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Factors Affecting Biodiversity Sustainable Management in Zagros Region of Iran

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Abstract: In this research, the perception of experts about factors that affect biodiversity sustainable management was examined. The research instrument was questionnaire and its validity, reliability was confirmed. Data was analyzed by using correlation coefficient and regression analysis. The results show that environmental, economical and policymaking explained about 68 percent of variance on perception of respondents about biodiversity sustainable management. Among factors that examined in this study, environmental factor contributed more in the biodiversity sustainable management.

Keywords: sustainable forestry, biodiversity, sustainable management, Iran, Zagros.

1. Introduction

In recent centuries, the excessive use of basic resources has created a deep impact on the destruction of environment. Sustainable development can contribute in protecting and preserving resources for

future generation. One of the important aspects of sustainable development is sustainability of forest and among the subset of forestry sector development, conservation of forest biodiversity is very critical. Human being would not be able to survive, unless they can find ways to conserve biodiversity (Van Duijl et al., 2004).

Sedjo and Botkin (1997) have pointed out that one of the accepted principles of sustainable forestry management is the balance between the growth and development of forest biodiversity and productivity of forests. Many people believe that forest products are effective in protecting the environment and maintain biodiversity.

Maintaining biodiversity is an ambitious goal. The very concept of biodiversity is abstract, ambiguous and difficult to measure. Many start from the definition given in the Convention on Biological Diversity (CBD) as a starting point, which distinguishes genetic, species and ecosystem levels. The focus of attention in practice is often on the species level. Even if aggregated to forest vegetation types, the sheer number and diversity of these is enormous (Rametsteinera and Simulab, 2003).

Treves et al (2005) referring to Secretariat Convention of Biological Diversity (2004) pointed out that biodiversity, a term once solely considered by scientists, has moved to center stage of global environmental debates, most recently at the Seventh Meeting of the Conference of the Parties (COP-7) to the Convention on Biological Diversity (CBD) in Kuala Lumpur in February 2004. The 157 representatives to COP-7 agreed to establish and maintain "comprehensive, effectively managed, and ecologically representative systems of protected areas" that, collectively, will significantly reduce the rate of global biodiversity loss.

Lapham and Livermore (2003) biodiversity conservation today is challenged to engage with the most important UN Millennium Goal, which is to eradicate extreme poverty and end hunger. As the development community has increasingly focused on this goal, biodiversity funding has been linked more often, and more directly, to poverty alleviation (Treves et al., 2005).

Rametsteinera and Simulab (2003) indicated that there are many approaches to maintaining biodiversity, including putting forests under various degrees of legal protection. However, this not only encounters poor enforcement realities in many developing countries. A high percentage of destruction, both in protected areas and production forests, is thought to be caused by people that fight poverty rather than by wealthy exploiters. The underlying causes for forest degradation are many, and they differ from region to region.

In a report about global diversity, it indicates that biodiversity has continued to decline over the four decades with most state indicators showing negative trends. There have been declines in population trends of (i) vertebrates and (ii) habitat specialist birds; (iii) shorebird populations worldwide; extent of (iv) forest mangroves; (vi) seagrass beds; and (vii) the condition of coral reefs (Butchart et al., 2010).

Iran is among the top 10 countries of the world in area of biodiversity. Zagros region is in the western part of country which lies from northwest to the southwest and is inclined toward the center. It covers about one fifth of the country and more than 50 percent of livestock in the country use this area for grazing. Based on the latest statistics, about 5.2 million hectares of forest are in the Zagros region. Number of plants and species in this area are between 2000 and 2500 and number of endemic species of tree and shrub species are over 190 species (figure 1).

Figure 1: Topographic map of the Zagros Mountains

Zagros region has faced an excessive use of forests and pastures due to grazing cattle and the lack of control over entry of surplus livestock, soil erosion, land use change and it has resulted the destruction of forests in an accelerating speed. Based on the latest statistics, more than 40 percent of forests in this region have been destroyed.

In this paper, we examine the factors that influence biodiversity sustainable management in the Zagros region. We describe the perception of natural resources and environmental experts about factors that influence the biodiversity sustainable management. We then focus our results about important factors that affect the biodiversity sustainable management and offer some recommendation to policy makers.

2. Materials and Methods

This study is an applied type research and methodology used, involved a combination of descriptive and correlative method to collect the data. The total population of this study was 170 natural resources and environmental experts in the Zagros region.

A series of interviews was conducted by experts and a questionnaire consists of open–ended and close-ended questions were developed to collect the data. Ddata was collected by using face-to-face method.

Measuring respondent's attitudes about factors influencing biodiversity sustainable management has been achieved largely though structured questionnaire surveys. The usual questionnaire approach to measure attitude is to include a range of Likert items (ranging from 1 as very little to 5 as very much) to operationalize the attitude construct.

The questionnaire consists of eight sections. The first section was developed to measure the attitudes of respondents about biodiversity sustainable management (16 statements). The next section was questions about role of psychological factors in biodiversity sustainable management (7 statements). The third section was used to find out the respondents views about educational factors influencing biodiversity sustainable management (10 statements). Fourth section dealt about role of economical factors in biodiversity sustainable management (20 statements). The next section was related to role of policymaking in biodiversity sustainable management (20 statements). The sixth section of questionnaire was about role of social factors in biodiversity sustainable management (19 statements). The perception of respondents about role of environmental factors in biodiversity sustainable management was measured in the seventh section (24 statements). The last part was questions about personal characteristics of respondents.

Content and face validity were established by a panel of experts consisting of faculty members at Islamic Azad University and experts in the field of natural resources and environment. A pilot study was conducted with 20 participants who had not been interviewed before the earlier exercise of determining the reliability of the questionnaire for the study. Computed Cronbach's Alpha score was between 73.0% and 85.0%, which indicated that the questionnaire was highly reliable (Table 1).

Table 1: Reliability of questionnaire

Sections	Cronbach Alpha Score
Psychological factors	0.75
Educational factors	0.79
Economical factors	0.84
Policy making factors	0.73
Environmental factors	0.76
Social factors	0.78
Biodiversity sustainable management	0.85

The dependent variable in this study was the perception of respondents about biodiversity sustainable management and was measured by responding to seven statements. The independent variables were social, psychological, economical, educational, policymaking and environmental factors that influence the biodiversity of sustainable management.

For measurement of correlation between the variables and the dependent variable correlation coefficients have been utilized and include Spearman test of independence. The stepwise regression method was also used to explain the variance in the perception of respondents about factors influencing the biodiversity sustainable management.

3. Results and Discussion

All of the respondents had a bachelor degree, while forty six of them had a master degree. The degree of half of respondents was in the field of forestry. However, more than two third of respondents indicated that their job description is relevant to the educational background.

Respondent were asked to rate different factors in biodiversity sustainable management and in each case Likert 5-point scale (very much to very little) was used. The sum of the given scores for each factor was counted and mean of scores for each factor is presented in Table 2. Social factors with

mean score of 3.99 was determined to be the most important factor that influences biodiversity sustainable management, while policy making was considered to be the least important factor.

Table 2: Means of respondents' views about factors influencing biodiversity sustainable management (1=Very Little, 5=Very Much).

Factor	Mean and Standard Deviation	
	Mean	**SD**
Social	3.99	0.99
Educational	3.94	0.91
Psychological	3.92	0.88
Economical	3.88	0.94
Environmental	3.79	1.02
Policy making	3.77	1.05

Spearman coefficient was used to measure the relationship between independent variables and dependent variable. Table 3 shows that there was relationship between perceptions of respondents about role of educational, economical, policymaking, environmental, social factors as independent variables and enhancing biodiversity sustainable management as dependent variable.

Table 3: Correlation measures between independent variables and dependent variable

Independent variables	Dependent variable	Sig	p
Environmental Factors	Enhancing biodiversity sustainable management	0.000	0.77**
Economical Factors	Enhancing biodiversity sustainable management	0.003	0.62*
Policy making Factors	Enhancing biodiversity sustainable management	0.000	0.55**
Social Factors	Enhancing biodiversity sustainable management	0.000	0.32**
Educational Factors	Enhancing biodiversity sustainable management	0.000	0.16*
Psychological Factors	Enhancing biodiversity sustainable management	015	013

$*p<0.05$, ** $p<0.01$

Using regression analysis, the factors influencing the biodiversity sustainable management was studied. Environmental factor had a significance role on the biodiversity sustainable management (Beta=0.432). The findings also show that economical factors (Beta=0.313), policymaking (Beta=0.261) had influence on biodiversity sustainable management, respectively.

Table 4 shows the result for regression analysis by stepwise method. The result implies that 68% of the variance in the perception of respondents could be explained by environmental, economical and policymaking factors, respectively. Other variables were not statistically significant.

Table 4: Multivariate Regression Analysis

	B	**Beta**	**T**	**Sig.**
Constant	7.58	-------	----	0.000
Environmental factors	4.41	0.432	4.59	0.003
Economical factors	2.06	0.313	3.48	0.000
Policymaking factors	1.59	0.261	2.78	0.000

$R^2=. 68$

Based on the mean score, the main factor was found to be the social factor. Despite the highest mean score for social factors among other factors, the study did not find a role for social factor in regression analysis.

Among the factors that were found to influence biodiversity sustainable management, regression analysis revealed that environmental, economical and policymaking factors are significant factors.

Perhaps not unsurprisingly, environmental factors were found to explain 62 percent of respondent's perception about biodiversity sustainable management. Based on the results of regression analysis, economic and policymaking factors along with environmental factor caused 68% of variance on the perception of respondents regarding biodiversity sustainable management. This result is consistent with Miginnis et al (2003) in which above mentioned factors could affect the biodiversity sustainable management.

Based on the results of the study, there was correlation between the biodiversity sustainable management and environmental, social, educational, economical and policymaking factors. Raison et al (2001) concluded that policymaking factor influenced the forestry sustainable management. Shlaepfer et al (2004) also reported that social factors have a significant role in sustainable forest management.

4. Conclusions (M_Heading1)

These results have some policy implications for policymakers in Iran. First, environmental factors play an important role in biodiversity sustainable management. Given their importance in this study, authorities should emphasize about environmental concerns to public and policymakers. More appropriate policy responses may be the provision of training for stakeholders and creation of appropriate programs to educate public about importance of biodiversity sustainable management.

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