

Socioeconomic Status and Livelihood Security of Farmers Practicing Agroforestry in Shimla District of Himachal Pradesh

Ranjeet Singh, K. S. Pant, Prabhat Tiwari* and Rajeev Dhiman

Department of Silviculture and Agroforestry, College of Forestry,
Dr. Y S Parmar University of Horticulture and Forestry, Nauni, Solan-173230, India

*Rani Lakshmi Bai Central Agricultural University, Jhansi-284003, India

*Corresponding Author E-mail: ranjeet.siingh26@gmail.com

Received: 17.10.2020 | Revised: 19.11.2020 | Accepted: 26.11.2020

ABSTRACT

The study was carried out in Shimla district of Himachal Pradesh with the aim to understand socio-economic status and livelihood opportunities of farming communities practicing agroforestry systems. It is evident from the study that majority of medium farmer community were having joint families, while small and marginal farmers had nuclear families. High literacy rate is one of the main characteristic feature of the study area. Major part of the study area is rainfed (>70 per cent) and farmers were doing their farming in a traditional way. The average land holding size was recorded in the tune 1.57 ha, 1.55 ha, 1.74 ha, 1.66 ha and 1.82 ha, in altitudinal zone-I, II, III, IV and V, respectively. The sampled farmers meet their livelihood through horticulture, agriculture/agroforestry and services in both government and private sectors.

Keywords: Agroforestry systems, Land holding, Agriculture and Agroforestry.

INTRODUCTION

Agroforestry is a traditional landuse system that integrates trees, crops and animals in a way that is scientifically sound, ecologically desirable, practically feasible and socially acceptable to the farmers (Nair, 1979). Agroforestry has been practiced since long time in many parts of the world. Its form varies considerably from region to region; depending on human needs, capabilities and prevailing environmental, cultural and socioeconomic conditions. The origin of agroforestry practices in India, i.e., growing

trees with food crops, grasses and other components is believed to have started during Vedic era, though agroforestry as a science evolved during 1980's. The long history and diversity of agroforestry system and practice in the country have been widely reviewed (Tejwani, 1994 & Kumar et al., 2012). In India, agroforestry is being promoted as an alternative land use system to deal with the problems related to sustainability and environmental amelioration, yet its real potential needs scientific evidences.

Cite this article: Singh, R., Pant, K. S., Tiwari, P., & Dhiman, R. (2020). Socioeconomic Status and Livelihood Security of Farmers Practicing Agroforestry in Shimla District of Himachal Pradesh, *Ind. J. Pure App. Biosci.* 8(6), 541-549. doi: <http://dx.doi.org/10.18782/2582-2845.8512>

Numerous agroforestry systems both natural as well as manmade have been developed in different agro-climatic regions of the country, which have been found highly productive and environmental/ecofriendly. The noteworthy feature of this is the healthy contribution of 88.66 M m³ from the tree outside forests, which indicates agroforestry contribution. India launched National Agroforestry Policy in 2014 and became the first country in the world to have a National Agroforestry Policy (Anonymous, 2014). Agroforestry practices are based on the socio-economic, cultural, communication, demographic factors of the population, experiences of farmers and other related factors. The Research and Development efforts undertaken during the last more than three decades have clearly demonstrated the potential of agroforestry for resource conservation, improvement of environmental quality, rehabilitation of degraded lands and providing multiple outputs to meet the day to day demand of the rural population (Dhyani et al., 2013). Shimla falls under Western Himalayan Region which is divided into two agro-ecological sub regions namely Western Himalayas and Warm Sub-humid eco-region. North western Himalaya is basically an agro-ecosystem, where 90 percent of its total population lives in villages, whose economy is dependent on agriculture, horticulture and animal husbandry (Atul et al., 1994).

MATERIAL AND METHODS

Study Area: The study was carried out in 20 panchayats of Shimla district of Himachal Pradesh that lies between 30°45" to 31°40" N latitude and 77°0" to 78 °19" E longitude. The altitude of the district ranges between 300-6000 m amsl. The climate of the district varies from sub-tropical in low hills and valleys to sub-humid in the mid hills and temperate in high hills. Precipitation is in the form of rainfall (average annual 1000 mm), snowfall (in upper ridges) and hailstorm in some pockets of the study area. Average minimum and maximum temperature of the district lies between -4°C to 31°C, respectively.

Sampling and Data Collection: Study sites were selected through stratified multistage random sampling technique and the Shimla district was divided into five altitudinal zones, viz., Zone-I (500-1000m amsl), Zone-II (1000-1500m amsl), Zone-III (1500-2000m amsl), Zone-IV (2000-2500m amsl) and Zone-V (>2500m amsl). In each altitudinal range, four panchayats were selected randomly and from each selected panchayat, farmers were divided into three different categories on the basis of their land holding, viz., marginal (<1 ha), small (1-2 ha) and medium (2-5 ha). A random sample of five farmers from each category was taken as ultimate unit of study. Relevant information from farmers was collected on pre-structured schedules and open ended interviews.

RESULTS AND DISCUSSION

Family structure and sex ratio:

In all the five altitudinal zones the highest average family size (6.89 individuals) was recorded under medium farmer's category in altitudinal Zone-I whereas, it was recorded lowest (5.61 individuals) under marginal farmer's category in altitudinal Zone-II (Figure 1). However, overall sex ratio was recorded more than 900 in all the altitudinal zones and was found to be highest (983.28) under marginal farmer's category in altitudinal Zone-IV, whereas, it was recorded lowest (901.73) under medium farmer's category in altitudinal Zone-III (Figure 2). The average household size of 6.4 was also in line to the findings of Joshi (2011). Masoodi (2010) and Sharma (2012) reported average family size of 5 persons in Solan (H.P.). Similar results regarding sex ratio were observed by Massingue (2007) in Naina Tikker panchayat of district Sirmaur (H.P.). Sharma (2012) also reported higher sex ratio of 988 female to 1000 male in one of the sub-watersheds of Giri Catchment.

Type of family: Figure 3, depicts that medium farmer's category were having maximum joint families (14) in altitudinal Zone-I whereas, it was recorded minimum (2) under marginal

farmer's category in altitudinal Zone-V. In case of nuclear families, marginal farmer's category were having maximum nuclear families (18) in altitudinal Zone-V whereas, it was recorded minimum (6) under medium farmer's category in altitudinal Zone-I. Lal (2017) found similar results by conducting socio-economic study in Bhota Town of District Hamirpur (H.P.).

Educational status of family: Data presented in Table 1, revealed that highest literacy rate (83.47 %) was recorded under marginal farmer's category in altitudinal Zone-IV whereas, it was recorded lowest (77.85 %) under same farmer's category in altitudinal Zone-I. It is clear from the study that overall literacy rate was nearby 80 per cent. Similar results were reported by Sharma et al. (2009), Joshi (2011), Nisha (2013) and Yadav et al. (2016).

Livestock status: Figure 4, indicate that Cow was the major domesticated animal with an average value of 1.26, 1.37, 1.65, 1.83 and 2.19 number per family in the altitudinal Zone-I, II, III, IV and V respectively, followed by Buffalos, Goats and Sheep. Livestock rearing is an integral part of farming systems in the hills. They not only provide milk, meat, wool and manure to improve the income and productivity of crops but also serve as main source of energy to plough farm. Significant contribution of livestock sector to the economy of Himachal Pradesh was also observed by Kumar et al. (2012).

Animal husbandry practices: It is evident from the data given in Table 2, that majority of the farmers in all the altitudinal zones were performing traditional milking methods, possess livestock and practiced regular deworming, disease pest management practices, scientific breeding method, better process of animal dung utilization and animal cleanliness due to increasing awareness and

accessibility of veterinary technicians and their consultations. Similar results were reported by Massingue (2007) regarding animal husbandry practices.

Status of occupation and off-farm employment:

It is Figure 5, reveals that there were four different employment avenues in the study area i.e., Service, business, waged labour and agriculture. With regard to service, it was found that 9.64, 9.01, 9.55, 10.15 and 11.42 per cent of individuals were engaged in this sector as against 3.36, 3.27, 3.30, 4.64 and 4.21 per cent of individuals having business, while 6.93, 6.54, 7.11, 5.85 and 5.10 per cent of households were engaged in wage labour in the altitudinal zone-I, II, III, IV and V, respectively. It is also clear from the figure that most of the males and females were engaged in agriculture activities in all the altitudinal zones. It is also evident from the Figure 6, that highest off farm income (Rs 2,45,690 / year) was recorded under medium farmer's category in altitudinal Zone-I whereas, it was recorded lowest (Rs 1,12,560 / year) under marginal farmer's category in altitudinal Zone-II. Sharma et al. (2009) also reported same trend in the Garhwal Himalaya. Government job, migration income and minor produce are the other sources of household income and their share varied between 7.0 per cent and 10.2 per cent at different elevations.

Land use statistics: Land holding size showed a significantly positive relationship with farmer's category in all the altitudinal zones. Figure 7, depicts that highest average land holding size (3.02 ha) was recorded under medium farmer's category in altitudinal Zone-V whereas, it was recorded lowest (0.67 ha) under marginal farmer's category in altitudinal Zone-II. Diagnostic survey of agroforestry systems in Balh valley of Mandi district (H.P.) by Upadhyaya (1997) reported similar result regarding land use statistics.

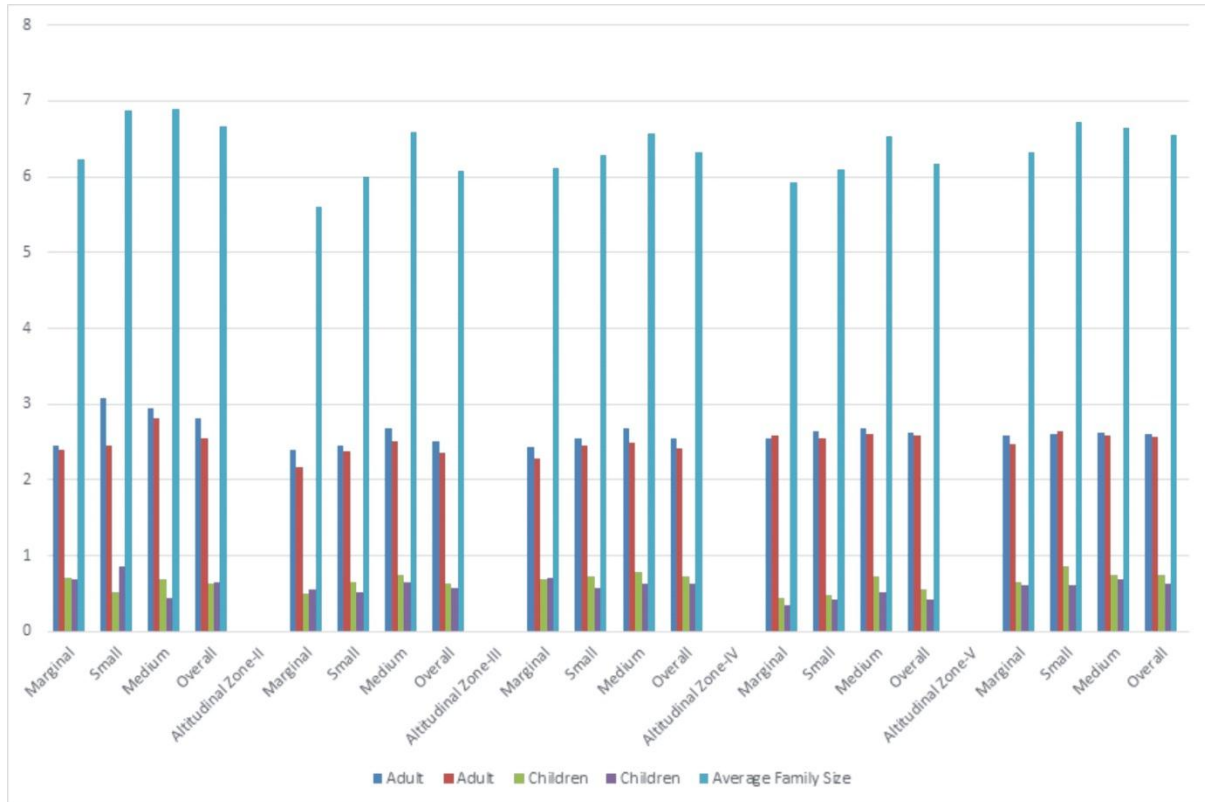


Fig. 1: Family structure of various farmers category in different altitudinal zones of Shimla District (No. of families=20)

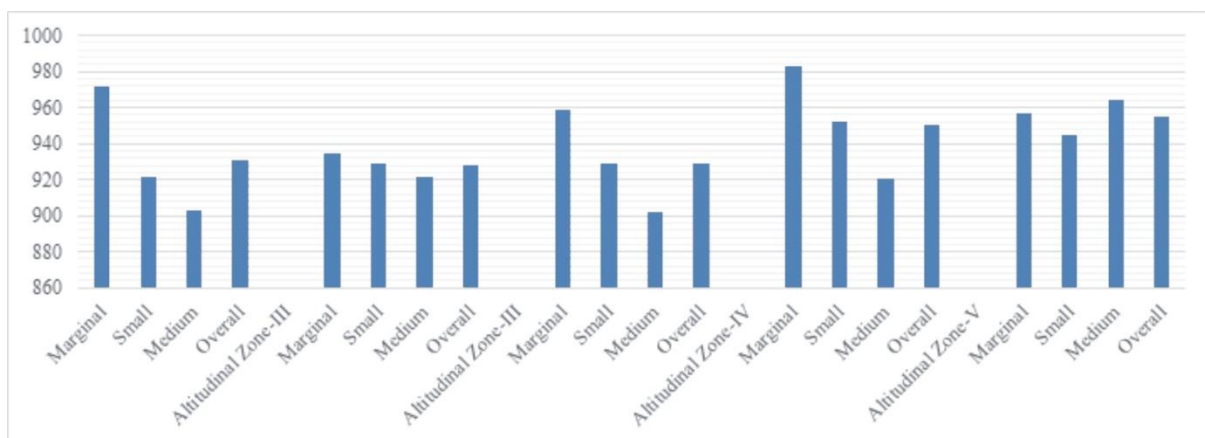


Fig. 2: Sex Ratio of various farmer’s category in different altitudinal zones of Shimla District (No. of families = 20)

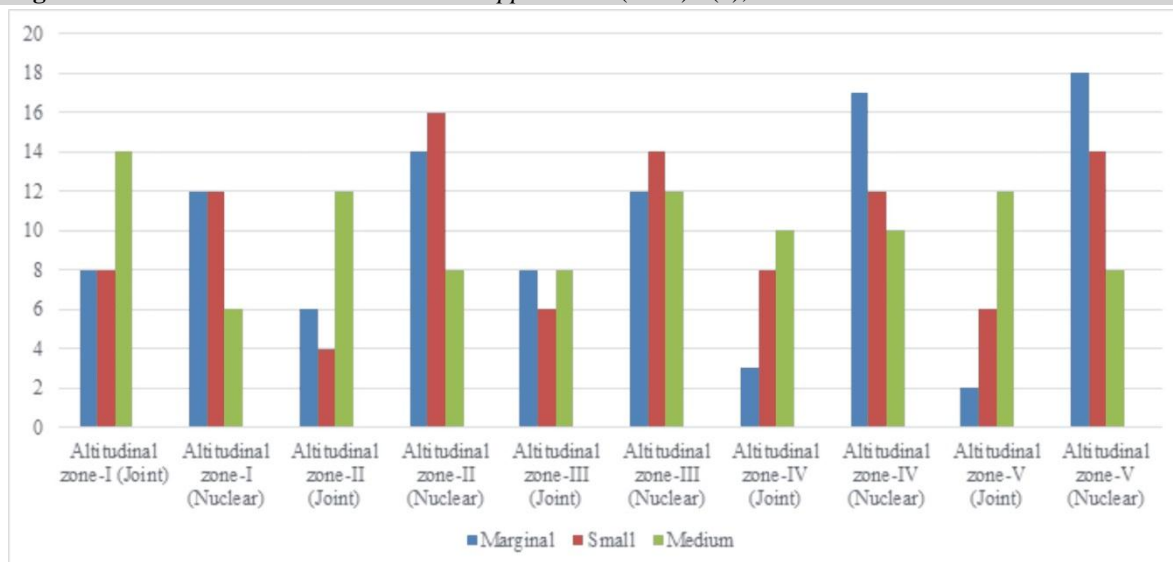


Fig. 3: Type of family in various farmers category in different altitudinal zones of Shimla District (No. of families=20)

Table1. Educational status of males and females in various farmers category in different altitudinal zones of Shimla District (No. of families= 20)

Farmers Category	Illiterate	Literate	Primary	Middle	Matric	Senior secondary	Graduate	Non-School	Total	Literacy (%)
Altitudinal Zone-I										
Marginal	0.89(14.29)	5.34(85.71)	0.87(13.96)	0.98(15.73)	1.12(17.98)	1.05(16.85)	0.83(13.32)	0.49(7.87)	6.23(100)	77.85
Small	0.95(13.81)	5.93(86.19)	0.96(13.95)	1.1(15.99)	1.29(18.75)	1.21(17.59)	0.92(13.37)	0.45(6.54)	6.88(100)	79.65
Medium	0.83(12.05)	6.06(87.95)	0.91(13.21)	1.13(16.40)	1.26(18.29)	1.37(19.88)	0.97(14.08)	0.41(5.95)	6.89(100)	81.86
Overall	0.89(13.35)	5.78(86.65)	0.91(13.70)	1.07(16.05)	1.22(18.35)	1.21(18.15)	0.91(13.60)	0.45(6.75)	6.67(100)	79.85
Altitudinal Zone-II										
Marginal	0.71(12.66)	4.90(87.34)	0.68(12.12)	0.93(16.58)	0.98(17.47)	1.16(20.68)	0.82(14.62)	0.33(5.88)	5.61(100)	81.46
Small	0.78(13.00)	5.22(87.00)	0.84(14.00)	0.96(16.00)	1.08(18.00)	1.12(18.67)	0.79(13.17)	0.43(7.17)	6.00(100)	79.83
Medium	0.85(12.90)	5.74(87.10)	0.95(14.42)	1.08(16.39)	1.16(17.60)	1.11(16.84)	0.96(14.57)	0.48(7.28)	6.59(100)	79.82
Overall	0.78(12.86)	5.29(87.14)	0.82(13.57)	0.99(16.32)	1.07(17.69)	1.13(18.63)	0.86(14.12)	0.41(6.81)	6.07(100)	80.33
Altitudinal Zone-III										
Marginal	0.91(14.89)	5.20(85.11)	0.79(12.93)	1.05(17.18)	0.98(16.04)	1.15(18.82)	0.8(13.09)	0.43(7.04)	6.11(100)	78.07
Small	0.86(13.67)	5.43(86.33)	0.93(14.79)	1.02(16.22)	1.16(18.44)	1.08(17.17)	0.88(13.99)	0.36(5.72)	6.29(100)	80.60
Medium	0.92(13.98)	5.66(86.02)	0.91(13.83)	1.12(17.02)	1.21(18.39)	1.04(15.81)	0.93(14.13)	0.45(6.84)	6.58(100)	79.18
Overall	0.89(14.17)	5.43(85.83)	0.88(13.86)	1.06(16.81)	1.12(17.65)	1.09(17.23)	0.87(13.75)	0.41(6.53)	6.33(100)	79.29
Altitudinal Zone-IV										
Marginal	0.71(11.97)	5.22(88.03)	0.82(13.83)	0.95(16.02)	1.24(20.91)	1.18(19.90)	0.76(12.82)	0.27(4.55)	5.93(100)	83.47
Small	0.76(12.48)	5.33(87.52)	0.73(11.99)	1.06(17.41)	1.29(21.18)	1.07(17.57)	0.83(13.63)	0.35(5.75)	6.09(100)	81.77
Medium	0.84(12.86)	5.69(87.14)	0.81(12.40)	1.07(16.39)	1.19(18.22)	1.33(20.37)	0.87(13.32)	0.42(6.43)	6.53(100)	80.70
Overall	0.77(12.45)	5.41(87.55)	0.79(12.72)	1.03(16.60)	1.24(20.05)	1.19(19.30)	0.82(13.26)	0.35(5.61)	6.18(100)	81.94
Altitudinal Zone-V										
Marginal	0.75(11.87)	5.57(88.13)	0.95(15.03)	1.08(17.09)	1.15(18.20)	1.12(17.72)	0.89(14.08)	0.38(6.01)	6.32(100)	82.12
Small	1.02(15.16)	5.71(84.84)	0.84(12.48)	1.13(16.79)	1.19(17.68)	1.27(18.87)	1.02(15.16)	0.26(3.86)	6.73(100)	80.98
Medium	0.87(13.10)	5.77(86.90)	0.71(10.69)	1.14(17.17)	1.26(18.98)	1.18(17.77)	0.9(13.55)	0.58(8.73)	6.64(100)	78.16
Overall	0.88(13.41)	5.68(86.59)	0.83(12.70)	1.12(17.01)	1.20(18.28)	1.19(18.13)	0.94(14.27)	0.41(6.20)	6.56(100)	80.40

Figures in parenthesis are percentage to total

Primary=<5th Grade, Middle=5th - 8th Grade; Matric 8th -10th Grade; Senior Secondary= 10th - 12th Grade

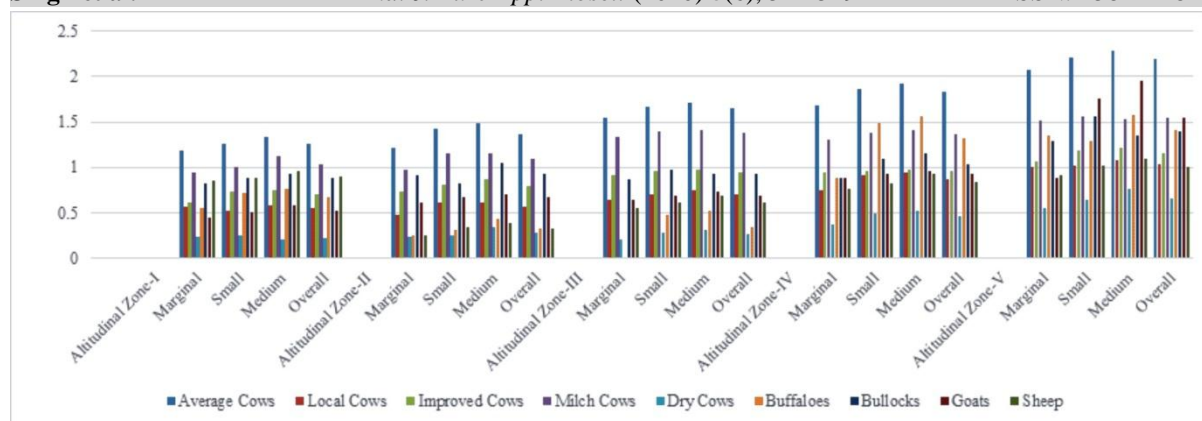


Fig. 4: Livestock status in various farmers category in different altitudinal zones of Shimla District (No. of families= 20)

Table 2: Animal husbandry practices in various farmers category in different altitudinal zones of Shimla District (No. of families=20)

Farmers Category	No. of farmers possessing animal	Milking Method		Disease management			Breeding Method		Animal dung utilization			Animal cleanliness	
		Scientific	Traditional	Regular deworming	Disease pest management	Both	Scientific	Traditional	Direct spreading	Fuel	Composting in pit	Washing/cleaning of animals	Sanitation/disinfection
Altitudinal Zone-I													
Marginal	16(80.00)		16(100)	11(68.75)	8(50.00)	7(43.75)	8(50.00)	8(50.00)	2(12.50)	13(81.25)	12(75.00)	7(43.75)	8(50.00)
Small	19(95.00)		19(100)	12(63.16)	7(36.84)	6(31.58)	10(52.63)	9(47.37)	4(21.05)	15(78.95)	16(84.21)	9(47.37)	8(42.11)
Medium	18(90.00)		18(100)	10(55.56)	8(44.44)	7(38.89)	7(38.89)	11(61.11)	6(33.33)	14(77.78)	12(66.67)	10(55.56)	9(50.00)
Overall	53(88.33)		53(100)	33(62.26)	23(43.40)	20(37.74)	25(47.17)	28(52.83)	12(22.64)	42(79.25)	40(75.47)	26(49.06)	25(47.17)
Altitudinal Zone-II													
Marginal	16(80.00)		16(100)	6(37.50)	5(31.25)	5(31.25)	6(37.50)	10(62.50)	3(18.75)	12(75.00)	12(75.00)	8(50.00)	7(43.75)
Small	20(100.00)		20(100)	5(25.00)	4(20.00)	4(20.00)	8(40.00)	12(60.00)	3(15.00)	15(75.00)	16(80.00)	10(50.00)	11(55.00)
Medium	18(90.00)		18(100)	9(50.00)	6(33.33)	5(27.78)	7(38.89)	11(61.11)	4(22.22)	14(77.78)	12(66.67)	8(44.44)	7(38.89)
Overall	54(90.00)		54(100)	20(37.04)	15(27.78)	14(25.93)	21(38.89)	33(61.11)	10(18.52)	41(75.93)	40(74.07)	26(48.15)	25(46.30)
Altitudinal Zone-III													
Marginal	17(85.00)		17(100)	7(41.18)	6(35.29)	5(29.4)	6(35.29)	11(64.71)	6(35.29)	12(70.59)	10(58.82)	7(41.18)	8(47.06)
Small	18(90.00)		18(100)	12(66.67)	8(44.44)	7(38.89)	9(50.00)	9(50.00)	7(38.89)	12(66.67)	11(61.11)	9(50.00)	10(55.56)
Medium	20(100.00)		20(100)	10(50.00)	5(25.00)	4(20.00)	9(45.00)	11(55.00)	7(35.00)	15(75.00)	14(70.00)	9(45.00)	11(55.00)
Overall	55(91.67)		55(100)	29(52.73)	19(34.55)	16(29.09)	24(43.64)	31(56.36)	20(36.36)	39(70.91)	35(63.64)	25(45.45)	29(52.73)
Altitudinal Zone-IV													
Marginal	19(95.00)		19(100)	8(42.11)	5(26.32)	4(21.05)	7(36.84)	12(63.16)	5(26.32)	13(68.42)	11(57.89)	8(42.11)	11(57.89)
Small	19(95.00)		19(100)	9(47.37)	5(26.32)	5(26.32)	8(42.11)	11(57.89)	6(31.58)	14(73.68)	11(57.89)	8(42.11)	7(36.84)
Medium	20(100.00)		20(100)	7(35.00)	6(30.00)	3(15.00)	10(50.00)	10(50.00)	4(20.00)	14(70.00)	13(65.00)	9(45.00)	9(45.00)
Overall	58(96.67)		58(100)	24(41.38)	16(27.59)	12(20.69)	25(43.10)	33(56.90)	15(25.86)	41(70.69)	35(60.34)	25(43.10)	27(46.55)
Altitudinal Zone-V													
Marginal	18(90.00)		18(100)	4(22.22)	5(22.22)	3(16.67)	5(16.67)	13(72.22)	6(33.33)	12(66.67)	12(66.67)	9(50.00)	8(44.44)
Small	17(85.00)		17(100)	5(29.41)	3(17.65)	2(11.76)	8(47.06)	9(52.94)	5(29.41)	11(64.71)	12(70.59)	8(47.06)	10(58.82)
Medium	20(100.00)		20(100)	7(35.00)	6(30.00)	4(20.00)	7(35.00)	13(65.00)	6(30.00)	16(80.00)	14(70.00)	9(45.00)	11(55.00)
Overall	55(91.67)		55(100)	16(29.09)	14(25.45)	9(16.36)	20(36.36)	35(63.64)	17(30.91)	39(70.91)	38(69.09)	26(47.27)	29(52.73)

Figures in parenthesis are percentage to tot

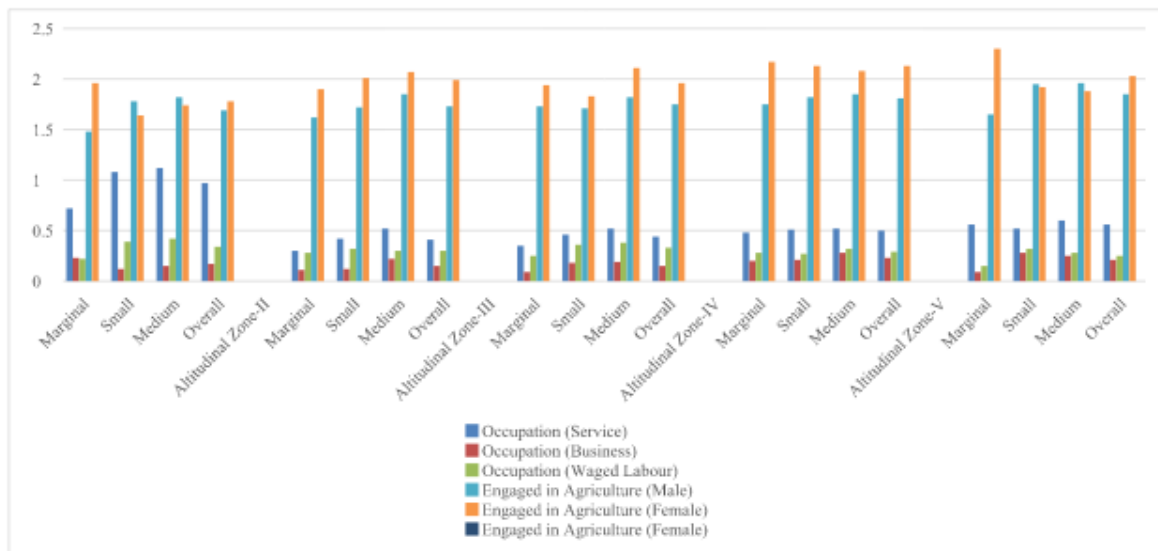


Fig. 5: Status of occupation in various farmers category in different altitudinal zones of Shimla District (No. of families=20)

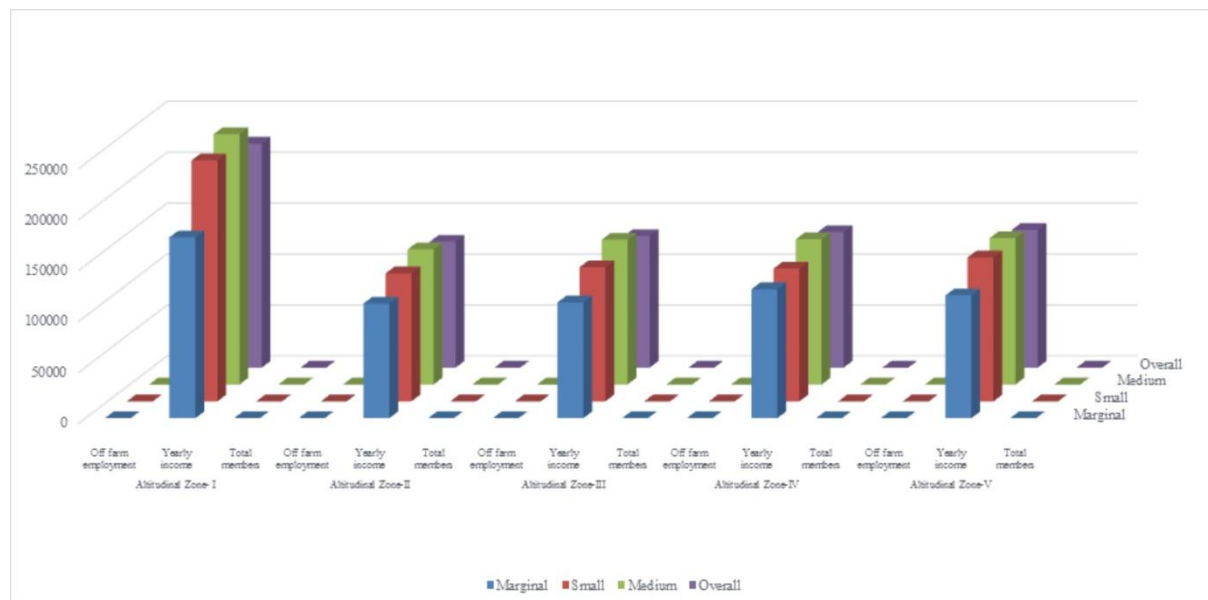


Fig. 6: Status of off-farm employment in various farmers category in different altitudinal zones of Shimla District

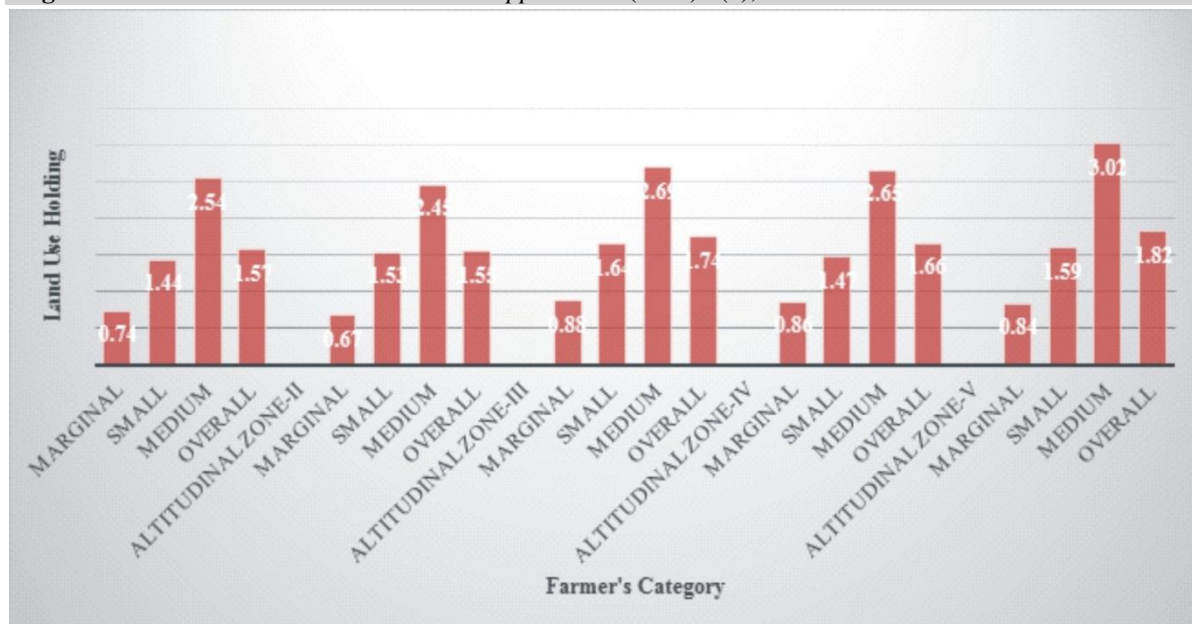


Fig. 7: Land use statistics of various farmers category in different altitudinal zones of Shimla District (No. of families=20)

CONCLUSION

From the present study it can be concluded that average family size varied from 5.61 to 6.89 individuals and sex ratio was recorded more than 900 in all the altitudinal zones. Majority of the medium farmer's community were having joint families, while small and marginal farmer's had nuclear families. Literacy rate was found nearby 80 per cent in all the altitudinal zones. Majority of the households own livestock and cow is the major source of milk for farming communities. With the increasing awareness and consultations of veterinary technicians, farmers in all the altitudinal zones were performing modern animal husbandry practices. Major source of income was from horticulture and agriculture irrespective of all farmers category followed by the service, waged labour and self-business. KuLand holding size also showed a significantly positive relationship with farmer's income in all the altitudinal zones. Government and its various agencies should ensure that every farmer should get the benefit of the various government sponsored schemes which are being launched for improving the socio-economic status and livelihood security of the farming communities.

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