Orginal Article

Preparation of forest management plans in medial Zagros forests, Iran.

M.Zandebasiri[1*]
H.Ghazanfari[2]
A.Sepahvand[3]
P.Fatehi[4]
R.Moradi[5]

1- Member of Scientific Board, Behbahan Khatamolanbia University of Technology, Iran.
2- University of Kurdistan, Iran.
3- Islamic Azad University (IAU), Tehran, Iran.
4- Center of Agricultural and Natural Resources of Kurdistan, Iran.
5- University of Kurdistan, Iran.
Mehdi.Zandebasiri@yahoo.com

ABSTRACT

The aim of this study is comparison of the determined Forest Management Unit [FMU] by Forests and Rangelands Organization [FRO] with the local society units the selection of forest management plan in the Zagros forests in Iran. The research was carried out in "Taf" territory in province of Lorestan which is located in middle Zagros forests. The decision making for the determination of FMU needs multiple factors. For this purpose, Stakeholder analysis and Analytic Hierarchy Process [AHP] was applied. Results showed that Social requests, Adaptability with natural resources plans, Topography, Forest type, Cost of forest management plan and Effectiveness of forest management plan are the Criterion for determining FMU in medial Zagros forests. Results of applying AHP indicate that choosing local society units for FMU is a better choice in Zagros forests.

Keywords: *Forest Management Plan, Forest Management Unit, Stakeholder Analysis, Zagros, Lorestan.*

INTRODUCTION

Introducing the Zagros forests

Zagros forest region is, located in the western part of Iran. These forests have a semi-Mediterranean climate. These forests are one of the most important and sensitive ecosystems in Iran. These forests are about 5 million ha, that located in the west of our country. The main tree species in these forests are Quercus spp [oaks] [Jazirehi & Ebrahimi, 2003].

Forests and Rangelands in Iran have nationalized eversince and more than 1.7 million ha of the Zagros forests has been destroyed from that time [fattahi et al, 2000]. Zagros forests are involved in some kind of conventional ownership by local communities. Forest in this region, are dividing among rural people according to common law. Current forest utilization practices prepare and support the traditional livelihood systems [fattahi et al, 2000].

For more than 40 years, the government of Iran's Forest and Rangeland Organization [FRO] has tried to stop deforestation and manage the Zagros

forests by different management plans, but none of the forest management plans have been successfully applied, because of social impacts [Jazirehi & Ebrahimi Rostaghi, 2003]. The experience of FRO has shown that incompatibility with the needs and expectations of the local communities, are the main problems with managing the Zagros forests [Ghazanfari et al, 2004].

Identification of the problem

A Forest Management Unit [FMU] is an area of forest land that is managed to meet a series of objectives explicitly determined in a long-term management plan. The overall area of a FMU has clear boundaries demarcated both on the field and map. One or more forest function [Conservation, Protection and Production] can be included in an

Journal of Biodiversity and Ecological Sciences JBES
IAU of Tonekabon Branch
Tonekabon, Iran
info@jbes.ir

FMU. The FMU is often set up to address the issue raised by the measurement of cumulative effects and provide a focus for plan implementation. The FMU may have a wide range of sizes. The most important consideration in deciding the size is the capacity of the manager to use the resource properly [Davis et al, 2001]. Selection of the whole village as a management unit will harden the goal-setting in the Zagros forest resources. People's role in the handling of Zagros forests is very important [fattahi et al, 2000; Jazirehi & Ebrahimi Rostaghi, 2003]. According to the instruction of FRO, around the forested village has been determined for forest management plan in Zagros region [fattahi et al, 2000]. The smaller divisions among local peple for productivity of forests are available in the villages of Zagros Mountains [Ghazanfari et al, 2004]. Since the determined management unit by the FRO will not include the goal-setting of local societies. It seems that the FRO' management unit doesn't agree with the human factors of Zagros forests.

Aim of the study

The aim of this study is a comparison between the determined FMU by FRO with the local society units for selecting the forest management plan in Zagros forests. The decision making for the determining FMU needs multiple factors. Multi criteria decision making [MCDM] techniques enable resources managers to select the most preferred choice of action in a context where several criteria apply simultaneously. In a retinol, decision making environment the most preferred choice is generally bounded by the management objectives, and the constraint that limit the choice and achievement of the objectives [Brent et al, 2005]. The Analytic Hierarchy Process [AHP] is a MCDM method that allows the pair wise comparisons of management alternatives with respect to single decision criteria based on a ratio scale [Leskinen & Kangas, 2005]. In this research, the evaluation with use of AHP applied. AHP is a widely used method in forestry and forest management planning [Ananda and Herath, 2008].

Litter review of AHP in forest management planning

Kangas [1994] presents AHP as a tool to integrate public preferences for choosing among a series of strategies for forest management. Kurttila et al [2000] used the AHP to improve the quantitative basis of strategic forest planning. They applied the combined AHP-SWOT approach to aid the decision making in a Finnish forestry. The AHP was then used to measure the relative importance weightings of the SWOT group [i.e., Strengths, Weaknesses, Opportunities and Threats] and the weightings of the SWOT factors with respect to the four criteria in the SWOT group. Based on the weightings, the overall priority of the factors obtained. Ananda and Herath [2003] described how the AHP methodology can be used to formulate forest plans using a small sample of forest stakeholders. Kajanus et al [2004] applied the AHP to answer the question of whether culture can be identifying as a successful factor in rural tourism. The approach was exactly the same as that presented previously in Kurttila et al. [2000]. Wolfslehner et al [2005] on a comparative basis resorted to AHP and to an extension of this approach known as the Analytic Network Process [ANP] for measuring the sustainability of four strategies evaluated according to 6 criteria and 43 indicators in an Austrian forest. Ananda and Herath [2008] described another AHP application to a forest planning case study in the same Australian region, with the same objectives and considering three management plans. Dhar et al [2008] applied the AHP to select an appropriate conservation forest strategy in Syria, Asutria. AHP is a widely used method also in forestry and forest management planning. Nowadays AHP applied in a wide array of decision problems related to forestry and number of applications is continuously increasing [Kangas and Kangas, 2005].

MATERIAL & METHODS
Study area

The research carried out in Taf territory of Lorestan province, which is located in medial Zagros forests [See figure1]. The area of Taf village is 4456 ha.
The Taf forests like other forests in Zagros are damaged. People living as a villager-nomad and their income originate from shepherd and farming. In this FMU, there are nine local society units. Table [1] shows the name and area of the local resident division in Taf Village County.

Study methods

A composition of stakeholder analysis and Multi-Criteria Decision making has used in this study. This analysis ensures that all the interests in a defined area of the forest considered within the planning and decision-making process. Stakeholders can be individuals, organization or groups [Emtage, 2004]. Applying the stakeholder analysis is very important for development of

management plans, because it can help the gathering and analysis of data. It is including identification data gaps, potential data sources, and data gathering priority [Rastogi et al, 2010]. Stakeholder analysis have been widely accepted in forest management as the most effective instruments for achieving sustainable forest management particularly in the developing nations [Sheppard & Meitner, 2005]. With the use of stakeholder analysis, assess the capacity of different stakeholders to participate in the process, and appropriate types of participation by different stakeholders as successive stages of plan development or implementation [Rastogi et al, 2010]. In this research, the stakeholder perspectives gathered by questionnaires and conducted interview. For the use of stakeholders, we distribute fifteen questionnaires. To perform the interview and filling the questionnaires, the process of reputation approach, applied. Reputation approach includes using veterans in the groups involved. After specifying the criteria, applying AHP used for choosing the best choice. Analytic hierarchy process [AHP] is a mathematical method for analyzing complex decision problems with multi criteria [Kangas, 1994]. When applying AHP, a hierarchical decision schema is constructed by the decomposing the problem The principles of an AHP model are:

i.   Developing a hierarchical decision model comprising decision attributes [criteria]; sub-attributes and options [decomposition principle].

ii. Eliciting relative preferences of considerable alternatives by means of pair-wise comparisons under constraint of acceptable consistency of the answers [principle of comparative judgment].

iii. Additive synthesis of calculated preferences to an overall priority for each alternative which allows for a cardinal ranking of the evaluated alternatives [synthesis of priorities principle] [Kangas, 1994].

AHP has several advantages from the viewpoint of multiple-use and participatory planning. Using AHP, objective information, expert knowledge, and subjective preferences can be considered together. Qualitative criteria can be included in the evaluation of alternative plans [Mujgan and Saaty, 2006]. To determine the importance of the factors, we hold three sessions. Team members were chosen as follow:

1. An expert from Forest, Range and Watersheds high council [the highest ranking ones for the decision making in the FRO]

2. An expert from Forest and Rangelands Research Institute

3. An expert from the office of Dry and Semi-dry forest areas of FRO.

RESULTS & DISCUSSION

The result of stakeholder analysis for choosing the criteria decision makers revealed as follows:

Social requests, Adaptability with natural resources plans, Topography, Forest type, Cost of forest management plan, Effectiveness of forest management plan. When there is a large number of attributes, pair-wise comparisons can be tedious for respondent. To reduce the pair-wise comparisons in the hierarchy level, we grouping the elements in two criteria in the Span of control [Cost of forest management plan and Effectiveness of forest management plan] and Coordination [Social requests, adaptability with natural resources plans, forest type and Topography] was applied. Figure [2] shows the hierarchy of criteria and sub-criteria of decision making of FMU in Zagros forests.

The result from AHP shows choosing local units [small FMU] for FMU is a better choice in Zagros forests [Table3]. The result of the pair wise comparisons of AHP in Table [2] shows, social request is the most influential parameter in determining the FMU of the Zagros forests. Small FMU introduced the goal-setting of local resident in management plans of forest Zagros. This approach, increase the acceptable of forest management plans by local resident the necessary condition to perform this approach is to participation of local resident in the relevant decision making in forest management plans for Zagros region. At the current conditions, the local residents of Zagros forests are the only executors for the forest management plans and have no role in decision-making [fattahi et al, 2000; Ghazanfari et al, 2004]. This is a kind of limitation to perform division according to common beliefs of local resident. Social requests have the most importance between other criterion for management unit because of local resident roles & their requests in managing Zagros forests. The local resident role in forest managing is conceivable and they are the main ownerships in these forests [Ghazanfari et al, 2004]. Designing the FMU is doing according to participate local resident in managing the forested resources, local laws and determining their responsibilities. In order to reach this goal, we need social studies and actual reputation approaches.Therefore; reputation approaches must coordinate executive management programs of country forests with regards to traditional local

management in Zagros forests. That can improve the effectives of hierarchy structure in managing forests. In each village conventional territory [Big FMU], smaller divisions about forest utilization and managing forest resources are available according to local resident in Zagros forests. It can let the native communities using one or more forested region distinctly. Therefore, selecting village conventional territory as a management unit in this forest is in conflict with decision making process for forest planning in Zagros, because in order to obtain forestry goals, management unit must be managing with obvious goals. Adaptability of the smaller conventional territory [Small FMU] as forest management unit, Taf territory in Lorestan province, management unit is more consistent with the case study area and human beings activities. It seems that the conflicts between human activities in management unit system and the expectations of local communities are the main reasons of unsuccessful destiny of these management plans but with participating people in management programs this problem can be solved [Jazirehi & Ebrahimi Rostaghi, 2003]. In order to better understand the decision situation in the region, a SWOT analysis was performed in this study to determine the negative and positive effects of the decision-making. SWOT is an acronym for Strengths, Weaknesses, Opportunities and Threats. SWOT analysis is a commonly useful tool for analyzing both environments in order to attain a systematic approach and support for a decision situation [Kurtilla et al, 2000]. SWOT analysis is a tool designed to be used the preliminary stages of decision-making on the one hand and as a precursor to strategic management planning on the other [Zaerpour et al, 2008]. In the SWOT analysis, available resources and their potential utilization studied from the viewpoints of economic, ecological and social sustainability [Suh & Ematage, 2005]. The results of the SWOT analysis of the small FMU presented in table4. It aimed at identifying the positive and negative factors, as well as internal and external factors, that might have an impact on the proposed FMU plan. Table [4] shows the SWOT factors of proposed FMU plan.

Another level is added to territorial organization hierarchy of the forest, by scaling down the FMU. Addition of a level to territorial organization hierarchy of the forest, create problems in planning and managing of Zagros forests. But at present conditions, according to the current facts in Zagros forests specially lack of suitable socio-economic development [Fattahi et al, 2000], non

effectiveness plans [Jazirehi & Ebrahimi, 2003] and their inconsistency with the goal-setting of local resident [Ghazanfari et al, 2004] during at short and intermediate time to acquire the development point will be considered.

REFERENCE

Ananda J., Herath, G. (2003). The use of Analytic Hierarchy Process to incorporate stakeholder preferences into regional forest planning. Journal of Forest Policy and Economics, NO.5, pp.13–26.

Ananda J., Herath, G. (2008). Multi-attribute preference modeling and regional land-use planning, Journal of Ecological Economics, NO.65, pp. 325-335.

Bbrent A.C., Heuberger R., Manzini D. (2005). Evaluating projects that are potentially eligible for Clean Development Mechanism (CDM) funding in the South African context: a case study to establish weighting values for sustainable development criteria. Journal of Environment and develop economics, NO.10, pp. 631–649.

Davis L.S., Johnson K.N., Bettinger, P.S., Howard, T.E. (2001). Forest management to sustain ecological, economic and social values. McGraw- Hill, pp 804p.

Dhar A., Rupercht H., Vacik H. (2008). Population viability risk management (PVRM) for in situ management of endangered tree species-A case study on Taxus baccata L. population. Journal of Forest Ecology and Management, NO.255, pp. 2835-2845.

Emtage, N.F. (2004). Stakeholder roles and responsibilities in the community-based forest management program of the Philippines. Journal of Small-scale forest economics, management and policy, NO.3, pp. 319-336.

Fattahi M., Ansari N., Abbasi H., Khan-Mohammadi M. (2000). Management of Zagros forests. Research Institute of Forest and Rangelands. (In Persian) 471pp.

Ghazanfari H., Namiranian M., Sobhani H., Mohajer R.M. (2004). Traditional forest management and its application to encourage public participation for sustainable forest management in the northern Zagros mountain of Kurdistan province, Iran. Journal of Scandinavian Journal of forest research, NO.19, pp. 65-71.

Jazirehi M.H., Ebrahimi Rostaghi M. (2003). Silviculture in Zagros. University of Tehran, 560 pp.

Kajanus M., Kangas J., Kurtilla M. (2004). The use of value focused thinking and the A, WOT hybrid method in tourism management. Journal of Tourism management NO.25, pp. 499-506.

Kangas J. (1994). An approach to public participation in strategies forest management planning. Forest ecology and management, NO.70, pp. 75-88.

Kurtilla M., Pesonen M., Kangas J., Kajanus M. (2000). Utilizing the analytic hierarchy process (AHP) in SWOT analysis- a hybrid method and its application to a forest-certification case. Journal of Forest Policy and Economics NO.1, pp. 41-52.

Leseskinen P., Kangas J. (2005). Multi-criteria natural resource management with preferentially dependent decision criteria, Journal of Environmental Management, NO.77, pp. 244–251.

Mendoza G.A., Martins H. (2006). Multi-criteria decision analysis in natural resource management: A critical review of methods and new modeling paradigms. Journal of Forest Ecology and Management, NO.230, pp. 1-22.

Mujgan S.O., Saaty T.L. (2006). The unknown in decision making what to do about it. Journal of European Journal of operational research, NO.174, pp. 349-359.

Rastogi A., Badola R. S., Hussain A., Hickey G.M. (2010). Assessing the utility of stakeholder analysis to Protected Areas management: The case of Corbett National Park, India. Journal of Biological Conservation, NO.143, pp.2956–2964.

Sheppard S.R.J., Meitner M. (2005).Using multi-criteria analysis and visualization for sustainable forest management planning with stakeholder groups. Journal of Forest ecology and management, NO.207, pp.171-187.

Suh J., Ematge N.F. (2005). Identification of Strengths, Weaknesses, Opportunities and Threats of the Community-based Forest Management Program, Journal of Annals of Tropical Research, NO. 27, pp. 55-66.

Wolfslehner B., Vacik H., Lexer M.J. (2005). Application of the analytic network process in multi-criteria analysis of sustainable forest management. Journal of Forest Ecology and Management, NO.207, pp. 157-170.

Zaerpour N., Rabbani M., Gharehgozli H., Tavakkoli R. (2008). Make-to-order or make-to-stock decision by a novel hybrid approach. Journal of Advanced Engineering Informatics, NO.22, pp. 186–201.

Table1.name and area of local resident division in Taf village

name	mohamad	Poshtape	Cheshmeh	Garaj	Kieref	Ghela	maroo	chapi	Pa taf
Area (ha)	245	151	521	302	808	550	431	1042	808

Table 2. Priority weights in the AHP decision tree

Factors	Percentage weight Between the factors	Percentage weight within the factors	Percentage weight within the factors	Percentage weight among the factors	Ranking
Span of control	0/29	———	———	———	———
Costs	———	0/180	———	0/2059	3
Effectiveness	———	0/820	———	0/2378	2
Coordination	0/710	———	———	———	———
Social requests	———	0/470	———	0/3337	1
adaptability	———	0/090	———	0/0639	6
forest type	———	0/360	———	———	
Origin	———	———	0/410	0/1048	4
Density	———	———	0/340	0/0869	5
Composition	———	———	0/250	0/0639	6
Topography	———	0/080	———	———	
Slope	———	———	0/430	0/0244	8
Direct	———	———	0/570	0/0324	7

Table 3. Comparison of the FMU alternatives

Factors	Big FUM	Small FMU
Span of control		
Costs	0/825 (1)	0/175 (2)
Effectiveness	0/203 (2)	0/797 (1)
Coordination		
Social requests	0/386 (2)	0/614 (1)
adaptability	0/617 (1)	0/383 (2)
forest type		
Origin	0/255 (2)	0/745 (1)
Density	0/255 (1)	0/745 (2)
Composition	0/369 (1)	0/631 (2)
Topography		
Slope	0/386 (2)	0/614 (1)
Direct	0/386 (2)	0/614 (2)
Total	0/289 (2)	0/711 (1)

Table 4. SWOT factors of proposed FMU plan

| **Strengths**	**Opportunities**
1- Consistency with the local resident	1- Involve local resident in forest management plan
2-Explicating of the responsibilities and invested authorities	2-Mmanagerial effectiveness
Weaknesses	**Threats**
1- Difficulty to execute a forest management plan	1- Complexity of the schematization
2- Decreasing of solidarity in FMU.	2- Increasing the cost of the forest management plans
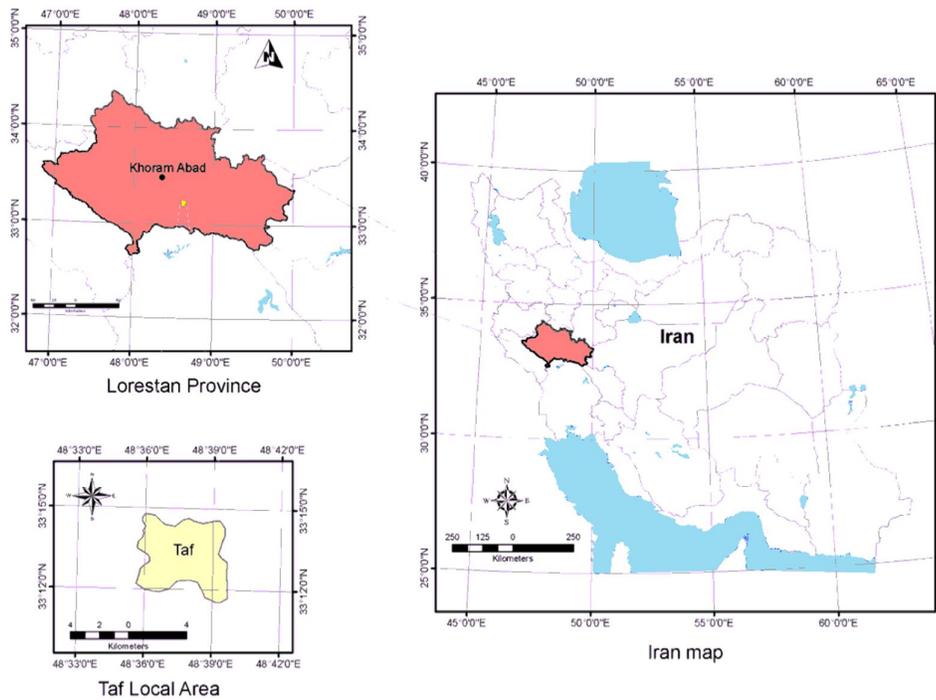
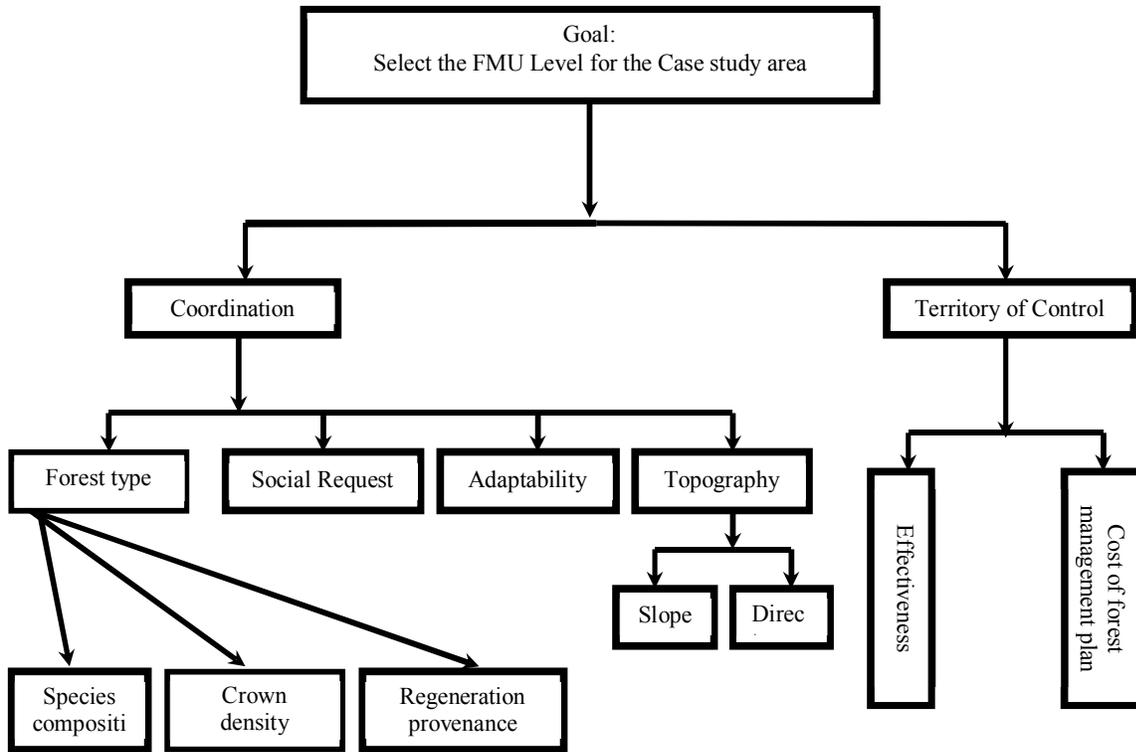

Fig1. The Taf local area in medial Zagros forests

Fig2. Hierarchical structure of the Criteria and Sub-criteria