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Assessment of Existing Agroforestry Systems and their Impact on Socio-Economic Status of Farming Community in Chamba Tehsil of District Chamba, Himachal Pradesh

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Abstract

The present study was carried out at Bangana Tehsil of Una district, Himachal Pradesh with the aim to identify existing agroforestry systems and to assess the demographic and socio-economic conditions of farmers. The study is carried out at Chamba tehsil of district Chamba, Himachal Pradesh with the aim to identify different existing agroforestry systems and to assess the demographic and socio-economic conditions of farmers. Eight Agroforestry systems are found to be practiced by farmers in the study area viz. Agrisilviculture (AS), Agrisilvipasture (ASP), Agrisilvihorticulture (ASH), Agrihortisilviculture (AHS), Agrihortipastoral (AHP), Agrihoticulture(AH), Pastoralhorticulture (PH), Silvipastoral (SP). Six agroforestry systems are identified in marginal and eight categories in the small and medium categories farmers. It is evident that Agrisilviculture system is dominant in all the existing agroforestry system followed by Agrisilvipastoral system practiced among the sampled farmers of all categories. Sex ratio is observed as Medium category (945.35) >Small category (870.78) > Marginal category (797.75). Average family members per household is in the order: Medium (4.76) > Small (4.61) > Marginal (4.475). Males dominated over women in literacy as well as in all the income generation. Cow is the most preferred domesticated animal followed by bullocks, goats, sheep and buffaloes. Average land holding is found 2.04 hectares in all categories. Average area under arable land constitutes 59.98 per cent combining both irrigated and unirrigated areas, out of which major portion of arable land is dependent on rainfall. The system units in agriculture components are maize, beans, capsicum, tomato as kharif crops whereas wheat, pea, barley and cabbage, cauliflower as rabi crops. Tree components are *Grewia optiva, Celtis australis, Pinus roxburghii, Robinia pseudoacacia, Quercus leucotrichophora, Toona ciliata, Pyrus pashia, Morus alba, Rhododendron arboretum, Melia azedarach, Murraya koenigii, Ficus recemosa, Cedrus deodara, Prunus cornuta, Olea cuspidate, Juglans regiaetc*. The major fruit species present in the studied area are *Actinidia deliciosa, Malus domestica, Prunus domestica, Prunus armeniaca, Pyrus, Citrus pseudolimon, Citrus limon, Prunus dulcis, Punica granatum.* Major grass species present in the studied area are *Setaria, Napier hybrid, Cynodon dactylon, Megathyrsus maximus.* It is worth mentioning here that the overall family sex ratio is reported 871.295 which is less than the state and national average of 972 and 940 respectively depicting

cultural difference on the gender of a child. The average family size is found to be 4.61 individuals per family and adult population constituted 67.56% of the total population. Literacy rate varied from 87.8 to 87.27 help in adaptation of new agroforestry technologies. Males are dominating in all small and marginal categories covering about 89 per cent of the total land area. Eight agroforestry system types are practiced by different categories of farmers. Agrisilviculture type was practiced by maximum number of farmers whereas, Agrihortipastoral type is practiced by least number of farmers. No woodlots were observed in the study area as people meeting their fuel, fodder and other needs through tree retained in agriculture land and pasture land. Agroforestry systems observed in the studied area helped farmers to increase their farm income, easy availability of firewood and timber on the farmland. Finally, it can be concluded that agroforestry is prerequisite for conservation of natural forest and socioeconomic upliftment of rural population.

Keywords: Agroforestry systems, demographic, socio-economic, Agrisilviculture (AS), Agrisilvipasture (ASP), Agrisilvihorticulture (ASH), Agrihortisilviculture (AHS), Agrihortipastoral (AHP), Agrihoticulture (AH), Pastoralhorticulture (PH), Silvipastoral (SP)

Introduction

About 65.07% population of India is living in rural areas and directly or indirectly dependent on agriculture. Thus, agriculture plays an important role in influencing the economy of the country and provides employment to more than 60% of population (Arjun, 2013). In 2020-2021 agriculture and allied sector contribute 20.2 in national G.D.P (Anonymous, 2021). India is the second most populous and seventh largest country in the world (Anonymous, 2015). Since availability of land is limited, there is need to adopt the practice of Agroforestry to meet demands such as fuel, fodder and food for people and also reduce the pressure from forests. Agroforestry has promising potentials for reducing deforestation while increasing food, fodder, and fuel wood. It plays an important role in increasing agricultural productivity by nutrient recycling, reducing soil erosion, and improving soil fertility and enhancing farm income compared with conventional crop production (Kang et al., 2000). Both agriculture and forestry are combined into an integrated Agroforestry system to achieve maximum benefits by a greater efficiency in resource such as nutrients, light and water capture, and utilization (Kohli et al., 2008).Agroforestry systems or the combination of production of trees with agricultural crops plays a very important role in climate change mitigation by absorbing excess carbon dioxide, which is used in the process of photosynthesis by the trees. Carbon is stored in tree biomass and in soil that helps protect natural carbon sinks through the improvement of land productivity and the provision of forest production agricultural lands (Albrecht & Kandji, 2003). Agroforestry plays a vital role in achieving sustainability in the hills farming system (Carson, 1992). Agroforestry is not a new concept in Himachal Pradesh and other Himalayan regions but it has been practiced traditionally since time immemorial (Nautiyal et. al., 1998). It is as old as the hill agriculture itself. In Himachal Pradesh 89.97% population i.e 6,176,050 people are living in rural areas and are directly or indirectly dependent on agriculture and forest goods and services (Anonymous, 2011). It was found that various Agroforestry systems exist in Himachal Pradesh but,there is a little practice of organized scientific Agroforestry practice in surrounding areas due to insufficient knowledge about Agroforestry. It is important that before any research, extension and execution programs for sustainable land-use, the diagnostic survey of the area must be undertaken to understand the problems and design a suitable system to fulfill the basic

needs of the people. This study will help in understanding the constraints, reasons of successful adoption and existing Agroforestry found in the region. Therefore, present study set out in identification of existing Agroforestry Systems and Socio-Economic Assessment in Chamba Tehsil of District Chamba, Himachal Pradesh.

Material and methods

The present study was conducted in Chamba Tehsil of district Chamba of Himachal Pradesh in 2021-2022. The total area of Chamba Tehsil/Block is 1,012 km^2 and population is 1, 79,253 (2011 Censes). Its co-ordinates lie between Latitude: 32° 33' 19.12" N Longitude: 76° 07' 35.29" E. Chamba is an ancient town in the Chamba district in the state of Himachal Pradesh, in northern India. Altitude of Chamba tehsil ranges from 996 m to 2250 m above mean sea level (Figure 1). The climate in Chamba is warm and temperate. The summers are much rainier than the winters in Chamba. It receives an average rainfall of about 1621mm and having average annual temperature13.3ºC.

Figure 1: Location map of the study area

The study site has been selected by mutli-stage randomsampling technique in which 12gram panchayats has been selected and from each panchayat, two villages are selected. In each village, farmers are divided into three different categories on the basis of their land holdings as per classification of government of Himachal Pradesh i.e., marginal (<1 ha), small (1-2 ha) and medium (2-5 ha) and 9 farmers are selected from each village and a random sample of three farmers from each category has been taken as ultimate unit of study. The relevant information about the study is collected through pre-tested schedule by personal interviews with each head of the household.

Results and Discussion

Identification of agroforestry system types

Eight agroforestry system types were found (Table 1) in the studied area viz Agrisilviculture (29.73%), Agrisilvipasture (22.97%), Agrisilvihorticulture (17.76%), Agrihortisilvicuture (5.56%), Agrihortipastoral (2.31%), Agrihorticulture (4.4%) Pastoralhorticulture (4.82%), Silvipastoral (12.35%)

among different categories of farmers. Six agroforestry systems were identified in marginal and eight categories in the small and medium categories farmers (Fig1). It is evident from (Table 1) that Agrisilviculture system is dominant in all the existing agroforestry system in the studied area practiced 29.73% followed by Agrisilvipastoral system practiced 22.97% among the sampled farmers of all category. The least practiced system was Agrihortipastoral practiced 2.3%.Agrihorticulturesystem and

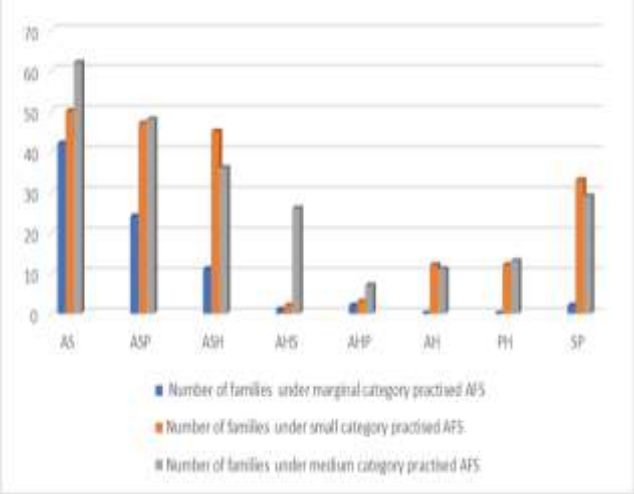


Fig1. Status of existing AF systems amongst different category of farmers.

Pastoralhorticulture system is found to be absent in marginal category farmer due to less availability of the land for further diversification of other agroforestry systems. Agrisilviculture system was observed maximum for small and medium category. The least preferred system for small and medium category of farmers was Agrihortisilviculture. Thus, it can be concluded that only two systems i.e. Agrisilviculture system and Agrisilvipastoral system are most prevalent among all the sampled farmers' categories.The functional units under agricultural component are cereals e.g., *Zea mays, Triticum, Hordeum vulgare;* oilseeds- *Brassica nigra;* pulses- *Phaseolus vulgaris*; Vegetables- Cauliflower, pea, capsicum, tomato, beans cabbage, potato broccoli, ladyfinger, garlic. The silviculture component was represented by *Grewia optiva, Celtis australis, Pinus roxburghii, Robinia pseudoacacia, Quercus leucotrichophora,, Toonaciliata, Pyrus pashia, Morusalba,Rhododendronarboretum, Melia azedarach, Murraya koenigii, Ficus recemosa, Cedrus deodara, Prunus cornuta, Olea cuspidate, Juglans regia.* The major fruit species present in the studied area are *Actinidia deliciosa, Malus domestica, Prunus domestica, Prunus armeniaca, Pyrus, Citrus pseudolimon, Citrus limon, Prunus dulcis, Punica granatum.* Major grass species present in the studied area were *Lantana camara, Setaria, Cynodon dactylon, Megathyrsus maximus.*

Different combinations of trees, horticultural crops, agricultural crops. and grass species are identified in different agroforestry systems among different category farmers during survey. Similar types of Agroforestry systems are identified and reported during studies in Himachal Pradesh. Kachru (1997) reported eight Agroforestry systems namely, Agrisilviculture (Maize, Wheat, Blackgram and Grewia, Morus), Agrihorticulture (Wheat, Mustard and Pear), Agrisilvihorticulture (Wheat, Mustard, Grewia and Apricot), Pastoralsilviculture (Grasses, Grewia and Bauhinia), Pastoralhortisilviculture (Grasses, Pear, Plum and Grewia), Agrihortisilviculture (Maize, Blackgram, Pear and Grewia), Pastoralsilviculture (Grasses, Chir pine and Acacia), and pasture in mid-hills of Himachal Pradesh. Likewise, Tiwari *et al.*

(2018) observed the system units of different Agroforestry systems and major constraints in North-Western Himalaya under Sirmour district of H.P. The study area has three prevailing agriculture-based Agroforestry systems viz. Agri-silvi-culture, Agri-horticulture and Agri-silvi-horticulture system as well as pasture-based Agroforestry systems viz. Agri-silvi-pasture, Silvi-pasture, Pastoral-silvi-culture and Pastoral-silvi-horticulture system at three altitudinal zones representing three categories of farmers. Kumari *et al.* (2008) reported five Agroforestry systems in Lahaul and Kinnaur in Himachal Pradesh viz., Agrihorticulture (Pea, Potato and Apple), Agrisilviculture (Pea, Potato, Rajmah and Salix), Agrisilvipastoral (Pea, Salix and grasses), Pastoralsilviculture (grasses and Salix) and Pastoralhorticulture (grasses and Apple). Kumar *et al.* (2018) have conducted a study in Kandaghat block of Solan district of Himachal Pradesh with the aim to identify different existing Agroforestry systems and to assess the demographic and socio-economic conditions of farmers. They found Agrisilviculture, Silvipastoral, Agrisilvipastoral, Agrisilvihorticulture, Agrihortisilviculture,and Horti-pastoral are prominent system in the studied area.Rajput (2010) reported four Agroforestry systems viz, Agrihorticulture (Maize, Blackgram, Cauliflower and Apple), Agrisilviculture (Maize, Wheat, Grewia and Celtis), Agrihorticulture (Maize, Wheat, Tomato, Apple and Grewia) and Silvipasture (Grewia, Chir pine, Bauhinia and grasses) in Kullu valley of Himachal Pradesh.

Demographic and socioeconomic status of the farmers:

Family structure of sampled households

Family structure of sampled household is shown in Table 2. The average family size is found to be 4.61 at overall. The highest family size 4.76 is found in medium category whereas, lowest family size is found in marginal category. Children represent 32.43% of overall population whereas, adults represent 67.56% of overall population. Highest sex ratio has been (945.35) found in medium category and least sex ratio (797.75) found in marginal family. Overall sex ratio is (871.29) which is less than the state and national averages of 972 and 940 respectively (Anon 2011). Masoodi (2010) has observed that in case of private job and business Sharma (2012) reported average family size of 5 persons in Solan (HP). Devi (2013) reported the overall average family size of 5.53 persons. Kumar (2016) reported an overall sex ratio of 1038 in sub-temperate region of solan district of Himachal Pradesh which is higher than in Chamba. Massingue (2007) reported 5.53 overall average size of family. The average family size in medium category family is 4.33 in sub temperate region of Himachal Pradesh which is similar as reported in Chamba.

Educational status of sampled households

Table 3 shows the educational status of the sampled households of different categories. Educational status determines the awareness of farmers to adopt modern technological improved agroforestry systems. Literacy rate is the highest in marginal category (87.8) followed by small (86.27) and medium category (86.82) farmer respectively. The percentage of male is found to be more literate than female in all categories in the studied area. Many workers who have worked on 'socioeconomic status' in other part of Himachal Pradesh reported that literacy percent varied from 75.79% in Katli panchayat and to 88.09% in Karganoo panchayat in Rajgarh and Sarah block of district Sirmour (Himachal Pradesh), (Joshi, 2011).Similar result of 83 percent overall literacy rate in kumaon, Uttarakhand had been reported by Yadav *et al* (2017). Similarly Sharma *et al.,* (2009) recorded 80% literacy in villages of Garhwal,

Uttarakhand. Boateng (2008) reported that high literacy rate is likely to increase technological productivity and reduce conservativeness.

Employment status of sampled households

The present study showed that sampled farmers met their livelihood through government jobs, pension, private jobs, private business, shopkeeping, daily wage workers and farm labour etc. Males are dominating in all income generating avenues. Data shown in table 4 that 99 male and 14 female are engaged in government job which are 37.78% and 5.3% of total male and female engaged in different livelihood. The average annual income of man lies between 2,61,604 rupees to 2,99,178 rupees in all

Table1. Identification of agroforestry system on the basis of structure and function of the components.

System types	Number of families under different categories practicing Agroforestry systems			Total
	Marginal category	Small category	Medium category	
Agrisilviculture	42(51.21)	50(24.5)	62(21.55)	154 (29.72)
Agrisilvipasture	24(89.26)	47(23.03)	48(20.25)	119 (22.97)
Agrisilvihorticulture	11(13.41)	45(22.05)	36(19.39)	92 (17.76)
Agrihortisilviculture	1(1.21)	2(.98)	26(.86)	29 (5.59)
Agrihortipasture	2(2.43)	3(1.47)	7(1.29)	12 (2.31)
Agrihorticulture	0	12(5.88)	11(5.17)	23 (4.44)
Pastoralhorticulture	0	12(5.88)	13(5.17)	25 (4.8)
Silvipastoral	2(2.43)	33(16.17)	29(14.22)	64 (12.35)
Total families in each category	82(100)	204(100)	232(100)	518 (100)

*Figures in the parentheses are percentage to the total categories of farmers whereas, in case of female it is 2,43,083 rupees in marginal category to 3,07,038 rupees in medium category. Similar trend was males employed as against the females. This clearly shows increased opportunities of cash generations being available to the male counterpart

in comparison to females. Overall average on farm annual income per male is 26,610 and for female is 26,000 (Table4b). The off-farm employment can provide more risk bearing capabilities to farmer community to implement improved technologies and practices.

Table2. Family structure of sampled households in Chamba Tehsil of district Chamba of Himachal Pradesh.

Farmer's category	Total no. of families	Average family size	Adults			Children		Total	Sex ratio
			Male	Female	Total	Male	Female		
Marginal	72	4.475	1.625	1.45	3.075	0.84	0.56	1.4	797.75
		(100)	(36.33)	(31.98)	(68.31)	(18.94)	(12.75)	(31.69)	
Small	72	4.61	1.5	1.45	2.95	0.97	0.69	1.66	870.78
		(100)	(32.43)	(31.53)	(63.96)	(21)	(15.04)	(36.04)	
Medium	72	4.76	1.76	1.6	3.36	0.77	0.63	1.4	945.355
		(100)	(36.8)	(33.62)	(70.42)	(16.23)	(13.35)	(29.58)	
Total	216	4.61	3.71	1.5	3.12	0.86	0.62	1.48	871.295
		(100)	(35.18)	(32.37)	(67.56)	(18.72)	(13.75)	(32.43)	

*Figures in the parentheses indicate the percentages to total respective figures, Sex ratio refers to the number Figures in the parentheses indicate the percentages to total respective figures, Sex ratio refers to the number of females per thousand Of male

Livestock inventory of the sample households

The data of livestock in the study area has been shown in table 5. Livestock plays an important role in the farming systems of sampled households. The present study revealed that cow is most preferred animal. Animal in marginal category with an average of 1.6 followed by goat, bullock and buffalo in descending order. Same trends are followed in small farmer category where cow showed highest value of an average 1.48 and in medium category where cow shows average of 1.67 followed by bullock, buffalo, ship and goat. It is also noticed that buffalo number are very less as compare to cows. The local breed of cow is 59.55% in marginal category which is more than improved breed 40.45%.Similarly local breed of cow is more in both small and medium category farmers. Studies of sample farmers also revealed that number of bullocks per family in areas which are accessible to road are less compared to families which are less accessible to road. Mostly land preparation is done by tractors in areas accessible to road and by bullocks in areas which are less accessible to road. Maximum number of sheep is found in small category famers followed by marginal and medium category in descending order. Sheep is only found in family of medium category farmers. No poultry, pisciculture,

Table 3. Educational status of sampled households in Chamba Tehsil of district Chamba of Himachal Pradesh.

Farmer's category	Illiterate	Primary	Middle	Matric	Senior secondary	Graduate	Total	Literacy rate %	Male literacy	Female literacy
Marginal	0.52 (4.46)	0.43 (9.6)	1.01 (22.6)	1.06 (23.91)	1.06 (23.91)	0.36 (8.07)	4.44 (100)	87.8	93.82	81.25
Small	0.63 (13.84)	0.31 (6.9)	0.86 (18.61)	1.16 (25.22)	1.15 (24.92)	0.48 (10.51)	3.96 (100)	86.27	90.9	80.89
Medium	0.34	0.38	0.9	1.33	1.18	0.36	0.29	86.82	92.81	80

*Figures in the parentheses are percentage to the total
*The literacy rate is calculated as: (Total literates/total members) x 100

Table 4a. Employment status of off farm income of sampled households in Chamba Tehsil of district Chamba of Himachal Pradesh

Farmer's category	Total no. of families	Total member	Government services				Private services			
			M	Annual income	F	Annual income	M	Annual income	F	Annual income
Marginal	72	100	27	7057317	1	243083	16	1807000	0	0
Small	72	94	34	10151634	7	2511366	20	1772000	0	0
Medium	72	99	38	9710770	6	1842230	33	3229000	0	0
total	216	293	99	26919721	14	4596679	69	6808000	0	0
Average annual income per person			33.7	271916	4.77	328334	23.54	98666	0	0

Farmer's category	Buisness				Wage labour			
	M	Annual income	F	Annual income	M	Annual income	F	Annual income
Marginal	12	1560000	0	0	42	996305	2	46695.7
Small	9	845000	0	0	24	707000	0	0
Medium	10	950000	0	0	12	349000	0	0
Total	31	3355000	0	0	78	2052305	2	46695.7
Average annual income per person	10.58	108225	0	0	26.62	26311	0.7	23347

Table 4b. Employment status of on farm income of sampled households in Chamba Tehsil of district Chamba of Himachal Pradesh.

Farmer's category	Engaged in agriculture			
	M	Annual income	F	Annual income
Marginal	77	1118722	27	392278
Small	74	2196592	24	712408
Medium	83	2864643	26	897357
Total	234	6179957	77	2002043
Average annual income per person	75.24	26410	24.76	26000

Values in parentheses are the percentages. The average income was calculated on the basis of total number of beneficiaries only.

apiculture and other accessory systems are observed in the samples area. Thus, studies shows that livestock is playing an important role in farm sector activities and help in increasing the overall income of the farmers.

Land use pattern of sample households

Different land use pattern of sample house is presented in table6. Average area under arable land constitutes 62.91% combining both areas i.e., irrigated and non-irrigated, the non-irrigated land constitutes of 54.91 percent shows majorly farmers are depended on rainfall. Besides this8.0% land is under irrigation facilities shown in figure2. Similar results regarding irrigated and non-irrigated land are reported by Sharma (2021) in Bangana tehsil of Una district. Maximum irrigated land is under medium category farmers and least

.

Category of farmers	Family having livestock	Animal's type	No. of animal	Average number per family	Local breed	Improved breed	Dry	Milking	Young stock	
									No. of animals	Average no. per family
Marginal	60	Cow	96 (52.45)	1.6	66 (68.75)	30 (31.25)	25 (26.04)	71 (73.95)	13 (43.33)	0.21
		Buffalo	6 (3.27)	0.1	4 (66.66)	2 (33.33)	5 (83.33)	1 (16.66)	4 (13.33)	0.06
		Bullock	39 (21.31)	0.65	35 (89.74)	4 (10.25)			1 (3.34)	0.016
		Goat	42 (22.95)	0.7	42 (100)	0(0.00)			12 (40)	0
		Ship	0 (0.00)	0	0 (0.00)	0(0.00)			0 (0.00)	0
		Horse	0 (0.00)	0	0 (0.00)	0(0.00)	-----	-----	0 (0.00)	0
		Total	183	3.05	147	36	30	72	30	0.286

Table 5. Livestock status of the sampled households of different categories of farmers in Chamba tehsil of district Chamba, Himachal Pradesh.

is under marginal category farmers. Data also revealed that more than half of the total land is used in the agriculture which is 67.08 in marginal category followed by 61.68 in small and 59.98 in medium category farmers. The pasture land contributed an average of 20.5% of total land.

Maximum area under pasture land is 23.22% under small category farmers and least in medium category farmer i.e., 17.97. Orchards are found

generally, in all the categories of sampled farmers. The size of farmer i.e., 17.97. Orchards found generally in all the categories of sampled farmers. The size of orchard is maximum in medium category i.e., 16.36 % followed by 11.32% in small and 10.74% in marginal categories farmers. The area of orchard in marginal is less due to less availability of overall land. The maximum degraded land holding is under medium category.

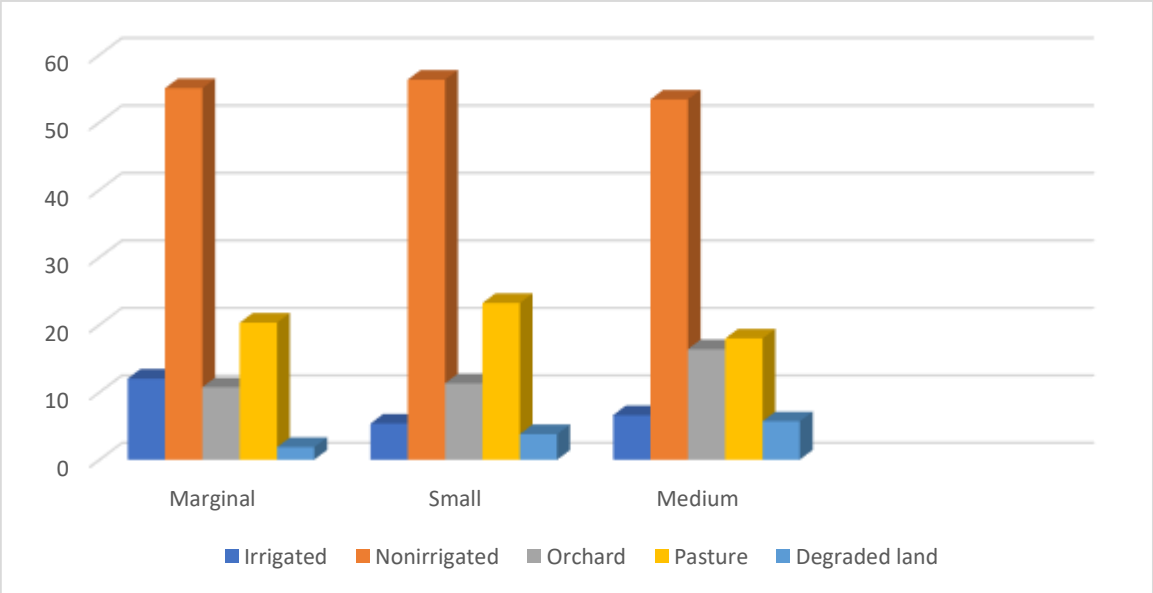
*Figures in the parentheses are percentage to the actual owners

Category of farmers	Family having livestock	Animal's type	No. of animal	Average number per family	Local breed	Improved breed	Dry	Milking	Young stock	
									No. of animals	Average no. per family
Small	60	Cow	89 (43.62)	1.48	53 (59.55)	36 (40.45)	15 (16.85)	74 (83.14)	11 55.00%	0.18
		Buffalo	2 (1)	0.03	2 (100.00)	0 (0.00)	0 (0.00)	2 (100.00)	1 5.00 %	0.017
		Bullock	52 (25.50)	0.86	35 (67.30)	17 (32.70)	----	----	3 15.00%	0.05
		Goat	61 (29.90)	1.01	61 (100)	0 (0.00)			5 25%	0.083
		Ship	0 (0.00)	0	0 (0.00)	0 (0.00)			0 (0.00)	0 (0.00)
		Horse	0 (0.00)	0	0 (0.00)	0 (0.00)			0 (0.00)	0 (0.00)
		Total	204	3.38	151	53	15	76	20	0.33

Table 6 Land use statistic of the farmers of studied area

*Figures in the parentheses are percentage to the actual owners

Fig 2 Land holdings of different category of farmers.



Conclusion

It is worth mentioning here that the overall family sex ratio is reported 871.295 which is less than the state and national average of 972 and 940 respectively depicting cultural difference on the gender of a child. The average family size is found to be 4.61 individuals per family and adult population constituted 67.56% of the total population. Literacy rate varied from 87.8 to87.27 help in adaptation of new agroforestry technologies. Males are dominating in all small and marginal categories covering about 89 per cent of the total land area. This land needs to be processed in to useful land for further generation of income. Similar survey of agroforestry systems in Balh valley of Mandi district (Himachal Pradesh) by Upadhayaya (1997) revealed that 97 per cent of the household among different categories of farmers. Local breed are preferred more as compare to improved breed in all animal. Eight agroforestry system types are practiced by different categories of farmers. Agrisilviculture type was practiced by maximum number of farmers whereas, Agrihortipastoral type is practiced by least number of farmers. No woodlots were observed in the study area as people meeting their fuel, fodder and other needs through tree retained in agriculture land and pasture land. Agroforestry systems observed in the studied area helped farmers to increase their farm income, easy availability of firewood and timber on the farmland. Finally, it can be concluded that agroforestry is prerequisite for conservation of natural forest and socioeconomic upliftment of rural population.

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