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RESEARCH ARTICLE

ASSESSMENT OF CULTIVATION PRACTICES OF BANANA USING COMMODITY SYSTEM ASSESSMENT METHODOLOGY (CSAM) IN ANANTHPUR, ANDHRA PRADESH

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ABSTRACT

A survey has been conducted in Kalyandurg area of Ananthapur district in Andhra Pradesh, India to determine the status of production technology, pre-harvest and post harvest techniques among Banana growers. The survey was done using Commodity System Assessment Methodology (CSAM) with few modifications as per requirement, which was originally developed by Jerry LaGra. The observations made were documented, which showed that the farmers are mostly following modern farming techniques for production but still lack enough knowledge about pre-cooling, pre-harvest and post-harvest handling techniques. There is a need to keep the farmers update to date for the any new production technology practices, new varieties, crop diversification, crop rotation, export potential and about processed products.

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INTRODUCTION

The determination of status of production technology, pre-harvest and post harvest techniques among banana growers was done by using Commodity System Assessment Methodology (CSAM), which was originally developed by Jerry La Gra (1990) and modified during its implementation over the course of many years. The commodity system is made up of 27 components that together account for all the steps associated with the production, postharvest handling and marketing of any given commodity.

METHODOLOGY AND OBSERVATIONS

Importance of the crop

Banana (*Musa sp.*) is referred as *Kalpatharu* (a plant of virtues) and is widely grown in different parts of India with huge socio-economic significance intermingled with culture and heritage. India is the largest producer of banana in the world contributing 20 percent of total world production (FAOSTAT, 2011). It has originated in the hot, tropical regions of South-East Asia and India in one of the centres of origin. In India it ranks second in area after mango and Tamilnadu, Andhra Pradesh, Karnataka, Kerala are the leading banana producing states in the country. CSAM studies in aonla were carried out at Kalyandurg area of Ananthapur district (Andhra Pradesh). There is wide area in Ananthapur district where banana is

being cultivated and contributing to major portion of banana production of Andhra Pradesh. Kalyandurg area in Ananthapur was selected for the CASM survey as it is one of the potential areas with several banana growers. Interviews were held with farmers at their fields, at market yard and also some of the information was collected from concerned departments.

Varieties

Traditionally several varieties of banana namely Dwarf Cavendish, Poovan, Grand Naine, Monthan etc. are being cultivated widely in India. But at present situation in Ananthapur region majority of area is being commercially cultivated by tissue cultured Grand Naine (G-9) variety.

Public Sector Policies

Several government bodies such as National Horticulture Mission, National Horticulture Board, State Department of Horticulture, APEDA (Agricultural & Processed Food Products Export Development Authority), State Agricultural Marketing Board, etc. are announcing several policies, subsidies and incentives related to export, development of agronomical practices, pest control, pesticide residue analysis, technical guidance, training & education, disease/pest forecasting facilities, drip irrigation, etc., but only few farmers are able to use these efficiently. Market information was got by different Public and Private sector media. Majority of farmers collect market information by maintaining direct phone conversations with market committee members and other

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source of information being Television and Crop information Booklets circulated by concerned Departments, daily news papers, pamphlets etc...

Relevant Institutions

1. Several public and private research centers have great contribution in development of good agro-techniques and commercial orchards.
2. The relevant institutions are
 - a. National Research Center for Banana, Trichy, Tamilnadu.
 - b. Tamil Nadu Agricultural University, Coimbatore, Tamilnadu.
 - c. Kerala Agricultural University, Thrissur, Kerala.
 - d. Agriculture Research Station, Kovvur, Andhra Pradesh.
 - e. Banana Research Station, Kannara, Kerala.
 - f. Mahatma Phule Krishi Vidyapeeth Banana Research Station, Jalgaon, Maharashtra.
 - g. Indian Agricultural Research Institute, New Delhi.
 - h. National Bureau of Plant Genetic Resources, New Delhi.
 - i. Central Institute for Subtropical Horticulture, Lucknow, U.P.



Fig. 1. Banana plantation under drip irrigation

Facilitating Services

1. Most of the farmers are availing subsidy up to 90 percent on drip irrigation for horticultural crops given by Andhra Pradesh Micro Irrigation Project (APMIP).
2. 50 percent subsidy on plastic crates up to 125 Rs. per crate is also being given by State Horticulture Department.
3. There is also 50 percent subsidy on production cost for newly established plantations (up to 31,125 Rs. / hectare) from State Horticulture Mission. Also 50 percent subsidy is again given for 2nd year maintenance of the same crop up to 10,375 Rs. / hectare.
4. Facility of credit is being availed by few farmers through "Kisan Credit Card" provided by Government of India, RBI (Reserve Bank of India), and NABARD (National Bank for Agricultural and Rural Development).

Producer Organisation

Banana Growers Association of India has been established in Jalgaon (Maharashtra). The main objectives of organisation are

to bring together buyers and sellers; increasing awareness of improved production technologies and helping in organizing seminars to disseminate knowledge regarding banana cultivation and marketing.



Fig. 2. Tissue cultured plants in portrays



Fig. 3. Tissue cultured plants in polybags ready to plant

Environmental Conditions

1. Banana is well-suited for cultivation from humid subtropical to semi-arid subtropics.
2. Mean temperature range from 20^o to 30^o C and plants show decline in growth in case of both increase or decrease in temperatures.
3. It can be successfully cultivated in the all kinds of soils having good drainage. The soil pH 6.5 – 7.5 is optimum but can also be grown in soils having up to 8.5, with suitable amendments.
4. High speed winds usually occurring during February – March cause major constraint as they uproot and collapse whole plant.

Planting Material

1. Tissue cultured banana propagules are majorly being used by farmers. Very few farmers are still growing through

sword suckers. Growing tissue cultured plants allow farmer to have a uniform harvest and also plants free from virus and other diseases.

2. Farmers are mostly depending on Private Nurseries for planting material.

PRODUCTION

General Cultivation Practices

1. Farm yard manure, vermicompost and neem cakes are applied by soil application to fulfil nutrient requirements of crop. Other fertilizers are being applied along with drip irrigation (fertigation). Information regarding amount and time of application is got from different media and horticulture department.
2. Drip irrigation is being strictly followed for irrigation, fertigation of micro nutrients and chemigation to act against pests and diseases.
3. Castor and Casuarina are being planted at borders, which will protect as wind breaks since banana is prone to fall in high velocity winds.
4. High Density Planting (HDP) method is being widely practiced to improve productivity.



Fig. 4. Castor planted as wind breaks



Fig. 5. Immature Banana bunch before denavelling (wiith male flower)

Pests and Diseases

1. No major pests or diseases were observed in the plantations.
2. Using disease free tissue cultured plants may be the reason for healthy plants without serious viral diseases in the plantations.
3. Minor occurrence of Rhizome weevil was observed in some areas.

Pre Harvest Treatments

1. Some farmers are practising 'bunch feeding technique' to gain profitable results like uniform sized fruits in bunch, increased bunch weight and improved quality.

Production Costs (INR)

S.No	Item of expenditure	Main Crop	I Ratoon	II Ratoon
I	Materials			
1	Planting material	36000	0	0
2	Organic Manures	9500	2000	2000
3	Inorganic manures	20500	11000	10000
4	Plant Protection Chemicals	2000	2000	2000
II	Operations			
1	Land preparation	1000	0	0
2	Digging and filling up of pits	5000	0	0
3	Planting and staking	1500	0	0
4	Manures & fertilizers application	1200	1000	1000
5	Irrigation	1200	1000	1000
6	Appl. of plant protection	300	300	300
7	Interculture	1500	1000	1000
8	Harvesting	1500	1500	1000
	TOTAL	81200	19800	18300

Note: Above data presented is average of cost information expressed by farmers per hectare in INR.

POST HARVEST

Harvest

1. Banana is a climacteric fruit and is usually being uniformly ripened using different ripening techniques after harvest.
2. The whole bunch is harvested using long knives when maximum corners of the fingers become round and plump with change in colour to light green.
3. Produce is harvested by labour in early morning and at evening periods.
4. On average 40-45 tonnes fruits/ hectare/ year is obtained depending up on variety and cultivation practices.

Grading

No specific grading is done at farmer level but over damaged or diseased ones are discarded. There are three grading levels viz., Extra class, Class I and Class II maintained at international market.

Postharvest Treatments

1. Farmers are unaware of pre-cooling practice and it is not done at farm level.



Fig. 6. Banana bunches manually harvested



Fig. 7. Transportation of banana bunches by Trucks

2. Artificial ripening using ethylene gas is done in cold storages for achieving a uniform ripening of all fruits in bunches. This process is carried out by traders after collecting the produce from farmer's fields.

Packaging

1. Bananas are transported as bunches from the fields, but traders pack them in corrugated fibreboard boxes as whole hands, clusters or individual fingers.
2. Bananas are also some times placed in plastic trays for transportation.

Cooling

1. Cooling chambers are widely used for ripening purpose. The temperature maintained in the chamber is not less than 13⁰ C.

Storage

1. No specific storage structures are used for storage by farmers at field level. They sell all the produce on the day of harvest.

2. The trader also keeps in cooling chambers for very less time after ripening process.

Transport

1. The produce is transported to nearby ripening chambers, which is more than 60km from orchards by trucks, tractors, auto rickshaws and other private vehicles.
2. Some of the farmers also transport their produce to other states which are about 1500-2000km distance, by means of railway and trucks.
3. Loading and unloading of produce is completely manual.

Delays or waiting

1. Normally there are no delays or waiting as produce is transported to local markets as soon as harvested, within hours.
2. Long distance transport are generally done overnight.

Other handling

1. Many farmers reported un-availability of sufficient labour.
2. Most of the labour, appointed in the farm is well practised in all intercultural operations like propping, denavelling, mattocking etc., harvesting techniques and handling.
3. Mechanical harvesting or other methods of harvest is not feasible for farmer to use as most of farmers owe orchards, which are not more than 3 hectares.

Agro-processing

1. Several processed products are available in case of banana viz. banana chips, candy etc.. But at farmer level no processing is being done.
2. All the fruits harvested are sold fresh.

MARKETING

Market Intermediaries

1. Most of the farmers sell their produce through commission agents to the traders. The fruits then are transported to different areas by means of Private vehicles to different places of demand by the wholesale marketers after completion of ripening procedure.

Market Information

1. Market prices vary largely from 12 Rs. /kg to 20 Rs. /kg. The market price is mostly fixed by marketers itself.
2. Majority of farmers collect market information by maintaining direct phone conversations with market committee members and also by other media like televisions, radio, newspaper, pamphlets etc...
3. Market values are unpredictable which doesn't allow proper production planning.

Consumer Demand

1. Banana usually has a round the year good consumer demand and is considered as poor man's food.

2. Most of the consumers are un-aware of effects of post harvest treatments like artificial ripening. So they are least bothered about the methods used and others. Most of the consumers just go with good appearance and size while selection.
3. No specific packing methods are used for fresh produce, while selling to consumers.

Exports

1. India exports very large quantities of banana up to 41000 MT to different countries, especially to Middle Eastern countries.
2. But maximum production in Ananthapur area is meant only for local marketing or to transport to other states.

Marketing Costs

1. Infrastructure for ripening, improving export potential and for commercial processing is major requirement.
2. Present cultivation practices are providing sufficient returns to farmer.

Conclusions

1. Most of the farmers are following possible modern farming techniques. Many farmers have enough knowledge about production technology but less idea about pre-cooling, pre and post harvest handling techniques.
2. There were very limited incidences of pests and diseases but major loss was observed due to abiotic factors like heavy winds, lack of sufficient ground water for irrigation.

Recommendations

1. Research Needs:
 - a) Development of low cost technologies to improve storage life of the fruits.

- b) There is need to develop varieties which can produce good quality fruits even under severe abiotic stress and also their tissue culture protocol.

2. Training Needs:

- a) The farmers have to be updated with proper nutrient management, any new techniques of production viz., bunch feeding techniques etc.
- b) The farmers need to be educated to plan their cropping to escape severe abiotic conditions like high winds. Planting wind break trees are to be encouraged to reduce the high wind damage.

3. Advocacy Needs:

- a) Regular inspection of plant materials providing tissue culture laboratories by concerned authorities, while issuing and renewing licence in order to check supply of faulty material to farmers.

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