Conference on

Food Loss and Food waste Reduction and Recovery

Postharvest Losses of Horticultural Produce: Causes, Challenges & Strategies for Loss Reduction

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- Foodcrop production, resources required and its implications
- Food supply chain and stakeholders involved at farm, wholesale, retail and consumer level
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Local Foodcrop Production

106,270 t of fresh vegetables and fruits (perishable)

		Ton/ year (2016)
Vegetables	**Potato**	16,300
	Tomato (cooking & salad)	10,136
	Onion	6,388
	Creepers(pumpkin, gourds, squash ,cucumber .....)	25,623
	Crucifers(cabbage, cauliflower, broccoli, petsai)	7,735
	Beans and peas	1,431
	Brinjal	2,738
	Chilli	1,963
	Leafy greens	2,706
	Mixed vegetables **	***13,812***
Fruits	**Banana**	7,731
	Pineapple	9,707

******* include carrot, beet, garlic, maize, groundnut, lettuce, ginger, sweet pepper, sweet potato , manioc, lady finger, leek, herbs, taro, ...*

Resources required for foodcrop production

Natural resources

- **Land** approximately 8,000 ha /year
- **Freshwater** for irrigation/ cleaning

Inputs (mostly imported) which accounts to a significant % of the cost of production

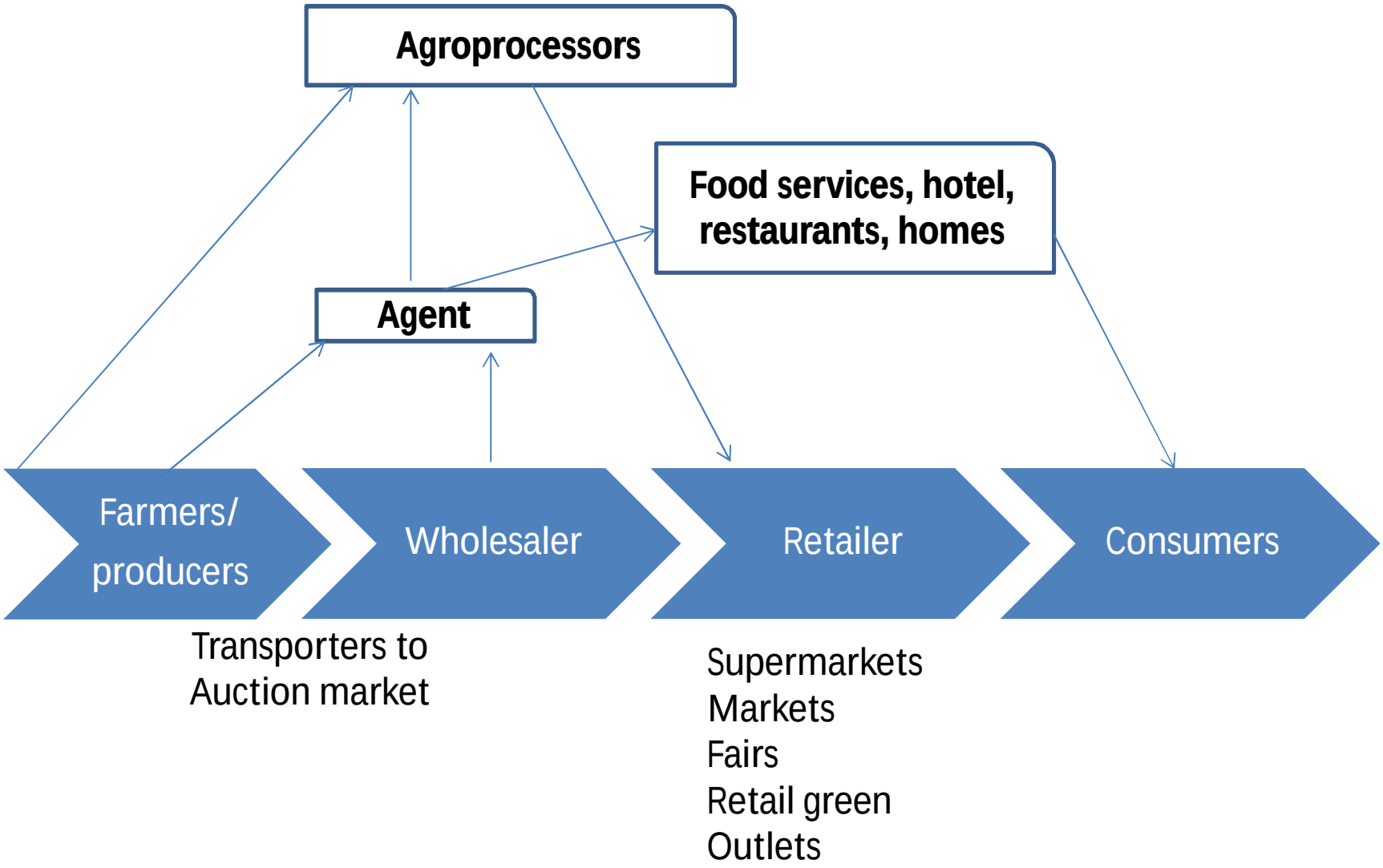
- Seed / planting materials
- Fertilisers (organic / inorganic)
- Pesticides
- Fuel – mechanisation / water pumping / transport/storage/ processing
- Others – plastic greenhouses,

Human resources

Increasing agricultural production to meet food and nutrition security is likely to lead to

Competition of natural resources, increased GHG emission/ environmental pollution, deforestation and land degradation

Food supply chain and stakeholders involved that can help to reduce fool loss and waste



Marketing system for Horticultural produce

Domestic market - mainly fresh , wholesome vegetables and fruits with some minimal processing

- **Municipal markets**
- **Fairs**
- **Supermarkets**
- **Road side green stalls**
- **Supermarkets**
- **Restaurants**
- **Hotels**
- **Canteens**
- **Hospitals, clinics, prisons**

Export market – *Involving collectors/ Packers and exporters for crops such as pineapple, litchi, breadfruit, passion fruit, greens, ...*

Post harvest losses an its implications

- Presently- No reliable data quantifying food losses at each stage of supply chain to help to understand how much and why ??

- It is estimated that loss vary between 10 – 30 % depending on perishability of the commodity / production system(open or protected), farming practices, climatic conditions, production level (surplus or shortage) and connectivity with markets

- However, it results in reduction in farmer income and no economic gain for future investment

Causes of food losses

1. Preharvest and harvest factors

- Pest and diseases
- Unfavourable soil or climatic conditions
- Farming practices – Excess N fertilisation , excess irrigation, harvesting either too early or too late .....

2. Postharvest Mal-practices leading to loss

Use of inappropriate packaging and rough handling

Mechanical damage and poor ripening conditions

Exposure to heat /
Pressure due to overpacking

Qualitative loss in onion and potato stored at AMB (2017)

	Quantity purchased (t)	Quantity down graded and sold at 30 % less (t)	% down graded
Imported onion	7,698	198	2.6
Locally onion	378	53	14.0
Onion imported from Rodrigues	79	13	16.5
Imported potato	4,305	455	10.6
Local potato, Grade 1	2,357	72	3.1
Local potato, Mixed grade	1,379	165	12.0

Reduction of market value due to loss in quality as a result of shrinkage, rotting and sprouting

Poor harvest, handling, ripening practices, poor storage infrastructure and packaging

Challenges in addressing post harvest loss

- **Human attitude and behaviour** (mal-practices probably due to ignorance / reluctance of farmers to adopt post harvest practices due to financial constraints)

- **Technological limitations** (poor packaging /transport practices, absence of cooling facility /cold chain & storage infrastructure, absence of processing facilities for value addition)

- **Economic factors** (Lack of economic benefits to the farmer due to low market price / competition with imported produce)

R & D – related to reduction of food loss

Screening of crop varieties

- tolerant to pest and diseases
- with good storability and processing potential

Development of optimal fertiliser and water regime for enhanced keeping quality (e.g in onion)

Develop postharvest treatments to improve shelf life of perishable produce (improved handing and packing, precooling , packaging , cold storage ,.....)

Development of fruit tree management practices to minimise losses due to bats

Development of Integrated pest and disease management to minimise losses (e.g fruit fly damage)

Capacity building in protected cultivation, postharvest handling techology, good agricultural practices

Postharvest Loss Reduction with improved postharvest handling of cooking tomatoes

	% of postharvest loss(due to weight loss & rotting)under ambient conditions	
	Traditional farmers practice	***Improved practice***
4 days after	14.1	7.7
8 days after	27.3	16.0

Traditional farmers practice- harvesting of mature green tomato, pack unsorted in wooden boxes and kept in field heat , prior to storing on floor at ambient conditions

Improved practice – *harvesting at mature green stage, sorted and packed in shallow plastic crates , transferred in shade and stored off floor on pallet under ambient conditions*

% losses was reduced by 11.3 % with the use of the improved methods of shade, plastic trays and good air flow during storage

Assessment of storability of promising onion varieties under ambient and cold storage conditions

Field curing of onion under favourable conditions

Split onions sorting of split disease and damaged onion prior to storage

Selected onion for storage

Onion Variety	Colour	% loss in marketable weight					
		Ambient conditions			Cold storage 2 - 4° C,65-75% RH		
		Month 1	Month 2	Month 3	Month 1	Month 2	Month 3
Chelsea	**Yellow**	1.0	2.8	**8.0**	0.4	0.6	**1.1**
890	**Yellow**	1.6	3.5	**10.1**	0.5	1.9	**2.4**
Russet	**Dark Red**	1.8	4.8	**11.0**	0.6	1.0	**1.8**
Malbec	**Dark Red**	1.9	4.6	**14.9**	0.3	0.9	**3.8**
Sunset	**Pink**	1.0	5.0	**15.2**	0.2	1.8	**2.6**
Sirius	**Yellow**	3.0	6.1	**18.7**	2.3	4.2	**6.8**
Francia *	**Red**	7.4	10.3	**18.3**	0.1	0.5	**1.5**
Star 5517*	**Yellow**	0.1	10.4	**21.5**	0.0	1.1	**3.0**
NUN 7272*	**Red**	1.0	13.9	**34.4**	0.3	0.5	**1.9**
Star 5529*	**Red**	1.4	3.1	**8.7**	0.3	0.8	**1.1**

***Control**

Main causes of loss in onion

- **weight loss**
- **rotting**
- **sprouting**

Screening promising potato varieties with good keeping quality and tolerant to cold induced sugar accumulation

14 weeks after storage

Ambient conditions

Variety Safari

Variety Delaware

Cold store at 2- 4° C

Proposed Strategies for food loss and food waste reduction

- Set national target for food loss and waste reduction across the food supply chain
- Need to quantify food loss and waste along supply change to understand the root causes and gather data for evaluation of loss reduction programme - Develop methodologies to measure food loss
- Raise awareness on post harvest losses., its causes and how to reduce them - among all stakeholders involved in the supply chain (farmer, transporter, market actors, ... consumers)

- Improved connectivity among producers, market and consumers to optimise production and distribution – production planning for a balance demand and supply
- Set support scheme to encourage investment in infrastructure , transportation, ripening facility, processing and packaging for more sustainable food systems.

Proposed Strategies for food loss and food waste reduction (2)

- Support to small holders to improve their economies of scale and convert over production to value added products with longer shelf life
- Set guideline for expiry or best used by date to standardise label and educate consumers on how to assess food quality
- Launch campaign to educate consumers on food waste reduction – *"Clean your plate initiative"*
- Reuse of food waste as animal feed
- Encourage supermarket chain/NGO to recover of food waste for charitable redistribution
- Recycling of food waste in composting , anaerobic digestion, incineration for energy and nutrients recovery

Thank you for your attention