AWARENESS OF ADOPTERS AND NON-ADOPTERS TOWARDS DIFFERENT ASPECTS OF POPLAR BASED AGROFORESTRY IN PUNJAB

RAKESH NANDA, G.S. MOMI* AND SANJEEV CHAUHAN**

RARS, SKAUST, RS Pura (Jammu) (J&K)

Introduction

The Johal Committee (1986) has strongly proposed the diversification of agriculture in Punjab. Agroforestry is not only helping in diversification in land management system but is also an economically potential alternative, with tremendous contribution to environmental improvement and judicious use of resources. Tree plantation is an emerging national issue, especially plantation of trees in association with agricultural crops. Efforts are being made for programming the issue of tree plantation. The principle value of issue programming is that it enables clustering of extension efforts into categories that can be more effectively communicated. It warrants the extension staff at all levels to recognize the dynamic and developmental nature of emerging issues. Issues are key to guide the system and they begin with low public awareness and then encounter increased public support over time, which might be precipitated by legal, social or economic conditions.

The growing of trees especially on agricultural land is not a new concept. Earlier people use to manage trees on the farmlands either deliberately planting or retaining naturally grown trees. Punjab being an agrarian State, the land under tree cover is very less (5.76% of total geographical area of the State). To meet the demand of wood, Punjab farmers earlier adopted raising *Eucalyptus* with agricultural crops on the field boundaries and as inter-culture with agricultural crops. But growing of *Eucalyptus* raised some ecological and economic issues which warranted discouragement of its growing on agricultural fields.

Another fast growing, short rotation species suitable for agroforestry in Punjab is Poplar and the farmers are taking it up very fast. The issues emerged by the *Eucalyptus* plantation were of public prominence, so present study was framed to study the awareness of adopters and non-adopters towards benefits of Poplar based agroforestry. Awareness as presented in this study, refers to the intensity of feeling (depth of concern) towards the Poplar based agroforestry, expressed by respondents. This was studied by the

*Deptt. of Extension Education, PAU, Ludhiana (Punjab)
**Deptt. of Forestry & NR, PAU, Ludhiana (Punjab)

responses given by adopters and non-adopters of Poplar based agroforestry on structured interview schedule.

Research Methodology

The selection of respondents was done by following multistage sampling technique. The selection of three districts and three blocks in each selected district was done by ranking on the basis of apparently highest area under Poplar based agroforestry, with the help of officials of Department of Forestry and Natural Resources, P.A.U., Ludhiana, Department of Agriculture and Department of Forests, Punjab. The selection of villages was done from each block where Poplar based agroforestry had been adopted. All the adopters (having at least one acre of land under Poplar based agroforestry) in the selected village were included in the sample and same number of non-adopters (having equal range of cultivable land as adopters) were also taken from same selected villages. To make the sample of 12 adopters and 12 non-adopters in each selected block, if 12 adopters were not available in the first selected village then next randomly selected village was taken without replacing the earlier selected villages from the block. The process of selecting the adopters and non-adopters was repeated and got the required sample in each block. In this way, sample of 108 adopters and 108 non-adopters of Poplar based agroforestry was taken for the study.

The awareness was taken more as a cognitive behaviour and operationalised as the respondents, consciousness i.e., being aware or not aware about the particular benefits of Poplar based agroforestry. The awareness items (factual statements) were collected from literature. The collected items were formulated and classified under different headings for the purposes of handling and explanation of data. The awareness about each individual item was computed by putting together dichotomous responses to that item i.e., aware or not aware from each respondent separately. So, awareness as presented refers to number of people who were alert about the particular item.

Results and Discussion

The data relating to awareness about the different aspects of benefits of Poplar based agroforestry system are presented as under :

(i) *Distribution of respondents according to their awareness about the efficient and judicious use of resources in Poplar based agroforestry* : The data relating to distribution of adopters and non-adopters regarding awareness about efficient and judicious use of resources have been given in Table 1, revealed that 75.93 per cent adopters and 62.96 per cent of non-adopters were aware about the proper utilization of space by adopting Poplar based agroforestry. The data in this table also indicated that 60.19 per cent of adopters and 45-37 per cent of non-adopters were aware about the benefits of efficient utilization of nutrients in Poplar based agroforestry. Seventy five per cent adopters and 57.41 per cent non-adopters were aware about the benefits of utilization of labour properly in intensive cultivation of Poplar based agroforestry. It was quite obvious that 61.11 per cent adopters and 29.63 per cent of non-adopters were aware about the benefits of more percolation of water into soil.

(ii) *Distribution of respondents according*

Table 1

Distribution of respondents according to their awareness about the efficient and judicious use of resources in Poplar based agroforestry

Statement	Adopters	Non-adopters
Space can be properly utilized by adopting Poplar based agroforestry	82 (75.93)	68 (62.96)
Nutrients are efficiently utilized in Poplar based agroforestry	65 (60.19)	49 (45.37)
Intensive cultivation utilizes labour properly	81 (75.00)	62 (57.41)
Poplar based agroforestry helps more percolation of water to soil	66 (61.11)	32 (29.63)

Figures in parenthesis indicate percentage.

Table 2

Distribution of respondents according to their awareness about nutrient cycling in Poplar based agroforestry

Statement	Adopters	Non-adopters
By adopting Poplar based agroforestry organic matter is added to soil by litter fall	90 (83.33)	53 (49.07)
It improved physical and chemical properties of soil	69 (63.89)	47 (43.52)
It suppresses weeds with shading effect and save the nutrient loss	75 (69.44)	54 (50.00)

Figures in parenthesis indicate percentage.

to their awareness about nutrient cycling in Poplar based agroforestry : The data relating to awareness of nutrient cycling in Poplar based agroforestry is given in Table 2. A perusal of data revealed that as many as 83.33 per cent of adopters and 49.07 per cent of non-adopters were aware about the benefits of adding organic matter to soil by litter fall of Poplar in Poplar based agroforestry. As many as 63.89 and 43.52 per cent of adopters and non-adopters, respectively, were aware about the benefits of improvement of physical and chemical properties of soil by adoption of Poplar based agroforestry. There were 69.44 per cent adopters and 50 per cent non-adopters, aware about the benefits of suppressing weed with shading effect and prevent nutrient loss. Raj (1998) also recorded the release of N, P and K from decomposing leaf litter of Poplar in agri-silvicultural system.

(iii) *Distribution of respondents according to their awareness about protective benefits of Poplar based agroforestry* : The data in Table 3 reveals that 71.30 per cent adopters and 41.67 per cent of non-adopters were aware regarding advantages of checking soil erosion by Poplar based agroforestry. Further, 38.89 per cent of non-adopters and 57.41 per cent of adopters were aware of benefits by restraining droughts and floods. Again, as many as 71.30 per cent

Table 3

Distribution of respondents according to their awareness about protective benefits of Poplar based agroforestry

Statement	Adopters	Non-adopters
Poplar based agroforestry checks soil erosion	77 (71.30)	45 (41.67)
It resists rains to drought and floods	62 (57.41)	42 (38.89)
Poplar plants slow down the beating effect of rainfall	77 (71.30)	48 (44.44)
Poplar plant acts as barrier to spread of diseases and pests	60 (55.56)	49 (45.37)
Poplar based agroforestry minimizes the risk from natural hazards	77 (71.30)	59 (54.63)

Figures in parenthesis indicate percentage.

Table 4

Distribution of respondents according to their awareness about benefits of Poplar plants

Statement	Adopters	Non-adopters
Poplar plant provides fuel wood in all seasons and saves cowdung	85 (78.70)	64 (59.26)
Market for Poplar plant is readily available	59 (54.63)	54 (50.00)
Uprooting of Poplar plant root is an easy job	68 (62.96)	53 (49.07)
Poplar plant matures uniformly so it can be harvested at one time	71 (65.74)	62 (57.41)
Due to coming up of plywood industries demand for Poplar wood is increasing	79 (73.15)	61 (56.48)

Figures in parenthesis indicate percentage.

adopters and 44.44 per cent of non-adopter were aware about the benefit of slowing down the beating effect of rainfall. On the other hand, 45.37 per cent non-adopters and 55.56 per cent of adopters were aware that Poplar plant acts as barrier to spread of disease and pests. In addition to these, it was also clear from Table 3 that 71.30 per cent adopters and 54.63 per cent non-adopters were aware about minimizing the risk from natural hazards by the adoption of Poplar based agroforestry. Similar observations were made by Sinha *et al.* (1984).

(iv) *Distribution of respondents according to their awareness about benefits of Poplar plants* : It is apparent from the data presented in Table 4 that 78.70 per cent adopter and 59.26 per cent of non-adopters were aware about the benefits regarding provision of fuel wood from Poplar plant in all seasons and thereby saving cow dung. As many as 54.63 per cent adopters and 50 per cent non-adopters were aware that market of Poplar plant was readily available. The uprooting of Poplar plant roots, a easy job, was known to 62.96 per cent adopters and 49.07 per cent of non-

adopters. Again, as many as, benefit of uniform maturity to harvest at one time to Poplar plant were known to 65.74 per cent adopters and 57.41 per cent of non-adopters. In addition to this increasing demand of Poplar wood by upcoming of plywood industries, were known to 73.15 per cent adopters and 56.48 per cent of non-adopters on an overall basis.

(v) *Distribution of respondents according to their awareness about environmental benefits of Poplar based agroforestry* : The distribution of adopters and non-adopters regarding awareness about the environmental benefits of Poplar based agroforestry has been given in Table 5. A remarkable differences was observed in case of awareness regarding reduction of air and noise pollution, between adopters (78.70%) and non-adopters (52.78%). Again modification in extremes of weather with Poplar as a benefit was known to 57.41 per cent adopters and 35.19 per cent of non-adopters. Poplar plant decreased wind speed as a benefit was known to 47.22 per cent of adopters and equal number of non-adoption. Some of these findings are in agreement with those of Sinha *et al.* (1984).

(vi) *Distribution of respondents according to their awareness about the benefits of*

Table 5

Distribution of respondents according to their awareness about environmental benefits of Poplar based agroforestry

Statement	Adopters	Non-adopters
Poplar plant reduces air and noise pollution	85 (78.70)	57 (52.78)
Extremes of weather are modified with Poplar	62 (57.41)	38 (35.19)
Poplar plant decrease wind speed	51 (47.22)	51 (47.22)

Figures in parenthesis indicate percentage.

Table 6

Distribution of respondents according to their awareness about the benefits of Poplar based agroforestry over sole agricultural crops

Statement	Adopters	Non-adopters
Poplar based agroforestry decreases diseases by changing microclimate	79 (73.15)	65 (60.19)
Poplar plants does not require additional nutrients	69 (63.89)	64 (59.26)
Poplar plant does not exhaust the ground water	88 (81.48)	67 (62.04)
Poplar being winter deciduous, has minimum shade effect on rabi crops	51 (47.22)	54 (50.00)
Poplar plant has minimum tree crop interaction	74 (68.52)	58 (53.70)

Figures in parenthesis indicate percentage.

Poplar based agroforestry over sole agricultural crops : It is evident from the data presented in Table 6 that 73.15 per cent adopters and 60.19 per cent of non-adopters were aware about the benefits of decrease in incidence of disease by changing micro-climate in Poplar based agroforestry. However, 63.89 per cent of adopters and 59.26 per cent of non-adopters were aware of non-requirement of additional nutrients by Poplar plant, as a benefit of Poplar based agroforestry. Adopters, 81.48 per cent and non-adopters, 62.04 per cent were aware that Poplar plant do not exhaust the ground water. Further analysis of data presented in Table 6 revealed a reverse trend that 47.22 per cent adopters were aware that Poplar plant as winter deciduous, had least shade effect on Rabi crops. Again, it was evident that 68.42 per cent adopters and 53.70 per cent of non-adopters were aware about the benefit of minimum tree crop interaction in Poplar based agroforestry. Dhaliwal *et al* (1997) also recorded that 21.43 per cent respondents expressed their views of shade affect on agricultural crops and only Rabi crop is feasible after two years of age of Poplar plants.

(viii) *Distribution of respondents according to their awareness about socio-economic benefits of Poplar based agroforestry* : A perusal of data given in Table 7 revealed that 75 per cent of adopters and 59.62 per cent of non-adopters were aware about benefits of selling Poplar plant at anytime. Adopters, 57.41 per cent and non-adopters, 44.44 per cent were aware about increase in land returns per unit of area. Further, it was also evident that Poplar brings self sufficiency, was aware to 62.04 per cent adopters and 36.11 per cent non-adopters. In addition to these, 55.56 per cent adopters and 38.89 per cent non-adopters were aware that Poplar based agroforestry makes living conditions better. Some of these findings are in conformity with those of Singhal and Panwar (1992), Mathews *et al.* (1993) and Dhillon *et al.* (1995).

From the above discussion it may be concluded that the adopters are much more aware about the benefits of Poplar based agroforestry than non-adopters with the existing issues raised by earlier adopted *Eucalyptus* under agroforestry, the non-adopters are having comparatively less awareness about the benefits. Majority of

Table 7

Distribution of respondents according to their awareness about socio-economic benefits of Poplar based agroforestry

Statement	Adopters	Non-adopters
Poplar plant can be sold in any time	81 (75.00)	64 (59.26)
Per unit area returns from Poplar based agroforestry are increased	62 (57.41)	39 (44.44)
Brings self-sufficiency	67 (62.04)	39 (36.11)
Makes living conditions better	60 (55.56)	42 (39.89)

Figures in parenthesis indicate percentage.

farmers reported that growing of Poplar in blocks is more profitable than agricultural crops. Similar findings were reported by Dhaliwal *et al.* (1997). They also reported that lack of technical guidance was major constraint in getting good productivity. In spite of the awareness towards Poplar based agroforestry, non-adopters may have social, legal, economic, technical or ecological constraints in adopting Poplar on their farms. If the efforts are made by the extension agencies to raise the awareness the adoption of Poplar can be enhanced to a considerably.

Conclusion

Poplar, a multipurpose agroforestry tree species occupies an important position in rural economy. However, Poplar based agroforestry in Punjab is at the beginning stage. The biological, environmental, economical and social relationship within and among the agroforestry system are yet not well known. For its successful development, there is great need for scientific research, suitable policy development of new technologies, their application and adoption by the farmers. Therefore, the present study was undertaken to study the awareness of adopters and non-adopters towards the benefit of Poplar based agroforestry by the farmers of Punjab. On the basis of the information provided by the respondents, it was concluded that awareness of non-adopters as well as adopters were medium to high, whereas, none of the adopters had low awareness about the benefits of Poplar adoption. Besides strengthening of research, there is great need for dissemination of already available information to the farmers.

SUMMARY

The present study was undertaken to compare the awareness of adopters and non-adopters towards the benefits of Poplar based agroforestry in Punjab. Multistage sampling technique was followed for the selection of the respondents and 108 adopters and 108 non-adopters of Poplar based agroforestry were taken for the study. Adopters as well as non-adopters had medium to high awareness about the judicious use of resources, nutrient cycling, protective benefits, environmental benefits, socio-economic benefits, etc of Poplar in agroforestry system.

पंजाब में अपनाने वालो और न अपनाने वालों की पोपलर आधारित कृषिवानिकी के विभिन्न पक्षों के प्रति जागरूकता

राकेश नन्दा, जी०एस० मोमी व संजीव चौहान

साराश

प्रस्तुत अध्ययन पंजाब में पोपलर आधारित कृषिवानिकी के लाभों के प्रति उसे अपनाने वालों और न आपनाने वालों की जागरूकता की तुलना करने के लिए किया गया । प्रतिचारियों का चुनाव करने के लिए बहुस्तरीय न्यादर्शन विधि अपनाई गई और पोपलर आधारित कृषिवानिकी के 108 अपनाने वालों और 108 उसे न अपनाने वालों को इस अध्ययन में लिया गया । पोपलर की कृषिवानिकी प्रणालियों में संसाधनों के बुद्धिसंगत उपयोग पोष्याहार चक्रण, रक्षाकारी लाभों पर्यावरणिक लाभों, समाजार्थिक लाभों इत्यादि के बारे में उसे अपनाने वाले और उसे न अपनाने वाले दोनों तरह के लोगों में मध्यम से अधिक तक की जागरूकता पाई गई ।

References

Dhaliwal, H.S., K. Singh and K.S. Bawa (1997). Production and marketing problems of agroforestry. *PSE Economic Analysis,* **17** (1-2) : 45-56.

Dhillon, M.S., H.N. Khajuria, H.S. Dhaliwal and D.S. Dhillon (1995). Bio-economic appraisal and improvement of natural and planted agroforestry models. *Project report submitted to Regional Centre for National Afforestation and Eco-development Board*, UHF Nauni, Solan.

Johal, S.S., S. Singh, D.S. Deve, G.S. Nijjor, A.S. Sidhu, K.S. Gill and S.S. Grewal (1986). *Report of expert committee on diversification of agriculture in Punjab.* Submitted to Govt. of Punjab, India.

Mathews, S., S.M. Peese, A.M. Gordon and P.A. Williams (1993). Land owner perceptions and the adoption of agroforestry practices in southern Ontario, Canada. *Agroforestry System,* **21** (2) : 159-168.

Raj, A. (1998). Pattern of weight loss and release of N, P and K from decomposing leaf of Poplar (*Populus deltoides*) in an agri-silvicultural system. *M.Sc. Thesis*, PAU Ludhiana. 58 pp.

Singhal, R.M. and B.P.S. Panwar (1992). A study of cropping pattern under Poplar based agroforestry system in North Western UP. *Van Vigyan,* **36** (1) : 29-38.

Sinha, H.S.P., A.K. Sinha and K. Sinha (1984). A study of attitude of farmers of Chhangpur towards soil conservation programme. *Ind. J. Extn. Edu.,* **20** (3 & 4) : 9-17.