



VISITORS' CHARACTERISTICS AND ATTITUDES TOWARDS IRAN'S NATIONAL PARKS AND PARTICIPATORY CONSERVATION

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ABSTRACT

The highly diverse climate and nature of Iran offer a potential to use ecotourism as a tool to support conservation and local development. To realize this potential, the ecotourism experience must be identified to guide management actions. This paper examines ecotourists' attitudes towards conservation and evaluates Iran's national parks (NPs) economically. 2,121 respondents answered an online questionnaire conducted in summer 2012. The majority of respondents had visited at least one of Iran's 26 NPs. The survey revealed the weak condition of NPs both in status and conservation activities. Almost all respondents were willing to voluntarily participate in projects related to nature, environment and biodiversity conservation; pay for protection; increase the area of protected areas; visit NPs in the future; and they were mostly young. They believed that the conservation of biodiversity is not only the responsibility of the government but also society in general. Furthermore, most answerers highlighted ecotourism activities as a tool to benefit local people. The paper concludes that the government should elevate environmental awareness and consciousness, build community capacity for biodiversity management, resurrect the conservation movement, promote ecotourism and sustainable investment, strengthen the capacity of NGOs, look for synergisms, and build opportunities for participatory, cooperative science and stewardship.

KEYWORDS: ecotourism, online survey, environmental awareness, national parks, Iran

INTRODUCTION

Protected areas (PAs) are a key global strategy and serve as one of the most important public goods. Many PAs continue to be established, especially in developing countries (PPW, 2012). PAs have long been the only way to conserve ecological regions from other forms of land use (EEA, 2010). Governments must ensure that their PAs are well managed (IUCN-Jeju, 2012), however, most PAs are not financially self-sufficient (Kolahi et al., 2012a; Leverington et al., 2010). As a result, underfunding hinders conservation or development objectives and activities (IUCN, 2005).

Tourism and recreation will increasingly make use of PAs and other nature areas, "in developed countries as buffer zones from daily urban life and in developing countries as the setting for nature tourism" (Evans et al., 2001). Based on the most commonly used definition, ecotourism or nature-based tourism is "responsible travel to natural areas that conserves the environment and improves the well-being of local people" (TIES,

1993), a definition which emphasizes the view that ecotourism should have positive impacts. However, to realize this potential, the ecotourism experience must be identified to guide management actions and thus to sustain the resources on which ecotourism ultimately depends. In this way, visitors are at the centre of ecotourism management. They represent a valuable resource for gaining information about the presence and extent of impacts, the acceptability of environmental change, and the consequences of management actions for conservation and their experience.

Economic considerations generally play a key role in decisions. Subsequently, the economic valuation of ecosystem services has received special attention in recent years. In fact, the idea of economic valuation of environmental benefits of recreation areas was first considered in 1947 (Majnonian, 1995). Many efforts have been conducted to determine the benefits of ecotourism. In the developing world, economic valuation of environmental services of PAs is increasingly common

(Adamsa et al., 2008). But few economic valuation studies have been conducted in developing countries (Dixon and Hufshmidt, 1986; Hadker et al., 1997).

In the last three decades, a range of economic valuation methods for ecosystem services has been developed to determine their values via people's preferences e.g., their willingness to pay (WTP) (Hein, 2007). One important approach is the Contingent Valuation Method (CVM). CVM has been commonly used as a standard approach to measure and quantify the non-market goods and the non-use values of an ecosystem in monetary terms, such as recreation, wildlife and environmental quality goods (Hanemann et al., 1991; Hanemann, 1994; Hein, 2007). For applying CVM to represent a WTP scenario posed to the respondents at recreation sites, however, entrance fee is the most logical choice and a realistic payment vehicle (Lee and Chun, 1999; Jorgensen et al., 2001; Turpie, 2003).

Population growth and climate change impacts has caused serious degradation of natural reserves and biodiversity in Iran over the past few years (Kolahi et al., 2012a). This has raised concern over the status of endemic species (Kolahi et al., 2012a, 2013a, 2014). In an attempt to preserve biodiversity, some areas were converted into PAs. Iran has four categories of PAs including 'National Park' (NP), 'National Natural Monument', 'Wildlife Refuge', and 'Protected Area', which altogether cover about ten per cent of the total Iran's area according to the Department of the Environment of Iran, GIS and Remote Sensing Section, statistics for November 2011 (BHPAs, 2011). These sites are spread throughout the country. They host habitats for an array of species and associated ecosystems and play an important role in the sustainable utilization of natural resources. The coverage and the challenges facing management in Iran's PAs are noted by Kolahi et al. (2012a). PAs lack management plans and challenges include mismanagement, limited public participation, and conflict between local people and PA management. Only 2 per cent of the country's PAs are effectively protected (Kolahi et al., 2012a). PAs depend completely on a relatively low, annual budget from government. No economic analyses have been undertaken and thus PAs have not optimized possible income (Kolahi et al., 2012a, 2014). Some reports also show that PAs managers considered the local community as a threat and they do not try to give the public opportunities to cooperate in conservation activities (Kolahi et al., 2011, 2013a).

There is a lack of reliable data specifically on ecotourism numbers to Iran and very little information exists regarding the environmental (biophysical and social)

impacts of visitor activities and the effect of these impacts on the visitors experiences. Based on an inquiry from the Bureau of the Habitats and Protected Areas (BHPAs) in 2013, the total number of eco-tourists in Iran's NPs is estimated at 100,000 persons per year.

Finding accurate information on visitors' views about PA management, cooperation and the resources that attract them is an important key to effective management of recreation sites. The main objective of this paper is therefore to examine the characteristics and attitudes of ecotourism towards Iran's NPs and biodiversity conservation. An economic valuation of the NPs was carried out, conditions and management of NPs were assessed, relationship between ecotourism and local people and the role of ecotourism in local development were investigated, and environmental awareness was evaluated.

METHODS

Study areas: The authors selected Iran's NPs as their study areas. Iran has 26 NPs, totally 1,960,537 hectares, covering 1.19 per cent of Iran's area (BHPAs, 2011). Because of their environmental characteristics and high biodiversity NPs have the greatest variety of management zones compared with other types of PAs in Iran. In addition, they have the greatest variety of natural attractions and opportunities for visitors, and the most developed tourist facilities (BHPAs, 2011).

Survey approach: An online questionnaire was administered to Iran's e-society between July and September 2012 to collect responses to primarily closed-ended questions. The questions were about NPs and biodiversity conservation in Iran. They were designed so that all participants could answer them. Those who had visited at least one of Iran's NPs were asked more questions than others. The questions were divided into seven sections: 1) environmental activities and attitudes; 2) awareness about NPs and other PAs; 3) the relationship between local people and ecotourism; 4) volunteer measures; 5) satisfaction; 6) WTP; and 7) demographic information. The survey consisted of multiple-choice, dichotomous yes/no, and ordered-rank responses, though a few open-ended questions were also posed to offer further explanations for checked responses.

After the questionnaire was structured and standardized, Iranians were informed by emails and advertisement (in some web sites). This call for information went viral (e.g. an email which rapidly propagates from person to person) and within a few days it had been sent to more than 3,000 people.

Table 1: A summary of variables used in all Logit Regression Models

Variables	Description	Mean±SD
Age	Ratio scale: respondents were asked to write their actual ages based on calendar years.	32.4±8.22
Gender	Binary scale: males=1 and females=0.	0.58±0.49
Marital status	Binary scale: married=1 and single=0.	0.49±0.50
Family size	Ratio scale: total number of people living in respondent's household.	3.69±1.48
Education	Ordinal scale (1 to 6): Under high school=1, high school=2, Associated degree=3, Bachelor=4, Master=5, Doctor and upper=6.	4.75±0.95
Field related	Binary scale: field related to environment, natural resources or similar issues=1, otherwise=0	0.48±0.50
Member	Binary scale: a member of any environmental supported organization=1, otherwise=0	0.31±0.46
Number of available information	Ratio scale: respondents were asked how they were informed about NPs at their last visit: Friends/relatives; Living nearby; Publications; Internet/website; School class/program; Television/radio; and Other. Each item gave 1 score. Higher scores indicate greater available information.	1.37±0.82
Total visitors' satisfaction	Index: Respondents were asked to rate ten statements on a 5-point Likert scale from very dissatisfied (1), dissatisfied (2), neutral (3), satisfied (4), and very satisfied (5). Six statements were about status satisfaction (Component 1 of PCA; annex 1) and four statements about Enjoyment satisfaction (Component 2 of PCA). An index was developed by summing the responses on all ten statements about satisfaction of status and enjoyment. Reliability analysis revealed Cronbach's $\alpha=0.82$, suggesting a valid index. Theoretically, the index score can range from 10 to 50. Higher scores indicate greater visitors' satisfaction.	17.40±7.48
Status satisfaction	Ratio scale: Six statements of component 1; annex 1; the index score can theoretically range from 6 to 30. Higher scores indicate greater status satisfaction.	13.96±4.95
Enjoyment satisfaction	Ratio scale: Four statements of component 2; annex 1; the index score can theoretically range from 4 to 20. Higher scores indicate greater Enjoyment satisfaction.	13.44±3.63
Group size	Ratio scale: The number of visitors including respondents travelling together.	9.57±10.14
Monthly income (Rials)	Ordinal scale (0 to 6): Nothing(0), less than 5,000,000(1), 5,000,000-7,500,000(2), 7,500,000-10,000,000(3), 10,000,000-15,000,000(4), 15,000,000-20,000,000(5), over(6)	2.54±1.87
Family monthly income (Rials)	Ordinal scale (0 to 6): Nothing(0), less than 5,000,000(1), 5,000,000-10,000,000(2), 10,000,000-15,000,000(3), 15,000,000-20,000,000(4), 20,000,000-25,000,000(5), over(6)	3.47±1.58
Number of visited NPs	Ratio scale: number of visited NPs in Iran including 1 (1), 2-5 (2), 6-10 (3), 11-15 (4), and more than 15 (5).	3.92±3.48
WTP	Binary: Willing to pay=1, not willing to pay=0.	0.90±0.30
Paying amount	Ratio scale: The maximum of paying amount including 0, 10,000, 20,000, 30,000, 40,000, 50,000 Rials or other (?).	43,586±62,323
Benefited to local	Binary: Benefited to local people= 1, not benefited=0	0.45±0.50



Alborz red sheep (*Ovis orientalis*), Central Alborz Protected Area © Fariborz Heidari

The authors did not seek to represent objectively the opinion of the Iranian public but to investigate the opinion of Iran's e-society. A total of 2,121 usable questionnaires were collected from the survey. In this paper only respondents' who had visited at least one of Iran's NPs have been presented. Data cleaning, checking and coding were carried out, followed by data analyses. The authors used factor analysis to reduce ten statements of satisfaction into smaller sets of underlying factors (see annex 1).

Contingent valuation method and payment option:

In this study, the authors designed the CVM to simulate as closely as possible a real market. We designed bids based upon previous studies (Kolahi et al., 2013b; Qorbani and Sadeghi, 2011; Amirnejad, 2007) and inflation, using an entrance fee as a familiar vehicle for payment. It was felt that respondents would have little trouble visualizing the contingent market specified, since Iranian people are familiar with paying entrance fees for activities at recreation sites and many local facilities actually charge entrance fees. In this way, respondents had a real-world baseline against which to judge their responses. A set of six different offers and an open-end offer were selected. The offers included *nothing*; 10,000; 20,000; 30,000; 40,000; 50,000 Rials; and *others* (?) (US\$ 1=12,260 Rial; CBI, 2012). In the open-ended bid format (*others* (?)) respondents were asked to state directly their maximum WTP¹.

Logit regression model: The authors used logit regression to model the relationship of the binary dependent variables (WTP – yes/no and benefiting local people – yes/no) to the independent variables by using the Conditional Backward method. A statistical summary and explanation of all variables included in the logit models are provided in Table 1.

Finally, to measure WTP, the following equation was applied (see annex 1):

$$E(WTP) = \int_0^{Max A} \frac{1}{1 + e^{-(\alpha^* + \beta A)}} dA \quad (I)$$

where $E(WTP)$ is the expected value of WTP, β is a coefficient to be estimated, A is an offer, and α^* is the adjusted intercept which was added by the socioeconomic term to the original intercept term of α . The area under the curve in Eq. (I) can also be used to make inferences of truncated mean of WTP.

RESULTS

Sample characteristics: Out of 2,121 respondents, 61.7 per cent (1,308) had visited at least one NP. The sample represented visitors across all Iran's NPs. Available information resources about the last visited NP were low with 76.5, 15.6, and 4.4 per cent of respondents

Table 2: Frequency distribution of perception variables

Statements: SD=Strongly Disagree, D= Disagree, N= Neutral, A= Agree, SA= Strongly Agree	Rate of agreement (%)				
	SD	D	N	A	SA
Local people economically benefit from ecotourism activities.	3.8	13.7	5.8	45.9	30.7
Everyone should conserve wildlife of NPs.	0.9	0.8	0.8	13.2	84.3
Government should allow stakeholders to participate in management of NPs.	3.7	11.9	9.3	34.2	40.8
There is trust between NPs administrators and local people.	16.3	39.1	23.6	14.4	6.6
Current preservation and management activities in NPs are successful in conserving Iran's natural areas and wildlife.	24.9	40.9	13.5	16.7	4.0
Local people like establishing of NPs.	4.7	19.2	34.7	30.0	11.5
Ecotourism activities contribute to conserve NPs and their biodiversity.	10.8	27.3	12.7	34.3	14.9

Table 3: Knowledge about biodiversity conservation and national parks

Statements (knowing of/agreement)	%	
	No	Yes
NPs may include private lands and some people are living in.	37.3	62.7
NPs are scenic outstanding areas of natural landscape which would be sufficient to represent the nature of our country.	16.7	83.3
The purposes of designing a national park are "protection and improvement of biodiversity and sites" and "recreation".	22.2	77.8
About 1% of the country is selected as NPs.	68.9	31.1
All countries have confirmed to increase their PAs at least to 17% of their country's area by 2020 at the last international convention in Nagoya (2010).	88.8	11.2
About 10% of Iran's land has been progressively selected as PAs.	73.7	26.3
To increase the percentage of PAs to conserve Iran's biodiversity.	3.8	96.2

having been informed by just one, two or three sources, respectively. Among, friends/relatives (35.0 per cent), living nearby (16.5 per cent), school class/programme (13.9 per cent), television/radio (7.8 per cent), internet/website (7.4 per cent), publications (7.3 per cent), and other (12.0 per cent) were available information resources. Only 0.3 per cent of respondents lived inside NPs. While 11.9 per cent lived less than 10km from a NP, 25.9 per cent were 10-50 km from a NP, 45.0 per cent lived more than 50km away, and 17.0 per cent did not know the distance to their closest NP.

0.8 per cent of respondents were 19 years of age or under; 42.5 per cent were between 20-29; 38.4 per cent between 30-39; 13.6 per cent between 40-49; 3.9 per cent between 50-59; and 0.8 per cent were over 60. About 0.3 per cent of responders did not complete high school, 2.9 per cent completed high school, 4.1 per cent had the associate degrees, 28.1 per cent had the bachelor degrees, 43.5 per cent had the master degrees, and 21.1 per cent had the doctorate degrees or upper.

Environmental activities and attitudes: With respect to visitation: 32.5 per cent of respondents had visited one NP; while 54.5 per cent had visited 2-5, 8.9 per cent had visited 6-10, 1.9 per cent had visited 11-15

and 2.1 per cent had visited more than 15 NPs. Over half (54.3 per cent) had voluntarily participated in at least one activity related to nature conservation and environmental protection, while 45.7 per cent had not had this experience. However, 89.8 per cent were willing to voluntarily participate in projects related to nature conservation and environmental protection. Almost a third (30.6 per cent) had participated in at least one project related to NP planning and management including meetings, enforcement and/or monitoring.

The proportion of respondents who reported a desire to visit NPs of Iran again in the future was high (99 per cent). With respect to governance, 56 per cent believed participatory conservation as the more suitable structure for Iran's NPs management system, others noted private management (28.6 per cent), while only 6.4 per cent thought governmental management appropriate.

A quarter of visitors (27.1 per cent) had bought at least one local product when visiting a NP. The frequency distribution of the respondents' perception on environmental issues, local people, ecotourism, and NPs management are shown in Table 2. Awareness of the respondents about biodiversity conservation and NPs are presented in Table 3.

Explanatory variable	Coefficient	Std. error	Sig.
Number of available information resources	0.369	0.168	0.028
Total visitors' satisfaction	0.046	0.013	0.000
Member of environmental organization	0.632	0.235	0.007
Respondents' monthly income	0.171	0.054	0.001
Constant	-0.027	0.419	0.948
Likelihood-ratio $\chi^2_{10}=38.35$, $p<0.001$, $N=1,308$; -2 log likelihood: 795.25			
Correctly classified: 90.3%			

Table 4: Results of the logit model for WTP of Iran's national parks

Explanatory variable	Coefficient	Std. error	Sig.
Enjoyment satisfaction	0.054	0.016	0.001
Education level	0.114	0.063	0.072
Respondents' monthly income	0.104	0.032	0.001
Constant	-1.720	0.361	0.000
Likelihood-ratio $\chi^2_{11}=31.68$, $p<0.001$, $N=1,308$; -2 log likelihood: 1770.57			
Correctly classified: 57.3%			

Table 5: Results of the logit model for benefited local people by ecotourism

Some 23 per cent of respondents commented in the open-end question. Almost all the respondents worried about the destruction of Iran's nature and reduction of biodiversity. The comments contained a lot of useful information about threats to Iran's ecological regions. The main threats can be grouped as: 1) mismanagement and lack of support from the Government, the Legislature and the Judicature (48 per cent); 2) lack of people's cooperation in environmental issues (29 per cent); and 3) lack of knowledge and information related to biodiversity, NPs, environmental impacts, NGOs, and conservation activities (21 per cent).

Almost 73 per cent (1,547) of respondents asked to receive the results of the research and 10 per cent noted they had learnt more about the NPs and conservation in Iran.

Regression for WTP estimation: Almost 90 per cent of the respondents were willing to pay the bid amount specified in the survey. The logit regression model was robust in fitting the data with almost 90.3 per cent of respondents correctly allocated to predicted WTP either 'yes' or 'no' in the model, indicating a relatively good-fit

to the data ($\chi^2_{10}=38.35$, $p<0.001$, Table 4). Of the 13 variables, four were significant predictors of WTP in our model: the number of available information resources, the total visitors' satisfaction, membership of an environmental organization, and respondents' monthly income. Their signs were positive as expected. These indicate that the probability of WTP 'yes' increases with more available information resources, larger satisfaction, being a member of environmental groups and higher monthly income, under the hypothetical market scenario.

Estimating logit model for relationship between local people and ecotourism: Significant variables were included in the logit model for measuring whether

local people benefited by ecotourism ($\chi^2_{11}=31.68$, $p<0.001$, Table 5). The estimated coefficients of enjoyment satisfaction (component 2 of PCA; see annex 1) and respondents' monthly income were found statistically significant at the one per cent level with the expected positive signs. The coefficient of education level was also statistically significant but at the ten per cent level with the expected positive sign. The positive signs of enjoyment satisfaction, education level, and respondents' monthly income, indicated that the higher enjoyment satisfaction, more educated, and higher respondents' monthly income, the higher chance of benefiting local people.

Measuring use value of Iran's national parks:

Equation (II) shows the expected value of truncated mean WTP, which represents use values of Iran's NPs. It was calculated by numerical integration, ranging from zero to Maximum Bid (see Eq. (I)) after parameters from WTP logit model were estimated using the maximum

likelihood method. The socioeconomic term of θ was estimated and added to an adjusted intercept together

with the original intercept term of α . Iran's NPs, in general, were estimated to have the highest use value of 49,404 Rials (approximately US\$ 4; CBI, 2012) per visitor.

$$E(WTP) = \int_0^{50,000} \frac{1}{1 + e^{-(-12.061 + 0.020A)}} dA = 49,404$$

Rials (US\$ 4) (II)



Miyankale Protected Area © Mohammad T. Zakeri

DISCUSSION

The results of the survey are discussed based around four issues: conditions of NPs and management, information about biodiversity conservation and NPs, ecotourism as a tool for conservation and local development, and the potential of people participation in national park management.

Conditions of National Parks and management:

The conditions of infrastructure and primary services, facilities and available information of the NPs were reported to be weak (Table 1; annex 1). Respondents were more satisfied with accessibility of roads and parking, but complained strongly about lack of shop, restaurant, hotel, hut, toilet and walking tracks/trails. An increase in resources showed an increase in the probability of WTP (Table 4).

Respondents believed that management activities aimed at building trust with local people were weak (Table 2). The majority of respondents also noted that current preservation and management activities were not successful in conserving natural areas and biodiversity. They worried about the future of Iran's biodiversity and habitats. The majority of the respondents (84.6 per cent) pointed out that the current governmental management structure of the NPs needs to be changed; participatory conservation was seen as the best structure (according to definitions by Borrini-Feyerabend et al., 2004; IUCN, 2012).

Information about biodiversity conservation and National Parks: Most respondents had no information about the percentage of Iran in NPs and other PAs (Table 3). The majority were not informed about the last

international convention related to PAs and biodiversity (Table 3). Furthermore, it was clear that media resources were not disseminating knowledge and awareness of nature conservation and environmental issues to the public. As most respondents were educated and had access to internet and read news online this shows the weakness in spreading knowledge and information to the public. TV and newspapers have little coverage of water, air, PAs, threatened species or habitat loss; and even climate change and renewable energy receive scant attention.

Clearly there is a need to develop Iran's environmental awareness and consciousness, build community capacity for biodiversity management, resurrect the conservation movement, promote ecotourism and sustainable investment, and strengthen the capacity of NGOs. Village and urban areas need to have nature centres and schools with environmental education programmes that contribute to a conservation ethic which increases the political value of biodiversity. More media space (e.g. TV, radio, etc.) reserved for environmental education will also benefit protection. Creating a biodiversity ethic, however, requires changing the perception of distant biodiversity loss into one in which people all share personal responsibility for, locally and globally.

Ecotourism as a tool for conservation and local development:

Ecotourism potentially provides a sustainable approach to tourism development across the world. Visitors in PAs can generate both positive and negative environmental impacts (McCool, 2006). But some efforts show that through developing sustainable ecotourism it can be possible to change attitudes and increase conservation (e.g., Buckley 2012; Hussain et al.,



Parvar Protected Area © Hamid Esmail Zadeh

2012; Miller et al., 2012; Kolahi et al., 2012b). There are no statistics about ecotourism in Iran's. However, it is estimated to be very low (BHPAs, 2013), mainly due to the lack of basic infrastructure, facilities and information.

The relationship between nature conservation and ecotourism can be classified into three categories: coexistence, conflict and symbiosis (Budowski, 1976). The survey results showed that there is a potential 'symbiosis' relationship between Iran's NPs, conservation and ecotourism with environment protection enhanced by interactions between conservationists and the ecotourism industry. While responders rejected current unplanned and uncontrolled ecotourism, nearly half believed ecotourism could contribute to the conservation of NPs and associated biodiversity (Table 2).

Almost all respondents were willing to pay an entrance fee (Table 1), and the probability of paying more, unsurprisingly, increases with higher incomes and visitor satisfaction (Table 4). The need for the government to improve incomes and welfare was noted, particularly in the rural sector (Table 5). Most respondents highlighted

ecotourism activities as a tool to benefit local people through increased income, education opportunities etc. (Table 1 and 2).

Recreation and ecotourism in Iran's NPs could be sustainable if managers were equipped with sufficient information about the visitors' views and needs. In other words, knowledge of visitor characteristics is essential for recreation planning and management. Informed decision making and sound management of the site and facilities would help, in the long term, to sustain economic benefits of ecotourism in Iran's NPs.

The potential of people' participation in National Park management: The spatial coincidence of people and biodiversity poses a problem for conservation biologists, but also provides an opportunity (Schwartz, 2006). Rosenzweig (2003) presents several successful examples of involving the public in biodiversity conservation.

The survey showed that people were interested in conserving nature and biodiversity, and supported an increase in Iran's PAs (Table 3). Respondents believed

that the conservation of biodiversity is not only the responsibility of the government but also others and that government authorities should allow for more participation in conservation management (Table 2).

Volunteer stewardship programmes are an important way to engage society (Schwartz, 2006), yet relatively a few organized efforts exist in Iran. Given that most of the respondents were willing to participate voluntarily, it is up to the government to consider how participatory conservation between NPs' administrations and the public could be successfully applied. PAs managers should consider mechanisms to help increase public participation by building opportunities for participatory, cooperative science and stewardship. Volunteers can be registered with each national park and be engaged in providing nature interpretation programmes, participating in clean-up operations, undertaking simple repairs of facilities, carrying out nature surveys, etc.

CONCLUSION

Given the speed of degradation of Iran's biodiversity is at least 166 per cent greater than the global average (Darvish, 2006) and all Iran's 'environmental alarm lights' are red (Kolahi et al., 2012a) it is clear the government must quickly act and carefully improve its biodiversity management activities.

NPs and biodiversity conservation in Iran are threatened by mismanagement, lack of funds, park-people conflict, park-other organization conflict (Kolahi et al., 2012a, 2013a, 2014), lack of biodiversity awareness, and lack of public participation. This is highlighted by several respondents to the survey believing that Iran's NPs are 'paper parks', (*sensu* Dudley and Stolton, 1999). The government needs to improve the conditions of NPs and management through financial and active planning support, to hire well-trained staff, enhance infrastructural and service facilities, etc. The government must also try to improve incomes and welfare, particularly in the rural sector.

People should be seen not as a threat but as an opportunity to help achieve broader nature conservation goals. The government should see the human and environmental condition as intricate linked system. If Iran's environmentalists are to move beyond their current isolation, they must reach out and connect to new audiences across the social spectra. Conservation biologists can help engage Iran's society in conservation efforts by striving to achieve three goals: adjusting the public's perception of biodiversity, increasing public participation in biodiversity conservation, and

encouraging ecotourism by tour packages to develop conservation and local.

This study, with its socio-political approach, contributed to a greater understanding of the implications of ecotourism management in Iran. In summary, almost all respondents were willing to voluntarily participate in projects related to nature, environment and biodiversity conservation; were willing to pay for protection; wished to see an increase the area of PAs; wanted to visit NPs in the future; and they were mostly young.

Finally, it should be noted that studies in the past used the direct face-to-face interview as their main survey method. We would like to see more online questionnaires in future for the evaluation of environmental problems as these can reach a far wider audience in a far more cost effective manner.

FOOTNOTE

¹ The authors are not supporting the implementation of entrance fee to PAs per se, but the government could, for example, consider payments for tour groups etc.

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Asiatic (Persian) Cheetah (*Acinonyx jubatus venaticus*), Miandasht Wildlife Refuge © Fariborz Heidari

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ANNEX 1: STATISTICAL ANALYSIS

The authors used factor analysis to reduce ten statements of satisfaction into smaller sets of underlying factors. This helped to detect the presence of meaningful patterns among the original variables and to extract the main opinion factors. The authors analyzed answers to the statements related to visiting satisfaction of services, facilities, information, and enjoyment by using principal component analysis (PCA) with varimax orthogonal rotation on ten statements measured by using the five-point Likert scale: (1) strongly disagree, (2) disagree, (3) neutral (neither agree nor disagree or do not know), (4) agree, and (5) strongly agree. We used two factors having an Eigenvalue of more than one in our analysis. PCA was used to identify key dimensions. In the interpretation of the dimensions, only variables with a factor loading greater than 0.40 were extracted (Kim and Muller, 1978, Hair et al., 1995). These data were appropriate for factor analysis according to the Kaiser-Meyer-Olkin measure of sampling adequacy value of 0.858 (Hair et al., 1995). The Bartlett Test of Sphericity was significant ($\chi^2 = 3502.590$, $p < 0.001$), indicating that correlations existed among the statements. Two components were found that were rotated into interpretable factors. The two key dimensions identified approximately 52 per cent of the total variance. According to correlations between

component loadings and statements, the first PCA axis represented questions related to NPs' status and the second questions related to enjoyment. Component 1, a status dimension, consisted of six statements (Infrastructural Facilities (e.g., accessible road, parking); Service facilities (e.g., shop, restaurant, hotel, hut); Clean, well presented toilet facilities; Well designed and maintained walking tracks/trails; Collected human waste; and Provided useful guides/maps/information on plants and animals of national park), and component 2, an enjoyment dimension, comprised four statements (Essence, friendly and responsive national park staff and provided information by them; Feeling safe; Able to enjoy nature; and Overall, how happy are you with your visit?). Component 1 accounted for 38.8 per cent of total variance, and component 2 accounted for 13.4 per cent of total variance.

MODEL SPECIFICATION FOR MEASURING WTP

It is assumed that an individual will accept a suggested admission fee for recreation activities (or a suggested tax for preservation), to maximize her/his utility under the following condition (Hanemann, 1984):

$$v(1, Y - A; S) + \varepsilon_1 \geq v(0, Y; S) + \varepsilon_0 \quad (1)$$

and reject it otherwise. Here, v is the indirect utility which is assumed to equal the utility u ; Y is income, A is an offer (admission fee or tax), S is other socio-economic characteristics affecting individual preference, and ε_0 and ε_1 are the identically, independently distributed random variables with zero means.

The utility difference (Δv) can be described as follows:

$$\Delta v = v(1, Y - A; s) - v(0, Y; s) + (\varepsilon_1 - \varepsilon_0) \quad (2)$$

The CVM has a binary choice dependent variable which requires a qualitative choice model. The probit and logit models are commonly used qualitative choice methods (Capps and Cramer, 1985). Because of its relative simplicity to compute, the logit model is used in this

research. The probability (P_i) that the individual will accept an offer (A) can be expressed as the following logit model (Pindyck and Rubinfeld, 1981; Hanemann, 1989):

$$P_i = F_{\eta}(\Delta v) = \frac{1}{1 + \exp^{-\Delta v}} = \frac{1}{1 + \exp^{-(\alpha + \beta A + \gamma Y + \theta S)}} \quad (3)$$

where $F_{\eta}(\Delta v)$ is the cumulative distribution function of a standard logistic variate and some of socio-economic variables are included in this research. β , γ , and θ are coefficients to be estimated.

Three methods are usually used to compute the value of WTP: the first method, called mean WTP is to calculate the expected value of WTP by numerical integration, ranging from 0 to ∞ ; the second method, called overall mean WTP is to calculate the expected value of WTP by numerical integration, ranging from $-\infty$ to $+\infty$; and the third method, called truncated mean WTP, is to calculate the expected value of WTP by numerical integration, ranging from 0 to Maximum Bid (A). The last method is preferable because it satisfies consistency with theoretical constraints, statistical efficiency, and ability to be aggregated (Duffield and Patterson, 1991). Thus, the truncated mean WTP is used in this research.

The logit model in Eq. (3) is then estimated using the maximum likelihood estimation method, the most common technique for estimating the logit model (Capps and Cramer, 1985). Once the parameters have been estimated using the maximum likelihood method, then the expected value of WTP can be calculated by numerical integration, ranging from 0 to Maximum Bid (A) as follows:

$$E(WTP) = \int_0^{Max A} F_{\eta}(\Delta v) dA = \int_0^{Max A} \frac{1}{1 + e^{-(\alpha^* + \beta A)}} dA \quad (4)$$

where $E(WTP)$ is the expected value of WTP, and α^* is the adjusted intercept which was added by the socioeconomic term to the original intercept term of α . The area under the curve in Eq. (4) can also be used to make inferences of truncated mean of WTP.

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RESUMEN

La amplia diversidad de climas y medios naturales de Irán ofrece posibilidades para utilizar el ecoturismo como herramienta para apoyar la conservación y el desarrollo local. Para sacar provecho de este potencial, es preciso identificar la experiencia del ecoturismo para dirigir las acciones de gestión. Este artículo examina las actitudes de los ecoturistas hacia la conservación y evalúa el valor económico de los parques nacionales de Irán. Dos mil ciento veintinueve personas respondieron un cuestionario en línea llevado a cabo en el verano de 2012. La mayoría de los encuestados había visitado al menos uno de los 26 parques nacionales de Irán. La encuesta puso de manifiesto la débil condición de los parques nacionales tanto en términos de su estado como de las actividades de conservación. Casi todos los encuestados, jóvenes en su

mayoría, estaban dispuestos a participar voluntariamente en proyectos relacionados con la naturaleza, el medio ambiente y la conservación de la biodiversidad, a pagar por la protección, aumentar la superficie de las áreas protegidas, y visitar los parques nacionales en el futuro. Opinaron que la conservación de la biodiversidad no es solo responsabilidad del Gobierno sino también de la sociedad en general. Por otra parte, la mayoría de los entrevistados destacó las actividades ecoturísticas como herramienta para beneficiar a la población local. El documento concluye que el Gobierno debería elevar el nivel de conciencia ambiental, desarrollar la capacidad comunitaria para la gestión de la biodiversidad, resucitar el movimiento conservacionista, promover el ecoturismo y la inversión sostenible, fortalecer la capacidad de las ONG, buscar sinergias y crear oportunidades para la gestión participativa y la cooperación científica.

RÉSUMÉ

Le climat et la nature très diversifiés de l'Iran permettent au pays de bénéficier de l'écotourisme comme outil de conservation de la biodiversité et de valorisation du développement local. Afin de réaliser ce potentiel, il faut tirer les enseignements de l'écotourisme et les utiliser pour piloter des actions de gouvernance. Ce document examine les attitudes des écotouristes envers la conservation et évalue les parcs nationaux (PN) Iraniens sur le plan économique. 2121 personnes ont répondu à un questionnaire en ligne réalisé durant l'été 2012. La majorité des répondants ont visité au moins l'un des 26 PN d'Iran. L'enquête a révélé un déficit des PN tant au niveau de leur statut que des activités qui y sont menées pour leur conservation. Presque tous les répondants, la majorité étant des jeunes, se disent prêts à participer bénévolement à des projets liés à la nature, à l'environnement et à la conservation de la biodiversité. Ils se disent également prêts à accroître la superficie des aires protégées, à visiter les PN à l'avenir et à contribuer financièrement à leur promotion. Ils considèrent que la conservation de la biodiversité n'est pas seulement la responsabilité du gouvernement, mais aussi celle de la société en général. En outre, la plupart des répondants mettent en avant l'importance de l'écotourisme en tant qu'outil bénéficiant aux populations locales. Le document conclut que le gouvernement devrait sensibiliser d'avantage la population aux questions environnementales, renforcer les moyens au niveau local pour gérer la biodiversité, ressusciter le mouvement de conservation, promouvoir l'écotourisme et l'investissement durable, renforcer le champ d'action des ONG, rechercher les synergies, et ouvrir la voie à un modèle de gouvernance participatif et communautaire.