

Ecosystem Services Improvement Project: Baseline Report of Socio-Economic Status of Project Areas of Madhya Pradesh



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Ecosystem Services Improvement Project: Baseline Report of Socio-Economic Status of Project Areas of Madhya Pradesh

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FOREWORD

Global climate change is a threat having perceptible and tangible impacts upon human kind and nature. The role of forests in maintaining ecological balance, environmental stability, sustainable development and the ecosystem services provided by forests are well known. Forests are now integral part of international protocols dealing with climate change mitigation. Responding to global call for nationally appropriate mitigation actions, Government of India released its National Action Plan for Climate Change (NAPCC) with eight National Missions. Green India Mission is one of the flagship missions under NAPCC. The World Bank supported Ecosystem Services Improvement Project (ESIP) is supporting Green India Mission in states of Madhya Pradesh and Chhattisgarh. The ESIP will support the goals of GIM by demonstrating models for adaptation-based mitigation through sustainable land and ecosystem management and livelihood benefits.

ESIP, in many ways, brings a new and novel approach to address some of the challenges in sustainable management of ecosystems and land. It will introduce new tools and technologies for better management of natural resources, including biodiversity and carbon assets and the use of advanced monitoring systems. The pilot in Chhattisgarh and Madhya Pradesh will help demonstrate the potential for nationwide scaling up of the ESIP and will directly support India's Nationally Determined Contribution. ICFRE as one of the project implementing agencies of ESIP and working on scaling up sustainable land and ecosystem management (SLEM) best practices in selected landscapes of Chhattisgarh and Madhya Pradesh.

The baseline surveys were conducted to assess the outcomes and impacts of the implementation of ESIP activities mainly related to upscaling of SLEM best practices, awareness generation and capacity building of the local communities on SLEM in the state of Madhya Pradesh.

I have great pleasure in presenting this 'Baseline Report of Socio-Economic Status of Project Areas of Ecosystem Services Improvement Project of Madhya Pradesh'. I am hopeful that the findings of this report will serve as framework for assessing the impact of project activities and will be a guiding document for effective implementation of ESIP activities in the state of Madhya Pradesh.

Date: 02/06/2020

(Arun Singh Rawat)

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P R E F A C E

Global climate change, population pressure, increasing demand for fuelwood, fodder and other natural resources and many other anthropogenic factors pose severe threats to natural resources and biodiversity thereby resulting into deforestation and forest degradation. One of the biggest challenges faced by humanity, therefore, is to manage natural resources in such a way that trade-offs between the increasing human needs and sustainability of ecosystem health are maintained.

The Ecosystem Services Improvement Project (ESIP) with financial support from the GEF Trust Fund and administered by the World Bank is being implemented in the states of Chhattisgarh and Madhya Pradesh. The project is designed to support Government of India's ambitious Green India Mission (GIM) and aims at increasing forest and tree cover, improvement in ecosystem services. The project also aims at enhancing forest-based livelihood opportunities of the stakeholders specially forests dwellers, small and marginal farmers living in fringe forest areas. By adding additional forest and tree cover, ESIP attempts to contribute towards India's NDC of creating an additional carbon sink of 2.5 to 3 billion tonnes of carbon dioxide equivalent and improve the quality of forest through better management of natural resources, reversing land degradation and conservation of biodiversity. ICFRE is one of the project implementing agencies and is mandated in scaling up of sustainable land and ecosystem management (SLEM) best practices in selected landscapes to benefit small and marginal farmers and other rural poor, enhance productivity on private and community land, building local knowledge and capacity on SLEM best practices.

The report on 'Baseline Report on Socio-Economic Status of Areas of Ecosystem Services Improvement Project of Madhya Pradesh' is intended to collect information related to the present socio-economic situation of the villages for upscaling of SLEM best practices. The baseline report provides information related to the parameters on land holding, occupation, major crops, income sources, family size, livestock population, pattern of energy consumption etc. Information is collected through detailed PRA exercises, community meetings and focus group discussions. The findings of the baseline report will help to measure the effectiveness related to monetary or non-monetary benefits from forests by the communities; land area under sustainable land management practices; number of female populations participating in the SLEM. The present base line report will also serve as a bench mark to gauge the overall project benefits during different phases of project implementation in the states of Madhya Pradesh.

Date: 02/06/2020

(Anurag Bhardwaj)



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We also acknowledge the efforts of the ESIP Team at ICFRE for their valuable suggestions during writing of the report. We are also thankful to Shri Umang Thapa, Establishment and Secretariat Expert in designing and type setting of this report.

We are hopeful that the 'Baseline Report on Socio-Economic Status of Areas of Ecosystem Services Improvement Project of Madhya Pradesh' will be a benchmark document to measure the impact of project activities to be implemented in the project areas.

Report Preparation Team





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ABBREVIATIONS USED

BP	-	Best Practice
CBOs	-	Community Based Organisations
ESIP	-	Ecosystem Services Improvement Project
FGDs	-	Focus Group Discussions
GEF	-	Global Environment Facility
GIM	-	Green India Mission
Ha	-	Hectare
Hr	-	Hour
ICFRE	-	Indian Council of Forestry Research & Education
JFMCs	-	Joint Forest Management Committees
kg	-	Kilogram
km	-	Kilometre
KVKs	-	Krishi Vigyan Kendras
LPG	-	Liquefied Petroleum Gas
mha	-	Million hectares
MP	-	Madhya Pradesh
m	-	Metre
mm	-	Millimetre
MoA&FW	-	Ministry of Agriculture & Farmers Welfare
MoEF&CC	-	Ministry of Environment, Forest and Climate Change
msl	-	Mean Sea Level
MSP	-	Minimum Support Price
NAPCC	-	National Action Plan for Climate Change
NDC	-	Nationally Determined Contribution
NJY	-	Nal Jal Yojana
NTFP	-	Non-Timber Forest Product
OBC	-	Other Backward Class
PIU	-	Project Implementing Unit
PMU	-	Project Management Unit
PRA	-	Participatory Rural Appraisal
q	-	Quintal
SC	-	Scheduled Caste
SEBS	-	Socio Economic Baseline Survey
SHGs	-	Self Help Groups
SLEM	-	Sustainable Land and Ecosystem Management
SRI	-	System of Rice Intensification
ST	-	Scheduled Tribe
TGA	-	Total Geographical Area



EXECUTIVE SUMMARY

Ecosystem Services Improvement Project (ESIP) is being implemented in the state of Madhya Pradesh. The State Forest Department of Madhya Pradesh has identified five forest ranges i) Bhaura (North Betul Forest Division), ii) Budhni (Sehore Forest Division); iii) Sukhtawa, Itarsi and Banapura (Hoshangabad Forest Division) for implementation of project activities. The project has targeted to cover 12,500 ha of land coverage and 2,500 beneficiaries for upscaling of SLEM best practices in the state of Madhya Pradesh. The purpose of a baseline report was to assess the outcomes and impacts of the ESIP activities mainly by upscaling of SLEM best practices, SLEM awareness generation and capacity building of the local communities through a variety of indicators reflecting: i) poverty and households; ii) productivity change observed through application of SLEM best practices; iii) adoption of SLEM best practices; iv) improvement in ecosystem services and forest quality; and v) institutional change. For the socio-economic survey, out of the 36 project villages, 13 villages were randomly selected from five forest ranges of three forest divisions as mentioned above.

The highest populated village was Nanderwada (2121 persons) and lowest populated village was Bhatna (152 persons). The average family size of all five Forest Ranges was about five members per family. Out of the total population of 11,450 in the ESIP area, 54.63% population belongs to scheduled tribes and 28.75% population belongs to other backward class. Only 12.62% of population belongs to scheduled caste. The average literacy rate of the villages was around 66.3%. Farming (male 30.5% and female 9.5%) and agricultural laborers (40.6% male and 12.9% female) were the main occupation of the villages. The average annual income of households was Rs.46,402/- per household in the ESIP area. It was observed that majority of the population were residing in kutchha houses and highest numbers of kutchha houses were recorded in Banapura Forest Range (94%). Among the total livestock population, cow population was the highest with 45.6%, followed by oxen 24.7%, buffaloes 13.3% and poultry 8.7%. Other livestock such as goat, horses and ponies were also reared in the villages. In Banapura Forest Range, cow and oxen population was highest with 72% and 41%, respectively. Commonly used fodder species of the ESIP villages are bhur-bhuri (*Eragrostis tenella*), kandi (*Dichanthium annulatum*), gurlu (*Firmiana simplex*), fulera (*Cenchrus ciliaris*), gunera (*Themeda quadrivalvis*) and bhus-bhusi (*Oplismenus burmanii*).

In villages of Itarsi Forest Range, community well was the major source of drinking water while villages of Budhni Forest Range majority of the households use tap water. The use of community open wells for drinking water was also observed in Banapura Forest Range. In Banapura Forest Range, pond (55%) and well (37.8%) were the major sources of irrigation apart from rain water. Dependency on rain water for irrigation was common in most of the villages and the highest was observed in the villages of Bhaura and Itarsi Forest Ranges. Majority of population belong to small category of land holdings (31.6%) while only 2.3% population belong to marginal farmers. This pattern was observed across all the villages. Horticulture and agroforestry are not very common practices in the ESIP area. Few trees under horticulture and agroforestry observed were mainly munga (*Moringa oleifera*), mango (*Mangifera indica*), guava (*Psidium guajava*), banana (*Musa acuminata*) and custard apple (*Annona reticulata*). With access to free medical facilities provided by the government under different schemes and programs, dependency on forest for medical plants among the villagers has been reduced. Only 40% of the villagers were observed collecting



medicinal plants from forests. Common medicinal plants used by the villagers were satavar (*Asparagus racemosus*), harra (*Terminalia chebula*), bahera (*Terminalia bellerica*), aonla (*Embllica officinalis*), palash (*Butea monosperma*), mahua (*Madhuca indica*), neem (*Azadirachta indica*), arjun (*Terminalia arjuna*), karanj (*Pongamia pinnata*), chirayta (*Andrographis paniculata*), kali musli (*Curculigo orchioides*), dahi (*Woodfordia fruticosa*) and haddijor (*Cissus quardangularis*) etc. Fuelwood was used by 67.3% households followed by dung cake (21%) for cooking and heating purposes. Only 12% of the households use LPG as primary source of fuel for cooking. In case of fuelwood, on an average 20 kg fuelwood was being collected per day per households from the forest. Maximum distance travelled by the villagers for fuelwood collection varies from 2 to 5 km and time spent varies from 5 to 8 hours depending upon the availability of fuelwood in forest. Women were also contributing in family income apart from looking after the household in the villages. Women folk were also involved in agriculture labour as secondary occupation with 42% representation. They earn Rs.200/- per day as daily wage and contribute towards family income. In the ESIP villages, female headed households were only 1.5%. Among all the members interviewed, 25% were members of self-help groups (SHGs).

Most of the villagers during focus group discussions (FGDs) suggested to create water harvesting structures for irrigation, to provide sustainable livelihood for women and to conduct awareness cum training programmes on crop diversification, lac cultivation, system of rice intensification and mushroom cultivation etc. SLEM best practices activities suggested for up scaling in ESIP area of Madhya Pradesh were Wadi - A tree-based farming system model for sustainable land and ecosystem management (SLEM), agro-biodiversity innovations for sustainable land and ecosystem management, Chauka system for management for sustainable livelihood and adaptation to climate change, rainwater harvesting (deepening of silted pond) and ground water recharge, construction of water conservation structures, climate proofing fish farming and system of rice intensification for SLEM.





1.

Inroduction

Madhya Pradesh is the second largest state and located in the central part of India. There are 50 districts in the state, of which 24 are tribal districts. The total geographical area of the state is 3,08,252 sq km which constitutes 9.38% of the total geographical area of the country. The forest cover in the State is 77,414 sq km which is 25.11% of the state’s total geographical areas (FSI, 2017). Land use pattern of the state is given in Table.1.

Table 1: Land use pattern in Madhya Pradesh

Land use types	Area (000'ha)
Total geographic area	30,825
Reporting area for land utilization	30,756
Forests	8,691
Not available for land cultivation	3507
Permanent pastures and other grazing land	1291
Land under miscellaneous tree crops and groves	20
Culturable wasteland	1008
Fallow land other than current fallows	468
Current fallows	350
Net area sown	15,422

Source: FSI, 2017

Madhya Pradesh has wide variation in climate, ranging from semi-arid (dry moist to moist), sub-humid to humid tropical. Average rainfall varies from 800 to about 1800mm (FSI,2017). Madhya Pradesh with its large land area is endowed with eleven agro-climatic zones with five crop zones and seven soil types. The Malwa, Vindhya and Nimar plateau and the Narmada valley in west and central Madhya Pradesh have black to deep black soils. Bundelkhand and part of Gird area in northern Madhya Pradesh have mixed black to red laterite soils. The type of soil in far north (Morena, Bhind and Gwalior) is alluvial while the plateaus and plains in the east and south have black soils(Planning Commission, 2011).The major crops of the state are oil seed, pulses, wheat, soyabean, paddy, maize and *arhar* covering an area of 6.99, 6.66, 6.03, 5.40, 2.29, 1.28 and 0.69 million ha, respectively (MoA&FW, 2017). Kharif crops are sown in 63% of the area whereas rabi crops are sown in 37% of the total cropped area in the state. Further, agriculture of the state lacks diversification, high proportion of traditional crops (coarse cereals 20.6% in kharif particularly), low use of improved variety seeds, high use of chemical fertilizer and less mechanization (Planning Commission, 2011). State is implementing National Horticulture Mission supported by Ministry of Agriculture since 2005-06. The programme is being implemented in 35 districts of the state. The major fruits produced in Madhya Pradesh are mango, guava, orange, melon, papaya, banana, grapes etc. Madhya Pradesh is a populated state and nearly 69.8% of the state’s population depended on agricultural practices. Nearly, three-fourth land holdings of the state are marginal and small. Two-third of the gross cropped areas



is rain-fed showing great dependence on vagaries of the monsoon (Planning Commission, 2011).

The total degraded land of the state is 3.47mha which constitutes 3.28% of the total geographical area of the country. The major land degradation processes affecting the state is through vegetal degradation (2.08 mha) followed by water erosion (1.31 mha) and rocky barren (0.06 mha) (MoEF&CC, 2015). The total population of the state is 72.63 million accounting to 6% of India's total population (Census of India, 2011). The rural and urban population stands at 72.37% and 27.63%, respectively. The male and female population was 51.8% and 48.2%, respectively. The population density of the state is 236 persons per sq km, which is lower than the national average of 382 persons per sq km. The Scheduled Tribes (ST) population of the state is 21.1%. There are six districts with greater than 50% ST population in the state (Census of India, 2011). The gender ratio in the state is 931 (females per 1000 males). The total literacy rate is 69.32% out of which 78.73% are male and 59.24% females. The total working population belong to farmers (55%) followed by agricultural labourers (38.6%), other workers (27.2%) and household industry workers (3%) (Census of India, 2011). In the state, 80% of the households are dependent on firewood and dung cakes etc. as their primary source of energy for cooking (Census of India, 2011). The 19th Livestock Census (2012) has reported a total livestock population of 36.33 million in Madhya Pradesh, out of which cow constitute highest with 53.95% followed by buffalo (22.54%), goat (22.06%) and sheep (0.85%).

1.1. Project Area of ESIP

Ecosystem Services Improvement Project (ESIP) is being implemented in the state of Madhya Pradesh. The State Forest Department of Madhya Pradesh has identified five forest ranges viz. Bhaura in North Betul Forest Division, Budhni in Sehore Forest Division; Sukhtawa, Itarsi and Banapura in Hoshangabad Forest Division for implementation of the project activities. The project has targeted to cover 12500ha of land and 2500 beneficiaries in the ESIP project area of Madhya Pradesh for upscaling of Sustainable Land and Ecosystem Management (SLEM) best practices. Details of project villages of Madhya Pradesh with populations, number of households and areas are given in Table 2. The forest types as per Champion and Seth (1968) are Dry Teak Forest (5A/C1b) and Southern Dry mixed Deciduous Forest (5A/C3) in the selected ESIP area of Madhya Pradesh.



**Table 2:** Details of project villages of Madhya Pradesh under ESIP

Forest Division	Forest Range	Villages	Population	No. of Households	Area of Village (ha)
North Betul	Bhaura	Banabehda	1066	229	532
		Koyalbuddi	326	64	459
		Handipani	681	138	500
		Koyalari	543	106	388
		Kachhar	1498	332	1303
		Kuppa	948	196	383
		Tetar Mal	331	70	146
		Tetar Ryt	137	27	70.85
Sehore	Budhni	Naganpur	131	24	393.7
		Chachmau	141	31	962.9
		Hathlewa	298	64	163.8
		Khatpura	1462	264	3827
		Akola	991	224	781
		Paraswada	620	104	128
		Saidganj	457	94	1474.8
		Pahar Khedi	492	116	271.69
Hoshangabad	Sukhtawa	Kohda	742	144	1497
		Pipariya Khurd	1091	206	1250
	Itarsi	Bhatna	152	34	85
		Khatama	496	95	600
		Lalpani	320	57	1323
		Ranjhi	231	42	933
	Banapura	Banapura	803	167	1301.5
		Banspani	174	31	338
		Bhawanda	490	96	366
		Chandakhad	444	96	380
		Ghoghara	252	144	396
		Gotabarri	324	62	230
		Jondhal	311	62	391
		Keolajhir	430	86	210.8
		Narri	578	108	813
		Salai	318	59	180
		Sotachikli	690	142	1238
		Nanderwada	2121	453	599
		Pipalgota	497	89	265
		Nayagaon	378	60	193
Total		20964	4316	24374.04	

(Sources: 1. Madhya Pradesh Ecosystem Services Improvement project Landscape profile landscape profile of people and geography (Milli Watershed 5D3D6k – Profile District Hoshangabad; Madhya Pradesh Ecosystem Services Improvement project Landscape profile landscape profile of people and geography (Milli Watershed 5D2D8g-profile, Block Budni, District Sehore; Madhya Pradesh Ecosystem Services Improvement project Landscape profile landscape profile of people and geography (Milli Watershed 5D5A2h – Profile, District Betul. 2. Census of India 2011)



2.

Purpose of the Socio-Economic Baseline Survey

The purpose of baseline survey was to assess the outcomes and impacts of the ESIP activities mainly upscaling of SLEM best practices, SLEM awareness generation and capacity building of the local communities through a variety of indicators reflecting: i) poverty and households ii) productivity enhancement observed through application of SLEM best practices iii) adoption of SLEM best practices iv) improvement in ecosystem services and forest quality and v) institutional changes. The baseline socio-economic survey was conducted with following objectives:

- i) To establish baseline information of the villages related with respect to their present socio-economic status
- ii) To understand the household requirement for natural resources and
- iii) To prioritize village specific needs for upscaling of SLEM best practices.



A. Vegetable cultivation in Pipalgota village in Banapura Forest Range



B. Source of drinking water in Banapura Forest Range



C. Arhar cultivation in Khatpura village under Budhni Forest Range



D. Field site in Kachhar village under Bhoura Forest Range



3. Methodology

The survey was undertaken in the ESIP area of five forest ranges namely Budhni of Sehore Forest Division, Sukhtawa, Itarsi and Banapura of Hosangabad Forest Division and Bhaura of North Betul Forest Division. The local educated youths along with the frontline staff members of State Forest Department were involved in survey. Out of the 36 villages under ESIP area, 36 % villages i.e. 13 villages were randomly selected for detailed socio- economic survey. Keeping, the project area as a unit, which consist of 4316 households, 359 households were surveyed (Table 3) during the month of December 2018 and May 2019. For household survey, sampling intensity of 10% subject to minimum 18 households were undertaken in each of the selected village. Location of the villages surveyed for socio-economic survey under ESIP area of Madhya Pradesh is given in Figure 1. For the purpose of survey, farmers are categories into four classes on the basis of land holdings namely i) Marginal i.e. those own less than 1 acre of land, ii) Small i.e. those own 1-2 acre of land, iii) Medium i.e. those own 2-4 acre of land and, iv) Large i.e. those own more than 4 acre. Participatory Rural Appraisal (PRA) was conducted during the survey. Focus Group Discussions (FGDs), an important tool of PRA were conducted in all the villages. FGD helps to understand the need and perception of the villagers, prioritising the area requiring desired attention and in enhancing people’s participation. FGDs were held in all the villages of ESIP area. FGDs were attended by 8-12 members comprising of Self Help Group (SHG), farmers, Panchayat members, women, Joint Forest Management Committees (JFMCs) members, forest dwellers, landless individuals and daily wage labourers. The qualitative information related to the perceptions, attitudes, beliefs, opinion or ideas related to agriculture crops, agro forestry and horticulture practices, level of participation of female members, suggestions on sustainable land and ecosystem management best practices etc. were collected with the help of FGDs. Data pertaining to relevant parameters were collected by way of a detailed set of questionnaires containing both qualitative and quantitative information (Annexure-1). The survey includes information on land holding, occupation, major crops, income sources, family size, livestock population, energy consumption etc. The key indicators, tools and survey methodology followed during surveys are given in Table 4.

Table 3: Details of the villages surveyed for socio-economic survey

Forest Division	Forest Range	Villages	Number of Households	Geo-Coordinates	Number of Households Surveyed
Sehore	Budhni	Khatpura	264	22052’25N 77044’01E Altitude: 319 m (msl)	31
		Akola	224	23052’31N 77047’31’E Altitude: 310 m (msl)	26
		Paraswada	104	22051’32N 77046’49E Altitude: 305 m (msl)	20



Forest Division	Forest Range	Villages	Number of Households	Feo-Coordinates	Number of Households Surveyed
Hoshangabad	Itarsi	Bhatna	34	22026'07N 77042'36E Altitude: 415 m (msl)	20
		Banapura	453	22027'01N 77034'50E Altitude: 337 m (msl)	50
	Banapura	Bhawanda	96	22022'15N 77038'40E Altitude:438 m (msl)	20
		Narri	108	22027'12N 77038'02E Altitude:361 m (msl)	20
		Sotachikli	142	22025'41N 77035'42E Altitude:344 m (msl)	20
	Banapura	Pipalgota	89	22024'15N 77039'12E Altitude:460 m (msl)	34
		Sukhtawa	Kohda	144	22025'07N 77044'52E Altitude:408 m (msl)
North Betul	Bhaura	Kachhar	332	22017'41N 77048'20E Altitude:415 m (msl)	33
		Koyalari	106	22019'22N 77048'08'E Altitude:435 m (msl)	26
	Banabehda	215	22016'49N 77052'24E Altitude:367 m (msl)	34	
Total			2311		359

Table 4: Summary of the objectives, key indicators, tools and survey methodology

Objectives	Key indicators	Methodology
To establish baseline information of the villages related with respect to their present socio-economic situation	Profile of members of the household, land holdings, cropping pattern, occupation, level of education, income and household size, types of houses, source of irrigation, livestock population, nature of energy consumption and level of participation of female members in income generation.	Household Survey (adult members including female and children above 16 years), discussion with the members and focus group discussion (FGD).



Objectives	Key indicators	Methodology
To understand the household requirement for natural resources	Availability and sources of household amenities like water, fuelwood and fodder, etc. Availability and access to irrigation, seed, fertilizers (both organic and chemical). Sources of income and expenditure in agriculture practices.	Door to door survey, interaction and FGD.
To prioritize village specific needs for upscaling of SLEM best practices	Cropping pattern, income, livelihood, female participation, source of irrigation, agriculture production, land under sustainable land and ecosystem management practices.	FGD and interactions.



A. In village Sotachikli



B. In village Akola



C. In village Pipalgota



D. In village Kachhar

Focus group discussion with villagers during socio-economic survey

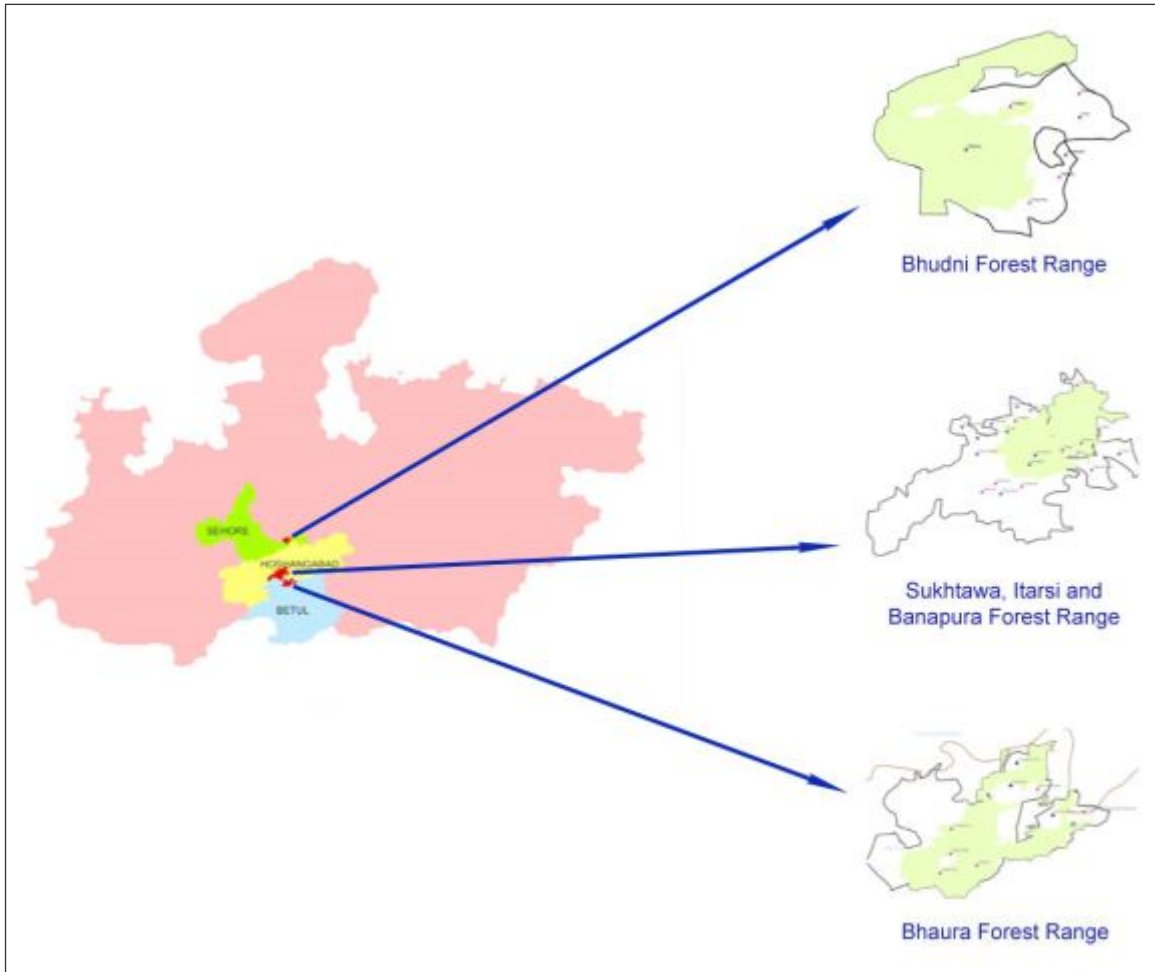


Fig 1: Location of the villages surveyed for socio-economic survey under ESIP area of Madhya Pradesh



4.

Socio-Economic Profile of Villages

4.1 Population and Family Size

For the socio-economic survey, out of the 36 villages from the ESIP area, 13 villages were randomly selected. From ESIP area of Hoshangabad Forest Divisions villages namely Bhawanda, Nanderwada, Narri, Pipalgota, Sotachikli (Banapura Forest Range), Bhatna (Itarsi Forest Range) and Kohda (Sukhtawa Forest Range) were selected. Three villages Koyalari, Banabehda and Kachhar (Bhaura Forest Range) were selected from North Betul Forest Division. Similarly, Paraswada, Akola and Khatpura villages (Budhi Forest Range) were selected from Sehore Forest Division. Among the surveyed villages, highest populated village was recorded in Nanderwada (2121 persons) under Banapura Forest Range and lowest populated village was recorded in Bhatna (152 persons) under Itarsi Forest Range. Incidentally both villages fall under Hoshangabad Forest Division. The average members per family observed was 5 in the villages of ESIP area. Detail population and area of the villages of five forest ranges are given in Table 5.

Table 5: Population and family size of households in the villages

Forest Range	Village	Population	Male population	Female population	Average members per households	Area of village (ha)
Itarsi	Bhatna	152	79	73	5	85
Banapura	Bhawanda	490	231	259	5	366
	Pipalgota	497	258	239	6	265
	Nanderwada	2121	1115	1006	5	599
	Narri	578	283	295	6	813
	Sotachikli	690	368	322	5	1238
Sukhtawa	Kohda	742	393	349	5	1497
Bhaura	Koyalari	543	278	265	5	388
	Banabehda	1066	554	512	5	532
	Kachhar	1498	760	738	5	1303
Budhni	Paraswada	620	300	320	6	128
	Akola	991	502	489	4	781
	Khatpura	1462	832	630	5	3827
Total		11,450	5953	5497	5	11,822

4.2 Caste Composition

Table 6 shows caste wise distribution of population in the villages of ESIP area. Out of the total population of the villages, 12.62% of population belongs to scheduled castes and 54.63% belongs to scheduled tribes.



The highest percentage of scheduled castes population (26.24%) was recorded in the villages of Budhni Forest Range while none was recorded in Itarsi Forest Range. Scheduled tribes population was highest (100%) in Itarsi Forest Range while lowest (1.51%) in the villages of Budhni Forest Range. General category population was only 4% of the total population and population of the general category in majority of the villages (10 out of 13 villages) was nil. Other backward class population constitute 28.75% of the total population in the ESIP area. The highest other backward class population (62.14%) was recorded in Nanderwada and lowest (0.2%) in Pipalgota under Banapura Forest Ranges.

Table 6: Caste wise distribution of population in the villages under ESIP area in MP

Forest Range/ Village	SC	%	ST	%	OBC	%	General	%	Population
Banapura Forest Range									
Nanderwada	193	9.10	336	15.84	1318	62.14	274	12.92	2121
Bhawanda	2	0.41	475	96.94	13	2.65	0	0	490
Narri	19	3.29	534	92.39	25	4.33	0	0	578
Sotachikli	13	1.88	632	91.59	45	6.52	0	0	690
Pipalgota	3	0.60	493	99.20	1	0.20	0	0	497
Itarsi Forest Range									
Bhatna	0	0	152	100	0	0	0	0	152
Sukhtawa Forest Range									
Kohda	41	5.53	489	65.90	212	28.57	0	0	742
Budhni Forest Range									
Khatpura	377	25.79	742	50.75	343	23.46	0	0	1462
Akola	260	26.24	15	1.51	607	61.25	109	11.00	991
Paraswada	146	23.55	268	43.23	131	21.13	75	12.10	620
Bhaura Forest Range									
Kachhar	139	9.28	880	58.74	479	31.98	0	0	1498
Koyalari	129	23.76	409	75.32	5	0.92	0	0	543
Banabehda	123	11.54	830	77.86	113	10.60	0	0	1066
Total	1445	12.62	6255	54.63	3292	28.75	458	4	11,450

4.3 Education

The average literacy rate of the villages in all the five forest ranges was 66.3%. Table 7 presents the literacy rate of the ESIP villages. Highest literacy rate of 78.92% was recorded in village Akola in Budhni Forest Range while the lowest (51.53%) was recorded in village Bhatna in Itarsi Forest Range. Sex-wise analysis of literacy rates showed that highest percentage of male literacy (87.95%) and female literacy (69.32%) were recorded in Akola in Budhni Forest Range while the lowest percentage of male literacy (56.52%) was observed in village Bhatna and lowest female literacy (40.59%) in Bhawanda village under Itarsi and Banapura Forest Ranges. The gender literacy gap between male and female literacy was recorded highest (32.81%) in Bhawanda village of Banapura Forest Range.

**Table 7:** Literacy rate of the villages in the ESIP area

Forest Range/ Village	Number of literates			Number of illiterates			Literacy rate			
	Persons	Males	Females	Persons	Males	Females	Persons	Male	Females	Gender gap
Banapura Forest Range										
Nanderwada	1439	862	577	682	252	429	78.51	87.16	68.36	18.8
Bhawanda	220	138	82	270	93	177	56.41	73.40	40.59	32.81
Narri	329	179	150	266	114	152	65.93	75.84	59.31	16.54
Sotachikli	358	234	124	332	134	198	65.93	79.05	50.2	28.85
Pipalgota	244	136	108	253	123	130	59.8	66.34	53.2	13.14
Itarsi Forest Range										
Bhatna	67	39	28	85	40	45	51.53	56.52	45.9	10.62
Sukhtawa Forest Range										
Kohda	399	239	160	343	154	189	63.43	65.12	54.60	10.52
Budhni Forest Range										
Khatpura	734	485	249	728	347	381	61.78	70.49	49.8	20.69
Akola	674	387	287	317	115	202	78.92	87.95	69.32	18.63
Paraswada	277	149	128	191	82	109	69.95	74.12	63.36	10.76
Bhaura Forest Range										
Kachhar	756	455	301	742	305	437	59.43	70.43	48.08	22.35
Koyalari	308	170	138	235	108	127	68.75	76.58	61.06	15.52
Banabehda	553	334	219	512	220	292	59.78	71.06	48.02	23.04
Total	6358	3807	2551	4956	2087	2868	66.3	75.52	55.54	19.98

4.4 Occupation

Table 8 reflects the distribution of occupation among male and female in the villages. Occupation of the ESIP villages constitute of farmers (male 30.5% and female 9.5%), agricultural labourers (40.6% male and 12.9% female) and other workers (4.9% male and 1.6% female). The proportion of male farmers, agricultural labourer and other workers were higher than that of female farmers, agricultural labourer and other workers in the villages of all five forest ranges. The percentage of male farmers was recorded highest in village Bhawanda (45%) and lowest in village Narri (17%) in Banapura Forest Range. The highest percentage of male agriculture labour was found in village Kachhar (62.5%) in Bhaura Forest Range and highest percentage of female was found in village Narri (30%) in Banapura Forest Range. Households with large land holdings predominantly depended on agriculture as the principal source of livelihood while most of the landless households and a considerable proportion of small-farm households depended on labour works. Categories of other workers include individuals who were engaged in other income generation activities besides the farming or agricultural works.

**Table 8:** Distribution of occupation in the ESIP villages

Forest Range/ Village	Category of workers in %					
	Farmers		Agricultural labourer		other workers	
	Male	Female	Male	Female	Male	Female
Banapura Forest Range						
Nanderwada	24.5	13.8	18.6	18.6	12.7	11.8
Bhawanda	45.3	2	39	10	3.7	0
Narri	17	16	35	30	2	0
Sotachikli	33	18	35	9	4	1
Pipalgota	35	15	43	5	2	0
Itarsi Forest Range						
Bhatna	28.6	18.6	30.6	21.2	1	0
Sukhtawa Forest Range						
Kohda	23	7	54	6	7	3
Budhni Forest Range						
Khatpura	29	4	49	8	10	0
Akola	35	10.2	31	19	4.8	0
Paraswada	27	3	46	18	5.3	0.7
Bhaura Forest Range						
Kachhar	24.8	1.4	62.5	4.3	5	2
Koyalari	32.5	11.5	37.8	13.2	4	1
Banabehda	42.3	3.4	46	5.3	2	1
Average	30.5	9.5	40.6	12.9	4.9	1.6

4.5 Annual Income

The average annual income of households in the ESIP area was Rs.46,402/- per household. Table 9 reveals that on an average 48% of the population have annual income in the range of Rs.30,000 to 60,000/- while 13% households have annual income more than 60,000/-. In Bhaura Forest Range most of the households (69.7%) have annual income in the range of Rs.10000 to 30,000/- only. In Banapura Forest Range, average annual income of most of households is between Rs. 30,000 to 60,000/-. In Budhni Forest Range about 41.4% households have annual income above Rs.60,000/- while only 2.9% households in Banapura Forest Range have household income above Rs.60,000/- per annum. It was also observed that majority of the villagers were engaged in collection of non-timber forest products which forms the major part of their income. The villagers collect mahua flower and sells @ Rs.15/kg during peak season and @Rs.50/kg during off-season. In case of tendu-patta, for each 100 bundle (one bundle contains 50 leaves) the villagers earned Rs.250/-. In Sukhtawa Forest Range, 58%of the households are involved in mushroom cultivation which is one of the major sources of their income. Women were especially involved in the mushroom cultivation and sell the mushroom @Rs 325/ kg. In Bhaura Forest Range 25% of the households were involved in poultry farming and earning @Rs.100/- per bird.



Table 9: Annual income of households in the ESIP villages

Forest Range/ Village	Annual income range of household (%)			
	Rs.10,000-30,000	Rs. 30,000-60,000	Above Rs. 60,000	Average income (Rs)
Banapura Forest Range				
Nanderwada	23.08	46.15	30.77	62879
Bhawanda	44.83	48.27	6.9	37896
Narri	50	45.83	4.17	40000
Sotachikli	15	80	5.0	43095
Pipalgota	67.65	29.41	2.94	25764
Itarsi Forest Range				
Bhatna	45	45	10	44150
Sukhtawa Forest Range				
Kohda	45.5	50	4.5	48227
Budhni Forest Range				
Khatpura	32	64	4	44670
Akola	26.92	42.31	31	78,000
Paraswada	20.69	37.93	41.38	60440
Bhaura Forest Range				
Kachhar	69.7	24.24	6.06	28666
Koyalari	30.77	57.69	11.54	45384
Banabehda	38.2	53	8.8	44052
Average	39	48	13	46402



A. Mushroom cultivation in Sukhtawa Forest Range



B. Women engaged in shop keeping in Bhaura Forest Range



C. Livelihood from Bamboo in Budhni Forest Range



D. Women farmer in Budhni Forest Range



E. Woman engaged in tailoring in Banapura Forest Range



F. Poultry farming practice in Bhoura Forest Range



G. Villagers engaged in making bundle of tendu patta in ESIP area

4.6 Types of Houses

Types of houses in the ESIP area are given in Table 10. It is observed that majority of the population were residing in kutcha houses and highest numbers of kutcha houses were recorded in the village Pipalgota of Banapura Forest Range (94%). Most of the villages in Bhaura Forest Range have semi-pucca houses (44%) while highest percentage of population residing in pucca houses were recorded in the villages of Budhni Forest Range (28%).

Table 10: Types of houses in the ESIP villages

Forest Range/ Village	Types of houses (%)		
	Kutcha	Semi-pucca	Pucca
Banapura Forest Range			
Nanderwada	48	28	24
Bhawanda	66	22	12
Narri	65	13	22
Sotachikli	60	35	5
Pipalgota	94	3	3
Itarsi Forest Range			
Bhatna	70	10	20
Sukhtawa Forest Range			
Kohda	48	33	19



Budhni Forest Range			
Khatpura	74	10	16
Akola	46	27	27
Paraswada	47	25	28
Bhaura Forest Range			
Kachhar	69	28	3
Koyalari	65	31	4
Banabehda	50	44	6



A. Kutcha house



B. Semi-pucca house



C. Pucca house

Types of houses in the villages of ESIP areas

- ¹ **Pucca House** : A pucca house is one whose walls and roofs are made of strong materials such as cement, concrete, oven burnt bricks, hollow cement, ash bricks, stone and stone blocks etc.
- ² **Kutcha House** : A kutcha house is one which has walls and roof made of non-strong materials.
- ³ **Semi-pucca House** : A house which cannot be classified as a pucca or a kutcha houses having walls or the roof but not both, made of strong materials.



4.7 Livestock Population:

According to 19th Livestock Census (2012) there was a decrease in livestock population during 2007 to 2012 from 40.69 million to 36.33 million (excluding 0.43 million stray cattle) in the state. Table 11 shows that among the total livestock population in the villages of all forest ranges, cow constitute highest with 45.6%, followed by oxen 24.7%, buffaloes 13.3% and poultry 8.7% besides other livestock such as goat, horses and ponies. In the villages of Banapura Forest Range cow and oxen population were highest with 72% and 41% population, respectively. Livestocks were mainly reared for self-use for their produce like milk, meat and egg. In Kachhar village of Bhaura Forest Range, the Yadav community used to sell buffalo milk @ Rs. 25-35 per litre but at present due to the absence of collection agent and chilling centre they have stop selling milk. Similarly, in case of Kohda village of Sukhtawa Forest Range families were earning @Rs.2000-2500 per month from selling of milk. The villagers informed that the productivity of the livestock in terms of milk production was very low. The cause of low milk production was due to seasonal variation in fodder availability, financial constraint for purchase of quality feed and poor breeds of the livestock. In the villages of Budhni Forest Range, only 2% of the households have horses and ponies besides other livestock. Goats were reared mainly to supplement their income which provide the income of Rs 3000 per goat in the local market. Major source of fodder collection was from agriculture field. Maximum distance travelled for fodder collection was 2km. On an average 10-15 kg fodder was collected per day per household. In the villages, stall-feeding was frequent for buffaloes but cows and oxen were generally grazed in forests. Grazing was done in forests throughout the year generally under the supervision of male adults of the village. The male adult is paid in cash or in kind (give grain) for grazing of animals. Fodder availability and collection vary from season to season. During winters the fodder availability and consumption were more as compared to summer season. The consumption of fodder varies from 10 to 20 kg per cattle during winter season. In summer majority of the villagers buy fodder from market and expenses of Rs.8,500/- per annum were incurred in procurement of fodder. The quantity of fodder required varied with the number and size of livestock and on an average at least 10kg fodder was collected per day. Commonly used fodder species of the villages were *bhur-bhuri* (*Eragrostis tenella*), *kandi* (*Dichanthium annulatum*), *gurlu* (*Firmiana simplex*), *fulera* (*Cenchrus ciliaris*), *gunera* (*Themeda quadrivalvis*) and *bhus-bhusi* (*Oplismenus burmanii*).



Livestock in the villages of ESIP area

**Table 11:** Livestock composition in ESIP areas

Forest range/ Village	Livestock Population (%)					Horses and Ponies
	Cow	Buffaloes	Goat	Poultry	Oxen	
Banapura Forest Range						
Nanderwada	72	12	10	2	4	-
Bhawanda	47	5	2	5	41	-
Narri	60	10	6.67	0	23.33	-
Sotachikli	30.8	15.38	7.69	20.8	25.33	-
Pipalgota	48	5	7	8	32	-
Itarsi Forest Range						
Bhatna	30	15	15	20	20	-
Sukhtawa Forest Range						
Kohda	37.7	15.2	4.8	15.2	27.1	-
Budhni Forest Range						
Khatpura	43	7	11	16	23	-
Akola	38	27	10	0	23	2
Paraswada	65.6	31.3	3.1	0	0	-
Bhaura Forest Range						
Kachhar	31.8	13.4	11.4	6.4	37	-
Koyalari	43.3	1.5	7.1	16	32.1	-
Banabehda	45.7	15.2	2.2	4.3	32.6	-
Average	45.6	13.3	7.5	8.7	24.7	0.2



Fodder collection and storage in the villages of ESIP area

4.8 Sources of Drinking Water

Common drinking water sources available for the households in the villages are handpump, tap and well. In the villages of Banapura Forest Range, handpump was the major source of drinking water while in the



villages of Budhni Forest Range majority of the households use tap water. Under Nal Jal Yojana (NJY) scheme majority (90%) of the households in the villages under Budhni Forest Range have access to potable water. Under this scheme, every household was getting 70 liters per day of drinking water from the domestic tap connection. The use of community open well for drinking water was also observed in Itarsi Forest Range (Table.12).

Table 12: Percent share of different sources of drinking water in the ESIP area of Madhya Pradesh

Forest Range/ Village	Drinking water source (%)			
	Well	Tap	Handpump	Tube well
Banapura Forest Range				
Nanderwada	24	20	56	-
Bhawanda	-	-	100	-
Narri	-	-	80	20
Sotachikli	-	-	90	10
Pipalgota	80.8	-	19.2	-
Itarsi Forest Range				
Bhatna	80.9	-	19.1	-
Sukhtawa Forest Range				
Kohda	20	-	80	-
Budhni Forest Range				
Khatpura	-	97	3	-
Akola	-	98.6	1.4	-
Paraswada	-	90	10	-
Bhaura Forest Range				
Kachhar	13.8	-	86.2	-
Koyalari	14.6	-	85.4	-
Banabehda	14.7	-	85.3	-



Sources of drinking water in the villages of ESIP area



4.9 Sources of Irrigation

In the ESIP villages, major sources of irrigation used in addition to rain water were well (20.9%) followed by pond (15.2%), tube well (10.2%), river (3%) and canal (1.5%). In the villages of Banapura Forest Range, pond (55%), well (37.8%) and river (35%) were the major source of irrigation. In Banabehda and Kohda villages more than 40% of the households used pond as the major source of irrigation. In Sukhtawa Forest Range, 60% of the farm ponds were constructed under Ponds Construction Scheme for Irrigation by State Agriculture Department. In Banapura Forest Range, 20% of the households used canal as the primary source of irrigation. Dependency on rain for irrigation was common in most of the villages and the highest is observed in Kachhar and Narri villages (Table 13). In Budhni Forest Range, Kesari Nala was one of the major sources of irrigation in village Khatpura. Due to inadequate sources of irrigation and water scarcity, crops were cultivated only in Kharif season.

Table 13: Sources of irrigation in the villages of ESIP area of MP

Forest Range/ Village	Sources of irrigation (%)						
	Well	Tube well	Pond	Nala	Rain	Canal	River
Banapura Forest Range							
Nanderwada	37	25	0	0	14	20	4
Bhawanda	15	0	0	0	50	0	35
Narri	0	35	0	0	65	0	0
Sotachikli	20	5	55	0	20	0	0
Pipalgota	37.8	0	1	0	61.2	0	0
Itarsi Forest Range							
Bhatna	27.2	5	0	0	67.8	0	0
Sukhtawa Forest Range							
Kohda	25.8	0	47	0	27.2	0	0
Budhni Forest Range							
Khatpura	9.5	19.3	16	6.4	48.8	0	0
Akola	22	28.1	0	0	49.9	0	0
Paraswada	15	15	5	10	55	0	0
Bhaura Forest Range							
Kachhar	18.2	0	16.2	0	65.6	0	0
Koyalari	22	0	15.6	0	62.4	0	0
Banabehda	22.13	0	42.17	0	35.7	0	0
Average	20.9	10.2	15.2	1.3	47.9	1.5	3



A. Kesari Nala in Budhni Forest Range



B. Field site of Pipalgota village of Banapura Forest Range



C. Sources of irrigation in villages of ESIP area

4.10 Land Holdings

Table 14 shows that the highest proportion of households (31.6%) belong to the small category of land holdings and the lowest proportion of households belong to the marginal holdings (2.3%). This pattern was observed across all the villages of all forest ranges. Moreover, more than 50% of the households together account for small and medium land holdings. It was seen that the proportion of households in the relatively larger land holdings was less as compared to small and medium land holdings. Budhni Forest Range has the highest landless population (49%) while lowest landless population is in Banapura Forest Range (3%). Large land holding category was maximum in Bhaura Forest Range (32.35%) and lowest in Sukhtawa Forest Range (4.76%). In the villages, 25% of farmers also practices contract farming, allowing other landless farmers to work on their farm land and in return they get cash or agriculture produce out of the farm land which varies from 25-35% depending upon the expenses incurred by the farmer in agriculture production.

Table 14: Distribution of households as per land holdings categories in the villages (%) of ESIP area

Forest Range / Village	Category of land holdings (Land size class in acre)				
	Landless	Marginal	Small	Medium	Large
Banapura Forest Range					
Nanderwada	44.23	0	23.08	19.23	13.46
Bhawanda	14.29	0	35.71	17.86	32.14
Narri	17.4	0	30.43	39.13	13.04
Sotachikli	19	0	34	33	14
Pipalgota	3	6	35.2	29.4	26.4
Itarsi Forest Range					
Bhatna	9	0	35.2	29.4	26.4
Sukhtawa Forest Range					
Kohda	9.52	4.76	42.86	38.1	4.76
Budhni Forest Range					
Khatpura	49	0	16	22.1	12.9
Akola	19.2	0	42.3	31	7.5
Paraswada	40.6	0	9.4	28.1	21.9
Bhaura Forest Range					
Kachhar	12	12	40	21	15
Koyalari	19	7.7	30.7	11.6	31
Banabehda	17.65	0	35.29	14.71	32.35
Average	21.06	2.3	31.6	25.74	19.3



4.11 Major Crops

In terms of area under crops, 60% of the total land was under crops production, while the remaining 40% was waste land. The major crops grown were wheat, rice, maize, and jowar among cereals; gram in pulses and soya bean in oilseeds. Major agriculture produce are listed in Table 15. Apart from the agriculture crops, 10% villages have grown fruit and fodder trees as well. Kharif crop was sown in 63% whereas rabi crop was sown in 37% of the arable land area. About 38% of cropped area was generally occupied by cereals, while pulses occupied 22% of area and oilseed occupied about 31% of area and in remaining 9% of area vegetables, fruits, fodder and other horticultural crops were grown. It was observed that Public Distribution System is functioning in all the villages, providing an alternative source of food grain for all household population. Majority of the farmers (90%) are using chemical fertilizer (Urea and DAP) in their agriculture fields. Each farmer spent about Rs 10,000/- to 40,000/- (seed, labour, tractor, fertilizers, water etc.) annually on agriculture practices. The expenses on agriculture practices depend upon the size of the agriculture land, availability of water and economic conditions of the farmers. Costs incurred for crop cultivation were classified as input and labour costs. Expenses on land preparation, seeds, fertilizers, pesticides and farmyard manure and water charges for irrigation were the input cost. Among the input and labour cost, labour was the most expensive one.

Farmers stored the seeds mainly of maize and *arhar* from the previous year's production for sowing. Farmers also collect seeds from the government agencies, market and sometimes borrow from neighbour. In village Pipalgota of Banapura Forest Range, bush lima beans was very popular, which was generally dried and also consumed in the off season. Along with bush lima beans, bitter gourd, cowpea, gourd, garlic and onion were also grown. Guava, custard apple and mango were very popular fruits. The practice of growing vegetables can be converted into opportunity in the form of Wadi, where fruit trees, vegetables and forestry trees are grown together in mixed form. Average annual production of wheat, paddy and channa was 25, 20 and 10 quintal/acre, respectively. Almost all the farmers ranging from medium to large categories sell their produce as per minimum support price (MSP) or local price rate. It was also observed that farmers under marginal and small category did not sell their produce as observed in Koyalari, Kachhar and Kohda villages of Bhaura and Sukhtawa Forest Ranges. Table 16 shows the major crops of the selected villages under five forest ranges.

Box 1. Impact of Public Distribution System

Cropping patterns changed over time in response to changes in weather patterns, technological improvements, water availability and relative prices. Public Distribution System is functioning in all the villages which has provided an alternative source of food grain for all farm groups. Under the provisions of National Food Security Act 2013, the subsidized quantity of ration for AAY (Antyodaya Anna Yojana) is 35 Kgs per family and 5 Kgs per member for other Priority Households. Wheat, Rice, Sugar, Salt & Kerosene supplied in the scheme is of fair average quality as prescribed by GOI. Sugar & Salt is available at the scale of 1000 grams, per family per month. Kerosene is available to all priority households – AAY at the scale of 5 liters/family/month (NITI Aayog, 2016).

Box 2. Minimum Support Prices

Wheat	Rs.1840/q
Paddy	Rs.2700/q
Arhar	Rs.3000/q
Channa	Rs.3500/q
Soya bean	Rs.2500/q
Urad	Rs.3000/q
Moong	Rs.3500/q

**Table 15:** Major crops in the villages of ESIP area

Cereals	Wheat, Rice, Jowar
Pulses	Gram, Tur, Urad, Cow Pea, Moong
Oilseeds	Soyabean
Vegetables	Green Peas, Bush lima beans, Tomato, Potato, Bitter gourd, Eggplant, Onion
Spices	Garlic, Coriander, Ginger, Turmeric, Chillies
Fruits	Mango, Custard Apple, Guava, Orange, Papaya, Banana, Grapes

Table 16: Major crops grown in the villages of ESIP area

Forest Range/ Village	Crops grown	
	<i>Kharif</i>	<i>Rabi</i>
Banapura Forest Range		
Nanderwada	Rice, Maize, Soyabean	Wheat and <i>Channa</i>
Bhawanda	Maize, <i>Arhar</i> , <i>Tilli</i>	<i>Channa</i>
Narri	Maize	Wheat and <i>Channa</i>
Sotachikli	Maize, Soyabean	Wheat and <i>Channa</i>
Pipalgota	Rice and Maize	<i>Channa</i> and vegetables (Bush lima beans)
Itarsi Forest Range		
Bhatna	Rice and Maize	<i>Channa</i>
Sukhtawa Forest Range		
Kohda	Maize	Wheat and <i>Channa</i>
Budhni Forest Range		
Khatpura	Rice and Maize	Wheat and <i>Channa</i>
Akola	Rice, Maize	Wheat and <i>Channa</i>
Paraswada	Rice, Maize, Soyabean and Jowar	Wheat and <i>Channa</i>
Bhaura Forest Range		
Kachhar	Maize and <i>Arhar</i>	<i>Channa</i>
Koyalari	Maize and <i>Arhar</i>	<i>Channa</i>
Banabehda	Maize and <i>Arhar</i>	<i>Channa</i> /wheat

4.11.1: Cost of cultivation and income from crops production: Cost of cultivation and income generated from each crop was calculated for each land holdings based on Commission on Agriculture Costs and Prices (Swaminathan and Rawal, 2015). Costs of following are included: -

- Value of seed
- Value of manure
- Value of chemical fertilizers
- Recurrent cost of irrigation (rental costs, fuel costs, water charges)
- Hired labour
- Recurrent cost of deploying animals (hired and owned)
- Marketing expenses
- Other crop specific expenses

In terms of the entire operational holdings of a cultivator, the average cost of cultivation was Rs.18,992/- per acre. After adjusting for paid out cost, net income averaged Rs.3,677/- per acre (Table 17). There were clear variations across the different category of farmers. The cost of cultivation ranged from an average of



Rs.10,500/- per acre for marginal farmer to Rs. 40,719/- per acre for large farmers. After deducting cost of cultivation, total income earned for marginal and small farmers is almost same. However, the variation has been observed in almost all categories of cultivators especially in case of large farmers and medium farmers. categories of cultivators especially in case of large farmers and medium farmers.

Table 17: Cost of cultivation, Income earned and net income by class (Rs/acre)

Class	Average cost of cultivation	Average Income earned	Average net income
Large farmers	40719	49000	8281
Medium farmers	12900	11322	1578
Small farmers	11850	9500	2350
Marginal farmers	10500	8000	2500



Storage of maize seed



Crops and vegetables cultivated in the villages of ESIP area

² According to Commission for Agriculture Cost and Price, Cost A1 includes purchased value of input material like seed, insecticides and pesticides, manure, fertilizer), hired labour, irrigation changes, land revenue along with interest on working capital. Cost A2 include the rent cost. For the purpose of the survey Cost A2 include only the income earned by selling crops was included in the survey. In case of Cost A1, value of seed, manure, chemical fertilizers, recurrent cost of irrigation (rental costs, fuel costs, water charges), hired labour, recurrent cost of deploying animals (hired and owned), marketing expenses and other crops specific expenses like value for borrowing seed from neighbour, etc was included.



4.12 Horticulture and Agroforestry Practices

Horticulture and agroforestry practices are not very common in the ESIP area of all five Forest Ranges. Few trees under horticulture and agroforestry were recorded mainly *munga* (*Moringa oleifera*), mango (*Mangifera indica*), guava (*Psidium guajava*), banana (*Musa acuminata*) and custard apple (*Annona reticulata*). In Budhni Forest Range, 5.6% of the households were engaged in handicraft items like baskets and other household items made of bamboo which were sold in weekly market for income generation.

Box 3. Water Scarcity: A Deterrent to Tree Growing

The practice of agroforestry and horticulture are not a preferred option by the villagers owing to water scarcity, fewer crops are grown on field. For those who have no access to irrigation sources were bound to take only one crop per year. Therefore, growing trees on farm land was not preferred as revealed by the villagers. Villagers revealed that if water is provided they would like to grow tree on farm bunds and fields. In Khatpura, villagers were interested to grow trees which fetch good income like teak (*Tectona grandis*) if water is available for irrigation.



Horticulture and agroforestry practices in the villages of ESIP area

4.13 Medicinal Plants

In case of major ailment, villagers preferred going to government hospitals for their treatment. Under the scheme like National Rural Health Mission, treatment is provided free of cost to the villagers by government hospitals. However, in case of minor ailment villagers were observed using locally available medicinal plant which are collected from forests. They also take help from local traditional healers/vaidya. Common medicinal plants used by the villagers in the ESIP area were *satavar* (*Asparagus racemosus*), *harra* (*Terminalia chebula*), *bahera* (*Terminalia bellerica*), *aonla* (*Emblica officinalis*), *palash* (*Butea monosperma*), *mahua* (*Madhuca indica*), *neem* (*Azadirachta indica*), *arjun* (*Terminalia arjuna*), *karanj* (*Pongamia pinnata*), *chirayta* (*Andrographis paniculata*), *kali musli* (*Curculigo orchiodes*), *dahi* (*Woodfordia fruticosa*) and *haddijor* (*Cissus quardangularis*) etc.



4.14 Major Sources of Energy

Villagers mostly used fuelwood as primary source of energy for cooking and heating. Fuelwood were used by 67.3% of households followed by dung cake 21%. Only 12% of the households used LPG as primary source for cooking purposes. In case of fuelwood on an average 20 kg fuelwood was being collected per day per household from forest. Maximum distance travelled by the villagers for fuelwood collection varies from 2 to 5 km and time spent varies from 5 to 8 hours depending upon the availability of fuelwood in forest. It was also observed that fuelwood was sometime purchased during lean season from nearby villages which charged them Rs 300per bundle (one bundle contains 30-35 fuelwood) or are collected in bulk from forest either by head hold or by bicycle, handcart, bullock cart etc. during their spare time for emergency use. Commonly used fuelwood species were *saja* (*Terminalia tomentosa*), *papra* (*Gardenia latifolia*), *ladiya* (*Lagerstroemia parviflora*), *arjun*(*Terminalia arjuna*), *ghiriya* (*Chloroxylon swietenia*), *dhawara* (*Anogeissus latifolia*), *kari* (*Miliusa tomentosa*), *salai* (*Boswellia serrata*), *palash* (*Butea monosperma*), *kusum* (*Schleichera oleosa*), *mahua* (*Madhuca indica*), *babul* (*Acacia nilotica*) and *moyan* (*Lannea coromandelica*).



Fuelwood collection and storage in the villages of ESIP area



Dung cake: A source of energy for cooking and heating in ESIP villages

4.15 Gender participation

Women are traditionally responsible for collection of fuelwood and fodder in almost all the ESIP villages. They were also contributing in family income apart from looking after the household in all ESIP villages. Women folk were also involved in agriculture labour as secondary occupation with 42% representation. They earn Rs.200/- as daily wage and contribute towards family income. The percentage of women involved in collecting fuelwood and fodder may vary from season to season. In summer season fodder were mostly purchased, therefore, women participation in fodder collection was almost nil during summer season. During winter season, maximum distance travelled for fodder collection by women was about 2 km and maximum time taken was 2hr. Women play major role in fuelwood collection. Women along with other family members sometimes travelled 2-5 km and spent almost whole day in collection of fuel wood. In the villages, female headed households were only 1.5%. Among all the members interviewed, 25% were members of self help groups (SHGs). Most of these SHGs were involved in mid-day meal in Anganwadi centres.



Box 4: Women's participation in the villages of ESIP area

- More than 65% women participated and responded during the socio-economic survey and in focus group discussion.
- 1.5% female households were headed by women in the villages.
- 25% of the women were SHGs members and were mostly involved in mid-day meal in *Anganwadi*.
- In Nanderwada village women were also working in shops. Some women were involved in tailoring. They were also involved in agriculture work as well as in fuelwood and fodder collection.
- In Kohda village women were involved in mushroom cultivation and earning @ Rs 325/ kg
- In Khatpura, Sotachikli and Narri villages, women play an important role in fuelwood collection. In these villages women worked as labourers both in agriculture and non-agriculture works and contribute 50% of the overall household income.
- Tendu-patta collection and bundling the leaves were mostly done by women.
- Highest female populated village is Bhawanda with 259 out of total population of 490 and Narri with 295 females out of total population of 578.
- In all the villages, women were equally working with men in various agriculture activities like land preparation, nursery, transplantation, weeding, harvesting and storage of seed.
- Participation of women in marketing of agriculture produces and in buying seeds and fertilizers from market was negligible.

4.16 Timber Collection

Attempt was also made to collect information on collection of timber, source of timber (government forest, community forest, own land, etc.), amount of timber extracted annually and use of timber. Most of the respondents were reluctant to respond to this question on fear of being challaned by State Forest Department. Therefore, approximate quantification of timber collection could not be made. However, in the villages most of the households have heaps of small timber collected in their backyard/courtyard for use of agriculture and other household purpose.





Small timber collection in courtyard for agriculture and household purpose

4.17 Household Waste Management

Cow dung utilisation for organic manure and fuel were observed in all the ESIP villages. Compost pits were observed for organic farming practices in Banapura, Itarsi, Bhaura and Sukhtawa Forest Ranges. In the villages of Budhni Forest Range, heaps of dung were used as organic manure in agriculture. However, due to lack of proper storage and maintenance, 50% manure is wasted specially during the rainy season. Similarly, in villages like Kohda, Bhawanda of Sukhtawa and Banapura Forest Ranges, similar problems were observed. Agriculture residue was used as fodder and for fuelwood purpose. Almost all the houses have toilets under *Swatch Bharat Mission*.



Household waste management in the villages of ESIP





5.

Conclusion and Way Forward

Based on the informations received from the villagers and compilation of data from the socio-economic survey, possible areas of interventions were also identified. The areas identified are water resources, natural resource management, agriculture development community mobilization, women group formation and livelihood through sustainable land and ecosystem management practices. Detailed potential areas for interventions are given in Table 19. Some of the villages are situated in tough geographical terrain having limited water resources which forced the villagers to cultivate only one crop per year, limited sources of secondary occupation and low annual income. Stringent traditional values in village like Kachhar where Yadav community dominates, there exist limited secondary sources of income. They were confine to cow and buffaloes rearing and not engaged in other livestock rearing like poultry and goat. This community group however, engaged in dairy but due to lack of market linkages they were unable to operate in local milk market therefore, failed to fetch enough income for sustenance households. Due to limited sources of irrigation the production was low in agriculture. The willingness to participate and strong community-based organization in the form of SHGs were existed in the village but due to lack of resources they were unable to meet the needs. Accordingly, interventions of the villages in the ESIP area are planned keeping in mind the constraint and possibility existing in the villages.

Box 5: Village Kachhar: A case study

The village Kachhar is located at the south western part of North Betul Forest Division. The name of the village Kachhar suggests that the village is at the bank of big nala/stream and ravines. Agriculture is predominantly rain-fed. There have been consecutive droughts for past two years. The water is the most crucial need of the village. The land has deep alluvium deposits and the entire village landscape suffers with shallow and deep gullies, which turn into ravines near the river. The major kharif crops of the region are pearl millet, sorghum, green gram, and cluster beans. The rabi crops are gram, mustard and barley etc. Red gram, which is sown as intercrop with maize is the main crop of rabi season. As agriculture is predominantly rainfed therefore, animal husbandry is common practice in this village. Villagers reared buffaloes, goat and sheep. Provisions of the nutrient rich fodder for animal husbandry and marketing of milk may improve the livelihood of the villagers in Kachhar. Nearly, 50% community in this village are Yadav, having traditional knowledge and experience in rearing of animals and marketing of milk and milk products. There is acute shortage of fodder in this village during summer season. It requires to develop alterative cropping system of fodder grasses along with improved crop so, it could generate quality residue for animals. The villagers expressed their willingness to adopt the SLEM best practice under ESIP. The activities proposed by the community are i) development of tree-based farming system ii) deepening of pond iii) construction of stop dam and iv) agri-silvi-pasture development.

**Table 19:** Potential area for ESIP intervention in the Villages

Agriculture	<ul style="list-style-type: none"> • Crop diversification is a potential intervention in the villages but due to lack of irrigation facilities and undulating land condition most of the farmers are growing crops in small areas. • Promotion of organic agriculture practices. • Improved irrigation system and introducing small water harvesting structure under SLEM best practices viz. rain water harvesting and augmentation of water resources in the respective villages. • Farmers need to be aware on improved variety of seeds which require less water. • Coordination with Krishi Vigyan Kendras (KVKs) so, that farmers are provided with updated knowledge and awareness of the various government schemes and programmes on agriculture improvement in the region. • Possibilities of cultivating vegetables-cum-paddy-cum horticulture tree under Wadi model in villages need to be encouraged. Vegetable kits of improved varieties can be supplied to the farmers. • Farmers growing fruit trees and other multipurpose trees on their farm lands to be encouraged and involve them in the activities of sustainable land management and ecosystem practices. • Exposure visit and hands-on training to the farmers for better understanding on land management, agriculture productivity and water conservation in the region need to explored.
Livestock	<ul style="list-style-type: none"> • Integrate farm management practice with livestock rearing and growing fodder crops on the bunds need to be encouraged.
Capacity Building/Awareness	<ul style="list-style-type: none"> • Training on mushroom and lac cultivation, organic farming practices and crop diversification. • Awareness on on-farm water management by drip irrigation and moisture conservation. • Awareness building to strengthen Community Based Organizations (CBOs). • Capacity building of the CBOs on sustainable land and ecosystem management Practices. • Awareness on water conservation measures, low cost water harvesting models, organic farming practices and natural resource management. • Awareness on water use efficiency in agriculture practice.
Community based institutions	<ul style="list-style-type: none"> • SHG formation and strengthening of the JFMC to be explored under the ESIP. • Formation of farmer school/user group for implementation of SLEM best practices in the villages.



5.1 Suggestions

Focus Group Discussions (FGDs) were held in every village selected for the survey. During the FGD the purpose of the visit and objectives of ESIP were discussed. FGD was attended by sarpanch, farmers, SHG and JFMC members, Anganwadi workers, elderly person and other stakeholders. After the discussions the participants were asked to brief about their occupation, agriculture, major crops grown, sources of water for both irrigation and drinking and their problems. Table 18 illustrates suggestions of villagers during FGD which were categorized into four different sections targeting management of natural resource, livelihood, capacity building and others. Under management of natural resources 14.04% villagers suggested for appropriate water harvesting structure for irrigation and 3.51% wanted land levelling. Under livelihood section, 10.53% villagers required sustainable livelihood for women. 10.53% of villages asked for awareness about cropping pattern under the category of capacity building and training. Around 7.02% of villagers focused on training on organic farming and crop diversification.

Table 18. Suggestions by community on upscaling of SLEM activities (%)

Activities	Views of the community
Natural Resource Management	
Water harvesting structure for irrigation	14.04
Practice of horticulture and agroforestry	8.77
Pond deepening and check dam	7.02
Land levelling	3.51
Plantation of fuelwood and fodder species and development of silvi-pasture	5.26
Provision of providing quality seed	8.77
Livelihood	
Sustainable livelihood for women	10.53
Employment for youth	7.02
Upgrading of local handicrafts and market option	5.26
Capacity building and trainings	
Awareness about cropping pattern	10.53
Training on mushroom cultivation for women	3.51
Skill development training for youth	1.75
Capacity building of SHGs	5.26
Training on organic farming and crop diversification	7.02
Others	
Providing hybrid cattle	1.75
Total	100



Based on the suggestions received from the villagers, SLEM best practices selected for upscaling in the selected villages of five forest ranges are as follows:

Forest Range/ Village	SLEM Best Practices activities for up scaling in ESIP area in selected villages of Madhya Pradesh
	SLEM Best Practices
Banapura Forest Range	
Nanderwada	Wadi - A tree-based farming system model for SLEM; agro-biodiversity innovations for sustainable land and ecosystem management .
Sotachikli	Wadi - A tree-based farming system model for SLEM, agro-biodiversity innovations for sustainable land and ecosystem management .
Pipalgota	Deepening of old silted /damaged water ponds on demand from villagers; Chauka System for management for sustainable livelihood and adaptation to climate change.
Itarsi Forest Range	
Bhatna	Wadi - A tree-based farming system model for SLEM
Sukhtawa Forest Range	
Kohda	Rainwater harvesting (deepening of silted pond) and ground water recharge and Wadi - A tree-based farming system model for SLEM
Budhni Forest Range	
Khatpura	Wadi - A tree-based farming system model for SLEM Climate proofing fish farming; Training on lac cultivation for livelihood generation and biodiversity conservation
Akola	Demonstration of system of rice intensification for sustainable land and ecosystem management and training; climate proofing fish farming
Paraswada	Wadi - A tree-based farming system model for SLEM
Bhaura Forest Range	
Kachhar and Banabehda	Deepening of old silted /damaged water ponds on demand from villagers; field bunding for reducing soil erosion and water recharge.
Koyalari	Deepening of run-off water Pond; field bunding for reducing soil erosion and water recharge.





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Annexure : A

Questionnaire for Socio-Economic Survey of the Villages under ESIP for MP

INFORMED CONSENT

Please read the following that explains this survey including the associated risks and benefits, if any. You are being asked to take part in the survey being conducted by ICFRE under Ecosystem Services Improvement project. This should help you decide whether or not you want to participate in the survey. Agreeing to this will confirm that you have been informed about the survey and you want to participate. Taking part in this survey is completely voluntary and anonymous.

Survey Description

This survey is about to know the socio-economic status of the local communities before the start of activities in the field. This survey will be helpful in identification of the actual beneficiaries of the project and people choices for up-scaling of SLEM best practices.

Risks and Benefits

There are no foreseeable risks or discomforts for participating in this survey. You may not receive any direct immediate benefit from taking part in this survey. However, by participating in this survey you may support the project implementing agency in implementation of component 3 of ESIP i.e. up-scaling of SLEM best practices in CPR. Data that we collect detailing household dependency on natural resources etc. can be used to implement the ESIP in the area.

Ending your Participation

You have the right to withdraw your consent or stop participating at any time. You have the right to refuse to answer any question(s) or refuse to participate in any procedure for any reason. Refusing to participate in this survey will not result in any penalty or loss of benefits to which you are otherwise entitled.

Description of Procedures

If you agree to take part in this survey, you will be asked to complete a survey that will last approximately 45 minutes.

Confidentiality

We will make every effort to maintain the confidentiality of your responses. Only the team of the project will have access to the data and information about participation and will not be shared with others, except for scientific publication and community necessities.

Authorization

I have read this information about the survey or it was read to me. I,
.....solemnly declare that the information provided by me are correct to best of my knowledge and belief, and is for research purpose only.

Signature of respondent



Questionnaire No. _____

Date: _____

Geographical Information of Village

- Q1.** Name of Village:..... Name of District
- Name of Forest Division:..... Name of State
- Q2.** GPS Location- Latitude:°.....'....." N Longitude:°.....'....." E
(Consultant/team should carry the GPS for taking reading of geo-coordinate of village)
- Q3.** Altitude :.....(m) amsl

Socio-Demographic Profile of Household

- Q5.** Name of Respondent:..... Mobile No.
- Q6.** Age: years..... **Q7.** Sex..... M F
- Q8.** Education: Illiterate , Primary , High School , Intermediate , Bachelor and above
- Q9.** Religion: **Q10.** Caste: General / OBC / SC /ST
- Q11.** What type of house do you have?
a) Katcha House b) Semi-pucca House c) Pucca House

Q12. Age wise distribution of household members:

Gender	below 7 years	between 8 to 18 years	above 18 years
Male			
Female			

Q 13. Family Education Status:

Educational Level	Illiterate	Primary	High School	Intermediate	Bachelor	Above Bachelor
Male						
Female						

Q14. Profession:

Primary Profession:

Agriculture , Service , Self Employed , Labour , Any Other.....

Secondary Profession:

Agriculture , Service , Self Employed , Labour , Any Other.....

Approximate Annual Income (Rs.)

Q15. Involvement in project(s), if any Yes, No, If yes, please specify

Q16. Training received, if any



d. Livestock Resources

Livestock	Number		Product		Expenditure	Income
	Desi Breed	Cross Breed	For Self Consumption	For Selling		
Cow						
Buffalo						
Goat						
Sheep						
Chicken						
Bullock						

e. General information about farming practices.

- Type of fertilizers used: Chemical , Organic , Both
- Annual quantity of chemical fertilizer for cultivation:Expenditure: Rs.....
- Annual quantity of organic manure used for farming practices:.....Expenditure: Rs.....
- Use of chemical insecticide: Yes , No Expenditure: Rs.....

Dependence on Forest Resources

Q23. Fuelwood collection:

Season of Collection	Winter		Summer	
Quantity of Collection (kg/day)				
Own field (kg/day)				
Forest (kg/day)				
Community Forest (kg/day)				
Any Other (kg/day)				
Major fuelwood species				
Time spent (hr/day)				
Distance Travelled (km/day)				
Collector of fuelwood	No. of Male		No. of Female	
				No. of Children

Q24. Fodder collection:

Season of Collection	Winter		Summer	
Quantity of Collection (kg/day)				
Own field (kg/day)				
Forest (kg/day)				
Community Forest (kg/day)				
Any Other (kg/day)				
Major fodder species				
Time spent (hr/day)				
Distance Travelled (km/day)				
Collector of fodder	No. of Male		No. of Female	
				No. of Children
Fodder Cultivation at farm	Yes/No			
Do you grow grasses on bunds?	Yes <input type="checkbox"/> , No <input type="checkbox"/> , If yes, please specify			

**Q 25 Grazing**

- a. Livestock feeding practiced: Stall fed: Yes / No Grazing: Yes / No
- b. Time of grazing (Hour/day):
- c. Quantity of grazed stock, if possible:
- d. Place of grazing: Own field , Forest , Community Forests , Others

Q26 Leaf Litter/Understory collection for manuring and bedding:

- Own field , Forest , Community Forests , Others

Q27 Timber Logging

- a. Source of timber: Forest , Community Forest , Own Land , Forest Right
- b. Amount of timber logged annually:
- c. Use of Timber Extracted, if any

Q28. Plants from forest used for food or food stuff

Common Name	Useful Plant Part	Source	Remark

Q29. Plants from forest used for medicinal purposes

Common Name	Useful Plant Part	Source	Remark

Q30. Bamboo consumption and craft industry:

- a) Are you involved in bamboo cultivation
- b) If yes, what is the main specie of bamboo used in cultivation
- c) What is the approximate annual income from the bamboo
- d) What is the major use of the bamboo (i.e. craft industry/ own consumption)
- e) Personal Recommendation for bamboo cultivation and craft industry

Q 31. Fish Farming/Apiculture/Lacultivation/Sericulture**Q32 Gender Perspective**

- a) What is the contribution of females towards income generation at house hold level
- b) Involvement/Contribution of females in decisions making at community level..... If yes, define their roles and responsibilities

Q 33. Please elaborate your opinion on up-scaling of SLEM best practices:

.....

Investigator





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