Journal of Plantation Crops 18 (Supplement) : 415–419

SPICES PRODUCTION TECHNOLOGY THROUGH LAB-TO-LAND PROGRAMME*

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ABSTRACT

Spices production technology with major thrust on pepper based cropping system and/or raising pepper as mixed crop in coconut garden was implemented through lab-to-land programme (LLP) in three villages comprising 185 farm families in Kozhikkode district during 1979-85. Bench-mark survey, farmplan for individual farmer and supply of inputs were carried out. A critical assessment at the end of the programme at Muthukad village showed that 98% of the farm families cooperated with the project. Pepper has become the most popular crop amongst the farmers and in the pepper based cropping system the mean yield per pepper vine was 1.13 kg whereas in the mixed cropping system, yield was 0.90 kg. The mean yield obtained in the case of ginger cultivar (Himachal) and turmeric (mixed local) was 24 and 36 Mt/ha, respectively. The mean per capita index per family was 1.99. Fifteen to twenty per cent additional employment was also generated.

INTRODUCTION

About seventy per cent of agricultural technological innovations developed in India have not reached the farming community (Prasad, Choudhary and Nayar, 1987). The Lab-to-Land (LLP) programme was launched by National Research Centre for Spices (NRCS), Kozhikkode during 1979–85. The objectives of the programme were to adopt small and marginal farmers and agricultural labourers and to educate them on the latest High Production Technology (HPT) of spices. The programme also aimed at diversification of labour utilisation and to provide additional employment. It was also aimed to identify the constraints in the low adoption of technology and to establish good rapport between scientists and farmers, thereby improving their economic and social status.

MATERIALS AND METHODS

The programme was implemented in two phases extending six years. During the first phase (1979–81), eighty-nine farm families in the Harijan colony at Pannikottur village (two km from Peruvannamuzhi) was adopted and black pepper (c.v. Panniyur-1 and Karimunda) was introduced as a mixed crop in coconut gardens. Pepper was trailed on *Erythrina indica* planted in the interspaces of coconut.

During the second phase (1982–85) sixty farm families in the Muthukad village (four km from Peruvannamuzhi) was adopted and pepper based cropping system was introduced, using *Erythrina* as standard. Forty farm families at Chelavoor, adjacent to NRCS Campus, Chelavoor was also adopted during this phase. In this village pepper

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was raised as a mixed crop in coconut garden on *Erythrina* standard.

Bench mark survey

Bench mark survey of each village was carried out with relevance to the farming system, material resources and socio-economic condition. Farm plans were prepared, inputs supplied for each farm family with emphasis on improving their entire farming system thereby generating enhanced employment and income.

Climate and soil

The climate is typical of humid tropics and mean annual rainfall received at Pannikottur/Muthukad Transfer of Technology Centres (TTC) was 4200 mm (140 rainy days from June – October). About 70% of the precipitation was received during south-west monsoon (June-August) and the rest during north-east monsoon (September-October). Summer is practically dry. The mean maximum temperature is 38°C (May) and minimum 21°C (January). The elevation of the area ranges from 40 to 60m (MSL). The mean annual rainfall received at Chelavoor TTC was 3200 mm. The soils are acidic, lateritic in character, clayey loam to sandy clay loam in texture, medium in nitrogen, poor in phosphorus and potash status.

Subsidy

Subsidy worth Rs. 500/- annually per family in the form of inputs like improved agricultural implements, planting material, fertilizers, plant protection chemicals, sprayers etc. were distributed.

To tide over the unprecedented drought of 1982–83, one bore well of 300 m depth was also dug through the State Department for augmenting drinking water supply at Muthukad TTC. Financial assistance of Rs. 1750/- was given to the farmers to meet one fourth of the total cost for deepening seven selected wells to be used on community basis by all the sixty farm families, to augment the drinking water supply and to give irrigation to young plants.

The state government was persuaded to establish one "Anganwady" at Muthukad TTC benefiting 42 wards.

An amount of Rs. 3,000/- was granted to meet one-fourth of the total cost for the development of one km road at Muthukad TTC for easy access to the village. Financial assistance was also arranged to ten farm families through the Agricultural Development Bank under State Bank of India, Perambra for the purchase of milch animals.

Farm enterprises

The details of technology transferred including fertilizer dose are given in Table I. Farm enterprises such as rooted pepper cuttings of hybrid Panniyur–1 and Karimunda cultivars (10,000 Nos.), seedlings of west-coast tall (WCT) coconuts (900 Nos.), ginger rhizomes c. v. Himachal (240 kg), turmeric (470 kg) and tapioca stems (700 Nos.) to be raised as intercrops in coconut/pepper gardens were supplied. Clove and cinnamon seedlings (300 each), congo signal grass seeds (50 kg) for raising green fodder, mango grafts (200 Nos.) for planned development of the homestead, white leghorn poultry layers (150 Nos.) to the needy farmers, inorganic fertilizers (50 tonnes), plant protection chemicals, sprayers, multipurpose trees such as subabul (10,000 Nos.) were also supplied to the farmers.

Training

Pre-season training on spices cultivation was imparted to the farmers. Pamphlets and folders on the various aspects of spices cultivation were also distributed. Media support through radio talk in the "Farm and Home" of A.I.R. Kozhikkode was also given. Scientists accompanied by Technical Assistants visited the TTCs periodically and gave instructions in the execution of the programme.

Table I. *Planting materials distributed and the technology transferred to the farmers*

Planting material supplied (Nos.)	Varieties	Technology transferred
Pepper (10,000)	Panniyur–1 and Karimunda	Spacing 3 x 3 m. NPK 100, 40, 140 g/vine/year. Plant protection.
Coconut (900)	West-Coast Tall	Planting in 1 m cube pits NPK 0.5,0.32, 1.2 kg/palm/year.
Ginger (240)*	Himachal	Plant protection. Spacing 30 cm. Neem cake 2 t/ha. NPK 75: 50: 50 kg/ha.
Turmeric (470)*	Mixed local	Seed treatment. Spacing 30 cm. Neem cake 2 t/ha. NPK 30: 30: 60 kg/ha.
Tapioca stems (700)	H–2304	Planting 2 m away from coconut. NPK 100: 100: 100 kg/ha.
Clove (300)	Local	Mixed crop. Spacing 6 x 6 m.
Cinnamon (300)	Local	Mixed crop. Spacing 2 x 2 m.
Subabul (10,000)	K–8	Planting along the boundary line @1 t/ha.
Grass seed (50)*	Congo-Signal	Contour planting.
Mango grafts (300)	Local	Spacing 9 x 9 m

* Weight in kg.

RESULTS AND DISCUSSION

Bench mark survey

Bench mark survey revealed that the holding size of the family ranged from 0.025 to 1.0 ha and all are marginal farmers. Sixty-five per cent of the families belong to backward class, seventeen per cent scheduled caste, eight per cent scheduled tribe and the balance ten per cent belong to other classes. At Pannikottur and Chelavoor TTCs, the main crop grown was coconut, besides this, arecanut, banana and tapioca were also grown. The Muthukad TTC was almost barren except 40 coconuts palms. This barren land was allotted at one ha per family by the State Department during 1981. This formed part of a collective farm to be established by Kerala Government. Pepper based cropping system was mainly adopted in this TTC.

The farmers were generally poor and economically backward. Most of the families were not following any improved cultivation practices. Consequently the crop yields were very poor. The farmers were earning their livelihood by working as agricultural labourers in the nearby villages. The annual income of the members ranged from Rs. 400–1500.

Impact of the programme

A critical review of the impact of the programme at the end of the period showed that

98% of the farm families cooperated with the programme. Among the seedlings/ saplings supplied, 81% of coconut, 69% of pepper, 59% of clove, 70% of cinnamon and 73% of mango grafts got established. The higher percentage of establishment indicates the farmers good response to the programme.

Pepper

In the pepper based cropping system pepper vines started yielding during the second year. The average yield was 1.13 kg dry pepper per vine per year during the fourth year. Pepper has become one of the most favourite crops among the farmers because of the quick monetary return. One of the beneficiaries got one and half quintals of pepper from 132 vines getting an income of Rs. 5,200/- from pepper alone.

Pepper raised in the coconut based cropping system also yielded and the mean return per vine was 0.9 kg as against the initial level of 0.28 kg. The low yield might be due to the excess shade imparted by coconuts.

Ginger and turmeric

Ginger and turmeric were grown as intercrops in coconut and pepper gardens. By the adoption of present technology like seed treatment (0.3% Dithane M.45 with 4 ml of Ekalux) and the application of organic amendment (neem cake at 2 tonnes per hectare with NPK at 75, 50 and 50 kg/ha) and following plant protection (using Malathion spray 2.0 ml in one litre), one of the beneficiaries had harvested seven quintals of ginger within two years (season), from four kg of ginger seed rhizome supplied by the Institute, thereby making an average yield (wet) of 24 tonnes per hectare (Table II). In the case of turmeric the average yield obtained (wet) was 36 tonnes per ha.

Tapioca

Tapioca variety H-2304 introduced as an intercrop in coconut garden (obtained from Central Tuber Crops Research Institute, Trivandrum) was planted with a spacing of 90 cm leaving 2 m away from the base of coconut using NPK at 100:100:100 kg/ha. One of the farmers of Muthukad TTC supplied with fifty stem cuttings realized 600 kg of tapioca which was sold for Rs. 500/- (after meeting his home consumption). The yield

Table II. *Impact of Lab-to-Land Programme on productivity of crops and generation of employment*

Name of enterprise	Yield (kg/ha)		Productivity (%)	Additional employment (Manday/ha)
	Before	After		
Pepper based cropping system	FI	1130*	—	20
Pepper (mixed crop in coconut garden)	280*	900*	221	18
Coconut (pure crop)	3150**	11,900**	277	—
Ginger	5 tonnes	24 tonnes	380	15
Turmeric	FI	36 ,,	—	25
Tapioca	10 ,,	35 ,,	250	15
Congo signal grass	FI	28 ,,	—	25

FI — First introduction * Dry weight ** Numbers Tonnes (Wet weight)

obtained was 35 tonnes/ha compared to 10 tonnes obtained from local variety. Fifteen to 20 per cent of additional employment (Table II) was also generated due to the adoption of improved technology by the farmers.

Constraints

1. The basic limiting factor for production is the small size of the holdings and consolidation of holdings in cooperative basis is the only solution for augmenting production.

2. Tendency among the farmers for neglecting early symptoms of wilt diseases of pepper, neglecting to conserve the soil and soil moisture.

3. Inadequate staffing and lack of adequate incentives to the extension field staff and lack of transport facilities.

4. Non-availability of timely financial support from the bank and the tedious procedures for procuring loans.

5. Social constraints identified are non-receptiveness to the new technology by certain farmers, reluctance to the use of inorganic fertilizers and adoption of artificial insemination to cattle and unwillingness to share new experiences with their neighbouring farmers.

A sense of self reliance was imparted in the minds of LLP farmers for taking up new ventures with the latest spices production technology developed at the Institute. The State Bank of India, Perambra (Kozhikkode district) has adopted Muthukad TTC under their "Gramodaya project" in lending financial support to the farmers by seeing the overall development attained through the LLP initiated by NRCS.

ACKNOWLEDGEMENTS

The authors express their deep sense of gratitude to Dr. M. K. Nair, Director, Central Plantation Crops Research Institute, Kasaragod, for all encouragements in carrying out the project work and to Dr. A. Ramadasan, Director I/C, National Research Centre for Spices, Kozhikkode, for valuable suggestions in the preparation of this paper.

REFERENCE

PRASAD, C., CHOUDHARY, B. N. and NAYAR B. P. 1987. *First line Transfer of Technology Projects.* Indian Council of Agricultural Research, New Delhi. pp. 87.