

Land use planning of Kiyan forest reserve for Strategic Management

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ABSTRACT: History has shown that power, influence, and cultural life of civilization societies during their evolution have been created by the existence of forests and natural reserves. Conservation and management of these resources is essential in the Iran which is considered as one of the most arid regions of the world and also in terms of biodiversity have the potential too. The study area (kiyan forest reserve) located in 12 kilometers of the Nahavand city whit southwest. In this study entitled "Land use planning of Kiyan forest reserve for Strategic Management" first has done Land use planning with ecological models and finally, using SWOT model was proposed guidelines for strategic management in the region. The results land use planning of Kiyan forest reserve as a homogeneous management zone indicated which best option is protection (National Natural Monument) and the second option is Tourism (recreation outdoor); In respectively: National Natural Monument>>>Tourism>>Forestry>Grassland management. Therefore proffered this region converted to National Natural Monument from view point of management level.

Keywords: Land use planning, SWOT model, Strategic Management, Kiyan forest reserve

INTRODUCTION

History has shown that power, influence, and cultural life of civilization societies during their evolution have been created by the existence of forests and natural reserves. Growth of population depredated environmental and recreational resources (Watt, 2004). Probers have argued that welfare is equal whit value of forest resources divided on population (Mosadegh, 2004). In this regard, one of them is recreational use of forests, the growing tourism industry as a source of income for improved social and economic conditions of native people; also these capabilities are principles of forest sustainable use (Amirnejad et al., 2006). Iran can be considered as one of the top countries in the world from of view natural diversity, presence of four full seasons and attractions of Islamic Iranian (Rezvani, 2001). Management programs of natural resource should be done with proper segmentation until utilization of natural values and ecological potential in order achievement Sustainable development (Pir Mohammadi *et al.*, 2008). Several methods are to determine of ecological potential; For example, for feasibility and potential of tourism can be use SWOT method (Strength-Weakness-Opportunities-Threats) (Mohammadi Deh Cheshmeh & Zangi Abadi, 2008). (Kiyani et al .,2011) used matrix analysis for investigation land use change in Taleghan area. Strategic Analysis is an important step in the planning process (Ahamdi, 2007). In this study entitled "Land use planning of Kiyan forest reserve for Strategic Management" first has done Land use planning with ecological models and finally, using SWOT model was proposed guidelines for strategic management in the region. Kiyan forest reserve is remnants Zagros forest in the west of Iran and has status of stable (climax), Particular floristic composition and high species richness (405 species), this factors are important reasons for choosing it as a genetic reservoir (Safikhani et al., 2007). In this order to (Amirnejad *et al.*, 2006) estimated the existence value of north forests of Iran by using a contingent valuation method. (Kiyani and Khalilnejad ,2009) stated outdoor capability of Kiyan forest reserve is very good for ecotourism. (Kiyani and Kiyani ,2010) in order to Evaluation of the Kiyan forest reserve for manage ecosystems showed due to grazing and use of more than ecological carrying capacity, decreased there capability. (Shayan et al ., 2012) showed

exist of numerous springs and Kiyan forests, genetic reserves, have reasons for higher combination score (view point of tourism); and stated absorption of tourism will improve economic status of native peoples. Therefore is necessary to maintain its existence in every possible way and then restoration. The aim of this study was Land use planning of Kiyan forest reserve for Strategic Management.

MATERIALS AND METHODS

The study area (Kiyan forest reserve) located in 12 km southwest of the Nahavand city. This area is in North latitude of 34° and East longitude 48° and average altitude its 1,700 meters above sea level. In This area has protected species such as *chestnut*, *walnut* and *hawthorn* and has trees over 500 years old. The area of its natural forest is 100 acres and totally with destroyed forests and implanted is 500 hectares (Barzehkar, 2005). The cover of pasture plants is between 20 to 80 percent. The maximum temperature of summer is 40°C and 25°C in winter. Nahavand township view of point geomorphology divided to three physiographic sections: Alluvial Plain, Piedmont Plateau and Alluvial Fans. Kiyan region located within Alluvial Fans (Khezeli, 2000). In this region because of ground limestone, water from precipitation dissolve with lime and penetrates the ground easily and Cartesian surface of ground water is up. Aqueous of Kiyan spring around 2,500 liters per second which after drinking purposes and agricultural uses flowed into the Gamasyab River. Figure 1(Golshahi et al., 2010) shows the location of Kiyan forest reserve in the Nahavand Township.

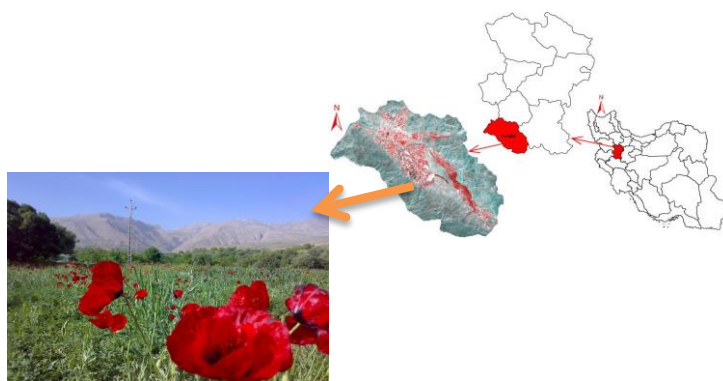


Figure 1. position of kiyan forest reserve in the Nahavand Township

Figure 2 shows Satellite image of Kiyan forest reserve and Kiyan city, using Google Earth spatial information database. Kiyan region has semi-arid climate and cold steppe, summers are relatively mild and winters are relatively cold. According to the regional meteorological center of Nahavand city, rainfall average is 360 mm (maximum is 479 mm and minimum is 221 mm); annual average temperature is about 20°C . Water hardness of kiyan springs is 110 mg/LCaCO_3 while mineral water is about 110 mg/LCaCO_3 too (Kiyani and Khalilnejad, 2009). Figure 3 shows also kiyan forest reserve and Tourists in it.



Figure 2. Satellite image of the forest reserve kiyan



Figure 3. kiyan forest reserve and tourists in it

Method research has been survey- analysis based on field studies. Basic information of this research is based on analyst of detail studies to identify ecological resources. The characteristics of these models are based on hydrological, geomorphologic, climate and vegetation assessment and classification of the land. Ecological model of tourism and recreation has three classes; Forestry has seven class and range management has seven classes too (Makhdoom, 2006). Ecological models forums are general guide for assessing the ecological application. Therefore, based on hydrological characteristics, geomorphologic, climate and vegetation area should be developed specific model (Makhdoom, 2009). Models of tourism, forestry, conservation and grass land management were prepared in accordance with Nahavand region and they were compared with characteristics of the study area. To identify ecological resources of forest reserve Kiyan, scientific literature reviews and field studies too; view of point physiographic Nahavand township divided to three sections: Alluvial Plain, Piedmont Plateau and Alluvial Fans. Kiyan area in Alluvial Fans section; Alluvial Fans have deep soil And high gravel generally (Khazli, 2000). Table 1 shows Characteristics of environmental units of Kiyan forest reserve. Priority indicators in the evaluation ecological model of tourism are: slope, stone, geography, water, vegetation, climate and weather. If the slope is not appropriate for tourism area, will avoided investigate of other parameters. This general rule is most true for first key indicators (Makhdoom, 2006). Figure 4 shows kiyan forest reserve as a homogeneous zone management (Yellow line).

Table 1. Characteristics of the environmental kiyan forest reserve (kiyani, 2013)

| Zone name (units) | Kiyan forest reserve as a homogeneous zone management |
|-----------------------------|--|
| Ecological features | |
| Altitude (m) | 1600-1800 |
| Percent slopes | More than 8 percent |
| Geographical aspect | Western North - Eastern North |
| Type of soil and rock | Sandy - loamy of half deep and calcareous rock |
| Vegetation type and density | Oak, sycamore, hawthorn, ash, hackberry, Arjan and wild almond with density of 10-70 percent |
| climate | Semi-arid (cold steppe to temperate alpine) |
| Water resource | Kiyan springs with 1.2 m ² /s |
| wildlife | partridge, porcupine, jackal, wolf and goats * Habitat has destruction |
| Erosion risk | risk of landslides and erosion is Moderate to high |



Figure 4. kiyan forest reserve as a homogeneous zone management (Yellow line)

RESULTS AND DISCUSSION

According to world association of tourists, nearly 40 percent of travel incentive are estimated ecotourism and visiting natural attractions (Ecotourism Regulations, 2005). Kiyan forest reserve view of point natural and attractive is unique in West of Iran; for continue utilization in order to develop tourism will need determined ecological potential. After comparing features of Kiyan forest reserve whit ecological model, potential of area described in Table 2.

Table 2. Assessment of ecological potential Kiyan forest reserve

| Protected area (National Natural Monument) | pasture management (7 class) | Tourism or recreation outdoor (3 class) | Forestry (7 class) | Land use type Unit name |
|---|------------------------------------|---|--------------------------|---|
| - Genetic value of rare species (such as oak, dangle tulip and squirrels) - source of water for agriculture - Educational value - Recreation Place | 3 | 1 | 4 | Kiyan forest reserve as a management homogeneous zone |

General methods for land use planning are Qualitative methods and quantitative methods (Makhdoom, 2006); in the present study we have used quantitative methods to determine priority. This method has four scenarios as below:

- 1- Percentage of the current land use
- 2- Economic needs of region
- 3- Social needs of region
- 4- Ecological needs of area

First based on above assumptions, land use will be prioritized and weight of 1 to 10 is assigned to each, then, for a deficit position or a failure of Class potential one rating will be decrease from value-weighted (table3). Ranking is based on sum of options; finally, the best option selected for the Environment unit. The results of land use planning Kiyan forest as a management homogeneous zone indicated best of option is conservation (National Natural Monument), The second option is Tourism (recreation outdoor), therefore priority is as follows: National Natural Monument >>> Tourism >> Forestry> Grassland Management.

Table 3. Weighted values of kiyan forest reserve

| Land use scenario | Protected area (National Natural Monument) | Grassland Management (medicinal plants) | Tourism (recreation outdoor) | Forestry (product of wood) |
|----------------------|---|--|---------------------------------|-------------------------------|
| Class potential | 1 | 3 | 1 | 4 |
| First scenario | 10 | 6 | 9 | 4 |
| Second scenario | 8 | 7 | 8 | 6 |
| Third scenario | 10 | 6 | 10 | 6 |
| Forth scenario | 10 | 5 | 9 | 5 |
| sum | 39 | 27 | 37 | 25 |
| precede cement | 1 | 3 | 2 | 4 |

Ecological resources of Kiyan forest reserve Compared for tourism, forestry, conservation and grassland management. Results indicated this region has potential 4 for forestry, potential 3 for grassland management, class 1 for recreation outdoor, and has high potential for protection. Figures 5 show landscapes Kiyan forest reserve which validated results for determination of ecological capability. Figure 6 shows a sample of snowy mountains reserves in this area; in some there deep of snow reserves is more than 100 meters. For propose of strategic planning, results of this study were combined with previous studies; Matrix analysis of strategic factors SWOT were presented in Table 4. Strategies are listed according to importance respectively.



Figure 5. roost of partridge and dangle tulip



Figure 6. A sample of stocks snowy and waterfall its

Table 4. SWOT Matrix

| Weaknesses | Strengths | |
|--|--|--|
| 1- formations and slopes susceptible to erosion and landslide 2- Soil erosion caused by farming activities and high traffic of tourists especially 3- Lack of space for family comfort 4- Lack of boundary 5- unsuitable entrance area | 1- natural pathway along river to biodiversity 2- Topography for weather conditions moderate 3- Diversity in the region, in compared with similar areas 4- Water supply for Kiyan city 5- place of recreation outdoor other city | Opportunities |
| WO strategies | SO strategies | 1- Optimum utilization of rich pasture area 2- Production of medicinal plant 3- Nurture of fish in downstream 4- Increase number of guardsman 5- Have educational value |
| 1- Buffer zones to maintain of region 2- terracing of slopes with plant adapted species 3- Grant cheap to the farmers in order to reducing grazing and product of medicinal plants 4- Replacement entrance to below | 1- Enhance level management to National Natural Monument 2- Construction of tell cabin 3- Multipurpose use of rangelands (medicinal plants) 4- Created of Kiyan industries for agricultural products | Threats |
| WT strategies | ST strategies | 1- Increase of waste due to increased tourism 2- Risk of contamination of source of water 3- Low tourist security for families 4- loss of social networks in natural resource conservation 5- Not take imposition from native people |
| 1- partnership and community consultation 2- Range Management Plan to reduce surface runoff and reduce soil erosion 3- Determine of ecological carrying capacity for improves tourism 4- Prevent construction in region | 1- law enforcement of Water and soil pollution from health centers 2- Promote the culture of tourism by municipality kiyan 3- Creation of participative management in outdoor recreation 4- take imposition of all visitors | |

CONCULSION

Kiyan forest reserve is remnants Zagros forest in the west of Iran and has status of stable (climax), Particular floristic composition and high species as a genetic reservoir. Results multi criteria evaluation method indicated this

region has 4 potential for forestry, 3 potential for grassland management, 1 potential for recreation outdoor, and has high potential for protection, therefore Kiyani forest reserve as a homogeneous zone management, the best option is conservation (National natural monument). Analysis of the strategic matrix: best strategy of SO was Enhance level management to National Natural Monument; best strategy of ST was law enforcement of Water and soil pollution from health centers; Best strategy of WO Buffer zones to maintain of region and finally the best strategy of WT partnership and community consultation. Finally, in order to sustainable development proffered this region converted to National Natural Monument from view point of management level which is one of areas supported by the Environmental Protection Agency; until will be caused a stable improving in nature quality of region.

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REFERENCES

- Amirnejad H, Khalilian S, Assareh MH and Ahmadian M. 2006. Analysis estimating the existence value of north forests of Iran by using a contingent valuation method. *Journal of ecological economics*, 58: 665– 675.
- Ahmadi MR .2007. Strategic Analysis (SWOT), Computer Research Center of Islamic Sciences, *Journal of Hosuon*, 13: 39-50.
- Barzehkar Gh. 2005. Forest Parks (Positioning and projection). Engineering Organization of Agriculture and Natural Resources of Iran. 231p.
- Ecotourism regulations of Islamic Republic of Iran. 2005. Ratified on 2005, Tehran.
- Golshahi A, Mirghafari N, Afyooni M, Sofyanian AR, hodakaramiNL. 2010. Mapping surface soil indices Nahavand city using GIS and Geo statistics. *Proceedings of Geomatics Conference, National Cartographic Center of Iran, Tehran*.
- Khezeli H. 2000. Environmental review of the Nahavand city, *Journal of cultural, social, economic*, Issue 3 (Cultural 3). Aliymradyan Institute, Tehran.
- Kiyani V, Khalilnejad MR. 2009. Identify of Kiyani Forest Reserve and eco-tourism capabilities it's. *Journal of mountain environment*, 15: 21-18.
- Kiyani V, Kiyani E. 2010. Introduction to ecosystem management whit approach native-applied (case study: Kiyani forest reserve). *Journal of Forest and Range*. 86, 87: 43-47.
- Kiyani V Feghhi J, Nazari Samani AA, Alizadeh Shabani A. 2011. SWOT Matrix Analysis Change user / Taleghan area to develop a strategy for sustainable land management. *Journal of Environmental Erosion, Hormozgan University, First Year*, 3: 60-45.
- Kiyani V. 2013. Land use planning of Kiyani Spring. *Shahre Ma Press, Nahavand*. 103 p.
- Mosadegh M. 2004. *Forest Ecosystems of world*. University of Tehran press. 245 p.
- Makhdoom M. 2006. *Fundamental of Landuse planning*, Tehran University Press .Seventh Edition . 289 p.
- Makhdoom M. 2009. *Textbook of Land use planning*. Faculty of Natural Resources, Tehran University. 58 p.
- Mohammadi Deh Cheshmeh M, Zangi Abadi A. 2009. Ecotourism Capability of Chaharmah O Bakhtiari province using SWOT. *Journal of Environmental Studies*, thirty fourth year, No. 47.
- Pir Mohammadi Z, Feghhi J, Zahedi Amiri, Gh, Sharifi, M. 2008. Application of GIS for use in the assessment of the ecological potential of ecotourism. *Proceedings in Geological and Environmental Conference, Azad university of Isalmshahr, Tehran*.
- Rezvani AA. 2001. Role of Ecotourism in protecting the environment. *Journal of Ecology*, No. 31.
- Safihani K, Rahiminejad MR, Kolvandi R. 2007. Introduced plant species and life forms Nahvand Kiyani district. *Journal of Research and Development of Natural Resources*, 74: 154-138.
- Shayan S, Zare Gh, Khalili S. 2012. Assess the scientific value and intensified tourism sites based on Rynard (case study: kiyani hills, plains Skinheads). *Journal of Tourism Development and Planning*. First year, 2: 57-74.
- Watt K. 2004. *Environmental Principles* (translated by Abdul Vahabzade). *Jahad of university peress, Mashhad*, Seventh Edition .321 p.