

**Economics and Sustainable Use of  
Samadai Reef "Dolphin House "  
,Marsa Alam, Red Sea, Egypt.**



## Economics and Sustainable Use of Samadai Reef “Dolphin House “ Marsa Alam, Red Sea, Egypt.

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### Abstract

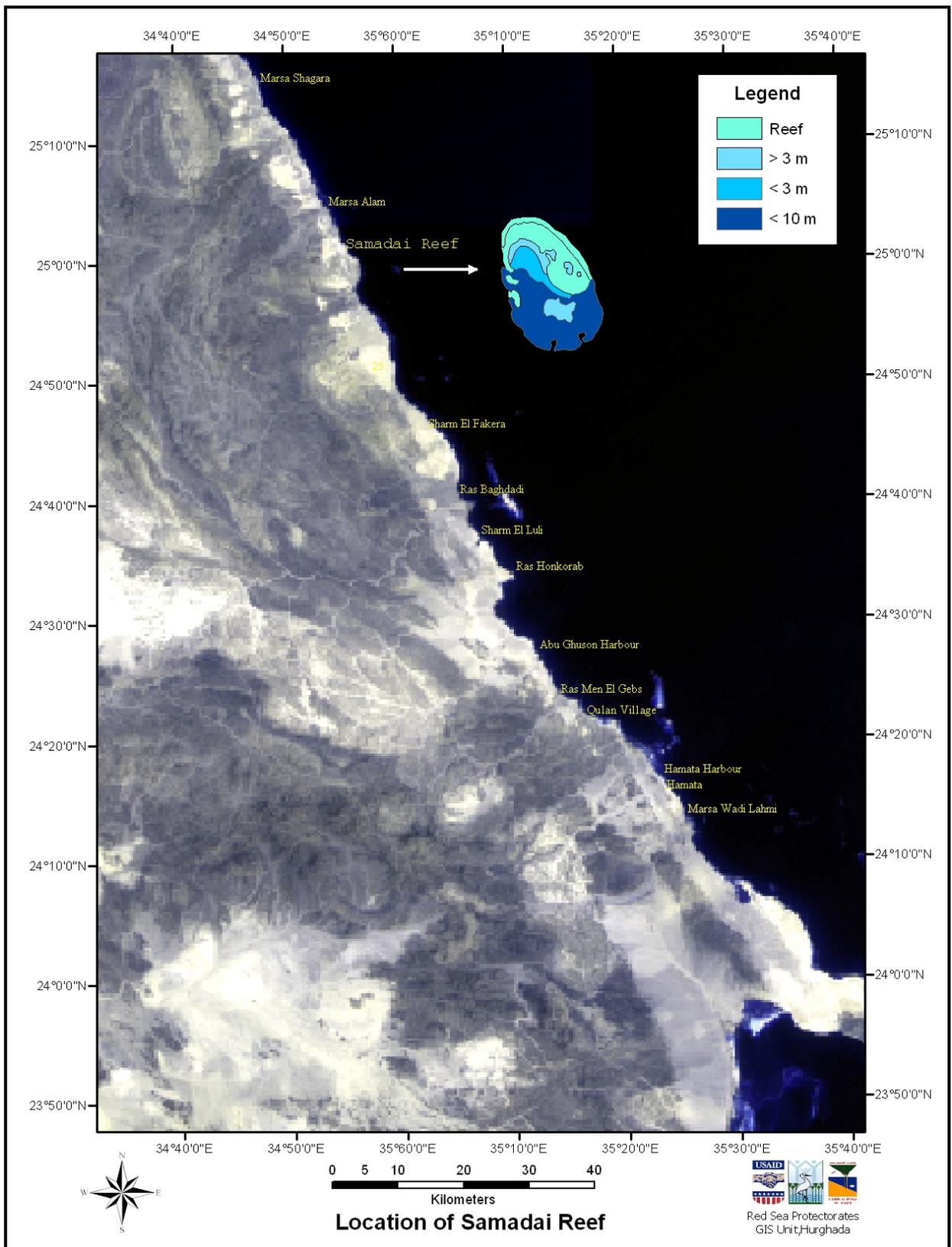
An experimental, precautionary management scheme is being implemented during 2004 at a very small place called Samadai Reef “Dolphin House”, Red Sea, Egypt. The management goal is to ensure the indefinite future enjoyment of the Red Sea biodiversity for the benefit of local community in a sustainable fashion. The described successful effort is a pioneer experiment opening the way to the development of an innovative approach to eco-tourism, with a potential of generating over one US\$ million of direct government revenues every year, and much greater revenues for the local tourism industry. The management of Samadai provides a strong case for the conservation of marine biodiversity in Egypt and elsewhere.

### Introduction

The Red Sea is one of the most important repositories of the marine biodiversity in the world. These marine resources, particularly coral reefs, have attracted the attention of tourists, hence touristy activities become predominate along the coast of the Egyptian Red Sea. Thus, tourism have grown considerably in recent years, contributing significantly to the Egyptian economy (about 10% of GDP and 4% of total employment , Knight 2003).

Species of large, charismatic marine vertebrates are today particularly attractive for tourists. The waters of the Red Sea support populations for many species of marine mammals (about 15 species of dolphins and whales, and one dugong species). Spinner dolphins *Stenella longirostris* attracted the attention of tourists during the last few years along the southern Egyptian Red Sea coast, not far from Marsa Alam City, in a place known as Samadai Reef.(Figure 1 )

**Figure 1 :**



Dolphins are known to occupy during day time hours the sheltered reefs of Samadai for their resting needs, hence the place is called Samadai Reef “Dolphin House”. This

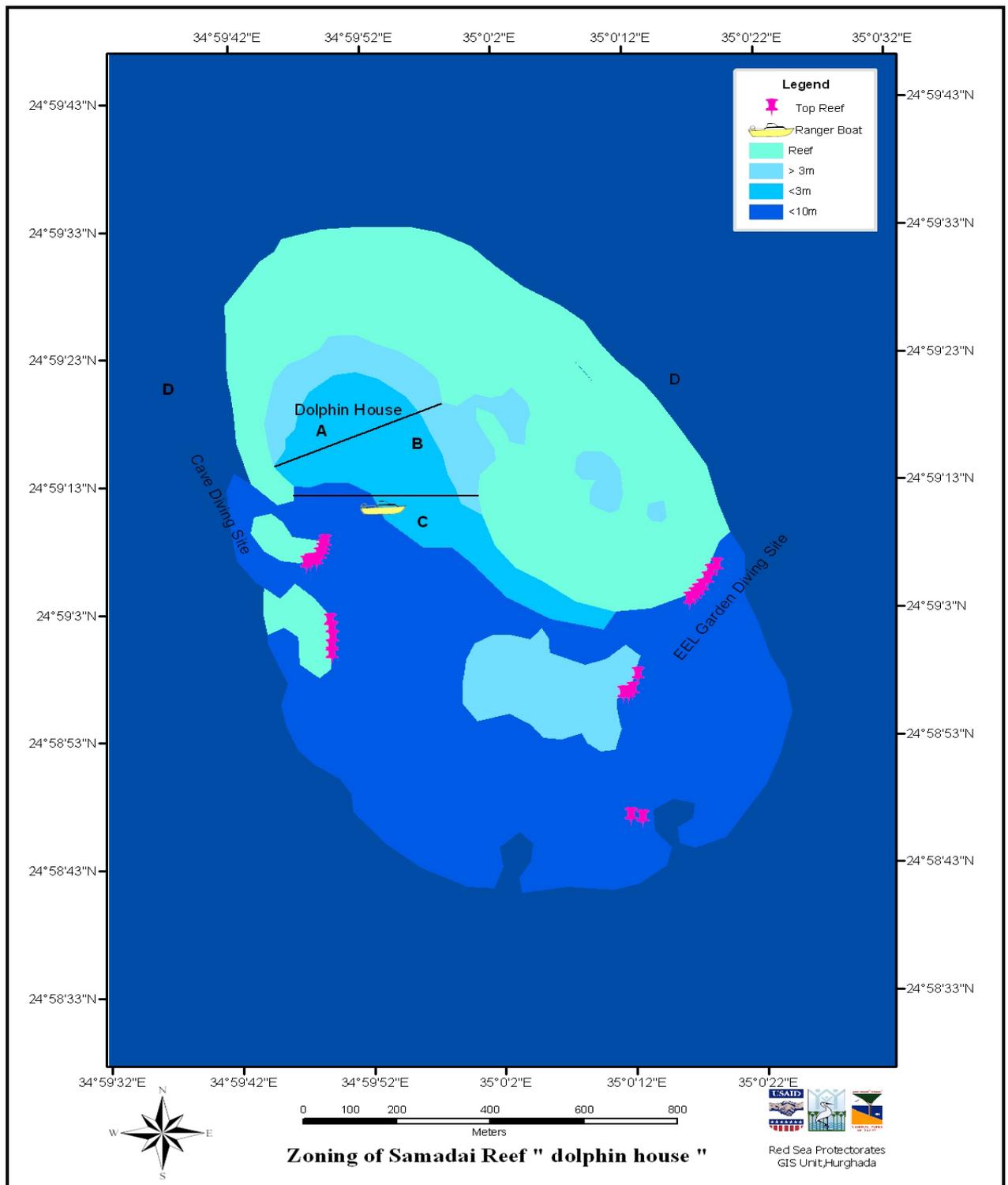
species of dolphins are known as a nocturnal animal, where they feed during night time.

During 2002 arrangements were made with local stakeholders to manage the Samadai Reef "Dolphin House" on behalf of Nature Conservation Sector (NCS) of the Egyptian Environmental Affairs Agency. In return, moorings were installed by NCS for "Dolphin House" and a simple management scheme was implemented where a maximum of 10 boats and 100-150 visitors were allowed to visit the site daily. Within one year, the fame of Samadai dolphins has attracted day tourist from as north as the Hurghada city, with several buses bringing hundreds of people daily to Samadai Dolphin House in addition to Marsa Alam tourists. Most of tourists have no diving expertise but with little snorkeling capabilities. Tourist activities resulted in pressures on dolphin, leading to reducing their numbers dramatically over one year period (Red Sea Marine Parks Monitoring Unit).

To resolve the conflict between the natural resources of Samadai Reef "Dolphin House" and the socioeconomic aspects, a decision was adopted by the local authorities in summer 2003 to suspend all visits to Samadai until a management scheme is in place. A management plan was prepared, in consultation with different stakeholders, approved by authorities and implemented in January 2004. The following described successful joint efforts by many individuals, organizations and stakeholders is a pioneer experiment opening the way to the development of a new approach to eco-tourism.

The site management plan focused on ; (1) implementing a zoning plan for the sheltered area "dolphin house "to create a restricted zone (A) for the exclusive use of the dolphins, zone (B) for snorkeling activities, zone (c) boat mooring zone, zone(d) diving sites(figure 2); (2) establishing a best practice guidelines; (3) implement a proper monitoring program; (4) restricting the day time use for visitors (10:00 am - 2:00 pm ); (5) implement a service fee system; (6) strengthen law enforcement process; (7) implement a public awareness program.

**Figure (2)**



**Samadai Zoning**

- Zone (A) for the exclusive use of the dolphins
- Zone (B) for snorkeling and diving activities
- Zone (C) boat mooring zone
- Zone (D) diving sites

## Tourism at Red Sea Governorate (RSG)

Red Sea Governorate is one of the most nature-based places in Egypt, by its magnificent landscapes, special marine life, terrestrial sites, culture sites, white sand beaches, great underwater world with coral reefs, marine mammals and sea grasses. RSG annually attracts around 27 % of Egypt's total number of tourists.(table 1 )

	2001	2002
Tourist arrivals - Egypt	4,648,500	5,008,680
Foreign visitors to Red Sea Gov	1,200,273	1,400,000
Red Sea Gov share	26 %	28 %

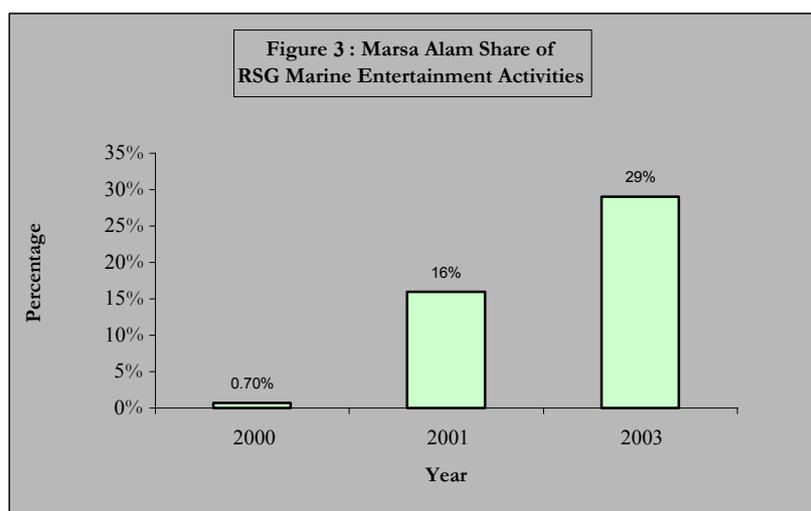
Data Source : Manuel Knight , Economic profile of Red Sea Tourism and dive industry , Jan 2003

RSG tourism industry depends mostly on entertainment marine activities (diving and snorkeling). The number of divers and snorkelers rose from 845577 in 2000 to reach 1031083 in 2003 ( Table 2 ).

Marsa Alam is a very promising tourism attraction .Tourism in the area of Marsa Alam is rapidly developing, with a large number of new hotels and resorts being built along its coast. The predominant attraction for Marsa Alam tourists is the Red Sea, with its largely intact reefs and associated marine fauna. However, diving locations are not very numerous along this stretch of coastline, and Samadai is by far the most attractive of them, not only because it offers at least three good diving sites, but also for its remarkable snorkeling opportunities. Marsa Alam share of total RSG divers and snorkelers is growing up year by year. It was 0.7 % during 2000, rose to 16 % , during 2001, and jumped to 29 % during 2003 ( table 2 , figure 3 ).

City	Activity / Year	2000	2001	2003
Hurghada	Divers	440,139	345,462	346715
	Snorkelers	231,514	204,647	300949
	Total #	671,653	550,109	647664
Safaga	Divers	136,760	97,616	96247
	Snorkelers	220	11,264	37750
	Total #	136980	108880	133997
Qusier	Divers	29,661	20,516	23124
	Snorkelers	1127	779	885
	Total #	30788	21295	24009
Marsa Alam	Divers	4,188	88,549	153647
	Snorkelers	1968	41618	71766
	Total #	6156	130167	225413
Total RSG ( Divers & Snorkelers )		845577	810451	1031083
Marsa Alam share of total RSG Entertainment Marine activities		0.7 %	16 %	29 %

Data Sources : 1. Amr Mostafa (2002) ,work assignment report , trench 2 , policy measure 2.2  
2. RSG Information Center



### Economics and Biodiversity Conservation

For a long time economists and conservationists found it difficult to speak the same language. However, during recent years, this situation has changed, as they have to realize that there is actually a great deal of mutual benefits to be gained from co-operating with each other. Biodiversity conservation goals have come to be recognized as an integral component of economic growth strategies, and economic approaches and tools are increasingly being used in support of biodiversity conservation.

Economics provide important set of methods and measures for biodiversity conservation. Perhaps most importantly, unless it makes demonstrable economic and financial sense for people to conserve biodiversity, it is unlikely that individuals, households, industries, companies or governments will take action to do so people will continue to degrade and deplete biodiversity in the course of their activities because they feel that it is more profitable and economically desirable to do so. Reflected in many of the provisions of the Convention of Biological Diversity, and in the Biodiversity Strategies and Action Plans prepared in response to it, economic tools are forming an increasingly important part of biodiversity planning and management processes. ( Emerton, 2001 )

At Samadai, one of the most important and effective economic tools has been used. Charging Samadai visitors a *service fee* was an effective economic tool managed to contribute revenues to the local economy, sustain tourism business through raising its quality and highlighting the economic value of Samadai to local agencies, stakeholders, tourists and general public.

### Integrating Policy into Biodiversity Conservation

During summer 2003 the human pressure inside Samadai reef peaked sharply ,reportedly with up to 500-800 swimmers in this small lagoon on a single day .Hordes of tourists are said to have been brought in the water, in close contact with the resting dolphins ,with little or no concern for safety aspects ,for the ecological uniqueness of the site, and for the need of respectful behavior in the presence of the mammals. Excess in swimmer density and the objectionable behavior of some within the “dolphin house” was seen to cause noticeable distress to the dolphins, who would try in vain to avoid being disturbed and to carry on with their normal resting and social activities.

It was largely thought that the situation must be brought under strict control as soon as possible if the continued presence of the dolphins in Samadai was to be ensured. Quite wisely, the decision was adopted by the governing authorities to suspend all visits to Samadai reef until a management scheme is in place. (Disciara, G. N, 2003, 2004 )

Based on Management recommendations, the Red Sea Governor issued the decree No.178 of 2003; "A daily service fee will be collected from Samadai Reef visitors, US\$ 15 per person per day on Motor /Yacht and US\$ 7 per person per day on Sail /Yacht . The fee is intended to manage the site, and the money will go directly to a special governmental fund which will be re-used again for the purpose of conservation. A limited number of tickets will be sold each day for environmental considerations (100 snorkelers - 100 divers). Entering Samadai Reef will be permitted only for ticket holders. Red Sea Marine Parks (RSMP) will be responsible for Samadai Reef management"

By releasing this decree, Red Sea Governor has actually solved the problem and put an end to RSMP concerns about the negative impact of the over use of the area . A management plan was prepared by RSMP, in consultation with different stakeholders, approved by authorities and implemented at the beginning of January 2004. The management plans involves: zoning; time limitation during the day; specific number of visitors and entrance fees; visits allowed only under control of trained and certified guides; adoption of a code of conduct; monitoring of the dolphins presence, use of the reef and behavior; training of guides and rangers; constant presence of enforcing agents; awareness and stakeholders involvement (Disciara, G. N, 2004)

Thus, Samadai experience has proven that policy was the key player in solving the conflict between tourism and biodiversity conservation.

### **Economic Profile of Samadai Reef**

Samadai Reef "dolphin house" has two main resources : dolphins and coral reefs .These resources have many economic values which can be linked to the local economy .In order to highlight economic profile for Samadai, the total economic values derived from Samadai and socio-economic assessment are presented as follow:

#### **Total economic value of Samadai Reef**

Samadai has a variety of values derived from its special resources . Direct use value derived from Samadai are recreation activities , tourism, research, education, conservation funds; social benefits ;employment and values derived from using Samadai resources for media purposes .Indirect use values are represented in ecosystem services, sediment control, coast protection and fishery support .Option values are the future use of direct and indirect values plus genetic resources and medicinal uses. Bequest values represented by Samadai express the use and non-use values for legacy . Existence values of Samadai are biodiversity, community values, spiritual values, culture and heritage. ( table 4 ). It is expected that these values will increase in the future .

Use Values			Non-Use Values	
Direct Use Value	Indirect Use Value	Option Value	Bequest Values	Existence Values
Recreation Tourism Research Education Conservation funds Social benefits Media	Ecosystem services Sediment control Coast protection Fishery support	Future uses ( direct - indirect ) Genetic Resources Medicinal	Use and non-use values for legacy	Biodiversity Community values Spiritual values Cultural heritage

### Socio-economic assessment of Samadai Reef

A *socioeconomic assessment* is a way to learn about the social, cultural, economic and political conditions of individuals, groups, communities and organizations. There is no fixed list of topics that are examined in a socioeconomic assessment. However, the most commonly identified topics are: resource use patterns, stakeholder characteristics, gender issues, stakeholder perceptions, organization and resource governance, traditional knowledge, community services and facilities, market attributes for extractive use, market attributes for non-extractive use, and non-market and non-use for non-extractive use, and non-market and non-use values. Socioeconomic assessments vary in the extent they cover these topics, and this will depend on the purpose of the assessment.

Marsa Alam city is a small city situated a long southern Red Sea coast with 2599 residents. Most of them depend totally on tourism to earn their living and the rest work at government agencies which also to support tourism activities at the city .

Marsa Alam city is a promising tourism market with its pristine natural recourses and beautiful landscapes .The main attraction for Marsa Alam tourists of the Red Sea with its beautiful white sand beaches , magnificent underwater world , coral reefs and dolphins .Tourism is increasingly developing with 20 hotel and 20 diving centers , These hotels provide 5155 beds and employing 2336 employee . During 2003, These hotel have received 550353 tourists, 41% of them were divers and snorklers. ( table 5 )

No. of diving centers	20
No. of hotels	20
No. of hotel beds	5155
No. of hotels employees	2336
No. of tourists	550353
No. of divers & snorkelers	225413
Samadai visitors	51000
Data Source: 1. Marsa Alam City Council , Tourism Department 2. RSMP	

Samadai reef attracted 9% of total Marsa Alam visitors ( 51000 visitor during 2003 ). Samadai ,with dolphins and coral reefs , has become the main site for many diving

centers at Marsa Alam. Thus it has become main source for income , investment and employment for many people at Marsa Alam.

There are many stakeholder beneficiaries from Samadai Reef , like tourists, tour operators ,general public, universities and schools, conservation agencies (RSMP, NGOs) and governmental agencies ( RSG , Marsa Alam City Council (MACC) , Red Sea Coast Guards (RSCG) ). Direct Benefits of tourists and general public are Diving , Snorkeling , Dolphin Watching and other Non-Use benefits while benefits of tour operators are tourism and non-use benefits . Universities and schools main benefits are research and education .Conservation agencies like RSMP,HEPCA and Abu Salama Society benefit from Samadai reef through employment ,conservation funds and revenues. Governmental Agencies will benefit also from Samadai as they get share of Samadai revenue . ( table 6 )

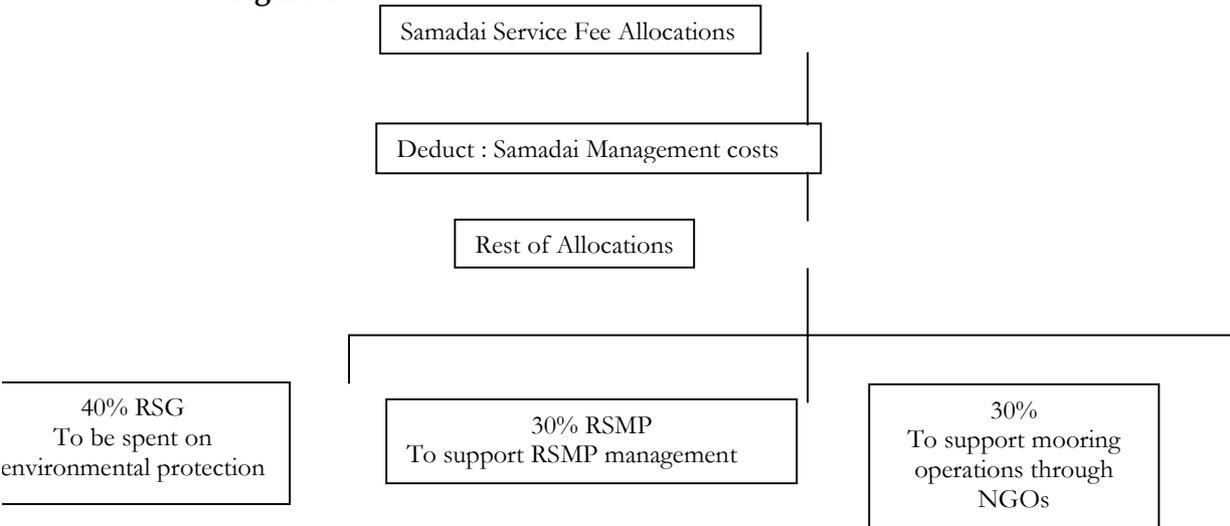
<b>Stakeholders</b>	<b>Direct Benefits</b>
Tourists	Diving , Snorkeling , Dolphin Watching , Non-Use Benefits
Tour Operators	Tourism , Non-Use Benefits
General Public	Diving , Snorkeling , Dolphin Watching
Universities & Schools	Research , Education
Conservation Agencies ( RSMP , NGOs )	Employment , Conservation Funds , Revenues
Governmental Agencies ( RSG , MACC,RSCG )	Revenues

### **Sustainable Financing**

Financing the conservation and sustainable use of biodiversity has been considered one of the greatest challenges. At the heart of this challenge lies the low financial and political value which are often assigned to biodiversity and the resulting lack of financial mechanisms for conservation and sustainable use. The biological diversity of the Red Sea is very high. This provides the region with a unique “comparative advantage”, including potential business opportunities based on the sustainable use of biodiversity. (Ricardo et al 2000)

Reaching sustainable financing in the Red Sea, is one of most important issues concerning the top management in responsible agencies. Charging service fee at Samadai was a right step towards this goal as an economic instrument (fee) to generate revenues to support high costs of biodiversity conservation by distributing revenue to three agencies ( RSG, RSMP and HEPCA ) working for biodiversity conservation in Red Sea Governorate ( figure 4) .

**Figure 4 :**

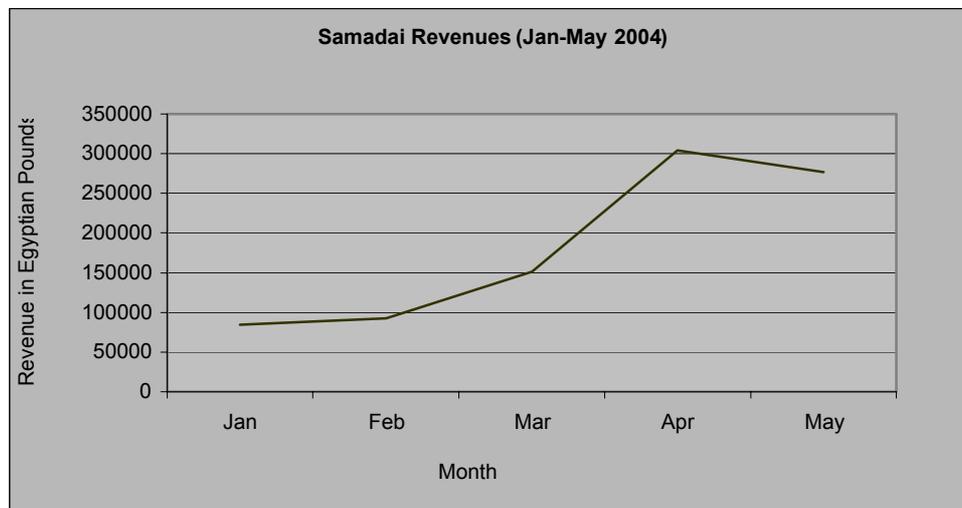


### Samadai Service Fee Program

Samadai Service Fee Program was approved in December 2003 and implemented in January 2004 to collect a service fee from Samadai. According to Samadai carrying capacity, the maximum number of daily entrance to service fee area is 200 visitor ( 100 snorkeling and 100 diving ) from 10:00 am to 2:00 pm .The program has been designed to adapt with the governor’s decree and Samadai management plan .

Revenues generated from the program is growing up month by month generating about 150,000 US\$ from January to May 2004 which is a great contribution to the local economy ( figure5 ). After the new arrangements at Samadai many diving and aqua centers will started to develop marketing programs specially for Samadai. This programs will make Samadai more famous and this will open the road for generating more revenues for tourism operators or even for Samadai management. It is expected that tiny Samadai Reef with its dolphin will generate over US\$ one million of direct government revenues every year, and much greater revenues for the local tourism industry.

**Figure 5 :**



## Samadai Management Effectiveness

In terms of effectiveness in relation to protected areas many authors stated that it is primarily concerned with measuring how well protected areas meet the objectives and goals for which they were established (Hockings *et al.* 2000; Izurieta 1997; Syms and Carr, 2000; WWF, 2001; Pomeroy *et al.* 2002; Roberts 2003). With scientific advice generally forming the basis behind the creation of the objectives and goals (Syms and Carr, 2000).

Specific management objectives to pursue Samadai management vision has been stated as follow :

- (a) To ensure the proper use of the site without affecting dolphin population or their habitat , based on precaution carrying capacity figure
- (b) To ensure sustainable use of the site as an important resource for the local economy

To examine how much Samadai management objectives has been reached, which will help to measure the effectiveness of the implementation of the management plan, some guidance indicators will be used as follow :

### 1. Human Impact

The human presence at Samadai to practice entertainment activities ,diving and snorkeling ,has been organized after implementing the management plan. That was by limiting the daily number of visitors to the area for a maximum number of 200 daily visitors .

A comparison between numbers of Samadai visitors before and after the implementation of the management plan, shows the decrease of the total monthly number of visitors after the implementation of the plan ( see table 6 ). This was a big step to reduce the negative human impact used to threaten dolphins.

It is also noticed that charging service fee attracted only the high quality and more educated visitors. Their behavior with dolphin is more proper than haw quality and poor visitors. This also may considered as a reducing factor for the level of impact.

Elements of the management plan ;open period ( 10 am - 2 pm ) , zoning, enforcement , education and awareness, were also keys of success; after being implemented, managed to reduce the negative human impact to the minimum level.

Month	Number of visitors	
	Before (2003)	After (2004)
January	3000	803
February	4200	879
March	2400	1450
April	2700	2893
May	3300	2634

Source : Samadai Management, Red Sea Marine Parks

## 2. Tourism Business

After gaining an international reputation as a very special place to snorkel and dive with dolphins, Samadai visitors has been rapidly increased. This increment opened the way to many tour operators; who don't have good reputation at local tourism business, to bring a law quality tourists, tourists who are not educated enough to respect environmental regulations. The involvement of these operators has affected daily trip price to be declined from US\$ 60-80 per visitor per trip to less than US\$ 10 per visitor per trip, which was going to destroy the whole business.

The situation has been changed after the implementation of the management plan. Charging service fee, implementation of strict environmental regulations and restricting access permissions to high quality diving/aqua centers only. All these conditions have filtered operating diving/aqua centers, only high quality ones survived.

Thus, the implementation of the management plan has resulted successfully in saving the local tourism business; tourism business at Marsa Alam , raising up the quality of tourism and contributing revenues to the local economy through service fee allocations.

## 3. Dolphin Abundance and Behavior

Before the implementation of the management plan, Samadai visitors were used to practice unacceptable behaviors, playing with dolphins, touches them, feeding them, causing a great change in their normal behavior.

Monitoring the dolphin population of Samadai shows a large increase in the population size after the implementation of the management plan. The overall means of the dolphin numbers increased from 32 dolphin sighted / day before to 78 dolphin sighted / day after the implementation of the management plan.(figure 6 )

In addition an obvious sign for normal dolphin behavior was observed after the implementation of the management plan. Zone (A) the core area seems to provide an exclusive dolphin use without any disturbance which may play very important role in the recovery processes of the dolphin population.

Figure 6 :

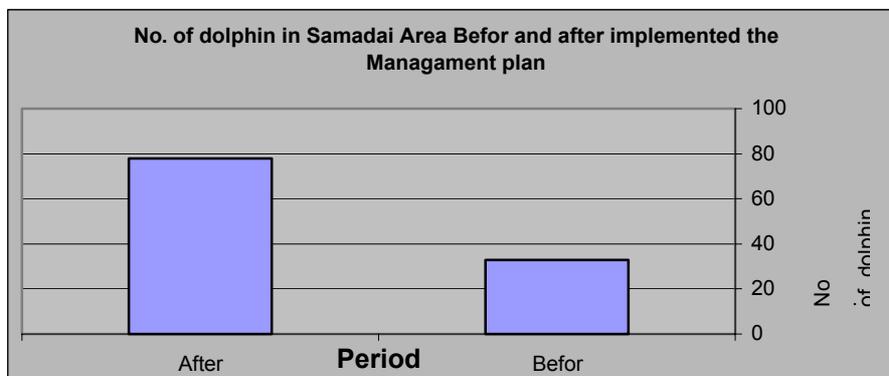


figure 6 shows number of sighted dolphins/day at Samadai Reef before implementing the management plan ( Jan- May 2003 ) and after implementing the management plan ( Jan- May 2004 )

Samadai management effectiveness has been examined by linking three indicators; human impact, tourism business and dolphin behavior to Samadai management objectives. The above analysis has shown that the management plan of Samadai has been designed and implemented very well. The management objectives have been successfully achieved. Human impact on dolphin has been reduced to the minimum level. The management plan implementation has supported tourism business and local economy. Dolphin behavior started to be normal again, and numbers have been increased.

## **Conclusion**

Samadai reef “Dolphin House” has proven to be an ideal model for applying policy to conserve a biodiversity and to reach sustainable finance for biodiversity conservation through revenue generation by using economic instrument ( service fee ). It demonstrates that protection of nature and development can co - exist, and provides a strong care for the conservation of marine biodiversity in Egypt and elsewhere.

## **Acknowledgments**

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