



Simpósio Nacional de
Instrumentação Agropecuária - 2019

Parte III:

Redução de Desperdício na Pós-colheita

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2050 World Population: How will we feed >9 billion??

World Population: Past, Present, and Future

Current World Population

7,747,956,306

[view all people on 1 page >](#)

TODAY

Births today
259,570

Deaths today
108,974

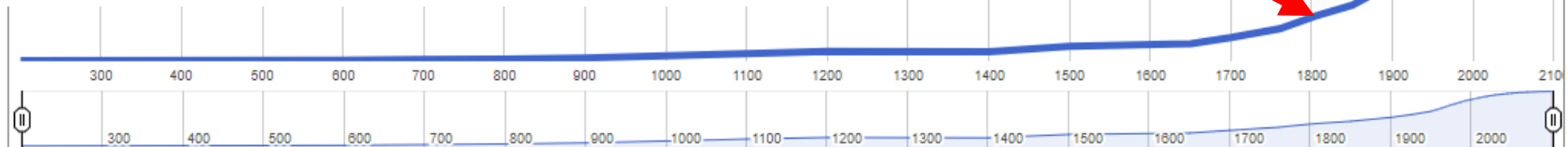
Population Growth today
150,596

THIS YEAR

Births this year
128,831,712

Deaths this year
54,086,640

Population Growth this year
74,745,073



worldometers

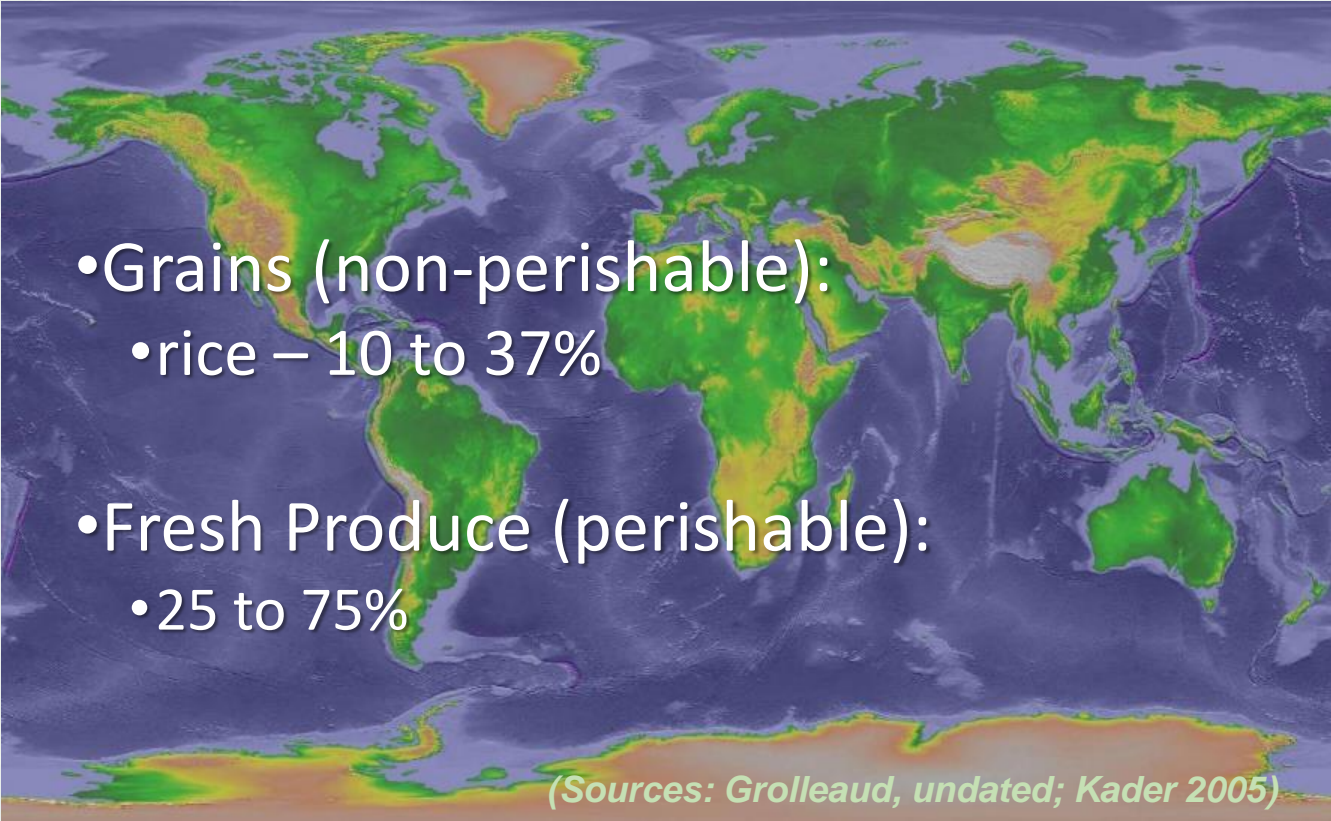
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Extent of World hunger

- 
- A world map with a color-coded overlay indicating the prevalence of hunger. The colors range from green (low prevalence) to red (high prevalence). High concentrations of red and orange are visible in sub-Saharan Africa, parts of South Asia, and Southeast Asia. Green areas are more prevalent in North America, Europe, and parts of South America and Australia.
- 24,000 people die each day
 - Mostly children
 - 1 in 9 (821 million people) are hungry
 - Progress since 1992:
 - 216 million fewer hungry people, but...
 - World population increased by 1.9 billion people!

World Food Programme, U.N.

Extent of Food Losses

- 
- A world map with a color-coded overlay indicating the extent of food losses. The map uses a color scale from green (low loss) to red (high loss). High loss areas (red/orange) are concentrated in South America (Brazil), Central America, and parts of Africa and Asia. Moderate loss areas (yellow) are seen in North America, Europe, and Australia. Low loss areas (green) are found in Russia, Canada, and parts of South America and Africa.
- Grains (non-perishable):
 - rice – 10 to 37%
 - Fresh Produce (perishable):
 - 25 to 75%

(Sources: Grolleaud, undated; Kader 2005)

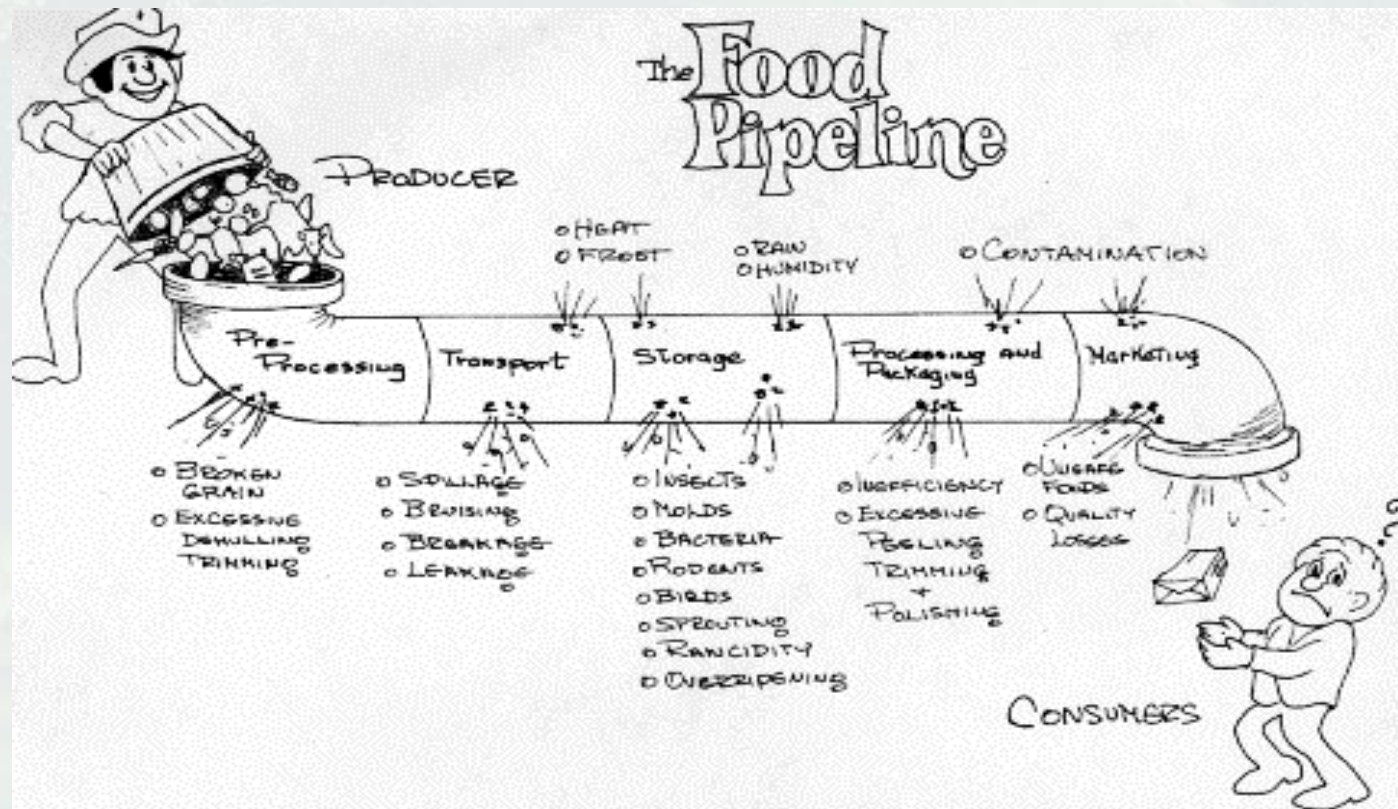


Anthony Bourdain to Make
“Wasted! The Story of Food Waste”
Documentary



Every year 80% of the world's water, 40% of the world's land, and 10% of the world's energy is dedicated to growing the food we eat, yet in the same year 1.3 billion tons of food is thrown out.

Postharvest losses are cumulative

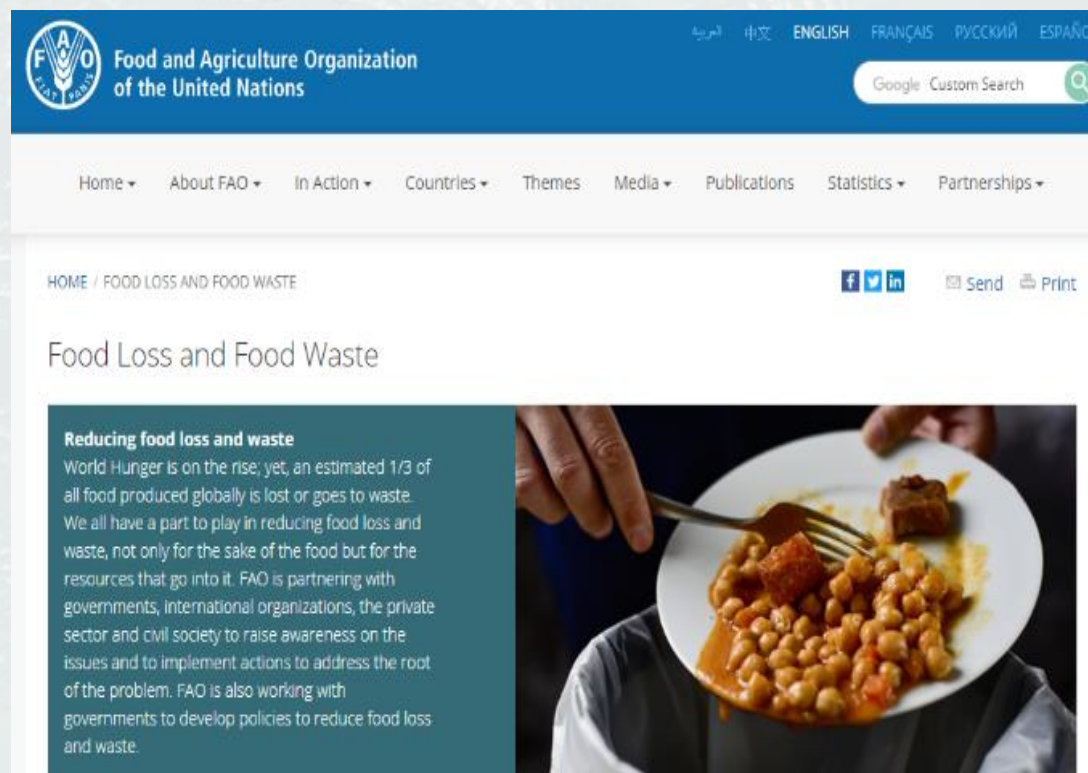


(U.C. Davis)

Food Loss (Perdas) vs. Food Waste (Desperdício)


What's the difference???

- Food Loss: occurs during distribution
- Food Waste: occurs at consumer level

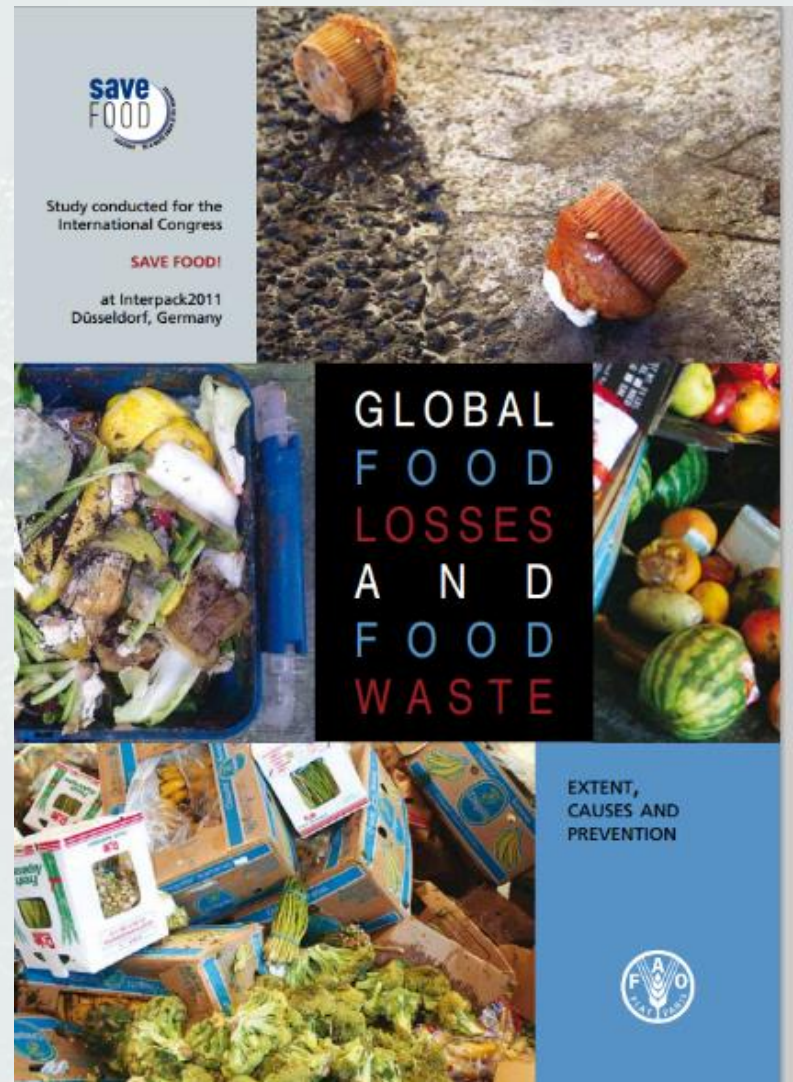


The screenshot shows the FAO website header with the logo and navigation links. The main content area is titled 'Food Loss and Food Waste' and features a text box on the left and an image on the right.

Reducing food loss and waste
World Hunger is on the rise; yet, an estimated 1/3 of all food produced globally is lost or goes to waste. We all have a part to play in reducing food loss and waste, not only for the sake of the food but for the resources that go into it. FAO is partnering with governments, international organizations, the private sector and civil society to raise awareness on the issues and to implement actions to address the root of the problem. FAO is also working with governments to develop policies to reduce food loss and waste.

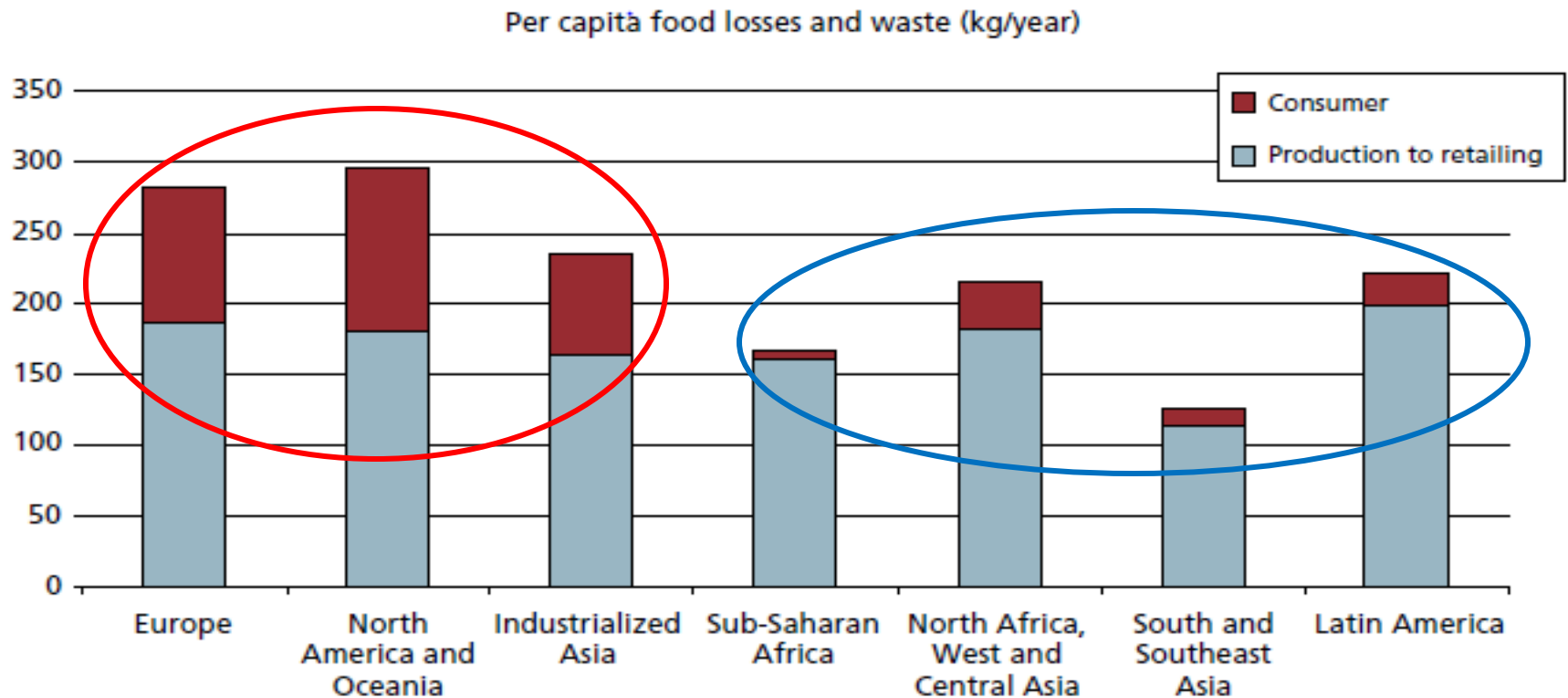


FAO Report on Losses and Waste: 2013

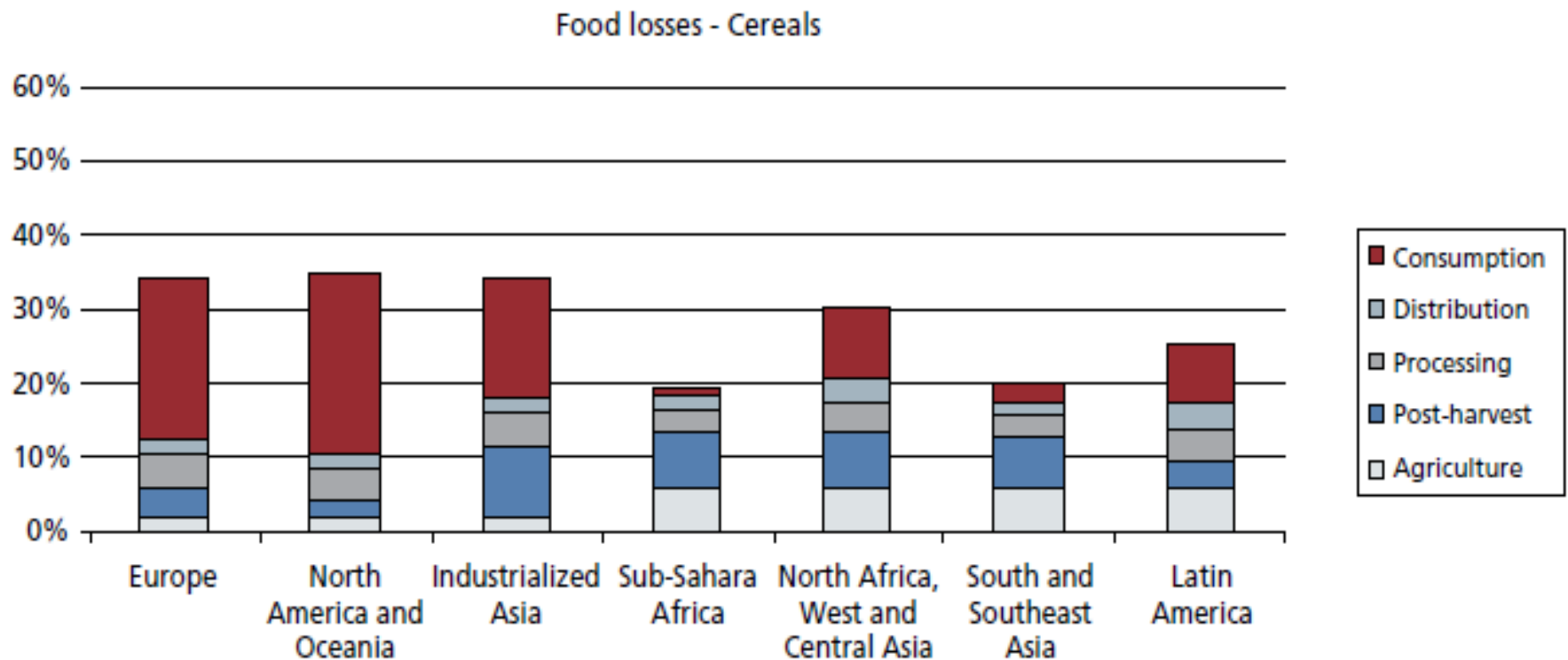


Food losses and waste per capita – by region

Figure 2. Per capita food losses and waste, at consumption and pre-consumptions stages, in different regions

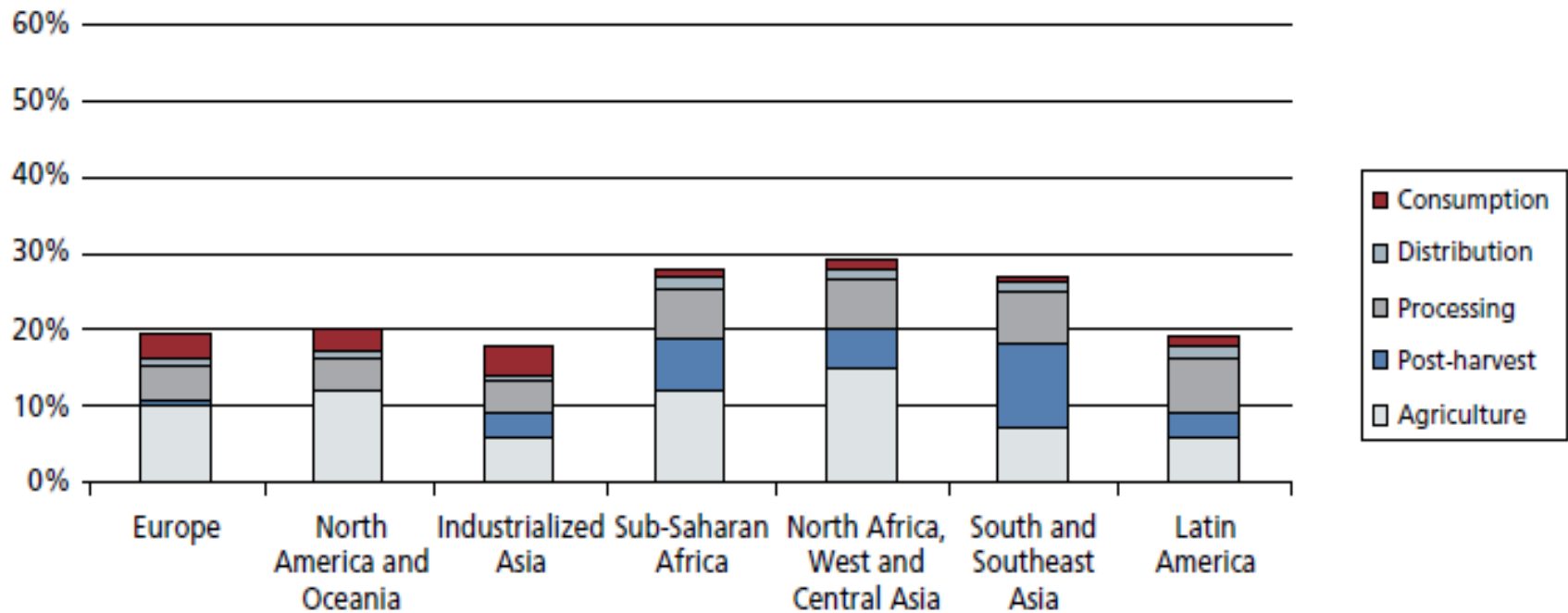


Losses and Waste for Cereal Crops: wheat, rice. 20% - 35%

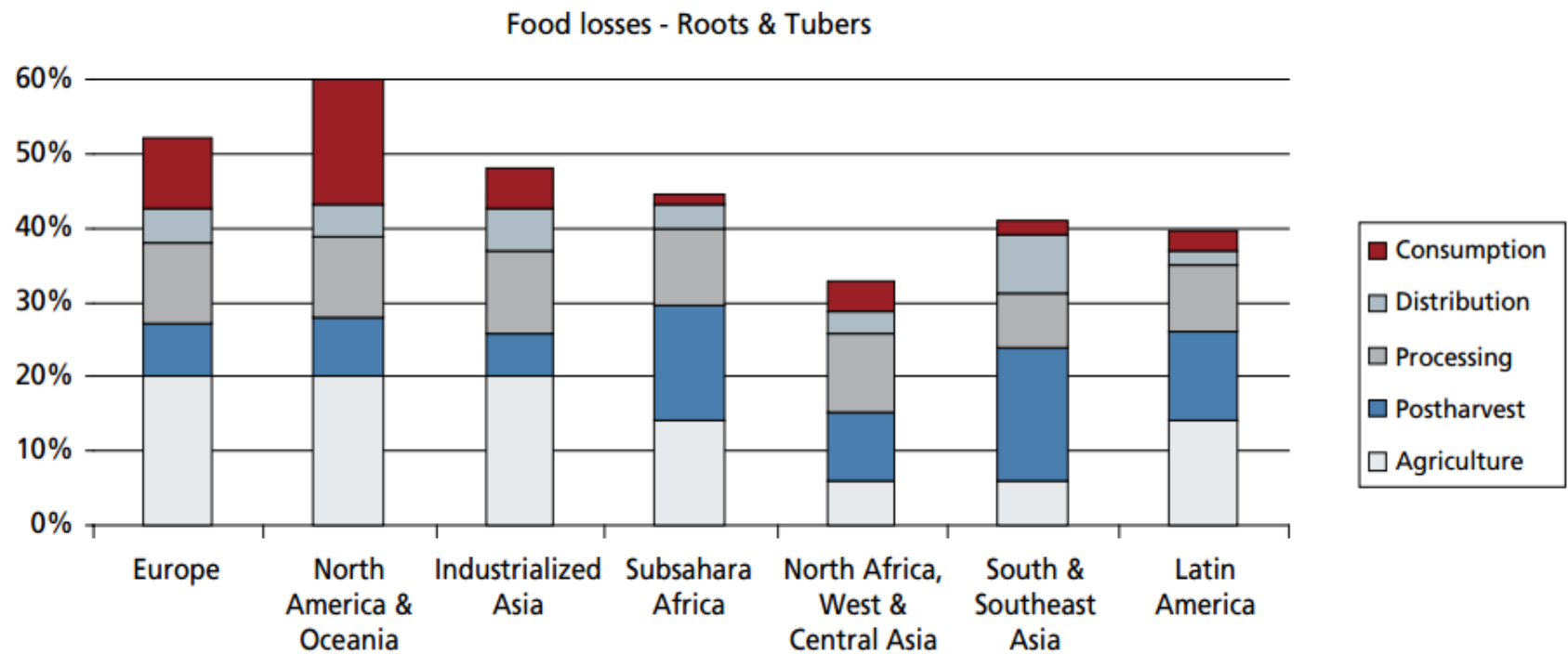


Pulse Crops: sunflower, rapeseed, soybean
Oilseed Crops: peanut, olive, soybean, coconut.
18% - 30%

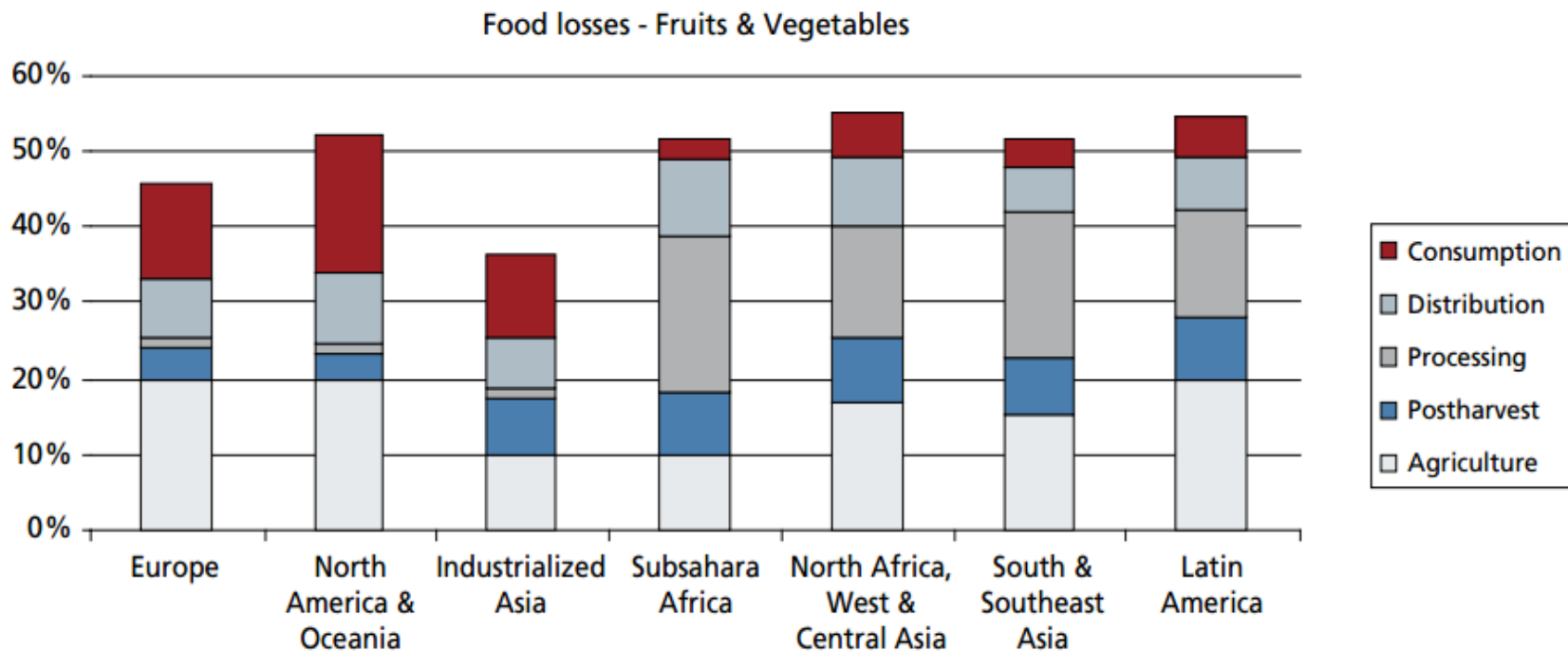
Food losses - Oilseeds and Pulses



Root & Tuber Crops: sweetpotato, cassava, potato. 32% - 60%



Fruit and Vegetable Crops. 37% - 56%





Reasons for food losses and waste

Industrialized Countries:

- Production > Demand
 - Overproduce to ensure supply in case of bad weather, outbreaks
- Grade standards based on appearance
- Cheaper to dispose than divert to alternative market
- Lack of processing facilities due to seasonal supplies

“Developing” Countries:

- Premature harvest
 - Desperate for food (beginning of season)
 - Desperate for income (later in season)
- Lack of infrastructure
 - Transportation, storage/cooling facilities
- Lack of marketing system from wholesale to retail

Supermarket produce section

*Worker removing
unsalable
produce:
6 to 9% loss
("shrink")*



Waste at consumer level: Brazil*

- Families waste 128.8 kg of food per year
- Most wasted food is rice (22%), followed by beans (16%) and chicken (15%)

**Brasil - Perdas e Desperdício de Alimentos em Cadeias Agroalimentares: Oportunidades para Políticas Públicas. International seminar sponsored by Embrapa. Dec. 2018.*

Postharvest losses are more than a total loss:

1. Total loss

- Discard

2. Partial loss

- Loss in value (defects cause loss in grade)
- Lower price
- Alternative = processing



A vegetable box from the ugly produce company Misfits Market. | Michael Roberto

The “same old story”-
only 30 years later!!

It's Time To Get Serious About Reducing
Food Waste, Feds Say

SEPTEMBER 16, 2015 2:16 PM ET

 ALLISON AUBREY 

Food waste 'one of the great paradoxes
of our times'

 By Caroline Scott-Thomas+ 
17-Oct-2013

 Post a comment



Related tags: Food waste, Sustainability, Malnutrition

United Nations – FAO – initiated the G20 Platform to document and reduce food loss

- Initiated by Director-General Dr. José Graziano da Silva (designed Fome Zero program in Brazil)



- 2nd term as D-G
- In 2015 initiated Zero Hunger program at FAO, to “End hunger, achieve food security and improved nutrition and promote sustainable agriculture”





Means for reducing losses:

Physiology/biology

- Traditional breeding and genetics programs
- Marker-assisted breeding
- Phenomics and other “omics”

Technology

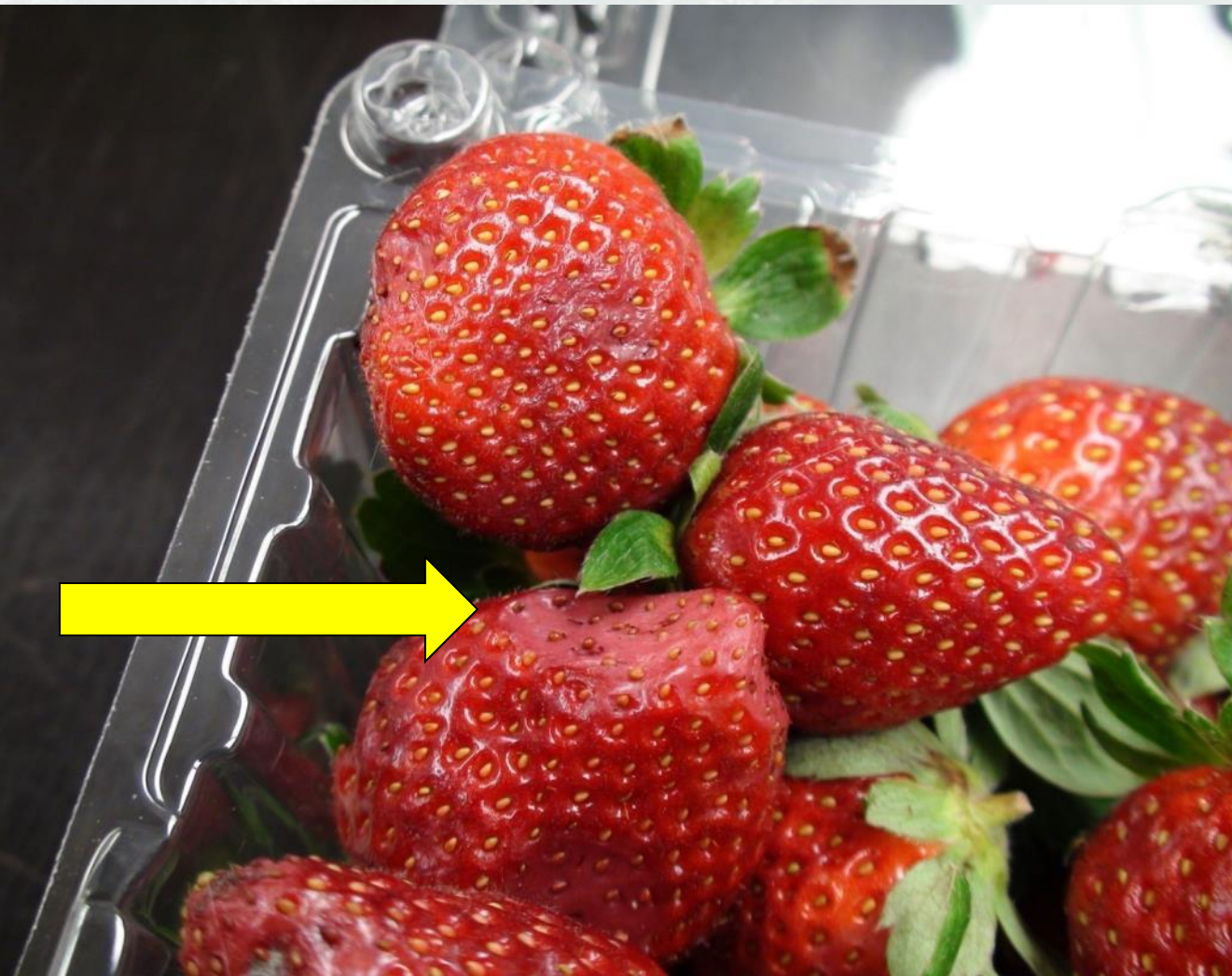
- Refrigeration
- Remote sensing
- Non-destructive sensing
- Robotics

Food Trends: Nutritious Crops

- High in vitamins, antioxidants (pigments, phenolics)
- Low in carbohydrates
- Natural fiber



Cooling is critical to extend quality



After 24 hours at ambient:

- Note bruise
- Unseen losses:
 - ↓ flavor
 - ↓ Vit. C

Cooling delays can lower postharvest quality

Strawberries with a 6-hour delay to cooling had poorer quality than those cooled more quickly after 1 week of storage:

- Significantly softer, more shriveled, had less attractive color
- Lower SSC, acidity, and Vitamin C levels



Nunes et al., 1995

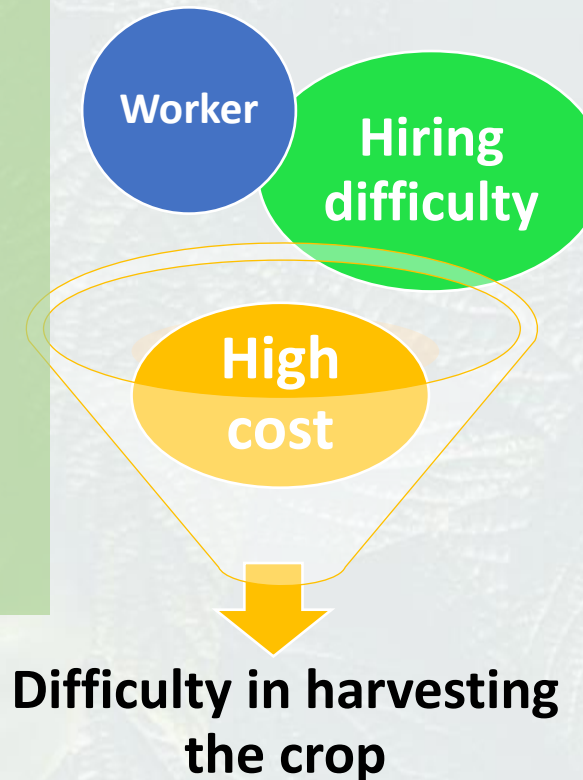
What is the “cold chain”?

- Maintaining fruits and vegetables as close as possible to optimal temperature and relative humidity during each of the handling steps
- Strict monitoring of a series of critical points implemented following Best Management Practices



Robotic Harvest

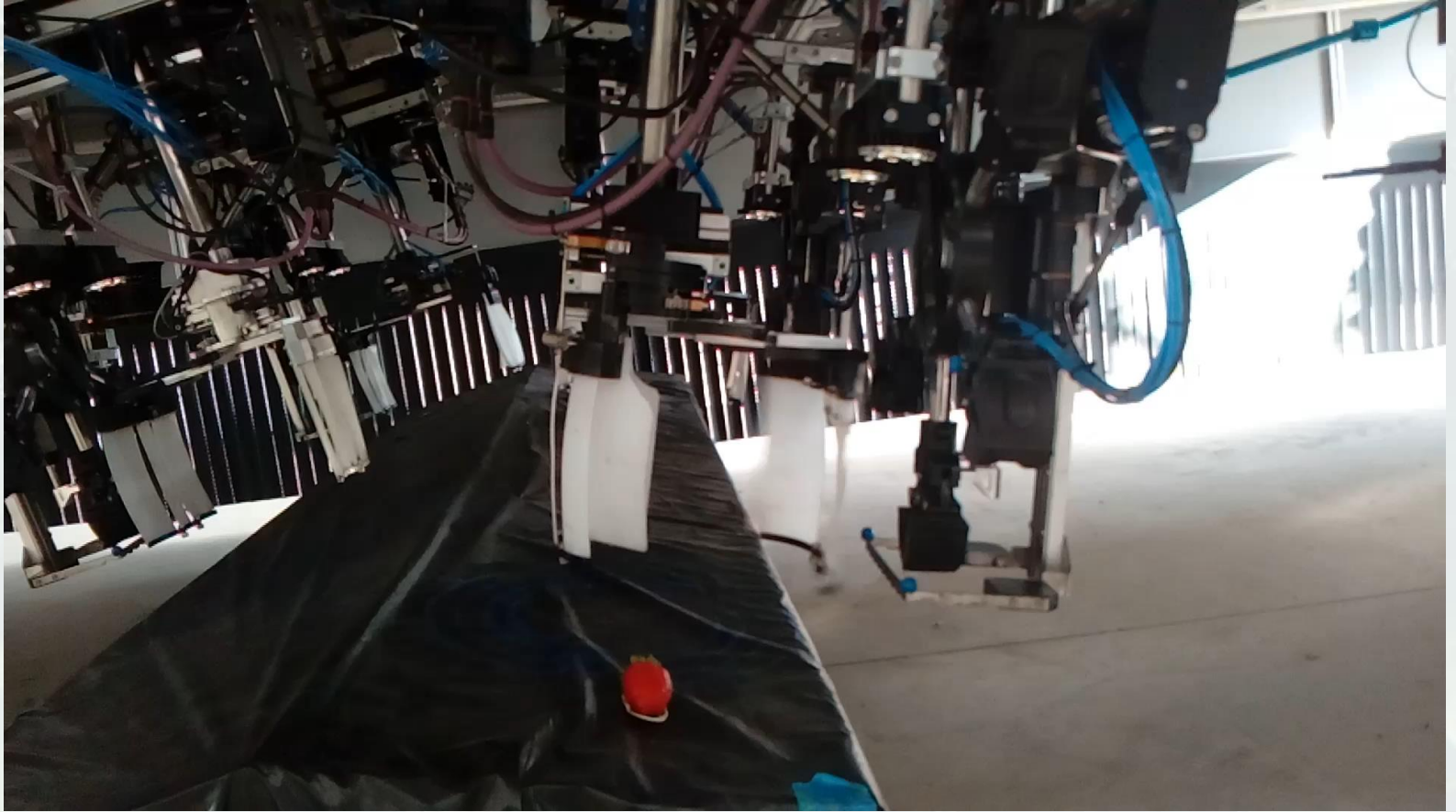
- Fruits are manually harvested due to extreme sensitivity to mechanical injury.



(Tamashiro, T., S.A. Sargent and A.D. Berry, 2018).

Harvest CROO – self-guided strawberry harvester. Platform #5 (2020): harvests 8 rows, 2 robots/row





The background of the slide features a close-up photograph of green leaves with prominent veins, creating a natural and fresh aesthetic. The leaves are layered, with some in sharp focus and others blurred in the background.

New Tracking Technologies during Handling and Shipping

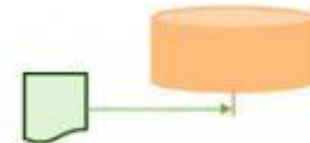
- Real-time tracking
 - Time, temperature logged during all handling
- Accessible at any time
- Chain monitoring and traceback - Blockchain

What is Blockchain? A management tool (Produce Mkg. Assoc.)

Centralized vs. Distributed vs. Decentralized

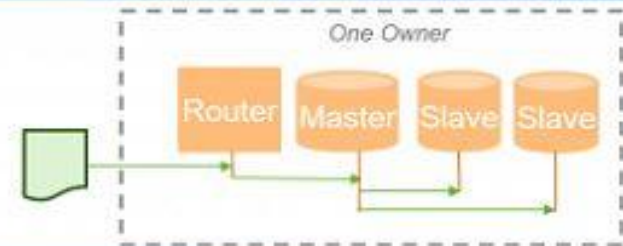
Centralized

- One database, one owner
- Not resilient to organizational failure
- Not resilient to technical failure



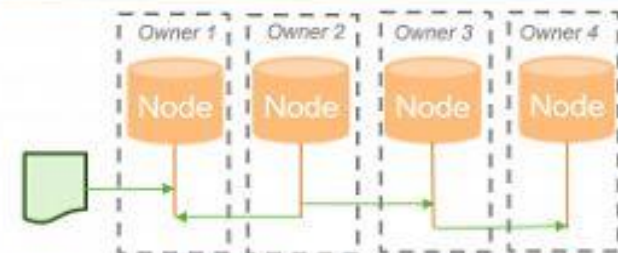
Distributed

- Many database copies, one owner
- Resilient to technical failure
- Not resilient to organizational failure



Decentralized

- Many database copies, many owners, no one "master"
- Resilient to technical failure
- Resilient to organizational failure



Blockchain



Questions

&

Comments

Florida Postharvest Horticulture Field Trip *March 2-6, 2020*

"from harvest to the supermarket"

