GOVERNMENT OF ORISSA

DEPARTMENT OF AGRICULTURE

PROJECT PROPOSAL FOR PROVISION OF WATER SUPPLY SYSTEM & ELECTRIFICATION FOR MANGO HANDLING & GRADING PLANT AT BHAKURGUDA FARM, RAYAGADA.

Submitted by:
Deputy Director of Horticulture
Rayagada

Through
Director of Horticulture,
Odisha, Bhubaneswar

PROJECT SUMMARY

Name of the Project	:	Project proposal for provision of water supply system & electrification for mango handling & grading plant at Bhakurguda Farm, Rayagada.
Name and address of the executants	:	Deputy Director of Horticulture, Rayagada
Proposed Work	:	1. Provision of 250 KVA electrical sub-station. 2. Provision of 11 KV line, metering unit & HTTV meter. 3. Security deposit for electrification. 3. Provision of water supply system with RCC over head tank.
Proposed Site	:	Bhakurguda Farm, Rayagada Dist: Rayagada.
Source of fund	:	RKVY
Year of Execution	:	2016-17
Total Project cost	:	**Rs.24.22 Lakh**

1. Background / Introduction

Approximately 50% of all tropical fruits produced worldwide are mangoes. Mango (*Mangiferaindica* Linn) is an important fruit crop in India which is the most widely cultivated fruit in India. India being the major mango growing country, contributes nearly 49.62 per cent of world's area and 42.06 per cent of world's production respectively. Area under mango crop in Andhra Pradesh is the highest in the country. The fruit is very popular with the masses due to its wide range of adaptability, high nutritive value, richness in variety, delicious taste and excellent flavour. The fruit is consumed in both forms raw and ripe. The Inter-Ministerial Task Force on Agricultural Marketing Reforms suggested several measures for strengthening agricultural marketing system in the country for benefiting the farming community to enhance the share of farmers in the ultimate price of their produce as well as for various market functionaries in the new liberalized global market opportunities and to foster true competition among the market players.

In spite of the growing worldwide demand for mango fruits, disease attacks coupled with their lower shelf- life poses a serious threat to the industry. The two most serious fungal diseases of mangoes are powdery mildew *(Oidiummangiferae*) and anthracnose (*Collectrichumgloesporioides*) both of which are prevalent in the wet season. Unfortunately, domestic and international trade of fresh mangoes, have been limited by its high perishable nature and it's susceptibility to postharvest diseases, extremes of temperature and physical injury. The fruit may require from 3 to 9 days ripening and this short period seriously limits its commercialization in distant markets. Chemical treatments applied to the fruits have been reported to leave residues of the chemical on the fruits. This poses a significant health risk to the consumer and their use is very much restricted by regulatory bodies. However, heat treatment on mango fruits has been accepted worldwide as an ideal disease control treatment since it is environmentally safe and non-chemical.

Improved post-harvest practices results in reduction in losses, improve overall quality, extend shelf life and higher profits for growers and marketers. Normally, Mangoes do not need any post-harvest treatment for marketing in local markets, except simple washing with water to remove the latex and dust. However, on a commercial scale or they are sometimes dipped in hot water, for the control of diseases. Hot water treatment (HWT) is an effective post-harvest treatment for mangoes. Dipping newly harvested fruits in hot water minimizes fruit fly damage, anthracnose, and stem-end rot infections. This process enhances the keeping quality of mango and reduces post-harvest losses due to diseases and pests. Cool chambers are needed for ripening and long life preserving the freshness of products. About 9500ha. of area in different Blocks have been covered under Mango plantation out of which about 5000 ha. is only in Kashipur Block. Yield out of about 5000ha. bearing Mango tree is expected to be about 10,000MT to 15,000MT per season in 2016. So it is expected that, at least 200MT to 300 MT mango can be processed. (Assuming 20 to 30 days operation @ 10MT per day).

2. AIM & OBJECTIVE

Post-harvest loss in mango is often caused by anthracnose, stem end rot and fruit fly. Hot water treatment (HWT) of mango was suggested as it a cost effective intervention to minimise the post-harvest loss and in turn profit. Mango are harvested at maturity and kept upside down to discharge sap. These fruits are subjected to hot water treatment at 46 ^{0}C for 60 minutes. This reduces post-harvest loss and increases life of mango. As such the aims and objectives are

- To reduce pest losses in harvested mango
- To increase the post-harvest life of mango
- To prepare mangoes for long area transportation
- To attain uniform ripening in harvested mango
- To develop confidence of retailers and consumers in quality aspect of mango produced in a particular region.
- To enable the producers to get premium price of mango fruits

3. Feasibility of the Project

Rayagada in an important district of eastern Ghat of Odisha which is known for horticultural crops. Most of the areas of district are hilly inhabited by tribals. High Density Progeny Orchard, Bhakurguda farm, the site of activity, is one of the tribal area is characterized by subsistence hill farming and resource-starved agricultural production system. The economy of tribal farmers in target area was primarily based on agriculture and forest produce. They used to practice subsistence farming and cultivate variety of crops for their consumption. Cultivation of annual crops in undulated sloppy land was the prime source of their livelihood, though the practice was highly challenging and cumbersome. It was also observed that frequent tillage aggravated soil erosion and in turn affected soil fertility and productivity and rendered the land uncultivable. Under such circumstances, promotion of fruit crops like mango was perceived as a potential intervention not only to enhance income of poor tribal farmers but also to ensure better utilization of resources.

There has been a practice to give hot water treatment to mangoes being exported to certain countries. There has been no practice to give heat treatment to mangoes meant for local /domestic market. However Central Horticultural Experiment Station with the association of some farmers in Rayagada, initiated HWT way back in 2009. The fruits are subjected to hot water treatment at 46 ^{0}C for 60 minutes. The hot water treatment plant has been manufactured locally, using 2000 liters capacity tank fitted with heating rods, thermostat and circulating fan to ensure uniform temperature inside the tank. The plant can treat 600 kg mango at a time. Using pulley and chain, the mango crates are submerged in hot water tank for 60 minutes. Treated fruits are allowed to cool and dry before grading and packing. Fruits are packed in corrugated card board boxes of 5 kg capacity. Till 2015 nearly 400 tonnes of mango have been treated and supplied to local market. However this small system is supporting to small group of farmers which need further upgradation, moreover, this facility is not enough to support the volume of mango that is likely to come from Rayagada region from many villages.

For ripening of mango, low cost mango ripening method standardized by IIHR was modified considering the prevailing temperature at the time of fruit harvest in the tribal area of Rayagada. The technique was modified in such a manner that ripening of fruits with ethylene gas may be done with minimal inputs. An airtight room of dimension 3mx3m x3m was used as a ripening chamber accommodating 6-8 q of fruits/batch. Mature fruits were kept in plastic tray inside the chamber and exposed to ethylene gas produced by dissolving ethrel (10 ml) and caustic soda (2g) in 5-6 litres of water. Fruits were exposed to ethylene gas inside the chamber for 16-20 hours to initiate the ripening. After incubation, fruits were taken out and kept at normal room temperature for 3-4 days to complete the ripening process. The modification in the incubation period and quantity of ethrel has been done considering the high temperature of ripening chamber during summer (37-40°C). However this is small intervention which needs to be upgraded.

4. Basic information about the project

A mango handling & grading plant of capacity 1 MT / batch with a Pre-fabricated structure of size 30 mtr. X 18 mtr X 1.5 mtr. for housing the plant has been installed at Bhakurguda Farm, Rayagada by Food Science & Post Harvest Technology Division of IARI , New Delhi with an estimated cost of **Rs.207.90 lakh**. The detail components of the infrastructure are as follows:

i.	Pre fabricated structure for housing the handling & grading system	– 1 No.
ii.	Hot water treatment unit of capacity 1 MT / batch	- 1 No.
iii.	Washing, cleaning, brushing unit	- 1 No.
iv.	Sorting / inspection unit	- 1 No.
v.	De-sapping tables	-12 Nos.
vi.	Feeding elevator	- 2 Nos.
vii.	Hydro cooling –cum- surface moisture drying system	- 1 No.
viii.	Electronic weight grading system	- 1 No.
ix.	PVC crates	- 1000 Nos.
x.	Hydraulic pallet handler	- 3 Nos.
xi.	PVC pallets	- 20 Nos.

But the external electrification system with provision of 250 KVA sub-station & provision of water supply system with overhead tank have not been done by IARI although the infrastructure has been completed by IARI. In order to make the infrastructure functional for effective utilization by the local farmers, FPO's, it has been proposed for provision of one 250 KVA electrical sub-station with 11 KVA line, metering unit & HTTV meter, provision of security deposit & provision of water supply with RCC over head tank.

5. Competency and Sustainability

The project will be managed by Food science & post harvest technology division of IARI, New Delhi initially for a period of 2 years. Subsequently, the unit will be managed by FPO's with the help of Horticulture Department. Two staffs of Horticulture Deptt. and members of FPO Will be trained by the erector for operational management of the system till satisfaction. The system is automatic hence does not require much technical competent. It is expected that, mango would arrive in sufficient quantity. (at least 10 to 15), which will ensure the full utilization of the structure and machine during mango season. Since mango a perennial crop, it will continue for years to come and therefore the utility of the structure and machine would be harnessed for many years and thus the proposed proposal is stainable. The erector will ensure the rectification any defect / failure of the machine for one year and will also continue to provide after sales service as and when needed. Central Horticultural Experimental Station (CHES), Bhubaneswar will assist the FPO from time to time for successful utilization of the Unit.

6. Sector & Sub-sectors:

Horticulture – Infrastructure Development.

7. Anticipated Benefit

a. Mango is harvested in rainy season in Rayagada which is highly prone to fruit fly and anthracnose due to rain. HWT will provide complete protection from these post-harvest problems in mango.

b. It has been observed that hot water treated fruits have longer shelf life, hence farmers and retailer will get additional time to dispose their produce.

c. Hot water treated mangoes have longer shelf life therefore farmers can get distant area market to sell their produce.

d. Hot water treated mango normally come at ripening at same time. This will enable framers to get more prices.

e. Due to supply of quality mango from the area, a type of branding will be there for Rayagada mango. This will develop confidence of retailers and consumers in quality aspect of mango produced in the region.

8. A) Expected Output

A hot water treatment plant of capacity 1MT /batch with hydro cooling -cum surface moisture drying system has been installed for effective post-harvest management of mango in particular. One Pre-fabricated structure of size 30 mtr. X 18 mtr X 1.5 mtr for housing the plant has already been completed by IARI, New Delhi.

B) **ExpectedOutcome**

Production and supply of quality mango with longer shelf life would be output and premium price, reduction in post-harvest loss and branding of the produce would be the outcome of the investment

Proposed work/activities with detail narration

Sl. No.	**Proposed activity**	**Estimated cost**	**Amount**
i	Provision for installation of 250 KVA, 11/0.4 KV electrical sub-station	Rs.7,16,580 /-	Rs.7,16,580 /-
Ii	Cost towards 11 kv line with metering unit & httv meter	Rs. 2,70,064.00	Rs. 2,70,064.00
Iii	Cost towards security deposit for electrification	Rs.8,34,228.00	Rs.8,34,228.00
Iv	Provision of water supply system with RCC over head tank	Rs.5,77,840.00	Rs.5,77,840.00
v	Contingency	Rs.23,288.00	Rs.23,288.00
	Total		**Rs.24, 22,000.00**

(Rupees Twenty Four lakh and Twenty Two thousand only)

9. Time line

The project will be implemented in 2016-17 and will be completed before March, 2017.

10. District wise target (Phy. And Fin.)

Departmental Farm

11. Nos. of beneficiaries

Mango producers of Rayagada districts will utilize the Unit to get higher remuneration.

12. Project co-coordinator details:

	Name	**Designation**	**Mobile No.**	**Email**
State Level	Sri Jyoti Prakash Ray	Asst. Refrigerator Engineer, (Hq.)	9937446247	
Dist. Level	Sri Ananda Ch. Sahu	Dy. Director of Horticulture, Rayagada	9777234038	ddhrayagada.od@nic.in

13. Check list

a. Funds available under other schemes of the State / Govt. of India for the proposed projects have been accessed and utilized before it is proposed under RKVY.
b. There will be no duplication or overlapping of assistance / area coverage through other State / Central Govt. Schemes.
c. The funds under the project is not proposed as additional or top-up subsidy to other ongoing schemes/programmes of State / Central Govt.
d. DPRs includes contingency.

Asst. Refrigerator Engineer,
C/o- Director of Horticulture, Odisha

Dy. Director of Horticulture,
Rayagada