



ISSN (E): 2277- 7695  
ISSN (P): 2349-8242  
NAAS Rating: 5.23  
TPI 2021; SP-10(10): 1097-1106  
© 2021 TPI  
[www.thepharmajournal.com](http://www.thepharmajournal.com)  
Received: 13-07-2021  
Accepted: 02-09-2021

**Sinha Jyoti**  
M.Sc. Forestry, Department of  
forestry, College of Agriculture,  
Indira Gandhi Krishi  
Vishwavidyalaya Raipur,  
Chhattisgarh, India

**Dr. RK Prajapati**  
Professor Forestry, Department  
of forestry, College of  
Agriculture, Indira Gandhi  
Krishi Vishwavidyalaya Raipur,  
Chhattisgarh, India

## Traditional agro-forestry practices of Rajnandgaon and socio-economic contribution for the livelihood of local people

**Sinha Jyoti and Dr. RK Prajapati**

### Abstract

Agro-forestry practices for the livelihood and farm income, to characterize the structure and diversity of traditional agroforestry practices prevailing in the study area of Rajnandgaon and to identify the opportunities and challenges for promoting scientific agro-forestry in rural areas to boost overall farm productivity. A survey was conducted in nine villages of Rajnandgaon district of Chhattisgarh and the data was collected from 10% of the household in each village. Majority of the farmers in study area were belongs to marginal category especially in Rajnandgaon block followed by small and medium category were dominated in Chhuikhadan and Mohala. Medium-sized farmers benefited most from agroforestry since it provided them with fuel, followed by wood products, food, and fodder. A scientific agroforestry was seen between different farmers. The majorities of respondents in the Rajnandgaon block were small-scale farmers with land holdings of less than one hectare. Medium-scale farmers with landholdings of 1 to 2 hectares dominated Chhuikhadan and Mohala. The occupational profile of Rajnandgaon, Chhuikhadan and Mohala block. In block case of Rajnandgaon, Chhuikhadan and Mohala block agriculture was major occupational profile which was ranging from 60 to 76.32%. The occupational profile of respondents was in the order Agriculture>Labors> Agri-based> Services.

**Keywords:** Agro-forestry, traditional agro-forestry practices, socio-economic, livelihood

### Introduction

Agroforestry is a century old traditional practice of land management that deliberately combines woody perennial trees along with crops/animals for simultaneous or sequential production of food, fuel, fodder, timber, fiber and medicine etc from the same unit of land and applies management practices that are compatible with socio-economic, ecological and economic conditions of the region. It is not only important for food security and poverty alleviation, but also adds to improvement of climate and socio-culture in a local region. Traditional agroforestry systems are a group of age-old agroforestry systems that have been practiced around the world with varying structure, socioeconomic attributes, and ecological services and are generally devoid of deliberate intensified cultivation of agricultural or forage crops. They are found all across the globe primarily in the tropics, subtropics and even temperate regions across Asia, Africa, Europe, North America, South America and Pacific Islands, though less studied scientifically Viswanath *et al.*, (2018) [12]. The huge diversity in land and cropping pattern, climatic and whether conditions provide immense diversity in agroforestry systems within the country. There is ample scope and opportunity for improving the traditional practices by scientific interventions for enhancing the productivity and economic benefits to farmers. The structural complexity, species diversity, productive and protective attributes, as well as socio-economic aspects, all differ greatly among the systems. It can range from seemingly simple forms of shifting cultivation to complex home-gardens from sparse stands of trees on farmlands (e.g. *Prosopis cineraria* (Khejri) tree in arid regions of Western India to high-density complex multi-storied homesteads of humid lowlands. In Chhattisgarh plains farming communities traditional practiced multipurpose tree species like Babul (*Acacia nilotica*), Subabul (*Leucaena leucocephala*), Arjun (*Terminalia arjuna*), Sissoo (*Dalbergia sissoo*), Mangium (*Acacia mangium*), Neem (*Azadirachta indica*), Mango (*Mangifera indica*), Aonla (*Emblica officinalis*), Guava (*Psidium guajava*), Ber (*Ziziphus mauritiana*), Char (*Buchnanania lanzan*), Saja (*Terminalia tomentosa*), and Palas (*Butea monosperma*). Although the state government is putting immense effort to popularize the agro-forestry tradition in order to increase the income and livelihood of poor rural areas. But it is necessary to understand the aspects that influence agro forestry's success or failure.

**Corresponding Author**  
**Sinha Jyoti**  
M.Sc. Forestry, Department of  
forestry, College of Agriculture,  
Indira Gandhi Krishi  
Vishwavidyalaya Raipur,  
Chhattisgarh, India

It is also critical to identify the barriers to agroforestry adoption, as this will aid in the development of successful plans and programmes to popularize agroforestry. With the importance of agroforestry for socioeconomic development a survey was conducted in Rajnandgaon district of Chhattisgarh to know the status and livelihood of rural areas.

**Materials and Methodology**

The study was conducted in Rajnandgaon district of Chhattisgarh located in the western part of the state of Chhattisgarh, between the latitudes of 20°70 - 22°29 North latitude and the longitudes of 80°23 - 81°29 East. Rajnandgaon has an area of 8,222 square kilometers, with more than 11.90 percent of that covered in forest (around 978.87 square kilometers). Total forest area under Rajnandgaon Districts 2695.91 sq. km. comprising Rajnandgaon Forest Division, Khairagarh Forest division and Panabaras Project Division.

**Selection of block**

The study area was selected on random basis a total of 9 blocks were selected in Rajnandgaon district which are namely Rajnandgaon, Chhuikhadan and Mohala. Study site was selected in such a manner so that heterogeneity of district covered properly

**Selection of Villages**

Three villages were selected randomly from each block, thus the total (3X3=9) 9 villages was selected for the present study investigation.

The following villages selected randomly from each block

**Table 1:** Study area villages selected for experiment under Rajnandgaon District Chhattisgarh

Chhuikhadan Block			
S. No.	Name of the village	Number of Households	Sampling of households (%)
1.	Girgholi	288	29
2.	Atariya	147	15
3.	Jangalpur	144	15

Rajnandgaon Block			
S. No.	Name of the village	Number of Households	Sampling of households (%)
1.	Sukul daihan	380	38
2.	Farhad	144	15
3.	Dhaba	180	18

Mohala Block			
S. No.	Name of the village	Number of Households	Sampling of households (%)
1.	Hiddar	102	11
2.	Kunjamtola	128	13
3.	Majiyapar	97	10

**Questionnaire developed for survey**

A questionnaire-based survey carried out with individual households. The primary data from the farmers (respondents) collected through personal interview method (structured questionnaire), general observations, focused group discussions (FGD) and photography. The questionnaire designed and refined by taking into considerations of the objectives of the present investigation. Information collected

from respondents related to age, education, occupation, size of the family, land holding, livestock, crop production, agroforestry practices, income levels from different sectors, choice of trees diverse uses, marketing, identifying constraints and extension needs etc for promoting and development of agroforestry practices in the district.



**Fig 3.1:** A view of contact to local people in village



**Fig 3.2:** A view of contact to local people in village



Fig 3.3: A view of contact to local people in village



Fig 3.4: A view of contact to local people in village



Fig 3.5: A view of contact to local people in village

**Result and Discussion**

In total 9 villages, from each block three villages were selected viz., Rajnandgaon Block (Sukul daihan (V1), Dhaba (V2), Farhad(V3)), Chhuikhadan Block (Atariya (V4), Ghirgholi (V5), Jangalpur (V6)), and Mohala Block (Hiddar (V7), Kunjamtola (V8), Majiyapar (V9)), data were collected according to the developed questionnaire.

**Population status of selected block**

In case of Rajnandgaon block the female population ranged from 47.94 to 51.43%, while, male population ranged from 48.57 to 52.06%. In Chhuikhadan block the female population ranged from 49.17 to 51.04% and male population 48.96% to 50.82%. Whereas, in Mohala block female population ranged from 49.63 to 51.41% and the male population ranged from 48.59 to 50.37%. The population regarding gender basically depends upon the social and cultural value of the community in Chhattisgarh tribal dominated state doesn't having any gender discrimination as compared to other states where tribal population is very less similar trend observed in Jharkhand as it is also tribal dominated state. Islam *et al.* (2015) also reported that in Bundu block of Ranchi district of Jharkhand, the total population in the sample households is 881, of which 374 (42.45%) are male, 377 (42.79%) are female and rest 130 (14.76%) are children. The population statistics in the present investigation showed similar trend due to Neighbouring state of Jharkhand social and cultural structure are same confirms the results as reported by the above workers.

Table 2: Population Status of Rajnandgaon, Chhuikhadan and Mohala block

Population	Rajnandgaon			Chhuikhadan			Mohala		
	V1	V2	V3	V4	V5	V6	V7	V8	V9
Female (Frequency)	877(49.80%)	256(47.94%)	378(51.43%)	657(49.17%)	443(51.04%)	315(50.64%)	255(51.41%)	333(51.39%)	271(49.63%)
Male (Frequency)	884(50.19%)	278(52.06%)	357(48.57%)	679(50.82%)	425(48.96%)	307(49.36%)	241(48.59%)	315(48.61%)	275(50.37%)
Total	1761	534	735	1336	868	622	496	648	546

Where, V1-Sukul daihan, V2-Dhaba, V3-Farhad, V4-Atariya, V5-Ghirgholi, V6-Jangalpur, V7-Hiddar, V8-Kunjamtola, V9-Majiyapar

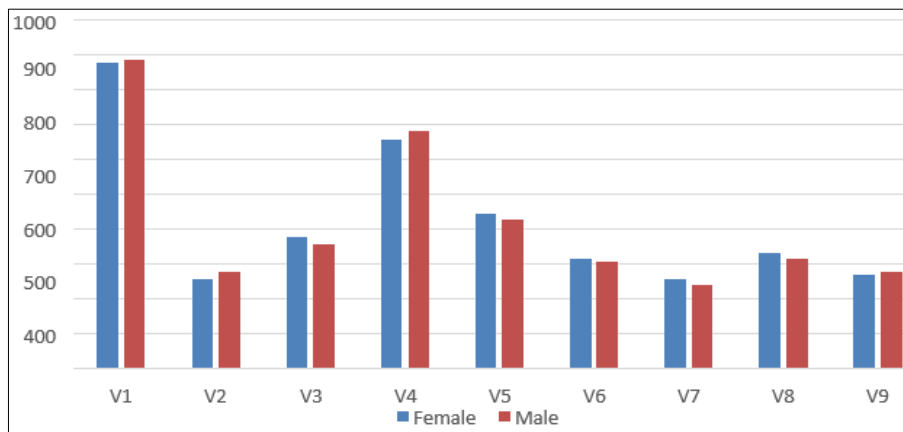


Fig 1: Status of male-female population of selected block

**Caste profile of Rajnandgaon, Chhuikhadan and Mohala block**

The statistics on social structure of respondents with respect to caste from Rajnandgaon, Chhuikhadan and Mohala block are presented in Table 3& Fig.2 among selected blocks, the result indicated that in Rajnandgaon block ST population varying from 0.74 to 23.03%, SC population varying from 0 to 48.84% and others cast population ranges from 44.76 to 76.97%. In Chhuikhadan block ST population ranging from 14.15 to 35.25%, SC population was ranging from 2.32 to 48.84% and the others ranging from 61.75 to 83.53%. In Mohala block the ST population ranging from 58.27 to 82.23%, SC population ranging from 5.311 to 13.51% and the others were ranging from 12.45 to 28.23%. The others cast

population was highest in Rajnandgaon and Chhuikhadan block while, the Mohala block had higher population of ST. This is the cast distribution pattern of Rajnandgaon block in different villages. Rana (2020)<sup>[9]</sup> reported that Schedule Tribe and Other Backward caste have been dominated castes in Dondilohara and Dondi Block, whereas, minimum population of SC (2-11%) and almost negligible representation by general categories (<1%). In the present investigation the General and OBC casts are much higher as compared with above worker this may be the settlements of these cast and Rajnandgaon comes under urban area as compared to Dondilohara block which is rural backward area against Rajnandgaon.

Table 3: Caste profile of Rajnandgaon, Chhuikhadan and Mohala block

Caste	Rajnandgaon			Chhuikhadan			Mohala		
	V1	V2	V3	V4	V5	V6	V7	V8	V9
ST	13(0.74%)	123(23.03%)	47(6.39%)	189(14.15%)	306(35.25%)	131(21.06%)	289(58.27%)	444(68.52%)	449(82.23%)
SC	459(26.06%)	0	359(48.84%)	31(2.32%)	26(3.00%)	62(9.97%)	67(13.51%)	63(9.72%)	29(5.311%)
Other	1289(73.20%)	411(76.97%)	329(44.76%)	1116(83.53%)	536(61.75%)	429(68.97%)	140(28.23%)	141(21.76%)	68(12.45%)
Total	1761	534	735	1336	868	622	496	648	546

Where, V1-Sulkudaihan, V2-Dhaba, V3-Farhad, V4-Atariya, V5-Ghirgholi, V6-Jangalpur, V7-Hiddar, V8-Kunjamtola, V9-Majiyapar

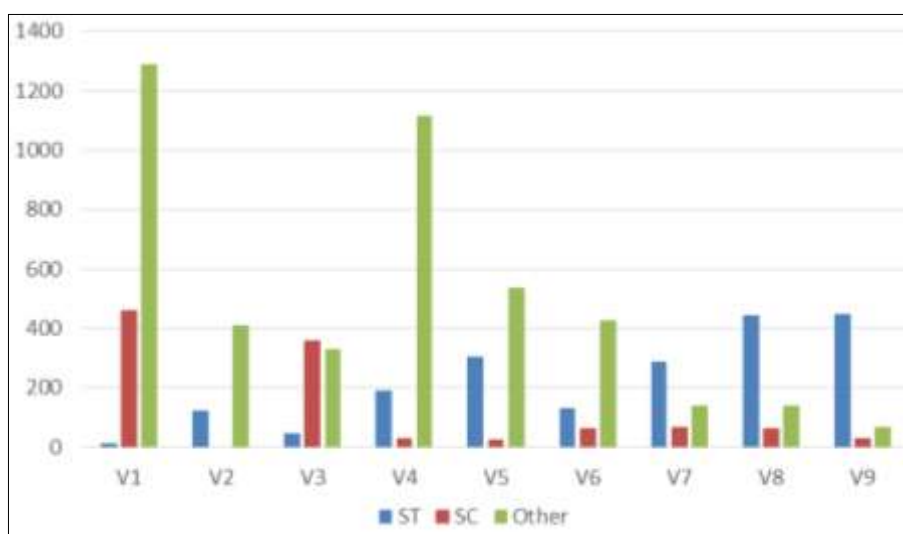


Fig 2: Caste profile of Rajnandgaon, Chhuikhadan and Mohala block

**Categorization of family size in selected block**

The family size of household in Rajnandgaon, Chhuikhadan and Mohala block is depicted in Table 4 & Fig.3. The perusal of data indicated that in Rajnandgaon, Chhuikhadan and

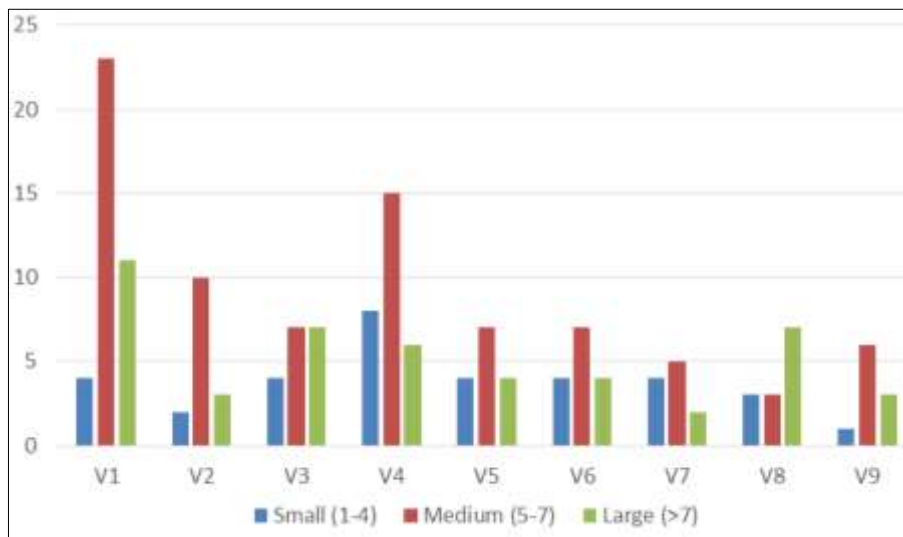
Mohala blocks the major part of households had been represented by medium size followed by small and large family size. Small to medium size family dominated by tribal's have a tendency to live in nuclear family which is also

supported by the findings of Sachidananda (1979) and Srivastava (1982). The population growth rate of tribal's in general are low to moderate in state of Chhattisgarh in last few decades (Census Reports, 2011, 2001). The habit of

Tribes is to stay in nuclear family instead of large families as reported by above workers confirm the results of present investigation.

**Table 4:** Different categories of Family Rajnandgaon, Chhuikhadan and Mohala block

Family size	Rajnandgaon			Chhuikhadan			Mohala		
	V1	V2	V3	V4	V5	V6	V7	V8	V9
Small(1-4)	4(10.53%)	2(13.33%)	4(22.22%)	8(27.59%)	4(26.67%)	4(26.67%)	4(36.36%)	3(23.08%)	1(10%)
Medium(5-7)	23(60.53%)	10(66.67%)	7(38.89%)	15(51.72%)	7(46.67%)	7(46.67%)	5(45.45%)	3(23.08%)	6(60%)
Large(>7)	11(28.95%)	3(20%)	7(38.89%)	6(20.69%)	4(26.67%)	4(26.67%)	2(18.18%)	7(53.85%)	3(30%)
Total	38	15	18	29	15	15	11	13	10



**Fig 3:** Different categories of Family Rajnandgaon, Chhuikhadan and Mohala block

**House categories of local residents Rajnandgaon, Chhuikhadan and Mohala block**

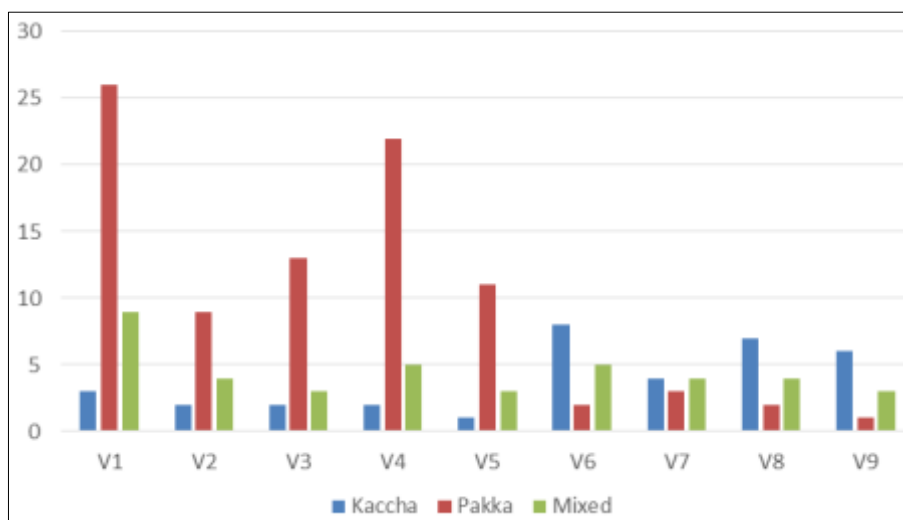
The people of Rajnandgaon, Chhuikhadan and Mohala block lives in different types of houses and are presented below in Table 5& Fig. 4. The results indicated that most of the respondents live in Pakka house. In case of Rajnandgaon block, 7.87%, 13.33% and 11.11% of Kaccha house was recorded in V1, V2 and V3 respectively. 68.42%, 60% and 72.22% of Pakka house in V1, V2 and V3 respectively. The mixed house percentage was recorded 23.68%, 26.67% and 16.67% of V1, V2 and V3 villages respectively. Whereas, in Chhuikhadan block, 6.90%, 6.67% and 53.33% of Kaccha house was observed in V4, V5 and V6 respectively. 75.86%, 73.33% and 13.33% of Pakka house in V4, V5 and V6 respectively. The mixed house category observed 17.24%, 20% and 33.33% in V4, V5 and V6 villages respectively. In

case Mohala block 36.36%, 53.84% and 60% of Kaccha houses observed in V7, V8 and V9 respectively. 27.27%, 15.38% and 10% of Pakka houses in V7, V8 and V9 respectively. The mixed houses recorded 36.36%, 30.77% and 30% in V7, V8 and V9 villages respectively. The similar trend also reported by Rana (2020)<sup>[9]</sup> that Pakka houses have been less than 14.4% and 13.8%. On the other hand mixed houses found as 48.8% and 34.8% for Dondi and Dondilohara block. The results of this investigation reveals that the trend of Pokka > Mixed house> Kaccha Rajnandgaon and Chhuikhadan block however in Mohala block Kaccha> Mixed> Pakka showed the income and poverty% there is contradiction with the result of above worker this is because of source of income employment are the factor for such variations. This is related with the income of family from various sources with poverty.

**Table 5:** House categories of local residents Rajnandgaon, Chhuikhadan and Mohala block

House type	Rajnandgaon			Chhuikhadan			Mohala		
	V1	V2	V3	V4	V5	V6	V7	V8	V9
Kaccha	3(7.89%)	2(13.33%)	2(11.11%)	2(6.90%)	1(6.67%)	8(53.33%)	4(36.36%)	7(53.84%)	6(60%)
Pakka	26(68.42%)	9(60%)	13(72.22%)	22(75.86%)	11(73.33%)	2(13.33%)	3(27.27%)	2(15.38%)	1(10%)
Mixed	9(23.68%)	4(26.67%)	3(16.67%)	5(17.24%)	3(20%)	5(33.33%)	4(36.36%)	4(30.77%)	3(30%)
Total	38	15	18	29	15	15	11	13	10

Where, V1-Sukuldaihan, V2-Dhaba, V3-Farhad, V4-Atariya, V5-Ghirgholi, V6-Jangalpur, V7-Hiddar, V8-Kunjamtola, V9-Majiyapar



**Fig 4:** House categories of local residents Rajnandgaon, Chhuikhadan and Mohala block

**Educational status of villagers Rajnandgaon, Chhuikhadan and Mohala block**

The information on the literacy of Rajnandgaon, Chhuikhadan and Mohala block are presented in Table 6 & Fig.5 results indicates that in Rajnandgaon block, V1 villager data shows that 10.53% were illiterates, 28.95% studied till primary school, 36.84% Village infrastructure and facilities school education and 23.68% studied till intermediate. V2 villager data shows that 13.33% were illiterates, 20% studied till primary school, 40% Village infrastructure and facilities school education and 26.67% studied till intermediate. V3 villager data shows that 11.11% were illiterates, 22.22% studied till primary school, 38.89% Village infrastructure and facilities school education and 27.78% studied till intermediate. In case of Chhuikhadan block, V4 villager data shows that 16.67% were illiterates, 50% studied till primary school, 61.11% Village infrastructure and facilities school education, 27.78% studied till intermediate and 5.56% were graduate. V5 villager data shows that 6.68% were illiterates, 20% studied till primary school, 33.33% Village infrastructure and facilities school education, and 33.33% studied till intermediate and 6.68% were graduates. V6 villager data shows that 13.33% were illiterates, 20% studied

till primary school, 40% Village infrastructure and facilities school education and 26.67% studied till intermediate. In case of Mohala block, V7 villager data shows that 9.09% were illiterates, 9.09% studied till primary school, 63.64% Village infrastructure and facilities school education and 18.18% studied till intermediate. V8 villager data shows that 7.69% were illiterates, 15.39% studied till primary school, 38.46% Village infrastructure and facilities school education and 38.46% studied till intermediate. V9 villager data shows that 20% were illiterates, 10% studied till primary school, 40% Village infrastructure and facilities school education and 30% studied till intermediate. The present findings are in line as the reviews of Rasid (2002) [10]. Who located that during Bangladesh 44% of family heads were literate and its rate varied from 31% for continually negative (poor) family heads to 68% for the sometimes poor family heads. In addition, he noted that higher literacy ranges are strongly correlated with use of greater offerings. It also suggests an element of empowerment and cognizance. It may probably be associated with the higher residing conditions and better status of literacy. The economic condition is directly related with the literacy/ educational status. The socioeconomic background is responsible for the educational status.

**Table 6:** Educational status of villagers Rajnandgaon, Chhuikhadan and Mohala block

Literacy	Rajnandgaon			Chhuikhadan			Mohala		
	V1	V2	V3	V4	V5	V6	V7	V8	V9
Illiterate	4(10.53%)	2(13.33%)	2(11.11%)	3(16.67%)	1(6.68%)	2(13.33%)	1(9.09%)	1(7.69%)	2(20%)
Primary	11(28.95%)	3(20%)	4(22.22%)	9(50%)	3(20%)	3(20%)	1(9.09%)	2(15.39%)	1(10%)
Village infrastructure and facilities	14(36.84%)	6(40%)	7(38.89%)	11(61.11%)	5(33.33%)	6(40%)	7(63.64%)	5(38.46%)	4(40%)
Intermediate	9(23.68%)	4(26.67%)	5(27.78%)	5(27.78%)	5(33.33%)	4(26.67%)	2(18.18%)	5(38.46%)	3(30%)
Graduate	0	0	0	1(5.56%)	1(6.68%)	0	0	0	0
Total	38	15	18	29	15	15	11	13	10

Where, V1-Sukuldaihan, V2-Dhaba, V3-Farhad, V4-Atariya, V5-Ghirgholi, V6-Jangalpur, V7-Hiddar, V8-Kunjamtola, V9-Majiyapar

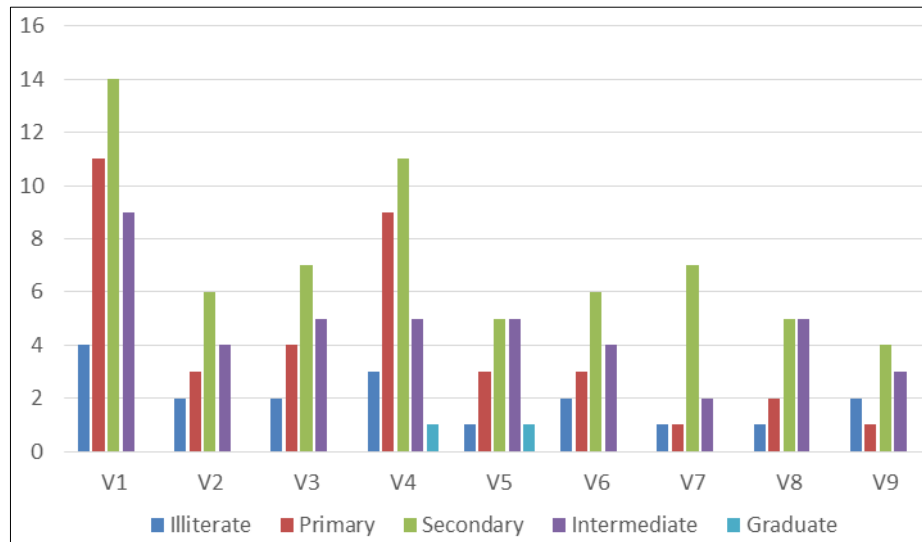


Fig 5: Educational status of villagers Rajnandgaon, Chhuikhadan and Mohala Block

**Working pattern of local residents Rajnandgaon, Chhuikhadan and Mohala block**

The occupational profile of Rajnandgaon, Chhuikhadan and Mohala block are presented in Table 7& Fig.6. In block case of Rajnandgaon, Chhuikhadan and Mohala block agriculture was major occupational profile which was ranging from 60 to 76.32%. The occupational profile of respondents was in the order Agriculture>Labors> Agri-based> Services. Sivakumar

et al. (2006) also reported that in Kancheepuram district Tamilnadu 57.78% of farmers were working as laboures followed by 31.11% of the farmers involving pig farming as caste occupation. Therefore, it can be said that the occupation of locals depends upon the economy, infrastructure and resources available in that area the agricultural land per capita is higher in Chhattisgarh as compared with the above workers study area of Tamil Naidu.

Table 7: Working pattern of local residents Rajnandgaon, Chhuikhadan and Mohala block

Occupation	Rajnandgaon			Chhuikhadan			Mohala		
	V1	V2	V3	V4	V5	V6	V7	V8	V9
Agriculture	29(76.32%)	10(66.67%)	11(61.11%)	20(68.97%)	10(66.66%)	9(60%)	7(63.64%)	8(61.54%)	6(60%)
Labour	5(13.16%)	4(26.67%)	5(27.77%)	7(24.14%)	5(33.33%)	6(40%)	3(27.27%)	3(23.08%)	2(20%)
Agri based	2(5.26%)	1(6.67%)	1(5.56%)	1(3.45%)	0	0	1(9.09%)	2(15.39%)	2(20%)
Services	2(5.26%)	0	1(5.56%)	1(3.45%)	0	0	0	0	0
Total	38	15	18	29	15	15	11	13	10

Where, V1-Sukuldaihan, V2-Dhaba, V3-Farhad, V4-Atariya, V5-Ghirgholi, V6-Jangalpur, V7-Hiddar, V8-Kunjamtola, V9-Majiyapar

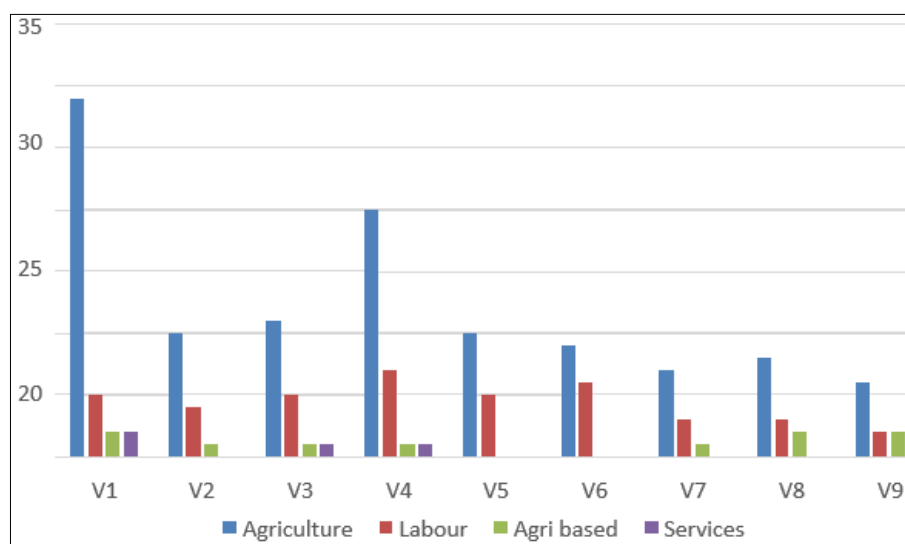


Fig 6: Working pattern of local residents Rajnandgaon, Chhuikhadan and Mohala block

**Agricultural Land distribution Pattern of Rajnandgaon, Chhuikhadan and Mohala block**

In case of Rajnandgaon block, 60.53%, 66.66% and 55.56% had <1 hac land holdings in V1, V2 and V3 villages respectively. 13.18%, 20% and 27.78% had 1 to 2 hectare of

land holdings in V1, V2 and V3 villages respectively. 23.68%, 13.33% and 16.67% had 2 to 4 hectares land holding V1, V2 and V3 villages respectively. V1 villagers had 4 to 10 hectares (2.63%) of land holding village Sukuldaihan. In case of Chhuikhadan block, 24.18%, 33.33% and 90.91% had<1

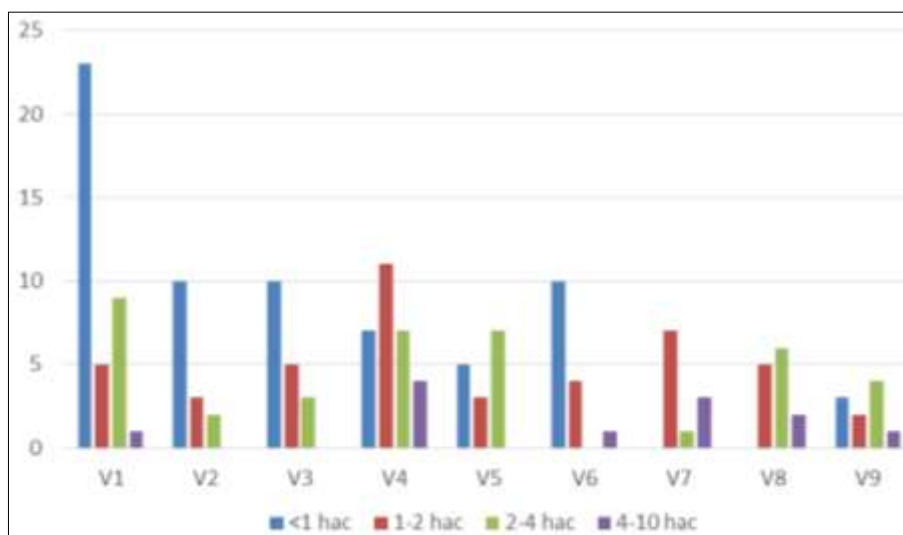
hac land holdings in V4, V5 and V6 villages respectively. 37.93%, 20% and 36.36% of pa had 1 to 2 hectare of land holdings in V4, V5 and V6 villages respectively. 24.14% and 9.09% had 2 to 4 hectares land holding V4 and V6 villages respectively. 13.79% (V4) and 9.09% (V6) had 4 to 10 hectares of land holding. In case of Mohala block, V9 had 30% respondents had < 1hectare land holding. 63.64%, 38.46% and 20% of V7, V8 and V9 villages respectively had 1 to 2 hectares of land holdings. 9.09%, 46.15% and 40% of V7, V8 and V9 villages respectively had 2 to 4 hectares of land holdings. 27.27%, 15.38% and 10% of V7, V8 and V9 villages respectively had 4 to 10 hectares of land holdings.

The land holdings of Rajnandgaon, Chhuikhadan and Mohala are represented in Table 8 & Fig. 7. Rana (2020) [9] reported that in Dondilohara block, almost 28-45% respondents had land holdings less than <1 ha. 41- 56% with 1-2 ha, 6-22% by 2- 4 ha. 0-3% over >4 ha. In Dondi block, almost 18-55% respondents had land holdings less than <1 ha. 33-56% with 1-2 ha. 2-33% by 2- 4 ha. The land distribution pattern is depends upon the population of that area per capita land holding in case of Chhattisgarh due to tribal dominated state the land holding distribution mostly come under small farmers. The results are matched with the above workers investigation confirm the trend of land holding.

**Table 8:** Agricultural Land distribution Pattern of Rajnandgaon, Chhuikhadan and Mohala block

Land holding	Rajnandgaon			Chhuikhadan			Mohala		
	V1	V2	V3	V4	V5	V6	V7	V8	V9
<1 hac	23(60.53%)	10(66.66%)	10(55.56%)	7(24.18%)	5(33.33%)	10(90.91%)	0	0	3(30%)
1-2 hac	5(13.18%)	3(20%)	5(27.78%)	11(37.93%)	3(20%)	4(36.36%)	7(63.64%)	5(38.46%)	2(20%)
2-4 hac	9(23.68%)	2(13.33%)	3(16.67%)	7(24.14%)	7(46.66%)	0	1(9.09%)	6(46.15%)	4(40%)
4-10 hac	1(2.63%)	0	0	4(13.79%)	0	1(9.09%)	3(27.27%)	2(15.38%)	1(10%)
Total	38	15	18	29	15	15	11	13	10

Where, V1-Sukuldaihan, V2-Dhaba, V3-Farhad, V4-Atariya, V5-Ghirgholi, V6-Jangalpur, V7-Hiddar, V8-Kunjamtola, V9-Majiyapar



**Fig 7:** Agricultural Land distribution Pattern of Rajnandgaon, Chhuikhadan and Mohala block

**Farmer’s income from different enterprises in Rajnandgaon, Chhuikhadan and Mohala block**

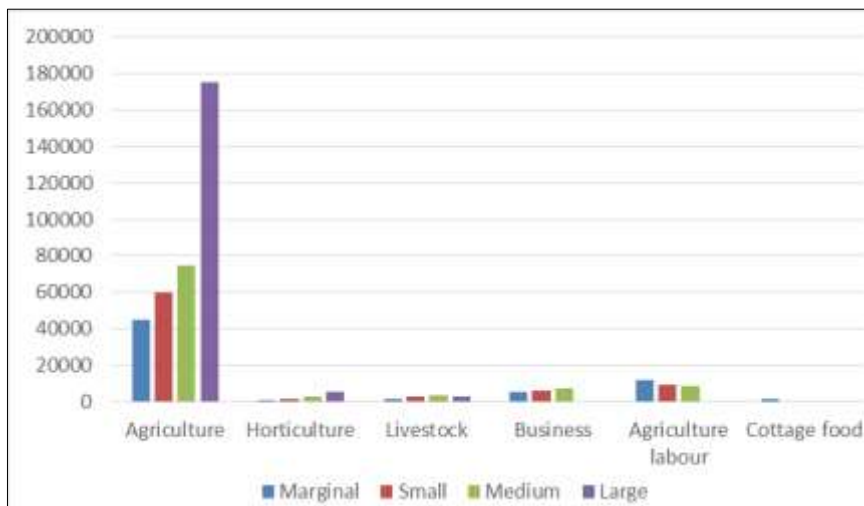
In Rajnandgaon block, agriculture respondents were earning 68.75% marginal, 75.92% small, 76.92% medium and 95.89% large source of income. In case of horticulture they earned 1.53% marginal, 1.89% small, 3.08% medium and 2.74% had large source of income. With livestock enterprise respondents earned 1.91% marginal, 3.53% small, 3.59% medium and 1.37% had large source of income. In case of business it was 7.64% marginal, 7.57% small, 7.69% medium

and none had large source of income through business in Rajnandgaon block. In case of agriculture labour 18.33% earned marginal, 11.35% small and 8.72% medium and through cottage food respondents earned marginal source of income (Table 9 & Fig.8). Rana (2020) [9] reported that the income of households (family) from the sale of agroforestry produce contributes with the aid of marginal, small, medium and large farmer’s are 14.98%, 17.33%, 19.78% and 47.90% in Dondi block following by way of 29.39%, 33.02%, 37.57% and 0% in Dondilohara Block to earn annual income.

**Table 9:** Farmers income from different enterprises in Rajnandgaon block

Source of income	Agriculture	Horticulture	Livestock	Business	Agriculture labour	Cottage food	Total
Marginal	45000(68.75%)	1000(1.53%)	1250(1.91%)	5000(7.64%)	12000(18.33%)	1200(1.83%)	65450
Small	60000(75.66%)	1500(1.89%)	2800(3.53%)	6000(7.57%)	9000(11.35%)	0	79300
Medium	75000(76.92%)	3000(3.08%)	3500(3.59%)	7500(7.69%)	8500(8.72%)	0	97500
Large	175000(95.89%)	5000(2.74%)	2500(1.37%)	0	0	0	182500





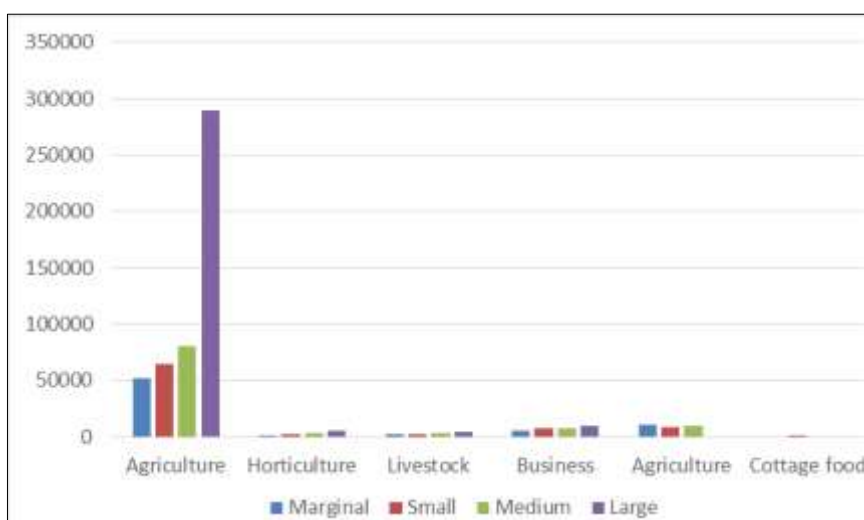
**Fig 8:** Farmers income from different enterprises in Rajnandgaon block

In Chhuikhadan block, through agriculture respondents were earning 73.39% marginal, 75.23% small, 77.52% medium and 93.97% large source of income. In case of horticulture earned 1.48% marginal, 2.08% small, 3.39% medium and 1.56% had large source of income. With livestock it was 2.54% marginal, 2.43% small, 23.10% medium and 1.23% had large source of income. In case business it was 7.76% marginal, 8.68% small, 6.78% medium and 3.24% had large source of income. By working as an agriculture labour 14.82% earned marginal, 9.84% small and 3.24% medium and through cottage food

respondents earned marginal source of income of 1.736% (Table 10 & Fig.9). Basu *et al.* (2004) [2] reported that Lodhas tribes were working as daily wages laborers and their (99.7%) household income ranged from Rs. 500-999 only. Household income of (80%) Santal was also Rs. 500-999. Only 3.6% of Santals had a monthly income of more than Rs. 2000 because they had their own land. It can be said that the income of people depends upon the resources available in the villages so there may be variation in income from different places.

**Table 10:** Farmers income from different enterprises in Chhuikhadan block

Source of income	Agriculture	Horticulture	Livestock	Business	Agriculture labour	Cottage food	Total
Marginal	52000(73.39%)	1050(1.48%)	1800(2.54%)	5500(7.76%)	10500(14.82%)	0	70850
Small	65000(75.23%)	1800(2.08%)	2100(2.43%)	7500(8.68%)	8500(9.84%)	1500(1.736%)	86400
Medium	80000(77.52%)	3500(3.39%)	3200(23.10%)	7000(6.78%)	9500(9.21%)	0	103200
Large	290000(93.97%)	4800(1.56%)	3800(1.23%)	10000(3.24%)	0	0	308600



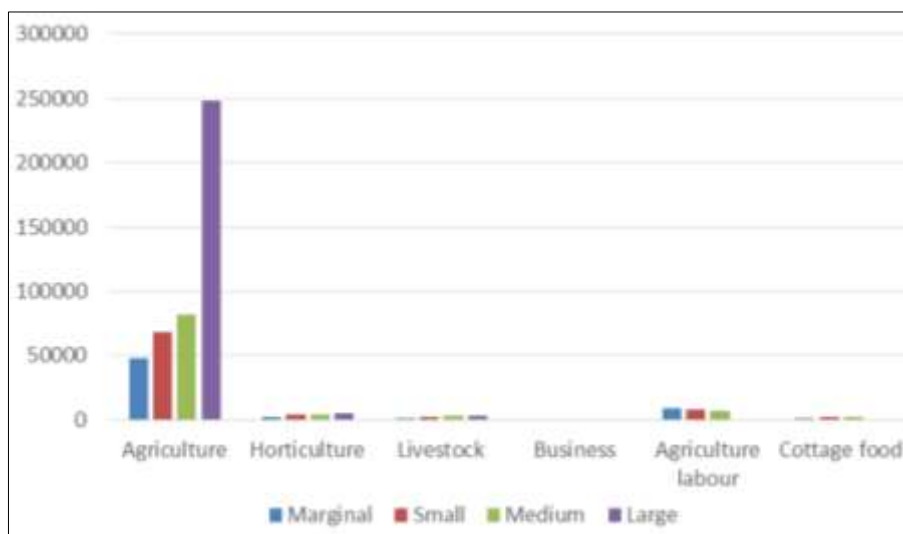
**Fig 9:** Farmers income from different enterprises in Chhuikhadan block

In Mohala block, agriculture respondents were earning 77.39% marginal, 80.26% small, 83.49% medium and 96.79% large. In case of horticulture earned 4.03% marginal, 4.45% small, 4.32% medium and 1.97% had large source of income. With livestock it was 2.02% marginal, 2.99% small, 2.84% medium and 1.25% had large source of income. No income through business. By working as an agriculture labour 14.62% earned marginal, 9.37% small and 7.31%

medium and through cottage food respondents earned 1.93% marginal, 2.93% small and 7.31% medium source of income (Table 8.3 & Fig.8.3). Dwivedi *et al.*, (2007) the average annual net returns worked out to Rs.28879/whereas, pure crop rotation gave a net return of only Rs.11734/- per annum. The source of income varies with place to place looking to the resources available in that area.

**Table 11:** Farmers income from different enterprises in Mohala block

Source of income	Agriculture	Horticulture	Livestock	Business	Agriculture labour	Cottage food	Total
Marginal	48000(77.39%)	2500(4.03%)	1250(2.02%)	0	9070(14.62%)	1200(1.93%)	62020
Small	68500(80.26%)	3800(4.45%)	2550(2.99%)	0	8000(9.37%)	2500(2.93%)	85350
Medium	82200(83.49%)	4250(4.32%)	2800(2.84%)	0	7200(7.31%)	2000(7.31%)	98450
Large	248500(96.79%)	5050(1.97%)	3200(1.25%)	0	0	0	256750

**Fig 10:** Farmers income from different enterprises in Mohala block

## Conclusions

The study's socioeconomic situation is sufficient to support the implementation of agroforestry programmes on farmer's fields. Horticulture, vegetable, livestock, agroforestry activities, and other farming supports provide income to families. The potential for establishing agroforestry on farmland is enormous. As a result, it can be inferred that there may be a significant opportunity to expand existing agroforestry using Scientific and appropriate agroforestry techniques in order to maximize farmer income with this sustainable agricultural system.

The present study also clearly indicated that agroforestry will play a significant role for farmers of Rajnandgaon District. The restrictions can be solved by enacting farmer-friendly legislation and recognizing agroforestry as a sustainable agricultural method from an environmental and ecological standpoint. For nationalized timber, the felling and transit laws must be changed. The institutional structures that have been put in place to ensure that the anticipated economic advantages are realized. Farmers that adopt agroforestry will be rewarded for ecosystem services as well as other indirect advantages. Technical assistance should be provided, as well as high-quality planting materials at competitive prices. A governmental authority/Board may be established to address the concerns of agroforestry producers and reach an acceptable resolution. The plans should be written to promote agroforestry aggressively in order to protect the interests of both local and global populations while also assuring long-term productivity. The intervention of scientific approach of implementation of agroforestry models with improved variety of trees, crops, vegetable, fruits, medicinal plants, NTFPs will be doubled the farmers income instead of sole cropping pattern which is economically poor system.

## References

1. Arnold JEM. Tree components in farming systems." *Unasylva* 1990, 41(160). FAO, Rome.

- Basu JP. Agroforestry, climate change mitigation and livelihood security in India. *New Zealand Journal of Forestry Science* 2014;44(1):3-10.
- Campbell BM, Clarke JM, Gumbo DJ. Traditional agroforestry practices in Zimbabwe. *Agroforestry Systems* 1991;14:99-111.
- District survey Report, Rajnandgaon 2016. <https://www.agricoop.nic.in/sites/default/files/CHH6-RAJNANDGAON-10.08.12-.pdf>
- Handa AK, Dhyani SK, Prakash Toky, Chavan SB. Innovative agroforestry for livelihood security in India. *World Agriculture* 2016, 1607.
- Jain SK, Singh P. Economic analysis of industrial agroforestry: Poplar (*P. deltoides*) in Uttar Pradesh (India). *Agroforestry Systems* 2002;49(3):255-273.
- Negi AK, Bhatt BP, Todaria NP. Local population impacts on the forest of Gharwal Himalaya, India. *The Environmentalist* 2009;19:297-307.
- Rahman SA, Foli S, Pavel MAA, Mamun MAA. Forest, trees and agroforestry: Better livelihoods and ecosystem services from multifunctional landscapes. *International journal of Development and Sustainability* 2015. ISSN: 2186-8662.
- Rana I. Analysis of traditional agroforestry practices in rural areas of Balod district of Chhattisgarh. Master thesis, IGKV, Raipur 2020.
- Rasid DA. The findings of the Northwest Rural Livelihood Monitoring Project, Care, Bangladesh 2002;4(6):59-67.
- Sahu B, Bahal R. Livelihood Diversification Pattern among the Farmers of West Bengal. *Economic Affairs* 2014;59(3):321-334.
- Viswanath S, Lubina PA, Subbanna S, Sandhya MC. Traditional Agroforestry Systems and Practices: A Review. *Advanced Agricultural Research & Technology Journal* 2018, 2(1).