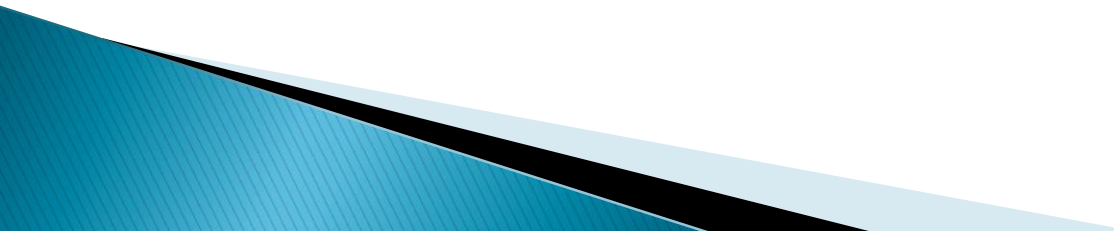


Food Loss & Waste (Problems & Solutions)



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INTRODUCTION

1. According to FAO, almost one-third of food produced for human consumption – approximately 1.3 billion tonnes per year, is either lost or wasted globally.
 2. The issue of food losses is an high alert situation for the efforts to counter hunger, elevate income and ameliorate food security especially in the world's poorest countries.
 3. Food losses have an humongous impact on food security for poor people, on food quality and safety, on economic development and on the environment.
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DEFINITION

Food loss is defined as “the decrease in quantity or quality of food” and are the agricultural or fisheries products intended for human consumption that are ultimately not eaten by people or that have incurred a reduction in quality reflected in their nutritional value, economic value or food safety.

Food waste, refers to the discarding or alternative use of food that was fit for human consumption, by choice or after the food has been left to spoil or expire as a result of negligence.

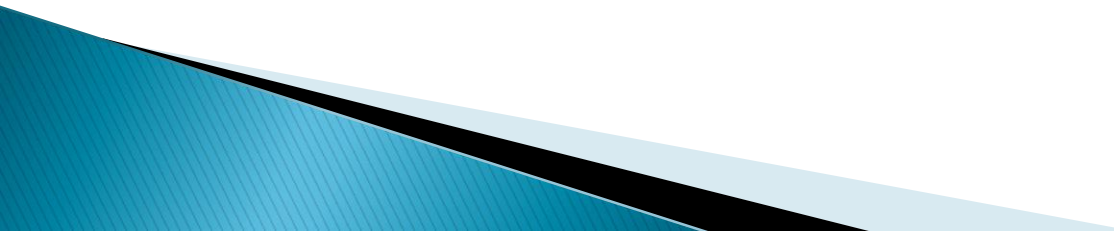
TYPES OF FOOD LOSSES / WASTE

- **Animal commodities and products**
- **Vegetable commodities and products**

Further classified into -

1. Agricultural production
2. Post– harvest handling and storage
3. Processing
4. Distribution
5. Consumption

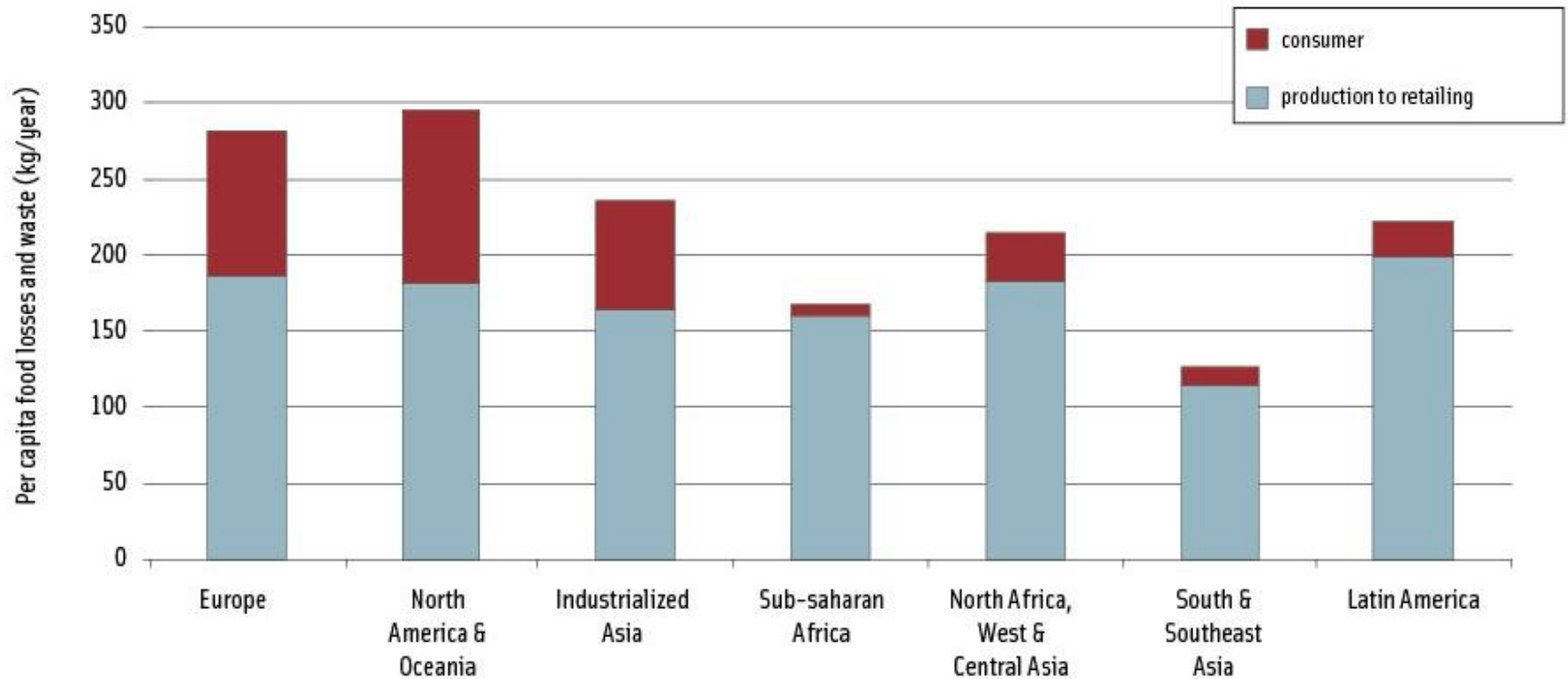
PROBLEMS

1. Risk of decreasing food security and nutritional quality
 2. Due to food loss increased methane production and increased global warming
 3. Increased water pollution due to mixing up off the debris due to waste material rotting
 4. Increased microorganism growth and fear of new disease incidence
 5. Last but not the least , even if we focus on increasing production and quality if we don't minimize loss/waste nothing is going to change in future.
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The destiny of wasted food



Per capita food losses and waste, at consumption and pre-consumptions stages

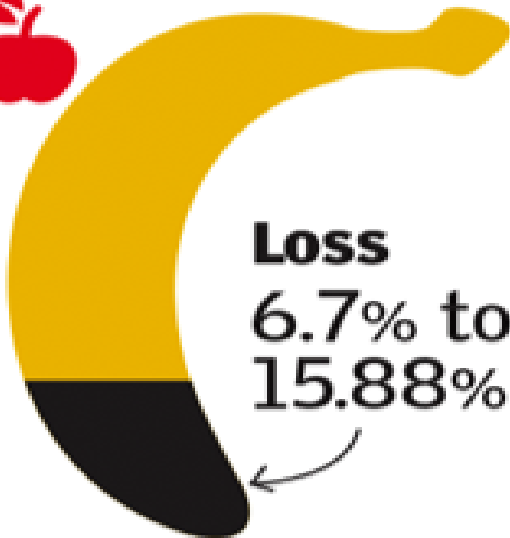




At Handling Level

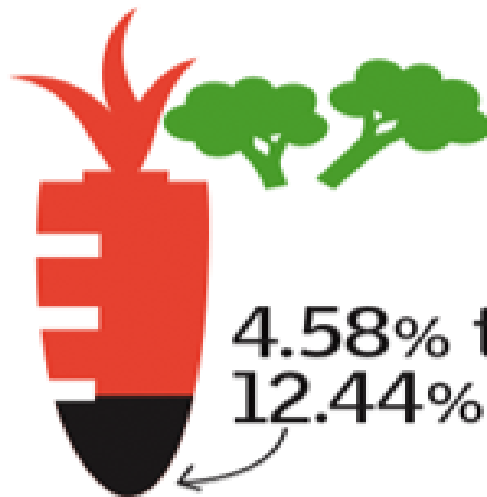
Estimated post-harvest losses in major crops, agricultural products

Fruits



Loss
6.7% to
15.88%

Vegetables

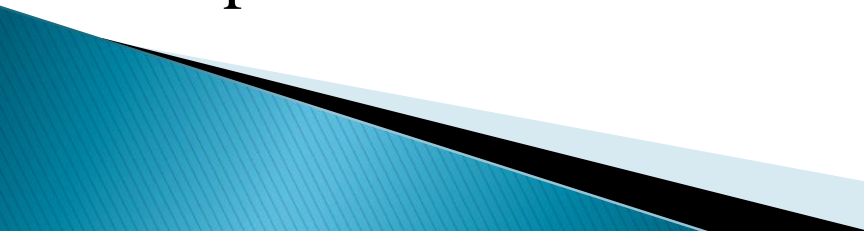


4.58% to
12.44%

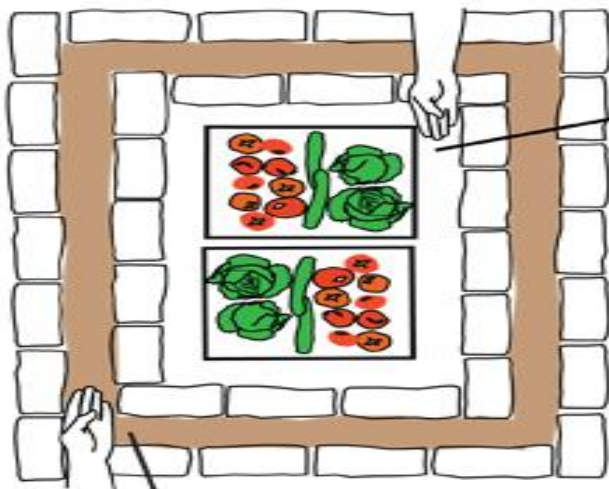
Zero Energy Cool Chambers(ZECC)

- ▶ A gift of nature - principle depends on cooling by evaporation.
- ▶ Efficiency of evaporative cooler depends on humidity of the surrounding air.
- ▶ Very dry, low humidity air can absorb a lot of moisture so considerable cooling occurs.
- ▶ In theory lowest temperature that can be reached is wet bulb temperature.
- ▶ It is a double brick-wall structure, structure, the cavity is filled with sand and walls of the chamber are soaked in water.

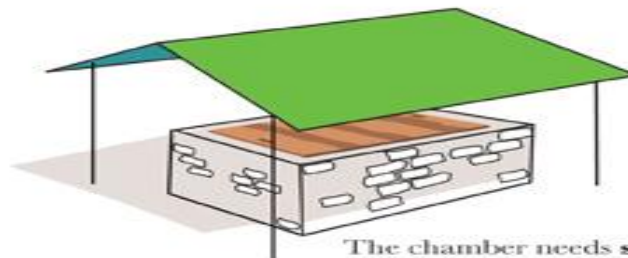
The main advantages of this on-farm low cost cooling technology are:

1. It does not require any electricity or power to operate
 2. Materials required like bricks, sand, bamboo etc. available easily and cheaply.
 3. Even unskilled labour can build the chamber, as it does not require any specialized skill.
 4. Small and marginal farmers can store a few days' harvest to avoid middlemen.
 5. Cool chambers can reduce temperature by 10-15 °C and maintain high humidity of about 95% that can increase shelf life and retain quality of horticultural produce.
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Zero-Energy Cooling Chamber



Measure **four fingers** of space (7-8cm) around your storage containers to get the size for the chamber.

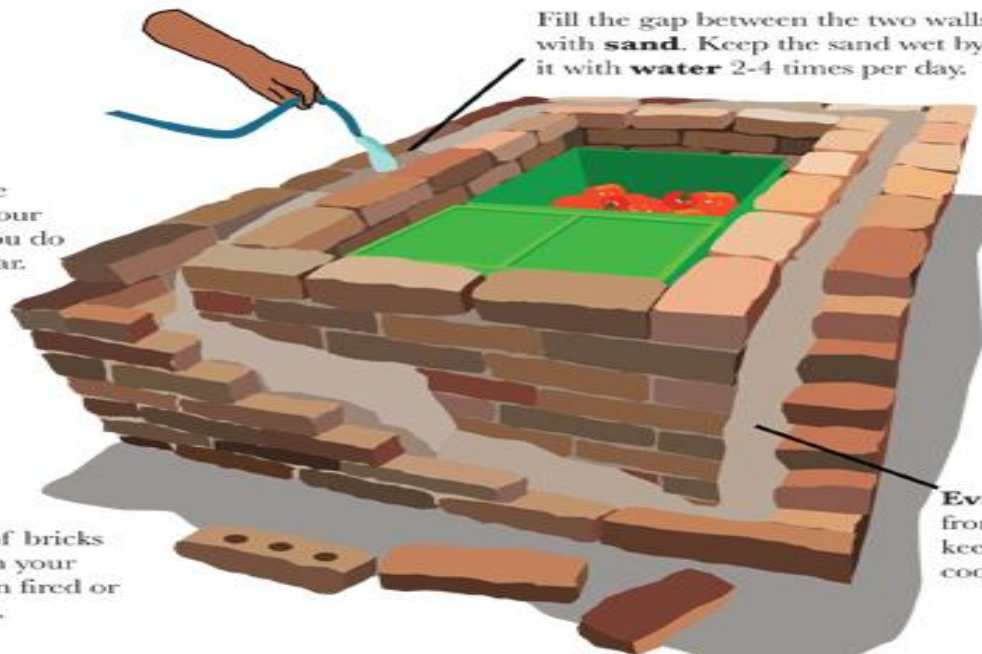


The chamber needs **shade** and a good **lid** to keep the cool air in and animals out.

Build the second wall four fingers away from the first wall.

Stack the bricks so the walls are taller than your storage containers. You do **not** need to use mortar.

Fill the gap between the two walls with **sand**. Keep the sand wet by soaking it with **water** 2-4 times per day.



Use **any** kind of bricks that you have in your community: kiln fired or sun baked mud.

Evaporating water from the wet sand keeps the vegetables cool.

Illustrations by Rebecca Jane Houston, 2017

Zero Energy Cool Chamber (ZECC)

- ▶ Generally, tomato and eggplant had a shelf life of 7 and 4 days at room temperature, respectively, as compared to 16 and 9 days when stored in the ZECC.
- ▶ Tomato and eggplant treated with hot water reduced the percentage of rotting.
- ▶ Tomato treated with hot water at 60°C for three minutes and eggplant treated with hot water at 45°C for an hour when stored inside silver-ion-coated containers in the ZECC showed extended shelf life of up to 28 and 15 days, respectively.

Source: https://www.researchgate.net/publication/279974670_Zero_Energy_Cool_Chamber_for_Extending_the_Shelf-Life_of_Tomato_and_Eggplant

Storage of fresh fruits and vegetables in zero energy cool chamber and ambient conditions

Crop	Duration	ECC		Ambient condition	
		Days	Weight loss (%)	Days	Weight loss (%)
Mango	June-July	9	5.0	6	14.9
Banana	Oct-Nov	20	2.5	14	4.6
Grapefruit	Dec-March	70	10.2	27	11.9
Sapota	Nov-Dec	14	9.5	10	20.9
Lime	Jan-Feb	25	6.0	11	25.0
Kinnow	Dec-Feb	60	15.3	14	16.0
Potato	March-May	90	7.7	46	19.1
Tomato	April-May	15	4.4	7	18.6
Amaranth	May-June	3	11.0	<1	49.6
Methi	Feb-March	10	10.8	3	18.0
Parwal	May-June	5	3.9	2	32.4
Okra	May-July	6	5.0	1	14.0
Carrot	Feb-March	12	9.0	5	29.0

Kale et al. (2016) Low Cost Storage Structures for Fruits and Vegetables Handling in Indian Conditions

Composting

Zera food recycler



✗ Takes months to create compost



✗ Requires manual heap maintenance



✗ Can't compost meat and dairy



✗ Requires a large outdoor space



✗ Can attract pests and wildlife



✓ Makes ready-to-use fertilizer within 24 hours*



✓ Requires minimal maintenance



✓ Recycles almost all types of food waste, including meat and dairy



✓ Integrates seamlessly into your kitchen

**Based on estimated 3.5 kg weekly household food waste for average U.S. family.*



Reducing dairy products waste with the use of Bioprotection

The study indicates that dairy manufacturers, retailers and consumers can all get positive net savings from reducing yogurt waste with the use of bioprotection.



GADGETS AND GIZMOS THAT HELP REDUCE FOOD WASTE

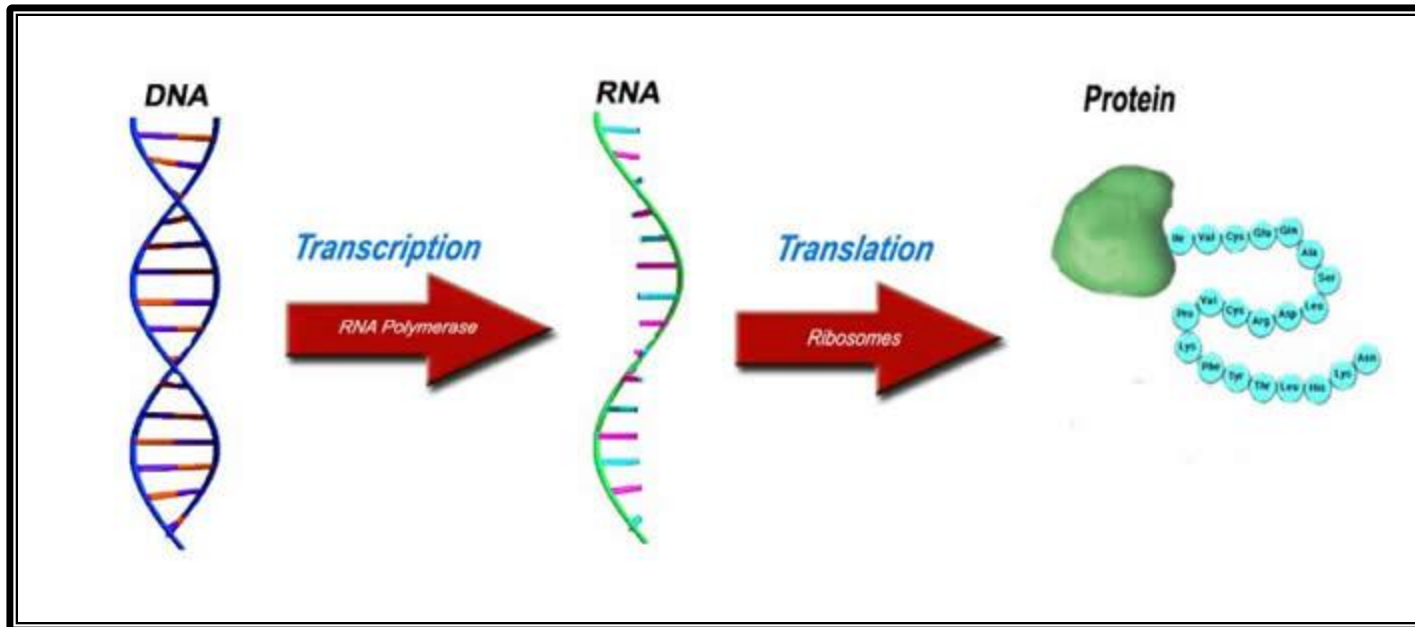


Phresh Food Protector

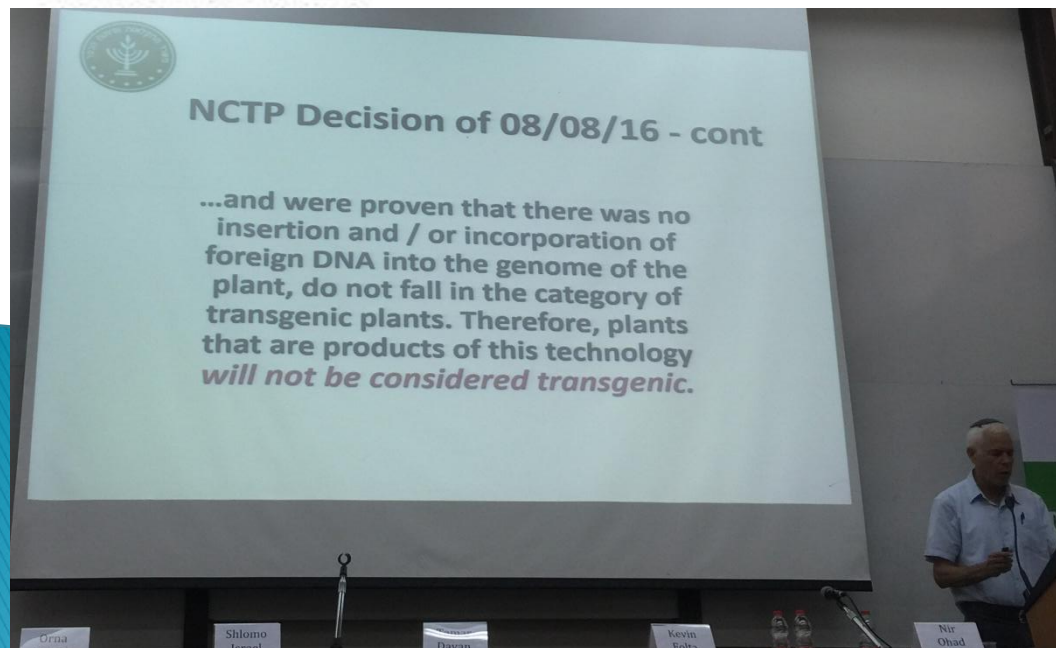
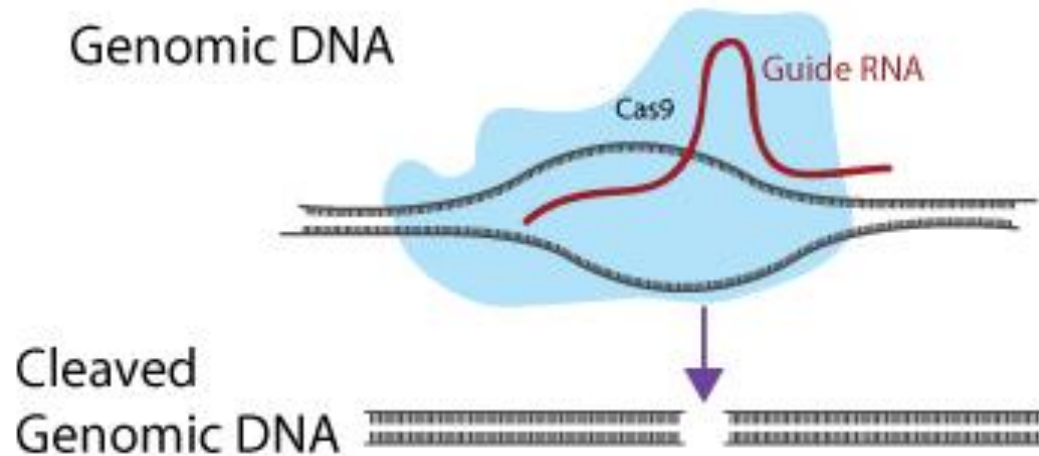


Herb Keeper

At Molecular level



Eliminating food waste requires behavioral changes, but GMOs can help too



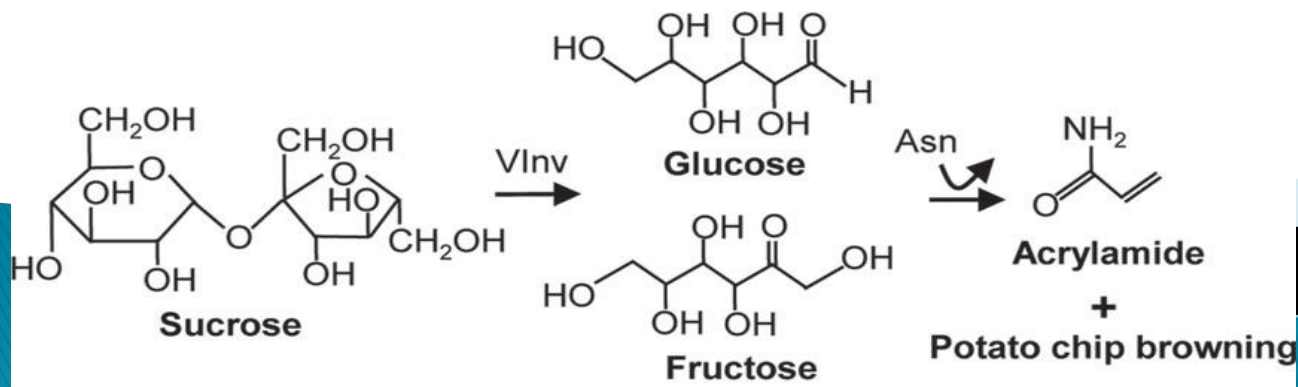
knock-down LsXTH16 gene would improve lettuce shelf life



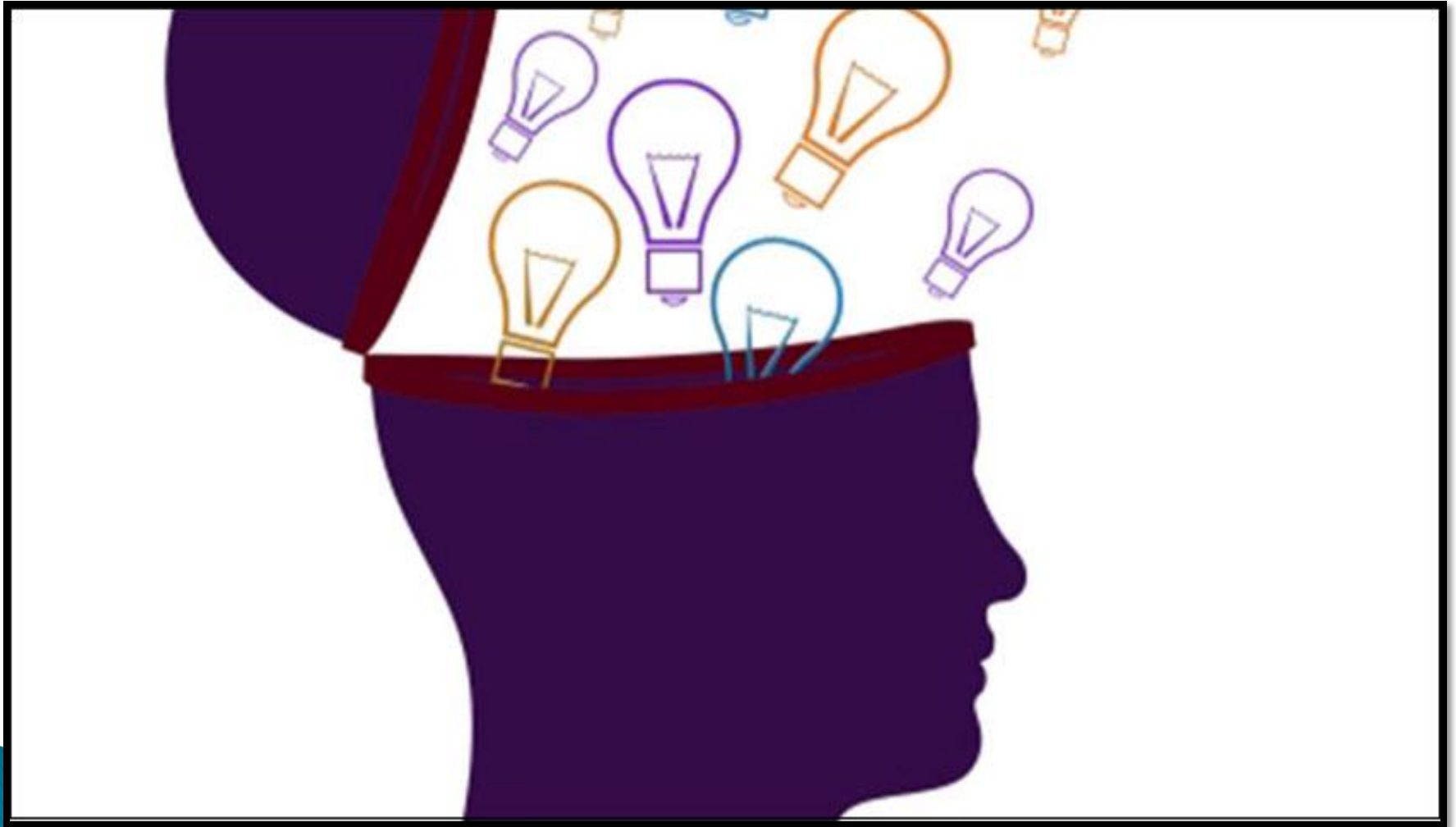
Short shelf life lettuce

Long shelf life lettuce

knock out vacuolar invertase gene (Vinv) could have significantly lower levels of reducing sugars and acrylamide



At Individual Level



Ways to Cut Global Food Loss and Waste

- ▶ **Reducing Food Loss Close to the Farm**

Improved storage methods

Redistribute food

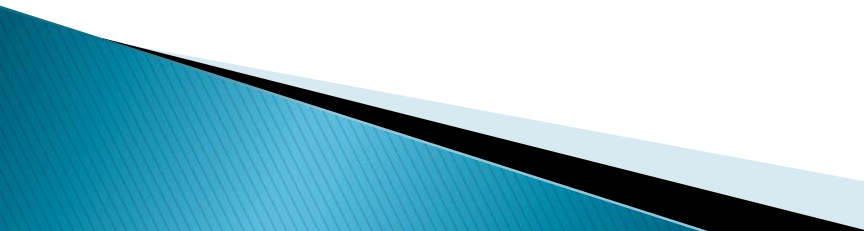
- ▶ **Reducing Food Waste Close to the Fork**

Better food date labels

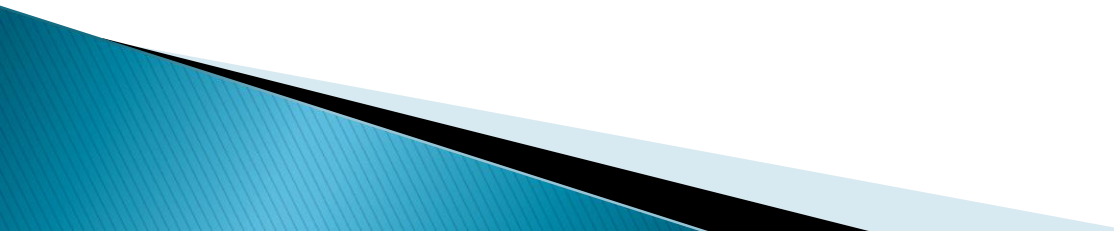
Reduce portion sizes

Launch consumer awareness campaigns

5 Cross-cutting Ways to Prevent Food Loss and Waste

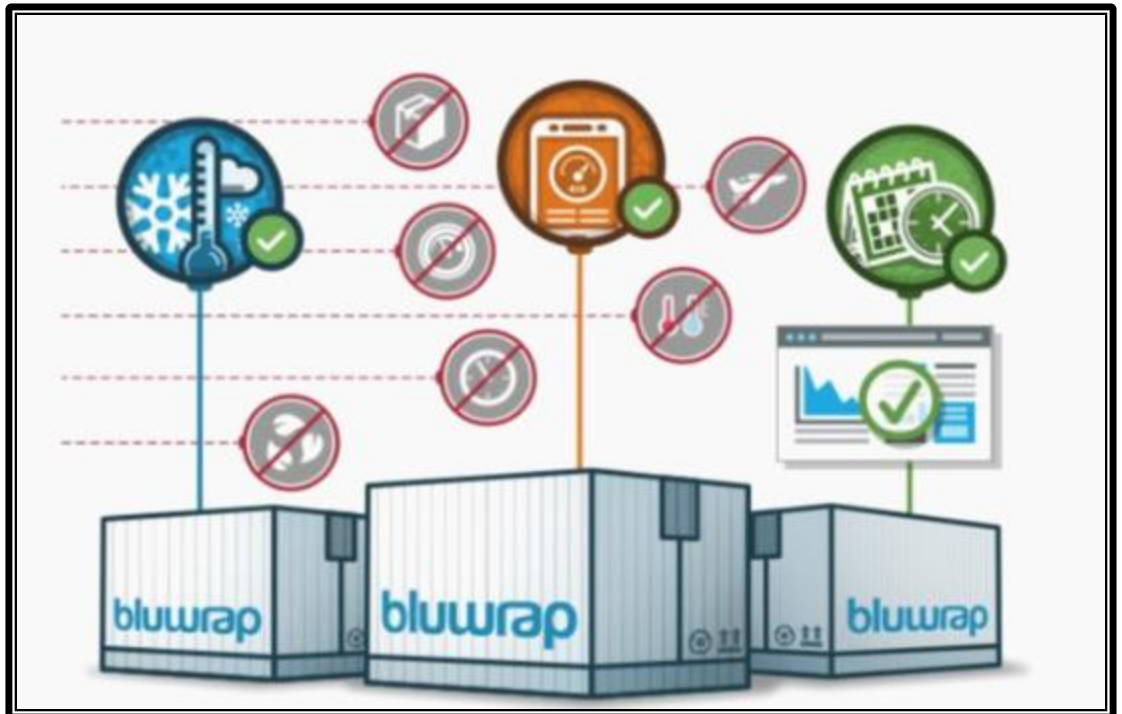
- ▶ Develop a food loss and waste measurement protocol:
 - ▶ Set food loss and waste reduction targets:
 - ▶ Increase investment in reducing post-harvest losses in developing countries:
 - ▶ Create entities devoted to reducing food waste in developed countries:
 - ▶ Accelerate and support collaborative initiatives to reduce food loss and waste:
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8 WAYS TO TAKE ACTION ON FOOD WASTE

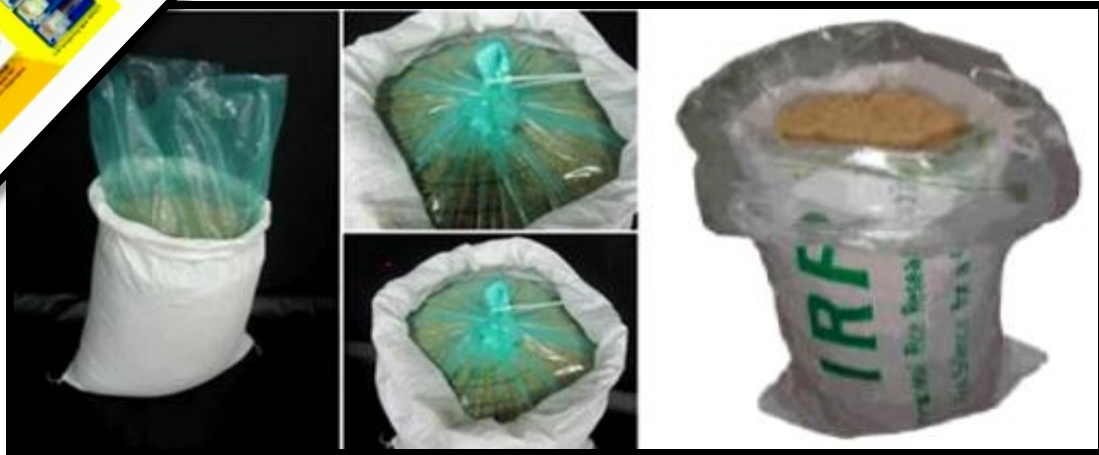
- ▶ Prevent and Reduce Food Waste in Your Own Life
 - ▶ Spread the Word
 - ▶ Volunteer with Local Food Rescue Organizations
 - ▶ Start a Food Waste Campaign in Your Community
 - ▶ Support Businesses with Good Food Waste Practices
 - ▶ Engage with Local Government
 - ▶ Tell Your Legislators That Food Waste Is an Important Issue
 - ▶ Organize a Food Waste Event in Your Area
- 

Reduce food waste through Innovation

- ▶ Bluapple
- ▶ BluWrap



- Copia
- Edipeel
- IRRI Super Bag
- Smart Packaging
- Gebni



A word cloud featuring the phrase "thank you" in various languages and scripts. The central and largest text is "thank you" in blue. Other prominent words include "gracias" (red), "merci" (blue), "dank je" (red), "tesekkür ederim" (green), and "bedankt" (dark blue). Smaller words include "obrigado" (red), "dziękuję" (green), "sukriya" (green), "terima kasih" (blue), "ngiyabonga" (blue), "hvala" (red), "maururu" (red), "nani" (dark blue), and "spas" (green). The word cloud is set against a white background with a blue decorative shape in the bottom left corner.



With thanks to faculty of Manna Centre