STAKING BANANA YIELDS AND QUALITY: A CASE STUDY OF THE JACHAK PATTERN

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ABSTRACT

We have some dynamic, well-educated farmers who follow agriculture as a passion. This research paper is the result of a case study investigation of one such farmer – Mr. Kapil Jayprakash Jachak, a progressive farmer from village Jachakwasti, Tehsil Indapur, Dist. Pune, whose innovative Banana cultivation technology is being accepted amongst other Banana farmers as the unique 'Jachak Pattern'. This innovative Jachak Pattern of Banana Cultivation includes 'paired row planting method' that accommodates more plants than the conventional farmers' method, which besides enhancing the quality, also increases the yield, while simultaneously reducing the cost fo production. In this Jachak Pattern, staking cost is reduced by tying Banana plants together with adhesive tapes enabling wider inter row spacing and easy interculturing inspite of increased plant population. This Jachak Pattern yields 100 to 110 t/ha for the plantation crop against the national average of 33 t/ha and Maharashtra state average of 65 t/ha. This pattern is enthusiastically followed by farmers from and outside of Maharashtra and this technology is gaining rapid popularity amongst the Banana farmers. It is necessary to acknowledge the efforts, trial and error based research and technology generated by Mr. Kapil Jachak and give wide publicity to his innovative technology.

Keywords: *farmer, case, study, pattern, yield, quality*

INTRODUCTION

India is a land of Agriculture. However, this identity is getting blurred with changing times (Vinaya and Shirur, 2021). This is due to the fact that many farmers are compelled to pursue agriculture as their occupation as they are not left with any other choice (Parmar et al., 2020). Still; we have some dynamic, well-educated farmers who follow agriculture as a passion rather than a secondary occupation choice. The aim of this research paper is to project one such farmer – Mr.Kapil Jayprakash Jachak, a progressive farmer from village Jachakwasti, Tehsil Indapur, Dist. Pune.

OBJECTIVES

(1) To know the advantages of jachak patterns' paired row over single row planting method of banana cultivation

(2) To know the comparison of jachak pattern and farmer's traditional method of banana cultivation

METHODOLOGY

The present research was conducted following the case study approach. A case study method involves an in depth analysis of a particular event, place, person or situation. This method is used to narrow down a very broad field of research into one easily researchable topic. Case studies are analyses of events, decisions, individuals, technologies, periods, projects, programmes, policies and institutions that are studied holistically by one or more method. The case that is the subject of the inquiry will be an instance of a class of phenomena that provides an analytical frame — an object — within which the study is conducted and which the case illuminates and explicates (Jamuna Rani, 2015).

Maxwell (1986) has mentioned that the case study method is a useful and cost-effective addition to the range of research tools used in multidisciplinary farming systems research. The case study method provides information that would be hard to obtain by other means, as well as an opportunity for close collaboration between social scientists, natural scientists and farmers.

The progressive farmer Mr. Kapil Jayprakash Jachak from Jachakwasti village in Indapur tahsil of Pune district was deliberately selected as a case study by virtue of the rapid popularity that he and his technology had gained. He has generated an innovative technology of Banana cultivation that is being accepted amongst other Banana farmers as the unique 'Jachak Pattern'. The criteria and procedures suggested by Murray *et al.* (1994) to conduct a case study were followed wherever possible and necessary.

RESULTS AND DISCUSSION

Banana is known by various names like – Tree of wisdom, Tree of paradise, Adams fig, Apple of paradise, an Antique fruit crop and also as a Fruit of wise men. Banana leaf is considered as a biological plate. It is an important fruit crop cultivated in India. It is the most consumed fruit crop of India. It is a high value crop grown in tropical and subtropical zones of India. Hence, it needs to be produced in an ample amount to mitigate the increasing nutritional demand of rapidly increasing population.

Banana is globally important fruit crop with 114 million tonnes of production on an area of 5.6 million hectares of land in 2017 according to annual report of Food and Agriculture Organisation. In India, it supports livelihood of millions of people. The total annual production of Banana crop is 16.91 million tonnes from 4.9 million ha. with national average of 33.5 t/ha as obtained from report of National Horticulture Board for the year 2017-2018. Maharashtra ranks first in production with 4.2 million tonnes on an area of 80.88 thousand hectares. Banana contributes 37% to total fruit production in India. Banana crop occupies 20 per cent area among total area under fruit crops in India. Maharashtra ranks 2nd in area and 1st in productivity in India. The state average productivity is 60t/ha according to report of National Horticulture Board for the year 2017-2018. Jalgaon is a major Banana growing district in Maharashtra which occupies 50,000 hectares area under Banana.

Most of the farmers are practicing traditional methods of Banana production which yields less while consuming more time, labour, cost of production and land, too. But Mr. Jachak, a progressive farmer aged 39, has developed and is practicing an exceptionally unique 'Jachak pattern of Banana production'. He had inherited Banana cultivation from his late grandfather, who was also a progressive farmer. In 1965 his grandfather had brought Banana suckers directly from Jalgaon district which is regarded as a 'Hub of Banana' in Maharashtra. Hence, it can be said that Mr. Jachak is continuing his grandfather's legacy of Banana cultivation with his own inventions and also of course by adopting advanced agricultural technologies.

Mr. Jachak had a cultural background of Agriculture. He did not complete his graduation in microbiology and instead of going for a conventional salaried job or business gaining exuberant returns, he preferred agriculture because of his rebellious nature not permitting him to follow the common path. He considers agriculture as his passion and not as a secondary occupation choice. He had started agriculture from 1999. Immediately in 2000 he felt the need of adoption of advanced agricultural technology. He came across the paired row system of Banana plantation practiced in the Philippines. From 2000 to 2004 he cultivated Banana on trial and error basis to check the most feasible planting distance for paired row planting in Banana. This experimentation enabled him to determine the feasible range of planting distance for paired row method of Banana cultivation. He started practicing Banana cultivation on commercial scale following and further experimenting on his newly developed paired row Banana cultivation method from 2005.

The normal planting distance for Banana is 7x5 ft. or 8x4 ft. However, Mr. Jachak experienced difficulties in interculture operations in this method and felt the need for some modification. Being a passionate farmer Mr. Jachak always wanted to adopt new technologies to increase the yield and quality of Bananas by minimising cost of production, labour and time. Jachak pattern of Banana production includes paired row planting replacing traditional single row planting. It accommodates 3750 plants/ha instead of normal 3175 plants/ha. Its' major advantage over single row planting is that it reduces the expenditure on bamboo staking. Both the plants in a pair are tied to each other by using virgin non transparent plastic adhesive polypropylene tapes supporting each other. This paired row method of planting also provides a space of 8.5 ft. in between two rows which facilitates effective and easy intercultural operations with tractor till 5 months and manually after 5 months alongwith easy application of pesticides, insecticides, etc. The wide inter row space also provides good aeration to Banana bunches and more exposure of leaves to sunlight also facilitates easy and convenient disease and pest monitoring due to more visibility of Banana trees.

The 'Jachak Pattern of Banana Production Technology':

- Tissue cultured plants are used as planting material.
- Planting is done in North-South direction.
- Irrigation is provided by paired row drip irrigation system.
- Fertigation is also practiced to enhance uniform application of water soluble slow release fertilizers at the root zone of plants.
- Mr. Jachak performs micro nutrient analysis for effective nutrient management. He has developed a chart of 365 days showing nutrient requirement of Banana from planting till harvesting and the nutrient doses are given to the crop as per the growth phase and requirement at the accurate time without any delay in its application.

Normally Banana suckers starts arising from the roots of the main crop after 80 to 90 days of planting at

intervals of 21 days. These suckers are borne 13 to 14 times a year necessitating continuous cutting which is a very tedious and time and labour consuming job. Growth of suckers affects the quality and production of commercial Banana production due to sharing of nutrients of the plant. Hence, to avoid this, the frequently growing suckers have to be cut regularly with a sharp knife. To overcome this problem, Mr. Jachak has adopted foreign technology to control the growth of suckers.

- He treats suckers with diesel (earlier with kerosene, until it was available) to reduce the frequency of growing suckers per year. 10 ml of diesel is injected into the suckers 2-3 inch deep with a syringe like tool causing unwanted suckers to die and only the healthy sucker is allowed to grow and used as a new seedling. This operation had reduced the frequency of growing suckers to 3-4 times a year rather than 13-14 times a year reducing cost on labour by 10 times.
- In Jachak pattern, ratoon crop is allowed to grow from 5th month of planting instead of 9th month as followed in traditional cultivation method.

As ratoon is grown from 5th month, additional doses of nutrients are supplied to fulfil nutrient demand of main crop as well as of the ratoon crop. When the main plant completes its life cycle of 12 months, ratoon crop completes its life cycle upto 7 months.

- De-leafing of main plantation is practiced after completion of its life cycle enhancing growth of the ratoon and more exposure of its leaves to sunlight.
- In this manner, interval of ratoon crop is decreased by 4 months in Jachak pattern as compared to traditional method of Banana cultivation.

  Banana bunches start growing after 9 months of planting.
- Skirting bags having 0.5 mm thickness and 75x100 cm dimensions with 6% holes are used to cover the Banana bunches protecting them from pests and diseases.

Use of skirting bags causes production of greenhouse effect inside the bags, causing early harvesting by 10 days. Bunches covered in skirting bags gains light green to yellowish colour giving pleasant appearance as compared to uncovered bunches that appear dark green at the time of harvesting.

The most significant feature of Jachak pattern is that it can yield 250 to 275 t/ha from a single tissue cultured plantation followed by two ratoons within a period of 28 months only. The Jachak pattern yields 100-110 t/ha for the plantation crop, the national average for which is merely 33t/ha and Maharashtra state average is 65t/ha.

Table1 : Advantages of Jachak Patterns' paired row over single row planting method of banana cultivation

Sr. No.	Paired row planting (Jachak pattern)	Single row planting
1	3750 plants/ha.	3175plants/ha.
2	Saving of cost on bamboo staking	Cost on bamboo staking
3	Wide inter row space of 8.5 ft.	Narrow inter row space of 6ft. to 7 ft.
4	Effective and easy intercultural operations	Ineffective and difficult intercultural operations
5	More visibility within and across plantation	Less visibility
6	Proper flow of air within the plantation	Hampered flow of air
7	Better crop microclimate	Poor or average crop microclimate
8	Yield of main plantation 100-110t/ha	Yield of main plantation 60t/ha
9	Yield of entire crop including 2 ratoons 250-275t/ha	Yield of entire crop including 2 ratoons 150-170t/ha

Table 2 : Comparison of Jachak pattern and farmer's traditional method of banana cultivation

Sr. No.	Jachak pattern	Farmer's traditional method
1	Use of subsoiler to break compact structure of soil	Use dependent on availability of subsoiler
2	Paired row planting	Traditional single row planting
3	3750 plants/ha	3175 plants/ha
4	Saving of cost on bamboo staking	Cost on bamboo staking
5	Ratoon crop after 5 months	Ratoon crop after 9 months
6	Wide inter row space of 8.5 ft.	Narrow inter row space of 6 to7 ft.

Sr. No.	Jachak pattern	Farmer's traditional method
7	Use of tractor for intercultural operations till 5 months	Tractor cannot be used
8	3 crops, *viz*.; main plantation and 2 ratoon crops can be taken within 28 months only	3 crops, *viz*.; main plantation and 2 ratoon crops requires 34 months
9	Yield 250t/ha (from 3 crops)	Yield 200t/ha (from 3 crops)
10	Use of skirting bags	No use of skirting bags
11	Micro-nutrient analysis of nutrients	Ineffective nutrient management
12	More visibility to trees and bunches	Crowding occurs causing no clear visibility
13	Effective pest and disease control	Ineffective pest and disease control
14	Good aeration	Poor aeration
15	Easy harvesting due to wide inter row space	Difficult harvesting due to narrow inter row space
16	Yield - 100 to 110t/ha	Yield – 60t/ha
17	Yield of plantation crop followed by 2 ratoons 250-275t/ha	Yield of plantation crop followed by 2 ratoons 150 -170t/ha

He also followed advanced technology recommended by the Sumifru Corporation, Phillipines, engaged in sourcing, production, shipment, marketing and export of various quality fresh fruits, and also exported his Banana production to Philippines in 2008.

Highest bunch weight of Banana obtained on following "Jachak pattern" has been recorded at 92 kg having 20 rings of Bananas with a bunch height of 5'3" ft.

Effect of the Jachak pattern

"Jachak pattern" is gaining rapid popularity amongst the farmers. This pattern is enthusiastically followed by farmers within Pune district and also by the farmers from districts like Satara, Sangli, Solapur, Kolhapur, Jalna and Jalgaon. More and more farmers from states like Uttar Pradesh, Bihar, Gujarat, Madhya Pradesh and Karnataka are getting attracted towards this innovative technology and are successfully following it. More than 1200 farmers are cultivating Banana crop with this innovative 'Jachak pattern of Banana production' over more than 800 ha. area and are reaping bumper yields upto 90-100 t/ha.

Biswas and Lalit Kumar (2010) have reported success stories of farmers cultivating Banana crop following High Density Planting techniques.

Mr. Jachak: An all rounder farmer and extension volunteer

Mr. Jachak is cultivating other crops like Pomegranate, Ginger, Papaya and Sugarcane in addition to Banana on his farm named as 'Parineeta Farm'. He had planted Golden bamboo, Apple, Peach, Dates, Avacado, Dragon fruit successfully on his farm. He has imported foreign breed of Koi Carp fish from China, Thailand and Singapore. He had started 'Agro tourism' on his Parineeta farm from 2016.

He had organised a '*Shivarferi*', farmers' field day, in co-ordination with KrishiVigyan Kendra, Baramati on his farm to guide other farmers. He has given lectures on Banana cultivation with the help of agricultural daily newspaper Agrowon in Pune, Akluj and Sangli. His articles on Banana cultivation were published in newspapers like Dainik Sakal and Agrowon.

He was selected by Dept. of Agriculture, Govt. of Maharashtra in 2014 for the farmers study tour to 17 different countries of Europe for studying their milk industry and advanced farming technology.

About Mr.Kapil Jachak

- In 2008, he won the privilege of being the first Indian farmer to have been interviewed by BBC, London regarding Banana cultivation.
- He was interviewed at Akashwani, Pune in 2009 for his innovative Banana cultivation technology.
- The Better India portal had taken notice of his work regarding Banana cultivation.
- He has his own youtube channel.
- On the popular demand of farmers, he is providing consultancy services regarding Banana cultivation to farmers across India.
- He was chosen as the brand ambassador for Sky Agro Drip company in the Krushik 2019 Agricultural Exhibition organised by KVK , Baramati.

Awards and honours

(1) Excellent Youth Farmer Award, 2008 by KVK, Baramati

(2) Excellent Farmer, 2016-17 by ATMA, Pune

(3) '*Shetinishtha*' Award, 2018-19 by Dadasaheb Shembekar Charitable Trust, Baramati

(4) Krushibhushan Raosaheb Kadlag '*Krishi Kranti Puraskar*', 2019

CONCLUSION

'Jachak pattern' of Banana production technology is gaining rapid popularity amongst Banana farmers. Inspite of many advanced innovations in agriculture, farmers are practicing traditional methods. But a few like Mr. Jachak are setting a brand of their own in front of other farmers and encouraging them to undertake agriculture as a passion and not as a vocation of secondary choice.

- This 'Jachak pattern of Banana production technology' needs to be assessed and refined by Agricultural Research Stations, Agricultural Universities and KVKs for its suitability and adaptation to Banana growing areas of various agro-climatic zones.
- It is necessary to acknowledge and diffuse the efforts and technology generated by Mr. Jachak and give wide publicity to his innovative technology.
- The Banana Growers Association should acknowledge his efforts and provide wide exposure to his experience and technology.
- Promoting and transferring Banana production technology developed by Mr. Jachak shall go a long way in breaking yield barriers of Banana crop.

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