Indian Journal of Extension Education

Vol.46, No. 1 & 2, 2010 (1-6)

Knowledge Level of Watershed Farmers about Agro-forestry and Silvi-pasture Practices - A Study in Karnataka

K. Narayanagowda[1], N.R. Gangadharappa[2], L. Ramakrishna Rao[3] and Doddahanumaiah[4]

ABSTRACT

This sutdy was conducted to asses to knowledge level of watershed farmers about agro-forestry and silvi-pasture practices in Karnataka. Ten farmers were selected from 18 villages under watershed project through random sampling procedure. Results shown that majority of farmers had sufficent knowledge of all the agro-forstry and silivi-pasture models alongwith practices and their economic advantages. Results revealed that farmers had knowledge of most of the species used in different modules of agro-forestry and silvi-pastural system. The association between education, farm size, animals owned, annual income, material possesion, extension participation, environmental awareness, deferred gratification with level of knowledge of the farmers was highly significant. Participation of farmers in the activiation of various social organisations such as panchayat institutions, cooperative, farmers club, etc. had contributed greatly for increasing knowledge of farmers.

The basic philosophy of watershed management is to conserve soil and moisture to ensure better productivity. The specific objectives of watershed development programme are : (1) conserving the basic resources like soil, rain water and vegetation, (2) imparting stability to crop yields through improved crop management, (3) developing alternative land use systems through forestry, horticulture and animal husbandry, (4) checking environmental degradation and (5) restoring ecological balance ananymous. In this endeavor, it is necessary to encourage farmers to practice multiple use of land through diversifying their land use practices. The "agro-forestry" system is one such endeavor gaining popularity in recent years. It is a system of combining or integrating food/cash crops, compatible with multi-purpose bushes or trees and animal enterprises. The adoption of this system ensures availability of fuel, fodder, green manure, poles and small timber to farmers. Further, the adoption of agro- forestry system reduces pressure on forest - the crux of environmental degradation.

In watershed programmes special emphasis has been laid for conservation and development of natural resources by adopting technically efficient and economically feasible land use system, inclusive of agro-forestry, silvi-pasture and agri-horticulture. These land use systems invariably involve cultivating tree species along with agricultural crops. Under agro- forestry, silvi- pasture and silvi-horticulture land use systems of watershed programmes, several technological packages have been developed and advocated by the scientists and field extension functionaries for acceptance and adoption by the end users.

The present study was undertaken to measure the knowledge level of farmers about agro-forestry and silvi-pasture practices as well as to examine the relationship between farmer's knowledge and their personal, socio-economic and psychological characters.

METHODOLOGY

The study was conducted in 18 selected villages in twin watershed project viz., Kalyanakere - Mavathurakere watershed project. From each of these villages, ten farmers practicing agro-forestry and silvi-pasture were selected by adopting random sampling procedure. Thus, the total sample consisted of 180 respondents for the study. Relevant scales and procedure were employed to measure the identified variables. Data were collected from the respondents using a pre-tested schedule by employing interview method, observation method and PRA techniques. Data were tabulated and analyzed by using statistical techniques like frequencies, percentages, correlation and multiple regressions co-efficient.

[1, 2, 3, & 4] Directorate of Extension, UAS, Hebbal, Bangalore - 560024.

In the present study, farmers' knowledge about agro-forestry and silvi-pasture practices refers to the understanding of the concepts, benefit and practices of agro-forestry and silvi-pasture systems by farmers.

The operational measure for knowledge was developed by construction of a teacher- made-knowledge-test and the procedure suggested by Anastasi (1961) was followed in this study. The knowledge test was constructed based on the package of practices for cultivation of trees on farm land prescribed by the Directorate of Watershed, Karnataka State Forest Department and the University of Agricultural Sciences, Bangalore. Further, in consultation with scientists, foresters and extension workers, a list of knowledge items were prepared relating to agro- forestry and silvi-pasture practices and each practice was put 'in question form to the farmers to obtain responses. Totally, there were 46 knowledge items in the schedule and each of them was given a score of zero and one for no knowledge and complete knowledge, respectively. Thus the total possible score was 46. To assess the knowledge level of farmers about each item, the results were expressed in frequencies and percentages.

RESULTS AND DISCUSSION

Knowledge level of farmers about agro-forestry and silvi-pasture practices :

Table 1, reveals that majority of farmers were knowledgeable about the concept of agro- forestry and silvi-pasture practices and their economic advantages.

Table 1. Knowledge level of farmers about agro-forestry and silvi-pasture practices

(N-180)

Sl. No.	Knowledge items	Respondents No.	%
1.	Agro-forestry means : Growing of trees along with agriculture crops	171	95
2.	Silvi-pasture means : Growing of trees along with pastures	154	86
3.	Agro-forestry and silvipasture gives substantial income even in drought/ delayed monsoon	163	91
4.	Agro-forestry and silvi-pasture supply fodder even in drought/delayed monsoon	147	82
5.	Agro-forestry and silvi-pasture helps in utilizing marginal and sub-marginal lands	146	81
6.	Agro-forestry and silvi-pasture helps in conserving soil	114	63
7.	Agro-forestry and silvi-pasture helps in conserving water	104	58

Multiple responses are possible

The primary goal of extension is to spread knowledge and technology for benefit to rural communities. This work was effectively discharged in the project area by employing appropriate extension strategies. Consequently, the intensive educational efforts undertaken by the project machinery over a decade on one hand and farmers participation in various activities of the project on the other hand might have resulted in farmers possessing high knowledge on various aspects of agro-forestry and silvi-pasture practices and their benefits.

Further, due to fall in the prices of agricultural commodities in the preceding years of data collection, many farmers were looking for an alternative farming systems that would ensure better net income. Agro-forestry was considered by the farmers as the better option over many seasonal agricultural crops. Probably this economic motive might have greatly influenced the farmers to know more about agro-forestry and silvi-pasture practices.

From the results presented in Table 2, it can be inferred that a great majority of the farmers had sufficient knowledge of all the agro-forestry and silvi-pasture models. This might be due to the extension activities organized by the staff and demonstration effect of the established agro-forestry models in the project area. Only 50 per cent of farmers had the knowledge of contour bund planting and planting along field roads. Laying contour bunds across the slope is an important technology recommended under soil and water conservation practices of watershed management. Both of these technologies viz., the formation of contour bunds and field roads can be practiced conveniently only in large holdings. On the contrary most of the holdings in the project area were small, fragmented and scattered all-round the village. Therefore, due to non-feasibility, 50 per cent of farmers did not possess the knowledge on these two practices.

Table 2 : Knowledge level of farmers about agro-forestry and silvi-pasture models and species recommended

Models	Knows different Models		Know species	
	No.	%	No.	%
Field border planting	180	100	180	100
Non-arable lands planting	180	100	180	100
Block planting	180	100	180	100
Rando tree planting	160	89	154	86
Trees in rows/Alley cropping	162	90	150	83
Foreshore planting	153	85	150	83
Nala bank planting	144	80	144	80

Timber trees + Pasture	86	48	144	80
Live bunds	146	81	144	80
Planting along waterways	151	84	144	80
Contour bund planting	90	50	138	77
Top feeds + pasture	85	47	138	77
Planting around water harvesting structure	153	85	128	71
Planting along field roads	90	50	108	60

Multiple responses are possible

Majority of the farmers had the knowledge of most of the species used in different models of agro-forestry and silvi-pastural system. This was made possible, because of their past experience of growing trees as well as their involvement in educational activities of the project for more than a decade.

Since time immemorial, trees are being grown by farmers mainly to meet their domestic and agricultural requirements. Besides, being the direct consumers of tree products, the critical observation of farmers about the utility of tree species for different purposes in their surroundings might have contributed to possess better knowledge about the suitable species recommended for different purposes (Table 3).

Table 3 : Knowledge level of farmers about the species suitable for different purpose

(N=180)

Purpose	Respondents	
	No.	%
Timber	180	100
Fuel	180	100
Fodder	180	100
Fruits	180	100
Wind break	166	92
Flowering	166	92
Green manure	153	85
Fiber	144	80
Soil binding	111	62

Multiple responses are possible

Research studies conducted in the past by Dixit (1988) and Sangappa (1996) in different parts of the country about the knowledge level have indicated that, farmers had reasonably good knowledge about agro-forestry. Whereas, a study carried out by Sinha, et al. (1991) indicated that farmers possessed poor knowledge.

Association between personal, socio-economic and psychological characteristics of farmers and their knowledge level about agro-forestry and silvi-pasture practices :

A cursory look at the results presented in Table 4, clearly demonstrated at the association between the variables viz., education, farm size, animals owned, annual income, material possession, mass media participation, social participation, extension participation, environmental awareness, deferred gratification and with level of knowledge of the farmers was highly significant.

Table 4 : Association between personal, socio-economic and psychological characteristics of farmers and their knowledge level about agro-forestry and silvi-pasture practices

(N=180)

Sl. No.	Characteristice	Correlation values	Leval of significance
1.	Education	0.2564	**
2.	Farm size	0.3619	**
3.	Annual income	0.3844	**
4.	Animals owned	0.3043	**
5.	Material possession	0.3662	**
6.	Social participation	0.4355	**
7.	Mass media participation	0.4333	**
8.	Cosmopoliteness	0.0690	NS
9.	Extension participation	0.5963	**
10.	Achievement motivation	0.0805	NS
11.	Risk orientation	0.0076	NS
12.	Environmental awareness	0.6977	**
13.	Deferred gratification	0.4838	**

** = Significance at one per cent level
NS = Non-significant

The highly significant association between knowledge level and education level of farmers might be due to the known fact that to broaden one's knowledge horizon, the basic requirement would be to become a literate and to some extent possess a formal education. Many farmers in the area have undergone the elementary education. This was made possible because of free access to education and infrastructure available in each and every village. Therefore, in the present study it was found that education level of farmers was significantly correlated with the knowledge level of farmers.

The association between farm size and animals owned with the knowledge level was positive and significant. This might be due to the fact that the farmers owning relatively larger holdings might have thought it would be appropriate to diversify their farming. Considering the requirement of food grains for their family and hay for their cattle, these farmers were willing to take up non-traditional crops such as dryland horticulture, agro- forestry and silvi-pasture. Therefore, with an idea of venturing into a new land based enterprise, farmers having large holdings might have acquired knowledge on various options of crop diversification including agro-forestry and silvi-pasture practices. Similarly to ensure fodder supply in dry season, the livestock possession of farmers might have contributed and inspired them to know more about agro-forestry and silvi-pasture practices.

The farmers having larger land holding, generally produce sufficient food grains for their livelihood. Obviously, once this basic need is met, big farmers try the ways and means of increasing their net income (Maslow, 1943). One of the options of enhancing their income by keeping natural resource intact could be agro-forestry especially in the rainfed areas. Hence, size of the land holding is positively related with the knowledge level of farmers with respect to agro-forest. Similarly farmers owning more number of animals have to bother much about the fodder, particularly in the absence of common grazing land. Further, the fodder requirement cannot be met through out the year by growing only food crops. Farmers might have thought of alternative perennial crops to feed the animals under agro-forestry and silvi-pasture systems. Hence, animals owned and knowledge level of the farmers with respect to agro-forestry were positively correlated.

The annual income and material possession, which are economic factors, had highly significant relationship with the knowledge level of farmers in respect of agro-forestry and silvi- pasture practices. It is quite natural that, resource rich farmers will have an advantage over the resource poor farmers to try an innovation on their farms and can withstand the loss if innovation fails to perform. Therefore, farmers who have willingness and capacity to withstand high investments might have sought to know more about developments that were taking place around them and the innovations that were available for adoption.

Extension participation, mass media participation and social participation were found to have positive and significant relationship with the knowledge level of farmers. It is a proven phenomenon, wherever, the extension activities were organized professionally, irrespective of the enterprise/technology, it was found that the knowledge level of the participants was high. This might have happened in the present study area also. Mass media is found to be a powerful and low cost media to disseminate variety of information and more so about aforestation and eco-conservation. The repeated coverage on these issues, mass media might have induced the farmers to know more about agro-forestry and silvi-pasture practices. Any individual will also try to move from unfreezing condition to that of freezing condition in order to find the solution to the problem by exposing, participating and interacting himself with others (Miles, 1964). Farmers are not exceptional and hence these variables were related significantly.

Farmers live in nature, work with nature and depend on nature. Therefore, they play an important role in reconstructing the degraded environment. With an idea of restoring environmental degradation and considering their role and responsibilities, farmers might have sought information related to agro-forestry and silvi-pasture practices.

Generally, farmers who were willing to realize the benefits only after certain years will go for tree crops. Knowing this fact very well, only such farmers might have sought more information about agro-forestry and silvi-pasture practices. This resulted in establishing association of knowledge level of farmers in respect of agro-forestry and silvi-pasture practices with that of deferred gratification.

These results are in conformity with the results of Ramegowda (1991), Sangappa (1996) and Dixit (1998) establishing a positive and significant association between socio- psychological variables and the knowledge level of farmers in cultivation of trees and related crops. However, the results of the present study are contradicting the results of Ranganath (1997), Prasanna Kumar (1995) and Jirli (1996). The non-significant association between the knowledge of farmers and the risk orientation, achievement motivation and cosmopoliteness of the farmers found in the present study are in agreement with the results of Dixit (1988) and Jirli (1996).

Extent of contribution of independent variables in explaining the variation in knowledge level of farmers :

As per the results presented in Table 5, the important determinants of knowledge of farmers with regard to agro-forestry and silvi-pasture practices were farm size, social participation, extension participation, environmental awareness and deferred gratification.

Table 5 : Extent of contribution of independent variables in explaining the variation in the knowledge level of farmers

(N=180)

Sl. No.	Independent variables	Regression co-efficient	SE of regression co-efficient	't' value
1.	Education	0.3515	0.2682	1.3105
2.	Farm size	0.3296**	0.1004	3.2823
3.	Annual income	0.0005	0.0003	0.3891
4.	Animal owned	-0.0477	0.0609	-0.7844
5.	Material possession	0.0009	0.0436	0.0212
6.	Social participation	0.1633**	0.0488	3.3456
7.	Mass media participation	0.3511	0.1861	1.8864
8.	Cosmopoliteness	-0.0020	0.0472	-0.0438
9.	Extension participation	0.3817**	0.0830	4.5654
10.	Achievement motivation	-0.0109	0.0282	-0.3895
11.	Risk orientation	0.0859	0.0505	1.7013
12.	Environmental awareness	0.1429**	0.0174	8.1679
13.	Deferred gratification	0.1933**	0.0587	3.2896
14.	Constant	6.4681	1.7190	3.7625

R = 0.7131, F = 31.740**

** = Significance at one per cent level

The influence of farm Size on knowledge level was found to be positive and significant. The possible reasons could be that the small farmers grow food grains mainly for family consumption and fodder for their livestock. Further, many a time the food grains and fodder produced in their small piece of land is insufficient to meet the domestic requirement. Therefore, only large farmers might have diverted a portion of their land for tree cultivation. Hence, only such farmers might have sought or made an attempt to know more about tree cultivation. Thus, the size of farm might have influenced in increasing the knowledge of the farmers in respect of agro-forestry and silvi-pasture practices. These findings are contradicting the results obtained by Dixit (1988).

Participation of farmers in the activities of various social organizations such as panchayat institutions, cooperatives, farmers clubs etc., had contributed greatly for increasing knowledge level of farmers. The possible reasons could be that, taking part in the activities of social organizations as a member or an office bearer would help the farmers to know the latest developments that have taken place in the field of agriculture, horticulture, sericulture etc., including the forestry activities planned and executed under watershed project. Participation in the activities of the social organizations would enable the farmers to get first hand information about the developmental programmes formulated for their benefit. Many-a-time, these projects are formulated through participatory methods. Therefore, social participation has significantly contributed for increasing the knowledge level of farmers in respect of agro-forestry and silvi-pasture practices. The results are in line with the findings of Sundararaj (1978).

To educate the farmers, the extension approaches employed by the project staff were conducting meeting, carrying out demonstrations, arranging field visits, study tour and orgaruzmg exhibitions. The extension work was further strengthened by employing participatory methods. These concerted efforts have resulted in bringing about tremendous achievements in all fronts of watershed management viz., soil and water conservation, crop production and tree cultivation. Therefore, the intensive extension education activities planned and executed by the project staff might have largely contributed in increasing the knowledge level of farmers in respect of agro-forestry and silvi-pasture practices. These results are in line with the findings of Dixit (1988).

It is interesting to note that, in the present study the environmental awareness of farmers had greatly influenced in increasing the knowledge level of farmers. These findings can be explained on the basis of the fact that, the farmers' exposure to environment in the neighbourhood and critical observation of changes that have taken place in their surroundings over a period might have created a sort of concern for environment. It was the opinion of all the elder farmers that in the yester years the farmers' requirements such as firewood, fodder, timber, green manure etc., were met out by nearby forests, there was adequate rainfall and sufficient underground and surface water for irrigation. On the contrary, they said that now they are facing various problems related to environmental degradation. Therefore, difficulties experienced by farmers themselves might have resulted in expressing highest concern about environmental aspects and to acquire more information in conserving the fragile eco-system.

Not many studies are available on environmental awareness of farmers, therefore, the related studies carried out by Hareesha (1994) was considered for the review and it is quite apparent that, farmers had little knowledge about ill effects of agricultural chemicals, which is contradicting results of the present research.

Deferred gratification of farm trees also contributed for increase in knowledge level of farmers. This might be due to the fact that, though the forest trees gives returns only after certain years, the income was assured with high cost-benefit ratio. Probably, the assured net financial benefit might have made the farmers to know more about agro-forestry and silvi- pasture practices. These results are in agreement with those of the studies conducted by Ramegowda (1991). However, it was in contrast with the results of Ravishankar (1995).

CONCLUSION

The overall knowledge level of watershed farmers about agro-forestry and silvi-pasture practices appeared to be high. However, nearly 40 per cent of the farmers seem to be not aware of the usefulness of agro-forestry and silvi-pasture practices in soil and water conservation as well as the species recommended for contour bund planting, which is an important component in watershed management. Therefore, concerted efforts are necessary to educate the farmers in this regard.

The knowledge level of farmers was greatly influenced by the variables, viz., farm Size, social participation, extension participation, environmental awareness and deferred gratification. The extension agencies may considered these factors to ensure further increase in the level of knowledge of farmers in respect of agro-forestry and silvi-pasture practices.

REFERENCES

Anastasi, A. (1961). Psychological Testing. Mc. Million Company, New Delhi.

Anonymous, (1997). Land management techniques for watershed development in Karnataka, Department of Agriculture, Bangalore. pp. 5-6.

Dixit, S. (1988). A study on the impact of social forestry and farm forestry programmes on rural beneficiaries, M.Sc. thesis (Unpub.), Univ. Sci., Bangalore.

Hareesha, N., (1994). Awareness and attitude of farmers and extension personnel towards the ill effects of agricualtural chemicals. M.Sc.(Agri.) thesis (Unpub.), Univ. Agric. Sci., Bangalore.

Jirli, V. Basavaprabhu. (1996). Knowledge Level and Adoption Behaviour of Vegetable Growers with respect to Integrated Pest Management. M.Sc. (Agri.) thesis (Unpub.), Univ. Agric. Sci., Bangalore

Kantharaju, (1989). A study on adoption of improved practices of coffee and cardamom by small farmer in Hassan district, Kamataka State. M.Sc. (Agri.) thesis (Unpub.), Univ. Agric. Sci., Bangalore.

Maslow, A.H., (1943). A theory of human motivation. Psychol. Rev., SO: 373-396.

Miles, M.B., (1964). Innovations in education, New York, Bureau of Publication, Teachers College, Colombia University.

Prasanna Kumar, G.T., (1995). Knowledge and perception of joint forest planning and management by participant farmers in Uttar Kannada district. M.Sc. thesis (Unpub.), Univ. Agric. Sci., Bangalore.

Ramegowda, B.L., (1991). Crisis management by farmers - An analysis. Ph.D. thesis (Unpub.), Univ. Agric. Sci., Bangalore.

Ranganath, A.D., (1997). A study on the knowledge and adoption of organic farming practices among rice farmers. M.Sc. thesis (Unpub.), Univ. Agric. Sci., Bangalore.

Ravishankar, R.L., (1995). A study on knowledge and adoption constraint analysis of potato farmers in Chikkamagalur district. M.Sc. (Agri.) thesis (Unpub.), Univ. Agric. Sci., Bangalore.

Sangappa, B. (1996). A study on knowledge, adoption and perception of usefulness of Agroforestry practices of farmers of Hangal tal uk, Dharwad district. M.Sc. thesis (Unpub.), Univ. Agric. Sci., Dharwad.

Sinha, R.P., Rahad, B.G. and Ingle, P.O., (1991). Changing scenario of Dryland Horticulture in Tribal Area. Maharastra J Extn., Educ., 10 : 75-80.

Sundararaj, A.K., (1978). A study of knowledge and adoption behaviour of small and big farmers growing tomato in Bangalore district. M.Sc. (Agri.) thesis (Unpub.), Univ. Agric. Sci., Bangalore.