



Evaluation of agroforestry systems viz-a-viz livelihood of farmers of Jammu

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Agroforestry systems combine arboreal species with either annual or perennial crops in a way which promote the optimal use of land together with maximization of output per unit area. These provide multiple benefits including high productivity and additional income while maintaining the soil health, advantages such as crop and livestock protection, soil and stream conservation, diversification of agricultural revenues through timber and non-timber forest products, promotion of biodiversity, landscape enhancement and carbon sequestration (Arnold and Dewees 1998, Garforth *et al.* 1999, Cole 2010). India has a long traditional history of agroforestry and a variety of such indigenous systems are present in different parts but their benefits have remained vastly underexploited. Most of the research results obtained from such efforts are also largely location-specific. Both environmental and socio-economic factors have played a key role in adoption of innovations in agroforestry technologies by farmers (Neupane *et al.* 2002). Where subsistence agriculture is the backbone of local livelihoods, the necessity to encourage and embolden farmers to adopt agroforestry on farmland has been established. Economic studies of agroforestry systems have shown that financial benefits are a consequence of increasing the diversity and productivity of the systems which are influenced by market and price fluctuations of timber, livestock and crops (Benjamin *et al.* 2000). In Jammu and Kashmir, Agriculture being the main source of livelihood of farming community and agroforestry based farming plays a dominating role in contributing to the economy of rural inhabitants. Keeping this in view, the present study was carried out with the aim to assess the economic returns of different agroforestry systems being practiced by the farmers and their impact on livelihood.

The study was carried out during 2019 in Jammu district of Jammu and Kashmir, a Union Territory in north-western

Himalayas. Multi stage random sampling method was used for selection of respondents. Jammu district was purposively selected for the present study because of satisfactory prevalence and adoption of traditional as well as improved agroforestry systems. Out of 20 blocks of Jammu district, 10 blocks were selected purposively as they have majority of rainfed area and the prevalence of agroforestry. Two villages were selected randomly from each block consisting 20 villages in total with 08 randomly selected farmers/households as respondents per village thereby making a total sample size of 160 respondents. Data collected from sampled respondents of different blocks were clubbed into three agriculture sub divisions i.e. Akhnoor, Marh and Dansal, because organizational set up of State Agricultural Department at field level is divided into different sub-divisions and moreover dissemination of new agricultural technology is managed primarily at the sub-division level. A pre-structured questionnaire was used for collecting the data from the sampled respondents. Classification on the basis of nature of components was adopted for identification of agroforestry systems and economic returns were calculated in term of ₹/ha/year/respondent.

Two agroforestry systems namely agri-silvicultural and agrosilvopastoral system were mainly identified in study area (Table 1). On overall basis Jammu district comprised of 23% of the respondents to be practicing agri-silvicultural system whereas, 77% the agro-silvo-pastoral system.

Agriculture being an important component of agroforestry, the average economic returns as income/ha/yr/respondent was ₹19,989, ₹18,484, ₹21,265 and ₹19,912 from Akhnoor, Dansal, Marh sub-divisions and mean income in Jammu district respectively (Table 2). Agricultural crops,

Table 1 Prevalent agroforestry systems (%) in the study area

Systems Agricultural Sub- divisions	Akhnoor (n=80)	Dansal (n=48)	Marh (n=32)	Overall N=(160)
Agri-silviculture system	20	28	22	23
Agro-silvo-pastoral system	80	72	78	77

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Table 2 Economics of agri-silviculture and agro-silvo-pastoral system

Systems Agriculture Sub- divisions	Akhnoor (n=80)	Dansal (n=48)	Marh (n=32)	Overall N=(160)
Agriculture	19989	18484	21265	19912
Fruits	13869	15548	11296	5875
Timber	157865	120480	132650	136998
Fuel	1112	1288	1867	1422
Fodder	980	860	920	626
Livestock (Milk)	17165	16235	17562	16987
Total (₹)	210980	172895	185560	181820

fruits, timber, fuel, fodder and livestock are the main productive components of agroforestry systems.

As identified, the existing agroforestry systems included agri-silviculture and agro-silvo-pastoral in the study area, economic returns from these two systems by adding the returns of respective components was worked out (Table 2). Whereas, the overall economic return from agri-silviculture system in study area was ₹164833 in comparison to the overall economic returns from agro-silvo-pastoral system in study area in Jammu district of ₹181820. The observations recorded are in close agreement with Dwivedi *et al.* (2007). Similar findings were also reported by Sood (2006) and Dhyan (2009) who reported that the extent of agroforestry adoption was found to have increased significantly with increasing crop diversification, agricultural production, food sufficiency, agricultural income, off-farm income total house hold income, number of livestock units, restrictions on farm grazing, and sale of horticultural as well as forestry tree produce from the farm and thereby improving the socio-economic conditions of farmers.

On the basis of results it is concluded that agri-silviculture and agro-silvo-pastoral systems were most common and have great impact on the livelihood of resource poor farmers in the study area. The economic returns from the agroforestry systems were more than sole agriculture. The forest department, agriculture department and other extension workers have lot much scope to create awareness among the people for application of well-designed agroforestry systems.

SUMMARY

The study to investigate the socio-economic values

of different land use systems and their impact on the livelihood of farmers was carried out in different blocks of Jammu district of Jammu and Kashmir during 2019. Out of total 20 blocks of Jammu district, 10 blocks were delineated purposively having maximum rainfed area. Two villages were selected randomly from each selected block with 08 farmers/households randomly selected as respondents making a size of 160 respondents. A pre-structured questionnaire was used for collecting the data from respondents. Two agroforestry systems namely; agri-silviculture and agro-silvo-pastoral were mainly identified in study area contributing 23% and 77% to the livelihood of the respondents respectively. The findings revealed that the overall economic returns from agri-silviculture system and agro-silvo-pastoral in study area in Jammu district were ₹164833 and ₹181820 respectively. The study further concluded that large part of population in the study area was dependent on agriculture as the main income generating component in existing agroforestry systems.

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