Title	Synergisms for the intricate system of biodiversity and society in the conservation management of IRAN(Digest_　　)
Author(s)	Kolahi, Mahdi
Citation	Kyoto University (　　　　)
Issue Date	2013-09-24
URL	http://dx.doi.org/10.14989/doctor.k17922
Right	9　　2
Type	Thesis or Dissertation
Textversion	none

SYNERGISMS FOR THE INTRICATE SYSTEM OF BIODIVERSITY AND SOCIETY IN THE CONSERVATION MANAGEMENT OF IRAN

A Thesis Presented

by

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to

Department of Social Informatics, Graduate school of Informatics

of

Kyoto University

In Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy
Specializing in Biosphere Informatics

Kyoto, September 2013

Doctoral Thesis Series of Biosphere Informatics Laboratory
Department of Social Informatics, Graduate School of Informatics,
Kyoto University

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ACRONYMS AND ABBREVIATIONS

BHPAs	Bureau of the Habitats and Protected Areas
CBD	the Convention on Biological Diversity
CVM	the Contingent Valuation Method
DB	the Data Bank
DoE	the Department of the Environment
E(WTP)	the expected value of willingness to pay
EMP(s)	Environmental Management Plan(s)
FRWO	the Forests, Range and Watershed Organization
GEF	the Global Environment Fund
GIS	Geographic Information System
IUCN	the International Union for Conservation of Nature
KNP	Khojir National Park
ME	the management effectiveness
METT	the Management Effectiveness Tracking Tool
NGO(s)	Non-Governmental Organization(s)
NP(s)	national park(s)
PA(s)	protected area(s)
PCA	Principal Component Analysis
RIFR	the Research Institute of Forests and Rangelands
SPSS	Statistical Package for the Social Sciences
WB	the World Bank
WCPA	the World Commission on Protected Areas
WDPA	the World Database of Protected Areas
WTP	willingness to pay
WWF	the World Wide Fund for Nature

ABSTRACT

Since the 1950s, there has been a continuous increase in the number and coverage of protected areas (PAs) in Iran, and in total 253 PAs have been declared that cover 10.12% of the country's area. However, the capacity of the selected reserves to maintain viable population of wildlife species and provide vital ecosystem services is threatened by a combination of many factors including PAs-people conflict, mismanagement, the lack of sustainable financing, PAs-other organizations' conflicts, population growth, and climate change. As a result, wild habitats and populations continue to be lost and the ecosystem services are increasingly being disturbed.

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. Thus, this thesis attempts to investigate on relationships and conditions of Iran's PAs, management, and society; it presents synergisms for this intricate system. The intricate system refers to seeing the human and environmental condition as one system. The synergisms help to find ways to meld conservation work with the public interests and day-to-day lives. Therefore, this research surveys potential collaboration by considering conservation challenges, management effectiveness, and social capital (the local people and the e-society). The thesis is divided up into seven chapters. All of which address the issues of future development challenges, management effectiveness, and the attitudes and opinions of the eco-tourists, the e-society, and the local people about biodiversity conservation and ecotourism development in Iran.

Chapter I explains the problem statement, objectives of the research, and overview of the thesis. Chapter II reviews literature addressing Iran's PAs, examines what is known about them, highlights the challenges and lessons learned, and identifies areas where more research is needed. The PAs system in Iran is criticized because of (1) shortages of manpower, equipment, and financial resources; (2) de jure PAs that are often implemented as de facto reserves; (3) lack of national biodiversity indicators and objective monitoring processes; (4) information gaps and lack of a suitable PAs information database; and (5) limited public participation and conflict between people and other organizations over PAs. It explains that most PAs operate without any management plans; only 2% of the country's PAs are effectively protected. It also reports that Iran's environmental alarm lights are red. Chapter III conducts an evaluation of management effectiveness (ME) for Khojir National Park (KNP), one of Iran's oldest PAs, using a multi-method approach where this type of evaluation has never been conducted. KNP received an average score of 43%, which is lower than the global average (54%), illustrating that its general management was in the low-intermediate level. There were significant differences in ME scores and PCA results among the respondents. The scores implied that the threat levels are serious in KNP. Most of the threats and pressures to KNP come from inability, mismanagement, inadequate funding, and a lack of support from upper management levels. The total scores were basically proportional to the number of staff, which clearly demonstrates the importance of adequate staffing. However, the ineffective management of KNP is depleting wildlife and habitats. It finally concludes that an ecoguard is required for every 1,000 ha of Iran's PAs to protect those areas effectively. Chapters IV and V examine ecotourism' attitudes and people capital towards conservation, and economically evaluate Iran's national parks (NPs). 2,121 respondents answered an online questionnaire conducted during the summer of 2012. Chapter IV explains

the answers from the respondents who had at least visited one of Iran's 26 NPs. Chapter V presents all answers about PAs and biodiversity conservation in Iran. The majority of the respondents had at least visited one of Iran's NPs. The conditions of infrastructural and primary services, facilities and available information of the NPs were reported to be weak. Five logistic regression models were robust in fitting the data and show significant results. Almost all respondents were willing to voluntarily participate in conservation and environmental projects; willing to pay for protection; willing to increase the PAs; willing to visit the 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 others. The majority of the respondents believed participatory conservation and private management to be more suitable structures for Iran's NPs management system. There is a resurgent interest in conservation amongst Iranian citizen scientists. Furthermore, the survey results showed that there is a potential symbiosis relationship between Iran's NPs conservation and ecotourism. Therefore, environment conservation and local development can be enhanced by ecotourism because of the advantages of interactions between conservationists and the ecotourism industry. However, well-managed ecotourism can help biodiversity protection. Finally, to apply economical assessment for the conservation of Iran's NPs and to determine willingness to pay for candidate entry fees, the contingent valuation surveys were administered to the respondents. The population was averagely willing to pay an entry fee of about 4 US$ (49,905 Rials). Chapter VI examines the opinions and perceptions of local residents towards conservation, ecotourism, and Khojir National Park (KNP) in Iran. Questionnaires and informal interviews were conducted on 129 households 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 moderately 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 the respondents were classified as supportive of biodiversity conservation and neutral to ecotourism development, which may indicate a coexistence relationship.

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 through tour packages to develop conservation and locals. Furthermore, the government should see the human and environmental condition as one intricate system. The governor must focus on conservation projects that engage the urban and rural populace and support the goal of developing a biodiversity ethic. Iran's PAs system needs to be realistically supported by policies and planning instruments. In addition, the implementation of active management to restore habitat, increase education and awareness, build capacity, design environmental volunteer plans, and shift practices towards the guidelines of international organization. The government's responsibilities should also elevate environmental awareness and consciousness, 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.

ACKNOWLEDGEMENTS

assisted in conducting the questionnaires and interviews. Most of all, I would like to thank all the local people, in or around Khojir National Park, who participated in the survey and offered their time and insights. I am also grateful to Dr. Stanko Trifkovic at Kyoto University who gave me a lot of suggestions for preparing the questionnaires.

I would like to thank my family for their support and to my parents-in-law for their full encouragement and support throughout my PhD studies, despite thousands of kilometers that separate us. Finally, I would like to extend my special recognition to my lovely wife Masi, whose unconditional love and support have motivated me to reach my goal. This thesis is dedicated to her.

CHAPTER 1: INTRODUCTION

1.1. Problem Statement

Iran is a large country of diverse climates, terrains, flora, fauna, and people (Collins 2001). Despite the fact that 85% of the country is semi-arid or arid (Misra 2009), Iran is well known as one of the world's major centers of biodiversity and natural heritage, because of the junction of four major plant geographical regions (Irano-Touranian, Hyrcanian, Zagrosian, and Khalijo-Omanian). Nonetheless, Iran faces serious challenges in sustainable development with major environmental issues in its territory, coastal, and wetland sections (See Coadt 1980; Croitoru and Sarraf 2010; Ebtekar 2009; GoIRI 1995; IFNRCBD 2010; IUCN 1992; Madanipour 2011; Pak and Farajzadeh 2007; Pak and Majd 2011; Seddigh et al. 2010).

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). Their establishment has sometimes involved displacement of, and loss of assets by, indigenous people (Geisler and Sousa 2001; Ghimire and Pimbert 1997; Smardona and Faust 2006). The effects of PAs on the livelihoods of local people are poorly documented, but they are often negative when people are excluded from PAs that they formerly relied on for natural products (Chomitz 2007). Conflicts between management of PAs and local communities are increasing in many countries (Munasinghe and McNeely 1994). Nowadays, indigenous peoples and issues are becoming increasingly common at international conservation events (Brockington et al. 2008; 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 co-management 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).

PAs can only deliver environmental and socioeconomic benefits if they are managed effectively (Hockings 2000). There is a growing evidence of critical biodiversity (species, ecosystems, and genes) breakdowns both inside and outside many PAs (Butchart et al. 2010; Dudley et al. 2004; Fischer 2008; Hockings et al. 2002; Stolton and Dudley 1999). Accordingly, many PAs are presently being degraded and destroyed (Dudley et al. 2004; Hockings 2003; Liu et al. 2001). To improve the management systems of PAs, it is necessary to evaluate the management effectiveness (ME) of and the extent to which PAs actually protect the ecosystem value and deliver benefits to the communities (Ervin 2003a; Hockings and Phillips 1999; Quan et al. 2011; Southworth et al. 2006; Timko and Innes 2009).

PAs are expensive to establish and operate. However, it is less costly to protect their ecological integrity and manage their goods and services before biodiversity and environmental values are lost, than to restore them later. On the other hand, the establishment of PAs does not guarantee that their objectives will be achieved. The reports show that still, there remains a poor linkage between (1) the production of

resource materials, (2) the education and training of competent professionals, (3) the achievement of certified high standards of PAs management effectiveness, and (4) the measurement of conservation outcomes (IUCN-web 2012). Thus the governments must ensure that their PAs are well managed (IUCN-Jeju 2012),

In developing countries, conservation funds are extremely scarce and come mostly from one source (Baral et al. 2008). These aspects are unlikely to be sustainable in the long-term management of conservation lands (Dixon & Sherman 1990; Navrud and Mungatana 1994). As a result, underfunding hinders conservation or development objectives and activities (IUCN 2005). Therefore, many PAs exist merely on paper (Baral et al. 2008).

Economic considerations generally play a key role in decisions. Subsequently, the economic valuation of ecosystem services has received special attention in recent years. In the developing world also, economic valuation of environmental services of protected natural areas is increasingly common (Adamsa et al. 2008). 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 as expressed e.g., by willingness to pay (WTP; Hein 2007; Walsh 1986).

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). 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), a definition which emphasizes the view that ecotourism should have positive impacts. However, to realize this potential, the ecotourism experience and view must be identified to guide management actions and thus to sustain the resources on which ecotourism ultimately depends. In this way, in order for tourism businesses to succeed (Leco et al. 2013), 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.

The past decade has seen a substantial move toward using education, information, and voluntary cooperation not just with individuals, but also with communities (NRC 2002). In addition, 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).

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 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). 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). However, certain preconditions are needed for participatory conservation depend on legal, ecological, and socioeconomic conditions (Khadka and Nepal 2010). One of the strategies of the PAs managements is, therefore, 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).

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 years has caused serious degradation of natural reserves and biodiversity in Iran. 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 (see Makhdoum 2008) and little is known about the perceptions and beliefs of the society, especially local residents, regarding biodiversity protection, ecotourism development, and participative conservation. On the other hand, there is no established process by which Iran's PA managers or interested people can find out if PAs are achieving their objectives. However, investigating on challenges and ME, and finding ways to establish and strengthen the relationships between people and PAs are crucial to the long-term success of conservation efforts (COP11 2012; Fiallo and Jacobson 1995).

1.2. Objectives of the Research

The overall objective of this research is to investigate on relationships, conditions, and situations of Iran's PAs, management, and society, as a triangle of the biodiversity conservation in Iran (Figure 1). It presents synergisms for the intricate system of biodiversity and society in the conservation management. The intricate system refers to seeing the human and environmental condition as one system. The synergisms help to find ways to meld conservation work with the public interests and day-to-day lives. Therefore, this research investigates on collaboration potentials by considering on conservation challenges, management effectiveness, and social capital (the e-society and local people) (Figure 2). Specifically, this thesis research aims at accomplishing the following tasks objectives; 1) to discuss a historical overview, present situation, and future possibilities for biodiversity conservation; 2) to conduct a survey to assess ME for one of the oldest and most important PAs in Iran; 3) to examine the eco-tourists' and the e-society's attitudes and capital towards the national parks (NPs) and biodiversity management; 4) to carry out an economic valuation of the NPs; 5) to assess attitudes and capital of rural communities towards biodiversity conservation and ecotourism development; and 6) to evaluate environmental awareness and activities, and the willingness to be engaged in the PAs activities towards participative conservation. Finally, it presents and discusses scientific evidence on the efficacy of education,

information, and voluntary measures for achieving environmental protection objectives in Iran, in order to encourage better relationships between the communities and government authorities.
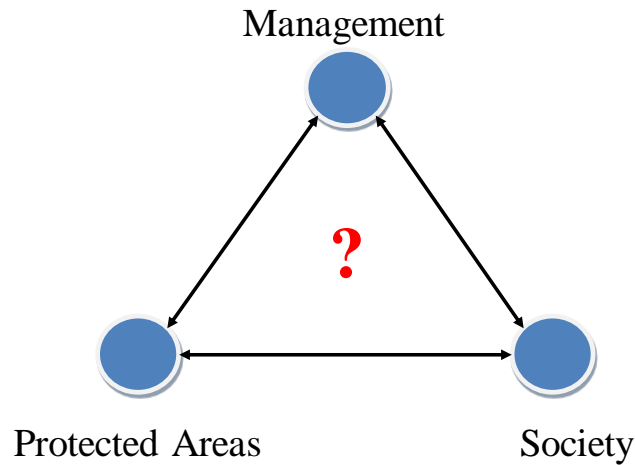
Figure 1: The triangle of collaboration in biodiversity conservation
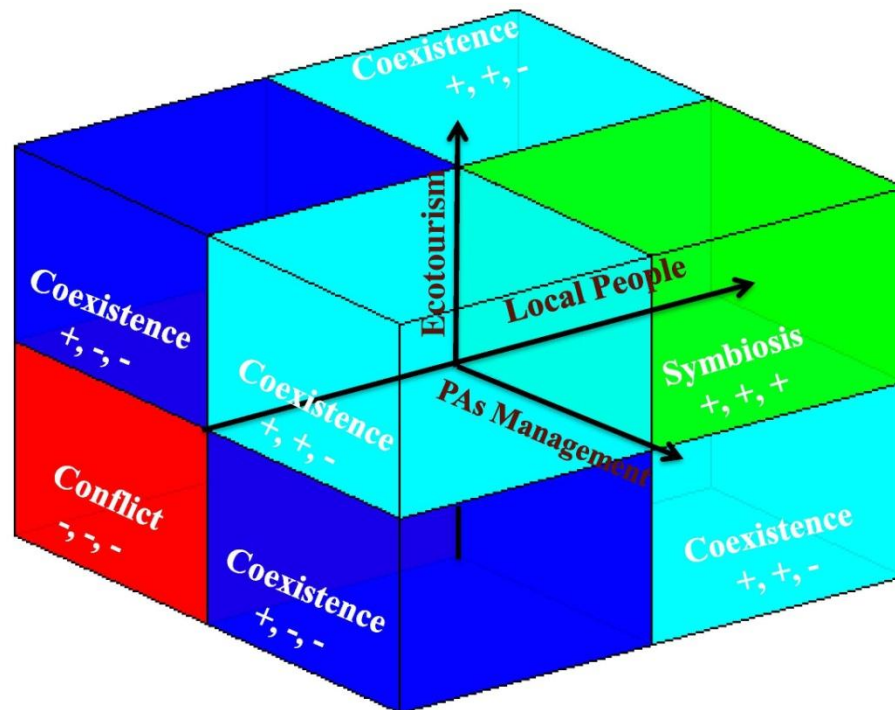
Figure 2: Relationship schematic model of local people, biodiversity management, and ecotourism development: This relationship can be classified into three categories of conflict, coexistence, and symbiosis. The question is how to move to the positives area namely "Symbiosis".

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1.3. Thesis Overview

Chapter 2 explores the literature on biodiversity in Iran, designation, policy, management and implementation issues in Iran's PAs system. It surveys what is known about Iran's PAs, to identify areas where more research is needed. Finally, it discusses the key characteristics of Iran's PAs system and challenges to its development and, in describing the observed effects and lessons learned from Iran's experience, sets out how these challenges may be addressed. The chapter concludes with the main challenges and opportunities.

Chapter 3 explores assessments of ME for one of the oldest and most important PAs in Iran, Khojir National Park (KNP), where this type of evaluation has never been conducted. It was also done to identify problems facing the PA, and to extract the primary factors for that habitat. In addition, the strengths and weaknesses of the current management are determined. Key variables are used and discussed in relation to their effects on the conservation activities. The recommendations are presented for improving the existing management strategies. These recommendations are applicable for other Iranian PAs.

Chapter 4 evaluates the attitudes and perceptions of the ecotourists towards managerial behaviour and cooperation, and the resources that attract them in the NPs. However, it examines the characteristics of ecotourism and attitudes towards Iran's NPs and biodiversity conservation. Furthermore, in this chapter an economic valuation of the NPs was carried out based on the Contingent Valuation Method, conditions and management of the NPs was assessed, relationship between ecotourism and local people and the role of ecotourism in local development was investigated based on logit models, and environmental awareness was evaluated.

Chapter 5 examines the Iranian e-society attitudes and capital towards the NPs and biodiversity conservation management. Furthermore, it carries out an economic valuation of the NPs; evaluates environmental awareness and activities; and presents and discusses scientific evidence on the efficacy of education, information, and voluntary measures for achieving environmental protection objectives.

Chapter 6 analyses the attitudes and capital of rural communities towards biodiversity management. It evaluates local residents' general knowledge and their perceptions about one of the oldest Iran's national parks, biodiversity conservation, and ecotourism development. Furthermore, it measures environmental awareness and activities; explores their willingness to be engaged in the PAs activities towards participative conservation; and obtains meaningful data for PA managers in an effort to assist in the creation of future environmental management plans. Finally, it presents scientific evidence in order to encourage better relationships between rural communities and government authorities.

Chapter 7 discusses overall results and concludes to answer the questions and objectives proposed in Introduction.

Because the chapters of two, three, four, five, and six are published in or are submitted to international scientific peer-reviewed journals and to follow their copyrights, I only prepared their abstracts in following pages. To read every paper, please visit the prepared link below of every abstract.

CHAPTER 2: POTENTIALS AND CHALLENGES OF BIODIVERSITY CONSERVATION IN IRAN

Abstract

Since the1950s, there has been a continuous increase in the number and coverage of protected areas (PAs) in Iran, and in total 253 PAs have been declared that cover 10.12% of the country's area. This paper reviews literature addressing Iran's PAs, examines what is known about them, highlights the challenges and lessons learned, and identifies areas where more research is needed. The PA system in Iran is criticized because of (1) shortages of manpower, equipment, and financial resources; (2) *de jure* PAs that are often implemented as *de facto* reserves; (3) lack of national biodiversity indicators and objective monitoring processes; and (4) limited public participation and conflict between people over PAs. To improve, Iran's PAs system needs to be realistically supported by policies and planning instruments. In addition, the implementation of active management to restore habitat, increase education and awareness, shift practices towards the guidelines of international organizations, build capacity, and improve management and co-management by local communities needs to occur.

CHAPTER 3: ASSESSMENT OF THE MANAGEMENT EFFECTIVENESS IN IRAN'S PROTECTED AREAS

Abstract

The requirement to assess the management effectiveness (ME) in protected areas (PAs) is increasing around the world to help improve management and accountability. An evaluation of ME for Khojir National Park (KNP), one of the Iran's oldest PAs, was conducted using a multi-method approach that consisted of structured interviews, open interviews, and site visits. This was the first ME evaluation in Iran. The structured interview was based on the management effectiveness tracking tool methodology. KNP received an average score of 43%, which is lower than the global average, illustrating that its general management was in the low-intermediate level. The indices of legal status, resource inventory, planning for land and water use, regulations, and objectives received the highest average scores, whereas education and awareness, community co-management, regular work plan, boundary demarcation, visitor facilities, budget sources, staff training, protection systems, and management plan received the lowest ones. The management system of KNP was generally established, but many problems of the management still need to be resolved. To improve ME, some countermeasures should be taken, such as increasing funding, strengthening capacity building, planning, and adaptive management, and implementing community participation.

CHAPTER 4: ECOTOURISM CHARACTERISTICS AND ATTITUDES TOWARDS IRAN'S NATIONAL PARKS AND PARTICIPATORY CONSERVATION

Abstract

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 ecotourism' attitudes towards conservation and evaluates economically Iran's national parks (NPs). 2,121 respondents answered an online questionnaire conducted in summer 2012. The majority of respondents had at least visited one of 26 Iran's NPs. The survey revealed the weak conditions of the NPs both in status and conservation activities. Almost all respondents were willing to voluntarily participate in projects related to nature, environment, and biodiversity conservation; willing to pay for protection; willing to increase the protected areas; willing to visit the 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 others. Furthermore, most answerers highlighted ecotourism activities as a tool to benefit local people. 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.

Iran's National Parks and Co-management. PARKS: The International Journal of Protected Areas and Conservation, IUCN

Will be available at:

http://www.iucn.org/about/work/programmes/gpap_home/gpap_capacity2/gpap_parks 2/

CHAPTER 5: SOCIAL CAPITAL IN THE BIODIVERSITY CONSERVATION OF IRAN

Abstract

The proposition that natural areas need protection from the destructive actions of people is widely accepted. This paper examines Iran's e-society attitudes and capital towards biodiversity conservation and evaluates economically Iran's national parks (NPs). 2,121 respondents answered an online questionnaire conducted in summer 2012. The majority of respondents had visited one of Iran's NPs. Almost all respondents were willing to voluntarily participate in conservation and environmental projects; willing to pay for protection; willing to increase the protected areas; willing to visit the NPs in the future; and they were mostly young. There is a resurgent interest in conservation amongst Iranian citizen scientists. Respondents showed that they could collaborate for resource management. They think ecological problems and solutions are human problems and not simply biological problems. Biodiversity conservation in Iran has been threatened by mismanagement, lack of funds, park-other organization conflict, lack of biodiversity awareness, and lack of public participation. 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. Furthermore, the government should see the human and environmental condition as one intricate system. The governor must focus on conservation projects that engage the urban populace and support the goal of developing a biodiversity ethic. It should consider updating management, enhancing environmental educational programs, designing environmental volunteer plans, treating ecotourism tour

packages, installing real collaborative principles, and establishing participatory conservation approaches.

The chapter is under press as:
Kolahi Mahdi, Tetsuro Sakai, Kazuyuki Moriya, Rohollah Esmaili, Masatoshi Yoshikawa (in Press) *From paper parks to real conservations: case study of social capital in Iran's conservation management*. International Journal of Environmental Research

Will be available at: http://ijer.ut.ac.ir/

CHAPTER 6: ATTITUDES OF LOCAL PEOPLE TOWARDS BIODIVERSITY CONSERVATION, ECOTOURISM DEVELOPMENT, AND KHOJIR NATIONAL PARK

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.

CHAPTER 7: GENERAL DISCUSSION AND CONCLUSION

Considering Iran's long history of environmental protection and government management of nature, the investigation on the condition of Iran's PAs management over the past decades highlights the many challenges that lie ahead for the conservation of biodiversity and ecosystems. In general, the decline of many species and ecosystems has increased markedly during the past few years. Conservation efforts in Iran's PAs system have been characterized by little information about the ecological merits of PAs, local socio-economic problems, centralized control, a lack of trained-stuff, insufficient budgets and stakeholder investment, shortages of manpower, equipment and vehicles, low management effectiveness, lack of biodiversity awareness, lack of systematic planning, an emphasis on de jure PAs, a lack of national biodiversity indicators and objective evaluations, major conflicts between conservation objectives and socioeconomic and political interests, limited public participation, PAs-people conflict, and PAs-other organizations' conflict. These challenges are causing planning and management of PAs to come to a standstill. These challenges must be addressed if Iran's PAs are to achieve their goal of protecting native biodiversity.

The number and scale of threats to Iran's PAs create an extremely difficult task for protection. As a result, Iran's ecological regions are facing rapid environmental changes driven by mismanagement, increasing competition for land from housing development, transportation and energy infrastructure, factories, agriculture, pollution, overexploitation, wetland draining, unchecked development, overgrazing, illegal logging, poaching, mining, and increasingly frequent drought, as well as insufficient staff and human resources, and budget constraints.

The information gathered suggested that no standard ME tool was currently used for tracking ME in Iran's PAs. The results of the ME study showed that structured interviews (using METT), open interviews, and site visits painted a clear picture of the management strengths and weaknesses in KNP (Figure 8). In addition, the current findings confirm that the present systems do not effectively protect natural resources. The indices of legal status, resource inventory, planning for land and water use, regulations, and objectives received the highest average scores, whereas education and awareness, community co-management, regular work plan, boundary demarcation, visitor facilities, budget sources, staff training, protection systems, and management plan received the lowest ones (Figure 11).

The ME results revealed that major factors that contribute to an ineffective management in KNP stem from inadequacy of resource investment, inability, mismanagement, a lack of support from upper management levels, and policy conflicts among government sectors. The management system of KNP was generally established, but many problems of the management still need to be resolved. To improve ME, some countermeasures should be taken, such as increasing funding, strengthening capacity building, planning, and adaptive management, and implementing community participation (Table 3). The Government, Parliament, and Judicature should use proper incentives for environmental managers to achieve the desired results. Investments from

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the government should be strengthened to hire well-trained staff and promote and train existing staff and managers. Also different strategies for budgetary support should be implemented. All necessary facilities or equipment should be procured. And the existing laws and regulations should be consistent and operational.

Because KNP and Sorkhe-hesar National Park are adjacent to each other and both have been severely degraded by human activities, it is suggested to redefine their boundaries to create a unified national park. However, without science-based management plans (Table 2) and monitoring systems (Figure 11), it is difficult to gauge whether progress is being made in PA management, which makes it difficult to motivate and justify the financial resources spent on managing PAs. There is also a need for a comprehensive assessment tool for ME evaluation of PAs in Iran that is based on the WCPA framework, to which Iran is a signatory.

The poor ME conditions in KNP (Figure 9), despite its long history and strong management body, suggest that other PAs in Iran may be in even worse condition. It is expected that efforts will be concentrated on incorporating assessment findings into KNP planning and management, and addressing weaknesses that were revealed by this study (Table 3). Furthermore, the results of this study will contribute to study and address the issues in other PAs in Iran.

There is a resurgent interest in conservation in the Iranian citizen scientists. This provided a venue for social study to conduct research relevant to decision making and builds social capital. Furthermore, conservationists could become more mindful of opportunities to work on multiple goals of conservation that include building public support. It was also clarified that management and ecotourism in Iran's NPs and biodiversity conservation could be sustainable if the managers were equipped with sufficient information from the public. Informed decision making and sound management of the site and facilities would help, in the long term, to sustain biodiversity, management, and economic benefits of ecotourism in Iran's NPs. This study, with its socio-political approach, also contributed to a greater understanding of the implications of Iran's e-society opinions for PAs management in Iran.

Almost all respondents to the online questionnaire were willing to voluntarily participate in projects related to nature, environment, and biodiversity conservation (Table 18, Table 33); willing to pay for protection (Table 6, Equation 5: 49,404 Rials (US$ 4), Table 33, Equation 6: 49,905 Rials (US$ 4)); willing to increase the percentage of PAs (Table 20, Table 35); willing to visit the NPs in the future (Table 18, Table 33). They were mostly young (Table 10, Table 27) and educated (Table 11, Table 12, Table 28, Table 29). But these opportunities are less considered. For example, volunteer stewardship programs are missed opportunities. Volunteers can be registered with each national park and be engaged in providing nature interpretation programs, participating in clean-up operations, undertaking simple repairs of facilities, carrying out nature surveys, and otherwise doing whatever they are capable of doing to support natural parks. However, the NPs volunteers and others can provide support for certain aspects of NPs managements.

The findings show that PAs in Iran are "paper PAs" (see Table 37). The current governmental management structure is not successful in the conservation (Table 21,

Table 36). The government must quickly act and carefully improve its management activities. Biodiversity conservation efforts have to be prioritized. The governor must focus on conservation projects that engage the urban populace and support the goal of developing a biodiversity ethic. It should consider updating management, enhancing environmental educational programs, designing environmental volunteer plans, treating ecotourism tour packages, and establishing co-management and community-based sustainable conservation.

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 study support the idea of participative conservation models for PAs managers and additionally serve to illustrate possible directions for biodiversity conservation in KNP and Iran.

The survey conducted in five villages in or adjacent to KNP (Figure 16) showed that local people understood the global objectives of the park management (Table 41). It also demonstrated that the majority took positive attitudes towards the conservation strategies of the government authorities and involvement in KNP activities (Figure 19). 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 (Figure 19), the majority of the local people 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 (Table 43, Table 44). 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 (Table 41, Table 42). 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 (Figure 13). 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 people with people and nature is required.

People should be seen not as a threat (Figure 11) but as an opportunity to help achieve broader nature conservation goals (see Table 42). The government should see the human and environmental condition as one intricate system. Iran's conservationists are losing the battle to protect nature because they are failing to connect with the hearts, anxieties, and minds of a large segment of the Iranian public. If Iran's environmentalists are to move beyond their current isolation, they must reach out and connect to new audiences across the political, economic, and social spectra. However, 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 through tour packages to develop conservation and local people.

The task of privatizing nature in Iran's conditions seems daunting, but there is much encouragement to have participatory conservation (Figure 13). This is why most of the respondents confirmed it as a reasonable management structure for Iran's NPs (Table 21, Table 36). Although, there is a persistent challenge to effectively engage people in the job of protecting biodiversity (Schwartz 2006), it consequently depends on the government's responsibilities to successfully apply participatory conservation between NPs administrations and stakeholders. The governor, however, should look for synergisms; to find ways to meld conservation work with the Iranian public's interests and day-to-day lives.

Substantial steps should be taken to secure effective conservation of PAs. More basic technical work and ecological field surveys are needed to better document Iran's biodiversity. Iran's experience demonstrates the need for realistic policies and planning instruments that encourage integrated and sustainable ecosystem management, active management to restore habitat, increased education and awareness, a shift to international organization guidelines and the development of appropriate linkages between strictly conserved and sustainable use underpinning the management of local communities and co-management. Capacity building should focus on management and financial planning, community interactions, participatory approaches, village-driven development, and resource mobilization. The DoE must recognize indigenous peoples and other local communities as important stakeholders in a real collaboration process to protect their rights and interests (Figure 13). Local level projects should build community capacity for biodiversity management, develop awareness concerning the production of natural materials, promote ecotourism, strengthen the capacity of local NGOs, and implement participatory approaches to support community empowerment. Using participatory

methodology, business-oriented management plans should be prepared for each PA, including a clear demonstration of how local communities can participate in, and benefit from, PAs. For Iran's government to meet targets and goals for effective management in conservation, a focus on all of these elements is required.

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ANNEXES

Annex 1: The list of threats in Data Sheet 2 of METT

1. Residential and commercial development within a protected area	1.1 Housing and settlement 1.2 Commercial and industrial areas 1.3 Tourism and recreation infrastructure
2. Agriculture and aquaculture within a protected area	2.1 Annual and perennial non-timber crop cultivation 2.1a Drug cultivation 2.2 Wood and pulp plantations 2.3 Livestock farming and grazing 2.4 Marine and freshwater aquaculture
3. Energy production and mining within a protected area	3.1 Oil and gas drilling 3.2 Mining and quarrying 3.3 Energy generation, including from hydropower dams
4. Transportation and service corridors within a protected area	4.1 Roads and railroads (include road-killed animals) 4.2 Utility and service lines (e.g. electricity cables, telephone lines,) 4.3 Shipping lanes and canals 4.4 Flight paths
5. Biological resource use and harm within a protected area	5.1 Hunting, killing and collecting terrestrial animals (including killing of animals as a result of human/wildlife conflict) 5.2 Gathering terrestrial plants or plant products (non-timber) 5.3 Logging and wood harvesting 5.4 Fishing, killing and harvesting aquatic resources
6. Human intrusions and disturbance within a protected area	6.1 Recreational activities and tourism 6.2 War, civil unrest and military exercises 6.3 Research, education and other work-related activities in protected areas 6.4 Activities of protected area managers (e.g. construction or vehicle use, artificial watering points and dams) 6.5 Deliberate vandalism, destructive activities or threats to protected area staff and visitors
7. Natural system modifications	7.1 Fire and fire suppression (including arson) 7.2 Dams, hydrological modification and water management/use 7.3a Increased fragmentation within protected area 7.3b Isolation from other natural habitat (e.g. deforestation, dams without effective aquatic wildlife passages) 7.3c Other 'edge effects' on park values 7.3d Loss of keystone species (e.g. top predators, pollinators etc)
8. Invasive and other problematic species and genes	8.1 Invasive non-native/alien plants (weeds) 8.1a Invasive non-native/alien animals 8.1b Pathogens (non-native or native but creating new/increased problems) 8.2 Introduced genetic material (e.g. genetically modified organisms)
9. Pollution entering or generated within protected area	9.1 Household sewage and urban waste water 9.1a Sewage and waste water from protected area facilities (e.g. toilets, hotels etc) 9.2 Industrial, mining and military effluents and discharges (e.g. poor water quality discharge from dams, e.g. unnatural temperatures, de-oxygenated, other pollution) 9.3 Agricultural and forestry effluents (e.g. excess fertilizers or pesticides) 9.4 Garbage and solid waste 9.5 Air-borne pollutants 9.6 Excess energy (e.g. heat pollution, lights etc)
10. Geological events	10.1 Volcanoes 10.2 Earthquakes/Tsunamis 10.3 Avalanches/ Landslides 10.4 Erosion and siltation/ deposition (e.g. shoreline or riverbed changes)
11. Climate change and severe weather	11.1 Habitat shifting and alteration 11.2 Droughts 11.3 Temperature extremes 11.4 Storms and flooding
12. Specific cultural and social threats	12.1 Loss of cultural links, traditional knowledge and/or management practices 12.2 Natural deterioration of important cultural site values 12.3 Destruction of cultural heritage buildings, gardens, sites etc

Annex 2: The list of questions in the Assessment Form of METT

	Issue	Category
1. Legal status	Does PA have legal status (or in the case of private reserves is covered by a covenant or similar)?	Context
2. PA regulations	Are appropriate regulations in place to control land use and activities (e.g. hunting)?	Planning
3. Law enforcement	Can staff (i.e. those with responsibility for managing the site) enforce PA rules well enough?	Input
4. PA objectives	Is management undertaken according to agreed objectives?	Planning
5. PA design	Is the PA the right size and shape to protect species, habitats, ecological processes and water catchments of key conservation concern?	Planning
6. PA boundary demarcation	Is the boundary known and demarcated?	Process
7. Management plan	Is there a management plan and is it being implemented?	Planning
8. Regular work plan	Is there a regular work plan and is it being implemented?	Planning / Outputs
9. Resource inventory	Do you have enough information to manage the area?	Input
10. Protection systems	Are systems in place to control access/resource use in the PA?	Process / Outcome
11. Research	Is there a programme of management- orientated survey and research work?	Process
12. Resource management	Is active resource management being undertaken?	Process
13. Staff numbers	Are there enough people employed to manage the PA?	Inputs
14. Staff training	Are staffs adequately trained to fulfil management objectives?	Inputs / Process
15. Current budget	Is the current budget sufficient?	Inputs
16. Security of budget	Is the budget secure?	Inputs
17. Management of budget	Is the budget managed to meet critical management needs?	Process
18. Equipment	Is equipment sufficient for management needs?	Input
19. Maintenance of equipment	Is equipment adequately maintained?	Process
20. Education and awareness	Is there a planned education programme linked to the objectives and needs?	Process
21. Planning for land and water use	Does land and water use planning recognise the PA and aid the achievement of objectives?	Planning
22. State and commercial neighbours	Is there co-operation with adjacent land and water users?	Process
23. Indigenous people	Do indigenous and traditional peoples resident or regularly using the PA have input to management decisions?	Process
24. Local communities	Do local communities resident or near the PA have input to management decisions?	Process
25. Economic benefit	Is the PA providing economic benefits to local communities, e.g. income, employment, payment for environmental services?	Outcomes
26. Monitoring and evaluation	Are management activities monitored against performance?	Planning / Process
27. Visitor facilities	Are visitor facilities adequate?	Outputs
28. Commercial tourism operators	Do commercial tour operators contribute to PA management?	Process
29. Fees	If fees (i.e. entry fees or fines) are applied, do they help PA management?	Inputs / Process
30. Condition of values	What is the condition of the important values of the PA as compared to when it was first designated?	Outcomes

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Annex 3: The questions of the online questionnaire

(After giving an explanation about myself and the research);

Q.1. Have you ever visited at least one of Iran's national parks? O No (Go to Q10)   O Yes (Go to Q2)

Q.2. What was the name of the last visited national park in Iran?

| Choose one method | O Choose from list: [Name of the national park – Province ▽]   or   O Write its name by yourselves here: …… |

Q.3. Had you visited there with? O alone   O A group (number of persons older than 18)? ….

Q.4. How did you first find out about that visited national park? You may tick more than one box.   □ Friends/Relatives □ Living nearby □ Publications □Internet/website □School class/program □ Television/radio   □ other …….

Q.5. Did you buy any local products in the last visited national park? O No   O Yes, which…

Q.6. Do you think the local people, near to the last visited national park, benefited from your visiting? O No O Yes

Q.7. In total, how much is it the maximum amount that you are willing to pay as entrance fee for the last visited national park to be spending on its protection and management (Rials)?
O Nothing O10000   O 20000   O30000   O 40000   O 50000   O others? ….

Q.8. Have you ever visited any other Iran's national parks? O No (If "No" go to Q.9)   O Yes (continue)

Q.8-1. If Q.8. is "Yes", how many?   O 2-5   O 6-10   O 11-15   O more than 15

Q.9. Please indicate the rate of your satisfaction of following items related to the last visited national park in Iran:

Row	Items	Very dissatisfied	dissatisfied	Neutral	Satisfied	Very satisfied
		Rate of Satisfactions				
1	Infrastructural Facilities (e.g., accessible road, parking)	O	O	O	O	O
2	Service facilities (e.g., shop, restaurant, hotel, hut)	O	O	O	O	O
3	Clean, well presented toilet facilities	O	O	O	O	O
4	Well designed & maintained walking tracks/trails	O	O	O	O	O
5	Collected human waste	O	O	O	O	O
6	Provided useful guides/maps/information on plants & animals of national park	O	O	O	O	O
7	Essence, friendly & responsive national park staff and provided information by them	O	O	O	O	O
8	Feeling safe	O	O	O	O	O
9	Able to enjoy nature	O	O	O	O	O
10	Overall, how happy were you with your visit?	O	O	O	O	O

Q.10. Have you ever voluntarily participated in any activities related to nature conservation and environmental protection?　　O No　　O Yes

Q.11. Are you willing to voluntarily participate in some projects related to nature conservation and environmental protection?　O No　　O Yes

Q.12. Did you know that national parks may include private lands and some people are living in?
O I Do not know　　O I know

Q.13. The distance of a nearest national park to your living city in Iran (km):
O I live inside of a national park　　　O less than 10　　O 10-50　　O more than 50
O I Do not know

Q.14. Please indicate the rate of your agreement with following statements:

Row	Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
		Rate of agreement				
1	Local people economically benefit from ecotourism activities.	O	O	O	O	O
2	Everyone should conserve wildlife of national parks.	O	O	O	O	O
3	Government should allow stakeholders to participate in management of national parks.	O	O	O	O	O
4	There is trust between national parks administrators and local people.	O	O	O	O	O
5	Current preservation and management activities in national parks are successful in conserving Iran's natural areas and wildlife.	O	O	O	O	O
6	Local people like establishing of national parks.	O	O	O	O	O
7	Ecotourism activities contribute to conserve national parks and their biodiversity.	O	O	O	O	O

Q.15. Does your income or a part of that depend on national parks?　　O No　　O Yes

Q.16. Have you ever participated in any projects of national parks planning and management including meetings, enforcement and/or monitoring?　O No　　O Yes

Q.17. Are you willing to visit Iran's national parks in future?　　O No　　O Yes

Q.18. In total, how much is it the maximum amount that you are willing to pay as entrance fee to a national park to be spending on its protection and management (Rials)?
O Nothing O 10000　　O 20000　　O 30000　　O 40000　　O 50000　　O others? ….

Q.19. Do you think which structure is more suitable for Iran's national parks management system?　O Governmental management　　O Participatory conservation　　O Private management
O Don't know

Q.20. Do you know that national parks are scenic outstanding areas of natural landscape which would be sufficient to represent the nature of our country?　　O No　　O Yes

Q.21. Do you know that the purposes of designing a National Park are "protection and improvement of biodiversity and sites" and "recreation"?　　O No　　O Yes

Q.22. Do you know that about 1% of our country are selected as national parks? O No   O Yes

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Comment: National Parks are one of fourfold areas under protection of Department of the Environment which they are the most important compare to other areas.

Q.23. Do you know that all countries have confirmed to increase their protected areas at least to 17% of their country's area by 2020 at the last international convention in Nagoya (2010)? O No   O Yes

Q.24. Do you know that about 10% of Iran's land has been progressively selected as protected areas? O No   O Yes

Q.25. Do you agree to increase the percentage of protected areas to conserve Iran's biodiversity? O No   O Yes

Q26. Respondent' attributes
Q.26-1. Gender: O Male   O Female

Q.26-2. Marital status: O Single O Married

Q.26-3. Age: …………..

Q.26-4. Your primary job: O Teachers (elementary to university)   O   Government employee O Private Company employee   O Retired O Student O Housekeeper   O   Part-time   job O Farmer and ranchman   O Liberal expert (doctors, judges, lawyers, deputies, artists, writers, etc.) O Self employment O unemployed   O other

Q.26-5. Educational level: O Under high school   O high school   O Associated degree O Bachelor   O Master   O Doctor and upper

Q.26-6. Is your major related to environment, natural resources or similar issues? O No   O Yes

Q.26-7. Are you a member of any environmental supported organization? O No   O Yes

Q.26-8. Your household size: O alone   O 2   O 3   O 4   O 5   O more

Q.26-9. Your totally monthly income (Rials): O Nothing   O less than 5000000 O 5000000-7500000   O7500000-10000000   O10000000-15000000   O15000000-20000000   O over

Q.26-10. Your totally monthly Family income (Rials): O Nothing   O less than 5000000 O 5000000-10000000   O10000000-15000000   O15000000-20000000   O20000000-25000000   O over

Q.26-11. name of your living place in Iran: Province: [Please select the name of Province ▽] city……

Q.26-12. You are living now in: O Iran   O abroad
Comments:

If you have any comment, suggestion, guidance or criticisms please write here!

If you are interested to take its final paper, please write your email address here: …..
Thank you very much for your answers!
Kolahi   [Submit]

===

Annex 4: The questions of the questionnaire applied for local people

(After giving an explanation about myself and the research);
A: General Opinion
Name of residential area: ……………… Date: ………………….

Q.1. Do you know of the existence of KNP? O No   O Yes

Q.2. Have you ever seen any brochure about KNP? O No   O Yes

Q.3. Have you ever seen the signs or poles of the boundary of KNP? O No   O Yes

Q.4. Do you, as a local people, enthusiastically receive people outside of this district? ONo OYes

Q.5. Have you ever participated in any awareness/meeting program about KNP? O No   O Yes

Q.6. Do you have any direct connection such as collaboration with KNP managers? O No O Yes

Q.7. Are you eager to be involved in the park administration?   O No O Yes

Q.8. Do you have any income from ecotourism?   O No   O Yes

Q.9. If "Yes", how much per month (Rials)? …….

Q.10. Do you think that if you protect the nature, eco-tourists will come here? O No   O Yes

Q.11. Are you willing to participate with other villagers to make here a pleasant place for eco-tourists? O No OYes

Q.12. Do you agree to change your living style if you were offered another job? O No   O Yes

Q.13. Does any of your household member work in KNP? O No   O Yes

Q.14. Have you or your family made any handicraft? O No   O Yes (What? …………..)

Q.14. Have you ever voluntarily participated in any activities related to nature conservation and environmental protection?   O No   O Yes

Q.15. Are you willing to voluntarily participate in some projects related to nature conservation and environmental protection? O No   O Yes

Q.16. Are you willing to participate in a payable job in some projects related to nature conservation and environmental protection?   O No   O Yes

Q.17. Does your income or a part of it depend on KNP (e.g., selling KNP collected fuel-wood, fodder, and medical plants)? O No   O Yes (what type(s) and how much per month)……..

Q.18. Please indicate the rate of your agreement with following statements:

Row	Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
		Rate of agreement				
1	Local people economically benefit from ecotourism activities.	O	O	O	O	O
2	Everyone, including local people, should conserve wildlife of KNP.	O	O	O	O	O
3	Government should allow stakeholders, including local people, to participate in management of KNP.	O	O	O	O	O
4	There is trust between KNP administrators and local people.	O	O	O	O	O
5	Current preservation and management activities in KNP are successful in conserving KNP's natural areas and wildlife.	O	O	O	O	O
6	Generally speaking, I like KNP.	O	O	O	O	O
7	Ecotourism activities contribute to conserve KNP and its biodiversity.	O	O	O	O	O
8	KNP was created for the betterment of our community.	O	O	O	O	O
9	I am generally satisfied that my village is included in/near to KNP.	O	O	O	O	O
10	The establishment of conservation areas is important.	O	O	O	O	O
11	Visitors to the area are well behaved.	O	O	O	O	O
12	Tourism development is important for the future.	O	O	O	O	O
13	I agree with increasing the area of KNP.	O	O	O	O	O

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Q.19. How is the effect of nature conservation on your household economy? O Disadvantage O No effect   O Benefit

Q.20. Do you enjoy of living here? O Yes O NO

Q.21. Are you willing to relocate to a place outside of KNP/JPA? O No at all   O Yes O Yes, but under certain conditions (which? ………………………….)

B: Open questions

Q.22. Are there any problems/restrictions/conflicts which come from KNP? O No   O Yes

Q.23. Do you have any recommendation/suggestion to improve the park management? O No O Yes

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C: Respondent' attributes

Q.24. Do you think that your household income is enough to cover your households' expenses? O Yes   O No   O Barely

Q.25. What is your primary family income source? …………

Q.26. Your household size: ……..

Q.27. Educational level (year): …………

Q.28. Do you own land? O No   O Yes (Private landholding (ha or m2)) ………

Q.28.1. If Q.28 is yes, what is the current use of your land (prioritize)? ☐ Growing crops (what crops? …………………………………………………..) ☐ Pasture/Hayfield   ☐Garden ☐ others: …..

Q.29. Do you own livestock? O No   O Yes

Q.29.1. If Q.29 is yes, what kind of livestock and how many of each kind? ☐ Cattle: ……..   ☐ Poultry: ……..   ☐ Sheep: …….. ☐ Horses: ……..   ☐ Others: ……..

Q.30. Gender: O Male   O Female

Q.31. Age: …………..

Q.32. Marital status: O Single   O Married

Thank you very much for your answers! Kolahi

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LIST OF THE PUBLICATIONS DURING DOCTORAL COURSE

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