



Banana Cultivation in Goalpara Aspirational District of Assam: Problems and Prospects

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ABSTRACT

Goalpara is an aspirational district of NITI ayog in the state of Assam. The district is one of the highest producers of banana in the state, however, the productivity remains quite low compared to the national average. The district also shelters the once Asia's largest banana market. The lower productivity and market related constraints have led to reduction in the charm of the market and repulsion of farmers from cultivating banana. Hence, this study was carried out in the district by studying the soil profiles from inorganic and organically cultivated banana fields. The soils were analysed for fertility properties. Also, the socio-economic constraints were surveyed in the field and data were collected from the farmers. The article discusses the results as problems and prospects, with an aim to help the banana farmers of the district as well as bring out their policy related problems in public domain.

INTRODUCTION

Goalpara district is an administrative district of Assam. It is bounded in the north by Barpeta district, in the east by the Kamrup district, in the south by Meghalaya and in the west by Dhubri district of Assam. The natural landmarks are Brahmaputra river in the north-west and the Garo hills in the south. It is spread between 25° 53'15" - 26° 14' 15" N latitudes and 90° 07' 0" - 91°06'30" E longitudes in 1824 Km² area. The district portrays heterogeneous physiographic condition viz., flood plains in the Northern part and gently sloping hill side slopes towards the south eastern part. Goalpara is also one of the aspirational districts of NITI Ayog. The aspirational district programme is focussed at integrated development of the district, which also includes the development in agriculture sector.

The district is mainly agrarian and 90% population of the district depend on Agriculture. Paddy is the main cultivated crop of the district. It is known that 6.25% of the net cultivated area of the district is under fruit crops. In total, 1,18,507 ha area (59.8% of TGA) is under completely

rainfed agriculture, whereas 26,511 ha area (13.3 % of TGA) is only irrigated (Comprehensive District Agricultural Plan, 2018). It is interesting to note that Goalpara is the highest producer of banana in Assam (Indiaagrstat, 2017) and the district shelters the once largest banana retail market in Asia (The Hindu, 2011), at a place named Daranggiri. In this market 20% of produces are from Goalpara district itself. The productivity of banana in the district is about 22t/ha under inorganic system of cultivation which is much higher than the state average (15t/ha). In the past 10 years, unprecedented growth in banana cultivation has been seen in the district. In the year 2009-10, with the Area Expansion programme of Agriculture Department under Mission on Integrated Development of Horticulture (MIDH), one progressive farmer of Rangjuli block of the district started banana cultivation. Presently, there are many farmers involved actively in banana cultivation in the block and the district as a whole who are reaping high profits. Banana is being grown at large scale now in the district both organically and inorganically. However, the inorganic production dominates. In both the cases different package of practices are being followed.

The package of practices (as per the information collected from two progressive farmers under both systems of cultivation) under both the systems are as follows:

Table.1. Package of practices of banana cultivation under different systems of cultivation

Package of practices	Inorganic system	Organic System
Planting density	2250 Plants/ ha	2250 Plants/ ha
Method of planting	Ridge and furrow	Ridge and furrow
Nutrient management	SSP-basal application @ 100g/plant, Urea- 100 g/plant starting from 45 DAT and repeated each 45 days interval, MOP- 250 g/plant starting from 90 DAT and repeated each 45 days interval	Vermicompost @ 2-3 kg /plant starting 45 DAT, at every 2-3 months interval, litter decomposition product, and liquid organic manure
Major pest and diseases	Scarab beetle and Sigatoka leaf spot	Scarab beetle and Sigatoka leaf spot
Control method	Chemical control (insecticides like Furadan and fungicides like Bavistin)	Organic control (Citronella/Neem oil spray and <i>Trichoderma spp.</i>)
Productivity	22-23 t/ha	18 t/ha

One of the major practices under both systems of cultivation is shifting of the plantation at an interval of 2-3 years. The farmers usually shift the plantation from one place to another in every 2-3 years to prevent pest and disease proliferation and consequent yield loss. The lands after 2-3 years of banana cultivation are used for growing seasonal vegetables.

However, the productivity is quite low as compared to the National average (33.5 t/ha, Indiaagristat, 2018). Hence, in the present study, the soil health status was taken in to account. According to soil nutrient mapping based on grid sampling of Goalpara district, (NBSS & LUP, 2012) the soils of Goalpara district are inherently fertile with around 47% soils are medium to high in soil available N, around 49% of soils are medium to high in soil available K but low in available P status in 78.7 % soil and 74.3 % of the soils are high (> 0.75%) in organic carbon.

The soil profile samples were also collected recently, from the banana fields of both organic and inorganic systems of cultivation, and tested for soil health parameters *viz.* pH, Soil Organic Carbon (SOC), N, P, K, and micronutrients (Fe, Mn, Zn, and Cu). The fertility status of soil at 50 cm depth has been depicted below:



Fig. 1. Inorganic Cultivation Plot



Fig. 2. Organic Cultivation Plot

Table 2. Soil physical and chemical properties under different systems of banana cultivation

System of cultivation	Soil Depth (cm)	Soil Texture	pH	SOC (%)	N (kg/ha)	P (kg/ha)	K (kg/ha)	Fe (ppm)	Mn (ppm)	Zn (ppm)	Cu (ppm)
Inorganic system	0-20	Clay Loam	4.42	1.4	539.33	22.25	140.7	12.16	1.07	0.57	0.74
	20-50	Clay	4.75	0.85	497.56	13.56	90.3	5.75	0.56	0.23	0.33
Organic system	0-20	Silty Clay Loam	4.38	1.52	436.62	17.3	175.00	6.62	1.48	0.18	0.12
	20-50	Silty Clay	4.66	0.88	419.78	9.1	124.27	10.78	1.33	0.47	0.49

Problems of banana cultivation

1. Problems of lower productivity of banana

The reasons of lower productivity may be related to soil, management practices, irrigation water availability and quality and crop loss due to elephants. The recent soil test results depict a highly acidic soil reaction. Which, according to Naidu *et al.* (2006) are unsuitable for banana cultivation with respect to soil reaction. The SOC status was found to be very high in both the practices. The organic plot showed higher value of SOC in both the depths of soil (0-20 cm and 20-30 cm) due to regular incorporation of organic manures for past few years. However, lesser difference was observed between two plots, which might be due to the fact that, the soil of the inorganic plot was found to be finer (Table 2) in texture (clay loam to clay) than the organic one, which would have facilitated higher retention of SOC even if external addition is lower. This also indicates the importance of the determination of soil texture for planning nutrient recommendations. Coming to the status of major nutrients (N, P and K), the soils were found to be medium in available N status, for both organic and inorganic plots. The amount was observed to decrease with depth. The organic plot was found to be lower in available N status, compared to the inorganic plot which might have resulted due to the regular application of chemical fertilizers (Table.1) in inorganic plot. In case of available P status, the results showed low values, or deficiency of P in both the systems of cultivation, due to the obvious reason of highly acidic soil reaction. The inorganic plot showed higher value, which might have resulted due to regular application of chemical fertilizers. Other fertility parameters like available micronutrients (except Fe) are low in both cultivation practices. The micronutrient deficiencies might have resulted due to lack of any external application of micro nutrients in any chemical form or any concentrated organic manure forms. The soil test results reveal the inappropriate balance in fertility management or lack integrated nutrient management.

Banana is a high water consuming crop. But as most of the area is under rainfed condition, many farmers are not able to adopt banana cultivation. The banana farmers in the area face problem of irrigating with ground water due to high iron (1.29 mg/l), fluoride (7.6 mg/l) and arsenic (0.05 mg/l) contents (Central Ground Water Board, 2013) on one hand and withdrawal of government subsidy for bore wells (due to valid reasons to control pollution) on the other. Most of the farmers growing banana in large scale use lift irrigation from river to irrigate the crop. This costs them very high as they have to lay 900-1000 m pipelines to draw water.

Other inter-cultural practices are not being taken care of properly and most of the fields were left unattended. The regular cleaning, earthing-up etc. are being neglected by the farmers. The reason may be the lack of technical know-hows. Another big problem is the elephant menace which

has been in the headlines for past few years. As, almost one-third of the district is under forest cover, elephants enter into the villages at night and destroy the crops, including banana. The farmers face more than 50% of crop loss due to this. And many farmers have also quit cultivating banana due to this reason only.

2. Problems of marketing of produce

As mentioned earlier, the district shelters the once largest banana retail market in Asia, which is still the largest banana market of north-eastern India. As we visited the market recently, the market has lost its charm. The amount of produce is reduced drastically. During the market survey, it was found that, the storage facility and transport facilities have not been properly developed. The transport is still being done in normal pick-up vans, to Guwahati and nearby places only, which is then transported to different states like West Bengal and Bihar. Specially, the *cheni champa* and *malbhog* varieties. The cost incurred for production is around Rs.130 /- per bunch. In the peak season the farmers sell one bunch for around Rs.300 /-. But as the district lacks enough cold storage facility to store their produces, sometimes they have to sell their produces at lower price causing depreciation in their profit. If there was proper cold chain for banana, then the products could be directly exported to longer distances, thereby increasing the profit of the farmers.



Fig.3. Transaction and export of produces at Daranggiri banana market.

Prospects

For achieving a good productivity in any crop, the soil test-based recommendations for inorganic as well as organic cultivation should be a prior consideration. As the results show the deficiency of micronutrients and P, the nutrient management practices are needed to be improved. Integrated nutrient management is recommended. The recommended integrated nutrient management for organic and inorganic system of cultivation is as follows:

Table.3. Integrated nutrient management recommendation

	Inorganic System	Organic System
Macronutrients	Application of AM 250 g + phosphate solubilizing bacteria (PSB) 50 g + Azospirillum 50 g/ plant along with 100% recommended dose of fertilizers (110:35:330 NPK/ plant is recommended to get high yield potential of 65 t/ha.	Application of AM 250 g + phosphate solubilizing bacteria (PSB) 50 g + Azospirillum 50 g/ plant along with locally available various organic sources like coir pith, pressmud, FYM and copper ore tailings (COT) can be judiciously used to enhance the yield potential.
Micronutrient	Foliar application of ZnSO ₄ 0.2% + FeSO ₄ 0.2% + CuSO ₄ 0.2% + Boric acid 0.1% at 3 rd , 5 th and 7 th month after planting along with recommended dose of fertilizers is recommended to improve the yield and quality traits	Application of coir pith dust, vermicompost and FYM are usually good source of Fe, Mn, Zn, Cu, Mo and B. Pig manure application will be a very good recommendation in Assam because pig rearing is a very common practice in almost every households in Assam. Pig manure incorporation @ 3 to 5 t/ha is recommended.

However, the fertilizer dose varies according to soil condition and variety of crop, for which soil test based recommendation is prescribed. One such intervention is soil health card, which is also provided by ICAR-NBSS & LUP, Regional Centre, Jorhat, to the farmers of north-eastern India.

Amelioration of soil acidity is also a major concern. The liming chemicals should be made available to the farmers at subsidized costs. Also, the locally available liming materials like paper mill sludge, from the nearby Jagiroad paper mills, should be exclusively made available to the farmers.

The development of proper storage and supply chain facility as well as proper irrigation facilities will boost the contribution of Goalpara district to the banana market. Although government agencies are working in these areas, the problems faced by farmers should be addressed by all the concerned departments, so that, the banana cultivation can be boosted in the

area which is likely to improve the livelihood of farmers. Due to interventions from government agencies like Krishi Vigyan Kendra, pitcher drip irrigation was introduced to some farmers in Dudhnoi block of the district. This helped increase banana yield in water scarce period. Irrigation systems like drip with micro-filters can be a good solution to overcome the problem of toxicity of Fe and other elements. A proper cold chain for storage and transport of banana should be taken as a priority area. Refrigerated vans and cool chambers for progressive farmers and zero energy cool chambers for small farmers should be provided at subsidized cost.

To prevent the entry of elephants in to crop fields, the borders of forest areas or buffer zones should be planted with wild fruit plants like *wood apple, bael and wild banana*.

CONCLUSION

Banana cultivation in Goalpara district is a growing venture in agriculture sector. It is and will be the source of livelihood of many a farmer in the district. However, the emerging problems of lower productivity, irrigation facility, marketing of produce and elephant menace is pushing the farmers away from adopting banana cultivation. Hence, the focussed effort towards addressing the problem will amply contribute to the economic growth and development of the district and help achieve the goal of aspirational district programme.