

## Introduction of Participatory Conservation in Iran: Case Study of the Rural Communities' Perspectives in Khojir National Park

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**ABSTRACT:** Participatory conservation, as bottom-up management, is currently the most acceptable model for management of protected areas across the world. Social context is a central issue in the sustainable management of conservation areas. It is also crucial to introducing participatory conservation. The new approach therefore recognizes rural communities as key partners in biodiversity management and seeks their participation in social development and biodiversity conservation. This paper examines the opinions and perceptions of local residents towards conservation, ecotourism, and Khojir National Park (KNP) in Iran. A questionnaire and informal interviews were conducted in five villages in or around the park. A comparative analysis of community participation and its barriers among the villagers were also employed. A model was developed to study attitudes of the local people and how they affect conservation and ecotourism development. The results revealed a moderate general knowledge about KNP and environmental issues, the lack of interaction between local people and government authorities, eagerness to participate in the activities of KNP, general support for the conservation cause, and important differences among the villages. Furthermore, the majority of respondents were classified as supportive of biodiversity conservation and neutral to ecotourism development, which may indicate a coexistent relationship. The research clearly identifies the need for devising strategies and initiatives appropriate to specific local groups for optimizing their input in conservational issues. The optimization process of participatory conservation in Iran should be undertaken to create a congruent, site-specific model with the best possible results based on world experiences.

**Key words:** Biodiversity conservation, Bottom-up management, Local people, Ecotourism development

### INTRODUCTION

Biodiversity (species, ecosystems, and genes) management is an interdisciplinary conservation. It requires the consideration of biodiversity and people as an intricate system, and also many factors and their relationships (Fu *et al.* 2004). Therefore, social-political context is crucial to conserving biodiversity. On the other hand, the establishment of protected areas (PAs) is perhaps the longest-standing, most widely practiced, and best-funded approach to maintaining environmental services (Chomitz 2007; Yakhkashi 2002). They are certainly a main building block in protection attempts of environmental services (Kolahi *et al.* 2012a, 2013a). But their establishment has sometimes involved the displacement of, and loss of assets, by rural people (Geisler and Sousa 2001; Ghimire and Pimbert 1997; Swardona and Faust 2006). Conflicts between

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management of PAs and communities are increasing in many countries (Kolahi *et al.*, 2011b, 2012a; Munasinghe and McNeely 1994). Nowadays, indigenous peoples and issues are becoming increasingly common at international conservation events (Brockington *et al.*, 2008; COP11 2012; Fuller 2004) and there is a trend towards permitting multiple uses for PAs. Subsequently, the mission of PAs has expanded from biodiversity conservation to improving human welfare (Naughton *et al.* 2005). There has also been a trend to educate, increase awareness and income, and to actively engage local people in participative conservation and sustainable use of PAs (Braatz 1992; IBRD 2011; Munasinghe and McNeely 1994), to protect the diversity of species and communities (Muller *et al.*, 2011). The past decade has additionally seen a substantial move toward using education, information, and voluntary cooperation not

just with individuals, but also with communities (NRC 2002). Moreover, policies based on voluntary agreements normally are presented as a way to reduce environmental impact faster or further than regulations require (e.g., NRC 2002; Stern *et al.*, 1993). Given such circumstances, a more adaptive and holistic management approach is suggested by many conservationists to involve local communities in decision-making processes and to share the equal distribution of conservation related benefits (Bruyere *et al.*, 2009; COP11 2012). Therefore, participatory conservation approaches are now dominant in most of the world (Kapoor 2001; Khadka and Nepal 2010; Sladonja *et al.*, 2012). The public can help with conservation. The best way to get people to internalize a biodiversity ethic is to have them participate in ecological stewardship (Schwartz 2006). There is a growing recognition of the effectiveness of local groups and the idea of important social capital assets in bringing and gaining positive biodiversity outcomes (Pretty and Smith 2004). Furthermore, there is an indispensable shift in ecological systems from traditional centralized structures to participatory approaches where local communities and other stakeholders are the base (Kapoor 2001). Therefore, Pretty and Ward (2001) have identified four central features of social capital including (i) relations of trust; (ii) reciprocity and exchanges; (iii) common rules, norms, and sanctions; and (iv) connectedness in networks and groups. As Ford (2010) mentioned, however, stakeholder knowledge is an important source of information, and local people knowledge is especially important in biodiversity and natural resources management. It can take the form of “street science” (Corburn 2005) or as experiential knowledge accumulated in a rural community (Costanza and Ruth 1998).

Co-management, community-based conservation, or other participatory approaches are suggested to implementing specific solutions in ecological systems (Brunckhorst 2010; Parr *et al.* 2008; Shackleton *et al.*, 2010; Sladonja *et al.*, 2012). Co-management in conservation, for example, answers the local people’s claim to the right to share management power and responsibilities for biodiversity conservation with the governor (McCay and Acheson 1987). Nevertheless, it can be achieved only if local people are not excluded from PAs management, and their management put government authorities, rural residents, and other related stakeholders on an equal footing (Torn *et al.* 2008), in the manner of integrated management (Kolahi *et al.*, 2011a, 2012a). However, certain preconditions are needed for participatory conservation depending on legal, ecological, and socioeconomic conditions

(Khadka and Nepal 2010). Therefore, one of the strategies of the PAs managements is to discover whether rural communities are willing to be involved, and how they can participate in the management processes. Given this reason, public attitudes and perceptions towards biodiversity conservation and PAs are being widely studied and evaluated (Alibeli and Johnson 2009; Allendorf 2007; Harada 2003; Kideghesho *et al.* 2007; Mehta and Kellert 1998; Sladonja *et al.*, 2012; Torn *et al.*, 2008; Walpole and Harold 2001; Wang *et al.*, 2006).

Tourism and recreation will increasingly use 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” (Font and Tribe 2000). Tourism is one of the most popular buzz words throughout the world, and surprisingly one billion tourists travelled the world in 2012 (UNWTO 2012). 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” (Lindberg and Hawkins 1993). This definition emphasizes the view that ecotourism should have positive impacts. Given this definition, the relationship between biodiversity conservation and ecotourism development can be classified into three categories of conflict, coexistence, and symbiosis (Budowski 1976). The territory of Iran hosts one of the most diverse, rich, ancient, multifaceted and compilations of cultural heritage found in contemporary societies today (UNESCO-Tehran 2010). This richness plus its diverse multilingual and multicultural society has ranked it among the world’s ten most touristic countries (Farsinet 2003). Iran is also rated one of the world’s five richest countries with the highest biodiversity (Ghadimi 2008). Furthermore, it is one of the fifth countries with the highest ecotourism attractions in the world (Khadem and Sazegara 2011), because of it being the main sources of nature, climate and biodiversity in geography (UNESCO-Tehran 2010). According to historical documents and evidence, the first protected forest area in the world was established in Iran by Xerxes (Khashayar Shah, a Persian king) around 500 B.C. (Yakhkashi 2002). However, growth in population, anthropogenic activities, and climate warming over the past few decades has caused serious degradation of natural reserves and biodiversity in Iran (Kolahi *et al.*, 2012a). This trend has raised concern over the status of biological endemic species. In an attempt to preserve biodiversity, some areas were assigned into PAs. But only a few research studies have been done on the status of Iran’s PAs (Makhdoum 2008; Kolahi *et al.*, 2012a, 2013b) and little is known about the perceptions and beliefs of local residents

regarding biodiversity protection, ecotourism development, and participative conservation. However, most threats to these natural PAs come from PAs-people conflicts, limited public participation, the lack of environmental educations, PAs-other organizations conflicts, mismanagement, and shortages of manpower, equipment, and financial resources (Kolahi *et al.* 2012a, 2013a, 2014). Although, local capital is important in real conservation, there is no organized cooperation between local people and conservation (Kolahi *et al.*, 2011a, 2013e). Rural communities are excluded from the management (Kolahi *et al.*, 2013a,b). There is a lack of

real community participation, a lack of indigenous community conserved area, and no place for community-based conservation (Kolahi *et al.* 2013a, 2012a). Therefore, finding ways to establish and strengthen the relationships between rural communities and PAs is crucial to the long-term success of conservation efforts (COP11 2012; Fialo and Jacobson 1995). 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

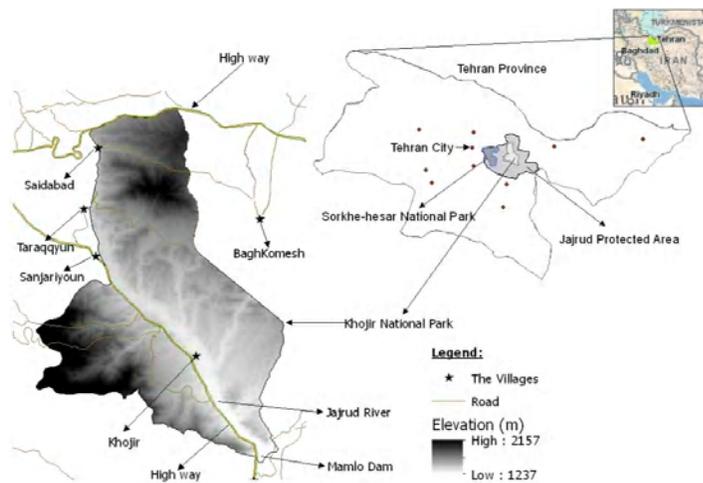


Fig. 1. Location of the study site (Khojir National Park and the villages where the investigations were conducted)

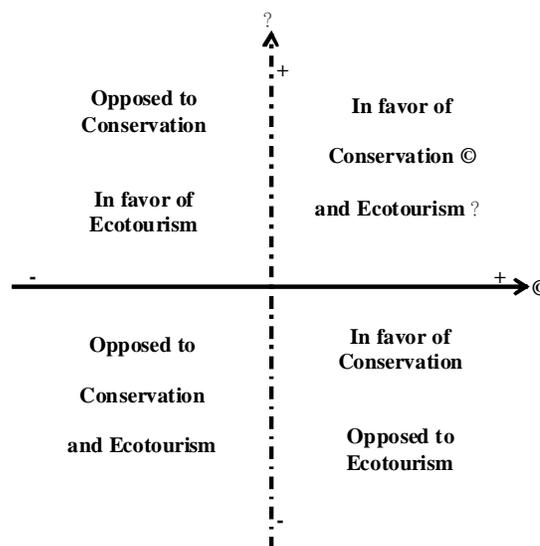


Fig. 2. Schematic model of the opinions of the residents about biodiversity conservation and ecotourism development

Table 1. Socioeconomic and demographic characteristics (%) of the respondents in different residential areas

Socioeconomic/demographic characteristics	Khojir (n= 32)	Sanjariyoun (n= 26)	Taraqyyn (n= 6)	Saidabad (n= 54)	BaghKomesh (n= 11)
Gender					
Male	68.8	80.8	83.3	70.4	72.7
Female	31.2	19.2	16.7	29.6	27.3
Marital status					
Single	9.4	23.1	33.3	75.9	36.4
Married	90.6	76.9	66.7	24.1	63.6
Household size					
1-3	25.0	38.5	33.3	37.0	54.5
4-6	68.8	61.5	50.0	51.9	36.4
7-9	3.1	0.0	16.7	5.6	9.1
10-12	3.1	0.0	0.0	5.5	0.0
Age					
15-30 yr	15.6	23.1	33.3	38.9	36.4
31-45 yr	46.9	11.5	33.3	38.9	36.4
46-60 yr	31.3	38.5	33.3	16.6	18.1
61-75 yr	6.3	23.1	0.0	5.6	9.1
76-90 yr	0.0	3.8	0.0	0.0	0.0
Level of education					
Illiterate	9.4	19.2	16.7	7.5	9.1
Elementary school	40.6	3.8	0.0	11.1	0.0
Middle school	18.8	11.5	0.0	22.2	27.3
High school	28.1	42.4	66.7	44.4	45.4
Higher education	3.1	23.1	16.7	14.8	18.2
Land ownership					
Do not own land	12.5	15.4	33.3	98.1	36.4
Own land	87.5	84.6	66.7	1.9	63.6
Livestock ownership					
Do not own livestock	43.8	65.4	33.3	100	54.5
Own livestock	56.2	34.6	66.7	0.0	45.5
Effect of nature conservation on household economy					
Disadvantage	9.4	7.7	0.0	3.7	9.1
No effect	25.0	46.2	66.7	22.2	81.8
Benefit	65.6	46.1	33.3	74.1	9.1
Household income is enough to cover the households' expenses					
No	12.5	50.0	33.3	51.9	36.4
Barely	34.4	7.7	0.0	33.3	45.5
Yes	53.1	42.3	66.7	14.8	18.1
Primary family income source					
Pensioner	9.4	42.3	50.0	3.7	27.3
Employee/worker	53.1	7.7	0.0	33.3	27.3
Entrepreneur	37.5	50.0	50.0	63.0	45.4

experiences. Based on an inquiry from BHPAs (2013), the total eco-tourists of Iran's national parks have been estimated at 100,000 persons per year. However, ecotourism has a great future and there is a huge potential for the development of ecotourism in Iran's nature.

#### MATERIALS & METHODS

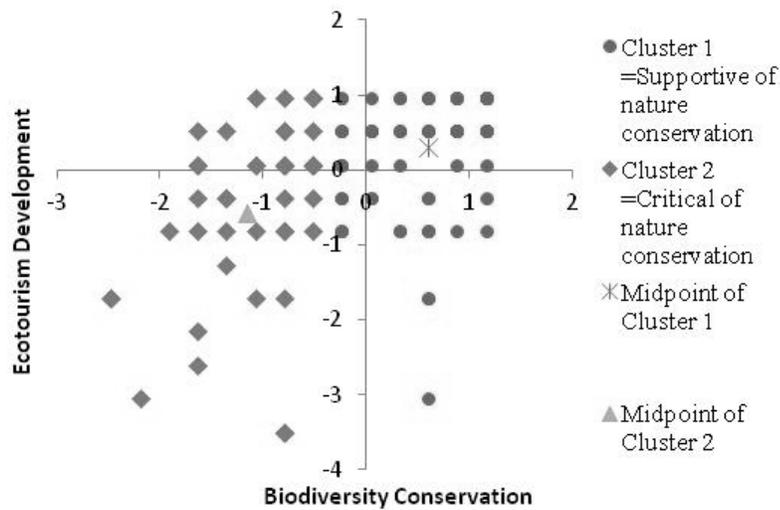
The study area for this research was the oldest PA in Iran, Khojir National Park (KNP; Figure 1; 35° 41'N, 51° 41' E). It is situated inside the Jajrud Protected Area, east of Sorkhe-hesar National Park and Tehran city (the capital of Iran). The set of Jajrud PA, KNP, and Sorkhe-hesar

National Park, with a total area 72,626 ha, is managed by a common office with about 6 staff and 30 ecoguards under management of Department of the Environment (DoE; Kolahi *et al.* 2013b). This study site was selected because it has a comparatively extensive PA system and a strong management body. This site is also experiencing increasing pressures from human activities and climate changes, and management strategies have been created to address these changing stressors. This active management allowed us to assess attitudes of local people towards conservation and KNP. Starting in 1754, Khojir was controlled as a royal game reserve (Safaei and Mohammadi 2005). In 1979, it became part of the Jajrud protected area. It was later promoted to a national park in 1982, with an area of 9971 ha. A model management plan based on FAO guidelines was prepared for KNP and Sorkhe-hesar National Park in 1985 (Makhdom *et al.* 1987), although the plan is currently being updated (Kolahi *et al.* 2013b). The region is located on the southern slope of the Alborz Mountain range in Tehran Province; it is a mountainous rolling area ranging from about 1200–2200 m in altitude. The Jajrud River flows through this region. Mean annual precipitation and temperature are 300 mm and 11°C, respectively, producing a temperate semi-arid climate. Biodiversity is high, with 512 plant and 192 animal species identified in this region (ATM, 2011). Because of its proximity to the Tehran metropolitan area, numerous access roads, biodiversity, beautiful landscapes, and rivers and frequent springs, the park attracts tourists and scientific activities (Darvishsefat 2006). KNP has genetic resources, a high diversity of fauna and flora, is a biome representative of Central Alborz, and preserves ancient history. The area's role as a filter to reduce air pollution was mentioned because it is adjacent to Tehran city. The two primary KNP management objectives were protection, and ecotourism and use of park potentials (Kolahi *et al.*, 2013b). In these areas, there are some problems, which could be an obstacle to adequate KNP management (Kolahi *et al.*, 2012a, 2013b). The Park-other organizations conflict, mismanagement, land encroachment, fragmented areas, and existence of a highway in middle of KNP were the most threats for the park authorities. We first created a schematic model that classifies the residents based on their perceptions of and opinions about biodiversity conservation and ecotourism development (Fig. 2). Using this schematic model as a framework, our second step was to conduct a survey of local residents. It was estimated that approximately 16,890 people lived within 35 villages in six rural districts, in the five counties of Tehran, Damavand, Rey, Varamin, and Shemiranat in and around Jajrud set (DoE 2002). Based on the experiences of KNP rangers and the importance of the location of

the villages, five villages in or around KNP were selected including (number of households, population): Khojir (47, 178), Sanjariyoun (19, 70), Taraqqyun (9, 24), Saidabad (565, 2388), and BaghKomesesh (287, 1393) (DoE 2002). In October 2012, we collected data via direct formal and informal interviews with 129 randomly selected households from the five above mentioned villages located in or adjacent to KNP, to determine their opinions about biodiversity conservation and ecotourism development. But in Taraqqyun, interviews were done only with available natives who lived there. We also selected the method of Rapid Rural Appraisal to collect data from BaghKomesesh village, because of its characteristic and distance to KNP. The questionnaire was written in Persian. Survey responses were later translated into English. Participation was on a voluntary basis and no compensation was provided for the interview. In an effort to obtain an unbiased response, no information about KNP was given to respondents until after the interview was completed.

The questionnaire which contains 32 questions was structured into four sections: 1) perceptions of the residents to the national park and conservation; 2) perceptions of ecotourism; 3) strategies for participatory conservation; and 4) the socioeconomic and demographic information. The survey consisted of dichotomous yes/no, multiple-choice, and ordered-rank responses, though a few open-ended questions were also posed to offer further explanations for checked responses. By these questions, the understanding of the villagers about the existence of the national park, the customary knowledge about conservation, and natural resource use by the residents in KNP for their daily needs were examined. Their claims on lands and resources within the park were explored. The local judgments about relocation, local participation, and openness of local communities to the outside world were examined to prepare strategies for participatory conservation approaches between government authorities and local communities. Furthermore, the socioeconomic and demographic variables of the respondents were collected including residential area, gender, marital status, age, level of education, primary family income source, proportion of family income to their costs, household size, land ownership, livestock ownership, and effect of nature conservation on household economy.

Formal interviews were conducted with each randomly selected household. Informal interviews with each respondent were added to confirm, strengthen, and enrich the results of the formal interviews with the questionnaire. Additionally, general information was also gathered by informal, unstructured and open-



**Fig. 3. Biplot of the cluster analysis (Note that many points are overlapped, especially in Cluster1: n=129)**

ended interviews with key informants such as village leaders, elderly village members, as well as each respondent.

Chi-squared tests ( $\chi^2$ ) were performed on every statement to determine the differences between the five villages living within or adjacent to the park. The  $\chi^2$  tests were also conducted to measure the correlation between affluent conditions and attitudes toward conservation and the park. In addition, the perceptions of the residents about biodiversity conservation and ecotourism development, beyond current conditions, were used for cluster analysis. Therefore, the data were summarized for each person, then were normalized using the Mean and Standard Deviation. Then, we conducted  $\chi^2$  tests to investigate if cluster membership was dependent on the socioeconomic and demographic variables of the respondents.

**RESULTS & DISCUSSION**

Land use of Jajrud set is mostly rangeland (87.53%), while agriculture lands are about 0.48% (DoE 2002). With regard to area and the villages' effect on the park, the respondents' rate was 24.8% (32) from Khojir, 20.2% (26) from Sanjariyoun, 4.6% (6) from Taraqqyun, 41.9% (54) from Saidabad, and 8.5% (11) from BaghKomesh. The majority of the respondents were male (72.9%) and married (78.3%), except in Saidabad (Table 1). The average of their household members was 4.2 persons. Many were 31-60 years old, and the average was 40.5 years old. The 10.9% of respondents were illiterate, and others had finished a year of elementary school (15.5%), middle school (18.6%), high school (41.0%), or a higher education level (14.0%). Nearly half of the respondents (48.1%) owned agriculture land, and 27.9% owned livestock. Almost

all of villagers in Saidabad did not have land and livestock. In every study area, a few respondents reported that nature conservation had a disadvantage on their household economy. All the villages except Taraqqyun, were at the lowest income level. Approximately, half of the respondents in all residential areas were entrepreneurs (51.8%; ranchman, farmer, or self employment), whereas others were employee/workers (31.1%) and pensioners (17.1%). However, the populations of the villages have changed a lot. The conditions of the surveyed communities (Fig. 1) are as follows:

Khojir village is located in the middle of KNP, as the oldest village in the region being more than 300 years old. With about 53 households, its population was about 150. 12 households were permanently living there but others lived in the near cities and used their houses for vacation or rest. The respondents reported that the village had about 1050 sheep, 350 poultry, 5 cattle, and 35 hectares of agriculture land (mostly for floriculture and fruit gardens). A few of the local people sometimes collect medical plants for their personal use. Currently, about 18 villas are built by nonnative and newcomer persons. 81.3% of respondents in this village were happy and enjoyed living there. The respondents deeply worried about the conditions of the park, because of the loss of natural beauty and ancient monuments. They believed biodiversity and lands in KNP were severely destroyed. Among those being, lack of supervision and proper management, the park-other organizations conflicts, lack of integrity management, drought, and treason of the authorities for selling meat of prey were the most repeated mentioned comments. Furthermore, they complained about visitors hunting wildlife, fishing, and the cutting

and burning of plants and trees. They explained many items in response to the question of any problems, restrictions, or conflicts which come from KNP. The most common notes were lack of basic utilities and facilities, lack of attention to indigenous needs and opinions, lack of income from ecotourism because of their restrictions to entry, and that they are pressured by several organizations (Governor General, Water Authority, DoE, Natural Resources office, Jihad-Agriculture ministry, etc.) to stop livestock and agriculture activities and to move from the village. In response to any recommendations or suggestions to improve the park management, the majority of the respondents suggested that an active exchange of ideas and establishment of an integrated management, together with the local people, can improve the management of KNP. They were also willing to take responsibility of the park to prepare KNP as a community-based conservation park.

Sanjariyoun village is located near the west border of KNP. With about 70 households, its population was about 380. 30 households were permanently living there but others lived in near cities and used their houses for vacation or rest. This village had about 600 sheep, 350 poultry, 15 cattle, and 55 hectares of agriculture land (mostly for floriculture and fruit gardens). 84.6% of the respondents of this village enjoyed living there. The respondents worried about conditions of KNP. They complained about non-integrated management, lack of conservation facilities, uncontrolled visitors, mismanagement, fire, and lack of motivation in rangers because of unpaid salary, lack of support from managers, and unsustainable employment. The most common problems which came from KNP included lack of utilities and facilities, drought because of dam, higher living costs, lack of rural development, cancellation of rangeland licenses, lack of easy access to village from entry gate, and ban for renewing buildings and construction. They asked the management to respect their needs, prepare meetings, hear their opinions, clean the area, attract KNP for ecotourism, apply village improvement schemes, and plan for integrated management.

Taraqqyun village is located in the northwest of KNP. It was a small village with seven households. But it had about 60 newcomers' households who use their houses mostly for rest or recreation on holidays and weekends. All respondents of this village enjoyed living in their village. However, they complained about the inappropriate behaviour of the rangers, no permission for repairing buildings and gardens, the rangers taking bribes, fire in the field, garbage, unsafe area, lack of grazing permits, and lack of facilities because of KNP. They believed that the management

should consider preparing voluntary plans, controlling ecotourism and visitors, watering plants and wildlife, planting, allowing local people to participate in the management, and applying comprehensive management. Saidabad village, in the northwest of the park, is pasted to Jajrud County. It had about 1250 households and a population of 8,000 in which only 2% were native (reported by Saidabad Dehyari office, October 2012). People did not engaged in any livestock or agriculture activities, and only 35.2% of the respondents said that they were enjoying living there. Saidabad has been planning to change to become a county. The respondents mentioned land encroachment, biodiversity loss, fire, lack of recreation place, no traffic allowed, irregularities of the rangers, treason of the rangers to their tasks, and mismanagement as their concerns. They believed KNP management should invest and improve conservation conditions, employ expert personnel, build capacity, collaborate with other organizations and local people, plan ecotourism zones of the park, consider and resolve the problems, develop the village, and supervise and manage scientifically.

BaghKomesesh village is located in the east of KNP with the distance of about 3000 km from its border. This village had about 500 households and a population of 2,000 in which 2.5% were native (reported by BaghKomesesh Dehyari office, October 2012). This village, with traditional livestock, had about 3500 sheep and 1500 hectares of fruit gardens and agriculture lands. 54.5% of the answerers were satisfied living there. The respondents were worried about biodiversity loss, pollutants and emissions of cement and sand crushing factories, burning trees, hunting wildlife, garbage, weakness in attracting ecotourism, uncontrolled visitors, destruction of mountains, and the taking of bribes by the responsible persons of KNP. They believed that the governor should consider preventing sewage from flowing into the park in coordination with relevant organizations, controlling pollution from the factories, and obstructing illegal hunting. They also wanted the governor establish facilities and services to attract ecotourism, collect waste and recycling, participate in profiting people, and improve the situation of KNP and the village. They also suggested preparing meetings with local people, active management, planting, increasing rangers, designing ecotourism plans, preserving monuments, building capacity, and establishing a visitor center.

A large proportion of indigenous people knew about the existence of the park including 100%, 85%, 100%, 46%, and 64% of the respondents in the villages of Khojir, Sanjariyoun, Taraqqyun, Saidabad, and BaghKomesesh, respectively, with a statistically

**Table 2. Frequency distribution of perception variables about conservation, management and ecotourism**

Statements	Rate of agreement (%)																$\chi^2$	df	P									
	Khojir				Sanjariyoun				Taraghian				SaeidAbad							BaghKomesh								
	SD	D	N	A	SD	D	N	A	SD	D	N	A	SD	D	N	A				SD	D	N	A					
Everyone, including local people, should conserve wildlife of KNP.	0	3	7	6	84	0	0	0	42	58	0	0	0	0	100	2	0	6	31	61	0	0	0	100	24.70	16	.075	
KNP was created for the betterment of our community.	6	19	3	19	53	8	19	11	31	31	0	0	50	17	33	7	4	20	43	26	9	9	46	18	30.47	16	.016	
I am generally satisfied that my village is included in/near to KNP.	9	16	3	28	44	8	23	8	27	34	0	0	0	17	83	6	6	20	37	31	0	0	27	27	46	22.38	16	.131
Generally speaking, I like KNP.	3	3	4	6	84	0	0	0	46	54	0	0	0	0	100	0	2	26	41	31	0	0	18	27	55	42.70	16	.000
I agree with increasing the area of KNP.	16	25	12	16	31	27	19	0	35	19	17	0	17	50	16	24	7	44	17	7	9	0	18	27	46	28.37	16	.029
The establishment of conservation areas is	3	6	6	13	72	8	12	0	38	42	0	0	0	0	100	2	0	13	33	52	0	0	0	18	82	27.36	16	.038
Ecotourism activities contribute to conserve KNP and its biodiversity.	3	9	7	28	53	8	31	8	27	27	50	0	0	17	33	6	7	22	41	28	9	27	10	27	27	38.56	16	.001
Local people economically benefit from ecotourism activities.	12	9	13	16	50	19	23	31	15	12	67	0	17	16	0	19	7	39	20	15	73	18	0	9	0	51.33	16	.000
Visitors to the area are well behaved.	6	0	62	19	13	31	15	15	31	8	17	0	33	33	17	13	6	43	28	11	18	0	27	55	0	27.41	16	.037
Tourism development is important for the future.	0	3	6	13	78	12	0	0	42	46	16	0	0	17	67	4	2	4	33	57	0	0	0	9	91	21.24	16	.169
Government should allow stakeholders, including local people, to participate in management of KNP.	0	3	3	19	75	4	4	0	42	50	0	0	0	0	100	2	4	15	33	46	0	0	0	18	82	21.91	16	.146
There is trust between KNP administrators and local people.	47	9	25	13	6	38	12	15	27	8	17	17	16	50	0	31	7	49	6	7	27	0	27	46	0	27.93	16	.032
Current preservation and management activities in KNP are successful in conserving KNP's natural areas and wildlife.	66	25	0	9	0	31	15	15	31	8	17	0	17	50	16	24	7	45	17	7	27	27	9	37	0	48.79	16	.000

SD=Strongly Disagree, D= Disagree, N= Neutral, A= Agree, SA= Strongly Agree

Table 3. Strategies for participatory conservation approaches (%)

Statements	Khojir		Sanjariyoun		Taraqyoun		Saidabad		Bagh Komesh		$\chi^2$	df	P
	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes			
Do you, as a local people, enthusiastically receive people outside of this district?	16	84	23	77	50	50	37	63	18	82	6.91	4	.141
Have you ever participated in any awareness/meeting program about KNP?	87	13	92	8	83	17	96	4	82	18	4.11	4	.392
Do you have any direct connection such as collaboration with KNP managers?	87	13	85	15	50	50	98	2	73	27	16.62	4	.002
Are you eager to be involved in the park administration?	6	94	23	77	17	83	43	57	27	73	14.14	4	.007
Do you agree to change your living style if you were offered another job?	19	81	19	81	33	67	30	70	9	91	3.41	4	.492
Does any of your household member work in KNP?	91	9	96	4	100	0	100	0	100	0	5.82	4	.213
Have you or your family made any handicraft?	94	6	81	19	67	33	74	26	91	9	6.66	4	.155
Have you ever voluntarily participated in any activities related to nature conservation and environmental protection?	62	38	65	35	33	67	72	28	45	55	5.75	4	.219
Are you willing to voluntarily participate in some projects related to nature conservation and environmental protection?	3	97	19	81	0	100	41	59	18	82	18.73	4	.001
Are you willing to participate in a payable job in some projects related to nature conservation and environmental protection?	34	66	50	50	17	83	41	59	55	45	3.75	4	.440
Does your income or a part of it depend on KNP (e.g., selling KNP collected fuel-wood, fodder, and medical plants)?	100	0	100	0	100	0	100	0	100	0	-	-	-
Are you willing to relocate to a place outside of KNP/JPA, even with some compensation?	94	6	92	8	100	0	22	78	27	73	51.47	4	.000
Are there any problems/restrictions/conflicts which come from KNP?	12	88	27	73	33	67	87	13	82	18	57.04	4	.000
Do you have any recommendation/suggestion to improve the park management?	3	97	23	77	0	100	65	35	45	55	39.94	4	.000

Thirteen questions were used in the survey to evaluate the frequency of distribution of local people's perceptions variables about biodiversity conservation, management of KNP, and ecotourism development (Table 2). Almost all respondents believed that the conservation of biodiversity is not only the responsibility of the government but also others. They respected and liked the existence of KNP. People were completely interested in conserving nature areas and biodiversity with a high agreement in regards to the importance and essence of PAs. In informal discussion, they were worried about uncontrolled visitors and believed they always damaged nature, overfished, hunted wildlife, and cut trees. However, many people noted that planned ecotourism can be an effective tool to develop conservation and improve local economy. Almost all respondents affirmed the need of participatory management, but many claimed that there is no trust between KNP administrators and local people. With a statistically significant difference between villages, many people, especially villagers of Khojir, rejected current conservation activities, but others had different opinions. However, in some statements, there were statistically significant differences in the results among the villages (Table 2).

In Table 3, 14 statements were used to find current and future strategies for participatory conservation in the park. Many of respondents enthusiastically received people outside of their districts. There is a big lack of awareness and meeting programs about KNP, of which almost all responders did not know about those kinds of programs. The relationship between the local people and the management of KNP was very weak. They highly agreed to be involved in the park administration and were ready to change their lifestyle. Almost none of their family members worked at KNP. Most villagers had not made any handicraft. Although, most respondents had not voluntarily experienced any environmental activities, they were willing to voluntarily participate in projects related to nature conservation and environmental protection. Many were also willing to work in the park. No part of the answerers' income depended on the park. Only a few people of Khojir, Sanjariyoun, and Taraqqyun agreed to relocate to a place outside of KNP or Jajrud set. The rest of the respondents were not willing to relocate, even when some compensation was offered for their relocation. Vice versa, villagers of Saidabad and BaghKomesesh were more willing to relocate. In regards to the conflicts came from KNP or recommendations to improve the park management, the villages had significantly differing opinions. The first three villages had problems which came from KNP, and subsequently had recommendations to solve the problems. Contrariwise, the last two villages had fewer problems,

and thus had fewer suggestions. The informal interviews showed that they wanted to positively collaborate with the government and they hoped that their management initiatives would not be disregarded.

The cluster analysis classified the respondents into two categories according to the opinions about biodiversity conservation and ecotourism development which they expressed in individual observations (Figure 3). Based on their opinions, respondents were assigned to one of these clusters: (1) supportive of nature conservation, or (2) critical of nature conservation, which both are neutral to ecotourism development (Figure 3). Except residential area and marital status, the other factors that had no meaningful relationships with cluster groups included gender, age, education, household size, etc. (Table 1, Table 4).

Cluster1 (Supportive of nature conservation): Cluster1 members had, on average, positive opinions about biodiversity conservation, with a midpoint around 1 and some variation in both negative and positive values of ecotourism development axis. Respondents were therefore labelled as supportive of nature conservation and neutral to ecotourism development (Figure 3). They comprised of approximately 65.9% of the total sample. Between 75% and 100% of the respondents living in Khojir, Taraqqyun, and BaghKomesesh belonged to this group, compared to around 50% of the respondents in Sanjariyoun and Saidabad (Table 5). Most married persons were also classified in Cluster1.

Cluster2 (Critical of nature conservation): Cluster2 members, who comprised of 34.1% of the respondents with a midpoint around -1, were generally critical of nature conservation, but also a little critical about ecotourism development (Fig. 3). The proportion of respondents in Cluster2 was higher (more than 44%) in Sanjariyoun and Saidabad than in other residential areas (Table 5). Most single persons were also classified in Cluster2. They felt more of a lack of recreational places, and wanted to freely go inside KNP and enjoy the nature.

Rural people 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. Local participation is a precondition for long term sustainable development and their positive attitude is the driving force of successful PAs (Sladonja *et al.*, 2012; Rao and Geisler 1990).

Our study revealed that there is a significant difference between these five villages. Lack of

**Table 4. Dependency between the groups of respondents and clustering to their opinions about biodiversity conservation and ecotourism development (Chi-square test)**

Socioeconomic variable	$\chi^2$	df	P
Residential area	14.227	4	.007
Gender	1.636	1	.201
Marital status	6.028	1	.014
Age	4.836	2	.089
level of education	1.880	4	.758
Household size	3.835	3	.280
Land ownership	0.182	1	.670
Livestock ownership	0.890	1	.345
Effect of nature conservation on household economy	0.961	2	.619
Income	0.053	2	.974
Primary family income source	0.067	2	.967

**Table 5. Frequencies of clusters in terms of the socioeconomic and demographic characteristics of the respondents**

Socioeconomic/demographic characteristics	Supportive of nature conservation		Critical of nature conservation	
	Number	Ratio (%)	Number	Ratio (%)
<b>Residential areas</b>				
Khojir	24	75	8	25
Sanjariyoun	14	54	12	46
Taraqyyn	6	100	0	0
Saidabad	30	56	24	44
BaghKomesh	11	100	0	0
<b>Marital status</b>				
Single	13	46	15	54
Married	72	71	29	29

significant difference among the villages at 99 percent confidence ( $\chi^2=34.38$ ,  $df=4$ ,  $p<0.000$ ). However, a number of people still did not know about KNP at all, especially people of Saidabad and BaghKomesh villages. A large number of people had not seen any brochure about the park including 75% of the respondents in Khojir, 92% in Sanjariyoun, 73% in Taraqqyun, 94% in Saidabad, and 73% in BaghKomesh ( $\chi^2=9.31$ ,  $df=4$ ,  $p<0.054$ ). Along with that, 0% in Khojir, 46% in Sanjariyoun, 17% in Taraqqyun, 76% in Saidabad, and 45% in BaghKomesh also reported that they did not see any sign or pole of boundary from KNP ( $\chi^2=48.85$ ,  $df=4$ ,  $p<0.000$ ). Furthermore, informal discussion with the respondents revealed that the local people only know superficially about the existence of the park but did not understand the objectives and the management activities very well. They also asked a lot about how they can contribute to the park management.

Almost all the people did not receive any income from ecotourism, except 17% in Taraqqyun and 7% in Sanjariyoun. On the other hand, most respondents had a high passion to participate with other villagers to make their villages a pleasant place for ecotourism. These rates were 94%, 88%, 67%, 74%, and 91% of the respondents in Khojir, Sanjariyoun, Taraqqyun, Saidabad, and BaghKomesh, respectively. Although, many complained about current unplanned visitors in formal discussions, 100% in Khojir, 88% in Sanjariyoun, 83% in Taraqqyun, 85% in Saidabad, and 82% in BaghKomesh believed that they can develop ecotourism activities by protecting the nature. There were no statistical differences in these three answers about ecotourism between the five villages. The informal interviews demonstrated that a lot of people considered that ecotourism could bring a positive economic impact on the local communities by increasing job opportunities.

information was a big problem, especially in Saidabad and BaghKomesh. This says that KNP authorities do not invest enough effort to educate the public about their role. Nevertheless, the respondents believed that the conservation of biodiversity is not only the responsibility of the government but also others (Table 2). Almost all of them agreed with establishment of conservation areas. It clearly shows that the concept of biodiversity conservation, which can bring wide benefits to human beings, is meaningful for the local residents. This finding is different than Harada's (2003) findings in Indonesia where this concept was not meaningful for the local people. Furthermore, people did not have any problem with the existence of KNP, on the contrary, they were very happy to be inside or close to it. The big problems, restrictions, or conflicts they had were related to the park's administration and un-integrated management (Table 3). The indigenous people especially from Khojir, Sanjariyoun, and Taraqqyun complained that the management imposed them with a lot of restrictions and did not let them live normal lives in their villages. Local residents declared that they were not very satisfied with the management of KNP. They said that they are excluded from activities of biodiversity conservation. This is probably the result of a long period of centralized nature protection systems. So, some society's resistance towards KNP and conservation was presented because of given restrictions and constraints by the governor (see cluster2). However, lack of trust was a highly mentioned item. Consequently, the respondents said that they need a bridge to connect the management and prepare some meetings for negotiation to eliminate the conflicts. They were worried about biodiversity depletion and land degradation, and rejected current preservation activities, especially in the conservation of natural lands. Unfortunately, job, political and economic instability, conflicts between organizations, and sanctions left little room for environmental and conservational issues or for ensuring that the management of PAs developed in line with world trends. Therefore, there is a meaningful implementation gap between the set of legal norms and the capacity to implement and enforce them (IFNRCBD 2010; Kolahi *et al.* 2012a; Makhdoum 2008), and we perceive a lack of confidence and a global state of indifference and pessimism amongst the society. In such a climate, it is not easy to attract attention and obtain more financial and infrastructural resources for biodiversity protection initiatives. This makes the mission of local environmental agencies and NGOs even more difficult.

The residents were more likely to care about biodiversity. Therefore, a positive attitude towards KNP and conservation is an instrument that must still be further developed; the present results should serve as

an incentive for the management personnel to intensify all actions related to the involvement of rural residents. It is obvious that the local people expect a more active approach to biodiversity conservation. In addition, the residents were angry about the existence of different organizations and subsequently different policies inside of the park. In this case, integrated management was the best suggested solution for KNP. Although the findings of this research and Kolahi *et al.* (2011a,b, 2012a, 2013a,b,d,e, 2014) mostly support participatory conservation structure for the PAs, we have little information regarding the type of activities that would trigger a positive environmental attitude, but this is certainly something that should be further investigated in future studies. With these interested local people and with some efforts, however, it seems the government authorities can be completely succeed in their jobs to conserve the integrity of the park.

In fact, many Iranians are not accustomed to actively participating in nature protection. Iran needs time to adjust to a better system in conservation and generational replacement will hopefully bring new individuals with advanced approaches to biodiversity protection (Kolahi *et al.*, 2012a, 2013a,e). Therefore, more efforts should be made to educate local, especially young, residents (Menzel and Bogeholz 2010; Winter *et al.*, 2007; Kolahi *et al.*, 2012a, 2013a, 2014).

The majority of respondents were classified as supportive of biodiversity conservation and neutral to tourism development (Table 5, Fig 3), which may indicate a coexistent relationship according to the classification by Budowski (1976). This finding is similar to Torn *et al.* (2008) in Finland. On the other hand, the number of respondents in the next cluster, namely critical of nature conservation and neutral to tourism development, was also relatively large, indicating that indigenous communities are heterogeneous (Ryan and Montgomery 1994).

Some studies reported that respondents' opinions were generally affected by their socio-economic background (Infield 1988; Newman 1993; Brougham and Butler 1981, Kinzig *et al.* 2005). In our case study, however, the effected factors were residential area and marital status (Table 4 and 5). No differences were observed in other characteristics between respondents in regards to knowledge or attitude, because of some overlap of the socioeconomic factors of the residents. From this we can conclude that gender, age, level of education, household size, land and livestock ownership, effect of nature conservation on household economy, income, and primary family income source may not necessarily benefit biodiversity conservation strategies. Most of our findings are generally congruent with other published

studies (Baral and Heinen 2007; Khadka and Nepal 2010; Winter *et al.* 2007; Kideghesho *et al.* 2007; Harada 2003).

Population of the villages have been changed by newcomers or returnees, except Khojir and Sanjariyoun where natives were dominant. Generally speaking, the natives were more positive in their opinions about biodiversity conservation and ecotourism development. Peoples in Khojir, Sanjariyoun, and Taraqqyun were more aware and worried about KNP's conditions in comparison to Saidabad and BaghKomes. It shows a necessary focus on these three villages. On the other hand, single respondents were more likely to express negative attitudes than married ones. Almost all respondents had no income from eco-tourists. Furthermore, they rejected current unplanned and uncontrolled visitors because of the damages they made to nature. They were worried about ecotourism development while continuing current weak supervision. Nevertheless, they had positive opinions about planned ecotourism development, because of its benefits to local development such as income, improvement of employment level, local services, and education (Pizam 1978, Murphy 1985, Ryan and Montgomery 1994, Cottrell *et al.* 2007). The income from ecotourism, for example, can compensate restrictions and revenues previously derived from natural resources (Kiss 2004). However, in general, most of the negative attitudes toward biodiversity conservation were influenced by: (1) interactions between local people and the park's administrator and other organizations, (2) the lack of involvement of local people in the management of KNP, and (3) the lack of perceived benefits from KNP and other nearby PAs.

The high diversity climate and high biodiversity in flora and fauna preserved Iran become a top destination for tourists seeking a contact with nature. It shows a crucial need to comprehensive programs to promote ecotourism. In addition, the ecotourism form might be deemed "restorative" to prevent negative environmental impacts of visitors and to be regarded as "sustainable". In that case, it has a net-positive impact on all three pillars of sustainability (ecological, socio-economic, and cultural), which helps sustainability to be achieved. The governor should design a restorative ecotourism plan and then the systems and infrastructure that create a net positive interaction, where local communities and the ecosystems are better off for the presence of ecotourism than without it. Therefore, by introducing some tour packages, ecotourism is a potential tool to improve sustainability in conservation and local development (Kolahi *et al.*, 2012b, 2013c,d, 2014a,b). Travelling in nature when almost everything is new and different, however, is a perfect time to introduce

new ideas about personal needs, buying decisions, sharing, and impact.

PAs managers must have a variety of skills, including people-related skills (Phillips 2003). Iran needs to shift the awareness of nature managers to include psychology and sociology (Kolahi *et al.* 2012a). Thus, DoE and institutes and universities of natural resources and the environment should also play a role in bringing together the natural sciences and social sciences, the two essential components of sustainable solutions to these challenges.

The local residents, especially the natives, desired to participate in the park management and to collaborate with the government to overcome the difficulties, even with changing their life style. Many also asked to design community-based conservation areas. The respondents were highly willing to voluntarily participate in environmental and conservational plans. Most of them had positive attitudes towards biodiversity conservation. This shows a high potential for co-management, joint management, or any other participatory conservation approaches to reduce social consequences and enhance assimilation of such areas by residents and other stakeholders. It also proves that they are in favour of a dialogue between those involved in the decision-making process of nature protection. However, participation may not be enough if the government does not develop property ownership regimes to entrench community rights over local resources, and does not integrate participatory mechanisms within and between all stakeholders (Kapoor 2001). Thus, the traditional top-down management of nature protection in KNP and Iran should be replaced by bottom-up conservation. KNP, other Iran's PAs, and natural areas have very important natural and historical sites (Darvishsefat 2006). In addition, combining natural and cultural aspects can be a successful combination (Kolahi *et al.* 2012a, 2013a). Therefore, the needs and attitudes of rural residents should receive adequate priority (Ahnstrom *et al.* 2009). Thus, this new approach in Iran can treat local communities as the key partners in biodiversity management and calls for their participation in social development and nature conservation.

A few short-term participatory conservation plans are applied in Iran. Saving the Hawksbill turtle and rehabilitation of the Sirangoli and Hassanlou Ramsar Site Wetlands through community participation were the first participatory conservation plans in Iran (SGP 2013). Those plans were successful in operation and engaging local capital towards biodiversity conservation. Since there are lessons to be learned from all over the world, Iran must try to incorporate these collective experiences and select the best

model for its conditions and circumstances. Then the participatory conservation could raise the management effectiveness in KNP, which is in the low-intermediate level (Kolahi *et al.* 2013b), as well as in other Iran's PAs.

The Iranian Government's 5th Five-Year Development Plan clearly emphasizes development aspects, calling for action to foster civic participation, and so forth. Its young population needs to access expanded opportunities to actively participate in the country's development (UNESCO-Tehran 2010). In biodiversity conservation issues, however, there are some obstacles to solve conflicts such as the lack of trust and the difficulty of communications between the PAs and local communities (Hough 1988). According to recent scaling-up conservation guidelines, the governments must ensure that their people are aware of the values of biodiversity and be engaged in support of conservation and ecosystem services by 2020 (COP11 2012). To live in harmony and sustainable manner, the government should focus on building an active relationship between people and nature at many different levels. For example, linking people with nature, and people with people and PAs. It should act in knowledge-based plans for ensuring PAs quality, designing nature-based solutions, and developing institutional and financial capacity in regards to reaching conservation goals. The governor needs to adopt policies for promoting positive social and cultural environments and for increasing social trust and solidarity. It should improve health, wellbeing, food security, and practically support the human life of local people. Political and economic stability enables local and citizen people to more focus on environmental and conservational issues. The governor must build capacity via creating awareness of PAs, raising community education and participation, increasing the number of volunteer game guards, and enhancing the public's respect for environmental game guards. It should also engage the youth, and develop young professionals in communication, technology, and social media. Governance diversity and quality and rights-based conservation should be a base for broadening participation in conservation. In addition, in order to be able to participate in and contribute to the new conservation era, the local communities should be empowered with more detailed knowledge on Iran's natural environment. They should be involved in conservation activities based on on-site training and improved communication toward sustainable biodiversity conservation. However, the government has to move from simple protection to a more proactive approach of intervention, facilitation,

and management (UNESCO-Tehran 2010). It also must think about mechanisms to let locals share adequate benefits such as hiring, preparing meetings, introducing environmental voluntary plans, and engaging local agencies, NGOs, and civil society. These mechanisms are the starting points to act locally, giving the communities the opportunities to actively participate in biodiversity conservation and PAs managements.

## CONCLUSION

Participatory conservation, as bottom-up management, is currently the most acceptable model of PAs management across the world. Considering this approach, one of important strategies in PAs management is to discover what rural communities' attitudes are towards conservation, whether they are willing to be involved, and how they can participate in the management processes. We knew almost nothing about the perceptions of rural communities towards biodiversity conservation and ecotourism development in KNP and a few in the other Iran's PAs. Therefore, the data obtained from this study is helpful in administrative planning, biodiversity management, and monitoring the efficacy of subsequent policies. Furthermore, the results presented in this paper support the idea of participative conservation models for PAs managers and additionally serve to illustrate possible directions for biodiversity conservation in KNP and Iran.

This survey conducted in five villages in or adjacent to KNP showed that local people understood the global objectives of the park's management. It also demonstrated that the majority took positive attitudes towards the conservation strategies of the government authorities and involvement in KNP activities. The results showed that the local people in Iran have concerns and complaints about biodiversity conservation and ecotourism development similar to those of the inhabitants in other countries. This attitude, however, is not supported by their participation. It should be fostered and directed to encourage further protection of KNP and other PAs, to educate and raise awareness about the value of PAs among rural residents, to encourage commitment of locals, to promote economic and non-economic activities, and to drum up stronger governmental and conservational support. These incentives could be regarded as an effective method for the implementation of participatory conservation, and to decrease the negative opinions and insufficient commitments. KNP and other PAs of Iran present opportunities to combine participative conservation and production activities such as ecotourism.

According to our model, the majority of the respondents were supportive of biodiversity conservation and neutral to ecotourism development. The responses of local inhabitants to questions about biodiversity conservation and ecotourism development depended more on the residential area and marital status than other socioeconomic characteristics. It shows a necessary concentration on villages which they have direct interaction with KNP, i.e., Khojir, Sanjariyoun, and Taraqqyun.

The residents support the cause of biodiversity conservation, but they did not know more about the function of the park and its management activities. However, the rural communities were worried about biodiversity loss and land encroachment and degradation. They believed that mismanagement activities, KNP-other organizations' conflicts, and excluding local people from KNP management are the greatest challenges for the park. Therefore, active integrated management and replacing traditional top-down approach in biodiversity protection with bottom-up conservation could be the solutions for sustainable conservation in KNP and across Iran. Thus, it can respond to the changes in human needs as well as the environment, in a dynamical process to protect the diversity of species and communities. However, for KNP's and other Iran's PAs administrators to meet targets and goals for effective management in conservation, a focus on linking people with people and nature, and in the management of biodiversity is required.

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