EXCELLENT PUBLISHERS

International Journal of Current Research and Academic Review

ISSN: 2347-3215 Volume 3 Number 1 (January-2015) pp. 74-84

www.ijcrar.com

The Role of Coral Reefs to develop Ecotourism using SWOT (Case Study of New Marine Coral Site of Chabahar Bay)

Mohammad Reza Alimoradi[1]*, Gholam Reza Miri[2] and Mahmoud Reza Anvari[3]

[1]Department of Geography and Tourism Planning, Islamic Azad, University Zahedan Branch, Zahedan, Iran
[2]Department of Geography, Islamic Azad University, Zahedan Branch, Zahedan, Iran
[3]Department of Geography, Islamic Azad University, Zahedan Branch, Zahedan, Iran
Corresponding author

KEYWORDS

Coral Reefs,
Ecotourism,
SWOT Model,
Chabahar Bay

A B S T R A C T

Coral reefs named rainy forests of sea are one of the richest forms biologically all over the world. In addition, they survive in the oceans for long times and they are one of the most beautiful places for tourism because of locating on the head of food chain of aquatics as its rank in 10% in International Tourism Industry. Annually, millions tourists visit these natural blessings and limpid waters but southern coasts of Iran especially Oman seashores can't absorb many tourist in spite of very beautiful views. This research that performed for the first time in Iran is an applied-analytic study. Then, after performing field study and exact recognition of new site of transferred corals from Developing Region of Shahid Beheshti jetty in Chabahar and polling Marine environment experts, findings have been analyzed by SPSS and SWOT. On the basis of these results, strength points and opportunities gain the highest point near to 4. Because of that "Aggressive Strategy" has been proposed. It can be used strength points and opportunities and resolved available weak points and threats optimally and introduced this site as a tourism target and stepped to develop ecotourism of Chabahar certainly.

Introduction

There is one of the richest biological types named Coral Reef in the oceans. This sensitive reef is categorized in marine Coelenterate and they have played important role in stability of ocean life in tropical regions and it has many advantages for the native (Lesser, 2004). In fact, coral reefs are the most various colonies all over the world. These ecosystems aren't extended but they form 25% of creatures in the seas and oceans. Coral Reefs are called rainy forests while they include 32 of 33animal categories in the world and tropical rainy forests host 9 animal categories (Birkland, 1996). More

than 91000 animal and herbal types live in these domiciles (Nybakken, 2000) and 35% of marine types are dependent to them to survive in low depth water of oceans while these coral reefs occupy small section (2% approximately) (Newell, 1971).

Oceanographers believe that there are more than 1 millions Coral Reefs that haven't been known till now. Discovering this type can be a key to access new scientific and medical findings and to control some fatal diseases such as HIV and Cancers. Coral Reefs have played important role in stability and steady of local communities. There are more than 80 developing countries that are dependent to Coral Reefs to provide the foods and earn economical outcomes (20% of world population provides the main foods by them) (Department of the Environment, 2009, Page 3-5).

$1km^2$ safe Coral Reefs produce 15tons/year foods that it is enough for 1000people. $1km^2$ Coral Reefs has valued equal to 47000$, each. It is the biggest Tourism Industry in the world that included 10% of total Tourism Industry with the natural views. Coral Reefs have also played important role to spend leisure time and entrepreneurship. These Coral Reefs produce goods and services valued 30milions$ and population (more than 1 milliards) are dependent to them (Munro and Williams, 1985).

History and Geographical Position of Studied Region

When navigation organization has taken actions to develop Chabahar Shahid Beheshti jetty, 5 hectares of the best coral ecosystems of the mentioned Platform led to stop development plan of Environmental Conservation Organization. Finally, the responsible have taken necessary actions to either develop south-eastern axis or conserve this valuable ecosystem. They made decision to transfer 30000 coral colonies to the new site around territorial waters of Chabahar (where is as the same conditions as the main domicile). Many costs have been expended to transfer the corals.

Unfortunately, people don't know the valuable ecosystem, then it hasn't play important role to spend leisure time. Therefore, all strength points and occasions should be considered and weak point and threats should be resolve to measure the abilities of theses ecosystems and to plan to meet necessary substructures along developing tourism.

Geographical Specifications of this Coral Region are as following:

North 25 19 24/7 West 60 36 49/5
South 25 19 4/6 East 60 37 15/5

Methodology

This research is an applied- analytic and field study. Regarding the main question" has Coral Ecosystem of Chabahar Bay played any role to spend tourists' leisure time and develop ecosystem?" this questionnaire has been designed on the basis of weak and strength points, occasions and threats and it distributed between 30 experts who are aware of marine environment of this region.

The complete questionnaire was analyzed by using Statistic Software, SPSS and Strategic Planning Model, SWOT. The necessary administrative strategic was determined and provided according to obtained final point.

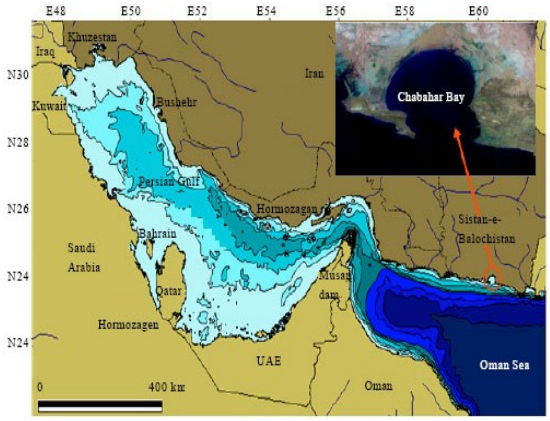


Fig.1 Chabahar Bay position

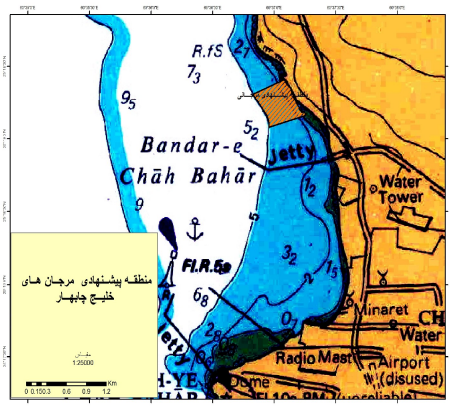


Fig.2 New coral site position

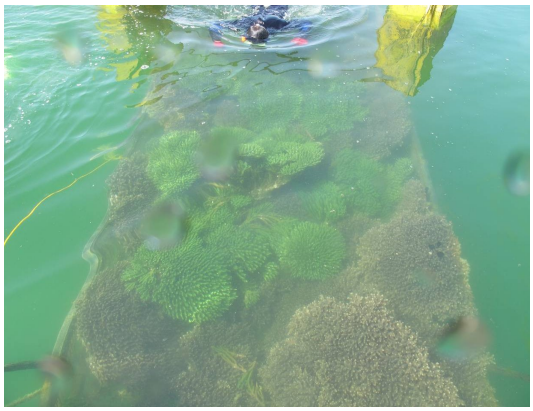


Fig.3 Coral relocation at studied region

Fig.4 Coral watch)

Hypothesizes

- Coral Ecosystem of Chabahar Bay can played important role to spend tourists' leisure time and develop ecosystem.
- Aggressive Strategy is the best strategy to plan new Coral site of Chabahar Bay strategically.

Discussion

Internal and external factors that affected on Coral Ecosystem as amusement place include strength and weak points, occasion and threats as following:

Strength points

- Appropriate Environmental position for coastal waters
- Diving Cottage near the site
- Hotel and accommodation near the site
- The importance of educational and research as a natural laboratory
- To be near to commercial centers of free region
- Importance as Gen Bank
- Availability of Shahid Kalantari jetty water cut in the south and decreasing density of waves
- Availability of coral measurement station of Environment Conservation Organization in a coast near to the coral site
- Availability of On line System and underwater Cameras in the coral site and transfer pictures of water

- Availability of health and services possibilities near to this region
- Desired weather and appropriate climate for cold seasons
- Variety biology of coexistent types with coral ecosystem
- Availability of urban services (water and power) in the coast
- Entrepreneurship

Weak points:

- Shortage of suitable spaces in the neighboring coast to develop substructures related to the coral site
- Land ownership the belonged to free region
- Precise Control of traffic tourists in the coast by security system
- Pollution of coastal waters by settling oil materials result from traffic and refueling commercial ships in Shahid Kalantari jetty at a distance of 1km from south of coral ecosystem
- Coastal Erosion at the time of rainfall and high waves at the time of hurricane
- Not educated and trained natives related to tourists

Opportunities:

- Entrepreneurship and establishing services unites related to tourism
- Increasing the natives' knowledge about environment and aid to biology
- More attention to plan and invest in ecotourism
- More motive to travel
- The prosperity of the available commercial center in free region and Chabahar via tourist
- Providing necessary infrastructure possibilities for marine biology researchers and students
- Possibilities of showing under water coral ecosystem on line to tourist who can't dive

Threats:

- Damaged coral colonies by the inexperienced divers
- Traffic of Motor boats and stress on coral colony as a result of sonic pollution
- Changing the natives' traditional culture by presenting tourists
- Proliferation of social crimes and violations against tourists in the region
- High density of population in sensitive coral region
- Presenting Fishing net and fishing hook in coral site to fish
- Visual pollution of coast and sea as a result of presenting not responsible tourists
- Increasing deposits on coral site because of coastal constructions in Chabahar Golf and disordering natural direction of ocean flows

When Internal and external factors was determined by Likert spectrum and each criterion got an especial value and coefficient. It is done by the questionnaire. The questionnaires have been distributed between 30 experts of Sistan and Balouchestan General Environment Conservation Organization and Marine Environmental Specialist. In this questionnaire, there are three general questions in addition to Internal and external factors that include amount of respondents' aware of Coral Ecosystem, new Coral site of Chabahar Bay and effect of these types on developing ecotourism. Finally, a questionnaire was measured by SPSS Cronbach's Alpha that 0.994 indicates that it is reliable.

Table.1 Reliability statistics

Cronbach's Alpha	N of Items
0.994	35

The results of general question or frequency of responds base on SPSS in the statistical society, 30 people, are as following:

Table.2 Statistical table

Statistics

		Aware of Coral Ecosystem	Place of Coral Ecosystem in Ecotourism	Aware of New Coral Site
N	Valid	30	30	30
	Missing	0	0	0

Table.2 Frequency of general questions "amount of aware of coral ecosystem"

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Little	4	13.3	13.3	13.3
	Average	9	30.0	30.0	43.3
	Much	11	36.7	36.7	80.0
	Very much	6	20.0	20.0	100.0
	Total	30	100.0	100.0	

Table.3 Frequency of this question: the role of coral ecosystem to develop ecotourism

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very little	1	3.3	3.3	3.3
	Average	1	3.3	3.3	6.7
	Much	10	33.3	33.3	40.0
	Very much	18	60.0	60.0	100.0
	Total	30	100.0	100.0	

Table.4 Frequency of the general question: "aware of new Coral Site"

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very little	1	3.3	3.3	3.3
	Little	5	16.7	16.7	20.0
	Average	12	40.0	40.0	60.0
	Much	6	20.0	20.0	80.0
	Very much	6	20.0	20.0	100.0
	Total	30	100.0	100.0	

Quality data is changed to quantity data to analyze and then it is valued for Likert Spectrum as fallow: Very much: 5 Much: 4 Average: 3 Little: 2 Very little: 1

In the stage, to determine the first coefficient of each factor, number of population who select each one of these options are multiple to the value of the same option in the Likert Spectrum that the final results are as following:

Table.5 Coefficient of strength and weak points, occasions and threats

Strength points	**The first Coefficient**	**The second Coefficient**	**Rank**	**The Final Coefficient**
Appropriate Environmental position for coastal waters	111	0.063	3	0.189
Diving Cottage near the site	123	0.070	4	0.280
Hotel and accommodation near the site	118	0.067	4	0.268
The importance of educational and research as a natural laboratory	134	0.076	4	0.228
To be near to commercial centers of free region	125	0.071	4	0.284
Importance as Gen Bank	141	0.079	3	0.239
Availability of Shahid Kalantari jetty water cut in the south and decreasing density of waves	109	0.062	1	0.062
Availability of coral measurement station of Environment Conservation Organization in a coast near to the coral site	133	0.075	4	0.296
Availability of On line System and underwater Cameras in the coral site and transfer pictures of water	140	0.079	4	0.316
Availability of health and services possibilities near to this	115	0.065	4	0.260

region				
Desired weather and appropriate climate for cold seasons	135	0.077	2	0.154
Variety biology of coexistent types with coral ecosystem	130	0.074	4	0.296
Availability of urban services (water and power) in the coast	125	0.071	4	0.284
Entrepreneurship	119	0.067	2	0.134
Total	1763	1		**3.30**

Weak points	**The first Coefficient**	**The second Coefficient**	**Rank**	**The Final Coefficient**
Shortage of suitable spaces in the neighboring coast to develop substructures related to the coral site	108	0.154	4	0.616
Land ownership the belonged to free region	120	0.172	3	0.516
Precise Control of traffic tourists in the coast by security system	101	0.145	1	0.145
Pollution of coastal waters by settling oil materials result from traffic and refueling commercial ships in Shahid Kalantari jetty at a distance of 1km from south of coral ecosystem	128	0.183	2	0.366
Coastal Erosion at the time of rainfall and high waves at the time of hurricane	114	0.163	2	0.326
Not educated and trained natives related to tourists	128	0.183	1	0.183
Total	699	1		**2.15**

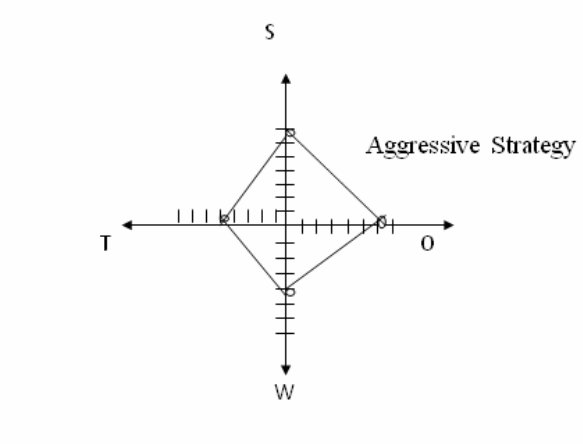
opportunities	**The first Coefficient**	**The second Coefficient**	**Rank**	**The Final Coefficient**
Entrepreneurship and establishing services unites related to tourism	132	0.143	3	0.429
Increasing the natives' knowledge about environment and aid to biology	131	0.142	4	0.568
More attention to plan and invest in ecotourism	132	0.143	3	0.429
More motive to travel	127	0.137	2	0.274
The prosperity of the available	129	0.140	2	0.280

commercial center in free region and Chabahar via tourist				
Providing necessary infrastructure possibilities for marine biology researchers and students	137	0.148	4	0.592
Possibilities of showing under water coral ecosystem on line to tourist who can't dive	136	0.147	4	0.588
Total	924	1		**3.16**

Threats	**The first Coefficient**	**The second Coefficient**	**Rank**	**The Final Coefficient**
Damaged coral colonies by the inexperienced divers	120	0.131	4	0.524
Traffic of Motor boats and stress on coral colony as a result of sonic pollution	127	0.139	3	0.417
Changing the natives' traditional culture by presenting tourists	100	0.109	1	0.109
Proliferation of social crimes and violations against tourists in the region	95	0.104	1	0.104
High density of population in sensitive coral region	109	0.119	2	0.238
Presenting Fishing net and fishing hook in coral site to fish	117	0.128	2	0.256
Visual pollution of coast and sea as a result of presenting not responsible tourists	112	0.123	2	0.246
Increasing deposits on coral site because of coastal constructions in Chabahar Golf and disordering natural direction of ocean flows	130	0.142	3	0.426
Total	910	1		**2.32**

Table.6 Matrix of internal and external factors

	Strength points (S)	**Weak points(W)**
opportunities (O)	Strategy SO: Strength points are used to utilize opportunities.	Strategy WO: Occasions are used to resolve Weak points.
Threats (T)	Strategy ST: Strength points are used to avoid threats.	Strategy WT: Weak points should be decreased and threats should be avoided.



These coefficients find which strategies and factors are more important and can be effective to develop our aim (the role of coral ecosystem to spend leisure time). The above- mentioned coefficients guide us to develop and reinforce that factor. Also, final coefficient of each system suggests which section of internal and external factors can affect more than other and the strategy should be directed to which direction and which strategy should be applied. As these coefficients show that the sections of strengths and occasions have the most coefficients.

If the final point is near to 4, the determined strategy will be very excellent. If the final point is near to 1, the determined strategy will be weak. Here, the determined strategy is near to excellent.

In this model, there are 4 strategies:

1. Maximum-Maximum Strategy: It is obtained by combining strength points and occasions.
2. Maximum-Minimum Strategy: It is obtained by combining strength points and threats.
3. Minimum-Maximum Strategy: It is obtained by combining weak points and occasions.
4. Minimum-Minimum Strategy: It is obtained by combining weak points and threats.

We combine the above- mentioned factors to decrease next weak points and threats by using strength points and occasions.

Now, we determine strategies in 4 separate sections by combining internal and external factors. A factor of strength points that is the most important and has high coefficient in the strength points is combined with a factor that is the most important in occasions to determine direction of Maximum-Maximum Strategy.

Maximum-Maximum Strategy (Strength Points and opportunities)

- Developing and equipping online measurement center and installing big monitors to display coral ecosystems of undersea to the tourist who can't dive to spend leisure time, education, research and to promote the people and researchers' biology
- Developing related services unites and establishing diving school to absorb tourists and entrepreneurship and flourishing free commercial regions
- Performing necessary electronic and internet substructures to flourish tourism, publicity and introducing this site to Iranian and foreign tourists.
- Holding specialty and scientific tourism tours and Photography Competitions under sea around coral regions for professional diving by cooperating Chabahar Free Commercial and Industrial Area Organization
- Marking and introducing coral regions as a conserved littoral regions or sea park

Maximum-Minimum Strategy (Weak Points and opportunities)

- Coordination of Environmental Conservation Organization and Chabahar Free Commercial and Industrial Area Organization to become free and leave a section of adjacent coast of site and also participating to develop substructures of tourism
- Coordination with Navigation Organization to supervise on refueling ships and boats of Shahid Kalantari Platform and transshipping legally in this platform to prevent oil pollution of site
- Optimizing the coast and channels led to the site and constructing effective defensive concrete wall under water to prevent coastal erosion and ruin the site when they clash with high waves result from hurricane
- Educating necessary tourism problems to local society along with coopering them with tourists who travel to this site

Minimum-Maximum Strategy (Threats and Strength Points)

- Educating diving to the beginner, planting the separate colonies adjacent to the main site and also installing one series of equipments such as polycarbonate visible tunnels, fixed platforms and ladder between coral rows to lean the beginners to these bases and less clash with coral colonies.
- Using canoes and preventing traffic of motor boat, jet-sky on the coral site by marine environmental guard and also prevent to record tow times-motor boats to decrease sonic pollution and stress on sensitive coral ecosystem
- Preventing netting and hunting fish in the coral regions and cleaning adjacent coasts and controlling divers to enter to this site
- Evaluating environmental studies before re-cultivation project in the sea to prevent any disorders in ocean flows.

Minimum-Minimum Strategy (Threats and Weak Points)

- Approving Coastal Management Organizations and performing this project to control all actions related to coast and sea and directing actions of different organizations in one direction
- Using sensitive coral ecosystem optimally and stably to decrease its limitations
- Participating the natives to invest and service- commercial actions related to coral site
- Organizing and investing in other costal villas to distribute population between various beautiful places.

Then, according to matrix of evaluating situation, we can determine one of general fourfold strategies (Aggressive, Competitive, Conservative and Defensive). Therefore, we use total coefficients of each section of internal and external factors and draw 4 result numbers in horizontal and vertical axis of coordinate system. If the drawn picture is incline to each side, it indicates position of general strategies of the considered site.
Strength points: 3.30
Weak points: 2.15
Occasions: 3.16
Threats: 2.32

Conclusion

Based upon the results from polling and strategic graph SWOT, our hypothesis no. 1 and 2 are accepted as following:

- 60% and 33.3% of respondents have selected "Very much" and "Much" Options, respectively and agreed that coral ecosystems have played role to spend leisure time and to develop ecotourism. 3.3% and the remaining 3.3% of respondents have selected "Average" and "Very Little" Options, respectively. Then, Hypothesis 1 will be accepted.

- Regarding the points that obtained by strength points and opportunities is near to 4 and strategy graph is trend to positive axis, Chabahar coral ecosystem strategies is near to "Aggressive Strategy". Then, we try to use strength points and opportunities very much and direct them to spend leisure times and develop tourism.

Appreciation

We offer our thanks to General Director of Sistan & Balouchestan General Environmental Conservation Organization, Engineer Afsari, to conserve and preserve coral ecosystem of Chabahar Golf and cooperate to study and research.

References

Birkland, C. 1996. Introduction to life and death of coral reefs. Chapman and Hills, New York. Pp. 78–90.

Department of the environment, 2009. Study on Density, Variety and Health determination of Corals Ecosystem of Chabahar Bay, Study Plan, Sistan & Balouchestan, 125 Pp

Lesser, M., 2004 Experimental biology of coral reef ecosystem. *J. Exp. Biol. Ecol.,* 300: 217–252.

Munro, J.L., Williams, D.M. 1985. Assessment and management of coral reef fisheries. *Proc. Fifth Coral Reef Cong.*, Vol. 4: 545–581.

Newell, ND. 1971. An outline history of tropical organic reefs. *Mus. Novit.,* 2465: 1–35.

Nybakken, J.W. 2000. Marine biology: an ecological approach. Addison, Wesely. 481 pp.