"International Workshop on Food Loss & Waste Prevention in the South Asian Region"
INDIAN COUNCIL OF AGRICULTURAL RESEARCH (ICAR) & THÜNEN INSTITUTE, GERMANY

Post-Harvest Loss of Cereal Grains, Fruits and Vegetables in Bangladesh

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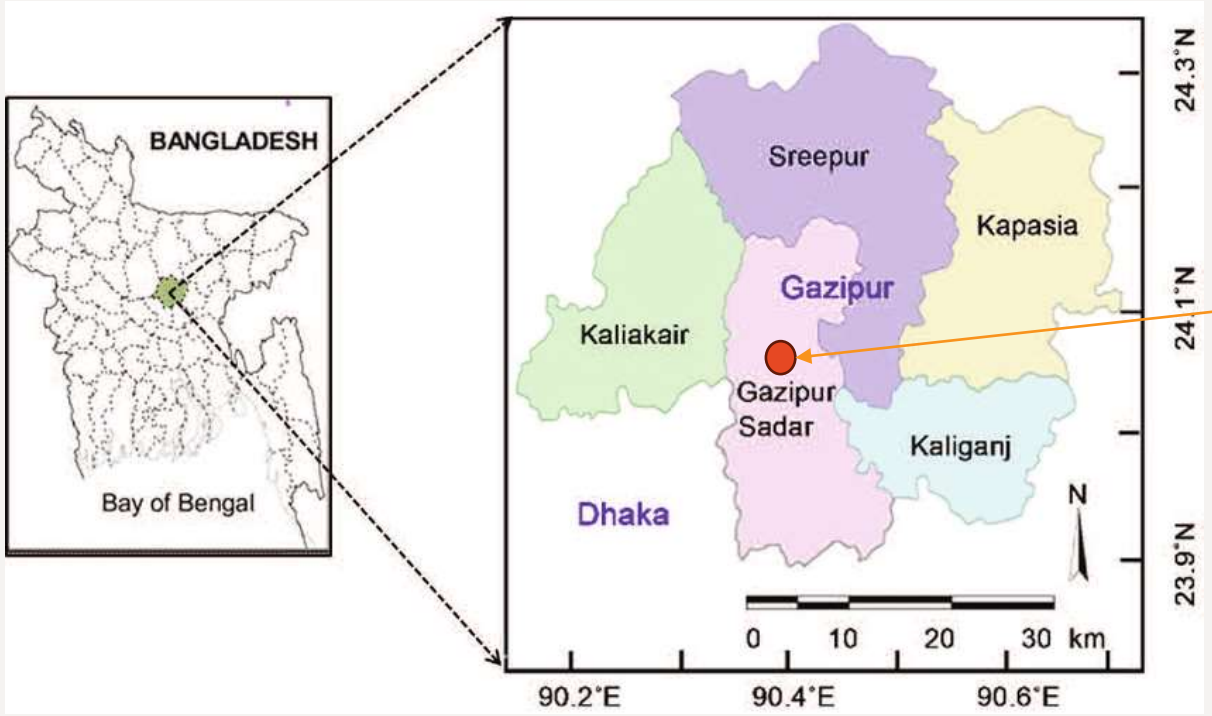
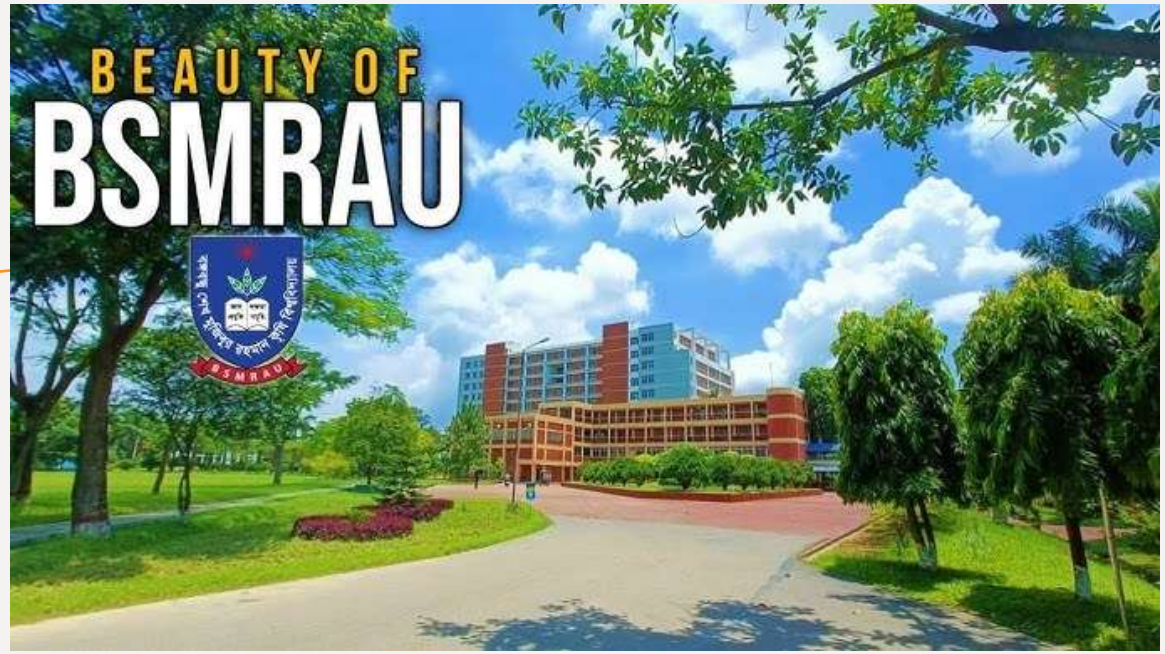


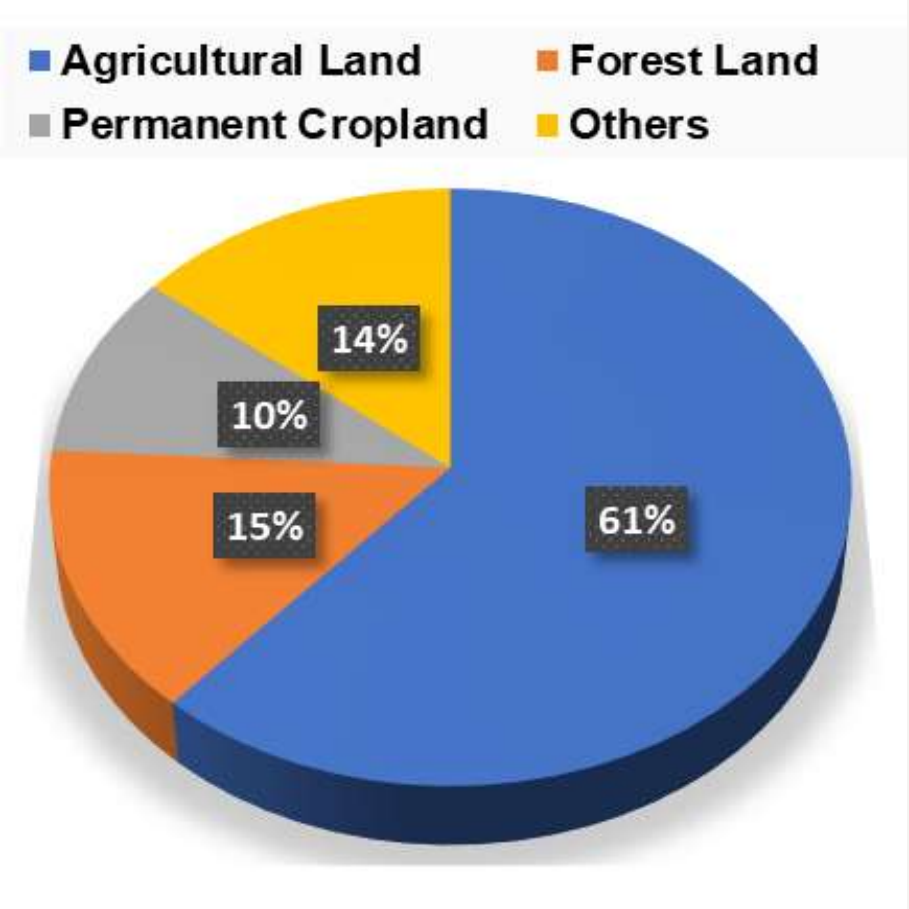


Education:
Ph. D from Hokkaido University, Japan

Research Interests:

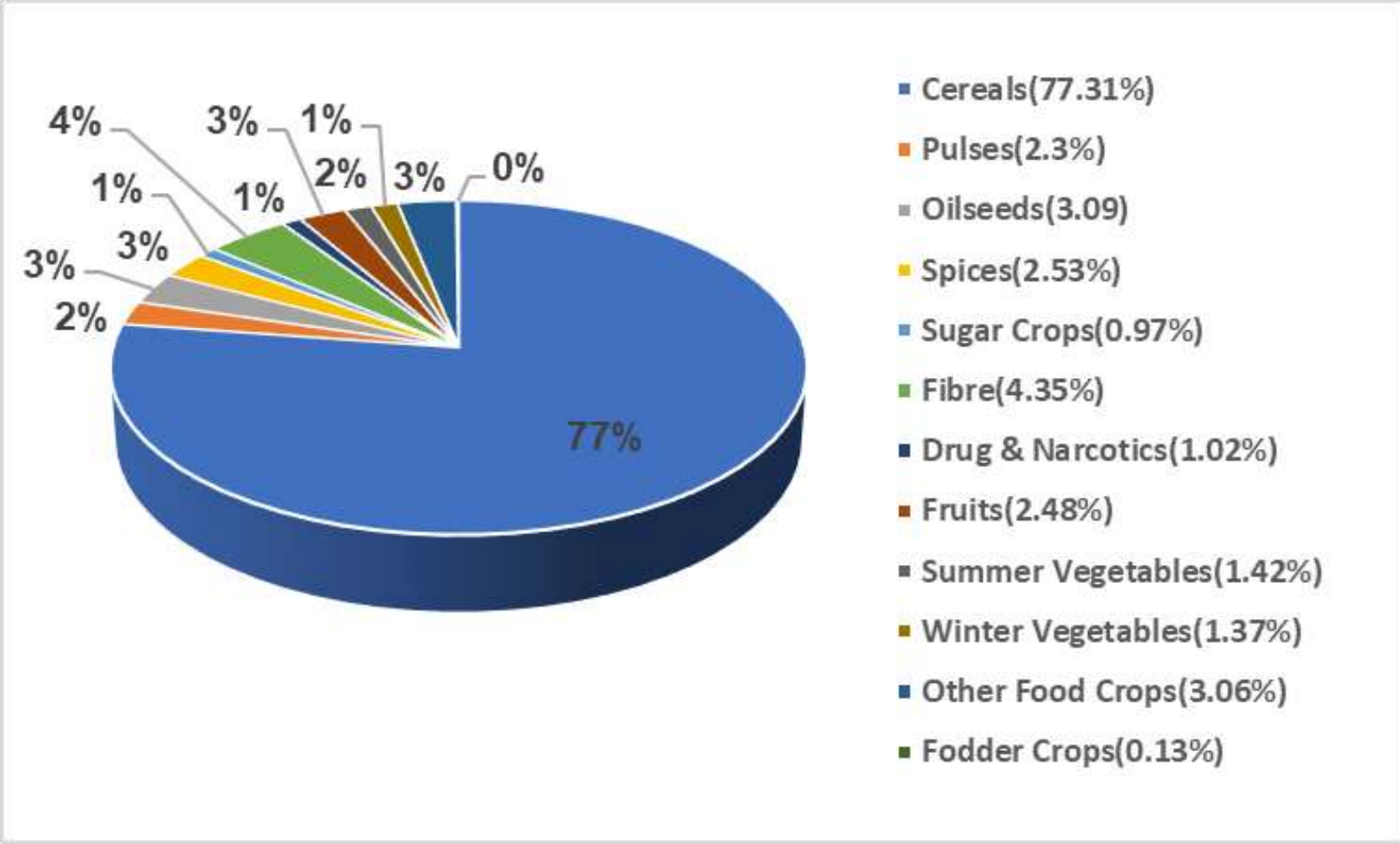
- Precision Farming,
- Agricultural Machinery Robotics,
- Image Processing of Agricultural Products
- Post-Harvest Technology of Agricultural Products

Total: 147,570 km²
Land: 130,170 km²
Water: 18,290 km²

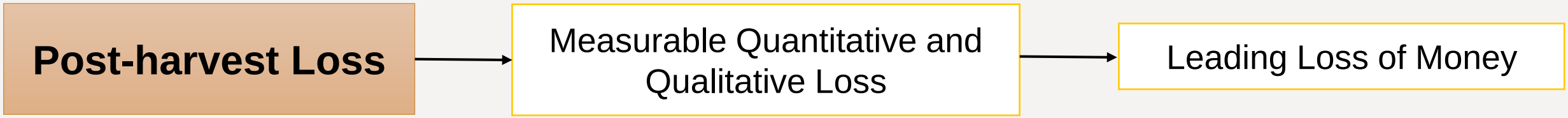


Source: World Bank Development Indicators

Area Under Cultivation of Different Crops in Bangladesh, 2020-2021



(Source: Yearbook of Agricultural Statistics – 2022)



Reasons of Grain, Vegetables and Fruits Loss in Bangladesh

- Inadequate postharvest activities
- Lack of modern technologies and machineries
- Inefficient marketing systems
- Government supports not sufficient in research and extension sector
- Lack of Processing and preservation facilities
- Poor handling during loading and unloading at market point

(Source: Latiful Bari, 2015)

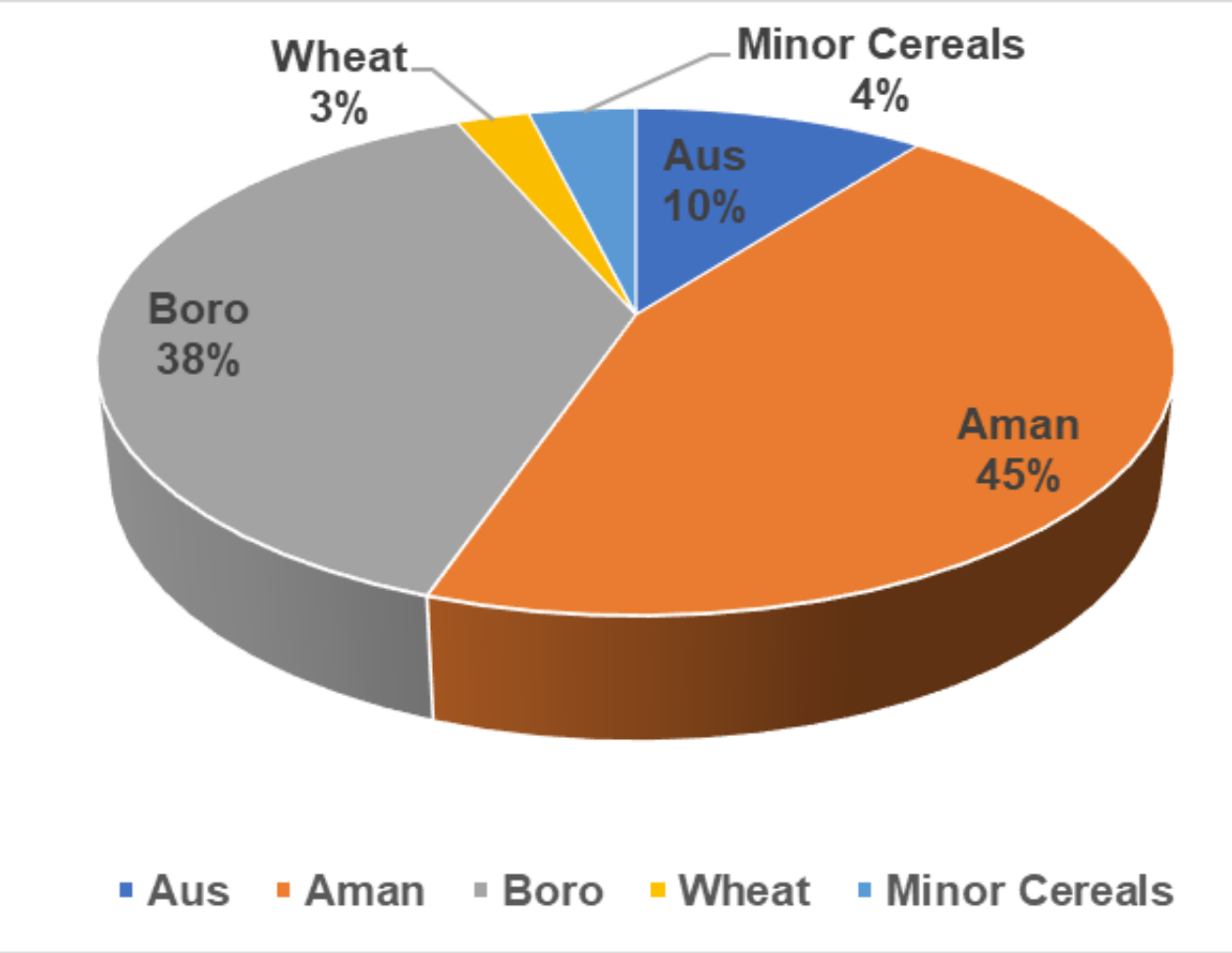
Types of losses/Waste

- **Production:** Losses due to mechanical damage/ spillage during harvesting operation
- **Post-harvest handling and storage:** Losses due to spillage and degradation during handling, storage and transportation between farm and distribution.
- **Processing:** Losses due to spillage and degradation during industrial or domestic processing. Loss may occur during washing, peeling, slicing and boiling or during process interruptions and accidental spillage.
- **Distribution: L**osses and waste in the market system i.e. wholesale markets, super market, retailers and wet markets.
- **Consumption: L**osses and waste during consumption at the household level.

(Source: Latiful Bari, 2015)

Post-harvest Loss of Cereal Grains

Area Under Cultivation of Major and Minor Cereals, 2020-21



Production

Aus = 3.0 Million Tonnes (1.2 Million ha)

Rice (Boro) = 20.2 Million Tonnes (4.8 Million ha)

Aman = 14.9 Million Tonnes (5.7 Million ha)

Wheat = 1.08 Million Tonnes (0.314 Million ha)

Maize = 4.3 Million Tonnes (0.48 Million ha)

(Source: Yearbook of Agricultural Statistics – 2022)

Potential Losses in Postharvest Operation of Cereal Grains in Bangladesh

Harvesting	Lodging, Shattering, Delay Harvesting, Fissuring
Field Stacking	Yellowing, Discoloration
Threshing	Spillage, Mechanical Damage
Sun Drying	Over drying, Non-uniform drying, Fissuring
Storage	Pest Infestation, Moisture Migration, Discoloration, Rotting
Milling	Over milling, Mechanical damage

(Source: Latiful Bari, 2015)

Post harvest Losses for Cereal Grains in Bangladesh

Table: Post harvest losses of rice in the different stages of supply chain

Season	Producer							Processor	Wholesaler	Retailer	Grand Total loss, %
	Harvesting loss, %	Transporting loss, %	Threshing loss, %	Parboiling loss, %	Drying loss, %	Storage loss, %	Total loss, %	Total loss, %	Total loss, %	Total loss, %	
Aman	1.60	0.87	1.10	0.03	2.19	3.70	**9.16**	1.30	0.17	0.27	**10.74**
Boro	1.62	1.13	1.22	0.03	2.37	4.14	**10.10**	1.30	0.18	0.31	**11.71**
Aus	1.91	1.07	1.79	0.02	2.35	3.45	**10.17**	1.13	0.19	0.28	**11.59**

Table: Post harvest losses of wheat and maize in producer stage

Crop	Harvesting loss, %	Transporting loss, %	Threshing loss, %	Drying loss, %	Storage loss, %	**Total loss, %**
Wheat	0.77	0.09	0.65	0.62	1.54	**3.62**
Maize	0.33	0.12	0.55	0.62	2.50	**4.07**

(Source: Bala et al., 2010)

Post-harvest Operations of Cereal Grains in Bangladesh







Figure: Manual and Mechanical harvesting and transportation of rice and wheat in Bangladesh

Postharvest Operations for Cereal Grains

Figure: Manual and Mechanical harvesting threshing, Sun drying, and storing of rice in Bangladesh

Introducing Modern Postharvest Operations for Cereal Grains in Bangladesh

BAU STR drying of Rice

Hermatic Bag for Rice Storing

Agri-Storage in Jamalpur District
(Source: BRAC)

Godowns

Post-harvest Loss of Vegetables

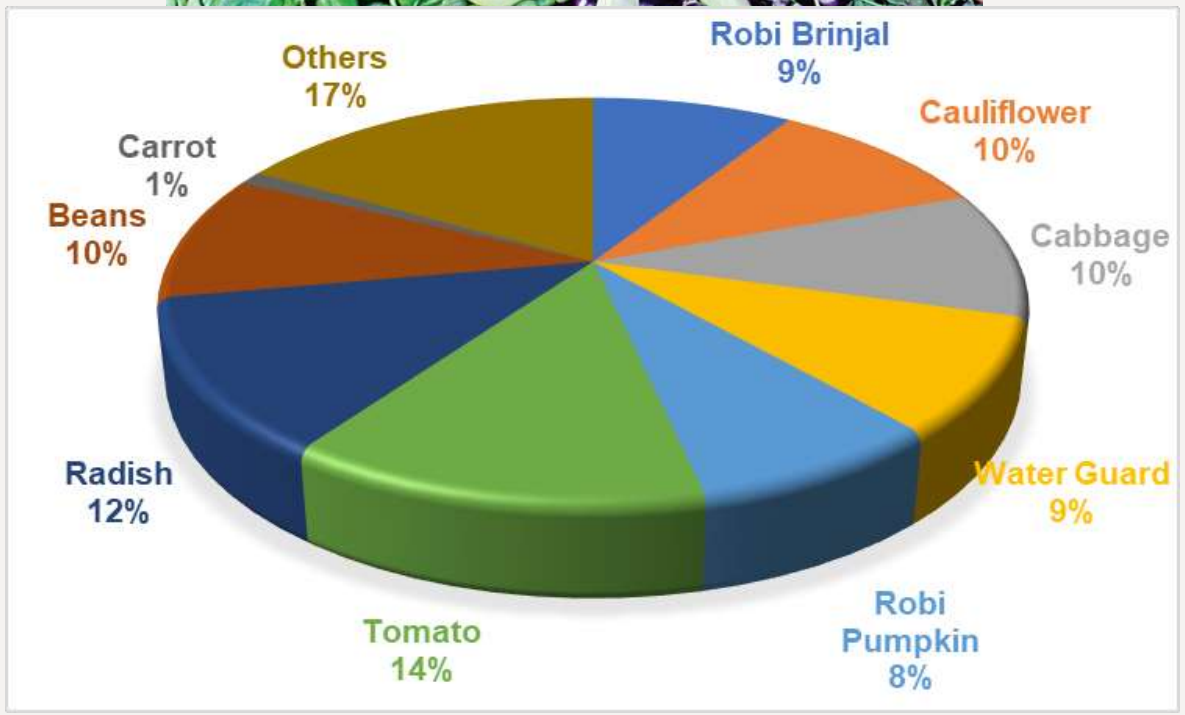
- Farmers grow 100 types of vegetables. According to (FAO), Bangladesh ranked third as a vegetable producer in the world. China secured first position and India is second.

- In FY2021-22, **32.6 million tonnes** of vegetables (winter + summer) were produced on 1.42 million hectares of land. This is a significant jump from the production in FY2015-16 when **19.9 million tonnes** of vegetables were produced on 1.06 million hectares in the country.

(Source: DAE database)

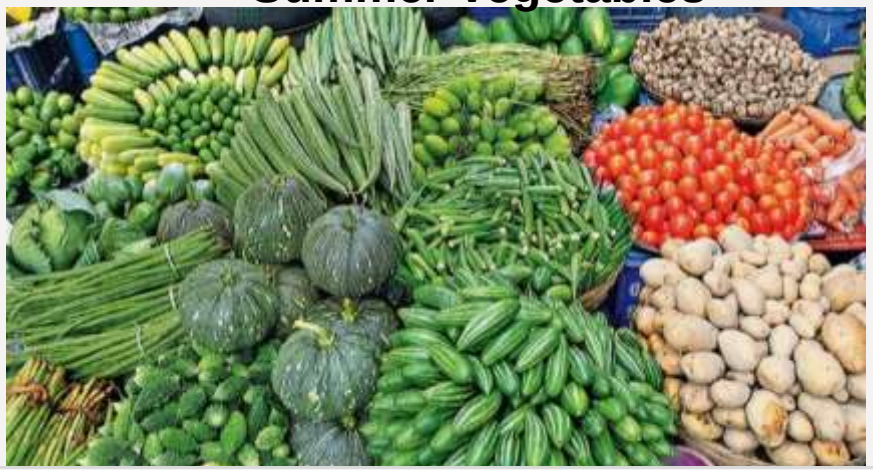
Winter and Summer Vegetables Available in Bangladesh

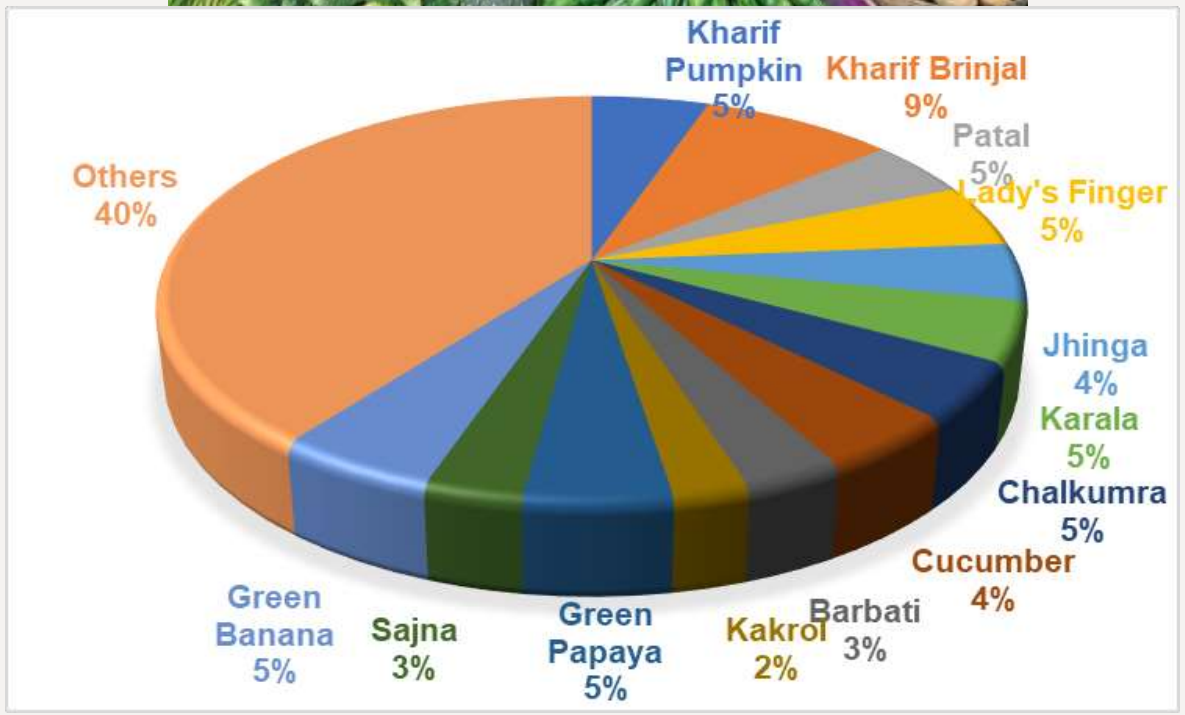
Winter Vegetables



Area Under Cultivation of Winter Vegetables

Summer Vegetables

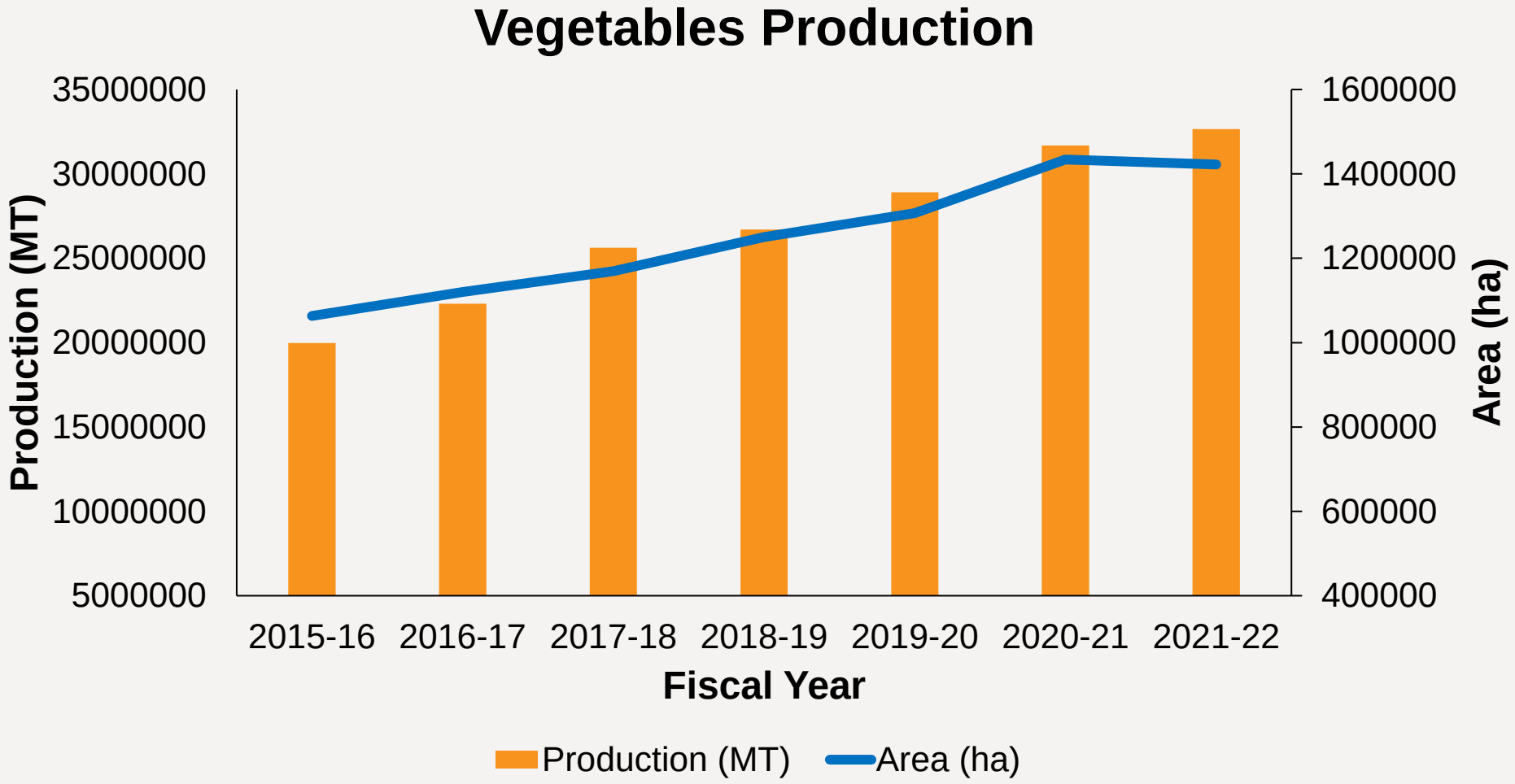




Area Under Cultivation of Summer Vegetables

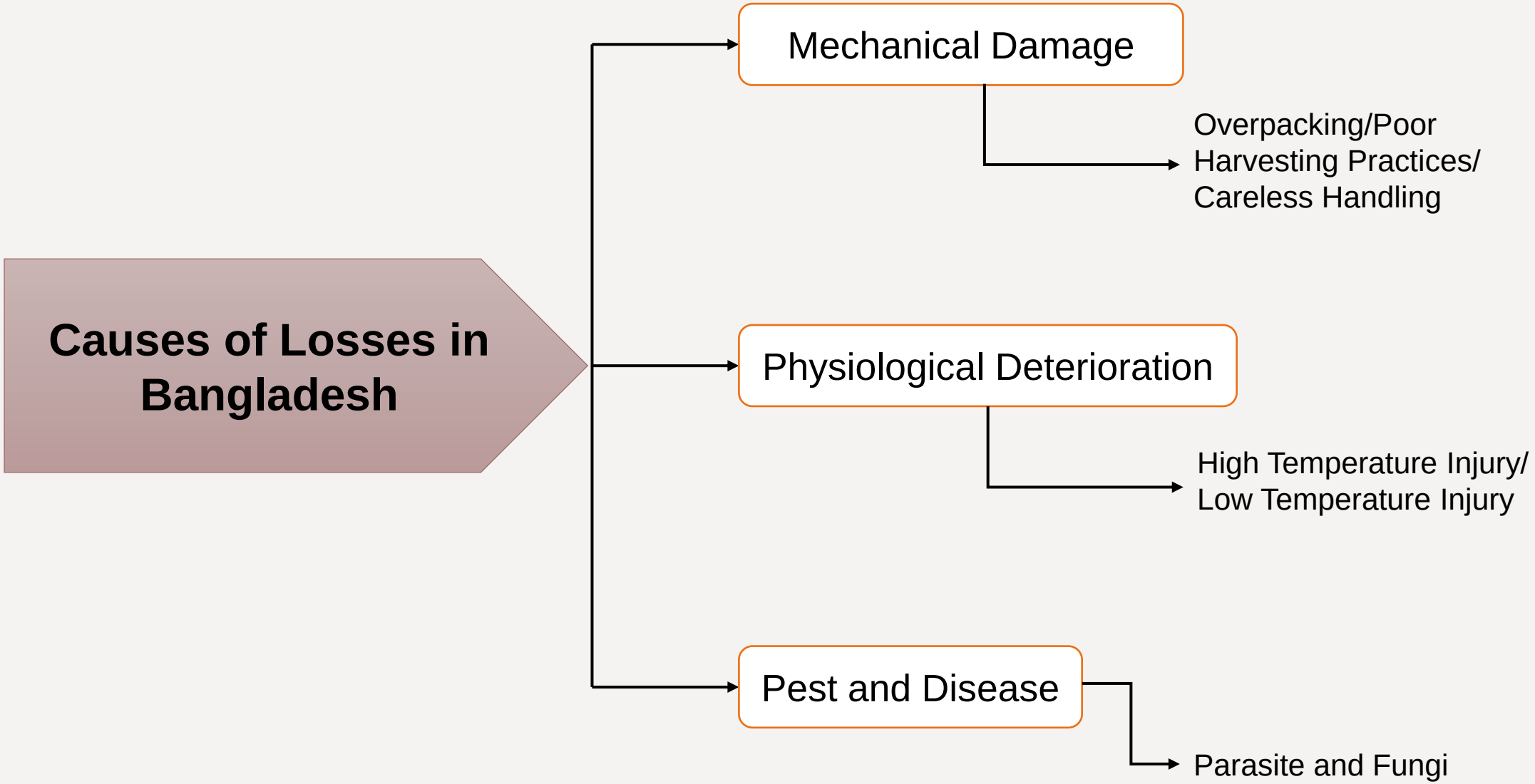
(Source: Yearbook of Agricultural Statistics – 2022)

In FY2015-16: 19.9 million tons on 1.06 million ha
In FY2021-22: 32.6 million tons on 1.42 million ha



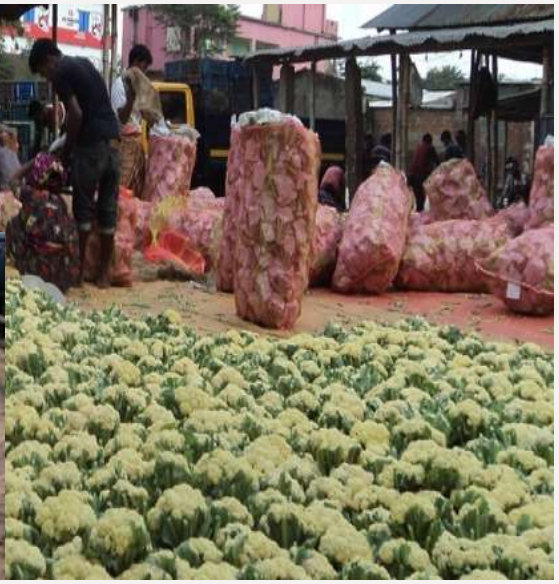
Production (MT) and Area (ha) of vegetables in Bangladesh by the Fiscal Years
(Source: DAE database)

Principal Causes of Post-harvest Loss of Vegetables and Fruits in Bangladesh



(Source: Samar Biswas, 2018)

Post-harvest Handling of vegetables in Bangladesh

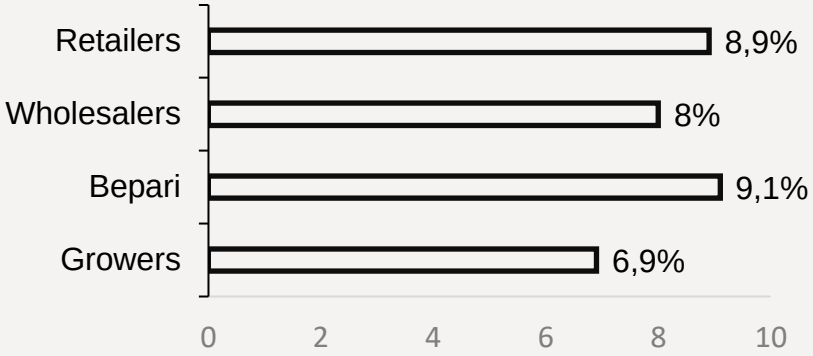


(Source: Hassan et al., 2010; Online Images)

Post-harvest losses of vegetables at different stages of supply chain in Bangladesh

(Source: Hassan et al., 2010 and DAE 2022)

Tomato (32.9%)

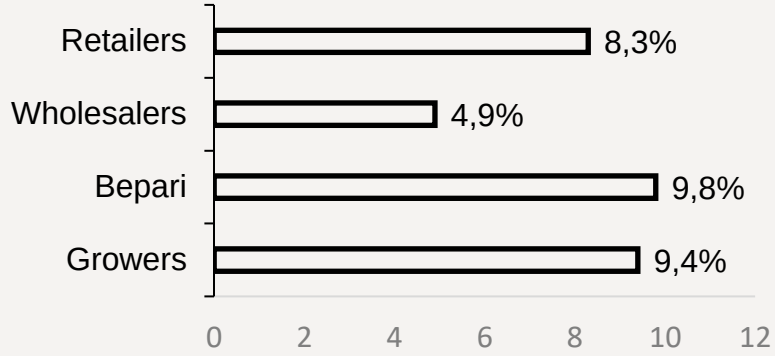


1.8 million tonnes for 60669 ha

Cauliflower (34.4%)

1.7 million tonness for 65633 ha

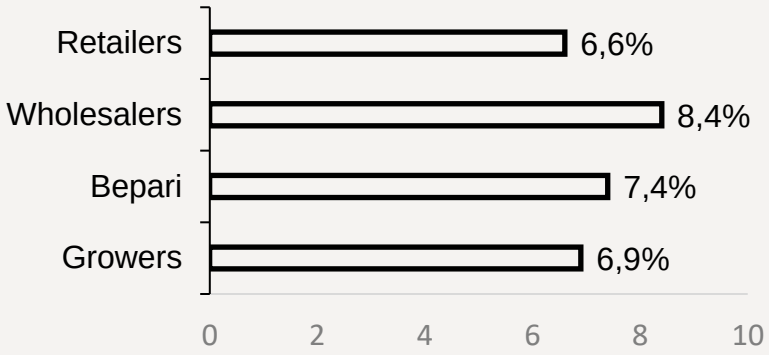
Lady's Finger (32.3%)



0.32 million tonnes for 27080 ha

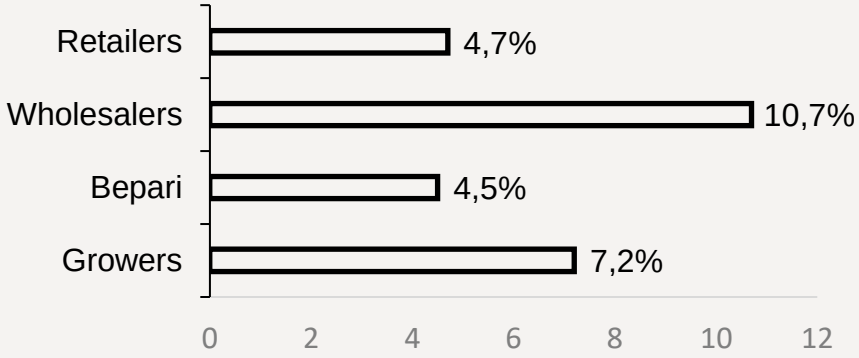
(Source: Hassan et al., 2010 and DAE, 2022)

Brinjal (29.4%)



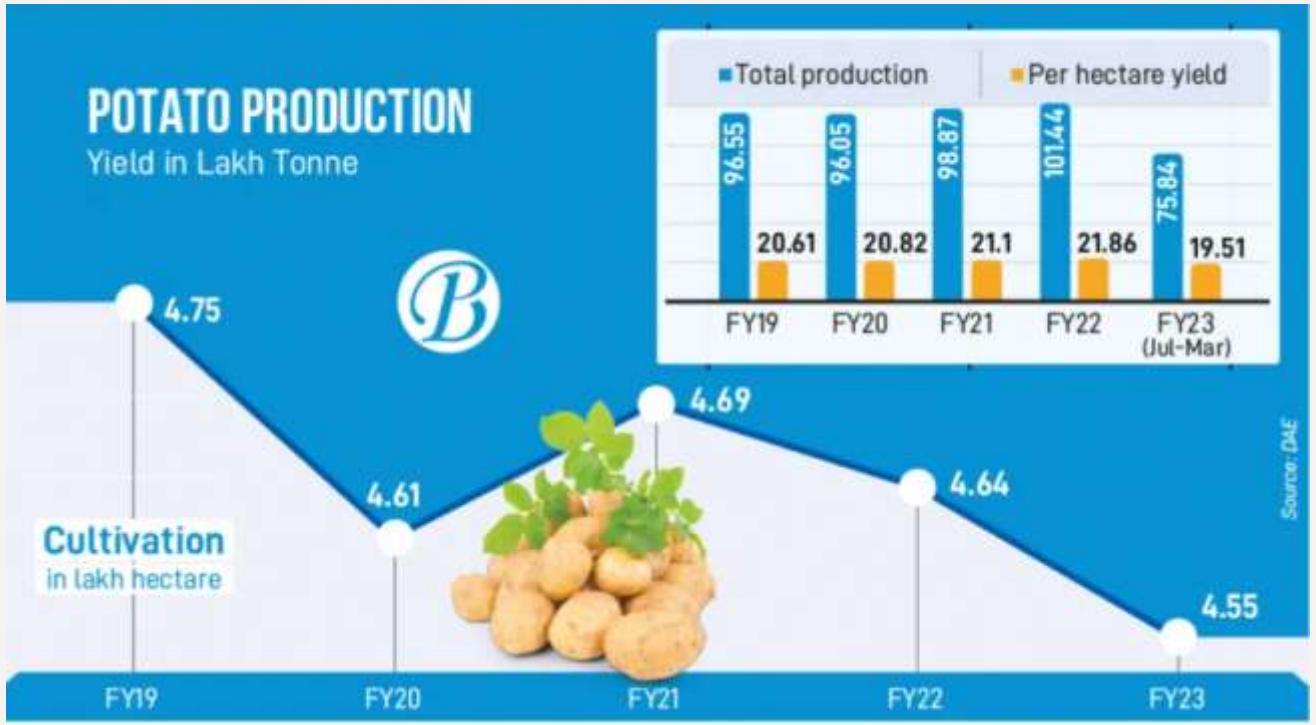
2.9 million tonnes for 0.1 million ha

Cucumber (27.1%)

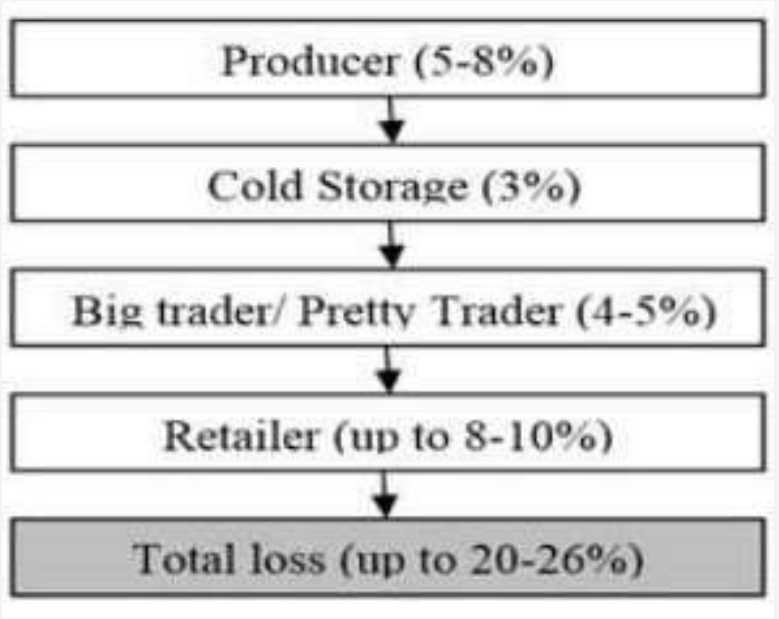


0.66 million tonnes for 35495 ha

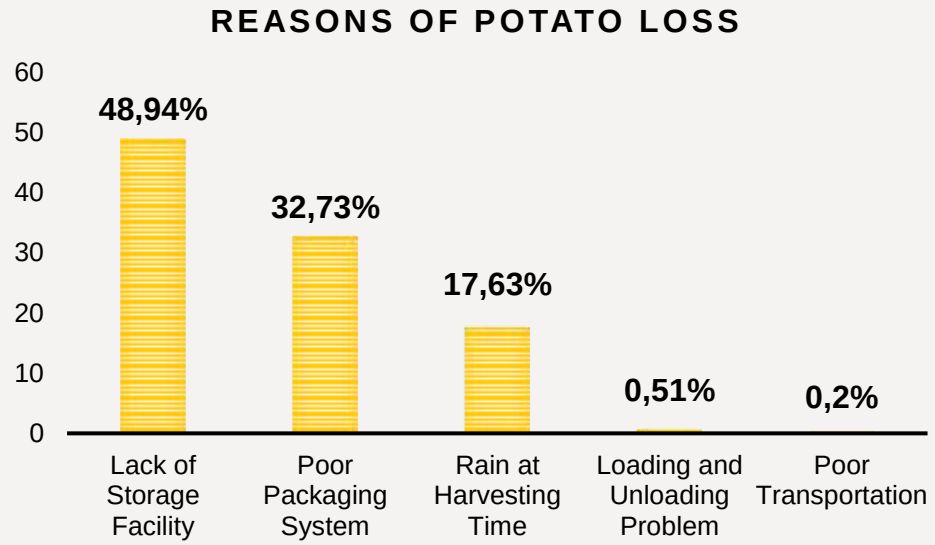
Post-harvest Loss of Potato



(Source: The Business Post, March/ 2023 and DAE database)



(Source: Bhuiyan et al. 2012)



(Source: Akter et al., 2022)

Potato Storing System in Bangladesh

Potato storing in Farmers Level

Potato storing in Commercial Cold Storage

Potato rotting due to faulty operation in Cold Storage

Post-harvest Loss of Fruits

- Bangladesh now lists among the top 10 countries of the world for producing seasonal fruits.

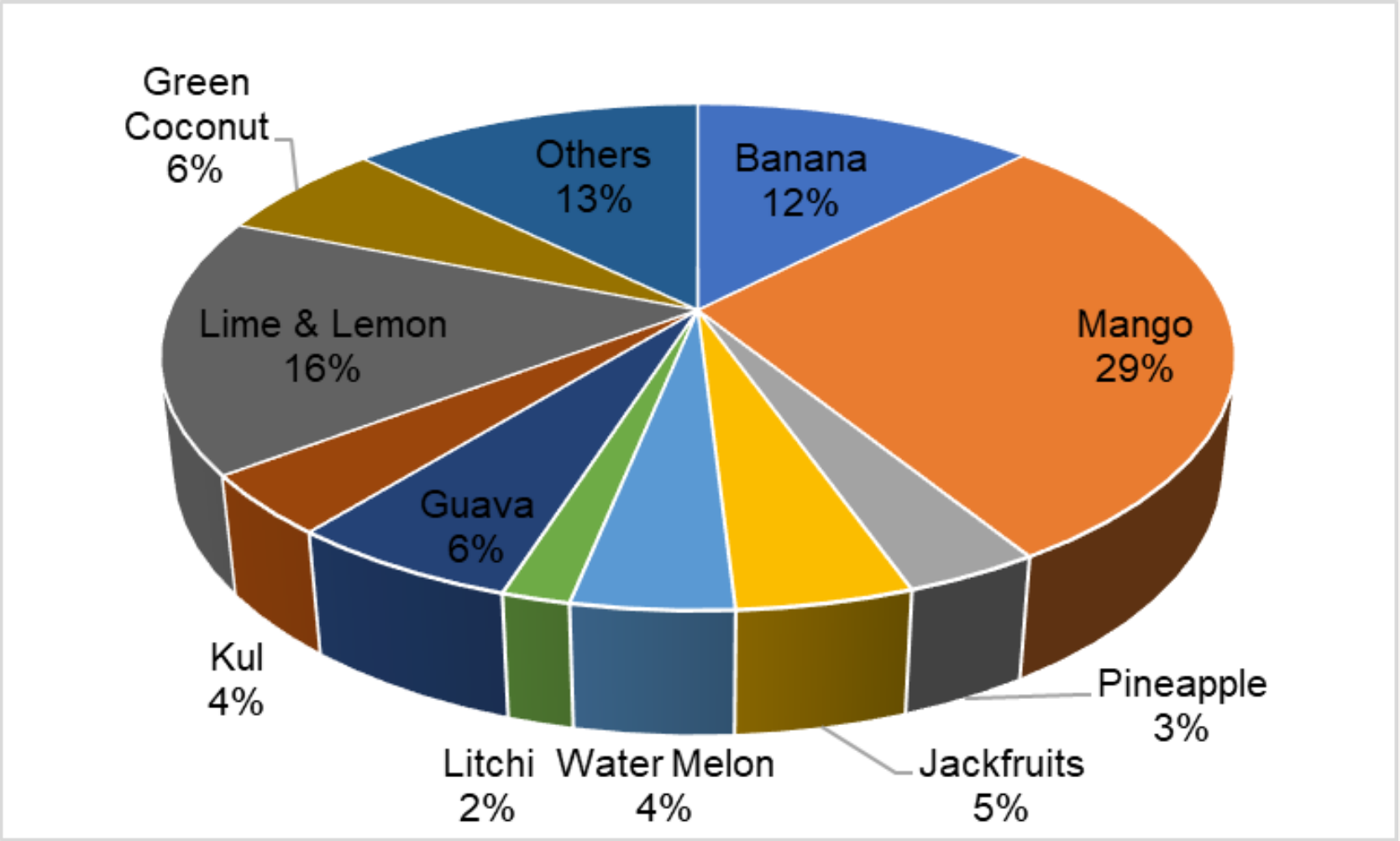
- Mango and jackfruit were the only major fruit produced in the country 20 years ago and produced only 56 types of fruits. Now, Bangladesh produces 72 types of fruits.

- Bangladesh secured **2nd place for jackfruit production** in the world, was **7th in mango production**, **8th in guava production** and **14th in papaya production.**

- According to the DAE, in FY2013-14, fruits were cultivated on 0.69 million hectares of land and the yield was **10.6 million tonnes**. In FY2020-21, agricultural land for fruit farming has jumped to 0.729 million hectares and fruit production to **12.2 million tonnes**.

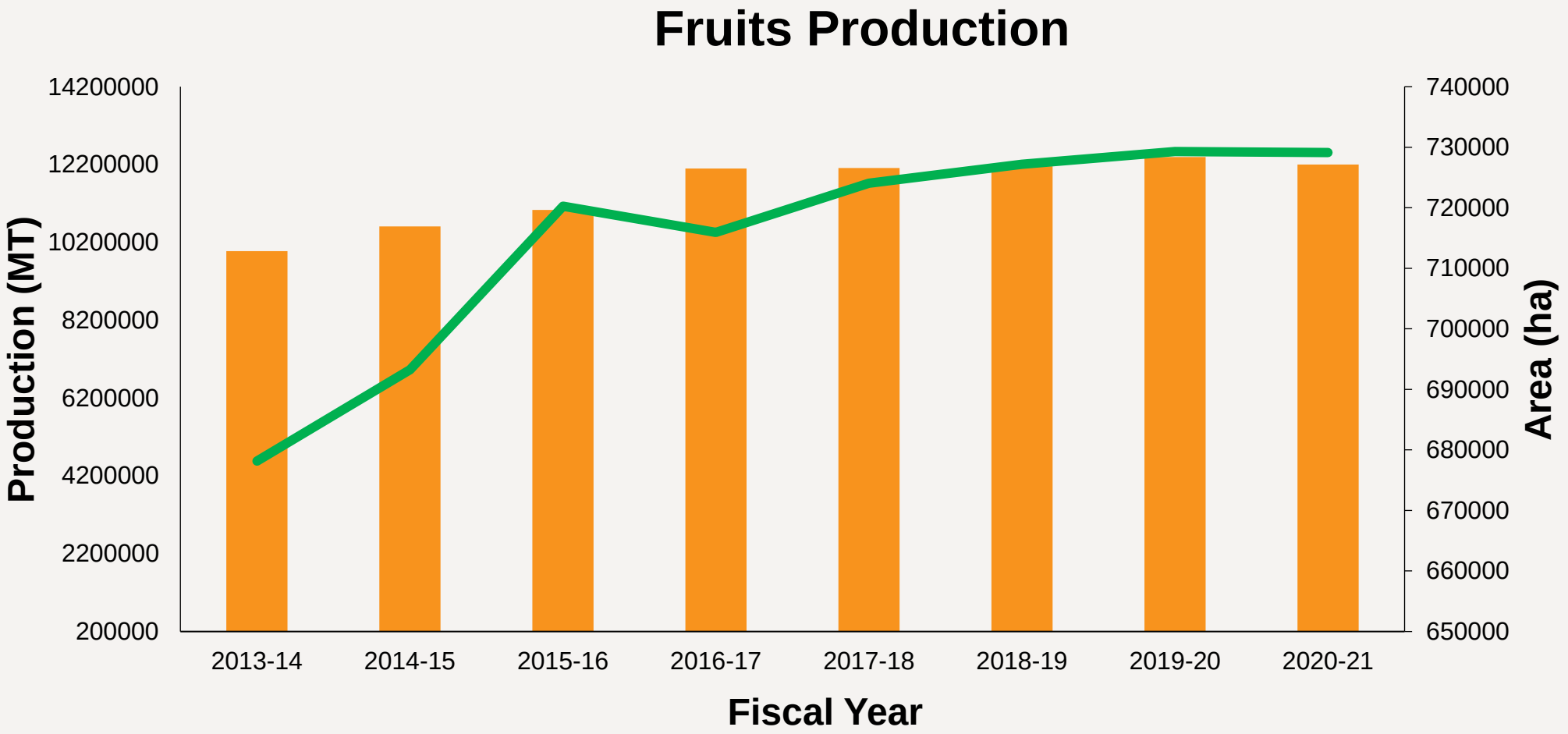
(Source: Online News Portal and DAE Database)

Area Under Cultivation of Fruits in Bangladesh, 2020-2021



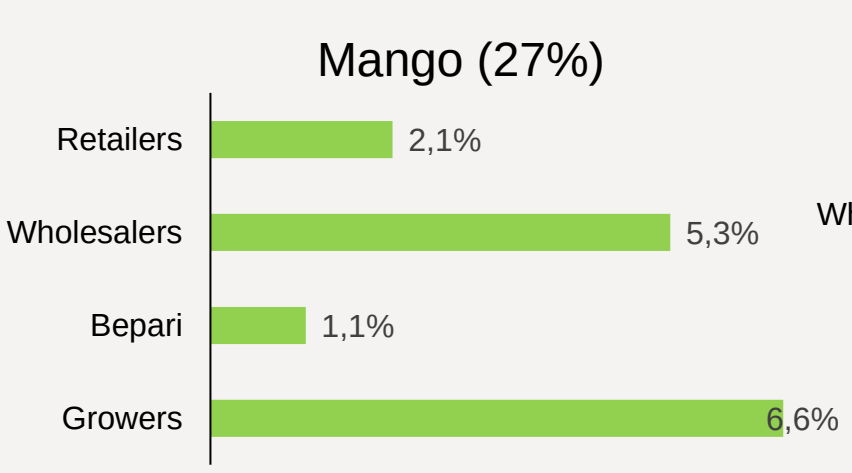
Source: Yearbook of Agricultural Statistics-2022

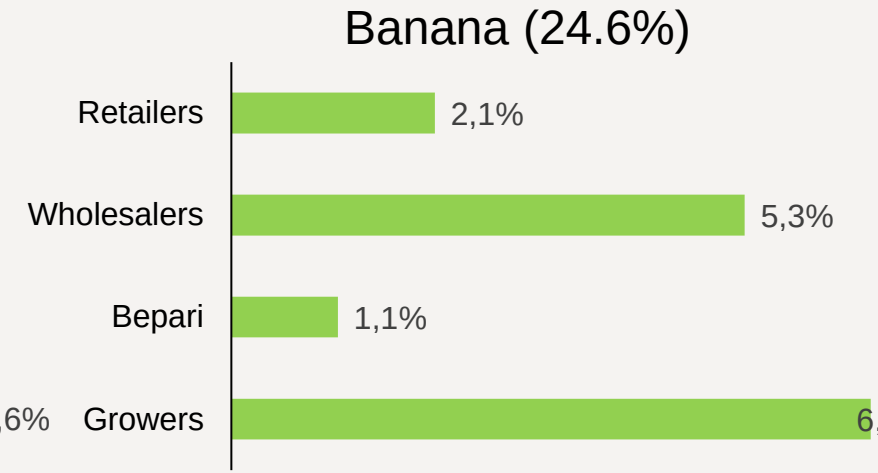
FY2013-14: 10.6 million tons on 0.69 million ha
FY2020-21: 12.2 million tons on 0.729 million ha

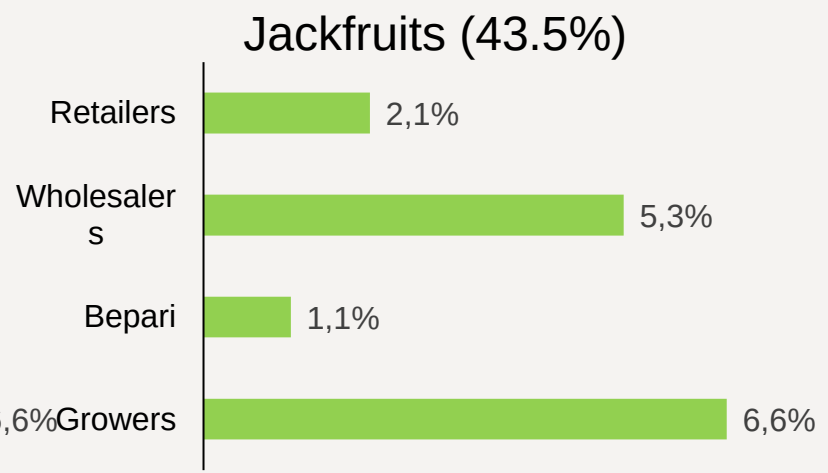


Production (MT) and Area (ha) of Fruits in Bangladesh by the Fiscal Years
(Source: DAE database)

Post-harvest losses of fruits at different stages of supply chain in Bangladesh







2.35 million tonnes for 0.20 million ha

2.9 million tonnes for 88938 ha

1.89 million tonnes for 62273 ha

(Source: Hassan et al., 2010 and DAE 2022)

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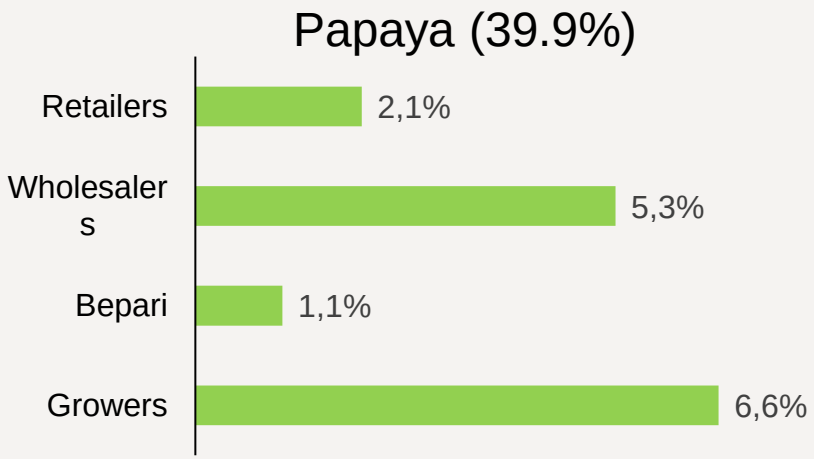
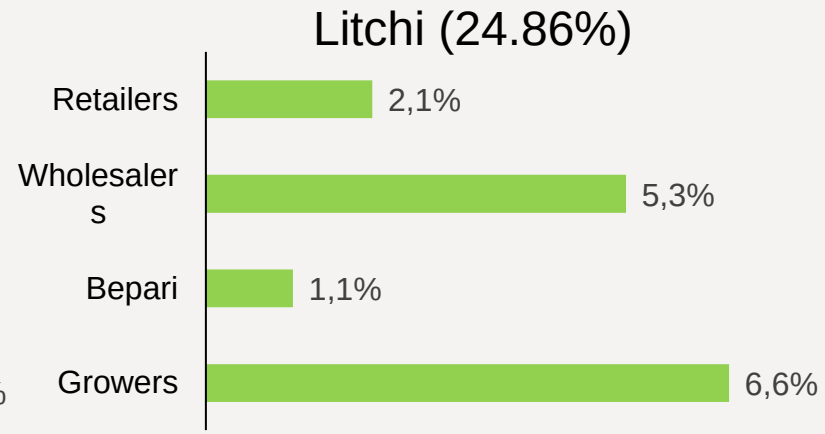
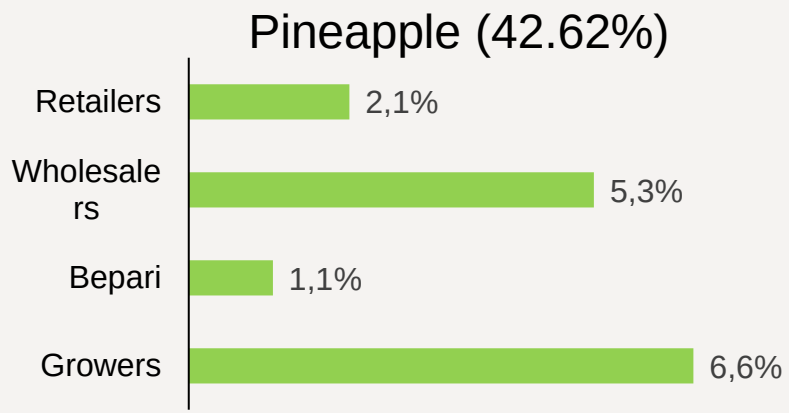






0.713 million tonnes for 27944 ha

0.225 million tonnes for 30565 ha

0.536 million tonnes for 18654 ha

Post-harvest Handling of Fruits in Bangladesh

Mango Packing with Plastic Crates and Bamboo Baskets

Litchi Fruits Packing with Bamboo Baskets and Huge Litchi Leaves

Mango Transported with Van and Trucks

Pineapple Transported with Bi-cycle, Van and Trucks

(Source: Hassan et al., 2010)

Jackfruits Marketing and Loading in Truck

Banana Marketing and Loading in Truck

Pictures for Post-harvest losses of Fruits in Bangladesh

Rough handling leads to damaged portion with white starchy areas and failure to turn yellow

Diseases of mango: anthracnose, stem end rot and fruit rot

(Source: FAO, 2018)

Over matured

Chilling Injury

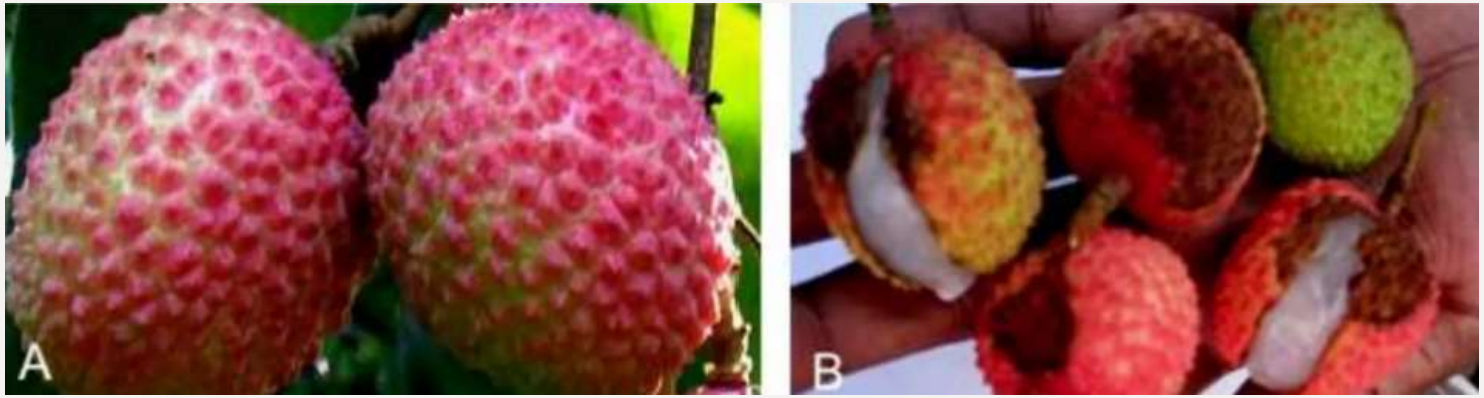
Cutting Damage

Impact Bruising

Abrasion Injury

(Source: Saha et al., 2021)

Damage by A) Fungal pathogen, B) by Rain water, and C) by Transportation

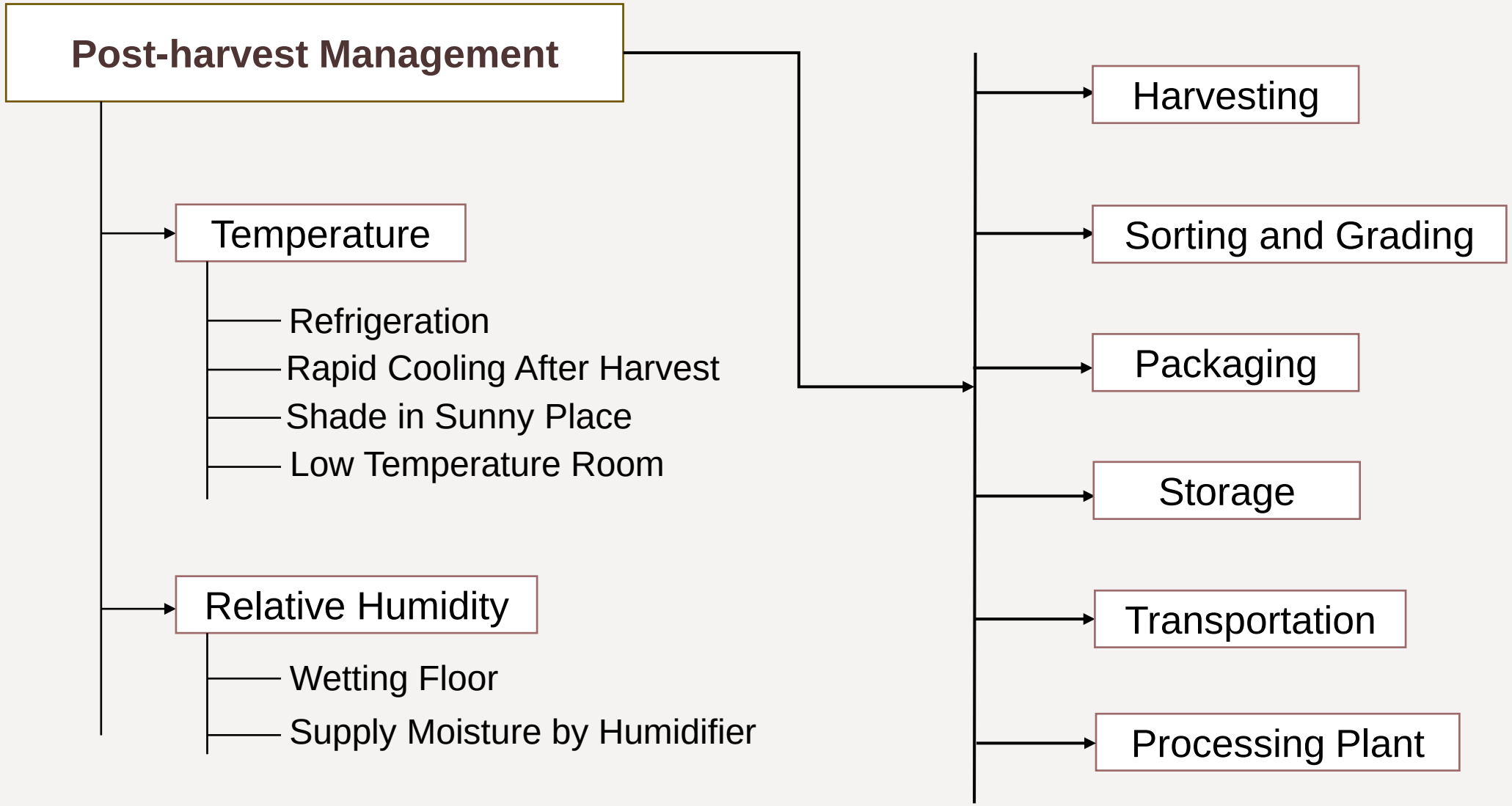


Damage Litchi due to Skin Cracking

(Source: Hassan et al., 2010)

Damage of Pineapple

Management for Reducing Post-harvest Losses (Source: Samar Biswas, 2018)



What about GO/NGO working for Post-harvest Loss Management in BD?

- Govt takes **Tk31.98 billion** farm mechanization project to support farmers as well as post-harvest loss of rice.

- PKSF has granted finance to install two pilot plants/storage (6-8 tons capacity) to ensure development of income generating activities among farmers and middlemen suppliers of safe food.

- A capacity of **1,000 tonnes** Privately-owned special cold storage at Tejgaon in Dhaka only for imported fruits.

- A capacity of **120 tonnes** Specialised cold storage for vegetables and fruits near Hazrat Shahjalal International Airport, which is only used by exporters.

- More than **400 cold storages** with a combined capacity of 0.60 million tonnes have been operating across Bangladesh to store potatoes.

- **25 Specialised** cold storages across the country (Capacity of 300 tonnes and 500 tonnes) with a combined capacity of storing 3,000 tonnes of vegetables or fruits. The project is expected to be implemented by December 2024 at a cost of Tk 2.70 billion with the Govt. funding.

- Govt. is building **196 new silos** in 53 districts for storing rice, wheat and maize.

(Source: Online News Portal in Bangladesh)

Thank you!

UN environment programme

Food and Agriculture Organization of the United Nations

STOP FOOD LOSS
AND WASTE.
FOR THE PEOPLE.
FOR THE PLANET.