Analysis of Participatory Management of Forest Resources in Assam

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ABSTRACT

The study investigates the status of participatory management of forest resources in Golaghat Forest Division of Assam, India based on the responses from 203 respondents selected through proportionate random sampling. Over 80% respondents had reported low level of participation in activities related to management of forest resources. The variables like education, family type, family size, localiteness-cosmopoliteness, decision making ability, interest in forestry, information seeking behaviour, forestry knowledge and attitude towards forest resources conservation by respondents had significant association with their level of participation in the management of forest resources.

Key words: Forest resources; Forest villages; Management;

*I*n India, forests have been important source of sustained employment, revenue earnings and raw-materials to various forest based industries. Forestry's role in ecological balance, environmental stability, bio-diversity conservation, food security and sustainable development has also been widely recognized. Although India is extremely sound in its ecology with rich biological resources, the country's forests are amongst the lowest in the world in terms of their productivity and quality management. Large scale developmental activities were initiated immediately after independence leading to large scale conversion of forest lands into non-forestry activities mainly in industrial sector. This causes heavy and unsustainable demand for timber and fuel wood etc. which eventually caused degradation of forests and consequently, affects the present environmental eco-systems. It is, therefore, imperative to boost productivity of forest resources continuously through quality management and judicious use of these resources to derive maximum and long term benefits.

A number of studies have been conducted in India in which some of the personal, socio-economic and psychological characteristics of men engaged in farming have quite extensively been explored in relation to their contribution to farm growth. However, practically there has been little research studies to improve the productivity of forest resources through quality management. Studies on management behaviour of the people and their contribution to sustained growth and maximum productivity of forest resources are often seemed to be ignored, although it is an established fact that forest management cannot succeed without the help and co-operation of local people. Keeping this view in mind, the present study was planned and undertaken with the objectives to study the level of participation in selected forest management practices by the people of forest villages and to explore the influence of socio-personal, economic and psychological characteristics of respondents on their level of participation in selected forest management practices.

METHODOLOGY

The study was conducted in Golaghat Forest Division of Assam. All the 14 Forest villages under the division were selected and 203 respondents which comprised about 20% of the total families from each of the village were selected by using proportionate random sampling. Data collection was done through personal interview method by using pre-tested structured schedule.

The independent variables viz. age, education, main occupation, social participation, caste, family type, family

size, house and material possession were measured with the help of the scales developed by *Trivedi and Pareek (1964)* with little modification. Economic variables- annual income, operational land holding and possession of forest implements were measured with the help of schedules structured for the study. Psychological scales developed by *Singha (1991)* were used to measure the variables such as economic motivation, decision making ability and scientific orientation with slight modification. The variable, localiteness-cosmopoliteness was measured with the help of the scale developed by *Singha (1991)* with little modification. The other independent variables viz. interest in forestry, information seeking behaviour, forestry knowledge and attitude towards forest resource conservation were measured by using developed structured schedules.

Level of participation in selected protection and maintenance practices of forest resources by the respondents were studied by developing test schedules by determining the weightage of the practices through judges' rating. For this purpose, a list of items related to protection and maintenance of forest resources was prepared separately after adequate review of literature and consultation with the forest personnel, extension scientists and workers. The statements/items, thus selected were edited on the basis of the criteria shown by *Edwards (1957)*. The items were then sent to a panel of 40 judges in order to judge the worthiness of each statement on a 3-point continuum - "Most important", "Important" and "Not so important". For item analysis, the statements marked "Most important", "Important" and "Not so important" were given scores 3, 2 and 1, respectively. For each statement, the frequencies of responses were multiplied with respective weightages to obtain the total score of each item. To obtain mean score of each item, the score was divided by the frequency of responses for that particular item. Items with mean score above 2 were selected. In this way, 7 and 8 practices in relation to the protection and maintenance of forest resources were finally selected for the study and incorporated in the interview schedule. Each item was provided with a 4-point scale – "Most often (MO)", "Often (O)", "Seldom (S)" and "Never (N)" with scores 3, 2, 1 and 0, respectively. The respondents were asked to judge each item/practice according to their extent of participation in the respective column of response categories. The protection and maintenance scores for all the practices were obtained separately for each respondent. For the purpose of

analysis, the mean protection and maintenance were calculated separately for each of the practice as well as for all the practices. On the basis of the scores obtained, the respondents were classified into three categories of protection and maintenance levels of forest resources by using cumulative cube-root frequency (3/F) method.

RESULTS AND DISCUSSION

Level of participation in management of forest resources: The distribution of respondents according to their level of participation in management of forest resources was shown in Table 1. More than four-fifth (82.27%) of the respondents had shown low level of participation in management of forest resources. The percentage distributions of respondents in medium and high level were 15.76 % and 1.97 %, respectively. The mean score was found to be 14.67 with standard deviation (S.D.) of 4.31. The value of co-efficient of variation (C.V.) with 29.36 % shows relatively high degree of variation among the respondents with respect to their level of participation in management of forest resources. The low level of participation in management of forest resources was due to the respondents' poor participation in both protection and maintenance practices, which were considered the two management dimensions of forest resources.

Table 1. Frequency and percentage distribution of respondents according to their level of participation in total management of forest resource

Category	Score range	N	%age
Low	7-19	167	82.27
Medium	19-28	32	15.76
High	28-34	4	1.97
Total		203	100.00
Mean	(N = 203)	14.67	
S.D.		4.31	
C.V.		29.36	

Participation level in protection and maintenance practices of forest resources Protection practices: Practice-wise participation in protection of forest resources by the respondents was given in Table 2. The table indicates that over half of the respondents had directly involved in practices like fencing with bamboo materials (82.27%), manual cutting of bushes (64.04%), manual cutting of parasites (83.25%) and watch and wards (64.04%). Practices of manual cutting of climbers were reported cent percent respondents. While other

Table 2. Frequency and percentage distribution of respondents against selected protection practices
of forest resources (N = 203)

S. No.	Selected protection practices participated	Total respondents		Total score	Mean score	Av. Mean score
		F	%			
1.	*Protection/ban on*					
	i. Grazing in areas of poor vegetation	25	12.31	21	0.10	
	ii. Over grass-cutting	20	9.85	2011	0.10	0.10
2.	*Fencing with*					
	i. Barbed wire	0	0.00	0	0.00	
	ii. Bamboo materials	167	82.27	330	1.62	0.49
	iii. Stones	15	7.39	15	0.07	
	iv. Trench digging	52	25.61	52	0.26	
3.	Planting around with					
	i. Live hedges	19	9.36	19	0.09	
	ii. Thorny plants/cactus	43	21.18	43	0.21	0.15
4.	Manual cutting of					
	i. Bushes	130	64.04	215	1.06	
	ii. Climbers	203	100.00	317	1.56	1.30
	iii. Parasites	169	83.25	259	1.28	
5.	Reducing fire hazards					
	i. Collection of inflammable materials	62	30.54	62	0.30	0.39
	ii. Burning of materials	97	47.78	97	0.48	
6.	Watch and wards	130	64.04	165	0.81	0.81
7.	Application of chemicals					
	i. Insecticides	13	6.40	13	0.06	
	ii. Repellants	34	16.75	34	0.17	0.08
	iii. Poisonous baits	0	0.00	0	0.00	

Table 3. Frequency and percentage distribution of respondents against selected maintenance practices
of forest resources (N = 203)

S. No.	Selected practices		Total resp.participated		Total score	Mean score	Avg. mean score
			F	%			
1.	*Soil working*		110	54.19	129	0.63	0.63
2.	*Mulching*	i. Leaf litters	97	47.78	164	0.81	0.52
		ii. Organic matter	35	17.24	47	0.23	
3.	*Weeding*	i. Physical/mechanical	168	82.76	168	0.83	0.44
		ii. Chemical	13	6.40	13	0.06	
4.	*Cleaning*	i. Cutting inferior species	159	78.32	189	0.93	0.84
		ii. Cutting malformed or weak plants	125	61.58	153	0.75	
5.	*Thinning*	i. Ordinary thinning	65	32.02	65	0.32	0.27
		ii. Crown thinning	43	21.18	43	43	
6.	*Replacement*	i. Undesirable plant species	75	36.94	94	0.46	0.39
		ii. Dead plants/cut plants	50	24.63	63	0.31	
7.	*Nutrient management*	i. Compost/FYM	37	18.23	37	0.18	0.06
		ii. Green manures	0	0.00	0	0.00	0.00
		iii. Chemical fertilizers	0	0.00	0	0.00	0.00
8.	*Water management*	i. Irrigation	25	12.31	25	0.12	0.37
		ii. Drainage	100	49.26	127	0.6	

practices such as protection/ ban on grazing in areas of poor vegetation (13.31%) and over grass cutting (9.85%), planting around forests with live hedges (3.39%), application of insecticides (6.40%), repellant (16.75%) etc. were not common among the people in forest villages. Interestingly, respondents had not at all followed fencing with barbed wire and application of chemical as poison baits. Further investigation reveals that lack of knowledge about the use of chemicals by forest villagers coupled with unavailability of efficient plant protection chemical in the forest areas and their high cost were some of the reasons for no or low adoption of such chemicals.

Maintenance practices : A perusal of Table 3 showed that respondents in general, had followed the maintenance practices like soil working (54.19%), physical/ mechanical weeding (82.76%), cutting of inferior species (78.32%) and cutting of malformed or weak plants (61.58%). Mulching with leaf litters and maintenance of drainage system in and around forest areas were also important maintenance practices of forest resources as reported by nearly half of the respondents i.e. 47.78% and 49.26% respectively. The study also found that none of the respondents had followed nutrients management practices like application of green manures and chemical fertilizers in the study areas.

Relationship of selected socio-personal, economic and psychological characteristics with their level of participation in protection and maintenance of forest resources : In order to study the relationship between independent variables and dependent variables, the data were subjected to simple correlation analysis separately for protection, maintenance and total management of forest resource by the respondents. The results are shown in Table 4

Results of correlation analysis presented in Table 4 reveal that the variables education, social participation, family size, decision making ability, interest in forestry, information seeking behaviour, forestry knowledge and attitude towards forest resource conservation of the respondents were positively and significantly correlated with their level of participation in selected practices of protection of forest resources. It implies that these variables had significant impacts on the level of participation in selected practices of forest resources.

In case of maintenance of forest resources, the table revealed that the variables namely; education,

Table 4. Correlation analysis with the level of participation in protection, maintenance and total management of forest resources

Independent variables		Coefficient of correlation (r)		
		P	M	TM
X1	Age	-0.086	-0.056	-0.084
X2	Education	0.154*	0.168*	0.151*
X3	Main occupation	0.062	0.050	0.058
X4	Social participation	0.159*	0.018	0.086
X5	Caste	0.003	0.054	0.037
X6	Family type	0.130	0.135	0.143*
X7	Family size	0.157*	0.149*	0.145*
X8	House	0.122	0.068	0.106
X9	Annual income	0.020	-0.016	-0.002
X10	Material possession	0.057	-0.018	0.028
X11	Operational land holding	-0.038	-0.093	-0.079
X12	Possession of forest implements	-0.084	0.0076	0.099
X13	Localiteness-cosmopoliteness	-0.076	0.294**	0.213**
X14	Economic motivation	0.025	0.180*	0.122
X15	Decision making ability	0.184**	0.350**	0.302**
X16	Scientific orientation	0.020	0.011	0.010
X17	Interest in forestry	0.147*	0.176*	0.186**
X18	Information seeking behaviour	0.145*	0.152*	0.167*
X19	Forestry knowledge	0.164*	0.159*	0.145*
X20	Attitude towards forest resource conservation	0.170*	0.149*	0.159*
Y1	Protection	--	0.535**	0.871**
Y2	Maintenance	0.535**	--	0.877**
Y3	Total Management	0.871**	0.877**	--

*   Significant at 0.05 level of probability

** Significant at 0.01 level of probability

P= Protection

M=Maintenance

TM=Total management

family size, localiteness-cosmopoliteness, economic motivation, decision making ability, interest in forestry, information seeking behaviour, forestry knowledge and attitude towards forest resource conservation of the respondents were positively significant with their participation level in maintenance practices of forest resources.

As regards total management which combined the two parameters of protection and maintenance of forest resources, nine independent variables were found positively and significantly associated with their level of participation in total management of forest resources. These variables were education, family type, family size, localiteness-cosmopoliteness, decision-making ability, interest in forestry, information seeking behaviour, forestry knowledge and attitude towards forest resource conservation. Since total management was the function of both protection and maintenance, those variables which were found significant in total management were more or less the dominant ones in protection as well as maintenance and therefore, these variables could be considered as important determinants of forest resource management. This signifies that those of the respondents who had higher level of these characteristics would make more participation in the management of forest resources. However, some of these significant variables identified above separately for protection, maintenance and total management should get more emphasis while considering specific forest management factors. The results of the present study conform to the findings of *Kumar et al. (1994)* in case of characteristics like education, annual income and information seeking behaviour. However, his finding on cosmopoliteness in relation to farmers' involvement was in contradiction to the present finding.

Relative contribution of socio-personal, economic and psychological characteristics with their level of participation in selected practices of protection and maintenance of forest resources : In order to find out the relative contribution of independent variables relating to socio personal, economic and psychological characteristics of the respondents on dependent variables, the technique of multiple regression analysis using linear mode (predictive equation) was computed separately. The predictive power of each multiple regression was estimated, by working out the value of co-efficient of determination (R^2).

Table 5. Multiple regression analysis of respondents' participation level in management of forest resources with independent variables

Ind. variables		PV	't'V	SV	Rank
X1	Age	0.476	0.735	0.077	13
X2	Education	0.345	0.786	0.087	10
X3	Main occupation	-0.286	-0.566	0.049	16
X4	Social participation	0.037	0.069	0.006	19
X5	Caste	0.014	-0.035	0.002	20
X6	Family type	0.285	0.424	0.033	18
X7	Family size	2.189	3.143**	0.249	2
X8	House	1.218	1.488	0.113	8
X9	Annual income	-0.659	-0.983	0.081	12
X10	Material possession	0.685	1.067	0.091	9
X11	Operational land holding	-0.616	-1.011	0.082	11
X12	Possession of forest implements	-0.894	-1.551	0.115	7
X13	Localiteness-cosmopoliteness	0.341	2.568**	0.192	4
X14	Economic motivation	-0.090	-0.740	0.055	15
X15	Decision making ability	0.542	4.977**	0.359	1
X16	Scientific orientation	-0.165	-1.530	0.133	6
X17	Interest in forestry	0.152	1.600	0.143	5
X18	Information seeking behaviour	0.576	2.540**	0.223	3
X19	Forestry knowledge	0.059	0.732	0.058	14
X20	Attitude towards forest resource conservation	0.032	0.419	0.036	17

R^2 = 0.403 (with 20 independent variables),   F = 6.145**
* Significant at 0.05 level of probability
** Significant at 0.01 level of probability
PV   =   Partial 'b' values
't'V   =   't' value for partial 'b' values
SV   =   Standard partial 'b' values

The various independent variables had their own units of measurement, which did not permit a comparison; the partial regression co-efficient values were converted into standard partial regression co-efficient values (beta-weights) which are free from the units of measurement. The independent variables were then ranked on the basis of beta-weights, in order to find out their relative importance in predicting the

dependent variables. The result of regression analysis and ranking of independent variables based on beta weights with respect to respondents' participation levels in selected practices of protection, maintenance and management of forest resources were presented in Table 5.

The data presented in Table 5 reveals that out of 20 independent variables, only 4 variables namely: family size, possession of forest implements, decision making ability and interest in forestry yielded significant 't' values and were significant in explaining the variation in participation level of protection practices of forest resources. While five variables namely, social participation, family size, localiteness-cosmopoliteness, decision making ability and information seeking behaviour were positively significant with the level of participation of respondents in maintenance practices and these variables were significant in explaining the variation in participation level of maintenance.

As regard relative contribution of independent variables to the level of total management of forest resources, the table also reveals that the family size, localiteness-cosmopoliteness, decision making ability and information seeking behaviour of the respondents had, as shown by the significant 't' values of 3.143, 2.568, 4.977 and 2.540 respectively, highest contribution to their level of participation in management of forest resources. Hence, these four variables stated above could be considered as good predictors or contributors to both the parameters of management (protection and maintenance) of forest resources. These four significant variables in descending order of importance based on corresponding beta weights were decision making ability (0.359), family size (0.249), information seeking behaviour (0.223) and localiteness- cosmopoliteness (0.192) respectively.

A close look at the regressing co-efficient values brings to notice that all the four significant variables in management were found significant either in any one of the parameters of management or in both, which can

suggest that characteristics such as family size, decision making ability, localiteness-cosmopoliteness and information seeking behaviour of the respondents were the most important variables in explaining the maximum variation in the participation level of respondents in management of forest resources. Therefore, these variables should get important place for consideration along with other variables in any forest development programme and policy matters among the people in and around forest areas in order to make it success. It is noteworthy that although education had not shown significantly contribution to management of forest resources, this variable was found to have significant association with management of forest resources perhaps due to better linkage with localiteness-cosmopoliteness, social participation, interest in forestry and information seeking behaviour etc. and hence, the role of education in the management of forest resources should not be ignored.

CONCLUSION

The practices of protection and maintenance of forest resources such as application of chemicals as plant protection measures, nutrients management, etc. although seemed very important, were not found in common adoption by the respondents probably due to their complexity coupled with high cost, risk and labour involvement. One of the best methods for inculcating management quality in the people of forest villages is through training. It is also important to devise management practices with human angle, making them compatible with the livelihood needs of the people. It can be suggested that in order to make participation in forest management activities and success of any forest management and development programmes, the concerned departments and implementing agencies should consider and take care of those identified significant individuals' characteristics through concerted efforts and policy formulation.

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