

Prospects of Agro Forestry in Rupnagar District of Punjab, India

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Abstract

Agroforestry systems provide a number of ecosystem services and environmental benefits besides being a viable land-use option and a source of additional income for the farmers. A survey was carried out in the Chamkaur Sahib block of Rupnagar district of Punjab to review about the agroforestry related practices followed by the local farmers and to identify the knowledge gaps. 50 farmers were surveyed randomly and incidentally all were practicing agroforestry. A set questionnaire was asked from them and the information generated through this survey is shared in this paper.

Keywords: Agroforestry, survey, income, practices

1. Introduction

Agroforestry is an integral part of agriculture which plays a special role in crop diversification particularly under Punjab conditions. It plays a considerable role in cleaning the aerial environment and also helps to improve soil physico-chemical properties. It also helps to improve ecological balance, sustain productivity of soils, improve quality of environment and neutralize air pollutants. Jose (2009) examined ecosystem services and environmental benefits of agroforestry in relation to carbon sequestration, biodiversity conservation, soil enrichment and air and water quality. Schroth and Sinclair (2003) addressed soil fertility enhancement by agroforestry practices. The incorporation of trees or shrubs in agroforestry systems can increase the amount of carbon sequestered compared to a monoculture field of crop plants or pasture (Sharrow and Ismail, 2004). Udawatta et al. (2008) examined the role of agroforestry buffers in improving soil porosity and observed that average pore paths for grass and agroforestry buffer strip soils were three and five times greater, respectively, than for soils under maize-soybean rotation. Originally the tree planting was considered to be a potential initiative to address the needs of growing populations and also to tackle land degradation and ecological problems (Arnold, 1997; Tamale et al., 1995). Poplar crop is not heavy on agricultural inputs and resources like pesticides, herbicides and fertilizers. Moreover intercrops can be grown both in *kharif* and *rabi* seasons which provide short term profits and further increase the profitability of agroforestry based

cropping systems. District Rupnagar is a diverse region of Punjab consisting of plains, *bet* (floodplains of river Satluj), sub mountaneous and kandi area. Agro forestry is quite popular among the farmers of this district falling under kandi and *bet* region while it is not that popular with those farmers falling under plain region. Most farmers practicing agroforestry in this region consider it as a kind of fixed deposit which yields after 5 years. A study was conducted to know the prospects and status of agro forestry in villages of Chamkaur Sahib block of Rupnagar district, where a large number of farmers are practicing agro forestry, mainly growing Poplar trees.

2. Materials and Methods

Fifty farmers were surveyed randomly in the Chamkaur Sahib block of Rupnagar district of Punjab during the year 2013–14 and asked a set questionnaire. These 50 farmers were collectively culturing 175 ha of agricultural land. Questions were formulated so as to take an account of the practices followed by the farmers and their impact on the agro forestry based cropping system, including the economical aspect. Through the survey attempt was made to make an account of percent area of operational land holding put under agroforestry, variety of poplar selected and the source of seedlings. Farmers were also asked about the tenure of the poplar crop and whether poplar is also the preceding and succeeding crop and the reason behind growing poplar. Also it was noted how much area was kept under previous poplar crop and the price q^{-1} and the income obtained acre⁻¹



from selling the previous poplar crop. Questions were also formulated to know about the spacing followed for poplar planting and the number of trees accommodated per acre and mortality of seedlings, intercrops raised and their yield during different years of plantation. Statistical test of correlation was used to know about any correlation between different parameters.

3. Results and Discussion

All the 50 farmers who were surveyed said that they practice agroforestry. Out of 175 ha operational land holding of the 50 surveyed farmers, 65 ha was under agroforestry which makes about 37 % area. All this 65 ha area was under poplar crop, though eucalyptus plantation is also being practiced in some blocks of the district. 100 percent of the farmers who were surveyed had put atleast some area, may be more or less, under agroforestry and the range varied from 7% to 100 % of the total land holding (Table 1).

Table 1: Frequency distribution of farmers according to land holding and area under agroforestry

Class	No. of farmers	Land holding (ha)	Area under agroforestry (ha)	% area under agroforestry
0-2 ha	30	0.4-2.0	0.4-2.0	20-100
2-5 ha	15	2.4-4.0	0.6-3.2	15-100
5-10 ha	4	10.0-16.8	1.2-4.0	7.7-23.8
>10 ha	1	44.0	14.0	31.8

A correlation coefficient of 0.917 between total land holding and area under poplar suggest that it is not that farmers keep a fixed acreage under agroforestry but they increase this acreage when the land holding is larger. Agroforestry is being practiced even on leased-in land also. In this case the lease is made for 5 or more years rather than usually followed one year term in case of annual crops. Poplar crop is very responsive to the climatic conditions prevailing here and post a good growth. G-48 variety of poplar is the most grown variety with 100% of surveyed farmers confirming the plantation of this very variety at their farms. Regarding the source of plantation material, the farmers named three sources. While 8% farmers borrowed or purchased the planting material from other farmers, 36% raised their own nursery and 56% farmers purchased from commercial nurseries. This suggests that 44% farmers are not very aware of the importance of good planting material and the impact it can have on their poplar crop yield. The data given in Table 2 suggests higher earnings per unit land by the farmers who sourced their poplar nursery from genuine and reliable sources. These farmers sold their poplar crop at higher average price of ₹ 950 q⁻¹ and earned ₹ 0.42 and 1.55 lakh ha⁻¹ more than the farmers who raised their own nursery and those who borrowed from other farmers, respectively. This may be attributed to poor quality of planting material when the

Table 2: Relationship between source of nursery, harvest time and average income

Nursery source	AHT	AP	AI	AUA
Other farmer	4.50	931	8.00	20-100
Self raised	4.86	937	9.13	15-100
Purchased from commercial nursery	4.77	950	9.55	7.7-23.8

AHT: Average harvesting time (years); AP: Average price (₹ q⁻¹); AI: Average income (Lakh ₹ ha⁻¹); AUA: % area under agroforestry

source of the nursery is not reliable. When the nursery was sourced from quality nursery producing commercial units, the price and income was higher owing to better quality of wood in terms of growth characteristics of the plant.

The study also revealed that 70% of farmers kept the trees for 5 years for harvesting while 30% harvested the crop before completion of 5 years. 100% of the farmers said that they had a poplar crop preceding the present crop and will also plant another poplar crop in succession. The most common reason given by farmers for reserving area under agroforestry continuously was that it helped them to get lump sum money after 5 years which, otherwise, they find difficult to accumulate. This helps them to deal with big expenditures like a wedding, construction, buying of land, education of children or buying of tractor, agricultural machinery or some other automobile. The price of per quintal poplar varied between INR 850 to 1000 during period of survey, which amounted to an income between ₹ 6.25 to 10 lakh ha⁻¹ (2.5 to 4 lakh acre⁻¹). In addition to this, farmers are also getting wheat, sugarcane, fodders and maize as intercrops. The wheat yield during 1st year of intercropping varied between 38 to 50 q ha⁻¹, amounting to ₹ 51000 to 68000 ha⁻¹; with 46% of farmers growing HD-2967 variety of wheat. Other common varieties grown under poplar were PBW-621 (28%) and PBW-550 (24%). Farmers reported a plant population between 563 to 1000 plants ha⁻¹ (225 to 400 plants acre⁻¹), with 60% of farmers maintaining a population of 750 plants ha⁻¹ (300 plants acre⁻¹). All the surveyed farmers followed block planting with varied spacings, according to one's needs. In reference to sowing time, all the farmers said that they planted the poplar saplings in standing wheat crop during end of January to end of February. All the 50 farmers said that agro forestry is a viable cropping option and they want to follow it continuously while the only constraint the farmers reported was that many times the price of poplar falls unexpectedly which reduces the profits drastically. This was also one of the main reasons reported by non growers (from other blocks of district), for not growing agro forestry trees, besides they also reported the problem of stray animals which they say destroy the young saplings.

4. Conclusion

This survey revealed that all economic categories of farmers



in this region practiced agroforestry, the main reason behind this being generation of a lump sum and aggregated income to meet a varied portfolio of goods and services. The farmers followed various practices during raising of the poplar crop which depended upon the farmer know-how like the choice of intercrop, harvesting time, area to be put under agroforestry etc. Some technical gaps were also found like sourcing of nursery where farmers need to be educated. Overall the farmers were satisfied with the agroforestry system with their only concern about unpredictable prices which sometimes fall to quite a low level.

5. References

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