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Criteria & Indicators for Monitoring Ecotourism Sustainability in a Protected Watershed: A Delphi Consensus

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Abstract: *The primary aim of this survey was to generate the criteria and indicators for monitoring ecotourism sustainability in a protected watershed within a sustainable framework. This survey employed the Delphi technique accompanied by individual face-to-face meetings. The author met with panel members which comprised a multi-disciplinary team consisting of representatives from different related ecotourism fields. Three rounds of questionnaires were administered to a panel of local experts consisting of ten academic and non-academic researchers. These experts provided input into generating the criteria and indicators. At the end of second round, the panel members reached a consensus on a set of indicators which include, 21 indicators related to environmental aspects, eight on economic aspects, six on cultural aspects, 21 on social aspects, and five on institutional aspects. The selected indicators would be applied in the Northern part of Iran by the Iranian Cultural, Heritage, Handicraft and Tourism Organization (ICHHTO).*

Keywords: *Ecotourism, sustainability, indicators, Delphi, monitoring, watershed*

I. Introduction

Tourism is recognized as the world's largest industry. It was estimated in 2010 that the economic contribution of travel and tourism would have grown to 11.6% of the global GDP and will support 250 million jobs (Page & Hall, 2006). Ecotourism is one branch of the tourism sector, which has the potential to contribute to sustainable development and has been identified as a form of sustainable tourism as expected to contribute to both conservation and development (Tsaur & Lin, 2006). The northern forest of Iran (Hyrcanian forest) is an initial area for tourism development in Iran. It is blessed with very rich biological diversity; endemic and endangered species; spectacular panorama and landscape scenery; and the natural ancient forest (ICHTO, 2007).

There is no doubt that ecotourism represents as a more–friendly alternative to economic use of natural resources compared to other economic activities such as mining, logging, farming and so on (Li, 2004). In spite of this, ecotourism may degrade the natural resources which it depends on, especially when confronted by poor management (Miezkowski, 1995). Therefore, for natural resources, ecotourism is not only an opportunity but also a challenge. It is well known that natural habitats degradation arises gradually, and usually it is difficult to revive the environment after the degradation has reached critical levels. Hence, establishing a set of warning indicators is necessary for ecotourism management. Because of the lack of warning indicators, revival attempts are made mostly after the environment has been seriously impacted upon and fragile ecosystems are lost (Li, 2004).

The use of criteria and indicators (C & Is) for sustainable development have been acknowledged and recommended by the United Nation Commission of Sustainable Development (UNCSD) as important tools used in measuring the status of management of sustainable development. In order to evaluate the past, guide the actions of the present, and plan for the future, we need to know what to monitor, what types of data to collect and what to measure. In other words, to track changes in social, natural, cultural, economic, and political arenas of ecotourism destinations, we need several sets of sustainability centered ecotourism indicators based on their relevance, analytical soundness and measurability (Sirakaya et al., 2001).

These C & Is are intended as standard measurements of sustainability, and for broad applications in various areas and disciplines throughout the world. The characteristics of indicators are to illustrate whether the destination's tourism development has deviated from sustainability (Tsaur & Lin, 2006). It is important to develop a set of indicators that are rigorous, credible, efficient, holistic, and useful to decision makers. These C & Is should also be flexible so that they can be adapted to different ecotourism destinations and to their specific contexts (Sirakaya et al., 2001).

Since the past decade, the tourism industry has been growing rapidly, especially the ecotourism sector in Iran. Annually, the number of ecotourist entering the northern forest of Iran increases significantly. This research intends to identify all C & Is which are effective for monitoring ecotourism sustainability, using the Delphi method. This C & Is should be multidisciplinary; covering all aspects of social, environmental, ecological, cultural, economic and institutional factors affecting sustainable ecotourism in protected area

(Hammond, 1995). There is a need to develop a standard method which can track the changes in ecological, social, cultural, economic and political arenas for the northern forest of Iran. Therefore, there is a need to provide indicators for measuring sustainability of ecotourism in the Northern forest of Iran.

One of the representatives in this study works in indicators for the sustainable management of tourism, which was developed by the World Tourism Organization (WTO) in 1993. Abidin (1999) developed the C & Is for evaluating sustainable ecotourism development in Taman Negara National Park in Malaysia. Stein, Clark and Richard (2003) utilized the Delphi method in a study of ecotourism development in Florida. Bhattacharya and Kumari (2004) developed C & Is for sustainable ecotourism in Sikkim biosphere reserve in India. Tsaur and Lin (2006) used the Delphi method to identify evaluation indicators for Taiwanese indigenous site; Young Bender (2008) used Delphi technique for the development of C & Is for evaluating forest-based ecotourism in West Virginia. Orsi et al. (2010) used the Delphi method for preparing a common set of C & Is to identify restoration priorities in the forest area. Ko (2005) used for his study, main stakeholders for approving some standard indicators for measuring the sustainability tourism which can contribute to sustainable development. Chris and Sirakaya (2005) employed the modified Delphi technique to generating indicators for community tourism.

Fresque and Plummer (2006)used a Delphi method to determine social and ecological indicators for assessing changes related to visitor use in Canadian parks and protected areas. Viljoen (2007) employed three questionnaires to collect primary data from participants, community members and tourists on each route under investigation to identify sustainability indicators for monitoring tourism route development in Africa. Hai et al. (2009) used the Delphi technique to create sustainability indicators for sustainable development in the Quang Tri Province, in Vietnam.

II. Research Method

2.1 Site Description

This forest watershed cluster consists of two neighbouring watershed areas in the western part of Mazandaran province in Northern of Iran. It is characterized by large tracts of natural ecosystems, especially forests, high mountains and wild rivers. They form many unique and fascinating landscape sceneries, which has high potential for nature-based tourism. The area is located close to the shortest road connection to Tehran, and for this reason it will have major and increasing importance for recreation and for the experience of nature. This area is located between 36°19′22″ to 36°45′25″ Northern latitude and 50°21′06″ to 50°23′30″ Eastern longitude.

The area includes two sub-watersheds. The whole area is 77 563 hectares including 32 761 hectares designated as the core zone and 44 802 hectares as the buffer zone. It is very rich in biodiversity and attractive natural landscape, the entire region is endowed with natural flora and fauna. It is a paradise for nature lovers, conservationists, botanists, zoologists and environmentalists. Its altitude at the lowest point is 100 meters above sea level and the highest point is about 4851 meters abovesea level. This watershed is a protected area and any utilization (logging, cutting, mining and others) is prohibited. Currently, the Forest, Range & Watershed Organization (FRWO) is trying to register it as a biosphere reserve with 42% of the area as forest cover and the rest as range land (Amiri, 2008).

This area is very attractive and has recreational potential such as beautiful scenery, spectacular landscapes, lush and rolling rivers, streams, different plant communities, religious and historical monuments, snowcapped mountains, natural glacier and blooming valley which attracts a large number of tourists in the peak season from June to September.

2.2 The Delphi Method

The Delphi method is a unique method for eliciting and refining group judgment based on the rationale that a group of experts is better than one expert when exact knowledge is not available (Kaynak & Macauley, 1984). It is a procedure to solicit opinion, judgment and consensus from a group of experts (Dalkey & Helmer, 1962). The Delphi technique is a long-range forecasting method of aggregating the forecasts of most experts on multidisciplinary issues (Dalkey & Helmer, 1962). To develop objective indicators, this study employs the Delphi technique, one of the best known qualitative and structured techniques for predicting future events through consensus (Woudenberg, 1991).

The aim of the Delphi surveys is to obtain the advice of panel members, and whenever possible to reach a consensus (Richey et al., 1985).The carefully selected experts answer questionnaires in two or more rounds. At the end of each round the researcher provides an anonymous summary of the panel member's suggestions from the previous round. It is believed that during this process the range of the answers will decrease and the group will converge towards the outcome. Finally, the process is stopped after reaching stable results by determining the mean or median scores.

2.3 Selection of Respondents

The selection of respondents is the most important step in the Delphi technique (Nelson, 2002). Random selection is not acceptable (Nelson, 2002). Wheeler et al. (1990) cited the needs for a balanced panel and accepted that there must be an element of judgment in achieving such a panel across a spread of experts from different background. Delbecq (1975) noted that the person who was invited to participate must be knowledgeable about the issue. One of the most critical requirements is the selection of qualified experts (Okoli & Pawlowski, 2004).

Linstone (1978) suggests that a suitable minimum panel size is seven. The decision for panel size is empirical and pragmatic taking into consideration factors such as time and expense (Hassan et al., 2000). Representation is assessed by qualities of the expert panel rather that its number (Powell, 2003). A sample of experts between ten to fifteen people is enough to yield sufficient results (Skulmoski et al., 2007). Twelve ecotourism experts were recommended by Taiwan ecotourism association (Tsaur et al., 2006). Dalkey and Hemer (1969) suggested that fuzzy Delphi group possess the largest confidence when the number of experts are at least ten.

2.4 Face-to-Face Meeting

The value of Delphi in supporting natural resource management is widely recognized (Gokhale, 2001) and its integration with face-to-face discussion can be of particular value in clarifying complex issues (Katzenbach & Smith, 1993; Gokhale, 2001). Linstone and Turoff (1975) noted that participant dropout can be a problem in Delphi studies. Hill and Fowles (1975) argue that face-to-face interviews should always be used in preference to mail-shots and this enables experts to use their expertise in a more meaningful way. A high degree of motivation and encouragement is needed to compensate the tendency for panel members to quit through the study progresses. To encourage panel members to remain active through the various rounds of the Delphi survey, it is important that they understand the goal of the study and feel they are a part of the panel members. If the Delphi researcher invites them individually to participate, there is a likelihood of increased participation (Stitt-Gohdes & Crews, 2004). As an extension to the study, the author conducted face-to-face meetings to discuss the C & Is resulting from the Delphi survey. Therefore, the researcher held meetings at least two times for every one through this survey. During these meetings, constructive negotiation between author and expert provided fruitful results.

Out of 28 experts invited, only fourteen of them agreed to become panel members of the Delphi process. In the second and third round the number of participants decreased to ten experts. These experts comprised five experts with Doctoral degrees, three with Master's degree and two with Bachelor degrees. The experts' characteristics had to meet all five of the following criteria to be considered for inclusion in the Delphi panel, local and familiar to the study area; practical experience in field study; renowned and famous; enough time and eager to participate; and finally, able to collaborate well.

First Round: The first round was an open-ended question for identifying the criteria and indicators in the iterative process in a general questionnaire, which asked the panel members the issues related to the question under consideration. Taylor and Judd (1989) agreed that the first round should use open-ended questions to gather as much information in the survey stage as possible. Each expert identified the C & Is and returned the questionnaire to the researcher through a meeting or by e-mail. The researcher who received the response of the first round, analyzed, summarized, collated and tabulated the responses into the second questionnaire. A second questionnaire incorporating the feedback report was developed and distributed to the first round respondents.

Second Round: In this step, the designed questionnaire was distributed among panel members. The questionnaire now included all the criteria with related indicators obtained from the panel member's first round responses. The ten experts were asked to indicate the degree to which they agreed with to a particular criteria and its indicators on a scale that ranges from 1 (highly irrelevant) to 5 (highly relevant). The goal of the second round and any other subsequent rounds using the questionnaire is to achieve consensus or stability of the panel member response (Chu & Hwang, 2007). Once consensus or stability is reached, the Delphi procedure is completed (Murry & Hammors, 1995).The Delphi method ends if one of the following situation occurs (Chu & Hwang, 2007), if all of questionnaire items are either accepted or rejected, the rating mean is higher than 3.5. The Delphi study data was analyzed using SPSS (16.0 version) software. Quantitative analysis included the calculation of mean scores, standard deviation and p-value. The author used Hotelling T-test for testing consensus among panel members and also the Mann-Whitney test for testing similarities or differences the opinion of two groups of experts (Academic & Non-academic).

III. Results and Discussion

After elicitation of the first round of questionnaires, about thirty criteria and 215 indicators gained. After summarizing, modifying, merging and deleting of redundant criteria and indicators, a total of fourteen criteria and 124 indicators were established at the end of the first round. In the second round, participants were

provided with a summary of all the input from the first round. The summary included the category of criteria and the objective of the rating system. The purpose of the second round was to induce a reduction of the number of criteria under consideration by choosing the score of scale. In round two, ten experts were asked to indicate the degree to which they agreed with the criteria in relation to the sustainability of ecotourism.

Between the fourteen criteria obtained, five criteria which had 30 indicators were rejected and nine criteria were accepted. In the second step of round two, the rating process continued for evaluating 90 indicators which were related to nine criteria. At the end of process, 29 indicators were rejected and 61 indicators accepted. Criteria and indicators were selected using the following cut-off point; based on a rating scale anchored by a score of 1 (highly irrelevent) to 5 (highly relevant), it was decided that scores of 3.5 or higher will be selected (Chris & Sirakaya, 2006). Criteria and indicator mean ranks of 3.5 and above was also adopted by Egan (1993) in his Delphi study.

Hotelling's T-square test was utilized to determine that there is consensus among the panel members through identification of C & Is. Results demonstrated a significant level of p-value= 0.05 was reached, and the p-value of all criteria and all related indicators to every criterion, exceeded 0.05. The results showed that a high level of consensus exist among all panel members. The Hotelling's T-square test results showed no significant difference among all of panel member's opinions to rating and evaluating all C & Is. Thus, it was felt that continuing the research for future rounds would not produce any extra convergence of opinion. In fact, in round two, the panel members had reached a consensus on all of criteria and indicators.

We used the Mann-Whitney U Test for testing the results as found below (Table 1 to 10). The p-value for all of criteria and indicators were not significantly different between two groups of experts (Academic and Non- Academic) when compared in rating and evaluating the C & Is. In other words, it was found similarities between both groups in approving C & Is. As the results indicate, both Academic and Non-Academic experts agreed and approved nine criteria and 61 indicators. Two rounds of the survey yielded 21 indicators for the environmental dimension (Table 11), eight indicators for economic dimension (Table 12), six indicators for the cultural dimension (Table 13). The panel members reached agreement on 21 social indicators (Table 14) while the institutional category produced 5 indicators (Table 15).

Table 1. Comparison of Academic (n=5) and Non-Academic (n=5) Experts' Rating of Criteria in Round Two Using Mann-Whitney Test

Criteria	Mean	SD	p-value
1. Conservation of natural resources & biodiversity	4.8	0.42	1.00
2. Education affairs and awareness	4.3	0.048	0.513
3. Conservation of soil & water resources	4.5	0.52	0.549
4. Tourists & local people satisfaction	4.8	0.42	1.00
5. Promoting economic benefits & poverty alleviation	4.6	0.516	1.00
6. Maintenance of heritage & cultural diversity	4.7	0.48	0.513
7. Maintenance of scenery, natural &physical features	4.7	0.48	0.513
8. Maintenance of hygiene& tourist safety	4.5	0.52	0.549
9. Legal, institution, legislation and policy frameworks	4.5	0.52	0.549

Note: Hotelling's T-square test p-value=0.59, shows high consensus among all members (n=10)

Table 2. Comparison of Academic (n=5) and Non-Academic (n=5) Experts' Rating of Indicators for Criterion 1: Conservation of Natural Resources & Biodiversity, in Round Two using Mann-Whitney Test

Criteria	Mean	SD	p-value
1. Extent of protected area	4.7	0.48	0.513
2. No. of protected water resource(river, marsh, stream, and so)	4.00	0.94	0.214
3. No. of rare, threatened, vulnerable & endangered species)	4.7	0.48	0.513
4. Existence & Implementation of action plan for conservation	4.3	0.82	0.65
5. Existence of different plant types(forest & range)	4.00	0.66	0.058
6. Diversity of plants and wildlife	4.5	0.52	0.549
7. Existence of zoning and comprehensive management system	4.2	0.78	0.371
8. Extent of damaged area duo to human activities	3.6	0.84	0.141
9. Existence & Implementation of EIA program in recreation area	4.00	0.94	0.572

Note: Hotelling's T-square test p-value=0.320, high consensus exists among all members (n=10)

Table 3. Comparison of Academic (n=5) and Non-Academic (n=5) Experts' Rating of Indicators for Criterion2: Education Affairs and Public Awareness, in Round Two Using Mann-Whitney Test

Criteria	Mean	SD	p-value
1. No. of trained local people in field of local skill	4.7	0.48	0.513
2. No. of educational workshop	4.1	0.56	0.606
3. No. of warning tableaus about waste management	4.2	0.7	1.00
4. No. of brochure for representing attraction areas and biodiversity	4.00	0.47	1.00
5. No. of educated & trained local people for hosting	4.6	0.51	1.00
6. No. of distributed handbill among tourists about respect to local culture	4.6	0.51	0.221

Note: Hotelling's T-square test p-value=0.391, high consensus exists among all members (n=10)

Table 4. Comparison of Academic (n=5) and Non-Academic (n=5) Experts' Rating of Indicators for Criterion 3: Conservation of Soil & Water Resources, in Round Two Using Mann-Whitney Test

Criteria	Mean	SD	p-value
1. Amount of erosion & sediment	4.7	0.48	0.513
2. Amount of contamination materials in water	4.5	0.7	0.811
3. Amount of fluctuation water resources	3.9	0.73	0.65
4. Extent and percentage of uncovered lands	4.00	0.81	0.439
5. Control of domestic (dairy cattle) animal in range & forest	4.1	0.87	0.268
6. Extent and percentage of afforested area	3.9	0.73	0.65
7. Amount of density for road and pedestrian in watershed	3.9	0.73	0.65

Note: Hotelling's T-square test p-value=0.089, high consensus exists among all members (n=10)

Table 5. Comparison of Academic (n=5) and Non-Academic (n=5) Experts' Rating of Indicators for Criterion 4: Tourist and Local People Satisfaction, in Round Two Using Mann-Whitney Test

Criteria	Mean	SD	p-value
1. No. of tourists visit per year (annually)	4.7	0.67	0.881
2. Duration of tourist stay (increase or reduce of planned staying)	4.4	0.69	0.817
3. Amount of local production for sale to tourists	4.00	0.66	0.343
4. No. of tourists repeat visitation	4.7	0.48	0.513
5. Percentage of local people who satisfy with tourism development	4.6	0.51	0.221
6. No. of complaints from local or level of satisfaction of them	4.3	0.67	0.166
7. No. & list of social disturbance (no of theft, burglary)	4.3	0.82	0.307
8. No. of conflicts between tourists and local people	4.1	0.73	0.65
9. Percentage of satisfied tourists or no of complaints	3.6	1.07	0.082

Note: Hotelling's T-square test p-value=0.626, high consensus exists among all members (n=10)

Table 6. Comparison of Academic (n=5) and Non-Academic (n=5) Experts' Rating of Indicators for Criterion 5: Promoting Economic Benefits & Poverty Alleviation, in Round Two Using Mann-Whitney Test

Criteria	Mean	SD	p-value
1. Amount of local revenue from ecotourism	4.7	0.67	0.881
2. Value of wood production	3.6	0.84	0.343
3. Value of non-wood production	4.1	0.87	0.74
4. Amount of investment in ecotourism sector	4.3	0.82	0.65
5. No. of people who are engaged in tourism sector	4.9	0.31	0.317
6. No. of wooden & handicraft workshops in region	4.00	0.81	0.439
7. No. of people who are engaged in craft art production	4.4	0.84	0.155
8. Promote well-being for residents with providing infrastructure	4.6	0.51	0.221

Note: Hotelling's T-square test p-value=0.392 , high consensus exists among all members (n=10)

Table 7. Comparison of Academic (n=5) and Non-Academic (n=5) Experts' Rating of Indicators for Criterion 6: Maintenance of Heritage & Cultural Diversity, in Round Two Using Mann-Whitney Test

Criteria	Mean	SD	p-value
1. Existence of program for protection of historic building & sacred place	4.4	0.69	0.419
2. Measures for protection of diverse traditional agriculture	4.00	0.81	0.439
3. Measures for protection and revival of diverse traditional clothing and music	4.7	0.48	0.513
4. Maintenance, revival & implementation of local rituals and festivals	4.2	0.91	0.496
5. Maintenance and management of local architectural buildings	4.4	0.69	0.419
6. Providing and development of local foods	4.2	0.78	0.371

Note: Hotelling's T-square test p-value=0.093 , high consensus exists among all members(n=10)

Table 8. Comparison of Academic (n=5) and Non-Academic (n=5) Experts' Rating of Indicators for Criterion 7: Maintenance of Scenery, Natural & Physical Features, in Round Two Using Mann-Whitney Test

Criteria	Mean	SD	p-value
1. Existence of plan for protection of spectacular landscape	4.7	0.48	0.513
2. Extent and no of specific natural plant communities	3.7	0.94	0.661
3. Existence of management plans for conservation of riparian zone	4.4	0.69	0.419
4. Growth rate of incompatible construction with natural environment	4.4	0.51	1.00
5. Existence of management plans for protection of geological features	4.1	0.87	0.268

Note: Hotelling's T-square test p-value=0.084, high consensus exists among all members (n=10)

Table 9. Comparison of Academic (n=5) and Non-Academic (n=5) Experts' Rating of Indicators for Criterion 8: Maintenance of Hygiene & Tourist Safety, in Round Two Using Mann-Whitney Test

Criteria	Mean	SD	p-value
1. No. of active health care center in region	4.4	0.51	1.00
2. Existence and accessibility to lucid water & food	4.8	0.42	1.00
3. Existence of rural sewage treatment system	4.7	0.48	0.513
4. No. of endemic disease in region	4.00	0.66	0.343
5. No. of incident, accident and other undesired accident	3.7	0.67	0.729
6. Volume of garbage which collected from nature	4.3	1.251	0.189

Note: Hotelling's T-square test p-value=0.075, high consensus exists among all members (n=10)

Table 10. Comparison of Academic (n=5) and Non-Academic (n=5) Experts' Rating of Indicators for Criterion 9: Existence Legal, Institution, Legislation and Policy Frameworks, in Round Two Using Mann-Whitney Test

Criteria	Mean	SD	p-value
1. Existence of institutional & policy framework for ecotourism in region	4.8	0.42	0.134
2. Existence of legal obligations, incentives for promoting ecotourism	4.7	0.48	0.513
3. Existence of legal frameworks for participation of all stakeholders	4.6	0.51	0.221
4. Existence of collaboration among different related organization	4.4	0.51	0.221
5. Existence of approved national plan for sustainable tourism development	4.6	0.69	0.669

Note: Hotelling's T-square test p-value=0.334, high consensus exists among all members (n=10)

Table 11. Indicators for the Environmental Dimension

Criteria with related Indicators
1. Conservation of natural resource & biodiversity
1.1. Extent of protected area
1.2. No. of protected water resource (river, marsh, stream, and so)
1.3. No. of rare, threatened, vulnerable & endangered species)
1.4. Existence & Implementation of action plan for conservation
1.5. Existence of different plant types (forest & range)
1.6. Diversity of plants and wildlife
1.7. Existence of zoning and comprehensive management system
1.8. Extent of damaged area duo to human activities
1.9. Existence & implementation of EIA program in recreation area
2. Conservation of soil & water resources
2.1. Amount of erosion & sediment
2.2. Amount of contamination materials in water
2.3. Amount of fluctuation water resources
2.4. Extent and percentage of uncovered lands
2.5. Control of domestic (dairy cattle) animal in range & forest
2.6. Extent and percentage of afforested area
2.7. Amount of density for road and pedestrian in watershed
3. Maintenance of scenery, natural & physical features
3.1. Existence of plan for protection of spectacular landscape
3.2. Extent and no of specific natural plant communities
3.3. Existence of management plans for conservation of riparian zone
3.4. Growth rate of incompatible construction with natural environment
3.5. Existence of management plans for protection of geological features

Table 12. Indicators for the economic dimension

Criteria with related Indicators
Promoting economic benefits & poverty alleviation
1. Amount of local revenue from Ecotourism
2. Value of wood production
3. Value of non-wood production
4. Amount of investment in ecotourism sector
5. No. of people who are engaged in tourism sector
6. No. of wooden & handicraft workshops in region
7. No. of people who are engaged in craft art production
8. Promote well-being for residents with providing infrastructure

Table 13. Indicators for the cultural dimension

Criteria with related Indicators
Maintenance of heritage & cultural diversity
1. Existence of program for protection of historic building & sacred place
2. Measures for protection of diverse traditional agriculture
3. Measures for protection and revival of diverse traditional clothing and music
4. Maintenance, revival & implementation of local rituals and festivals
5. Maintenance and management of local architectural buildings
6. Providing and development of local foods.

Table 14. Indicators for the social dimension

Criteria with related Indicators
1. Education affairs and public awareness
1.1. No. of trained local people in field of local skill
1.2. No. of educational workshop
1.3. No. of distributed handbill among tourists about respect to local culture
1.4. No. of brochure for representing attraction areas and biodiversity
1.5. No. of educated & trained local people for hosting
1.6. No. of warning tableaus about waste management
2. Tourist and local people satisfaction
2.1. No. of tourists visit per year (annually)
2.2. Duration of tourist stay (increases or reduces of planned staying)
2.3. No. of conflicts between tourists and local people
2.4. No. of tourists repeat visitation
2.5. Percentage of local people who satisfy with tourism development
2.6. No. of complaints from local or level of satisfaction of them
2.7. No. & list of social disturbance (no of theft, burglary,)
2.8. Percentage of satisfied tourists or no of complaints
2.9. Percentage of satisfied tourists or no of complaints
3. Maintenance of hygiene & tourist safety
3.1. No. of active health care center in region
3.2. Volume of garbage which collected from nature
3.3. Existence of rural sewage treatment system
3.4. No. of endemic disease in region
3.5. No. of incident, accident and other undesired accident
3.6. Existence and accessibility to lucid water & food

Table 15. Indicators for the institutional dimension

Criteria with related Indicators
Existence legal, institution, legislation and policy frameworks
1. Existence of institutional & policy framework for ecotourism in region
2. Existence of approved national plan for sustainable tourism development
3. Existence of legal frameworks for participation of all stakeholders
4. Existence of collaboration among different related organization
5. Existence of legal obligations, incentives for promoting ecotourism

IV. Conclusion

Sustainable tourism takes a holistic approach, where it seeks to be ecologically responsible, socially compatible, culturally appropriate, politically equitable, and economically viable for host community (Choi & Sirakaya, 2006). To realize this concept an effective set of indicators for monitoring ecotourism sustainability is indispensible. The aim of this study was to investigate the use of the Delphi approach to design a set of C & Is that potentially could be used to monitor ecotourism sustainability in Northern forest of Iran. Experts initially provided a large number of criteria which needed to be grouped into cognate areas in order to make them manageable for the purpose of the study. Some studies create indicators for ecotourism sustainability because of their failure to incorporate all dimensions of sustainable development, these studies are incomplete (McCool et al., 2001; Miller, 2001). While most available monitoring indicators focus on dominant economic, physical and ecological dimensions (Choi & Sirakaya, 2006), this study extends the spectrum by including social, ecological, cultural, economic and institutional dimensions.

This survey presents a set of sustainable C & Is that can serve as a monitoring tool in the sustainable ecotourism developmental process for protected areas. These 61 indicators encompassed all different aspects of environmental, social, economic, cultural and institutional values which are associated with sustainable development (Munasinghe, 1993). These C & Is overlaps with those adopted by international agencies, regional and national programmes in the development of C & Is (CSD, 1997; Munasinghe, 1993; Winogard, 1995).

In particular, eight criteria which have been identified from this study are similar and comparable to chapters on sustainable development listed for national use by United Nations Comission of Sustainable Development (1997). The criteria obtained through this study are also similar to four criteria for sustainable management for the European boreal forest developed through the Helsinki Process (Laletin, 1997). Additionally, the criteria obtained here are similar to five criteria for application of C & Is for sustainable ecotourism as found by the Globalization, Indian Institute of Forest Management, Bhopal, India (Bhattacharya & Kumari, 2004). The criteria are also similar and comparable to the six criteria for development of C & Is for evaluating forest-based ecotourism destinations in West Virginia (Young Bender, 2008). Finally, these criteria are also similar and comparable to eight criteria for the sustainable management of ecotourism in Taman Negara National Park (Abidin, 1999).

The implementation of C & Is can help the manager of the destination to achieve the goal of sustainable management of ecotourism to alert them to possible social trends, changes in the host community, and to the potential negative impact of tourism on natural and cultural resources. Furthermore, effective C & Is provide enough information that can enable the decision maker to identify, evaluate and make timely decisions on critical changes being caused by tourism to the natural environment, communities and other resources in the destination (Sirakaya et al., 2001).

References

[1]. S. J. Page and M. Hall, The geography of tourism and recreation (Abingdon, Routledge publishing, 2006).
[2]. S. H. Tsaur, Y. C. Lin, and J. H. Lin, Evaluating ecotourism sustainability from the integrated perspective of the resource, community and tourism, Tourism Management, 27, 2006, 640-653.
[3]. Iranian Cultural Heritage, Handicrafts and Tourism Organization (ICHHTO), 2007, Retrieved from www.unesco.org/en/tentativelists /5214
[4]. W. Li, Environmental management indicators for ecotourism in China's nature reserve: A case study in Tianmushan Nature Reserve, Tourism Management, 25(5), 2004, 559-564.
[5]. Z. Mieczkowski, Environmental issues of tourism and recreation (Laham: University Press of America, Inc., 1995).
[6]. E. Sirakaya, T. Jamal, and H. S. Choi, Developing indicators for destination sustainability, in D. B. Weaver (Eds.), The Encyclopedia of Ecotourism (New York: CABI Publishing, 2001) 411-432.
[7]. S. H. Tsaur, Y. C. Lin, and J. H. Lin, Evaluating ecotourism sustainability from the integrated perspective of the resource, community and tourism, Tourism Management, 27, 2006, 640-653.
[8]. A. Hammond, Environmental indicators: A systematic approach to measuring and reporting on environmental policy performance in the context of sustainable development (Washington, DC: World Resource Institute, 1995).
[9]. Z. Z. Abidin,), The identification of criteria and indicators for the sustainable management of ecotourism in Taman Negara National Park: A Delphi Consensus, doctoral diss., Morgantown: West Virginia University, 1999.

[10]. T. V. Stein, J. K. Clark, and J. L. Rickards, Assessing natures role in ecotourism development in florida: Perspectives of tourism professional and government decision –makers. Journal of Ecotourism, 2(3), 2003, 155-172.
[11]. P. Bhattacharya and S. Kumari, Application of criteria and indicators for sustainable ecotourism: Scenario under globalization (Bhopal: Indian Institute of Forest Management, 2004).
[12]. S. H. Tsaur, Y. C. Lin, and J. H. Lin, Evaluating ecotourism sustainability from the integrated perspective of the resource, community and tourism, Tourism Management, 27, 2006, 640-653.
[13]. M. Young, Development of criteria & indicators for evaluating forest-based ecotourism destination: A Delphi study, unpublished doctoral diss., Morgantown: West Virginia University, 2008.
[14]. F. Orsi, D. Geneletti, and A. C. Newton, Towards a common set of criteria and indicators to identify forest restoration priorities: An expert panel-based approach, Journal of Ecological Indicators, 672-683, 2010.
[15]. T. G. Ko, Development of tourism sustainability assessment procedure: A conceptual approach, Tourism Management, 26(3), 2005, 431-445.
[16]. H. Choi and E. Sirakaya, The Delphi method as a research tool: An example, design consideration and application, Journal of Information & Management, 42, 2005, 15-29.
[17]. J. Fresque, and R. Plummer, Determining social and ecological indicators in canadian parks: Utilizing the Delphi method (Ontario: Brock University, 2006).
[18]. F. Viljoen, Sustainability indicators for monitoring tourism route development in Africa, Unpublished Master Diss., South Africa: University of Stellenbosch, 2007.
[19]. L. T. Hai, , N. T. Khoa, and L. Hens, Indicators for sustainable development in the Quang Tri Province (Vietnam 2009).
[20]. M. J. Amiri, Ecological capability of hyrcanian forest (Tehran: Tarbiat Modares University 2008).
[21]. E. Kaynak, and J. A. Macauley, The Delphi technique in the measurement of tourism market potential: The case of Nova Scotia, Tourism Management, 5(2), 1984, 87-101.
[22]. N. Dalkey and O. Helmer, An experimental application of the Delphi method to the use of experts, Management Science, 9(3), 1969, 458-467.
[23]. F. Woudenberg, An evaluation of Delphi, Technological Forecasting & Social Change, 40, 1991, 131-150.
[24]. J. S. Richey, B. W. Mar, and R. R. Horner, The Delphi technique in environmental assessment, Journal of Environmental Management, 21, 1985, 135-146.
[25]. A. Nelson, Using a modified Delphi methodology to develop a competency model for vet practitioners (2002).
[26]. A. L. Delbecq, Van de Ven, A. H., and D. H. Gustafson, Group techniques for program planning: A Guide to nominal group and Delphi processes (Illinois: Scott, Foresman & Company 1975).
[27]. C. Okoli, and , S. D. Pawlowski, The Delphi method as a research tool: an example, design considerations and applications, Journal of Information and Management, 42, 2004, 15-29.
[28]. H. A. Linstone. The Delphi technique: Handbook of future research, (Greenwood: Westport, CT., 1978) 271-300.
[29]. F. Hassan, S. Keenery, and H. Mckenna, Research guidelines for the Delphi survey technique, Journal of Advance Nursing, 32, 2000, 1008-1015.
[30]. C. Powell, The Delphi technique. Barometer of sustainability: measuring and communicating wellbeing and sustainable development (2003).
[31]. G. J. Skulmoski, F. Hartman, and J. Krahn, The Delphi Method for Graduate Research, Journal of Information Technology Education, 6, 2007.
[32]. S. H. Tsaur, Y. C. Lin, and, J. H. Lin, Evaluating ecotourism sustainability from the integrated perspective of the resource, community and tourism, Tourism Management, 27, 2006, 640-653.
[33]. N. Dalkey, O. Helmer, An experimental application of the Delphi method to the use of experts, Management Science, 9(3), 1969, 458-467.
[34]. A. A. Gokhale, Environmental initiative prioritization with a Delphi approach: A case study, Environmental Management, 28, 2001, 187-193.
[35]. J. Katzenbach, and D. Smith,), The wisdom of teams (Cambridge, MA: Harvard Business School Press, 1993)
[36]. H. A. Linstone and, M. Turoff, The Delphi method: Technique and applications (Reading, MA: Addison-Wesley, 1975)
[37]. K. Q. Hill, and J. Fowles, The Methodological worth of Delphi technique. Technological Forecasting and Social Change, 7, 1975, 179-192.
[38]. W. L. Stitt-Gohdes, and T. B. Crews, The Delphi technique: A research strategy for career and technical education, Journal of Career & Technical Education, 20(2), 2001, 55.
[39]. H. Chu, and G. J. Hwang, A Delphi-based approach to developing experts system with the cooperation of multiple experts. Experts with Application (2007) 115.
[40]. J. W. Murry, and J. O . Hammors, Delphi, a versatile methodology for conducting qualitative research, The review of Higher Education, 18(4), 1995, 423-436.
[41]. A. F. Egan, and S. B. Jones ,Determining forest harvest impact assessment criteria using expert opinion: A Delphi study, North. Journal of Applied Forestry, 14(1), 1997, 20-25.
[42]. S. F. McCool, R. N. Moisey, and N. P. Nickerson, What should tourism sustain? The disconnect with industry perceptions of useful indicators, Journal of Travel Research, 40(4), 2001, 124-131.
[43]. G. Miller, The development of indicators for sustainable tourism: Result of a Delphi survey of tourism researches, Tourism Management, 22, 2001, 351-362.
[44]. M. Munasingh, Environmental economics and sustainable development: World bank environment, 3 (Washington, D.C: The World Bank, 1993)
[45]. M. Winogard, Conceptual framework to develop and use environmental and sustainability indicators for policy-making in Latin America and Caribbean, Discussion paper, Project UNEP-CIAT, Cali, Columbia, 1995.
[46]. P. Bhattacharya and S. Kumari, Application of criteria and indicators for sustainable ecotourism: Scenario under globalization (Bhopal: Indian Institute of Forest Management, 2004).