

Socio-economic and Socio-ecological Study of Sambalpur Forest Division, Orissa

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ABSTRACT The present study on socio-economic and socio-ecological aspects of Sambalpur Forest Division of Orissa reveals that forests play an important role in the economy of the State in terms of contribution to state revenue, State Domestic Product as well as dependence of people for livelihood. The people living adjacent to the reserved forests of Sambalpur Forest Division (pre-reorganised) are heavily dependent on these forests. Although the nominal forest cover of the state continues to remain unchanged one notices a gradual decline in the effective forest cover of the state. In terms of socio-economic profile, it was found that majority of the sample respondents (71.83) lived in kacha houses with only 4.83% having own toilet facilities, 92.7% depending on outside dug well and tube well for drinking water and 90.5% depending on wood litter collected from forest for fuel requirement. Cultivation is the primary occupation among Other Backward Class (OBC) group where as daily wage labours largely belong to Scheduled Caste and Scheduled Tribe population. Per capita annual income stands at Rs.3684/- which is significantly low and indicates the degree of deprivation of the people. The study on extent and nature of dependence on forest and people's perceptions about the causes of degradation and methods of conservation reveals that the people living adjacent to the reserved forest areas are highly dependent on the forest for medicinal plants (about 51 species). Regarding cultural practices of the people in the sacrifice of trees and animals, only 2.3% of respondents indicated sacrifice of trees and majority of respondents resorting to sacrifice of domestic animals but not wild life. Regarding loss of forest species 92.35% of the respondents stated about 28 different species lost from the forests. Most important causes of degradation as perceived by the respondents are domestic use by villagers, business/trading, fuel wood crisis in the region, illegal forest produce sale etc. Important methods of forest conservation are Village committee, VSS, Vana Mahostava, Social forestry etc. A very high proportion of the respondents suggested that there should be more forest personnel, formation and effective role of village committees and recruitment of more village volunteers. Regarding the magnitude of exploitation, about 29% visualized that there is frequent exploitation by outsiders.

INTRODUCTION

Forests are home to 50-90% of earth's species and are potentially renewable resources if used as per optimum needs and ensuring their security as per sustainability. The functions of a forest may be broadly classified in to following three categories.

- (a) Protective functions: These include the protective role of forests against soil erosion, droughts, floods, intense radiation.
- (b) Productive functions: Forests are sources of wood and many other products like gums, resins, fibres, medicines, Katha, honey, paper etc.

- (c) Regulatory functions: Regulating micro-climate, reducing pollution etc.

However, forests are disappearing faster than any other biome as they are cleared for timber, paper, pulp or fuel wood and even eco-degradation of forests is intense due to urbanization, industrialization and pollution. After years of neglect forestry is acquiring international dimensions. The role of forestry in the environmental amelioration and peoples life assumed global significance after the 1992 Rio Summit. The saga of deforestation in the developing countries on account of rising population and consequent poverty has attracted global attention of scientists, resource managers and law makers. To reverse the degradation of these resources action programme for conservation and development of forest resources on sustainable basis, have taken shape in most of the countries. (Anjaneyulu, 2004)

An estimated 250 billion people, one person out of every 20 on the earth, belong to indigenous

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cultures found in about 70 countries. They get most of their food by hunting, gathering, trapping and slash and burn cultivation. Many of earth's tribal peoples, representing 5000 cultures, are vanishing as their lands are taken over for economic development. They are forced to adopt new ways. The challenge before the political masters and forest managers are to reconcile and meet the conflicting needs of the society from the limited resource base. This requires assessment of the demand and a policy to meet it through demand reduction and substitution, increase in productivity on sustainable basis and a mechanism that ensures equitable distribution of the benefits. The two major goals for sustainable forest management are (i) Long-term ecological security and (ii) supply of forest goods and services to people and industry. During seventies, several environmental movements particularly the 'Chipko movement' brought awareness for the conservation of forest and environment. Several policy and legal initiatives were taken to check deforestation and degradation of forest cover. The Wild life (Protection) Act 1972 was enacted for protecting and conserving the biodiversity of the country. The Forest Conservation Act of 1980 was enacted to prevent diversion of forest lands for the non forests use (Khoshoo, 1988). The Ministry of Environment and Forests was created and National Forest Policy was adopted in 1988. A major shift in the management was involvement of forest user communities through the Joint Forest Management programme in 1990.

The rural community has also taken up planting of private and community lands under Social Forestry/ Farm forestry/ Agro-forestry programmes initiated in 1980s. Participatory action involving the Government and local communities for regeneration of degraded forests through effective protection, sharing of produce and improving the socio-economic conditions of these communities through employment generating forestry activities has been institutionalized through the Forest Policy of 1988 and Joint Forest Management Policy of 1990. Now over 36,165 committees and around 75 million people in 26 states are participating with the government to manage over 10.25 million hectares of forest. The launching of JFM programme has been a major break through in the involvement of local communities in the management of forests and has produced very positive results in regenerating the degraded forests and grasslands. State

Governments have been requested by the Government of India to constitute Forest Development Agencies (FDAs) as federation of these institutions at the divisional level. FDAs are now registered bodies legally and are funded for carrying out afforestation and regeneration activities along with other rural development and employment generation activities. This ensures not only regeneration of forests but also decentralization of administrative powers and genuine participation of people in resource management. With this background a detailed survey was undertaken in villages around reserved forests of Sambalpur (pre-reorganised) Forest Division of Orissa which includes Jharsuguda, Sambalpur, Bargarh and Suvarnapur to assess the socio-economic status of people and the extent of their dependency on forests for their livelihood in order to develop future strategy for implementation of forest policies for a sustainable forest conservation and protection.

Orissa's Forest Economy: The Land Utilization Pattern in Orissa as revealed by Statistical Abstract of Orissa (GoO, 2005) records 58.13 lakh hectares in the total geographical area of 155.71 lakh hectares in 2003-04. (37.33%). The Forest classification presented by Statistical Abstract also reveals area under total Government forests as 58135.47 sq. km, of which reserved forests constituted 26329.12 sq. km (45.29%). The other forest areas are under Demarcated Protected Forest (DPF) (20.10%), Un-demarcated Protected Forests (UDPF) (6.60%), Unclassed Forests (0.04%) and Other Forests under the control of Revenue Department (27.97%). The importance of forest in the economy of the state is evident in terms of contribution of forest to the State Domestic Product as well as dependence of people inhabiting around the forest areas for their livelihood, housing, fuel etc. Among these people the Tribal affinity to forests has been very high in terms of source of living, way of life and cultural moorings. In fact in 2001 Census, Orissa records 22.13% of total population as tribal compared to 8.19% at the all India level. Forests also contribute in the generation of revenues for the State. The total forest revenue collected by Government during 2002-03 stands at 96.92 crores. Table 1 presents the generation of revenue under major and minor forest produce as follows (GoO, 2005).

The trend in effective forest cover i.e. closed forest area as against nominal forest cover based on satellite data on forest cover from the year

Table 1: Revenue from forestry in Orissa (lakhs)

Year	Timber		Minor			Total Forest Revenue
	Timber	Firewood	Kendu leaf	Bamboo	Grass and other minor produce	
1996-97	982.16	143.32	2409.75	1.27	240.12	7621.19
1997-98	987.43	36.51	4060.00	905.93	299.66	7310.93
1998-99	610.98	35.22	6350.06	851.70	214.17	8680.83
1999-00	499.04	22.02	7450.00	550.02	287.50	9539.43
2000-01	1265.66	157.16	5500.00	511.30	204.69	8425.20
2001-02	836.15	37.09	6900.00	200.07	134.37	8723.68
2002-03	854.91	59.95	7500.00	6.99	61.74	9692.14

1972-75 to 1996 is presented in Table 2 (GoI, 2004). It is observed that during 1972-75, the effective forest cover was only 24 per cent. In the course of the next 24 years or so, the nominal forest cover remained constant at around 30 per cent, but the effective forest cover declined to less than 17 per cent which is due to the degradation of forest cover. As a result of this degradation, there is decrease in the closed forest area from 77 per cent during 1972-75 to 30 per cent by 1996.

Table 2: Actual forest cover based on satellite data, Orissa

Year	Total Forest area as percent of total geographical area (Nominal forest cover)	Closed Forest area as percent of total forest area (extent of forest degradation)	Closed forest area percent of total geographical area (Effective forest cover)
1972-75	31.07	77.03	22.97
1980-82	25.32	73.08	18.5
1990-91	30.32	57.94	17.56
1995	30.25	30.25	17.44
1996	30.15	30.15	16.76

METHODOLOGY

The present study is based on socio-economic and socio-ecological survey of dependency of people on forest in Sambalpur Forest division (pre-reorganised) of Orissa. The coverage broadly consists of forest blocks of Sambalpur, Jharsuguda, Bargarh and Suvarnapur districts. The reserved forests in the pre-organised Sambalpur Forest Division numbered 60 and as per notification consisted of 79,176.50 hectares. Number of villages and hamlets are located around these reserved forests.

Sample Design: The study is primarily based on analysis of 600 sample respondents through a canvassed structured questionnaire. The

sample was constituted following the procedure of random sampling with an attempt to include persons from different occupations and different resource endowment positions which approximated a stratified random sampling procedure.

Coverage of the Study: The questionnaire attempted to elicit information on the households relating to general particulars viz., place of domicile, type of family, type of house, availability of electricity, nature of housing and facilities, source of drinking water, mode of fuel used in cooking, ownership of land, occupation, asset and income structure, social customs and traditional knowledge and nature and extent of dependence on forest. The questionnaire also sought to obtain information on perceptions of people on the nature of degradation and causes of degradation, methods of conservation and the role of their social customs in the depletion of natural resources.

RESULTS

General Particulars: The general particulars of sample respondents can be stated as follows, which are presented in Table 3. It broadly includes the sex composition, family size, age structure, type of family, caste distribution and occupational structure. Among the 600 sample respondents, 89.16% are males. Similarly age wise 75.5% of the respondents belong to the age group above 35 years. About 52.2% of the respondents have Nuclear families and 40.8% belonged to Joint family system. The rest 7% are individuals. Caste group-wise 19.5% belonged to SC, 37.2% to ST, 36.3% to OBC, 6.3% to General caste and 0.7% to Minorities. Similarly in terms of primary occupation one notices 59.3% as cultivators, 1.8% Businessmen, 2.5% engaged in Service, 24.3% are Daily Wage earners and remaining 12% are engaged in various other occupations such as

Table 3: General particulars of sample respondents

Particulars	Number	%
1. Number of Respondents	600	100.0
Male	535	89.2
Female	65	10.8
2. Age Distribution		
19-25	16	2.7
26-35	131	21.8
36-50	289	48.2
Above 50	164	27.3
Total	600	100.0
3. Type of family		
Nuclear	313	52.2
Joint	245	40.8
Individual	42	7.0
Total	600	100.0
4. Caste Distribution		
SC	117	19.5
ST	223	37.2
OBC	218	36.3
General	38	6.3
Minorities	4	0.7
Total	600	100.0
5. Occupation distribution		
Cultivation	356	59.3
Business	11	1.8
Service	15	2.5
Daily wage	146	24.3
Others	72	12.0
Total	600	100.0

various categories of artisans, petty traders, fishermen, weavers, barbers, potters, processing of leaves etc.

Demographic Characteristics: The total population of the sample households is 3181 with an average family size of 5.3. The sex-ratio is 971 females per 1000 males. Of the total population

46.68% are working members, 40.39% being adults and remaining 6.29% children (Table 4). Caste group-wise one notices variation. The average family size is found highest in case OBC category and lowest in case of SC. Sex ratio is found high in case of ST and minority group and lowest in case of OBC. Relatively high work participation rate is observed in case of General caste followed by SC and lowest in case of OBC and Minority. Similarly children engaged in work are found relatively more in case of General caste and SC.

Average family size (5.87) is found highest in case of respondents having service as primary occupation and the lowest (4.64) is noticed in case of business families. Sex-ratio is found highest in case of cultivation and business occupation groups and lowest in case of service holders. Work participation rate is found highest in case Daily wage labour followed by cultivators. One also notices high children participation in work in case of Daily wage labour and cultivators (Table 5).

Housing and Other Facilities: Majority of the sample respondents (71.83%) live in kaccha houses followed by 16.5% in mixed type of houses and only 11.66% in pucca houses (Table 6). The average number of rooms per house is 2.3. Only 4.83% of the households have own toilet facilities and 7.66% have provision of waste water drainage system in their houses. About 26.83% of the respondents reported having electricity in their houses. Regarding provision of drinking water one finds that only 5.7% of the respondents reported getting facility of Public water system.

Table 4: Caste-group wise demographic particulars

Caste Groups	No. of HHs	Average family size	Sex-ratio	% Working members	% Adult	% Children
SC	117	4.97	960	51.37	42.78	8.59
ST	223	5.22	1030	48.57	43.34	5.23
OBC	218	5.55	913	41.95	37.9	4.05
GEN	38	5.29	971	53.23	33.33	19.90
Minority	4	5.5	1750	22.73	22.73	-
Total	600	5.30	971	46.68	40.39	6.29

Table 5: Occupation -group wise demographic particulars

Occupation Groups	No. of HHs	Average family size	Sex-ratio	% Working members	% Adult	% Children
Cultivation	356	5.33	1008	48.10	40.98	7.12
Business	11	4.64	1040	39.22	39.22	-
Service	15	5.87	692	29.55	29.55	-
Daily Wage	146	5.19	964	49.73	41.42	8.31
Others	72	5.39	874	38.65	38.14	0.51
Total	600	5.30	971	46.68	40.39	6.29

Table 6: Housing and other facilities

Particulars	%
1. Type of Houses	
a. Kaccha	71.83
b. Mixed	16.50
c. Pacca	11.66
2. No. of Houses with	
< 3 rooms	67.4
3-5 rooms	30.0
Above 5 rooms	2.7
3. No. of Houses with own toilet facility	4.8
4. No. of Houses with waste water drain	7.7
5. No. of Houses with Electricity	26.8
6. Sources of Drinking Water	
a. Public water system	5.7
b. Village ponds	22.5
c. Village dug wells/Tube well	92.7
d. River/ Stream	11.7
e. Own dug wells	4.8
f. Others	0.8
7. Mode of Fuel Used	
a. Purchased wood	18.8
b. Coal	12.0
c. Cow dung	15.83
d. Electric heater	2.5
e. Cooking gas	0.5
f. Gobar gas	0.8
g. Wood and litter collected from forest	90.5

Similarly dependence on village ponds is reported by 22.5% of the respondents. Bulk of the respondents (92.7%) indicated dependence on Village dug wells and tube wells. Only 4.8% reported dependence on own dug wells and 11.7% on river/streams. In case of fuels used in cooking one finds that 81.16% of the respondents do not purchase firewood for fuel, 88.0% do not use coal, 84.17% do not use cow dung, 97.5% do not use Electric heater, 99.5% do not use cooking gas, 99.2% do not use gobar gas and vast majority of the respondents (90.5%) are reportedly using wood litter collected from forest as fuel for cooking (Table 6).

Occupation: The different occupations groups to which the respondents belong are cultivation, business, service, daily wage and others which include the various artisans and

other village service providers. It is observed that total adult working members constituted 40.39% of the total population and they are found to be engaged on an average for 109 days during the year. It is also interesting to note that out of these engaged days about 33 days are spent to collect forest produce. One also notices variation among caste groups as well as occupation groups in the nature of engagement. It is noticed from Table 7 that cultivation is the primary occupation among respondents in case of OBC group, while daily wage is relatively more significant in case of SC and ST. Similarly relatively more service holders are located in general and OBC caste groups.

The nature and extent of engagement of different caste groups and occupation groups can be examined from Table 8. It is observed that relatively lower man days engaged is in case of OBC and ST and highest in case of general and minority caste groups. However highest number of man days engaged in collection of forest produce is found in case of ST followed by OBC and SC. In case of different occupation groups highest no. of man days engaged is revealed by business and service groups and the lowest in case of cultivator and daily wage labour. Relatively higher man days engaged in collection of forest produce is noticed in case of other occupation groups, daily wage labour and cultivators.

Land Ownership Structure: The land ownership structure of the sample respondents can be examined from Table 9. It is observed that nearly 22.33% of the respondents are landless. About 40% of the respondents own land below 2 acres, about 42% own land between 2 to 5 acres and only 6% own land above 5 acres. Among the sample respondents 16 (2.66%) reportedly leased out land and 17(2.83%) reportedly leased in land. Out of 13 leasing out land 11 leased out between 1 to 5 acres. Similarly out of 17 respondents leasing in land, 9 leased in between 1 to 5 acres. None of the respondents reported encroaching forest land.

The land ownership pattern of different caste

Table 7: Occupation structure of different caste groups

Caste Groups	Occupation Groups				
	Cultivation	Daily Wage	Business	Service	Others
SC	41.88	35.89	3.42	-	18.80
ST	59.64	27.35	0.45	1.79	10.76
OBC	70.64	15.59	1.83	4.13	7.80
GEN	52.63	23.68	5.26	5.26	13.16
Minority	-	-	-	-	100.0
Total	59.33	24.33	1.83	2.5	12.0

Table 8: Average no. of man days engaged in the households of sample respondents

Groups	No. of working members	Average no. of man days engaged	Average no. of man days engaged to collect forest produce
<i>Caste Groups</i>			
SC	240	116	27
ST	515	106	42
OBC	467	104	27
GEN	68	131	23
MIN	5	253	-
Total	1295	109	33
<i>Occupation Groups</i>			
Cultivation	794	95	31
Business	16	239	6
Service	27	150	3
Daily Wage	313	115	37
Others	145	148	40
Total	1295	109	33

Table 9: Land ownership structure of sample respondents

Land size (acres)	Landless	0-1	1-2	2-5	>5	Total
% of respondents	22.23	15.83	14.16	41.66	6.0	100

groups presented in Table 10 reveals that the major land owners belong to OBC and ST with a share of 42.33% and 36.61% in the total land owned by all respondents. Similarly among various occupation groups the Cultivators own 78.62% followed by Daily wage labour owning 11.61% of the total land.

Asset Ownership Pattern: The information on ownership of various assets owned by the sample respondents are presented in Table 11. It is observed from the table that 16% of the respon-

Table 10: Land ownership of different caste groups and occupation groups

Groups	% share in total land
<i>Caste Groups</i>	
SC	13.92
ST	36.61
OBC	42.33
GEN	7.14
MIN	-
Total	100.0
<i>Occupation Groups</i>	
Cultivation	78.62
Business	0.53
Service	3.70
Daily Wage	11.61
Others	5.53
Total	100.0

dents reported owning TV sets, 20.33% owning radio, 3.8% owning tape recorder, 0.33% owning four wheelers, 0.83% owning tractor, 72.5% owning bi-cycle and 36.16% owning wrist watches. Similarly regarding ownership of cattle one finds that 59.5% of the respondents reported owning oxen/cows, 20.33% owning sheep/goat/pig and only 23.66% owning hens. In terms of ownership of implements one finds that 27.66% of the respondents indicated owning wooden ploughs and only 1.16% possessed iron ploughs.

Annual Income: The pattern of income distribution among the sample respondents can be studied from Table 12. It is noticed that the annual household income stands at Rs.19533/- and the per capita annual income is Rs. 3684/-, which are significantly low and indicates the degree of deprivation of the people of the region. The shares of various economic activities in total

income reveals that major portion of the total income of the respondents come from cultivation of land (63.90%) followed by wages (18.20%), salary from service (6.81%), shop and business (3.34%), professional activities (1.57%) , collection from forest (3.65%) and the rest from other activities (2.53%). One notices variation in the income levels of different caste groups as well as different occupation groups. It is

Table 11: Ownership of assets, livestock and implements

Items	No. of units	No. of respondents owning	% of respondents
<i>Assets</i>			
TV	98	96	16.0
Radio	123	122	20.33
Tape recorder	23	23	3.83
Four Wheeler	2	2	0.33
Tractor	5	5	0.83
Bicycle	469	435	72.5
Wrist watch	225	217	36.16
<i>Livestock</i>			
Cows/Oxen	1127	357	59.5
Sheep/Goat/Pig	328	122	20.3
Hens	339	142	23.6
Total	1794		
<i>Implements</i>			
Wooden plough	181	166	27.6
Iron plough	7	7	1.16

Table 12: Income pattern of sample respondents

Source	Total income (Rs.)	% share
Cultivation of own land	7298677	62.28
Leased in land	127400	1.09
Rent of leased out land	62000	0.53
Wages	2133464	18.20
Salary from service	798540	6.81
Shop/Business	391150	3.34
Allied Agriculture	10000	0.09
Professional activity	183985	1.57
Gift and pension	28500	0.24
Collection of forest produce	427537	3.65
Others	258730	2.21
Total	11719983	100.0
Per Household annual income	19533/-	
Per capita annual income	3684/-	

interesting to note that highest household income as well as per capita income registered by general caste, minorities followed by OBC caste group and the lowest is exhibited by ST. Similarly among occupation groups highest per household income and per capita income are registered by service followed by business and lowest exhibited by daily wage labour (Table 13).

Table 13: Income pattern of sample respondents caste and occupation group wise

Groups	Per Household income	Per capita income
<i>Caste groups</i>		
SC	18177	3654
ST	16146	3091
OBC	21807	3925
GEN	29955	5663
MIN	25075	4559
Total	19533	3684
<i>Occupation Groups</i>		
Cultivation	19687	3697
Business	19786	4267
Service	83421	14219
Daily wage	13677	2634
Others	17297	3209
Total	19533	3684

Dependence of People on Forests

In the context of the socio-economic profile of the sample respondents which gives ideas about the nature of livelihood systems of people residing in the adjacent villages of the Reserve Forests of Sambalpur division, in the present section an attempt has been made on the one hand to identify the social customs and traditional knowledge of the people and on the other their perceptions regarding the nature of degradation of forests over

time, causes of degradation, methods of forest conservation known to them, their own contribution to the degradation in the form of loss of trees and animals through their age old customs and rituals, their own dependence on forests for livelihood, medicines, sources of fodder and their own suggestions for conservation of the forests.

Dependency of People on Forest as Source of Medicinal Plants: Results of the survey about the dependency of people on different medicinal plant species from the nearby forests reveals following data (Table 14). The data indicated that all the sampled population depended on forest for different medicinal species. Only 9% of the population expressed that they obtain 1-10 medicinal species from the nearby forest. A maximum of 47.6% stated that they use to collect 20-30 plant species for different medicinal purposes from the forest, where as 12.8% of total surveyed population expressed that they use to collect more than 30 plant species from the nearby forest for different health practices.

Table 14: Dependence on forest for medicinal plants

No. of species	% of people showing dependency
1 - 10 species	09.0
>10 - 20 species	30.6
>20- 30 species	47.6
>30 species	12.8

Further survey categorized these medicinal plant species for the treatment of different ailments (Table 15). The data indicated that for 10 different ailments; around 73 species can be used as medicinal plants. Some of the common ailments like stomach disorder, common cold etc. are treated with good number species which are present in local forest. Even, for treatment of some ailments of their domestic pets, people depend upon forest as the source of medicine. List of plant species having medicinal values for the people are enlisted in the Table 16.

Table 15: Use of medicinal plants for various ailments

Ailment	No. of medicinal plant species
Common cold and cough	10
Stomach disorder	14
Tooth ache	7
Ear problem	3
Eye problem	9
Boils, Burns and Blisters	6
Anthelmintic	6
Piles	4
Gyneic Problem	5
Veterinary medicine	9

Table 16: List of medicinal species collected by people from nearby forest

S.No.	Species	Local Name
1	<i>Achyranthes aspera</i>	Apamaranga
2	<i>Azadirachta indica</i>	Nimba
3	<i>Butea monosperma</i>	Palash
4	<i>Curcuma longa</i>	Haldi
5	<i>Euphorbia hirta</i>	Chitakutei
6	<i>Diospyros melaroxylon</i>	Kendu
7	<i>Jatropha curcusa</i>	Ramjada
8	<i>Lemonia acidissima</i>	Kaintha
9	<i>Madhuca indica</i>	Mahula
10	<i>Phyllanthus emblica</i>	Aanla
11	<i>Sapindus trifoliata</i>	Rithaphala
12	<i>Terminalia arjuna</i>	Arjuna
13	<i>Terminalia bellerica</i>	Bahada
14	<i>Terminalia chebula</i>	Harida
15	<i>Vitex negundo</i>	Begunia
16	<i>Phoenix sylvestris</i>	Khajuri
17	<i>Plumbago indica</i>	Rakta Chitaparu
18	<i>Eclipta prostate</i>	Bhrungaraj
19	<i>Cyperus rotundus</i>	Mutha
20	<i>Aegle marmelos</i>	Bela
21	<i>Andrographis paniculata</i>	Bhuin nimba
22	<i>Argemone mexicana</i>	Dengbhejri
23	<i>Cassia fistula</i>	Sunnari
24	<i>Ficus mumosa</i>	Dimri
25	<i>Soyamida febrifuga</i>	Rahen
26	<i>Syzgium cumuni</i>	Jam
27	<i>Holarshena antidysentica</i>	Kurei
28	<i>Boerharia diffusa</i>	Puruni
29	<i>Alstonia scholaris</i>	Chhatim
30	<i>Annona squamisa</i>	Ata
31	<i>Cleistanthus collinus</i>	Karada
32	<i>Asparagus racemosus</i>	Satabari
33	<i>Aristolochia indica</i>	Panairi
34	<i>Tephrosia purpurea</i>	Barakolathia
35	<i>Pergularia daemia</i>	Uturuli
36	<i>Evolvulus alsinoides</i>	Bichhamalia
37	<i>Parsiflora foetida</i>	Bisiripi
38	<i>Cleoma viscosa</i>	Huluhulu
39	<i>Tinospora cordifolia</i>	Guluchilata
40	<i>Mimosa pudica</i>	Sajakuli
41	<i>Millettia pinnata</i>	Karanja
42	<i>Bombax ceiba</i>	Simuli
43	<i>Ageratum Conyzoides</i>	Poksungha
44	<i>Semecarpus anacardium</i>	Bhalia
45	<i>Similax microphylla</i>	Muturi
46	<i>Sterculari urens</i>	Genduli
47	<i>Hemidesmus indicus</i>	Sugandhi
48	<i>Nyctanthus arboristis</i>	Gangasiuli
49	<i>Woodfordia fruticosa</i>	Dhatki
50	<i>Chloroxylon swetinoides</i>	Bheru
51	<i>Curarligo orchinoides</i>	Talmuli

Source of Fodder: To analyze the source of fodder for domestic animals in the area, following questions were put:

- Whether the fodder is purchased from the market?
- Whether the fodder requirement is met through forest grazing?

iii. Whether the requirement is met from public grassland?

iv. Whether the requirement is met from own land

A maximum 47% of the respondents stated to use public grassland as source of fodder. Only 28.3% of the respondent admitted to use forest as source of fodder through forest grazing. However, a majority of respondent (53-98%) preferred to answer 'No' to the question related to the fodder source. Further analysis of only 'Yes' respondent, indicated the maximum use of public grassland (42.8%) as the fodder source followed by own land (29.9%) and forest grazing (25.8%). A sizeable proportion of village dwellers allow their domestic animals to enter into forest for grazing.

Tree Species Collected for Housing and other Activities: During the survey, data was collected from villagers to adjudge their dependency on forest for housing and related activities (Table 17). Among the total respondents, 52.3% did not respond about tree species that they collect for their housing and other activities. Among the 47.7%, who responded to the questionnaire, a maximum of 7.3% stated to collect "Karla" plant (*Cleistanthus collinus*) for their housing, 6.3% for collection of Sal (*Shorea robusta*), 6.0% for collection of bamboo (*Dendrocalamus strictus*) and 4.4% for collection of "Sahaja" (*Terminalia tomentosa*). As many as 14 different species were found to be of use for housing purpose by the villagers. Besides,

Table 17: Tree species collected for housing and other activities

Tree	% Respondents
Bamboo	6.0
Karla	7.3
Dhaura	0.2
Haland	0.8
Kendu	0.5
Mahua	1.2
Mango	0.2
Sal	6.3
Piasal	0.4
Telkurei	0.6
Veru	2.0
Valia	0.6
Sahaj	4.4
Sena	1.5
Stem as bole	8.3
Leaf for thatching	2.9
Root as rope	4.5
Total	47.7
No	53.3

8.3% of the respondents did not categorise any specific tree for their housing, in stead stated to collect stems (boles) from the nearby forest. Similarly 2.9 and 4.5% of the respondents stated to collect leaf and non-woody materials respectively from the forest.

Celebration with Sacrifice of Trees: A major fraction of the respondents (97.7%) replied negative to the question of tree sacrifice during celebration. Only 2.3% of the respondents declared that they do sacrifice trees during celebration and the tree species they use to sacrifice is today called as *Halan* whose scientific name is “*Adina cordifolia*” (= *Haldinia cordifolia*) belonging to family *Rubiaceae*. The species is a usual element of Sal/dry mixed deciduous forest and is a good coppicer.

Celebration with Sacrifice of Animals: Data collected about the animal sacrifice during the survey revealed mainly 4 types of animal species sacrificed. Only 2% of the respondents stated about no sacrifice of animals. Among 98% of the respondents who stated about animal sacrifice, a majority (79.8%) reported about goat sacrifice and approximately 18% stated bird sacrifice (Hens and cocks) during celebration. Besides, sheep sacrifice was also revealed but by only 0.3% of the total respondents. The survey thus reveals the animal sacrifice by village dwellers for which they intentionally adopt domestic animals but no wild animal is sacrificed.

Tree Species Lost from the Forest: As per the perceptions of the sample respondents 92.35% of the respondents stated about 28 different species lost from the forests. Maximum of 29.5% respondents expressed their concern about the loss of “Sal” from the forest and 33% (approximately) stated about loss of some important species like Sisoo, Harida, Kendu, Piasal and Veru (Table 18).

Degradation of forest and its Causes: About 87% of respondents stated about their knowledge about the degradation of forest around them. With respect to causes of forest degradation, 91.9% of the total respondents responded for 15 different causes. Among these, 48.4% opined that excessive use of forest products for domestic purpose is one of the principal causes for forest degradation. Besides, illegal trading, and fuel wood crisis were the two important causes for forest degradation (Table 19).

Methods of Forest Conservation: On methods of forest conservation, 57.8% of the respondents

Table 18: List of trees lost from the Forests

Species	% Respondents
Bamboo	2.3
Bandhan	0.8
Bel	0.7
Bhanwar	0.6
Karda	0.8
Chara	1.7
Dhawra	0.3
Gamhari	0.5
Haland	1.2
Harida	5.9
Karanja	0.4
Kekata	0.8
Kendu	5.2
Khair	0.2
Khurdu	1.5
Kurei	0.2
Kusum	3.4
Mahua	3.8
Mango	0.3
Piasala	5.7
Rohini	0.8
Sahaja	3.3
Sal	29.5
Saliha	1.3
Sena	0.4
Sisoo	10.4
Veru	5.6
Asana	0.3
No response	7.7

Table 19: Causes of forest degradation

Causes of degradation	% Respondents
Business/ trading	16.5
Corporation	0.7
Agriculture	1.3
Domestic purpose	48.4
Fuel wood crisis	14.9
Forest fire	0.6
Housing	0.5
Industry (Paper)	0.2
Mining	1.3
Poverty	0.2
Population pressure	0.2
Illegal forest product sale	5.0
Urbanisation	1.5
Timber demand	0.2
Illicit felling	0.4
No response	8.1

Table 20: Method of forest conservation

	% Respondents
Afforestation	0.2
Vana mahostava	0.8
Forest Development Agency	0.5
Social Forestry	0.7
Village Awareness	0.3
Village Committee	20.5
VSS	19.2
No response	57.8

did not commit any response. Among 42.2% of 'Yes' respondents, maximum 20.5% opined constituting local village level committees for forest conservation. Role of VSS for forest conservation was appreciated by 19.2% (Table 20). Role of forest authority, afforestation, Vana mahosthava, social forestry, village awareness campaign etc. in protection of forest was not appreciated by the people.

Suggestion for Conservation of Forest:

Suggestions for conservation of native forest around the village were collected under 3 main options:

- i. Employment of more forest personnel,
- ii. Formation of village level committee, and
- iii. Deployment of village volunteers

Around 10-17% of the respondents did not come out with suggestions. Among the respondents who suggested, maximum 89.5% opined in favour of employing more forest personnel. Village level committee and deployment of village level volunteers were opined by around 83% of the respondents. Further categorization of such respondents revealed that around 35% of the total respondents favoured employing more forest personnel for more effective conservation. Suggestions for village level committee and village volunteers for effective forest conservation came from 66% respondents (33% from each category). Thus the analysis revealed more or less equal importance of all the 3 suggestions for the forest conservation measure

Outsiders Exploiting Forest: An attempt was made to know the status of forest exploiters (whether the exploiter is an outsider or the native). As per the analysis a majority of 63.3% respondents opined in favour of forest exploitation by outsiders. Out of this, 28.9% of the respondents stated frequent forest exploitation by the outsiders and 20.4% stated occasional and the rest of 16.9% as regular exploitation. Further attempt was made to ascertain the ways of forest exploitation by the outsiders (i.e., by cutting trees, by collecting litter/twig/ dry wood or by hunting and killing animals). The data have been presented in the Table 21. Thus, the forest is being exploited maximally by outsiders

(80.2%) for collection of litter/twig/ dry wood. Of the total respondents, 76.1% opined that outsiders do interfere their forests for cutting of trees and collecting wood logs. Response against hunting and killing by outsiders were found to be relatively negligible. (8-18.5%).

DISCUSSION

The lives and livelihood systems of people in and around forest areas have drawn considerable attention of academicians, policy makers and planners and non-governmental organizations in recent years. The high dependence of people on forests makes the rights and access to forest products as issues of basic livelihood to a vast majority of rural people. In recent years there has been increasing emphasis in different parts of the globe on forest management relevant to livelihood issue that could effectively sustain and widen the scope for capacity building (through skill development/ upgradation programmes) of forest dependent communities on sustainable basis. Sustainability of forest resources requires that the needs of present generation should not prejudice the interests of future generation. In other words the productive potential of asset base in no case needs to be reduced despite meeting its current needs, leaving a set of opportunities open to future generation. Thus sustainability subsumes productivity (growth) and equity. (World Bank, 1992). Thus two issues are of great concern, one the level and nature of dependence of people on the live support systems in the region and the other the nature of depletion of resources calling for improved forest management system that could ensure on the one hand strengthening the life support systems as well as ensure the sustainability of the resource base.

A large segment of rural poor are highly dependent on forest resources for their survival. A study conducted by the Indian Institute of Forest management in 1996 (MoEF, 1998) gives a fair idea about the contribution of forests to the economy of three tribes in Orissa. A socio-

Table 21: Outsiders exploiting forests

Means	Frequently	Occasionally	Regularly	No
By cutting tree	39.2%	24.7%	12.3%	23.9%
Collecting litter/twig/dry wood	41.7%	23.5%	15.0%	19.8%
Hunting and killing animals	8.0%	13.2%	18.5%	62.4%

economic survey (Singh, 1997) revealed that people staying in the fringes of forests draw as much as 49.2% of the total income/benefits from forests. Ganguly and Chaudhury (2003) studied the forests of Bastar in Chhatisgrah and reported that the forests have been a vital source of sustenance for many tribal groups who live there. World Bank Report (2006) described Forestry as the second largest land use in India after Agriculture. (22% of the total land base). Roughly 275 million poor rural people in India- 27% of the total population depend on forests for at least part of their sustenance and cash livelihoods.

The industrial consumption, economic exploitation leading to the rapid depletion of forests all over the world is a cause of grave concern (Pataik and Brahmachari, 1996). Actual forest cover of more than 10% tree density in the state of Orissa declined by 12% during 1987-99 compared to a decline of less than 0.4% for the entire country (Kumar and Saxena, 2002). An estimated 41 per cent of India's forest cover has been degraded to some degree in the past several decades (World Bank Report, 2006)

Mallik (2000) highlighted the common property nature of forest and NTFP resource which required indeed secure, enforceable user rights and pre-conditions for their collective management and conservation. Sundar et al (1996) argues that the concept of forests needs to be looked historically to uncover community forest protection measures. Singh (2002) focuses on the promising emergence of federations of forest protection groups in Orissa. Mukherejee (2002) argued that mere establishment of institutions shall not guarantee localized natural resources to be managed in a sustainable manner and emphasized a framework for measurement of social capital. Dhanagare (2000) reported the experience of Joint Forest management in Uttar Pradesh. Over the past several decades in India the focus in forestry has shifted toward conservation. JFM is now a key thrust. (World Bank Report, 2006). The Report notes " Many stakeholders at both the state and national levels agree that strengthening forest rights and management responsibilities of communities could help unlock more of the value inherent in Indian forests and boost local livelihoods while also supporting forest conservation policy goals".

The socio-economic survey in the regions adjacent to forests clearly reveals the primary dependence of sample respondents on agriculture

with nearly 22% belonging to the category of landless and nearly 50% belonging to Marginal and small farmers category. Together these 70% constitute the category of rural poor with attempts to supplement their income through alternative avenues, of which dependence on forest is of high importance. In fact for the sample respondents on an average the number of man days employed is 109 days of which nearly 30% time they are engaged to collect forest produce. Social group wise one observes variations with relatively higher dependence of ST category on forests. However, forests have not become an important source of earning for the sample respondents as the share of collection of forest produce in total income constitutes merely 3.65%, which may be due to distress sale of forest produce by forest dependent people and absence of proper marketing systems. The dependence on forests is not merely in terms of supplementary income and source of livelihood for the landless but it also is in terms of various medicinal plants with nearly 91% of people depending on more than 10 species, which are used for various ailments. Dependence on forests for housing has been reported by about 48% of the sample respondents. The survey also reveals that as per perceptions of the people (64% of the respondents) there is extensive exploitation of forests by outsiders for cutting trees frequently and occasionally. While majority of the respondents (58%) have not expressed opinion regarding forest conservation, and a sizeable portion (20%) argued for the role of Village committees, there is necessity of strengthening Community forestry programmes, which must be organized on co-operative basis rather than through private parties so that the forest resources acquire appropriate economic valuation and the benefits accrue to the forest dependent people.

RECOMMENDATIONS

Given the general level of poverty of the people living around the reserved forest areas, as evidenced in the Socio-economic survey in terms of lack of employment opportunities and bulk of the working days of working members remaining unemployed on the one hand and low income of the families (household income as well as per capita income) the context of conservation of forest areas broadly depends on the general

economic upliftment of people of the region. The following measures are recommended:

- i. The livelihood potential of forests remains underutilized and the forest offers little hope of escaping poverty. Therefore improving forest livelihoods must be integrated into broader rural livelihood initiatives such as agriculture intensification and marketing.
- ii. Agriculture and forest development initiatives must be complemented by infrastructure development (roads, electricity); health and education improvements.
- iii. The community based forestry approach initiated mainly through the JFM programs following the National Forest Policy of 1988, must be followed to ensure greater rights and responsibilities to local communities as has been the International experience.
- iv. Stronger forest resource rights for communities need to be established. Processes need to be established for strengthening community resource center.

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