Case Study: Enviournmental Valuation of Gir National Park and Sanctuary

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Abstract

Here I evaluated recreational and socio-economic values of Gir national park. Travel Cost Method (TCM) was used for evaluation. Therefore, 89 questionnaires were distributed among the visitors. The results indicated that the variables such as travel time to the park, travel costs, age and education were effective variables in using the park. The results show that there is a significant relation between travel time and the number of visitors whereas by increasing travel time the number of visitors decreased. Furthermore, there is a significant relation between the number of visitors as a dependent variable and travel costs whereas when the travel cost increases, the number of visitors decreases. Results indicated that the willingness to pay decreased by increasing the entrance fee. The models estimated an average willingness to pay 337 Rs. per visit.

Introduction

In the beginning of 21st century, it is proved that the human welfare is closely related with the Q&Q (Quality and Quantity) of natural resources. All economic activities are impossible without the utilization of natural resources. Because of industrialization, natural resources are more and more utilized. In that renewable resources are backed from biological activities but non-renewable resources i.e. crude oil can't be produced.
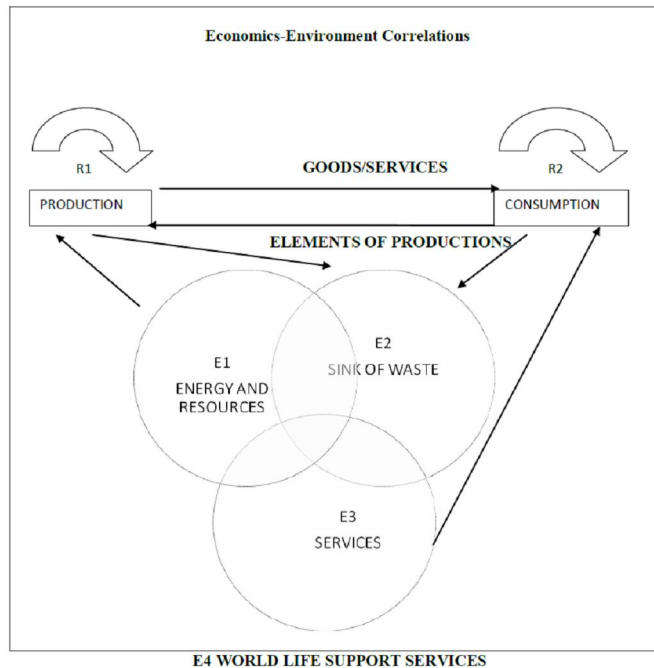
Initially natural resources are freely available goods. But in this era, terrific growth in the production activities has changed the natural resources and environmental quality from free to high income elasticity and low availability. Because of too much usage of natural resources, biodiversity is decreased and so problem for diverse species habitat and their conservation are created. And also all natural resources are time dependent, so supply of resources is affected by usage of resources at the same time. In addition, usage of non-renewable resources creates permanent decrease of its total supply. In present scenario, to make ease lifestyle of next generation through usage of natural resources, it is the prior necessity for proper natural resource management.

For best management, conservation and development of natural resources, Economics will play crucial role. But environmental goods and services or natural resources are the pure subjects of science, while economics is the social science. So, a correlation between two different disciplines must be understood.

Relation between Environment and Economics

Study of Environment was started from two different disciplines- science and engineering while, relation with Social sciences was established too late. Science and Engineering fields may correlate as medicinal parts of Environment, while Social sciences are curative parts of Environment. The integration between both the parts is necessary for conservation and management of environment.

Below mentioned figure, indicates correlation between Environment and Economics :

Reference: Environmental Economics in theory and practice: Nick Hanely Jason, Shergan and Ben White, Page 3

Role of environment in the economic activities describing this figure indicates that the Environment provides resources for economic activities (E1) and it acts as sink for the waste produce from production and consumption (E2). Till Environment has capacity to accept the waste, there are no environmental issues. But degradation of the waste produces pollutants. Some waste (R1 and R2) produced from production and consumption, can be reutilized but, they are in limited quantity. Quantity of waste above the limit of acceptance for the environment may create notable effect of pollution. The third role of the environment is to provide the environmental services (E3), and this role is started with the introduction of human beings in this world. But in the present scenario, this may be required to understand in concern with Economics. But in present situation, the supply of natural resources is not available in unlimited quantities and it creates the crises i.e. Kashmir, Forest of Gir, Kanyakumari, etc. such places provide pure air, water and atmosphere but the question is, how to evaluate them? Because the natural resources do not have market or market is failed for natural resources. There are some conditions for efficient work of market which may be fulfilled but these are not, because of the extraordinary criteria of natural resources.

Market failure for forest:

There are three conditions to make the market in dynamic form- 1. Perfect competition, 2. Declaration of wealth rights, 3. Absence of other impacts. But these are not fulfilled in concern with natural resources and environmental services.

Undefined property rights:

Well defined property rights contains following criteria-

1. Uniqueness:

Absence for rights of owner, other than of resources, has same or with competition for the same resources. In India, Government is the only owner for the forests since British rule. But, Maldharis have been habituated in the forests since a very long time in India and it is very important component of the ecosystem. Because of the sustainable management, such needful people have not been given property rights in the forests. Of course since 2006, this is given

but, it is not applied yet. So, even ownership of government for forests, Maldharis is using the forests for habitat and other requirements. And therfore in concern with forest uniqueness of property rights is not maintained.

2. Safety:

If any obstacles for resources or any political-economical unbalanced situation live, so that will be inefficient. Any illegal pressurization through other person, producer or government, there should be provision to clam for ownership. There should be no appreciation for proper management for productivity of resources and their increment due to unsafe property rights.
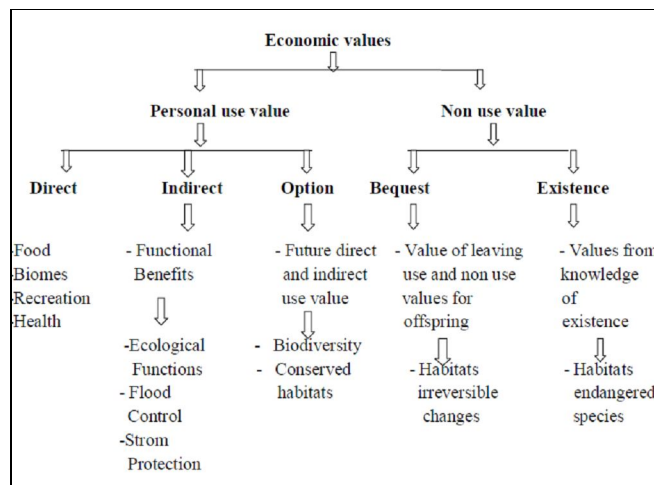
In concern with Gir, discussion with Maldharis, it has been cleared that they habitat in forest, till they can prohibit cattle grazing of surrounding villages. But after prohibition of habituation of Maldharis from sanctuary, cattle grazing are increased in forest. In this manner government is failed to protect the border of sanctuary. Even Maldharis are not interested for elimination of this pressure due to their restriction for forest ownership rights in the interior critical area and lake of encouragement.

3. Transferability

Resource should be hirable or tradable through personal transaction. Due to absence of these criteria, there is no encouragement for investment and protection of resources. The ownership for forest was unique since 2006. So there is no interest in protection for forest and therefore quality of forest decreased and along with that reduction of biodiversity can't be ignored, i.e. decrease in Tiger nos.

4. Enforcement

Property rights are important for maintenance and management of resources, and Ownership right should be implemented properly. That means, there punishment and find for disobey the ownership rights. Now, the government is the only the owner for forest, so they are available. But inefficiency and other aspects of government department, encouragement on the forest border, illegal cutting of timber & fire wood and poaching to some extent, illegal cattle-grazing and usage of byproducts of forest raised. Therefore property right can't be maintained very well.

With regarding above reasons and features, market is failed in determine the value for Gir national park and other natural resources. For the solution of above matter, environmental economists have developed various methods for valuation of environment. Before understanding for valuation of natural resources, various economic values need to be understood and which are described in below chart.

Various economic values are characterized based on their use. Even though we can not define resource based use value or nonuse value. i.e. forest has both values, use value and non use

value. In this way elimination of market failure for natural recourses, there are developed Environmental Valuation
Techniques.

These methods can be used as per various types of environmental resources. For example, CVM is mainly used for testing of effect on welfare through variation in environmental quality, recreation, wet land, and water and soil quality and forest and wildlife protection. Happiness - 6 - model is used mainly for determination of residential market while travel cost model is used for the determination of valuation of national park, recreational fishing places, beaches and forests etc. Because of the presence of Asiatic lions, the Gir forest of Gujarat state known for one of the famous tourism place worldwide. Here Travel cost method is used for recreational valuation of the Gir forest.

Travel Cost Method

This is one of the oldest methods in environmental valuation. *Hotelling* proposed the travel cost method in 1949. The method uses travel cost is proxy for the price of recreation. The logic of using travel cost as proxy originates from the rational behavior of the consumer. If a consumer purchases anything in the market, the cost of acquiring it should be equal to or less than the benefit. This applies to recreation as well. If the consumer visits a recreational site, although he does not pay a market determined price, the benefit he received should be less than or equal to the cost incurred. Because of that, one can use cost information as proxy for the price. So value of environmental services used for recreation can be determined by such cost calculation.

In this research, Travel Cost Method is applied for the Gir national park for determination of recreational demand and valuation of recreational services. Here, for valuation of the Gir national park, visitor's socio-economic status and their travel cost data are collected. From that recreational demand of the Gir established and consumer surplus achieved.

Step- 1

The first step for this research is to develop the Questioner for enough information collection. In that travel cost, length of the trip, amount of time spent at the site, person's income, other location visited during the same trip, other reasons for trip, etc are considered.

Step- 2

In the second step, information is collected through the questioner from foreign visitors and Indian visitors

Step- 3

In the third step, from the above collected information, wage rate is defined and from that value of travel time and multi location visitor's pure tourisms value of Gir is established.

Step- 4

In this step, Tourism information of visitors is calculated from socio-economic characterization and economic information analyzed through tables. - 7 -

Step-5

In this step, relation between number of visitor's visits, travel costs, and other related variables, is determined by regression analysis.

Step-6

In this step, demand function for visits of place is established from the result of regression analysis. From that recreational demand curve of the Gir is determined.

Step-7

In this step, consumer surplus is established by using recreational demand curve. From that total economic benefit of the Gir is proposed.

Objectives:

1. Valuation of the Gir national park for conservation of Asiatic lions and other endangered species.

2. Valuation of the Gir national park by travel Cost Method

3. To collect information about elements those, affects recreational demand of the Gir national park.

4. To know the difference between Indian demand and foreign demand for environmental services.

5. To collect the details for various national and international level studies for environmental valuation.

Site Selection

The Sasan Gir is the public forest, which is last habitat of the Asiatic lions. The Gir forest is one of the biggest and dense dried forest exist in the west of the country. The Gir national park which has rich biodiversity is the conservative forest for the endangered species including other species. In this forest there is huge number of non vegetarian animals. The gir is the most protective area - 8 -

for crocodiles and, has high population of them in the country. The Gir has diverse conservation value whose recreational demand periodically increased. Various troubles exist as tourism increased, because of inefficient management of the state Government.

Data Analysis

In this study, primary data is transferred from Micro Soft Excel to SPSS software version no. 15 for tabulation. The regression analysis is used to find out relation between various variables. Linear and log linear equations are used to calculate demand function of recreational demand. Consumer surplus is calculated by using integration.

Research Problems

1. Number of foreign tourist drastically decreased during the study because of the Mumbai terrorist attack.

2. The data of the tourist's monthly income is predictable.

Sample method

The sample size (number of questionnaires) is an important issue for proper and reliable estimating of the economic value of the site. The sample was selected using a random method. In order to determine the sample size is 90. Preliminary questionnaires were used.

Results

Descriptive results

Socio-economic characteristics Results of questionnaires indicated that Indian visitors came from Three State Gujarat, Maharashtra, Rajasthan and other. Details of population, number of visitors, percentage of visitors are shown in Table

Area of visitors

Number	Area of Visitors	Number of Visitors	Percent
1	Gujarat	64	69.9
2	Maharashtra	21	22.8
3	Rajasthan	3	3.3
4	Other	4	4.3
	Total	92	100

Most of visitors came from Gujarat, near to 70 percent this is show distance is most important factor in recreational demand. But second major part of tourist came from Maharashtra urban area. That means demand of eco-tourism is high in urban area.

Education level of visitors

The results of questionnaires show that most sample visitors (63%) studied at least Graduate. and Further more, 15 % of visitors have higher education. The details of education are shown in Table.

Education of visitors

Number	Education	Number of visitors	Percent
1	Secondary school	1	1.1
2	Higher secondary school	16	17.4
3	Graduation	58	63
4	Higher education	17	18
	Total	92	100

Occupation of sample visitors

The results of sample questionnaires show that 34.8% of the visitors have own business and other are show in table

Number	Occupation	Number of visitors	Percent
1	Governmental employee	23	25
2	Own business	32	34.8
3	Private job	30	32.3
4	Retired	6	6.5
5	Student	1	1.1
	Total	92	100

Monthly income of visitors

Income is most important factor in determination Recreational demand, this results of sample questionnaires show that 44 % of the visitors have 20,000 monthly income. When 15 % visitors have 40000 and above this table is show different level of income in visitors.

Monthly income of visitors

Number	Level of monthly income	Number of visitors	Percent
1	10,000 and below	7	7.6
2	10,001-20,000	41	44.6
3	20,001-30,000	21	22.9
4	30,001-40,000	9	9.8
5	40,000 and above	14	15.2
	Total	92	100

Type of vehicle for visit

Type of vehicle is most effective factor in tour cost. This table is show mostly visitors are used car (79.3)for gir visit and other are indicate in table

Number	Type of Vehicle	Number of visitors	Percent
1	Plane	2	2.2
2	Car	73	79.3
3	Bas	13	14.6
4	Train	7	8.3

Recreational Activity in Gir

Gir is home of Asiatic lion and gir is also have a rich biodiversity so mostly visitors are come for lion but gir is also have rich bird diversity. Many visitors are come for bird watching and many of tourist came for forest, this table is indicate different Recreational Activity.

Number	Activity	Main attraction	Other attraction
1	Lion watching	87	0
2	Bird watching	0	40
3	Forest watching	5	69

Cost of tourist for trip

In travel cost method cost is determine the price of place. So in this table indicate a different portion of total trip cost.

Number	Type of cost	Less than 25 % cost	25 to 50 % Cost	50to75% Cost	Greater than 75%	Total Visitors
1	Traveling cost	24	15	15	38	92
2	Recreational cost	77	10	5	-	92
3	Food and Accommodation cost	53	8	22	9	92

This table is show main cost is travel cost that mean when distance is more demand is less.

Demand function of visitors

The demand equation is

$$y = -860.99x + 7975.5$$

$$dy.dx = \frac{-860.99x^2}{2} + 7975.5x$$

$$\int_{1}^{9} \frac{-860.99x^2}{2} + 7975.5x$$

$$= \left[\frac{-860.99*9^2}{2} + 7975.5*9 \right] - \left[\frac{-860.99*1^2}{2} + 7975.5*1 \right]$$

$$= [369094] - [7545]$$

$$= 293644$$

Note: Integration is taken from 9 to 1 since highest number of visit is 9 and lowest is 1.

Cost Related Inferences

The integration of demand function shows the total consumer surplus for Indian tourists as Rs. 29364.4 and individual consumer surplus as Rs. 319.17. The visitation rate for foreign tourists is one; hence it is not possible to find consumer surplus in case for them.

General Suggestions

It is necessary to decide an entry fee for people who visit the religious places within the national park to control their number and to put a check on pollution.

Access and use of jungle for the purposes of fuel-wood and fodder need to be strictly checked and prohibited.

Effective monitoring and strict implementation of norms need to be implemented for the industrial units in neighbouring areas to check pollution.

Non-maldhari should not be allowed to stay within the boundaries of the national park. The use of forest land for cultivation should be stopped. The demarcation zone needs to be properly identified.

The tourists also generate pollution like throwing of plastic bags and other waste. The private vehicles of the tourists generate lots of air pollution. They need to be properly educated about do's and donot's in the jungle.

Vehicular movement through the national park can be restricted by building good alternative roads.

References

➢ Hanley, N.J.F. Shorgen and B.White. 1987 "Environmental Economics: In theory and Practice New York, Oxford University Press.

➢ Ali, Mohammed. 2007 "Recreation Use Value of Wondo Genet Wetland Ecosystem Ethiopia" Swedish University of Agriculture Sciences (SLU) Umea. http://ex_epslion.slu.se

➢ Andy, Jones. Ian, Bateman. Jan, Wright. 2003 Report to the Forestry Commission: Estimating Arrival Numbers and Values for Informal Recreational Use of British Woodlands. http://gov.uk/pdf.batemanfz.pdf/$file/batemanfz.pdf.

➢ Bishop, Citation. J, T. (ed). 1999 Valuating Forests: A Review of Methods and Application in Developing Countries. International Institute for Environment and Development, London.

➢ Chen. Weiqi. Huasheng, Hong. Yan, Liu. 2004 Recreation Demand and Economic Value: An Application of Travel Cost Method for Ximen Island, Environment Science Research Center, Ximen University, Taiwan. www.doi:10.1016/i.chieco.2003.11.001

➢ Nillesen, Eleonora. 2002 The Travel Cost Approach: An Application to Bellendenker National Park. http://www.sls.wageningen_ur.nl/enr/stapp/kuosmanen/rapers/tcm

➢ Kaval, Pam and John, Loomis. 2003 "Updated Outdoor Recreation use values with emphasis on National Park Recreation" Colorado State University Press.

➢ Mc, Cannel. K. E. and I, Strand. 1981 Measuring the Cost of Time in Recreation Demand Analysis: An Application to Sport fishing. American Journal of Agricultural Economics.

➢ Travel Cost Method, Dollar Based Ecosystem Valuation Methods. http://www.ecosystemvaluation.org/dollar_basedthm