the opportunity cost (or the benefits forgone) of using the agricultural land for other purposes such as construction. This urges the government intervention in order to provide supportive measures for those who will be bearing the cost of the preservation of the agricultural character of this plain. Fees paid by tourists for using this plain for biking would present a small compensation for the benefits forgone. A direct significant support from the ministry of agriculture is needed, mainly for citrus and banana producers. This support could be through the protection of the local products from foreign competition. Additional support can come through extension services in order to reduce the cost of production and to improve the quality and the productivity.

- *Concerning implementing agents*

The involvement of the private sector in the implementation of the touristic superstructure is crucial for tourism development. The government is responsible of legislation related issues regarding land-use and the improvement of the infrastructure. The media would play an essential role in the promotion of alternative tourism. The municipality of Sarafand, supported by local NGOs, should be responsible of tourism management at site level.

***12. Municipal development plan***

Based on the different CAMP reports outputs as well as the active community involvement, local agenda 21 principles and techniques were used to promote sustainable development concept among local communities at large and more specifically to be part of the municipal planning. Accordingly, the CAMP thematic recommendations were discussed with the municipal councils and local communities and consequently presented within a proposed municipal development plan.

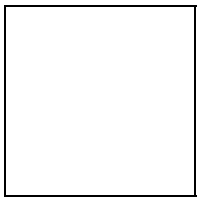


Photo 22. Awareness field visits to local communities of CAMP area in the context of the participatory programme. Explanation about illegal encroachment on maritime domains and untreated sewage effluents.

**Municipal Action Plan:**
**SARAFAND**
**2004**

| **Strategic objective** | **1. INTEGRATED LAND USE MANAGEMENT.** | | | | |
|---|---|---|---|---|---|
| **Output** | **1.1 Control and management of urban growth.** | | | | |
| **Activities** | **Resources needed** | | | | **Remarks** |
| | **Human** | **Information/Training** | **Logistics** | **Timeline** | |
| 1. Limit urban expansion to areas that can accommodate growth for next 20 years. | Municipality<br>DGUP<br>Local committee for urban planning | Land use plans | Municipal license<br>Municipal violation ticket | On-going | Refer to CAMP report on Urban planning |
| 2. Limit and demolish haphazard illegal construction and issue violation tickets on public property and beach abuses. | Municipality<br>Political decisions makers (deputies, governor, others)<br>DGUP<br>Funding agencies | Land use plans<br>Regular meetings and lobbying towards the government representatives | Municipal license<br>Funding sources<br>Ministerial decision | On-going | |
| 3. Benefit from highway to classify nearby zones as new industrial and economic growth areas that require efficient transportation. | Municipality<br>DGUP<br>Local committee for urban planning | Land use and zoning maps | Municipal violation ticket<br>Meetings with land-owners | Starting mid-2004 | This activity requires close collaboration between municipality and DGUP prior to master plan finalisation |
| 4. Continue infrastructure work and find appropriate locations for constructing wastewater treatment plants. | Municipality<br>Ministry of Energy & Water<br>Council of the South<br>CDR | Land use and zoning maps | Funding sources | On-going | |
| **Output** | **1.2 Improvement in public services and heritage management.** | | | | |

| Activities | Resources needed | | | | Remarks |
|---|---|---|---|---|---|
| | Human | Information\Training | Logistics | Time line | |
| 1. Support agriculture through financial and human capacity building. | Municipality | Land use and zoning maps | KAFALAT requirements | On-going | Refer to CAMP reports on land-use management and socio-economic aspects |
| | Farmers | Training workshops | | | |
| | IDAL | Credit schemes | | | |
| 2. Establish more public gardens, green spaces and pavements, and reforest green spaces overlooking the sea. | Municipality | Sarafand land use map | | Spring and autumn | School holidays for involving children |
| | Community volunteers | Reforestation techniques | Tree planting material | | |
| | Ministry of Environment | | | | |
| | DGUP | | | | |
| | NGOs | | | | |
| 3. Support touristic and historical sites by identifying them, marketing through media and organizing festivals around those sites. | Municipality | List of sites | Media coverage | On-going | festivals in summer |
| | Community volunteers | Awareness campaigns | Sponsors identification | | |
| | Ministry of Tourism | | | | |
| | Ministry of Culture | | | | |
| 4. Support handicrafts, market and help place products on markets. | Municipality | List of handicrafts & quantity | | On-going | Involvement of the Center of Social Affairs And the Center of Handicapped |
| | Tour operators | Training to re-introduce forgotten handcrafts | Show-rooms | | |
| | Private sector | | Media coverage | | |
| **Strategic objective** | **2. CULTURAL HERITAGE MANAGEMENT.** | | | | |
| **Output** | **2.1 Protection of historical and archaeological sites.** | | | | |
| **Activities** | **Resources needed** | | | **Timeline** | **Remarks** |
| | **Human** | **Information/Training** | **Logistics** | | |

| | | | | | |
|---|---|---|---|---|---|
| 1. Identify Sarafand Tell remaining and invest in its protection. | Municipality<br>Directorate of Antiquities<br>Ministry of Tourism<br>Cultural heritage expert | Detailed map of site | Appropriate material<br>Excavation works | Starting mid-2004 | Refer to CAMP report on cultural heritage |
| 2. Renovate attractive sites such as Sarafand Tell, ruins of religious sites. | Municipality<br>Directorate of Antiquities<br>Ministry of Tourism<br>Cultural heritage expert<br>Archaeology students | Detailed map of site<br>Renovation techniques | Appropriate material<br>Municipal protection against emerging vandalism | Starting mid-2004 | Refer to CAMP report on cultural heritage |
| 3. Provide regular maintenance of sites. | Municipality<br>Cultural heritage expert<br>Directorate of Antiquities | Detailed map of site<br>Monitoring of site | Appropriate material | On-going | |
| 4. Raise local awareness about importance of sites historically, culturally and for touristic purposes. | Municipality<br>Directorate of Antiquities<br>Ministry of Tourism<br>Cultural heritage expert<br>Community | Historical information<br>Potential sustainable tourism ideas<br>Slide shows/ videos/ others | Community meetings<br>Seminars and on-site visits | Continuous | Refer to CAMP report on cultural heritage |
| 5. Promote archaeological research on Sarafand Tell. | Municipality<br>Directorate of Antiquities<br>Cultural heritage expert<br>Archaeology students | Detailed map of site<br>Existing research | Contacts and posts with interested Lebanese universities | Starting September 2004 | Refer to CAMP report on cultural heritage |
| **Output** | **2.2 Sustainable benefits from cultural heritage management.** | | | | |
| **Activities** | **Resources needed** | | | | **Remarks** |
| | **Human** | **Information/Training** | **Logistics** | **Timeline** | |
| 1. Develop sustainable management plan of sites. | Municipality<br>Directorate of Antiquities<br>Ministry of Tourism<br>Cultural heritage expert | Integrated management plan. for cultural heritage<br>Inventory list of sites | Signposts<br>Field visits and field research | Starting mid-2004 | |

| | | | | | |
|---|---|---|---|---|---|
| 2. Provide information for visitors. | Heritage architect | Leaflets | Information center | Starting end of 2004 | Any cultural center could be temporary used as an information center until a proper center is established |
| | Community | | | | |
| 3. Create glass museum to inform about historical and traditional handicraft of Sarafand. | Municipality | Architectural plan | Construction or renovation of old dwelling | Starting mid-2004 | Refer to recommendations of CAMP report on cultural heritage |
| | Directorate of Antiquities | Management plan | Selection of a strategic location | | |
| | Ministry of Tourism | | Funding sources | | |
| | Glass factory owners | | | | |
| | Cultural heritage expert | | | | |
| | Donors | | | | |
| **Strategic objective** | **3. DEVELOPMENT OF ALTERNATIVE TOURISM AS A SUSTAINABLE ECONOMIC USE OF COASTAL RESOURCES.** | | | | |
| **Output** | **3.1 Protection of remaining agricultural land and beach area.** | | | | |
| **Activities** | **Resources needed** | | | **Timeline** | **Remarks** |
| | **Human** | **Information/Training** | **Logistics** | | |
| 1. Protect all agricultural land from any constructions. | Municipality | Land use plan for Sarafand | Signpost of "areas under protection" | On-going | |
| | Ministry of Environment | | | | |
| | DGUP | | | | |
| | Ministry of agriculture | | Municipal violation ticket | | |
| | Private land-owners | | | | |
| 2. Promote cycling as alternative tourism on agricultural access roads. | Municipality | Cycling map | Signposts | Summer 2004 | Spring, summer |
| | NGOs | Awareness campaigns | Media coverage | | |
| | Ministry of Tourism | Private sector involvement | Entrance fees | | |
| 3. Protect any remaining stretch of beach and agricultural land close to the beach. | Municipality | Land use plan for Sarafand | Municipal violation ticket | Continuous | Support of political decision makers |
| | Ministry of Environment | Public beach regulations | Signposts | | |

| | | | | | |
|---|---|---|---|---|---|
| | Ministry of Public Works<br>Maritime Guards | Awareness campaigns | | | |
| **Output** | **3.2 Improving scenic areas in Sarafand to promote tourism.** | | | | |
| **Activities** | **Resources needed**<br>**Human** | **Information/Training** | **Logistics** | **Timeline** | **Remarks** |
| 1. Manage land use between agricultural plain and highway (specify appropriate use, number of floors in buildings etc) to limit sight pollution. | Municipality<br>DGUP<br>Urban planner<br>Local committee for urban management | Land use plan for Sarafand<br>Ecological criteria<br>Landscape management plan | Municipal violation tickets | Mid-2004 | On-going |
| 2. Involve all tour operators, and environmental NGOs to market for alternative tourism in Sarafand. | Municipality<br>Ministry of Tourism<br>Alternative tourism expert<br>Tour operators<br>Environmental NGOs<br>Community activists | Alternative tourism possibilities<br>Media campaigns<br>Awareness campaigns | Signposts<br>Media coverage<br>Incentives to encourage alternative tourism<br>Leaflets and signs | Starting mid-2004 | Provided proper land-use management schemes are adopted and implemented |
| **Strategic objective** | **4. WATER RESOURCE MANAGEMENT.** | | | | |
| **Output** | **4.1 Improvement in monitoring capacities.** | | | | |
| **Activities** | **Resources needed**<br>**Human** | **Information/Training** | **Logistics** | **Timeline** | **Remarks** |
| 1. Municipality to monitor household consumption by installing a water meter on main lines and household connectors. | Municipality<br>Community<br>Al Tasseh Spring Water Authority | Number of households<br>Main lines<br>Sample tracking file | $300/ metre device, $500,000 for overall Sarafand (devices from Al Tasa Spring Water Authority | Continuous | Refer to CAMP report on IWRM. |

| | | | | | |
|---|---|---|---|---|---|
| | | | Monthly cost of samples LL 105,000 | | |
| 2. Municipality to monitor quality of surface water, paying attention to bacterial and agricultural pollution, and salt water intrusion by monitoring the following: | Municipality<br>Laboratories<br>Local committee on health | Train one municipal worker how to take samples.<br>Sample tracking file | | Continuous | Refer to CAMP report on IWRM |
| a) Samples from Ain Hama Springs, Ain Qantra and Ain Al Dinan (coliform). | | Sample test | LL 15,000/sample | On-going | once every month |
| b) Samples from Ain Antara and irrigation well (Nitrate). | | Sample test | LL15,000/sample | On-going | once every month |
| c) Municipal well (coliform, solid waste). | | Sample test | LL 30,000/sample | On-going | once every month |
| 3. Municipality to monitor illegal use of private wells and promote centralised system for household water consumption and irrigation. | Municipality<br>Water Authority | Updated list of wells in Sarafand | Annual inspections | Continuous | once every year |
| **Output** | **4.2 Protection of water quality.** | | | | |
| **Activities** | **Resources needed**<br>**Human** | **Information/Training** | **Logistics** | **Timeline** | **Remarks** |
| 1. Prevent waste water pollution by: | Municipality | | | | On-going |
| a) Halting pollution of Abou Al Dinan Spring - stopping consumption from Spring until pollution sources are identified. | Ministry of Public Works<br>Donors<br>Engineers | Lab tests | Municipal monitoring and surveillance | Continuous | |
| b) Providing alternative source for community. | Ministry of Public Works<br>Donors<br>Municipality<br>Council of the South | Water sources in the area | | As soon as possible | |
| c) Diverting sewage of Sarasir neighborhood that pollutes the Spring. | Ministry of Public Works<br>Donors<br>Council of the South<br>Municipality | Environmental Impact Assessment (EIA) | Field study | As soon as possible | |

| | | | | | |
|---|---|---|---|---|---|
| | | | Funding | | |
| d) Building a solid waste treatment plant linked to waste water treatment. | Ministry of Public Works<br>Donors<br>Council of the South<br>Municipality | Environmental Impact Assessment (EIA) | Proper location | Jun-Nov-04 | |
| 2. Municipality to promote alternatives to agricultural management with regards to use of fertilizers and chemicals through agricultural information center. | Municipality<br>Ministry of Agriculture<br>Ministry of Environment<br>Farmers Cooperative | Adequate training<br>Assistance programme to farmers | Community workshops<br>Agricultural center<br>Financial assistance | Mar-Sep04 | On-going |
| 3. Municipality to control pumping from underground water to prevent deterioration of water quality. | Municipality<br>Local community<br>Water experts | List of private wells<br>Water lab tests | Regular inspections | Continuous | |
| 4. Municipality to coordinate with Water Authority in order to operationalise central water system, given that water network system is available. | Municipality<br>Water Authority | Adequate training on how to maintain the system | Regular meetings | Jan-Mar04 | |
| **Output** | **4.3 Prevention and resolution of conflicts over water resources.** | | | | |
| **Activities** | **Resources needed**<br>**Human** | **Information/Training** | **Logistics** | **Timeline** | **Remarks** |
| 1. Resolve conflict between Al Tasseh Spring and local community of Sarafand over lack of quality water and higher prices by: | Municipality<br>Al Tasseh Spring Authority<br>Local community | Options for better management | Regular meetings | Jan-Feb04 | |
| a) Providing quality water to households. | | Short seminars on water resource management | Continuous water quality analysis | Continuous | |
| b) Protecting underground aquifers and preventing use of private wells. | | Water quality inspection | Regular inspections | Continuous | |
| c) Putting in place a pricing system to control consumption either through municipality grant to pay off Authority services while collecting local taxes, or putting up system for privatisation. | Economist<br>Ministry of Finance<br>Municipality<br>Water expert | Pricing mechanisms or systems (where available) | Government approval | As of end 2004 | |
| 2. Establish committee to improve communication with Litani Water Authority to provide quality and sufficient quantities of water to local farmers. | Municipality | Amounts currently disbursed | Regular meetings | Jan-Feb04 | |

| | | | | | |
|---|---|---|---|---|---|
| | Litani Water Authority | Samples of water quality | | | |
| | Local Sarafand farmers | | | | |
| **Output** | **4.4 Participation of local community in water resources awareness and conservation.** | | | | |
| **Activities** | **Resources needed** | | | **Timeline** | **Remarks** |
| | **Human** | **Information/Training** | **Logistics** | | |
| 1. Awareness rising about importance of installing water meters to monitor consumption and waste. | Local Committee established during CAMP.<br>Non governmental organizations<br>Municipality<br>Water expert | Awareness raising material | Meetings/workshops | Continuous | CAMP IWRM Reports |
| 2. Awareness raising about ways to preserve water. | Local Committee established during CAMP. | Awareness raising material | Meetings/workshops | Continuous | |
| 3. Awareness raising in schools. | Local Committee established during CAMP. | Awareness raising material | Meetings/workshops | School periods | on-going |
| 4. Follow up on monitoring of quality and work on diverting wastewater from Abou Al Dinan Spring. | Local Committee established during CAMP.<br>Municipality<br>Ministry of Energy & Water<br>CDR<br>Council of the South | Current status and possibilities | Meetings | On-going | |
| 5. Encourage setting up of agricultural information center for training on use of fertilizers and other environmental considerations. | Local Committee established during CAMP.<br>Municipality<br>Farmers<br>Ministry of Environment<br>Ministry of Agriculture<br>Donors | Awareness raising material | Low-cost center | Mar-Sep04 | |
| 6. Encourage protection of environment in general. | Local Committee established during CAMP. | Awareness raising material | Meetings/workshops | On-going | |

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| | | | Meetings/workshops | | |
| 7. Coordinate with municipality to resolve disputes on water related issues and environmental protection. | Local Committee established during CAMP. | Details of existing disputes | | On-going | |
| | Municipality<br>Community | | | | |
| **Strategic objective** | **5. SOCIO-ECONOMIC DEVELOPMENT.** | | | | |
| **Output** | **5.1 Effective land use management for sustainable economic and ecological benefits.** | | | | |
| **Activities** | **Resources needed** | | | **Timeline** | **Remarks** |
| | **Human** | **Information/Training** | **Logistics** | | |
| 1. Work on land use plan that protects agricultural land east of coastal road and keep links between pieces of agricultural lands. | Municipality<br>DGUP<br>Land use planner | Land use plan | Municipal violation ticket<br>Deconstruction work | On-going | |
| 2. Shift residents of illegal housing on beach to municipal land and demolish illegal constructions. | Municipality<br>Ministry of Public Transport<br>Public property lawyer | Land use plan<br>List of illegal houses<br>Number and composition of families | Alternative housing | Mid to end 2004 | |
| 3. Specify area between old village and highway for urban growth and limit growth to that area. | Municipality<br>DGUP<br>Land use planner<br>Consulting firm | Land use plan | Municipal license | Feb. 2004 | Refer to CAMP report on land-use management |
| 4. Limit industrial activities to highway area north of coastal road only. | Municipality<br>DGUP<br>Land use planner<br>Ministry of Environment<br>Consulting firm | Land use plan | Alternative industrial zones<br>Municipal license | Jan. 2004 | Refer to ministries decisions regarding industrial plots organization |

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| 5. Stop issuing permits for construction before land use plan is officially put in place. | Municipality | Land use plan | | Jan. 2004 | On-going |
| | Land use planner | | | | |
| 6. Encourage domestic waste re-use, sorting and recycling as part of integrated waste management and provision of economic returns. | Municipality | Continuous awareness raising | Land for waste sorting | Continuous | |
| | Local committee on solid waste management | Informative sessions about solid waste management | Municipal trucks | | |
| | Solid waste experts | Media coverage | Waste collection | | |
| **Output** | **5.2 Sustainable economic use of natural resources.** | | | | |
| **Activities** | **Resources needed** | | | | **Remarks** |
| | **Human** | **Information/Training** | **Logistics** | **Timeline** | |
| 1. Declare beach as touristic area and limit residential permits. | Municipality | Land use plan | Coordination and approval from concerned institutions | Mar04 | Media coverage |
| | Local communities | | Signs | | |
| | Ministry of Public Works | | Guards | | |
| | Ministry of Tourism | | Awareness campaigns | | |
| 2. Community to advocate for right of public use of beach for rest and relaxation. | Local community | Environmental law on beaches | Awareness sessions and seminars | | |
| | NGOs | | | | |
| | Municipality | | | Continuous | |
| **Output** | **5.3 Better management of municipal tax collection.** | | | | |
| **Activities** | **Resources needed** | | | | **Remarks** |
| | **Human** | **Information/Training** | **Logistics** | **Timeline** | |
| 1. Municipality to carry out census on residents and their occupations using technological data entries and analysis. | Municipality | Number of residents and jobs | Household visits | Feb-Mar04 | |
| | Community volunteers | Number of houses (2004) | Computer devices | | |
| | | | Software | | |

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| | | | Municipal violation ticket | | |
| 2. Municipality to take necessary actions against tax violator's especially big touristic projects. | Municipality | Amounts due by each household | Training staff for data entry and updating | Mar-Dec04 | Continuous |
| **Strategic objective** | **6. LOCAL PARTICIPATION IN COMMUNITY DEVELOPMENT.** | | | | |
| **Output** | **6.1 Participation of men, women and youth in community priority setting and initiatives.** | | | | |
| **Activities** | **Resources needed** | | | **Timeline** | **Remarks** |
| | **Human** | **Information/Training** | **Logistics** | | |
| 1. Involve members of the community in priority setting for community development through local group formations, meetings with NGOs and active members in the community. | Municipality<br>Local community members<br>NGOs<br>Community experts | Draft of municipal priorities<br>Recommendations of CAMP project | Community meetings | Jan-04 | Continuous |
| 2. Support local groups and individuals in taking up community initiatives and joint activities with municipality and other NGOs. | Municipality<br>Local community members<br>NGOs | Municipal action plan<br>Information on similar initiatives | | Jan-04 | |
| 3. Support implementation of project ideas identified by youth group: completing recycling project, tackling wastewater and creating public green spaces. | Municipality<br>Local community members<br>NGOs<br>Cultural Heritage experts<br>Eco-tourism experts | Local group written plan<br>Detailed plan of activities, budget and partners | Resources needed for implementing activities<br>Media<br>Fundraising | May-Oct 04 | |
| **Output** | **6.2 Municipal members are supported through training, information sharing and networks.** | | | | |
| **Activities** | **Resources needed** | | | | **Remarks** |

| | Human | Information/Training | Logistics | Timeline | |
|---|---|---|---|---|---|
| 1. Ministries, NGOs and experts to support municipal members in municipal action planning, fundraising, documentation and mobilizing community members for local development. | Municipality<br>Community development experts | Skill needs identification<br>Municipal development resources | Training workshops | Continuous | Refer to Local Agenda principles |
| 2. Municipal members to participate in relevant workshops with other municipalities and to select model projects or activities for implementation locally. | Municipality<br>NGOs<br>Municipality Unions | Lessons learnt from other municipalities. | Exploration visits<br>Experience sharing meetings<br>Selection criteria | Mar-Nov<br>End of 2004 | On-going<br>List of priority set during CAMPs |
| **Strategic objective** | **7. LOCAL SUSTAINABILITY INDICATORS DEVELOPED AND MONITORED.** | | | | |
| **Output** | **7.1 Local sustainability indicators in CAMP project monitored and reflected in municipal action plan.** | | | | |
| **Activities** | **Resources needed** Human | Information/Training | Logistics | Timeline | Remarks |
| 1. Municipality to set annual plan to monitor list of indicators identified through CAMP. | Municipality<br>Local community members<br>Thematic experts<br>Laboratories<br>University students | Draft of municipal priorities<br>Recommendations of CAMP project | Community meetings<br>Preparation and verification of set indicators | Continuous | |
| 2. Annual review of indicators and historical data collected. | Municipality<br>Thematic experts<br>Related ministries | List of sustainability indicators<br>Recent references and documentations | Monitoring tracking file | On-going | Check intervals for monitoring in list |
| 3. Municipality to integrate SPSA indicators in its annual municipal action plan and to regularly review indicators in light of new developments. | Municipality<br>Thematic experts<br>Related ministries<br>Universities | List of SPSA indicators<br>Municipal action plan<br>Historical data of indicators | | On-going | |

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| | Local community | | | | |
| **Output** | **7.2 Advocacy and media plans around sustainability indicators implemented for positive change.** | | | | |
| **Activities** | **Resources needed** | | | **Timeline** | **Remarks** |
| | **Human** | **Information/Training** | **Logistics** | | |
| 1. Municipality to carry out advocacy plan with related ministries and authorities. | Municipality | advocacy action plan | Planned meetings and pressure group sessions | On-going | Review dates of plan |
| | Thematic experts | | | | |
| | Related ministries | | | | |
| 2. Involve media in shedding light on priority indicators and strategies to promote positive change at local coastal levels. | Municipality | advocacy action plan | Press releases | On-going | Review dates of plan |
| | Thematic experts | Current historical data | TV programmes | | |
| | Related ministries | | | | |
| | Media | | | | |