

Intervention of watermelon variety sugar baby in pathanamthitta agroclimatic zone through multimode approach

Nisha Aravind*¹ and Rakesh.D²

¹Department of Agricultural Extension, KVK, Pathanamthitta (Kerala) India

²Soil Conservation Office, Tiruvalla (Kerala) India

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KVK-Pathanamthitta acknowledged the need to move away from top-down instructions and adopted pure technology transfer with a multimode participatory approach that directly involved farmers in defining and achieving their own development goals. Major constraint faced by the paddy farmers is non-remunerative paddy cultivation and lack of alternative profitable crop. Based on this watermelon is recommended as the best alternative crop in acres of fallow paddy lands of the district after conducting front line demonstration with innovator group of farmers in their field. Average yield/plant was about 30 kg and average yield/acre was nearly 40 tons with an average of two plants per pit. Yield data reveals that crop flowers and yields well in the agroclimatic situation of the district. Rapid transfer of technology was sort through group farming techniques. Productivity of watermelon cultivated by the men groups increased from 18.4 tons/acre in 2002-03 to 24.15 tons/acre in 2003-04. However, Yield of watermelon cultivated by the women groups was 17.08 tons/acre in 2002-03 and 15.72 tons/acre in 2003-04. On Farm Testing (OFT) with manure modification was conducted to study the vegetative as well as reproductive growth of the crop in these innovators field. Growth and yield of the plants supplied with vermicompost was higher compared to the plants supplied with coir pith compost. However, in plots where coir pith compost was applied, soil water retention was high and as a result the number of irrigation was reduced. The reduced cost of production resulted in a higher B:C ratio (3.57:1) for coir pith compost applied plots. Ratio of the spread of technology through master farmers was 1 : 2.7: 8.

Key words : Water melon, Kerala, Cultivator pathanamthitta.

INTRODUCTION

THE major problem faced by Kerala State is conversion of paddy fields and drastic decrease in paddy areas, which had made many agricultural laborers especially the women, jobless. Moreover leveling of flood channels in paddy fields started inducing flood problems in different parts of the state, which led to further ground water depletion during summer. The combined effect of environmental and farm degradation, mono-cropping, neglect of organics in farming, etc have led to reduction of agriculture production in the state as a whole and it had become high time for the extension agencies to take up alternative cultivation approaches. Watermelon is cultivated in different parts of India. In South India, its cultivation is restricted to only Karnataka and Tamil Nadu. In Kerala, different field trials at Krishi Vigyan Kendra (KVK) farm indicated that the watermelon variety Sugar baby flowers as well as fruits in Pathanamthitta Agro-climatic region. Sugar Baby has proved as promising variety under other Southern Kerala conditions Shibukumar (1995). Realizing that cultivation of this crop could be a profitable enterprise during summer season in the paddy fallows, the KVK took up the venture of transferring this innovation among farmers.

MATERIALS AND METHODS

Sugar baby variety of watermelon was introduced among the farming community of Pathanamthitta, Kerala.

Among the twenty agro-climatic zones identified in Kerala

by superimposing six moisture availability regimes over seven soil groups, the classification specified for Pathanamthitta district is given below:

Table 1: Agro-climatic zones

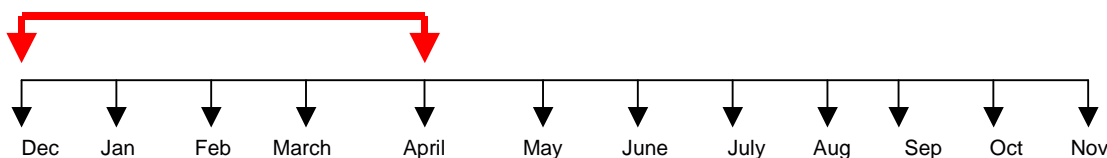
Types	Zones	Farming situations/ crops grown
Type 1	Humid laterite	Vegetables, nut mug, cashew, fodder grass, pineapples and banana
Type 2	Humid forest loam	Pepper, banana, rubber, ginger, paddy, jack and coffee,
Type 3	Wet laterite	Paddy, rubber, pepper, tapioca, ginger and banana

As this crop was an introduction in this district, following multi methodology approach was adopted to ensure full-fledged cultivation.

- ❖ Survey was conducted among 120 vegetable trainees to identify innovator category farmers .20% of them were categorized as innovators.
- ❖ Front line demonstration of variety sugar baby in innovator farmers' field was undertaken and location specific package was developed.
- ❖ Group approach techniques were adopted
- ❖ Master farmers were trained during crop demonstration

Fig. 1 : Seasonality of watermelon

Watermelon is cultivated from Dec-April in Kerala



* Author for Correspondence

- ❖ for further spread of technology
- ❖ On Farm Testing (OFT) with manure modification was conducted to study the vegetative as well as reproductive growth of the crop in these innovators field

Seasonality of the crop:

Watermelon is cultivated from December to April. This is the vegetable-growing season of Kerala State, as a result of which fall in price of different vegetables like pumpkin and cucumber happens due to market glut. KVK interfered at this juncture and recommended watermelon cultivation. Watermelon cultivation is adopted in paddy fallows from December to April as denoted in Fig. 1.

RESULTS AND DISCUSSION

A pilot study was conducted among 120 trainees cum vegetable farmers of Pathanamthitta district to categorize the respondents based on their degree of innovativeness. The above study was conducted with the primary objective of identifying the farmer group among whom a novel technology could be introduced and perpetuated successfully.

Results of the study reveal that majority of highly innovative farmers were mostly from middle to old age group. It was observed that they were educated up to high school and some of them were also graduates. To a greater extent these farmers were having small farms (2.5-5 acres), some were also having big farms (5 acres and above). They had a high annual income (55,421 and above) as compared with less innovative groups. These farmers were considered as innovators due to their venturesome nature as they are more responsive to latest technologies and tried to acquire more information regarding their cropping systems. They gave more emphasis to benefit cost ratio by the optimum utilization of resources. They were cosmopolite in nature and their sphere of influence and activity went beyond the community boundary. Competitive spirit and their desire to get more yield made them strive hard to get maximum profit. Majority of them were highly risk oriented also. High level of scientific orientation, credit orientation, management orientation and innovation proneness were the characteristic features of these farmers (Table 2).

Table 2 : Characters of highly innovative farmers

Sl. No.	Characters	Mean Scores
1.	Age	50.43
2.	Education	3.16
3.	Land Holding	4.51
4.	Annual Income	64,280
5.	Social Participation	2.70
6.	Extension Contact	2.37
7.	Mass Media Contact	9.97
8.	Cosmopoliteness	6.97
9.	Extension Participation	3.08
10.	Scientific Orientation	11.48
11.	Credit Orientation	4.72
12.	Management Orientation	5.16
13.	Innovation proneness	5.20

Front Line Demonstrations (FLD):

Front line demonstration was conducted in the selected 10 farmers fields under the guidance of KVK officials. The critical inputs were supplied by the KVK. Each farmer planted 5 to 12 pits at the rate of 3 plants per pit. The sowing was done by December end. Flowering started 90 days after sowing. It took

another 30-40 days for maturation. There were 5 to 10 fruits per plant and average fruit weight was 5Kg. There was no pest and disease incidence throughout the cultivation. Due to hairy nature of the fruit at initial growth stages infestation of fruit fly attack was nil. About 6 tons (Table 3) with an average of three fruits per pit of watermelon was produced from 0.45 acres and sold at Rs. 6/ Kg.

Table 3 : Yield data of watermelon

No.	Name	No of pits	Yield (Kg)
1.	Krishnankutty	6	525
2.	Cherian Abraham	5	420
3.	C.N. Chandran	10	820
4.	Babu Varghese	8	700
5.	Thankappan Pillai	5	400
6.	Unnikrishnan Nair	12	970
7.	Ravindran Pillai	5	380
8.	Omanakuttan Pillai	8	675
9.	Rajan Varghese	10	785
10	K. P Samuel	5	410
Total.			6085

Average yield/plant was about 30 kg and average yield/acre was nearly 40 tons with an average of two plants per pit. It was observed that the advantages of this novel technology had to be elicited in detail in collaboration with the experimental farmers so that the farmers themselves could explain the advantages of watermelon cultivation. The cost of cultivation, income statement and other aspects of watermelon worked out for FLD plots with an average of two plants per pit are given in Table 4.

INCOME STATEMENT

Particulars	Quantity
Average fruits per plant (No.)	6
Average weight of each fruit (Kg)	5
Average yield per plant (Kg)	30
Pits per acre (No.)	666
Average plants per pit (No)	2
Average yield per acre (Kg)	40,000
Market price (Rs/kg)	5
Gross Income (Rs/acre)	2,00,000
Total cost of cultivation (Rs/acre)	55,564
Benefit Cost ratio	3.6:1

It could be inferred from the above that watermelon cultivation is profitable to farmers in Pathanamthitta district. Based on this a field day was conducted in the most successful farmer's plot. Wide publicity was given through newspapers, radio and T.V for the event.

Group approach in watermelon cultivation:

Based upon the success, a number of groups established through Department of Agriculture and Self Help Groups established through Panchayats came forward to take up the watermelon cultivation in the district. As could be seen from Tables 5 to 8, the area under watermelon cultivation by different men and women groups during 2002-03 and 2003-04 has increased.

Productivity of watermelon cultivated by the men groups increased from 18.4 tons/acre in 2002-03 (Table 5) to 24.15 tons/acre in 2003-04 (Table 6). However, Yield of watermelon

Table 4: Cost of Cultivation of Watermelon (1 Acre)

No.	Particulars	Input (Kg)	Cost/unit or kg (Rs.)	Amount (Rs)
1.	Land preparation (Spacing 3m X 2m) 666 number of pits/acre	20 labourers	120	2400
2.	Inputs			
	Seeds	0.5	1000	500
	Manure and fertilizers			
	1.Basal application			
	i Vermi compost (3 kg/pit)	2000	5	10000
	ii. Cow dung (4 kg/pit)	2664	1	2664
	2.Top Dressing			
	i. First			
	a. Vermi compost (3 kg/pit)	2000	5	10000
	b. Ground nut cake (100 g/ pit)	70	10	700
	ii Second			
	a. Vermi compost (3 kg/pit)	2000	5	10000
	Management Expenses (planting, manure application, irrigation, trailing, weeding, harvesting, sales and others)			20000
	Total			=====
				55,564

Table 5. Achievements of men groups in terms of yield and net income for the year 2002-2003

Sl.no	Haritha Sangom	No. of farmers	Name of Village	Area in acres	Avg yield/acre in Kg	Gross income/acre
1	Puramattom	12	Puramattom	1.25	22,000	1,10,000
2	Ayroom	13	Ayroom	0.40	19,000	95,000
3	Mannar	10	Mannar	0.25	17,500	87,500
4	Chittar	14	Chittar	1.00	21,200	1,06,000
5	Vaypoor	12	Mallapally	0.30	11,000	55,000
6	Eraviperoor	13	Eraviperoor	1.00	13,500	67,500
	Total=6groups	74		4.20	18,446	92,240

Table 6 : Achievements of men groups in terms of yield and net income for the year 2003-2004

Sl.no	Haritha Sangom	No. of farmers	Name of Village	Area in acres	Avg yield/acre in Kg	Gross income/acre
1	Puramattom					
	Gp- 1	16	Puramattom	1.30	22,000	110,000
	Gp -2	14	Puramattom	1.00	21,200	106,000
2	Ayroom	14	Ayroom	0.60	16,750	83,750
3	Edapavoor	12	Edapavoor	1.05	23,000	115,000
4	Mannar	11	Mannar	0.75	17,500	87,500
5	Chittar	14	Chittar	2.00	20,000	100,000
6	Eraviperoor	13	Eraviperoor	1.00	19,400	97,000
7	Vaypoor	12	Mallapally	0.50	16,000	80,000
8	Kodumon	15	Kodumon	1.75	48,700	243,500
9	Pandalam	12	Pandalam	1.00	21,000	105,000
10	Pullad	13	Pullad	2.00	21,000	105,000
	Total=10groups	146		12.95	24,150	1,20,753

Table 7 : Achievements of women groups in terms of yield and net income for the year 2002-2003

Sl. no	Kudumbasree groups	No. of farm women	Name of Village	Area in acres	Avg yield/acre in Kg	Gross income/acre
1	Aranmula	48	Aranmula	1.05	23,000	115,000
2	Kulanada	14	Kulanada	0.75	17,300	86,500
3	Ayroom	32	Ayroom	1.25	11,000	55,000
4	Kozhencherry	40	Kozhencherry	0.10	18,200	91,000
5	Kodummon	23	Kodummon	2.00	17,000	85,000
6	Kadapara	21	Kadapara	1.00	16,500	82,500
7	Pandalam	65	Pandalam	2.00	18,000	90,000
	Total= 7groups	243		8.15	17,080	85,396

Table 8 : Achievements of women groups in terms of yield and net income for the year 2003-04

Sl. no	Kudumbasree groups	No. of farm women	Name of Village	Area in acres	Avg yield/ acre in Kg	Gross income/ acre
1	Ezhamkulam	38	Ezhamkulam	4	17,500	87,500
2	Kodumon	42	Kodumon	5	18,000	90,000
3	Aranmula	126	Aranmula	13	15,000	75,000
4	Puramattom	76	Puramattom	8	16,200	81,000
5	Naranganam	52	Naranganam	4	17,750	88,750
6	Konni	36	Konni	4	17,000	85,000
7	Omaloor	26	Omaloor	3	18,000	90,000
8	Kulanada	12	Kulanada	1	14,400	72,000
9	Vadasserikkara	33	Vadasserikkara	4	15,500	77,500
10	Pallickal	158	Pallickal	16	13,700	68,500
11	Pramadom	125	Pramadom	12	14,500	72,500
12	Eanath	25	Eanath	3	15,500	77,500
13	Pandalam	157	Pandalam	6	16,000	80,000
14	R-Pazhavzngadi	28	R-Pazhavzngadi	3	14,750	73,750
15	Ayiroor	147	Ayiroor	14	15,000	75,000
16	Kadapara	58	Kadapara	6	16,000	80,000
17	Chennerkara	25	Chennerkara	3	17,750	88,750
18	Vallicode	18	Vallicode	2	17,700	88,500
19	Mallappuzhassery	92	Mallappuzhassery	8	15,000	75,000
20	Kalanjoor	65	Kalanjoor	7	19,000	95,000
Total=20 groups		1339		126	15,727	78,636

cultivated by the women groups was 17.08 tons/acre in 2002-03 (Table 7) and 15.72 tons/acre in 2003-04 (Table 8).

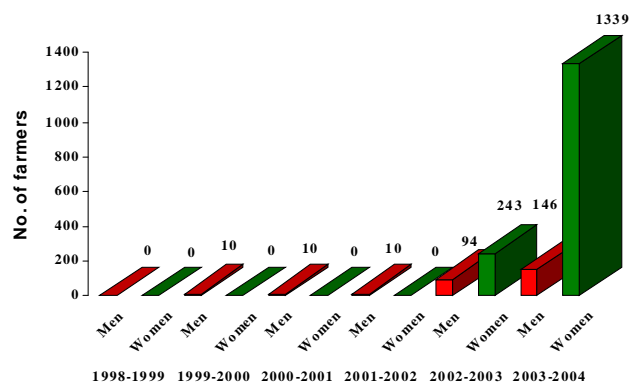
As per the cost of cultivation of watermelon, the major input cost was for labour, fertilizer and seeds. To reduce the cost most of the growers had started vermicompost units of their own. Another positive factor of this cultivation is family labour as well as farmers labour was solely utilized for this cultivation purpose. Interest in watermelon crop was extremely high among women groups as evident by the sudden spurt in their involvement (Fig. 2)

Women are keen learners:

Active women groups were selected further for generating location specific technologies as women showed eagerness to

Fig. 2 : Increased farmwomen involvement in watermelon cultivation

Gender involvement in Watermelon cultivation



experiment. It was also observed that once they were convinced of the benefits of the technology they had become dynamic disseminators. For getting good participation and encouraging intra and inter group activity, KVK organized a group meeting and discussion sessions.

Selecting technology to local situations:

Based upon the PRA among the watermelon cultivators, an On Farm Test (OFT) on "Efficiency and feasibility of different organic manures (Vermi Compost, Neem Cake and Coir Pith Compost) in watermelon cultivation" was implemented with the following treatments.

Treatment I

- Application of 4 Kg coir pith compost + 500 g Neem cake as basal dose/pit
- Application of 3 Kg coir pith compost/ pit as first top dressing
- Application of 3 Kg coir pith compost/pit as second top dressing

Treatment II

- Application of 4 Kg vermi compost + 500 g Neem cake as basal dose/pit
- Application of 3 Kg vermi compost/ pit as first top dressing
- Application of 3 Kg vermi compost/pit as second top dressing

Growth and yield of the plants supplied with vermicompost was higher compared to the plants supplied with coir pith compost. The nitrogen and potassium levels of vermicompost were significantly higher than that of coir pith compost (Bano and Suseela Devi, 1996). However, in plots where coir pith compost was applied, soil water retention was high and as a result the

number of irrigation was reduced. Flower drop was also reduced to a greater extent due to the presence of sufficient moisture in the soil. The reduced cost of production resulted in a higher B:C ratio (3.57:1) for coir pith compost applied plots.

Table 9 : Results of the On Farm Test

Sl. No.	Particulars	Coir pith based nutrient management	Vermi-compost based nutrient management
1	Yield (kg/acre)	55,775	61,022
2	Gross Income (Rs/acre)	2,78,875	3,05,110
3	Total cost of cultivation (Rs/acre)	77,922	87,912
4	B: C Ratio	3.57:1	3.47:1

Based upon the OFT results, coir pith compost was recommended to farmers along with vermicompost. The watermelon cultivators used coir pith compost in large quantities in 2003-04. Wide yield gap was observed in FLD, OFT results when compared to large scale cultivation of watermelon by different farmer group. Different factors which contributed to low yield in farmers' field were pointed out after conducting group discussion with the cultivator groups. Following factors were listed:

- ❖ Theft problem

Spread of watermelon cultivation:

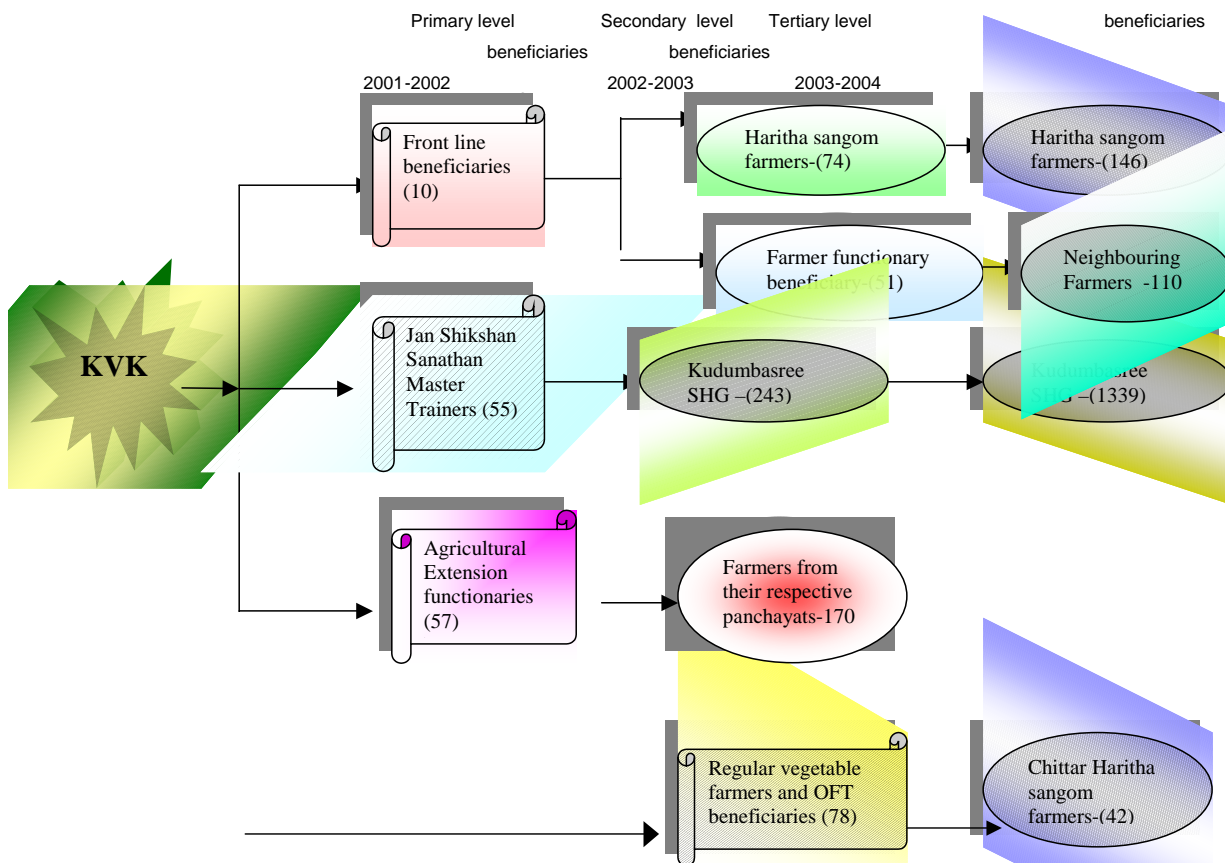
The year 2003-04 could see a sudden increase in area under watermelon crop due to direct and indirect effects. Apart from the direct influence of the KVK activities like training, demonstrations and visits, the farmer-to-farmer and extension functionaries to farmers contributed to the widespread cultivation of watermelon (Fig. 3).

Farmers as trainers:

KVK postulated that if farmers could master the process of "discovery learning" in their own fields, they could also facilitate other farmers in their learning. Based on this idea these innovator farmers were developed as master trainers for further promotion of technology.. Trainings conducted by using master farmers were very successful as the adoption of the technology was much higher. The spread effect was to an extent of 1: 2.7: 8.0 in two years time from 2001-02 to 2003-04.

Total	200	538	1637
Ratio of the spread	1	: 2.7	: 8

Fig. 3 : Schematic representation for spread of the technology among different beneficiary groups is given below:



- ❖ Undertaking cultivation in large scale resulted in poor management of the crop like improper fertilizer application, Weed management etc.
- ❖ Occurrence of disease and pest incidences like tip rot (viral), leaf spot etc.
- ❖ Severe drought during initial phases.
- ❖ Adoption of wider spacing than recommended.
- ❖ Plant population per pit varied from 1-5 which resulted in less yield per plant.
- ❖ Unexpected rain at the time of harvest

CONCLUSION

The multifaceted, decentralized, agro system-specific extension approach, which is blended with farmers' indigenous knowledge and experimentation has been very successful in introducing a crop hitherto unknown in Kerala situation. The KVK has acted in accordance with the demand of the situation, through technical, material and collaboration support, thereby ensuring successful introduction of watermelon crop in the district.

ACKNOWLEDGEMENT

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