

PROMOTION OF CONSERVATION POLICIES AND BIODIVERSITY STRATEGIES IN DENA BIOSPHERE RESERVE

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Abstract: *Biosphere reserves are the most important management tools for biodiversity conservation and its sustainable use. On the promotion of conservation policies and biodiversity strategies this area is evaluated as advocating the "Ecosystem Approach" to the in situ conservation of natural ecosystem and landscapes, as well as the diversity there within, which corresponds to what Biosphere Reserves are all about valuable biological diversity of the area for conducting scientific research and ecotourism activities considered an important element for the creation of unique sustainable development model in Dena.*

Key words: Dena, Biosphere Reserve, Biodiversity, Sustainable Development

Introduction

Dena with the area of 938,721 ha is located in south-west of Iran with geographical location of 51° 9' to 51° 37' longitude and 30° 52' to 31° 14 ' latitude. It is a mountainous area with steep slope, and located in north-west of Kaleh-Goleh with 1,359.2 m of height. The mountains has general slope of more than 60 percent and snowy precipitation regime. There are low vaporization and transpiration levels and high degree of the potential flood plain. Dena is the continuation of Zagros Mountainous ranges. The bio-geographical region situated in mountain biome, as "Temperate broadleaf and mixed forest". The presence of at least 1200 plant species with 50 endemic species would approve the value of the site to be considered as within the WNBR (World Network of Biosphere Reserves). Moreover, there are 90 plant families which corresponds to 60 percent of total plant families in Iran; 430 plant genus from total of 1215 plant genus which corresponds to 35 percent in Iran; 1201 plant species from total 7502 plant species which corresponds to 16 percent in Iran and 50 endemic plant species which corresponds to 17 percent of total endemic plant species in Iran. There are also 128 medicinal plant species, 110 wild plant species, 84 species of plant which contain chromogen compound and 61 edible plant species which reveals the medicinal, edible, and conservation values of plant species in Dena. Because of the presence of pastoral nomads and their impact to the environment, Dena considered as one of the most critical ecological area in the Zagros mountainous region. Through integrated ecosystem approach planning, local communities become part of the ecosystem, to get them fully involved for conservation and sustainable use of resources. Valuable biodiversity status in Dena is the best opportunity in seeking concrete solutions to reconcile biodiversity conservation with sustainable use of natural resources, for the benefit of local people, based on common approaches. Promoting sustainable development and associated cultural values in the area is a primary means for building the local constituency for conserving biological diversity in the landscape (UNESCO, 2015). For enormous contributions to the conservation of biological diversity in Dena, complex biological, ecological, legal, financial, social and managerial systems must be successfully integrated. Hence Dena Biosphere Reserve could be used as a tool for implementing the main objective of the Convention on Biological Diversity (CBD), which indicates about: "The conservation and sustainable use of biological diversity and, fair and equitable sharing of benefits arising from the utilization of genetic resources."

Local Communities

Dena has ancient historical record and is in close relation with Iranian culture and tradition. Nowadays, all the economical activities of the residents are taking place in the forest and surrounding areas. There is a close relationship between the forest and foresters. Forest is the main source for the population and also livestock. The most important exploitation activities from the forest within this area include:

1. Cultivations in forest;
2. Exploitation of the forest wood as fuel and rural construction;
3. Exploitation of forest and surrounding areas for grazing;
4. Exploitation of accessory products; and,
5. Dry farming development

Pastoral and tribal life styles with their special habits such as animal hunting are characters of their specific social structure. In Dena there is still transferring of pastoral nomad's activities to the next generations. Even in small numbers, this continuance in transferring means history, culture and millennium life style conditions; the feature which has historical and cultural values.

Climate

Based on DOMARTIN climate classification system, Dena is classified as very wet and Mediterranean area and based on EMBERGER classification system, Dena is classified as cold, wet and cold, semi-wet areas. Based on these results, this area in addition to having more average precipitation in comparison to the surrounding areas has less annual temperature too. Since Dena contains mountainous biome as well as plain biome, these biomes further are categorized into diversity of biomes. According to the diversity in biomes, the diversity of habitats takes place, like; fresh water habitat, littoral habitat, plain habitat and mountainous habitat. In addition to natural habitats, presence of farmlands brings about agricultural habitats and introduction of new animal species. In Dena heights there are inter-zonal biomes. This means that, Dena's crest-line divide the region into different climatic conditions. Different climate is a good reason for different land vegetation cover and also different biological combinations. The western part has typical feature of Zagros biome and the eastern part has the natural feature of the Central biome of Iran. The eastern part has mostly steppe feature. In this area, the valleys with special microclimate are different from the other areas. However, although these arable valleys are located in the territory of Dena protected area, most of them are residential and is covered with garden plantation and agricultural practices. Therefore the animal species which are compatible with the agro-tops exist in this area. In western part because of 2 following reasons animal diversity is more than the eastern part:

1. More natural landscapes diversity and accordingly more animal habitats; and,
2. Presence of safe and pleasant natural environment

Present Network and Definition

The Protected areas are considered the key global strategy for the conservation of species population's and habitats (Geldmann et al., 2013; UNEP-WCMC & IUCN, 2016). The protected areas number has been continuously rising, and is currently estimated at 217,155 in 244 countries (excluding UNESCO BRs) covering 14.7 percent of terrestrial regions and 10.1 percent of marine areas within national jurisdiction (UNEP-WCMC & IUCN, 2016). In parallel, BR model of site protection under international programs with a conservation focus and component to contribute to the global sustainability agenda has been flourished (Schaaf and Clamote Rodrigues, 2016). UNESCO BRs organized into a network of 669 in 120 countries (UNESCO, 2016a). UNESCO's early definition of BRs is: "Protected areas of representative terrestrial and coastal environments which have been internationally recognized for the value in conservation and in providing the scientific knowledge, skill and human values to support sustainable development" (UNESCO, 1984). In light of the complex evolution of the MAB (Man and the Biosphere) program, BRs have now reached a more sophisticated definition: "Biosphere reserves are science for sustainability support sites - special places for testing interdisciplinary approaches to understanding and managing changes and interactions between social and ecological systems, including conflict prevention and management of biodiversity" (UNESCO, 2016a).

Zonation System

In Biosphere Reserves the Zonation system comprises of 3 distinct zones (Ishwaran et al., 2008; Price et al., 2010). These zones from the inner most part to the outer most part is called as; Core zone, Buffer zone and Transition zone (UNESCO, 2016a). The core area set aside to protect large-scale ecological processes along with the complement of species and ecosystems characteristics of the area. It contains minimum human activities, except research and monitoring, aimed at protecting the landscape, ecosystems and species it contains. The surrounding area acts as buffer for the core and accommodates more human activities such as research, environmental education and training as well as tourism and recreational activities. An outer transition area or area of cooperation extends outwards and serves as a liaison with the larger region in which the biosphere reserves lies and promotes in particular the development concern with activities such as applied research, traditional use or rehabilitation, human settlements, agriculture, fisheries, etc. In buffer zone and transition zone of Dena, dry farms and irrigated farms cover more than 4400 ha of the total area. With considering the rule and regulation concerned grazing livestock is permitted in most of the transition area for a limited period of time in a year. Hence zoning is a device of land use regulation. With respect to zones, in Dena the core zone comprises of two zones with the total surface areas of 35905 ha. The core zone 1 includes 31066 ha and core zone 2 comprises of 4839 ha. The buffer zone contains 69689 ha and the transition zone 149943 ha, which on management system try to support each other in the region.

Method

In Dena attention is paid to cultural sensitivity, participation and benefits for local communities, tailoring scientific research to resolve natural resource use problems, fostering dialogue amongst different stakeholders, biodiversity education and awareness raising, conflict resolution with nomads and training of authorities also building up, local and national capacity for sustainable land management and development. The functional capacity for promoting the sustainable development of its eco-region is:

- Providing a tool for wider bioregional and eco-regional conservation planning exercises;
- Conserving the composition, structure, function and evolutionary potential of regional biodiversity;
- Contributing to regional conservation strategy;
- Maintaining the diversity of landscape with associated species and ecosystems;
- Delivering benefits to resident and local communities consistent with the other objectives of management;
- Delivering recreational benefits consistent with the other objectives of management;
- Minimizing disturbances through careful planning and implementation of research; and,
- Using adaptive management strategies to improve management effectiveness and governance quality over time

Results and Discussion

The logistic function in Dena is aimed to promote scientific research, which in some ways must serve as "living laboratories" for testing out and demonstrating integrated ecosystem management approach. Thus an efficient logistic function in Dena is central to the successful implementation of "Biosphere Reserve Implementing Monitoring Program". Monitoring is about the repeated measurement of a series of defined variables. Monitoring allows assessing changes, where a baseline is available or designed to get established latter on. In this context, undertaking research, carrying out observations and producing sound knowledge and data sets are basic tasks of any integrated research and monitoring program. Core zone is the safe area in protected area of Dena. Grazing and other exploitations are completely forbidden in this zone. By considering to its virgin nature, this zone is in the framework of Biosphere Reserve goals. In Dena the core zones are protected areas for conservation and monitoring activities. The main objective of the core zones is to preserve ecosystem and species in a state as undisturbed by human activities (Dudley, 2008, 2013). Buffer zone is the continuous protected area to the core zone and it is the surrounding part of the core area which contains some scattered villages. Limited exploitations, grazing, hunting and different kinds of recreational activities could be

involved here. Buffer zone includes sufficient area immediately adjacent to the core area which is of outstanding universal value in order to protect the site from direct human encroachment. The buffer zone contains 69,689 ha in which, the constructed area is about 310 ha and the area which excluded from governmental properties and considered as private land area is about 3,830 ha. The transition area has central function concerning socio-economic development. The conservation, sustainable development and logistic support can be implemented in all zones but with varying degrees, depending on the functional focus of each zone (Matar, 2015; UNESCO, 1996). With regards to the absence of any industrial and factory activities around Dena, the most important local community impact to natural environment and biodiversity is through livestock grazing and animal hunting or capturing. Environmental degradation in Dena is mainly caused by the lack of comprehensive and integrated management plan in:

- Excessive population of free grazing livestock;
- Over hunting and fishing activities;
- Over exploitation of wood for rural construction and fuel by villagers;
- Economic dependency of the village dwellers on medicinal, resins and nutritional plants and fodders; and,
- Unsustainable rain fed cultivation agriculture, land conversion and cultivation on high slope lands

Wise use of natural resources like; water, land, forest and rangeland is the main supporting policy for environmental conservation in the long run. Fortunately in Dena, because of the rich natural resources and the low labor expenses for rehabilitation and restoration programs of the degraded areas, recovery is quite possible. In Dena the transition zone comprises of 149,943 ha. So, the following activities are for achieving this goal in Dena:

- Integrate social and economic research in the MAB program, due to the importance of the human element in ensuring the social and economic relevance of research in ecosystem use and conservation;
- Identify and select methodologies appropriate for overall integrated monitoring including socio-economic facts as a key objective in Biosphere Reserve;
- Evaluation of the flora and fauna is arranged in order to assess the quality of data and the user friendliness and accessibility of its databases;
- Identify ecological priorities, ecosystem processes and ecological modeling;
- Verify critical threats and positive grass roots action;
- Build partnerships for promoting compatible economic development; and,
- Restore ecosystem through fundraising and campaign planning;

The major local community activities and businesses besides relying heavily on natural resources are apiculture businesses and pastoral practices. With respect to the concept of sustainable development, integrated ecosystem management approaches and land carrying capacity, the areas management is developing and progressing. In the buffer zone of Dena, the activities should make balance between the number of livestock and annual fodder production. In this respect, the production capacity of the grazing lands should be calculated annually and in a specific time, the number of livestock and the duration of their exploitation should be informed to the farmers. In the case of surplus livestock, the farmers can provide fodder from the legal organizations, at current price, directly. This process should be organized properly to sustain financial situation of farmers, otherwise we will face problem with their cooperation. The concept of Biosphere Reserves Integrated Monitoring (BRIM) as a global platform for monitoring implies the integration of GIS directly into the MAB net and BRIM database. The "data layers" will geographically locate which Biosphere Reserves are carrying out which type of monitoring (abiotic, biodiversity, socio-economic and integrated monitoring) and combining it with variables such as bio-geographic regions, land cover, indicators of sustainable development and other socio-economic data. So in this way gaps in the monitoring network programs could then be identified. There are series of management plans and policies, suggesting in Dena:

1. A large unmodified protected area considered as core area for retaining its natural character without human habitation, which is protected and managed so as to preserve its natural condition.
2. Surrounding of the proposed core area consider as protected buffer zone, which preserve core area from external pressure.
3. Transition or cooperation area for sustainable development.

Within the recommended framework status, natural features of Dena due to improvement of the area's economy via ecotourism, educational and research activities could become more conserved. To protect Dena's genetic biodiversity, conservation activities have taken place to prevent the entrance of livestock into the buffer zone and also the intensive planting of endemic shrubs in case of some micro destruction is under the program activity.

In Dena the following functional capacities for promoting the sustainable development of its eco-region exist:

- Conservation of biodiversity;
- Promotion of ecological understanding; and,
- Experimentation tools and demonstration objects for ecological sustainable development.

These could be integrated through multi-disciplinary approach, focusing on the following objectives:

- Local community participation in decision making and conservation;
- Ecosystem approach for integrated natural resources planning and management;
- In-situ wildlife conservation and restoration;
- Environmental education and training;
- Ecologically sustainable development; and,
- Developing ecological network system

Moreover, the following actions could confer great benefits to areas unity and solidarity:

- Access improvement to information services;
- Risk reduction from social capital;
- Greater influence over policies and legislation;
- Better management of common and shared resources through group actions;
- Bioregional ecosystems support maintenance to local community; and,
- Ability improvement for innovation

To promote conservation and equity in the area, intense capacity building programs should be implemented on building negotiation and communication skills of the local people, so that they are able to represent themselves. In addition, participation of women and young individuals in local activities should be encouraged by various methods. However to become more effective the following actions must be taken in advance:

- To establish an ongoing institutional system for biodiversity mainstreaming;
- To develop a broad vision of conservation at national level;
- To develop biodiversity strategies at local level;
- To invest significantly in building and sustaining political commitment throughout the process;
- To invest significantly in building commitment in line agencies including stakeholders, planning authorities and decentralized agencies;
- To seek formal links with key development planning processes;
- To integrate biodiversity objectives into existing national environmental management tools;
- To integrate biodiversity's livelihood and ecosystem functions locally;
- To engage local communities and private sectors into management processes

All future plans and programs for socio-economic activities, monitoring and evaluation have already been set up. In this regard there are some constraints and challenges ahead. These are:

- Integrating economic, environmental and social equity issues into development processes and implementation of a policy framework has continued to be one of the biggest challenge in transition zone; and,
- Adequate recognition and collaboration from local communities on environmental education and awareness raising

Recommendation

The management policy is formulated based on the local community education, participation and involvement. However to achieve this, there are some recommendations:

- People education program should be a long-term and continuous program. This should be lasting till get institutionalized in the society;
- The public education should help people to understand the necessity of conservation and management of their environment and take maximum benefit of it. Promotion of living quality should be a principle for action;
- Looking back should confirm this point that, environmental conservation is not possible by force; providing a good situation encourage people to consider conservation regulations eagerly; and,
- To save agricultural activities in traditional practices, it is advisable to receive national support

Conclusion

Broadly speaking a biosphere reserve is an area of terrestrial or coastal ecosystem organized in order to fulfill 3 basic functions: to conserve landscapes, ecosystems, species and genetic variation; to foster economic and human development which is socio-culturally and ecologically sustainable, and to provide support for research, monitoring, education and information exchange related to local, national and global issues of conservation and development. Dena include, legally protected core area for conservation, as well as protected buffer zone as managed use area and transition or cooperation zone, where sustainable forms of development are taking place. They constitute therefore living laboratories to test and improve relations between conservation and sustainable development, and to demonstrate that it can be mutually reinforcing. They provide in particular innovative tools for the resolution of land and water use conflicts through negotiation and consent by all legitimate stakeholders, and in the first place, the local communities. Generally speaking, the main problem in the management structure of Biosphere Reserves is to find ways for involvement of all stakeholders and in particular local communities who live in and around it, particularly in the transition area. The adaptation of the IUCN "management matrix" could be useful in this respect. The area is government managed protected area and the Department of Environment (DoE), as the government representative is responsible for conserving this area. However, the area has a shared governance co-managed protected area with a functioning local Biosphere Reserve Commission consisting of representatives of local people and stakeholders.

In this regard, national support to promote participatory management in Dena Biosphere Reserve and enhance national processes that empower local communities' rights and responsibilities to fully participate in the planning, implementation and decision-making processes affecting resource management in their lands and territories is mandatory. From the time the villages got protected, the villagers should feel the changes in their surrounding and relations with nature. Briefly, quality of life and the environment wherever they live must improve. Reconstruction of rural areas and building physical, mental, social and cultural infrastructures would be counted as important driving force in management processes, which ultimately needs some certain planning and programming. Its positive impacts will be counted in a close future. Organizing joint commissions with local communities and explain the DoE's targets in conservation and sustainable use of resources will bring further strength to management processes.

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