

## SUMMARY AND PROGRESS OF FIRST CALL PROJECTS

### Project Title: Improvement in post harvest handling and ripening of banana (023/059/060)

**Project Co-ordinator:** Mr. Indra Raj Pandey

**Address:** Nepal Horticulture Promotion Centre, Khumaltar, Lalitpur

**Duration:** Three years [Nov 2003 to Oct 2006]

**Budget:** NRs. 2,073,500

**Location:** Banana producing pockets of Kanchanpur and Kailali and Major fruit marketing centres of Nepal

**Purpose:** Increase farm income through improved banana post harvest technology

**Output:**

1. Indigenous maturity indices and ripening methods documented.
2. Appropriate physiological maturity indices for harvesting identified.
3. Suitable banana ripening technology identified.
4. Appropriate packaging material and stage for shipping to reduce post harvest loss identified
5. Banana growers and traders' knowledge and skill on post harvest handling upgraded.
6. Banana marketing system documented.

S. N.	Activities	Progress
1	Documentation of indigenous knowledge on banana maturity, ripening and transport	<p>All respondent farmers use recommended levels of fertilizer and go for recommended plant protection measures. In the surveyed sample, all farmers reported that they have practices of cutting off of bungo after fruit setting. They determine the harvesting time by observing weather the fingers are will fill or not as well as colour of the banana. Most of the farmers sell mature green banana without ripening. Packing of mature bananas in gunny bags, heaping or exposing to sun were some of the indigenous methods of banana ripening. Some farmers also use chemicals such as ethephone and calcium carbide for banana ripening. It was reported that treated banana takes 2-3 days in summer and 5-7 days in winter to ripen.</p> <p>Farmers use bullock cart, bi-cycle, rickshaw, three wheelers and tractor to transport banana from the farm to the market. Three wheelers (Tempo) were the most common means of banana transport. Wrapping banana before transportation was not a common practices. Banana leaves is the most common wrapping material.</p>

2	Identification of Maturity Indices for harvesting banana	<p>The experiment to determine maturity indices were conducted in Kailali and Kanchanpur using William Hybrid and Harichhal varieties respectively.</p> <p>Angularity, skin colour and total soluble sugar (TSS) were recorded in each treatment and replication after specified 60, 80, 100, 120,140 days after flowering. For the analysis banana fingers were classified as (i) flat, without pulp filling (angularity score 10) (ii) Triangular when banana ridges were clearly visible (angularity score 8) (iii) Almost round (angularity score 6) and (iv) round when angularity disappeared (angularity score 4).</p> <p>Both the varieties were flat up to 80 days after flowering initiation (DAIF). The fingers were triangular in 100 DAIF and changed to slightly round in 120 DAIF. The skin colour was found to be dark green until 100 DAIF and which first changed to light green at 120 DAIF. It changed to yellowish green from 140 DAIF. However, during winter months it took up to 180 days for complete changes in angularity and skin colour.</p> <p>The total soluble solid was very low until 100 DAIF. Total Soluble Solid (TSS) begins to increase after 120 days DAIF (3.6%). The TSS increased dramatically between 120 and 140 DAIF. The disappearance of angularities and skin colour change and increase in TSS to 10 or above are the indices of banana starting on the tree itself.</p>
3	Identification of banana ripening methods	<p>The experiment was conducted in Kailali and Kanchanpur District. Matured banana was selected using the shape and colour of the banana fingers. Total Soluble Sugar (TSS) content (brix reading) using a hand held refractometer were taken for the three banana fingers sampled from the top, middle and bottom hands of each bunches. There were nine treatments and three replications in the experiment. Two chemical (calcium carbide, ethephone), no chemicals were evaluated at three levels (low, medium and high) of treatments. Wrapping of the banana with jute bags increased the rate of TSS content as compared to the unwrapped ones. Farmers who have small quantities of banana and intend only for household use, can use this method. In case of chemical use, medium and high dose of both chemicals found similar effects.</p>
4	Conduct study to identify suitable packaging material and stage for shipping banana to transport for distant market.	<p>Unripe banana (freshly harvested unripe mature banana), ripe banana (from the banana ripening experiment, after a week of treatment) and half ripe banana (banana treated with calcium carbide, after two days of treatment) were used to identify the right stage of banana for long distance transportation. Second factor studied was the method of packaging. Wrapping the banana with dry straw and tying it with jute thread and packing banana bunch within cardboard box were the two packaging materials compared with control (with out any packaging).</p> <p>The result showed that the banana was suitable for long distance transportation only at matured green stage. The half ripe and ripe bananas suffer high degree of damage if transported long distance. The unripe but mature bananas are hard and resist the pressure exerted for the outside where as ripen bananas are soft and easily succumb to external pressure. The provision of cushion material like rice straw or paper box provides additional protection to bananas during transportation. The effects of such cushioning material were more obvious when the ripe bananas were transported.</p>

5	Farmers and entrepreneurs training on post harvest handling of banana	<p>With the scope of the activities of the project “improvement in post harvest handling and ripening of banana, training to farmers and entrepreneurs on maturity indices and post harvest handling of banana was the up scaling activities of the finding of the study. The training was for the commercial banana growers and entrepreneurs from the two project districts. In each district, three training were conducted. One training was organized for the leader farmers and other two for commercial farmers.</p> <p>Participants had opportunities to visit the orchards and received hands on training on removing unnecessary suckers, diseased plants and plant debris. They were also able to identify maturity indices of banana</p>
6	Conduction of banana market survey	<p>The survey has been completed in the major markets Kanchanpur, Kailali, Butwal, Narayangarh, Pokhara and Kathmandu of Nepal. Relevant information on marketing channels and volume of transaction in major market centers, transportation system and price spread have been collected. Information on the qualities of bananas marketed from different places also has been gathered. A structured and key informant survey tools were used to collect the information. The respondents included banana entrepreneurs, commission agents and traders.</p>