

Analysis of Socio-Economic Factors Influencing Forest Dwellers' Participation in Reforestation and Development of Forest Areas (The Case Study of West Mazandaran, Iran)

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Abstract: The main purpose of this study was to investigate the links between forest dwellers' participation in reforestation and development of forest areas in west Mazandaran of Iran and a set of socio-economic variables. The statistical population includes all forest dwellers living in villages, which locate in the west Mazandaran in Iran and had been covered by local forestry cooperative. A sample of 110 forest dwellers were selected by the use of proportional random sampling method. A questionnaire was used to collect data. For determining the validity of questionnaire, the content validity was used. Cronbach's alpha was used to measure reliability of the index measuring level of participation in reforestation and development of forest areas that its extent was 0.86 and showed that mentioned variable had high reliability. The data were analyzed by the use of descriptive and inferential statistics such as extent of mean, standard deviation, coefficient of variation, correlation analysis and regression analysis. The findings revealed that age, level of literacy, level of participation in extension-education courses, using level of communication channels and information resources, level of forest dependency, social participation, social solidarity, economic and social motivations are positively and significantly ($p < 0.01$) correlated with level of forest dwellers' participation in reforestation and development of forest areas. Household size is positively and significantly ($p < 0.05$) correlated with level of forest dwellers' participation in reforestation and development of forest areas. The result of multiple regression showed that variables of level of participation in extension-education courses, age, household size, level of economic motivation, social solidarity and level of literacy could explain 51.4% of the variation in the level of forest dwellers' participation in reforestation and development of forest areas.

Key words: Forest, participation, local communities

INTRODUCTION

The fundamental roles of forests in nation development, poverty alleviation and improving food security in developing country have been accepted and confirmed by committee on world food security at sessions in 1996 and 2002, UN's millennium assembly in 2000 and Global Sustainable Development conference in 2002^[2]. Furthermore, forests play the important role in preserving biodiversity, protecting critical watersheds and providing livelihoods^[5]. Therefore, Forests regulate stream flows and precipitation, thus preventing soil erosion and providing habitats for enormously varied populations of plants and animals^[7]. Many people of a great variety of cultures and land-use practices live in or around tropical forests. Although these people are all in some way dependent on forests, they have little else in common. In recent years in spite of becoming much harder for forest-dependent people to use local forests and their products, owing to deforestation, logging, population pressure or legal initiatives^[3,19]. Unfortunately, from

1990 to 2005, the world lost 3 percent of its total forest area, an average decrease of some 0.2% per year^[15]. Based on report of forests, range and watershed organization of Iran in 2007, in the last 40 years, north forest areas (Hyrcanian forests) have decreased 11%^[18].

There are many causes of forest degradation that include converting forests to land agricultural, over harvesting of industrial wood and fuelwood, overgrazing, insect, pests and diseases, fire and extreme climatic events such as storms^[14]. Based on mentioned subjects reforestation programs are a common policy response among developing country governments in the tropics attempting to deal with environmental and economic problems caused by widespread deforestation^[30].

It is widely argued that devolution of natural resource management is the most viable option for ecological and economic sustainability of the natural resources^[11]. According to researches have been done^[13,3,10,20], participation of local communities is one of effective approaches in forest management. Community participation in resource management

essentially means sustainable use and management of natural resources by people, living in and around a region integrated ecologically, socially and culturally^[21]. In Iran because of increasing forest dwellers population, economic and social dependency on forest and lack of governmental facilities, forest dwellers' participation in forest resources management is unavoidable^[1]. Hence, because of the necessity of participation in reforestation and development of forest areas, it is necessary to analyze factors influencing forest dwellers' participation in foregoing activities and to investigate the links between participation in reforestation and development of forest areas and a set of socio-economic variables. This research emphasized on socio-economic factors.

Theoretical framework: In studying an issue, it is essential to establish an approach upon which the situation that one wants to study may be conceptualized. This approach also provides a framework for research. In this study, the focus is given on some major theoretical frameworks. The conceptual framework for this study is based on the Durkheim's theory of social solidarity and Weber's theory of social action^[29,8]. Participation of farmers may differ among farmers according to their socioeconomic backgrounds^[26]. Education has been reported to influence farmers' participation in forest management^[20,16,24,9]. The influence of age on participation in forestry activities is not clear. Whilst some of the researches found that age had no influence on forest management^[30,33], other researcher reported that age is an important variable in explaining participation^[3]. Household size influence participation in forestry^[32,13].

Based on the masters' ideas, communication channels and information resources (e.g. friends, neighbors, consultants, public forestry sector and private forestry sectors) are necessary for forest dwellers' participation in forestry activities that local people can get information in relation to forestry through them^[12,10,6]. Forest dependency stimulates people's participation in forest management; a higher level of forest dependence means that the people have a higher stake in the forest, which is reflected in their level of participation^[20]. Therefore, community action is influenced by forest dependency^[25]. According to the study done^[4], social solidarity is one of the effective factors on villagers' participation. The person, who has more motivations to participate, has more level of participation^[23]. Social participation (membership of community groups organized), is effective factor for level of participation in forestry activities^[13]. According to some studies^[27,32], level of participation in extension-education courses is one of the effective factors on forest dwellers' participation in forestry.

Purpose and objectives: The main purpose of this study was to investigate the links between forest dwellers' participation in conservation of forest areas and a set of socio-economic variables. The special objectives of the study were:

- Identifying the personal, social and economical features of forest dwellers
- Priority setting of level of forest dwellers' participation in reforestation and development of forest areas
- Analyzing correlation for socio-economic variables and level of forest dwellers' participation in reforestation and development of forest areas
- Regression analysis for level of participation in reforestation and development of forest areas on socio - economic variables of forest dwellers

MATERIALS AND METHODS

Description of the study area: Mazandaran Province is located between the latitudes 35-47' and 36-35' N, and longitudes 50-34' and 54-10' E. It is bounded on the north by the Caspian Sea. Its area is 23,756 square kilometers^[22] that total area of its forests is estimated at 95,0000 hectares^[28]. West Mazandaran forests are extended over an area of 320,000 hectares^[17] that distributed in Nowshahr, Chalous, Tonkabon and Ramsar counties.

Sampling selection: The statistical population includes all forest dwellers living in villages, which located in the west Mazandaran in Iran and had been covered by local forestry cooperative. A sample of 110 forest dwellers was selected by using of proportional random sampling method. In sampling process, six villages were selected randomly and sampling in each village was carried out with proportional selection.

Measuring independent variables: For measuring level of social participation, Chapin's scale was used. For measuring other variables, the respondents were asked questions in relation to each variable and total score of statements for each variable organized final score of that variable. These variables are listed in Table 1 that shows names, labels and units of the quantitative variables. All the qualitative variables are converted into quantitative variables. In total, 11 quantitative variables are derived and used in the study. In order to obtain an insight into the composition of the interviewed 110 forest dwellers, Table 2 shows the distribution of interviewees according to personal features.

Measuring forest dwellers' participation in reforestation and development of forest areas: For measuring forest dwellers' participation in reforestation and development of forest areas, the respondents were

asked a set of questions that addressed forest dwellers' participation in reforestation and development of forest areas. These statements were rated on a six-point scale from 0 to 5. These statements are listed in Table 3.

Table 1: Names, labels and units of the quantitative variables

Name of variable	Scale	Unit	Label
Age	18-65	year	Age
Level of literacy	1-6	-	LIT
Level of annual income	10000 -50000	1000 Rials	AI
Household size	2-10	person	HS
Level of participation in extension-education courses	0-50	hour	PEEC
Using level of communication channels and information resources	0-35	-	UCCIR
Level of forest dependency	0-35	-	LDF
Level of social participation	0-21	-	SP
Level of social solidarity	7-35	-	SS
Level of economic motivation	0-25	-	ECOM
Level of social motivation	0-35	-	SM

Table 2: Personal features of forest dwellers

Features	(%)	Frequency
Age group		
30 and low	18.2	20
31-40	19.1	21
41-50	35.4	39
51-61	18.2	20
61 and above	9.1	10
Education levels		
Illiterate	10	11
Literate (not primary school)	14.5	16
Primary school	15.5	17
Secondary school	16.4	18
High school	16.4	18
Graduate and above	27.2	30
Household size		
2-4	46.4	51
5-7	37.2	41
8 and above	16.4	18
Annual income		
15000 and low	13.6	15
15001- 25000	27.3	30
25001-35000	38.2	42
35001-45000	14.5	16
45001 and above	6.4	7

Table 3: Priority setting of forest dwellers' participation level in reforestation and development of forest areas

Priority	CV	Std. dev	Mean [*]	Statement
1	0.577	1.708	2.96	Planting trees around homes
2	0.633	1.803	2.72	Planting in destroyed areas
3	0.751	1.674	2.23	Planting trees in boundary of farmlands and gardens
4	0.768	1.775	2.31	Seeding in natural areas
5	0.789	1.674	2.12	Planting in barren lands in the village
6	0.802	1.644	2.05	Planting trees around rivers and canals

*: Range of means is between zero and five

Tool and techniques: We collected data from the forest dwellers (the target group) by means of a questionnaire. For determining the validity of questionnaire, the content validity was used that was obtained by group of specialists. A pilot study was conducted in one of the villages covered by local forestry cooperative. The aim was to test the validity and improve the questionnaire. Cronbach's alpha was used to measure reliability of the index measuring level of participation in reforestation and development of forest areas that its extent was 0.86 and showed that mentioned variable has high reliability. Data analysis has been done in two sections, descriptive and inferential statistics. Descriptive statistics such as mean, standard deviation and coefficient of variation (CV) were used in the descriptive section. Correlation coefficient and multiple regression analysis were used in the inferential analysis section. To evaluate all variables simultaneously and, thus, to determine factors affecting forest dwellers' participation in reforestation and development of forest areas, correlation analysis is used. Furthermore, the derived factors are used in a multiple regression analysis (stepwise method) to explain variation in forest dwellers' participation. In applying these statistical techniques, version 11.5 of the Statistical Package for Social Science (SPSS) is used.

RESULTS AND DISCUSSION

Analyzing the personal, social and economic features of forest dwellers: The age of respondents ranged from 18 to 65 years; the respondents were relatively middle age with an average age being 44 years. Table 2 shows that the largest proportion of respondents were in the (41-50) year-old category (35.4%). About 10% of the respondents were illiterate and 15.5% had completed primary school (5 years of education). The average annual family income of respondents was 28000 (1000 rial), with 42 of them (38.2%) earning annual family income in the range of 25000 (1000 Rials) and 35000 (1000 Rials).

Priority setting of level of forest dwellers' participation in reforestation and development of forest areas: Table 3 shows that planting of trees around homes has first priority because of having the lowest extent of coefficient of variation (CV = 0.577). Planting in degraded areas (CV = 0.663), planting trees in boundary of farmlands and gardens (CV = 0.751), seeding in natural area (CV = 0.768) and planting in barren lands of village (CV = 0.789), respectively, have allocated priorities from second to fifth. In addition, planting trees around rivers and canals with the highest

extent of coefficient of variation (CV = 0.802) has allocated last priority to itself.

Level of forest dwellers' participation in reforestation and development of forest areas: By grouping the respondents with respect to level of participation in reforestation and development of forest areas, it turns out that level of participation of 21.8% of respondents is lowest, while this level for 13.7% of respondents is highest Table 4.

Correlation analysis for socio-economic variables and level of forest dwellers' participation in reforestation and development of forest areas: Table 5 shows that age was negatively and significantly (p<0.01) correlated with variable of level of forest dwellers' participation in reforestation and development of forest areas, Atmis *et al*^[3] reported that age is an important variable in explaining participation.

Table 4: Forest dwellers' participation level in reforestation and development of forest areas

Participation group	% of respondents	NO. of respondents	Scale
Group 1 (lowest)	21.8	24	≤6.59
Group 2 (low)	44.5	49	6.60-14.38
Group 3 (high)	20	22	14.39-22.16
Group 4 (highest)	13.7	15	≥22.17
Total	100	110	

max: 28, min: 0, mean: 14.38, standard deviation: 7.78, scale: 0-30

Table 5: Correlation analysis between socio-economic variables and level of participation in reforestation and development of forest areas

Independent variable	r	Label
Age	-0.308**	Age
Level of literacy	0.432**	LIT
Level of annual income	0.052	AI
Household size	0.241*	HS
Level of participation in extension-education courses	0.415**	PEEC
Using level of communication channels and information resources	0.455**	UCCIR
Level of forest dependency	0.197*	LFD
Level of social participation	0.27**	SP
Level of social solidarity	0.392**	SS
Level of economic motivation	0.296**	ECOM
Level of social motivation	0.466**	SM

*: (p<0.05) and **: (p<0.01)

Level of literacy was positively and significantly (p<0.01) correlated with variable of level of forest dwellers' participation in reforestation and development of forest areas. This result is accordant to the results of some studies^[20,16,24,9]. There is positive and significant correlation (p<0.05), between household size and level of forest dwellers' participation in reforestation and development of forest areas that varamini^[32] and

Dolisca *et al*^[13] have confirmed this correlation. There is positive and significant correlation (p<0.01), between level of using communication channels and information resources and level of forest dwellers' participation in reforestation and development of forest areas. This result is accordant to some studies done^[12,10,6]. There is positive and significant correlation (p<0.01), between level of social participation and level of forest dwellers' participation in reforestation and development of forest areas. This result is accordant to the results of Dolisca *et al*^[13]. Social solidarity is positively and significantly (p<0.01) correlated with variable of level of forest dwellers' participation in reforestation and development of forest areas. The result of Azkia and Ghaffari^[4] showed correlation between level of social solidarity and level of villagers' participation. There is positive and significant correlation (p<0.05),

Table 6: Regression analysis to explain variation in forest dwellers' participation

Description	Label	t	B
Constant		-0.198	-0.799
Level of participation in Extension-education courses	PEEC	3.269**	0.178
Age	Age	-4.333**	-0.223
Household size	HS	3.592**	1.162
Level of economic Motivation	ECOM	3.306**	0.35
Level of social solidarity	SS	3.262**	0.373
Level of literacy	LIT	2.092*	0.823
R ² adjusted			0.514

*: p<0.05 and **: p<0.01

between level of forest dependency and level of participation in reforestation and development of forest areas. This result is accordant to the studies done by Lise^[20] and Ostrom, *et al*^[25]. There is positive and significant correlation (p<0.01), between level of participation in extension - education courses and level of participation in reforestation and development of forest areas that the studies done by Varamini^[32] and Shariati, *et al*^[27] confirm this correlation. Level of Economic and social motivations are positively and significantly (p<0.01) correlated with level of forest dwellers' participation in reforestation and development of forest areas. Mohammadi^[23], in his research, has confirmed these results.

Multiple regression analysis of forest dwellers' participation: To explain variation in level of forest dwellers' participation in reforestation and development of forest areas in west Mazandaran in Iran, we have

undertaken a multiple regression analysis. The result is presented in Table 6.

Interpretation of Table 6 indicates that among independent variables that have significant correlation with dependent variable, level of participation in extension-education courses, age, household size, level of economic motivation, social solidarity and level of literacy have entered to regression equation by six steps. Six forgoing variables could explain 51.4% of variation in level of forest dwellers' participation in reforestation and development of forest areas. The following model is estimated by using stepwise method:

$$Y = \text{Constant} + \beta_1 \text{PEEC} + \beta_2 \text{Age} + \beta_3 \text{HS} + \beta_4 \text{ECOM} + \beta_5 \text{SS} + \beta_6 \text{LIT} \quad (1)$$

Equation (1) shows that (Y) is used as dependent variable that representing forest dwellers' participation level in reforestation and development of forest areas in west Mazandaran, (β_i) is the coefficient of socio-economic variable. Table 1 shows the meaning of the variables, which are included in the regression. Consequently, final equation of multiple regression is:

$$Y = -0.799 + 0.178 \text{ PEEC} - 0.223 \text{ Age} + 1.162 \text{ HS} + 0.35 \text{ ECOM} + 0.373 \text{ SS} + 0.823 \text{ LIT}$$

CONCLUSION AND RECOMMENDATIONS

According to results, level of forest dwellers' participation in reforestation and development of forest areas reduced while increasing age of forest dwellers. Hence, we suggest that appropriate implementations are carried out to persuade and empowerment young people in villages.

The results of research showed that level of literacy of respondents is low; therefore we suggested that indigenous communication channels are used to communicate them.

According to positive and significant correlation between level of economic motivation and forest dwellers' participation in reforestation and development of forest areas, government should distribute free inputs to implement reforestation programs and facilitate necessary conditions to establish forest nursery.

According to results of correlation coefficient that show a positive and significant correlation between level of social solidarity and level of forest dwellers' participation in reforestation and development of forest areas, it can be suggested that activities of community based organizations should be extended by extension and development agents of forestry sector.

Undoubtedly, these activities cause to increase social solidarity among forest dwellers.

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