ASSESSMENT OF SOCIO ECONOMIC STATUS AND AGROFORESTRY SYSTEMS ADOPTED BY INDIAN TRIBAL FARMERS IN LOWER HILLS OF MELGHAT REGION IN MAHARASHTRA STATE

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ABSTRACT

The study was undertaken by using exploratory design of social research in four *Korku* dominant tribal villages of lower hills of Melghat region Dist. Amravati, Maharashtra State, India on 1963.8 ha area during the year 2014-16, with an objective to assess the socioeconomic status of the tribal farmers and to identify the existing agroforestry systems. The data revealed that, the villages have a relatively higher population of young age category (up to 35 year) and only 8.21 per cent old age population (above 50 year). The maximum respondents (51%) were in landless category, followed by 39 per cent in marginal and small landholding category (below 2 ha). Agriculture is the main occupation in the region, in all 423 (96%) respondents engaged in it as their main occupation, out of which 226 (51.48%) were engaged in agriculture labor category followed by agriculture + agriculture labor category (39.40%). Highest number of respondents 51.48 per cent were in Rs. 25,001 to 50,000 income group category followed by 43.05 per cent of respondents had annual income between Rs. 50,001 to 75,000. Significant improvement in the income of villagers might be due to Govt. of India initiative to provide minimum 90 days' work under Employment Guarantee Scheme (EGS).Furthermore, it was observed that women playing almost equal contribution in improvement of family income through subsidiary enterprises like homestead poultry and goat farming. As regards of utilization of energy for cooking purpose, maximum number of respondents (249) were depends on collection of fuel wood from forest category followed by agricultural waste category (226), cow dung category (143), fuel wood collection from own farm tree category (69) and only 10 despondence had a LPG gas connections. The average firewood consumption per family was21.05 kg day⁻¹. The study revealed that, farmers are practicing seven different types of agroforestry systems namely; Boundary plantation, Bund plantation, Agrihorticulture system, Agrisilviculture with scattered plantation, planting near water sources, poultry based agroforestry practices and homestead. Out of the seven agroforestry systems, six agroforestry systems namely; Boundary plantation, Bund plantation, Homestead, Agrisilviculuture with scattered plantation, plantation near water source and poultry based agroforestry practices are traditional agroforestry systems, whereas, agrihorticulture practice comes under agrisilviculture system. Amongst all boundary plantation was most prominent agroforestry practices in rainfed agro-ecosystem in *Melghat* region. Nearly 60.1 per cent of the respondents followed the boundary plantation in rainfed situation followed by agrisilviculture with scattered (15.27%) and bund plantation (14.25%) and lowest was found in poultry based agroforestry (1.74%).

(Key words: agroforestry practice socioeconomicstatus, respondent, landholding)

INTRODUCTION

Trees and forest were an integral part of the Indian culture. The Programme for the Development of Alternative Biofuel Crops is being implemented by World Agroforestry Centre (ICRAF) and partners in South Asia, Latin America and Africa funded by the International Fund for Agricultural Development (IFAD), along with the European Commission. The core objective is strengthening food security and improving the livelihoods of smallholder farmers. People raised together trees, crops and animals traditionally on the same farm. This practice of mixed farming developed over centuries for meeting most of the requirements of a family (Dwivedi, 2015). Agroforestry is not a new concept, the practice is very old (Roy *et al.,* 2006), but the term is new. Agroforestry is collective name for landuse systems and technologies where woody perennials (trees, shrubs, palms, bamboos etc.) are deliberately used on the same piece of land management unit as agricultural crops and /or animals

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in some form of spatial arrangement or temporal sequence. In agroforestry systems there are both ecological and economic interaction between the different components (Lundgren and Raintree, 1982). Nair (1985) defines agroforestry as a land use system that integrates trees, crops and animals in a way that is scientifically sound, ecologically desirable, practicably feasible, and socially acceptable to the farmers. This system is one of the best known traditional practicesfor livelihood, suitable land management and sustainable development (Parihaar *et al.,* 2014) . Pattanayak *et al.* (2003) had made valuable contributions to understanding the characteristics of early adopters, targeting communities and house holds to promote agroforestry. Participation of rural women in subsidiary occupations sericulture, dairy poultry, and goatery was moderate. Annual income, occupational diversity had significant relationship with participation of women in income generation activities and had no significant significant relationship with their age and education was reported by Malwe (2010). In this sequence Thangata and Alavalpati, (2003) presented earlier research findings showing aplethora of social, cultural and economicissues including age, education andincome, awareness and attitude of the house holds and the extent of change agentcontact influencing therate of adoption of the system.

The Melghat is a vast forest tract spread over Chikhaldara and Dharni tehsils in Amravati district of Maharashtra State. The inhabitants are mainly tribal, largely of the unique *Korku* tribe (80%) and others like *Gond, Nihal, Balai, Gaolan, Gawali, Halbi, Wanjari*, etc. All inhabitants depend on the forest for bonafide domestic needs viz., firewood, timber, fodder, and non-timber forest products like fruit, flowers, gum, medicinal plants etc. About 50 per cent residence are landless and migration for livelihood security is the bottleneck of their survival. Their main source of income is from labor and rainy season agriculture. Khan *et al.* (2009) also reported that, tribal farmers in Chhattisgarh State have agriculture is the major occupation and maximum respondents had less than two ha of land, mostly under rainfed, led to low income. Despite of having high rainfall, Melghat still suffers very badly from water scarcity. The rainwater quickly gets drained off into steep slopes and hard-bedded hill streams. As a result, there are very few perennial springs and not a single perennial river in the area. Unfortunately, no such effort has been made to explore, identify, document and improve the agroforestry in Melghat region of Maharashtra. The documentation of the traditional agroforestry systems will help in building the knowledge treasure of the science of agroforestry. It will also help in implementing some of the most promising agroforestry models directly on the farmer's fields in the study area and for future planning of agroforestry research. Apart from this Adoption of modern agroforestry in Melghat region of Maharashtra spread mainly due to the influence of local indigenous knowledge and affinity of the tribal peoples towards the trees and the government policy to promote the agroforestry. Since resources are scarce, the analysis of agroforestry becomes important. There are still gaps in understanding the existing agroforestry practices and their socioeconomics in Tribal belt of Melghat region of Maharashtra. The purpose and role of why agroforestry should be adopted are better explained by the farmers who adopt agroforestry as land management option. An understanding of socioeconomic status of agroforestry farmers and their relationship to the agroforestry is highly important. This would help to ascertain the opportunities for the development of the system (Irshad *et al.,* 2011). Therefore, it is essential to know the different agroforestry systems adopted by the farmers and the socio economic condition of the agroforestry farmers this can be useful to assess the present situation and strategies to introduce the potential best agroforestry model for the future plan. Looking to the significance of the problem, present study was conducted to identify the existing agroforestry systems practiced by farmers in the region and to study the socioeconomic status of farmers practicing agroforestry in tribal belt of Melghat region, Maharashtra State in India is joint initiative with World Agroforestry Centre, Nairobi, Kenya.

MATERIALS AND METHODS

The pilot study was carried out in cluster of four villages namely; Dharamdoh, Bahardarpur, Ruiphata and Satti located at lower hills of Melghat region, Chikhaldara tehsil, Amravati district, Maharashtra State, India. As per GPS the Dharamdoh village located at latitude 21.305410 N and longitude 77.311872E, Bahardarpur 21.295545 N and longitude 77.305184 E, Satti and Ruiphata 21.284150 N and longitude 77.272652 E.

The forest dominated area showed considerable variation in climate especially in summer temperature. The annual temperature of the study area varies between 12⁰C to 43⁰C and the highest summer temperature is about 48 ⁰C, while the mean annual rainfall ranges between 750 mm to 1150 mm. The bulk of the rainfall is received from south – west monsoon, which usually breaks in the latter half of June. It continues for three months and usually ends in the latter half of September.

Method of sampling

The study had been undertaken by using exploratory design of social research infour villages namely; Dharamdoh, Bahadarpur, Ruiphata and Satti. A list of the 439 respondents was collected from Grampanchyat office of villages. The data required to achieve objectives of the study included thesociodemographic characteristics ofagroforestry adopters. To obtain this informationa number of questions having socio-demographic characteristics like gender, caste, family size, social status, level of education and landholding and economic characteristics like main occupation and income were included in questionnaire. The data was collected with 100 per cent sampling size from the

respondent and the information was collected by questionnaire methods, informal interview, personal interview of the respondent at home, farm and institution on the various aspect related to objective, participatory rural appraisal, transect walk along with farmers and personal observation. Besides some other questions pertaining to agroforestry like knowledge and experience of agroforestry, decision making in farming etc.were also asked so that respondents could clearly explain adoptionof agroforestry systems by them.

Many focus group discussions (FGDs) at farmers'levelincludinglocal farmers in discussion on agroforestry practices, labor resource types, knowledge of agroforestry etc. were held to gain farmers' views on their social and economic status and to give arguments on data already collected (Chup,2004). In the case where the interviews were held with the key informants notes were taken. The key informants included a broad range of people from the farmers of the region and thelocal leadership of the communities in which the individual survey was conducted. The analysis was however based on feedback obtained from the farmers themselves.

In agroforestry survey the data of the tree and woody perennial was collected through survey of individual farms of the farmers and observation by researchers. The data of an area over 1963.8 ha was collected carefully examined before tabulation and simple statistical tools were used.

RESULTSANDDISCUSSION

Social mapping and resource mapping of selected four villages was done through Participatory Rural Appraisal (PRA) carried out, followed by data collection through pretested questionnaire and vegetation survey during 2014-16.

PRA of Villages

The data was collected from individual village with the active participation of the residence (Table 1)showed that, total land owned by four villages under Gut Gram Panchayat of Dharamdoh is 1964.59 ha out of which 814.72 ha land under cultivation and 1122.87 ha land is uncultivated/barren land. This barren land can be brought under afforestation of TBOs with the joint activity of department of forest and local villagers. In all total 439 households i.e. families residing in the four villages having a total population 2128.All four villages have an education facility up primary level which is supported with *Anganwadi* (Integrated child development Centre to combat child hunger and malnutrition). Education facility up to Junior College available in nearby village Tembrusonda, which is around 4 km from village Dharamdoh. Primary health care centre for all four villages is located at Satti village. The literacy rate was maximum in Satti (53.23%) followed by Ruiphata (45.1%), Dharmdoh (38.1%) and Bahadrpur (31%), whereas the average literacy rate of four villages was 42.15 per cent. Shahanu rriver flew adjoining to village Dharamdoh and

Bahadarpur and terminated in the Shahanur Dam. All four villages have a water supply scheme for potable water provided by Grampanchat (Local Governing Body) through wells. Moreover, there are 22 wells dug by the villagers to fulfill the domestic water needs and protective irrigation to the fields. For rainwater harvesting villages also took the advantage of the govt. schemes and dig 42 farm pond in their fields. Maximum migration for livelihood security was recorded in Satti(80%) followed by Bahadarpur (57.5%), Ruipatha (41.6%) and Dharmdoh (40%). The average migration rate of four villages was 55 per cent . The maximum BPL card holder was found in Dharmdoh (93%) followed by Bahadarpur (61.9%), Satti (56.7%) and Ruiphata (52.7%), the average BPL card holder in four villages were 66 per cent.Out of 439 residance 347 are job card holders to wotk on Govt. EmplymentGurantee Scheme which is helpful in increasing family income as well as to arrest the migration for livelihood security.

Socio-economic survey and baseline information of the study area

To outline some of the main socio-economic features of the study area , which will help for providing background for the proper assessment and understanding the major stakeholders and other resources in the villages as a whole. The data (Table 2) on the basis of age level of respondent showed that, villages have a relatively higher population of young age category i.e. up to 35 year and their percentage was 66.14 per cent, followed by middle age category 25.64 per cent and only 8.21 per cent were in old age category (above 50 year age). However, Himshikha (2016) reported 69.86 per cent respondent are from middle age group associated with agroforestry activity and has a greater tendency to practice it.From table 3 it was observed that the maximum respondents (51%) were in landless category, followed by small land holding category (24%), marginal landholding category (15%), medium landholding (5%) and minimum landholding category was recorded in semi-medium landholding category (4%). No respondent was observed in large land holding category. Small and holding farmers world wide and particularly in developing countries have increased their interests in adoption and promotion of agro forestry in recent years. Similar results that small to marginal land holding of tribal farmers below 2 ha was also reported by Khan *et al.* (2009) in Chhattisgarh State in India. Occupation data of respondent presented in table 4, showed that the maximum number of the respondents 423 (96%) having agriculture as their main occupation, out of which 226 (51.48%) were engaged in Agriculture labour only category followed by Agriculture + Agriculture labour category (39.40%) and 24 (5.46%) were engaged in Agriculture only category. It was observed that the people have also adopted subsidiary occupation with agriculture in which mainly women were involved in homested farming of goatery and poultry. In subsidiary occupation, maximum peoples were engaged in Agriculture + NTFP collection category (16.40%), followed by Agriculture + Masonry work category (15.03%), Agriculture + carpentry category (3.48%),

Agriculture + tailoring category (3.46%), Agriculture + Grocery shop category (2.73%). On the basis of distribution of respondents on the basis of income (table 5), highest number of respondents 51.48 per cent were in income group category Rs. 25,001 to 50,000 followed by 43.05 per cent of respondents who had annual income between Rs. 50,001 to 75,000, whereas, 5.46 per cent of respondents belongs to the category of income group between above Rs. 75,000. None of respondent was observed in the income group up to Rs. 25,000 category. Significant improvement in the income of villagers might be due to Govt. of India initiative to provide minimum 90 days' work to those who desired @ Rs. 192 day^{-1} and at least 2 person from each family (Husband + Wife) went on Govt. Employment Guarantee Scheme (EGS), when there was no farming.

Energy Utilization Pattern

The data (table 6) on the distribution of respondent according to utilization of energy for cooking purpose revealed that, Out of 437 respondents in study area, the maximum number of respondents (249) were collected fuelwood from forest category followed by agricultural waste category (226), cow dung category (143), fuel wood collection from own farm tree category (69) and only 10 were observed utilization in LPG gas (10) for cooking purpose. The data on consumption of firewood family^{-1} day^{-1} for cooking purpose is given in table 7 reported that maximum firewood consumption was recorded in rainy season 22.26 (kg day^{-1}) followed by winter season (20.91 kg day^{-1}) and summer 19.92 kg day^{-1}. The average firewood consumption family^{-1} were recorded is 21.05 kg day^{-1}.

Traditional agroforestry Systems

The study on survey of agroforestry systems

reveled that (table 8), the farmers are practicings even different types of agroforestry systems instudy are a namely; Boundary plantation, Bund plantation, Agrihorticulture system, Agrisilviculture with scattered plantation, planting near water sources, poultry based agroforestry practices and homestead. Out of seven agroforestry systems, six agroforestry systems namely; Boundary plantation, Bundplantation, Homestead, Agrisilviculture with scattered plantation, plantation near water source and poultry based agroforestry practices are traditional agro for estrysystems, whereas, Agrihorticulture practice comes under Agrisilviculture system. Boundary plantation was most prominent agroforestry practice in rainfed agro-ecosystem in study area. Nearly 60. 1 per cent of the respondents followed the boundary plantation followed by Agrisilviculture with scattered(15.27%), bund plantation(14.25%), Agrihorticulture(4.25%), planting near water source (2.8%)and lowest was recorded in poultry based agroforestry (1.74%).Devaranavadgi *et al.* (2010) also reported that, in northan Dry tract of Karnataka nearly 88.4 per cent farmers followed bund planting as most prominent practice under rainfed farming. Whereas, inirrigated conditiononly homestead and Agrihorticulture systems were observed. Homested was most prominent agroforestry systems (100%) followed by Agrihorticulture system (1.59%).

These findings are in confirmation of Annoymous (2006). They reported that bund planting on the predominant agroforestry practice in rained condition.

Location of study area

India
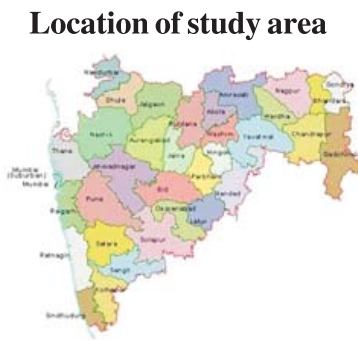
Maharashtra State

Amravati District

Collection of data & information

Participatory Rural Appraisal

Personal Inteview

Vegetation Survey

Table 1. Primary information of four villages in Melghat region under study

Particulars	Dharamdoh	Ruiphata	Bahadarpur	Satti	Total
Total Household	107	108	113	111	439
Pakka House	8	11	17	8	44
Kaccha House	99	97	96	103	395
Total Population	556	545	486	541	2128
Literacy	212 (38.1)	246 (45.1%)	151 (31%)	288 (53.23%)	897 (42.15%)
Total area (ha)	419.79	526.72	491.36	526.72	1964.59
Cultivated (ha)	137.53	190.12	336.57	177.50	841.72
Un-cultivated (ha)	282.26	336.60	154.79	349.22	1122.87
School	1	1	1	1	4
PHC	0	0	0	1	1
Anganwadi	1	1	1	1	4
Temple	1	1	1	1	4
Personal well	10	1	7	4	22
...	1	1	1	1	4
Farm pond	8	7	17	10	42
River	1	0	1	0	2
Regular migrating HHs	43 (40%)	45 (41.6%)	65 (57.5%)	89 (80%)	242 (55.3%)
BPL Card holder	100 (93%)	57 (52.7%)	70 (61.9%)	63 (56.7%)	290 (66.36%)
Job card holder	100 (93%)	107 (99%)	75 (66%)	65 (58.5%)	347 (79.4%)

Table 2. Distribution of respondent according to their age level

Category	Age level (years)	Dharamdoh	Satti	Rohiphata	Badarpur	Total
1.Young	Up to 35	241 (60%)	268 (68%)	279 (71%)	267 (66%)	1055 (66.14%)
2. Middle	36 to 50	138 (34%)	104 (27%)	72 (19%)	95 (23%)	409 (25.64%)
3. Old	Above 50	24 (6%)	21 (5%)	40 (10%)	46 (11%)	131 (8.21%)
	Total	403 (100%)	393 (100%)	391 (100%)	408 (100%)	1595 (100%)

* Fig in parenthesis are percentage of age level

Table 3. Distribution of respondent according to their landholding

Category	Land holding Size	
	Number (n= 439)	Percentage
1. Landless	226	51%
2. Marginal (< 1 ha)	66	15%
3. Small (1.1 to 2 ha)	107	24%
4. Semi Medium (2.1 to 4 ha)	16	4%
5. Medium (4.1 to 10 ha)	24	5%
6. Large(>10 ha)	0	0%

Table 4. Distribution of respondents according to their occupation

Category	Number (n=439)	Percentage
1. Agriculture Only	24	**5.46%**
2. Agriculture + Agriculture labour	173	**39.40%**
3. Agriculture Labour Only	226	**51.48%**
Subsidiary Occupation		
4. Agriculture + Govt. Service	3	**0.68%**
5. Agriculture + Tailoring	16	**3.46%**
6. Agriculture + Carpentry	17	**3.48%**
7. Agriculture + Meat Shop	2	**0.45%**
8. Agriculture + Grocery shop	12	**2.73%**
9. Agriculture + Flourmill shop	5	**1.13%**
10. Agriculture + Auto (Taxi)	1	**0.22%**
11. Agriculture + Masonry	66	**15.03%**
12. Agriculture + NTFP collection (Madhuca flowers, Marking nut, Charoli, etc.)	72	**16.40%**
13. Agriculture + Non license petrol seller	5	**1.13%**

Table 5. Distribution of respondents according to their annual income

Income (Rs.)	Number (n=439)	Percentage
1. Up to 25000	Nil	0
2. 25001 to 50000	226	51.48
3. 50001 to 75000	189	43.05
4. Above 75000	24	5.46

Table 6. Distribution of respondent according the utilization of energy for cooking purpose

Category	Dharamdoh	Satti	Ruiphata	Bahadarpur	Total
1. Agril. Waste	30	67	57	72	226
2. Cow dung	23	42	33	45	143
3. Fuelwood collection from Own farm tree	9	20	13	27	69
4. Fuel wood collection from forest	38	83	65	63	249
5. LPG gas	1	1	5	3	10

Table 7. Seasonal distribution of respondent according to the family size for firewood consumption for cooking purpose (kg day^{-1})

Family size	Summer	Rainy	Winter	Average firewood consumption (kg day^{-1})
1 to 3	9.21	13.55	11.61	11.45
4 to 6	14.27	19.37	16.66	16.76
7 to 9	23.68	25.57	24.81	24.68
10 to 12	32.52	30.89	30.57	31.33
Average fire wood consumption (kg per day)	19.92	22.26	20.91	21.05

Table 8. Agroforestry practices followed by farmer son farm in study area

Agroforestry practices	Percentage of respondent following agroforestry practices									
	Dharamdoh		Bahadarpur		Ruiphata		Satti		Average	
1. Boundaryplantation	67.74	0.00	58.14	0.00	48.89	0.00	65.63	0.00	60.10	0.00
2. Bundplantation	11.29	0.00	6.98	0.00	20.00	0.00	18.75	0.00	14.25	0.00
3. Agrihorticulutre	0.00	3.23	11.63	0.00	2.22	0.00	3.13	3.13	4.24	1.59
4. Agrisilviculturewi	17.74	0.00	13.95	0.00	20.00	0.00	9.38	0.00	15.27	0.00
5. Plantingnearwate	0.00	0.00	2.33	0.00	8.89	0.00	0.00	0.00	2.80	0.00
6. Poultry8. based	0.00	0.00	6.98	0.00	0.00	0.00	0.00	0.00	1.74	0.00
7. Homesteads	0.00	100	0.00	100	0.00	100	0.00	100	0.00	100

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