



Post Harvest

Research & Development Activities

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Mission Statement- FAREI



To support and implement priority research and development and training programs and projects and appropriate technologies for food security and to enhance competitiveness, sustainability and stakeholder equity across the agri-food value chains.

FAREI organi gramme

Research Departments

➤ Livestock Sector

➤ Crop sector

- Agronomy division – Strategic crops
- Vegetables and ornamentals
- Fruit Division –Fruit species, **Postharvest** and agro-processing
- Resources management Division
- Crop protection- Entomology and Plant Pathology Divisions

Extension Department

➤ Crop Extension

➤ Livestock Extension

➤ Information and Training

Crop Sector

Production - approx 117,000 tonnes/year (8,500 small scale growers)

- Small units of production
 - 0.125 ha to 1 ha
 - Vegetables, fruits & flowers
- Self sufficient in fresh vegetables, & local fruits (banana, pineapple,...)
- Strategic crops production in 2014
 - Potato :88 %
 - Onion :40%
 - Garlic :18 %

Market

Domestic market – locals and tourists

Export: Pineapple, litchi, breadfruit, passion fruit

Mauritius Net importer (77 %)

- highly dependent on imported food – Rice, flour, oil, pulses, milk products ,.....
- Fruit Import 20,000t :import apples, citrus and grapes

Challenges : Food security and nutrition , postharvest losses , climate change ,

Postharvest losses & Challenges facing the foodcrop sector

- Significant Postharvest losses in certain highly perishable commodities: tomato , banana, onion ,leaf green ,..... , ,

Main reasons –

- Poor handling ,
- Inappropriate packaging
- Poor storage conditions
- Excessive handling through intermediaries along market chain
- Postharvest losses in Strategic crops -Potato, onion & garlic during storage
- Limited farmers/ handlers education / awareness in postharvest
- Lack of quality standards for horticultural produce

Postharvest Challenges facing the food crop sector

- Preharvest losses due to pest and disease, sun scorching
- Postharvest losses in Strategic crops -Potato, onion & garlic during storage
- High postharvest losses along the marketing chain for banana, tomato ,
- Poor handling and packaging logistics
- Excessive handling through intermediaries along market chain
- Lack of hygiene and cold chain facility
- Limited farmers/ handlers education / awareness in postharvest
- Lack of quality standards for horticultural produce

Post harvest sector-local context

- Post harvest losses(10-35%) fruits&veg
- Seasonality and lack of production planning
- Poor storage infrastructure
- Poor management of produce supply-Mechanical and physical damage during handling& transport
- Reluctance of farmers to adopt post harvest practices - Financial constraints of the farmer
- Lack of economic benefits to the farmer

Aims & Objectives of Postharvest Research

1. To reduce post harvest losses of horticultural produce from field to consumer.
2. To increase shelf life of perishable fresh produce to improve their marketability
3. To increase availability of seasonal produce.
4. To assess consumer acceptability of stored produce through sensory evaluations.
5. To assess the postharvest quality of new varieties of fruits and vegetables
6. To evaluate effect of different postharvest treatments, packaging and storage conditions on quality of horticultural produce

R& D Activities in Postharvest of Horticultural Produce

- Characterisation of germplasm– NEW varieties of Banana, litchi, longan, mango, guava, atte(green , purple), pitaya
- Characterisation of the following underutilized local fruits have been carried out at the post harvest research facility - acerola, jamalac, amla, jamblon, strawberry guava, pineapple, olive, hogplum, local cherry, kumquat, atemoya, atte, soursop, jackfruit, breadfruit, longan, starfruit, banana, coconut, gooseberry, passion fruit
- Evaluating postharvest treatments (hydrocooling, packaging, cold storage) to improve shelf life of horticultural crops - carrot, litchi, pitaya, ...
- Evaluating of effect of different packaging and storage conditions on shelf life of **minimally processed** horticultural produce – carrot, green banana

Storage trials

- Trials on high yielding varieties of vegetables or fruits subjected to various packaging and storage conditions, shelf life monitored as marketability, firmness, brix, acidity and weight loss, color and post harvest disease incidence.
- Sweet pepper, tomato, broccoli, fine bean, strawberry, litchi, melon, pineapple, avocado, papaya, passion fruit, mango chillies, cucumber, papaya, guava, melon, breadfruit, asparagus, local lemon assessed.
- **Minimal processing** of vegetables and fruits of economic importance(carrots, pineapple, squash, fine beans, garlic, onion, mushroom, fine beans, pepino, roselle, starfruit, papaya, cassava, moringa leaves, lettuce, cauliflower, broccoli, pomegranate, jackfruit, sweet pepper, breadfruit, taro leaves) by different types of cut and being packed using plastic bags, clip-on barquettes or by vacuum and cold stored.

Past and ongoing Post Harvest Research projects

- Development of post harvest package for Rodriguan lime, carrots
- Development of a non-chemical treatment to extend shelf life
- for export of fresh litchi- hydrocooling of litchis
- Develop alternatives for control of post harvest diseases (biological, heat treatment)
- Identification of post harvest losses of vegetables (tomato, banana, onion)
- Evaluation of the use of low cost structures- zero energy chamber in improving shelf life of fresh horticultural produce.
- Development of post harvest package for post harvest disease control in mango
- Development of a post harvest package to prevent post harvest disease in fresh chillies.

Research & development activities in post harvest sector benefitting the farming community

- Reduction of preharvest and post harvest losses in commercial crops such as litchi, banana and pineapple through the adoption of strategies such as hydro cooling, bagging and degreening technique.
- **Capacity development** of farmers and operators along the marketing chain by sensitizing them on about good handling and storage practices through training programmes, demonstrations & visits.
- **Training**
- Agricultural Marketing Board on pre and post harvest management practice for onion
- Rodriguan growers on shelf life improvement of stored rodriguan limes for export,
- Post harvest practices and handling of fine beans and packhouse management and on EUREPGAP norms for the export of fine green beans to stakeholders
- Harvest and post harvest practices to litchi growers on EUREPGAP norms for the export of fresh litchis
- Training pineapple growers and potential exporters on post harvest practices involved for the harvest, handling, packing and export of fresh pineapples .

Sensitisation & Training

- Commercial banana ripening
- packaging of leafy vegetables, cucurbits and pineapples, passion fruit, papaya and mango prior to export.
- Training on minimal processing of horticultural produce of commercial interest and practical demonstration to potential entrepreneurs at the Post harvest facility
- Training on basic post harvest operations from field to storage to maintain quality and lengthen shelf life of fresh produce to agri-business farmers.

Sensitisation & Training

- Training of growers on international norms or access to export markets
- Sensitized growers and operators along the marketing chain- training programs, visits and demonstrations
- Introduce incentives to reward farmers who are adopting post harvest practices
- Adoption of standard norms should be legalised
- Training of growers on maintaining 'the cool chain'
- Establish national standards for major fresh fruits and vegetables of economic importance

Sensitisation in post harvest

Training

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- Rodriguan growers on shelf life improvement of stored rodriguan limes for export,
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Improving shelf life of Fresh Horticultural produce

R & D Activities	Output
<p>Shelf Life Evaluation</p> <ul style="list-style-type: none">- Cold stored packed litchi varieties <i>Yook Ho Pow</i> and <i>Tai So</i>- Cold stored packed longan- Hydrocooled, cold stored carrot at 2-4 °C , RH 90%	<p>Shelf life of both varieties were 14 days at 4-5 °C (packed in punnets)</p> <p>Longan treated with 200ppm Sodium hypochloride, air dried , packed in 30 Micron polyethylene bag , stored at 3 - 4 °C had a shelf life of 25 days</p> <p>Storability of carrot tubers packed in perforated cello pack was between 2.5 to 3 months at 2 -4 °C, RH 90%</p>

Shelf life of minimally processed Horticultural produce

Research Activities	Output
Shelf life evaluation of vacuum packed green banana chunks var. FHIA 25 , Williams and Ollier at 3 - 4 °C	Avg. Shelf life of 35 days
Cold stored minimally processed of vacuum packed carrot (slices, cubes, grated) at 3 - 4 °C	Vacuum packed carrot at 3 - 4 °C improved shelf life from 6 to 14 days for carrot cubes and sliced and from 4 to 9 days for grated carrot
Shelf life evaluation of Minimally processed vacuum packed cubes butternut varieties – Samson, Waltan, Pluto and Babara	Varieties Babara, Samson, Walton and Pluto showed a shelf life of 21, 25 , 31 and 31 days at 3-5 °C

Shelf life evaluation of underutilized fruit species

Fruit	Storage temp °C	Packaging	Shelf life & main observations
Strawberry guava	13	Plastic bags Clip-on	6 days,firm, sweet Red color
Starfruit	10	LDPE plastic	21 days, 1/4-1/2 ripe,firm.
Hogplums	10	Plastic bags	18 days,brix 7- 9,acidity 1.1-1.4.
Jambalac	6	Plastic bags	var Malgache -7 days, varLocal - 5 days
Pomegranate	10	Cling film	3weeks no cling film,6 weeks for cling filmed
Olives	13	Pastic bags, 30 micron.	2 weeks, ripen, soften, soggy.

Meetings with Farming community

- Facilitate technology transfer,
- Research and Extension and with the farming community to facilitate technology transfer and to obtain feedback.
- Technical Review Workshop (TRW) and meetings (TRM) on post harvest treatments of fresh litchis and fine beans to growers, and exporters and extension staff.
- Public lecture on 'Harvest and Post harvest breadfruit'.
- Public lecture on "Poste recolte des fleurs coupes" at the Municipality of Rose Hill.

Publications to support farming community

- Fact sheets on
 - (a) Post harvest treatment of freshly harvested litchi for export.
 - (b) Guidelines to harvesting, handling, packing and storage of mangoes, strawberry, passion fruit, guava, variety 'George and field tomatoes'.
 - (c) Fact sheet on post harvest handling of cut flowers was published in farming news
 - (d) post harvest aspects in published booklet on 'La culture de l'arbre a pain' a Maurice.
- Publications on reduction of postharvest losses and improvement of marketability of horticultural produce for the local (onion, banana)
- the export (anthurium, pineapple, litchi) market are also available at FAREI extension service.
- An article was published in Mauritius Horticultural Society journal on 'General post harvest management practices to extend vase life of fresh cut flowers
- following trials on the vase life of cut gerbera, lillium, roses, winter bulbs and gladiolus carried out using different home made and commercial preservative solutions

Scientific publications

- Quality attributes of Marquise strawberry variety- STASM 2003 .
- Effect of temperature and packaging on the shelf life of two strawberry cultivars - AMAS-2002
- Effect of hydro-cooling on shelf life of fresh litchis- Research week at the University of Mauritius- 2014
- Optimizing the shelf life of whole and fresh cut breadfruit in Mauritius ISHS-2016



Future activities

- Use of ethylene and oxygen absorbers to enhance shelf life of stored climacteric produce.
- Training on HACCP to agri-business farmers.
- Evaluation of post harvest losses of crops of economic importance.
- Rapid Detection Methods of pesticide residues in stored produce prior to export.
- Improve export quality of fresh mangoes.



Thank you