

Banana mulching, sleeving and nutrient pouch feeding technology

A number of factors influence banana production like climate, soil, variety, irrigation and fertilizer management etc. In view of higher productivity of banana as well as efficient use of water and fertilizer with drip irrigation, it is becoming more popular among the farmers' of South Gujarat. In order to enhance the productivity of banana further, adoption of advance technology, viz. use of good quality planting materials, tissue culture plant, fertigation, mulching, sleeving and nutrient pouch feeding at distal end after de-navelling etc. along with drip irrigation are being advocated to the farmers by the University. Significant benefit was obtained from this model and here is an account of farmer's journey.

BANANA crop is widely grown in India and has great socio-economic and religious significance. It is the fourth-important food ingredient in terms of gross value exceeded only by rice, wheat and milk product and second most important fruit crop in India next to mango. It is highly nutritive and very delicious. Its year round availability, affordability, varietal range, taste, nutritive and medicinal value makes it the favourite fruit among all classes of people. It has also good export potential. Hi-tech cultivation of the crop is an economically viable enterprise leading to increase in productivity, improvement in produce quality and early crop maturity with the produce commanding premium price. In India, banana crop is cultivated in 7.70 lakh hectare and has a share of 37% of the total fruit production. In Gujarat, banana crop is cultivated in 11 districts covering an area of about 62.3 thousand ha. The major banana growing districts are Surat, Valsad, Bharuch, Narmada, Vadodara, Kheda, Bhavnagar, Junaghadh and Navsari.

Technical information of Banana MSN Technology

Mulching: It is a well established technology experimented in number of wide spaced crops by the university. Apart from moisture conservation, mulching moderates the soil temperature, restricts upward movement of soluble salts, suppresses weed growth, induces early maturity in banana and improves crop yield. Among the materials tested as

mulching, black plastic of 50 μ thickness was found most suitable in banana. Further, mulching act synergistically in drip irrigated crop. Even in surface irrigation, it improves the yield of many crops. Mulching with black plastic of 50 μ thickness by covering 32-40% area in drip irrigated banana crop was adopted on farmer's field.

How to use banana sleeves

- The grower must check for flowering three times in a month
- Two weeks after flowering, when banana fruits begins to turn up, the sleeve is placed on the bunch and enclose



Farmer's Name: Harshadbhai Patel, Borbhatha Village, Bharuch District, Gujarat



1. Lay mulch in row



2. Hole at middle



3. Cut from centre of the hole on one side



4. Rape mulch around the stem

How to laying mulching



Sleeving: Along with mulching, sleeving technology i.e. covering the banana fruit bunch with light blue plastic sheet (16-18 μ) was also demonstrated. This improves the quality as well as colour of the fruit, which fetches better price in the market.

- Held the sleeve loosely around the entire bunch of expanding fruits and tie the bunch

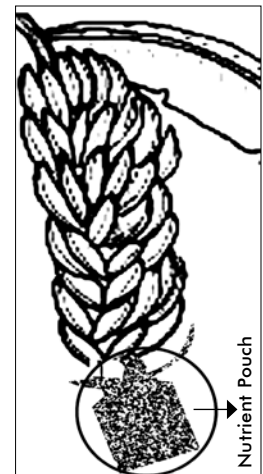
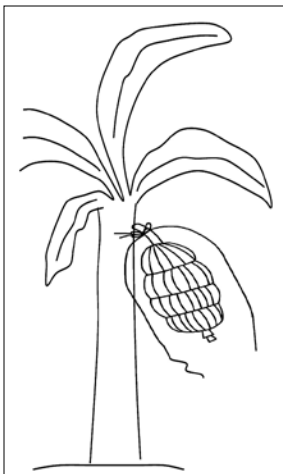
Nutrient feeding: Apart from mulching and sleeving, nutrient pouch technology (developed by IIHR, Bengaluru) was also included in demonstration. Generally, the banana fruits of upper hands are bigger and tend to decrease at the lower end of the bunch. In order to have uniform sized bananas from top to bottom of the

bunch, tying of nutrient pouch (fresh cow dung (400-500 g) + ammonium sulfate (13.3 g) + 0:0:50 (6.7 g)) at lower end of the bunch is beneficial.

After de-navelling (removal of the male bud after fruit set) nutrients pouch is fixed at distal stalk / rachis end of banana bunch.

Comparison of Banana MSN technology with Conventional practices

Water use efficiency: Banana MSN technology (mulching, sleeving and nutrients pouch feeding) increased the water used/expense efficiency by 67.4% over conventional practices.





Advisory strategy for sustaining of this technology: In banana, few farmers have already started using black plastic mulch along with drip. For making the black plastic of good quality available for the banana growers, fruit co-operatives need to be involved for bulk purchase. The supply of drip irrigation system is taken care of by GGRC. So this technology will be sustained for longer periods of times.

Ecological benefits: As water is a very important natural resources, we need to use very precisely. Here, water use efficiency is high as compared to open field condition; it can save the water for future use. Adoption of mulching technology improves soil physical conditions; it can suitable under clayey and even under moderate saline soils also.

Economics: The average cost occurred because of improved banana technology (₹ 269590/ha) was higher as compared to conventional practices (₹ 192125/ha). After computing the net realization, improved banana technology not only compensates the extra cost, but also increased the net realization. The average net realization received for improved banana technology was ₹ 479728/ha compared to conventional practices of ₹ 417880/ha. So, on an average ₹ 61849/ha was additionally generated from banana technology.

Feedback of farmer on the basis of his observation


(A) Mulching

Positive impact: Saving of water and fertilizer by 30-40% and 20-30%, respectively with less time required for irrigation. Mulching control 90% of weeds after laying of mulch. Particularly in winter, mulch moderate temperature, otherwise banana plants remain stunted during winter. It induces early maturity by 10-15 days as well as improved quality of fruit.

Particular	Benefits		
	CP	IT	
WUE (kg/ha mm)	62.0	103.8	Water saving 40%
Crop yield (t/ha)	74.4	85.1	14.4% increase in yield

CP, Conventional practices; IT, Improved technology

Yield (t/ha): Looking to the data on banana fruit yield, improved banana technology recorded 85.1 t/ha average yield against 74.4 t/ha produced from conventional practices, which is 14.4% higher than conventional.



Particular	Average performance of technology	
	Conventional practices	Banana MSN technology
No. of plant/ha	7" × 5" (3074 plant/ha)	
Yield (kg/plant)	24.2	27.7
Yield (t/ha)	74.4	85.1
Price/kg of banana fruit	8.2	8.8
Banana MSN technology cost (₹)	--	25.2
Cost/plant (₹)	62.5	87.7
Cost/ha (₹)	192125	269590
Gross realization (₹)	610005	749318
Net realization (₹)	417880	479728
Additional Increment (₹)	--	61849



Dr Tushar Patel, Scientist from NAU introduced nutrient pouch by de-navelling (removal of the male bud after fruit set) process and fixed pouch at distal stalk/rachis end of banana bunch.

Need to decide proper time of pouch installation.

Harshad Patel, 36-year young, emerging and innovative banana grower resident of Borbhatha village of Bharuch district (Gujarat) paved the success of banana mulching, sleeving and nutrient pouch feeding technology (Banana MSN Technology). Initially, he had cultivated tissue cultural banana under drip irrigation with conventional agronomical practices. He came in contact with scientists of University (Dr. Tushar Patel, College of Agriculture, NAU, Bharuch) during krushi mahotshav and adopted Banana MSN technology along with tissue culture and drip fertigation under continuous guidance and technical support. After 5 years of adaptation of Banana MSN technology, it was observed that technology saved the water (30-40%), fertilizer (20-30%), suppressed the weeds (90%), enhanced early maturity (10-15 days), besides moderation of the temperature particularly in winter. In case of sleeving, it improves quality of banana fruits, provide protection against pest and diseases, early maturity and harvesting of crop and protect banana bunch from direct impact of rain drops during monsoon. Nutrients pouch technology synchronizes the maturity of upper and lower bunch enabling to harvest crop 5-10 days earlier and improved the quality of produce. Overall yield of banana fruits increased by 14.4%. Now due to acceptance of concept of Banana MSN technology with proper agronomical practices and improved

Negative impact: Mulching laying required trained labour. Besides, for effective control of suckers, need to develop efficient control method. Reptile and rodent activities under mulch were experienced for sometime. Top dressing of water insoluble fertilizer becomes difficult.

(B) *Sleeving*

Positive impact: Sleeving improve quality of banana fruits. Its provide protection against pest and diseases thereby reduce the use of insecticides and fungicides. Enhance the maturity and harvesting of crop. During monsoon, banana bunch protected from direct impact of rain drops.

Negative impact: Its costly input, wear and tear of sleeve during monsoon, deteriorated quality of fruit were observed.

(C) *Nutrient pouch*

Positive impact: Synchronize the maturity of upper and lower hands on bunch that enable to harvest crop 5-10 days earlier. Improve the quality of produce, ultimately fetched higher market prices.

Negative impact: This technology is labour intensive. Timely availability of fresh cow dung at places is problem.

variety guided by scientists of University (Dr. Tushar Patel, College of Agriculture, NAU, Bharuch) increased his annual gross income significantly from ₹ 6,10,005 to ₹ 7,49,318 which increased his annual profit by ₹ 61849/ha (₹ 4,79,728 over ₹ 4,17,880).

Summary

High quality commercial cultivation of banana crop under Banana mulching, sleeving and nutrient pouch feeding technology by using tissue culture planting material and drip irrigation leads to multiple benefits *viz* synchronized growth, flowering and harvesting; reduction in variation of off-type and non-fruit plants; improved fruit quality; increases average productivity by more than 15%; makes possible harvesting of three crops within 36-40 months and harvesting of 99% plants; Banana MSN technology can save water and fertilizer by 30-40% and 20-30 %, respectively.

For further interaction please write to:

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