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Micro Nutrient to Enhance Yield in Banana Cultivation

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A B S T R A C T

Banana is a globally important fruit crop with the annual production of 97.5 million tons. India is in 2nd after China with the annual production of 16.91 million tons from 490.70 thousands hectares. Banana contributes 32% to the total fruit production of the country. Maharastra, Tamil Nadu, Kerala, Karnataka, Gujarat, Anthra Pradesh and Assam are the major state growing banana. Micronutrient disorders are most common in Tamilnadu. KVK, Vamban, Pudukkottai conducted Front Line Demonstration on Micro Nutrient mixture IIHR Banana special with the following objectives. To assess the knowledge level of farmers for the adoption of Banana special for markeable bunch, to assess the increased yield in Banana by adoption of Banana special, to assess constrains faced by farmers. Mix 50 grams of Banana special along with one lemon juice and 1 shampoo pocket in 10 liters of water are added and mix thoroughly before spraying. Drenching the solution of 250ml /plant after of 15 days of plantation in case of tissue culture plants. Start from 4 months of plantation once in 30 days continues up to 8 months as foliar application. Last two sprays done both on bunch and leaves 30 days and 60 days after bunch emergence. B:C ratio of 3.7 at demonstrated farmer's field than the check plot 3.4. From the study it was revealed that price of fresh bunches fetches minimum price than the processed and value added products. Therefore, the farmers need to be encouraged to take up processing by themselves by giving them subsidy or loan for establishing the small scale processing units.

Introduction

KVK, Vamban, Pudukkottai conducted Front Line Demonstration on Micro Nutrient mixture IIHR Banana special during 2016-17 and 2017-18 to increase the marketable bunch especially in Banana. In this context, the study has been conducted in Tiruvaranklam block of Pudukkottai district.

Micro nutrients or trace elements are essential are essential for plant growth bt it is needed in very small quantity for the plant system. Banana special is crop specific micronutrient

formulation technology through foliar application exclusive for higher yield in banana crop up to 20%. 6kg of Banana Special recommended for an acre as a foliar application recommended by IIHR. Mix 50 grams of Banana special along with one lemon juice and 1 shampoo pocket in 10 liters of water are added and mix thoroughly before spraying. Drenching the solution of 250ml /plant after of 15 days of plantation in case of tissue culture plants. Start from 4 months of plantation once in 30 days continues up to 8 months as foliar application. Last two sprays done both on bunch and leaves 30 days and 60 days after bunch emergence. Spray should be done preferably 6am to 11am and 4pm to 6.30pm and spray should be done mainly 60-70% on lower surface and 30% on upper surface.

Materials and Methods

Demonstration of Banana special was carried out by Krishi Vigyan Kendra in Thiruvarankulam block of Pudukkottai district in order to enhance the production potential of exportable bnch of banana. Out of twelve blocks in Pudukkottai district, two blocks namely, Gandarvakottai and Thirvaranklam were selected to conduct this study. A total of ten farmers from these blocks were selected randomly for this study purpose. A well-structured interview schedule was used to collect data for documenting of Banana Special on productivity with marketable bunch.

Indicator studies

Step 1: Development of Indicators

Conducting demonstration is one of the important component for the dissemination of any Agricultural technologies. KVK decided to work on “Banana Special” for the better marketable bunches.

KVK decided to introduce the concept called Front Line Demonstration on Banana special in participatory approach method. In a participatory manner KVK involved for conducting the demonstration. Based on the study the following indicators were drafted.

Indicator – 1: Experience in Banana cultivation

Indicator – 2: Knowledge in adoption of technologies

Indicator – 3: Foliar application of micro nutrient

Indicator – 4: Adoption and time of Banana special

Indicator – 5: Socio-economic Profile of the Sample Respondents

Indicator – 6: Cost Utilization Pattern in banana Cultivation

Indicator – 7: Input Utilization Pattern in Banana Cultivation

Indicator – 8: Labour Utilization Pattern in Banana Cultivation

Indicator – 9: Spread of technology

Indicator – 10: Constraints faced by farmers

Indicator – 11 : Cost details and Benefit Cost Ratio with yield

The data collected from the farmers are consolidated and furnished as below

Indicator - 1 & 2: Experience and knowledge in Banana cultivation

It was noticed that, all farmers are practicing the Banana cultivation as a primary work.

All the farmers are enrolled their name in Banana cultivation. All the farmers cultivating Banana in their land. But the technology about Banana cultivation, and other quality improving techniques are not having sufficient knowledge.

Indicator - 3: Foliar application of Micro Nutrient

The study revealed that, farmers are not applying recommended doss or soil based micro nutrients application, since they are not exposed on the importance of micro nutrients in enhancing in banana productivity and the marketable bunch. Banana special is a foliar micronutrient produced by IIHR Bengaluru for enhancing the productivity.

Indicator- 4: Adoption and time of Banana special application

Though the technology was helpful for increasing the productivity, the study shows that, the Banana special application is promote by Krishi Vigyan Kenra, Pudukkottai. farmers applied the banana special during the morning time or in the evening time which results in enhanced the efficiency of the micro nutrient uptake of the crop.

Indicator - 7: Input Utilization Pattern in Banana Cultivation

The resource poor farmers in the study area don t use any special horticultural techniques like mulching, drip irrigation and pinching. This might be due to lack of technical knowledge. In this area, both open irrigation and drip irrigation type of farming situations are existed. They are unaware about the practice of pruning, foliar application and plant protection. They don't use of any organic input like organic manure, bio fertilizer, pesticides etc which can boost their yield. Which ultimately reduces the fingure yield. It was revealed from the study that majority of farmers were not applying FYM or organic manure. Hence, there is a need to create awareness in the farmers about the use of organic manures, micro nutrient application.

Indicator - 8: Labour Utilization Pattern in Banana Cultivation

Indicator - 9: Spread of technology

The interesting fact noted that the technology was spread through the KVK, Vamban, Pudukkottai.

Indicator - 5: Socio-economic Profile of the Sample Respondents

Table.1 Questionnaire Response

S.No.	Question	Per cent
1.	**Knowledge about KVK**	**80**
2.	Experience in Banana cultivation	15-45 Years
3.	Knowledge in adoption of technologies	15
4.	Knowledge on Micro Nutrient	15
5.	Knowledge about Banana special	10
6.	Application of Banana special	10
7.	Knowledge about Time of application	95

Table.2 The socio-economic profile of the Banana growers of the study area.

S. No	Basic details	Variations	No.of person
1.	**Age group of the farmers**	40-50 30-40 20-30	6 3 1
2.	**Education**	10 12 Degree	0 7 3
3.	**Family Type**	Join family Single	6 4
4.	**Family size**	Small Medium Big	1 6 3
5.	**Agriculture as occupation**	Primary	10
6.	**Average Annual Income**	69,000	10
7.	**Average area under Banana cultivation**	1 acre	10
8.	**Growing pattern**	Irrigated Rain fed	10 0
9.	**Soil pattern**	Red Sandy loam	3 7

Indicator.6 Cost Utilization Pattern in banana Cultivation

S. No	Particulars	Rs
1.	Field preparation	6000
2.	Nursery and planting / sowing	8000
3.	Weeding	8000
4.	Plant protection	10000
5.	Fertilizers	10000
6.	Wages	6000
7.	Staking, transport & other expenses	80000
	Total	**56000**

Table.3 Labour Utilization Pattern in Banana Cultivation

S.No	Description	Man x days	Total man power
1.	Land preparation	5	5
2.	Ploughing (by bullocks)	10	20
3.	Mulch collection	12x2 days	24
4.	Mulching	10x1 day	10
5.	Sowing	10x3 days	30
6.	Weeding	5x2 days	10
7.	Special and Inter cultural operation	2x5 days	10
8.	Harvesting (plucking)	5x20	100
9.	Grading and packing	1x20 days	20

Table.4 Constraints faced by banana growers in the study area

S. No.	Particulars	Score
1.	High cost of labour	I
2.	Personal obligation with Traders	II
3.	Financial weakness	III
4.	Lack of technical knowledge	IV
5.	Lack of storage facilities	V
6.	Low productivity	VI
7.	Non availability of quality seed	VII
8.	Inadequate market information	VIII

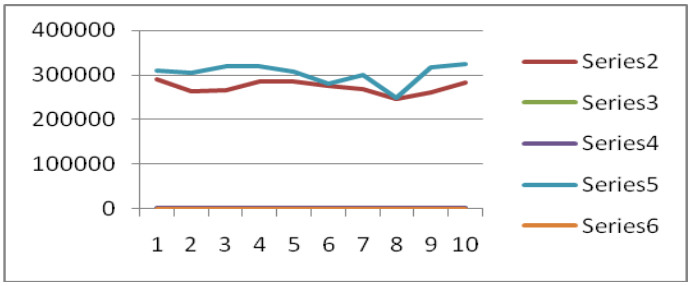
Table.5 Check plot details

Farmer	Bunch weight (kg)	Nmber of marketable Bnch/ha	Yield (quintal)	Gross Cost	Gross Cost	Net Return	Benefit Cost Ratio
1	15.2	2015	380	113000	403000	290000	3.6
2	19.6	1879	368	113000	375800	262800	3.3
3	20.4	1887	385	113500	377400	263900	3.3
4	13.8	1990	275	113000	398000	285000	3.5
5	18.3	1990	364	113000	398000	285000	3.5
6	19.2	1890	363	103000	378000	275000	3.7
7	21.9	1902	417	113000	380400	267400	3.4
8	20.8	1800	418	115000	360000	245000	3.1
9	14.3	1890	270	117000	378000	261000	3.2
10	15.8	1997	316	116500	399400	282900	3.4
Average	**17.9**	**1924.0**	**355.5**	**113000.0**	**384800.0**	**271800.0**	**3.4**

Table.6 Demonstrated plot details

Farmer	Bunch weight (kg)	Nmber of marketable Bnch/ha	Yield (quintal)	Gross Cost	Gross Cost	Net Return	Benefit Cost Ratio
1	22.5	2100	420	110000	420000	310000	3.82
2	24.5	2076	450	109000	415200	306200	3.81
3	21.3	2150	458	110500	430000	319500	3.89
4	27.6	2168	430	113000	433600	320600	3.84
5	22.8	2090	477	111200	418000	306800	3.76
6	29.6	1970	380	113000	394000	281000	3.49
7	24.7	2050	460	110000	410000	300000	3.73
8	28.9	1990	440	150000	398000	248000	2.65
9	29.5	2153	450	112000	430600	318600	3.84
10	22.6	2200	450	115000	440000	325000	3.83
Average	**25.4**	**2094.7**	**441**	**115370**	**418940**	**303570**	**3.7**

Fig.1 Yield, Net return and BCR for Treated and Check of Banana cultivation



Indicator- 10: Constraints Faced in Banana Cultivation in the Study area

The major constraints faced in cultivation of banana in the study area are presented in Table 6. The study revealed that the major problems faced by the growers in production are high cost of labour, non-availability of quality seed, lack of technical knowledge, financial obligation, inadequate market information and low productivity. The sample respondents ranked high cost of labour as the greatest constraint with a Garrett score of 76.40.

The problems ranked at second, third and fourth place were personal obligation with traders, financial weakness, lack of technical knowledge and lack of storage facilities with Garrett scores of 71.24,70.20,56.90 and 48.03 respectively.

Indicator - 11: Cost details and Benefit Cost Ratio with yield

Cost of Cultivation

The study shows (Table: 5 and 6) that, the Cost of Cultivation was increased in banana special applied field in terms of Rs. 115370 /ha (Singh Verma 2001) when compared to the existing farming practices 113000. By adopting this technology 24 % yield increased was recorded. The average incremental benefit reaped from the banana special was recorded Rs. 303570/ha Umagowri, Chandrasekaran, 2011.

The marketable quantity is high in treated area. It indicates that the Micro Nutrients directly or indirectly influencing the marketable bunches.

Gross cost and Net Return (Table 5and 6)

In control the maximum Gross cost recorded the 1,17,000 and the minimum Gross Cost value of 1,03,000 was recorded and the average Gross Cost is 1,13,000. For demonstrated method the maximum Gross Cost 1,50,000 was recorded and the minimum Gross Cost recorded the value of 1,09,000. Regarding the Net Return in demonstrated plot the maximum was recorded 3,25,000 and the average net return was 3,03,570. In check the minimum Net Return recorded 2,45,000 and the average net return was 2,71,800. For demonstrated method the average net return was 303570

Benefit Cost Ratio (Table 5 and 6)

The benefit cost ratio for demonstrated method was 3.7 for check it was 3.4.

Banana is one of the most important fruit crops grown in Pudukkottai district; however the productivity is continuously decreasing year by year. Thus, there is need to increase the productivity to fulfill the domestic requirement, commercial marketting and for export. Banana cultivation is capital intensive and needs more investment. It has been observed that technological interventions

pairing and pralinage (Almeida et.al, 2018), desuckering, propping, denevaling, foliar application of micro nutrients, bunch covering, soil application of bio control agent, crop rotation, mulching, and plant protection measures increased the bunch weight, there by yield is increased (Umagowri and Chandrasekaran, 2011) by 20 per cent with a B:C ratio of 3.7 at demonstrated farmer's field than the check plot 3.4. To enhance the productivity, eco friendly production technologies among the farming community are the need of the hour. The indigenous technical knowledge acquired by the farmers need to be tested and refined with the modern techniques of crop cultivation. Efforts should be made in the selection and production of improved cultivars with technological interventions local cultivars having high bunch weight, resistant to pest and diseases (Guayo, *et al.,* 2017) and time of irrigation, training on application of organic inputs, botanical formulations and biocontrol agents (Akila, R., Rajendran, 2011) should be followed. From the study it was revealed that price of fresh bunches fetches minimum price than the processed and value added products. Therefore, the farmers need to be encouraged to take up processing by themselves by giving them subsidy and/or loan for establishing the small scale processing units. Government should support.

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