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EXTENT OF ADOPTION OF RECOMMENDED PACKAGE OF PRACTICES FOR COCONUT

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ABSTRACT

In Kerala, the largest producer of coconuts in the country, the productivity level remained low compared to many other states in India. Lack of adoption of scientific cultivation practices has been stated to be one of the important reasons for such a low productivity. A study was undertaken to analyse the adoption of recommended cultivation practices by the coconut farmers. The study covered 42 gramapanchayats in Kannur district of Kerala State with a total of 630 respondents. The results of the study revealed that recommended practices such as planting time, size of pit, depth of planting, application of organic manures and mulching of basins were having high level of adoption. But items such as hybrid varieties, improved irrigation methods like sprinkler and drip, control of pests like red palm weevil, biological control of pests, nematode management, and post harvest technologies like use of copra dryers were having low level of adoption. Lack of labour and high cost of labour, fluctuating market for the produce, lack of availability of quality planting materials, high cost of inputs, lack of awareness about the improved cultivation practices were some of the constraints experienced by the coconut growers. Socio-personal characteristics such as educational status, farm size, annual income, social participation, extension orientation, and mass media exposure had positive and significant relationship with the extent of adoption. The results of the study revealed the need for strengthening the educational efforts by the various research and extension agencies engaged in the development of coconut to benefit the farmers and also to encourage group management of cultivation practices at grass root level by organising the farmers to reduce cost of production and to enhance the effectiveness of extension efforts.

INTRODUCTION

Coconut plays a pivotal role in the agrarian economy of Kerala State. The State has the largest area under coconut cultivation in India. It is also the largest producer of coconuts in the country. However the productivity level remained low in the state compared to many other states in India. In Kerala, the productivity is only 6188nuts (1998-99) per ha, which is far behind the productivity of 11620 nuts per ha obtained in the neighbouring State, Tamil Nadu. Lack of adoption of scientific cultivation practices has been stated to be one of the important reasons for such a low productivity. Bastine *et al.* (1991) reported that only 6.5 per cent coconut farmers grew hybrid varieties and only 16 per cent adopted irrigation. Further, coconut growers experience several socio-personal and economic constraints in adopting the recommended technologies. Lack of sufficient labour for climbing palms, high cost of inputs, lack of availability of quality planting materials etc are often reported as constraints in adopting the recommended cultivation practices (Jnanadevan and Prakash, 1994). Under these circumstances, a study was undertaken to analyse the extent of adoption of recommended cultivation practices by the coconut farmers. The objectives of the study were to ascertain the extent of adoption of recommonded package of practics and to analyse the relationship between socio personal characteristics of the farmers and adoption of recommonded package of practices.

Table 1. Extent of adoption of package of practices of coconut cultivation (n=630)

Sl. No.	Item	Adoption Frequenct	Percentage
1.	Coconut Hybrids	89	14.13
2.	Nursery practices		
	a) Mother plant selection	172/447*	38.48
	b) Collection of seed nuts	201/447*	44.96
	c) Seedling selection	150/447*	33.55
3.	Planting		
	a) Spacing	246	39.04
	b) Pit size	432	68.57
	c) Depth of planting	435	68.04
	d) Time of planting	546	86.66
4.	Irrigation and soil and water conservationa)		
	a) Basin irrigation	217	34.40
	b) Sprinkler irrigation	6	0.95
	c) Drip irrigation	18	2.85
	d) Mulching	240	38.10
	e) Husk burial	61	9.68
	(1994) Cover crop	33	5.23
5.	Manuring		
	a) Application of FYM	562	89.20
	b) Chemical fertilizer for seedlings	180	28.57
	c) Chemical fertilizer for adult palms	280	44.40
	d) Application of lime	237	37.61
	e) Application of magnesium sulphate	41	6.50
6.	Coconut based cropping/Farming systema)		
	a) Intercropping	241	38.25
	b) Mixed cropping	265	42.06
	c) Mixed farming	28	4.40
7.	Integrated pest management		
	a) Control of rhinoceros beetle	204/596**	34.22
	b) Control of red palm weevil	3/22**1	3.63
	c) Control of coreid bug	9/60**	15.22
	d) Control of leaf eating caterpillar	6/32**	18.75
	e) Control of white grub	7/49**	14.28
	f) Control of rodents	96/241**	39.83
8.	Integrated disease management		
	a) Control of bud rot	96/224**	42.85
	b) Control of stem bleeding disease	58/196**	29.59
9.	Nematode management	0	0
10.	Biological control of pests	2	0.3
11.	Post harvest processing technologies		
	a) Palm climber	15	2.4
	b) Solar drier	0	0
	c) Electrical drier	0	0
	d) Small holders' drier	2	0.3
	e) Copra moisture meter	0	0

*No. of farmers who raise own seedlings

METHODOLOGY

The study was conducted in Kannur district of Kerala State. Out of a total of 84 grama panchayats in the district, 42 were covered under the study. From each of the selected grama panchayats, five wards were randomly selected and from each ward, three farmers growing coconut were selected at random thereby making the total sample size to 630. A list of eight major items of technologies with relevant sub items was prepared and extent of adoption of these items was studied. A score of '1' was given for each of the adopted items and '0' for the non adopted item. Selected socio-personal variables such as age, education, farm size, annual income, social participation, extension orientation and mass media exposure were measured using standard scales. Data were collected individually using a pre tested interview schedule. Percentage analysis and correlation coefficients were employed to analyse the collected data.

RESULTS AND DISCUSSION

Adoption of recommended package of practices and constraints experienced by the coconut cultivators: Results on the extent of adoption of recommended package of practices by the coconut cultivators is presented in Table1.

Coconut hybrids: It could be observed that only 14 per cent of the farmers cultivate coconut hybrids. That too most of these farmers had only two or three palms of hybrids. Lack of availability of planting materials of hybrids was often cited as a major constraint in adopting coconut hybrids (Thampan, 1999). Coconut farmers, in general, perceived that hybrids required more care and management including proper manuring and irrigation for their better performance and under average management conditions local tall variety would be a better choice. Further they also believed that hybrid varieties were more susceptible to pests and diseases.

Nursery practices: Majority of the farmers (70 per cent) raised their own seedlings for planting. But it was observed that only less than half of them follow the recommended nursery practices. Only 38per cent of the farmers gave attention to the procedures for selection of mother palms while 45per cent followed proper collection of seednuts. When it comes to the selection of seedlings it could be observed that only 35 per cent of the farmers followed the recommended practices. Coconut being a perennial crop, production and planting of quality seedlings is very important for ensuring a better performance of the crop in the subsequent years. Arrangements for distribution of quality planting materials in sufficient quantity to those farmers who depend on external sources for seedlings and educational efforts to expose the farmers in raising own seedlings to the scientific nursery practices in coconut are some of the steps suggested to improve the situation.

Planting: Systematic planting of seedlings is essential for better establishment and performance of the coconut garden. The study revealed that only 39per cent of the gardens maintained proper spacing between coconut palms. In the remaining holdings plant density was high due to irregular planting which affect productivity of the crop. Predominance of small and marginal holdings is a factor that can be related to the unsystematic planting of coconut. Items traditionally followed such as pit size, depth of planting and time of planting were having a higher level of adoption with 68, 69 and 89 per cent of cultivators following the recommended practices. The results of the study showed that programmes to restructure the existing coconut gardens for optimum plant density and for systematic underplanting/replanting are to be implemented for enhancing coconut productivity in the state.

Irrigation and soil and water conservation practices: Only a small proportion of the coconut holdings received irrigation. Thirty four per cent of the cultivators followed basin irrigation method while improved irrigation methods such as sprinkler and drip methods were adopted by a very small number (0.95 and 2.85 per cent respectively) of growers only. Mulching the coconut basin with organic materials was practiced by 38 per cent of the farmers as a method of moisture conservation. Husk burial and cover cropping also were taken up by a few (9 and 5 per cent respectively) cultivators. It could

be inferred from these observations that programmes for development of irrigation facilities and popularising scientific methods of soil and water conservation among coconut growers are to be given emphasis in the coconut development programmes being implemented in the state for improving the coconut scenario.

Manuring: Majority (89 per cent) of the coconut cultivators applied organic manures. But many of the cultivators perceived that they experience difficulty in the availability of organic manures in the recent times. It is observed that farmers obtained organic manures from some private agencies and there were problems with regard to the quality of the products being supplied. This situation points to the need of popularising production and use of organic manures including vermicompost among the growers and also encouraging the cultivation of green manure crops in coconut garden. This becomes all the more important in the context of growing awareness among coconut farmers about the concept of organic farming. Only 28 per cent of the farmers applied chemical fertilizers to the seedlings and young palms while only 44 per cent of the cultivators applied chemical fertilizers for the adult palms that too most of them applied below the recommended quantities. Though not on a systematic basis 37 per cent of the farmers applied lime to the coconut palms. But only 6 per cent of the coconut growers applied Magnesium sulphate. It was observed that the farmers who apply Magnesium sulphate obtained the same through Krishibhavan, the grassroot level office of the Department of Agriculture under some development schemes. High cost of fertilizers, high wage rate and lack of availability of labour were the constraints experienced by farmers in proper fertilizer application to coconut palms. Lack of knowledge about the correct dose and frequency of application also limits the adoption of integrated nutrient management practices. Integrated nutrient management is an important component of the crop production technology package for coconut and farmers are to be exposed to the same on a regular basis along with suitable incentives for enhancing the productivity of the crop.

Coconut based farming system: Growing other crops in the interspace and integrating other enterprises like animal husbandry with coconut cultivation have been a traditional practice in Kerala, especially under homestead situation. In the study area it was noted that 38 percent of the farmers cultivated intercrops like banana, tapioca, yam, ginger, vegetables etc. About 42 per cent of the holdings were mixed cropped with perennial crops like pepper, mango, jack, arecanut etc. But only 28 holdings (4 percent) were following mixed farming practices with integration of animal husbandry with coconut cultivation. In these holdings, farmers adopted recycling of cattle manure in the coconut garden through composting. In general it was observed that most of the inter/mixed cropping methods practiced by the growers were not done in a systematic way. It could be due to the fact that majority of the coconut gardens were not properly laid out and optimum plant density could not be maintained which was acting as a barrier for correct multiple cropping practices. Lack of availability of irrigation facilities was another reason for low extent of inter/mixed cropping. To enhance the profitability of coconut cultivation especially in the present context of wide fluctuation in coconut prices, it is necessary to have programmes for popularising optimum methods of inter/mixed cropping in coconut gardens. Suitable crop combinations are to be suggested depending on the farmers' preferences, his resource endowment and prevailing agro ecological features of the locality.

Integrated pest and disease management: Rhinoceros beetle, red palm weevil, coreid bug, leaf eating caterpillar, white grub and rodents were the important pests affecting coconut in the study area. The study revealed that the extent of adoption of recommended practices for the management of the above pests was very low. As regards to the pest management in coconut, the extent of adoption was lowest (13 per cent) for red palm weevil. Only 34 per cent of the farmers adopted proper control measures against rhinoceros beetle, which is the most common pest of coconut. Extent of adoption of biological control measures against coconut pests was also

very low (0.3 per cent). Only two farmers took up biological control of leaf eating caterpillar with the support of the Parasite Breeding Station of Department of Agriculture. Most of the farmers were not aware about the biological control measures. As regards to the nematode management, none of the respondents adopted any control measures. The nature and symptoms of nematode infestation and control measures were not known to the cultivators.

Bud rot and stem bleeding disease were the common diseases of coconut. The extent of adoption of integrated disease management practices was low. Only 30 per cent of the farmers adopted the recommended control measures against stem bleeding, while the extent of adoption was 43 per cent in the case of bud rot. Those who adopted the control measures were not following all the recommended practices. In the case of stem bleeding disease, farmers were chiseling the affected portion and applying coal tar. Fungicidal treatment was not properly adopted by the farmers.

Lack of labour for climbing trees for plant protection measures, lack of knowledge about the recommended control measures, difficulty in identifying the symptoms of infestation, high cost of inputs like insecticides and fungicides were the major constraints hindering the proper adoption of integrated pest and disease management in coconut. Efforts are required to provide extension support to educate farmers about the scientific pest and disease management and also to implement location specific schemes to provide incentives for the need based plant protection measures.

Harvest and post harvest technology: In general the level of adoption of the harvest and post harvest technologies in coconut was found to be very low. Mechanical palm climbing device was used by only 2 per cent of the respondents. Under the Comprehensive Coconut Development programme implemented by the State Department of Agriculture, palm climbing devices were distributed at subsidized rate to the ward level coconut development committees. But interestingly in many instances the same were lying idle unused. As some amount of skill is required to use the climbing devices, special training programmes are to be organised on the same for the benefit of farmers. Most of the farmers who were having marketable surplus of coconuts sold the nuts to the local merchants and co-operative societies. Only few farmers (5 per cent) were making copra at the farm level and most of them were following sun drying of copra. Few (0.3 per cent) of them were using the small holder's copra dryer. Adoption of electrical dryer and solar dryer were nil. Copra moisture meter to assess the moisture content of copra was used by the co-operative societies who procure copra from farmers, and individual farmers were not adopting the same. Farmers are to be made aware about the importance of production of quality copra so as to enable them to secure premium price in the market and thus efforts are required to be taken to popularise the dryers.

Association between the level of adoption of recommended package of practices and the socio-personal characteristics of farmers: The relationship between the level of adoption of recommended package of practices and the socio-personal characteristics of coconut farmers were studied by working out the correlation coefficientsTable 2.

Table 2. Correlation between extent of adoption of recommended package of practices and socio - personal characteristics of coconut farmers.

Sl. No.	Item	Correlation coefficient
1.	Age	-0.0156
2.	Education	0.1560**
3.	Farm size	0.1219**
4.	Annual income	0.2677**
5.	Social participation	0.3705**
6.	Extension orientation	0.4296**
7.	Mass media exposure	0.4038**

** Significant at 0.001 level

It could be seen from the table that except age all the other selected socio-personal variables had positive and significant relationship

with the extent of adoption. Age of the farmers showed negative relationship with the extent of adoption. Education had a positive and significant relationship with level of adoption. Educated cultivators are able to acquire relevant information on improved cultivation practices and apply the same in their field situation. As the farm size increases cultivators tend to seek more information on improved technologies for enhancing their income and also become more risk bearing for adopting the same in their orchards and hence there is a positive relationship between farm size and extent of adoption. Adoption of many of the recommended technologies required financial investments on the part of the farmers. And hence there is a positive relationship between the annual income of the farmers and level of adoption. Social participation also had a similar relationship with extent of adoption. A cultivator having a high level of social participation generally get more opportunities to interact with his peer groups and other agencies which in turn expose him to the improved cultivation practices and provide a positive influence on his adoption level. Various extension agencies are functioning at grass root level who organise educational programmes on improved agricultural practices for the benefit of farming community. Farmers having high level of extension contact and extension participation are likely to acquire more knowledge on improved cultivation practices and a better adoption of the same in their gardens. Hence we could observe a positive association between extension orientation and level of adoption. Similarly mass media exposure had a positive relationship with the level of adoption. Various mass media such as newspaper, farm journals, radio, television etc keep the farmers informed about the improved agricultural practices which in turn have a positive impact on their adoption.

IMPLICATIONS

The results of the study revealed that extent of adoption of recommended technologies by the coconut farmers was comparatively low. Various socio-personal and economic factors limit the adoption of technologies by the farmers. This situation points to the need of strengthening educational efforts by the various research and extension agencies engaged in the development of coconut.

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