Challenges for Reducing Food Losses and Waste

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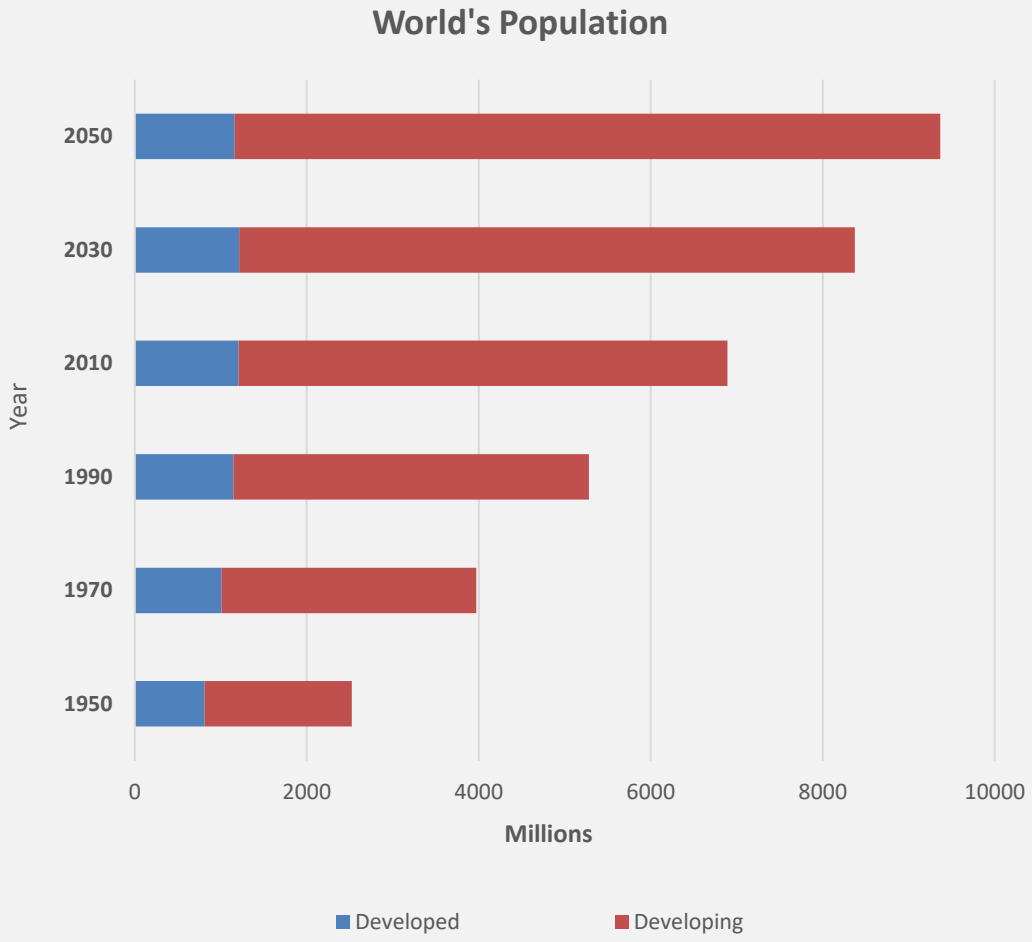
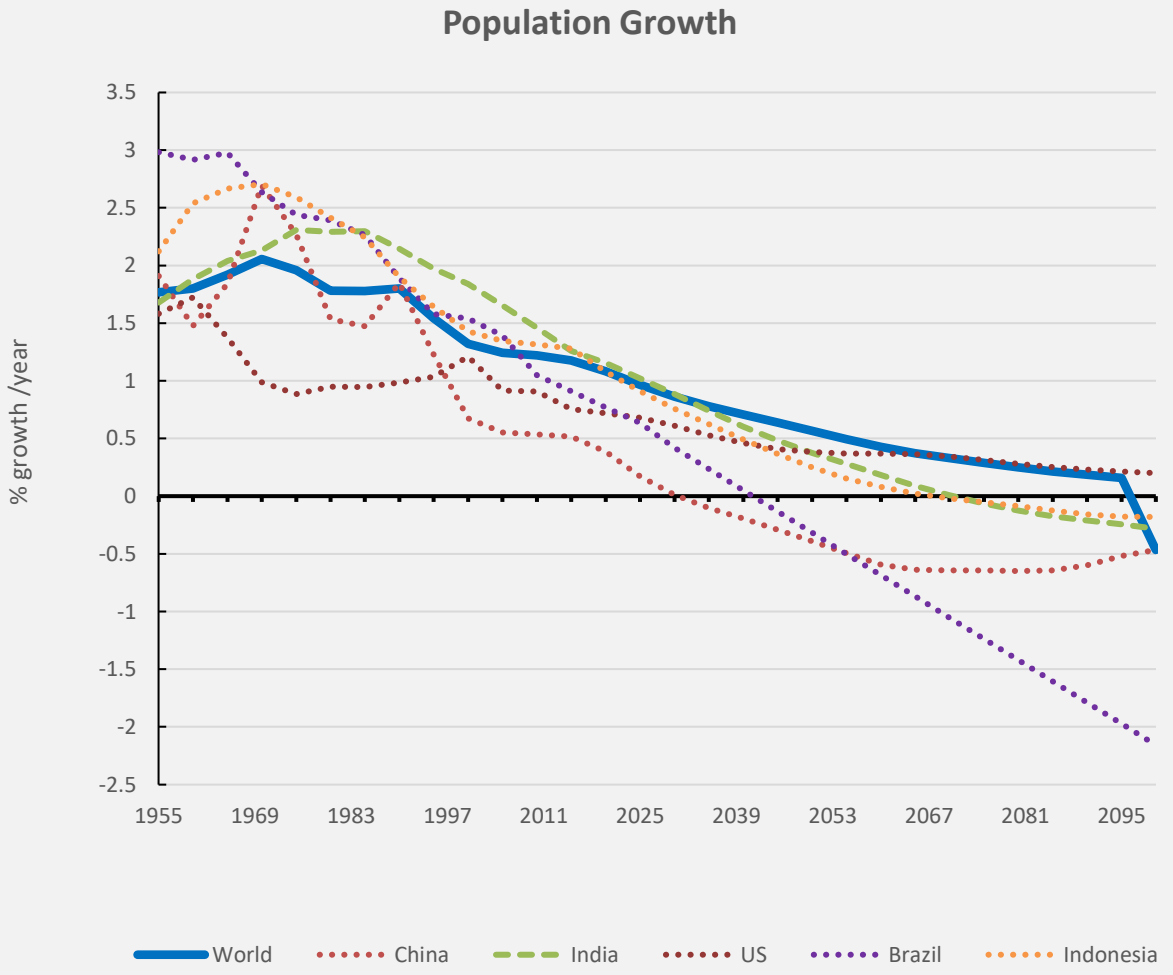
January 2021

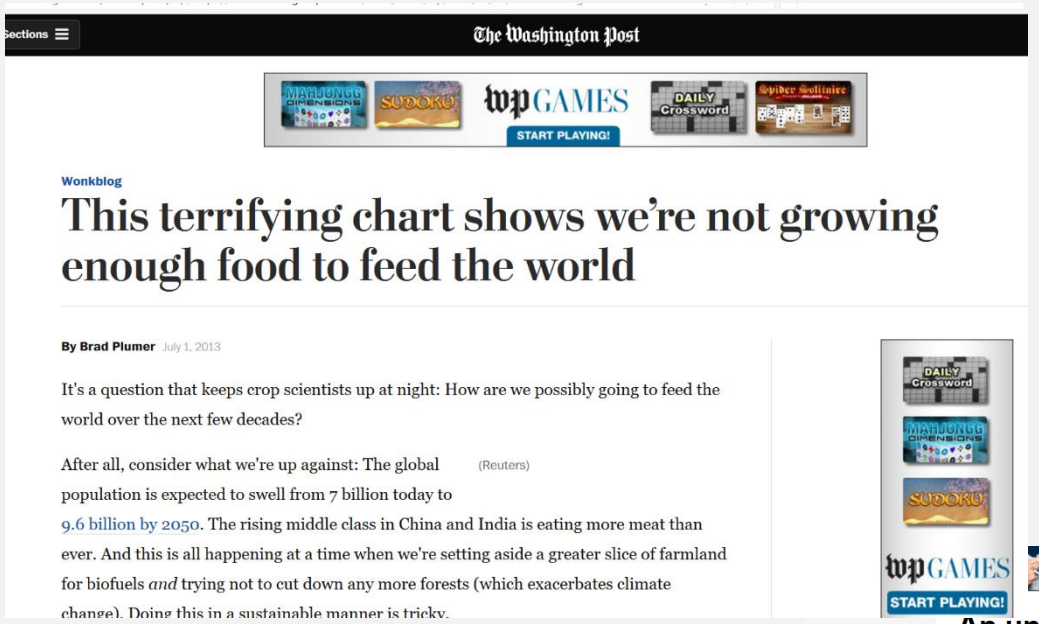
World’s Population Trends





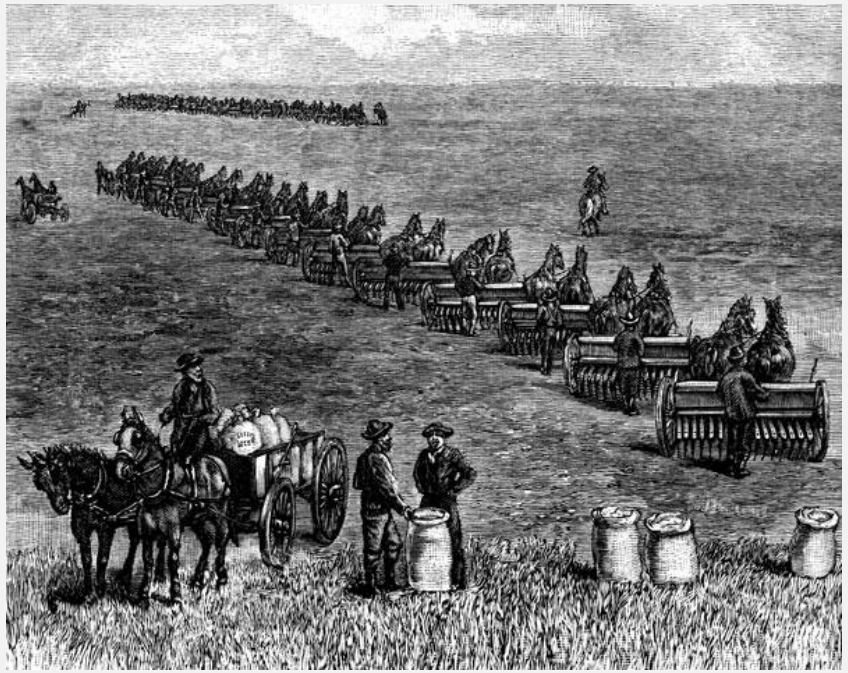
Source: UN Population Division

Malthus Revisited ?



Malthus Revisited ?

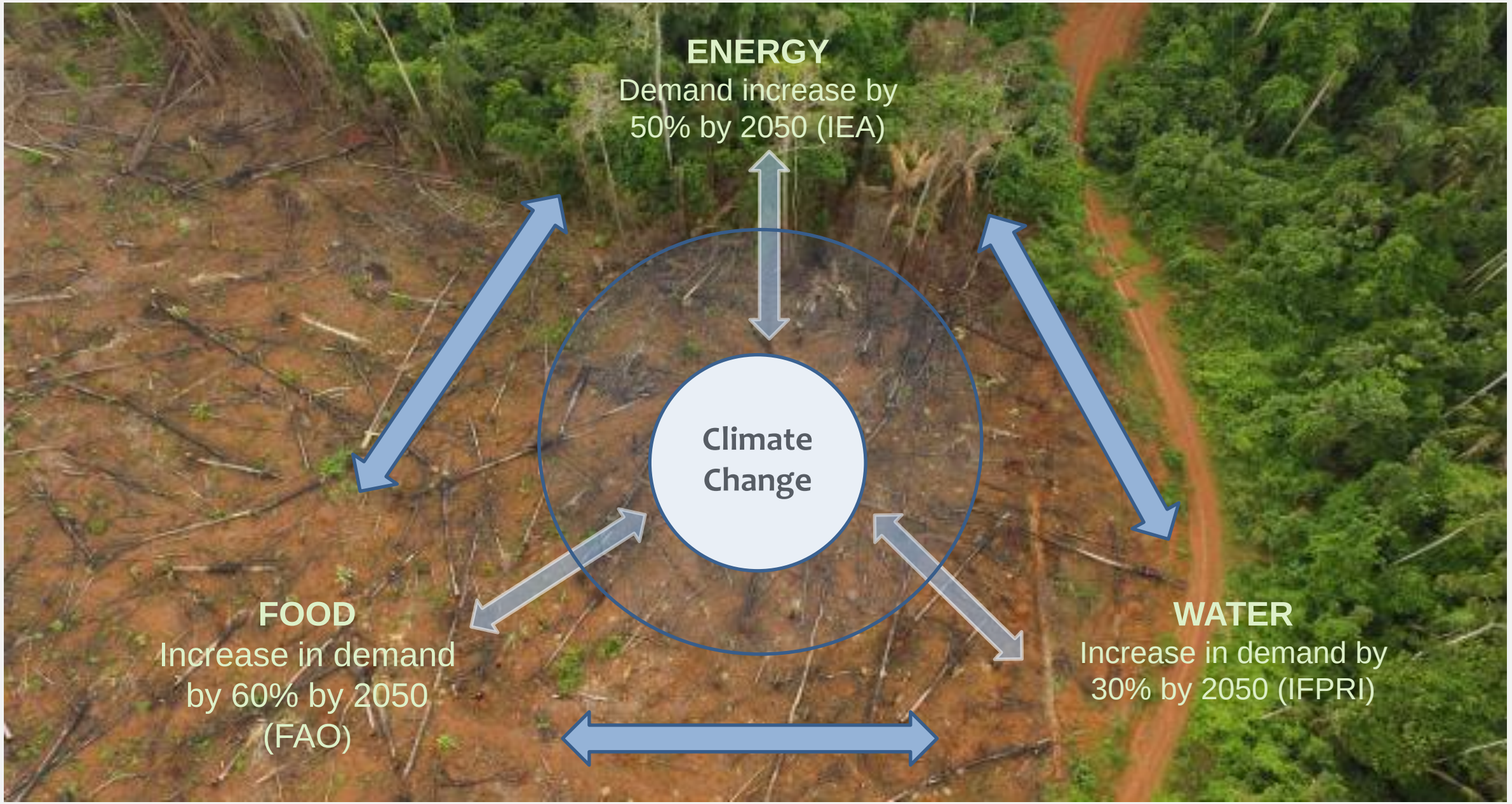
Thomas
R. Malthus
1766-1834



“The power of population is so superior to the power of the Earth to produce subsistence for man, that premature death must in some shape or other visit the human race.”

Fonte: ONU

The “Perfect World”



Forecast for 2050

- Food production will have to grow 60% - 70% by 2050;
- The consumption of meat is expected to rise from 32 to 52 kg / capita / year;
- Food *versus* fuel dispute raw materials (bioenergy demand is expected to increase 100% by 2050);
- Climate change brings new challenges for production;
- Land scarcity (prices skyrocketing) and water (+ 100%) (currently 36% of world population is living in areas without water availability)

Commitments for 2030

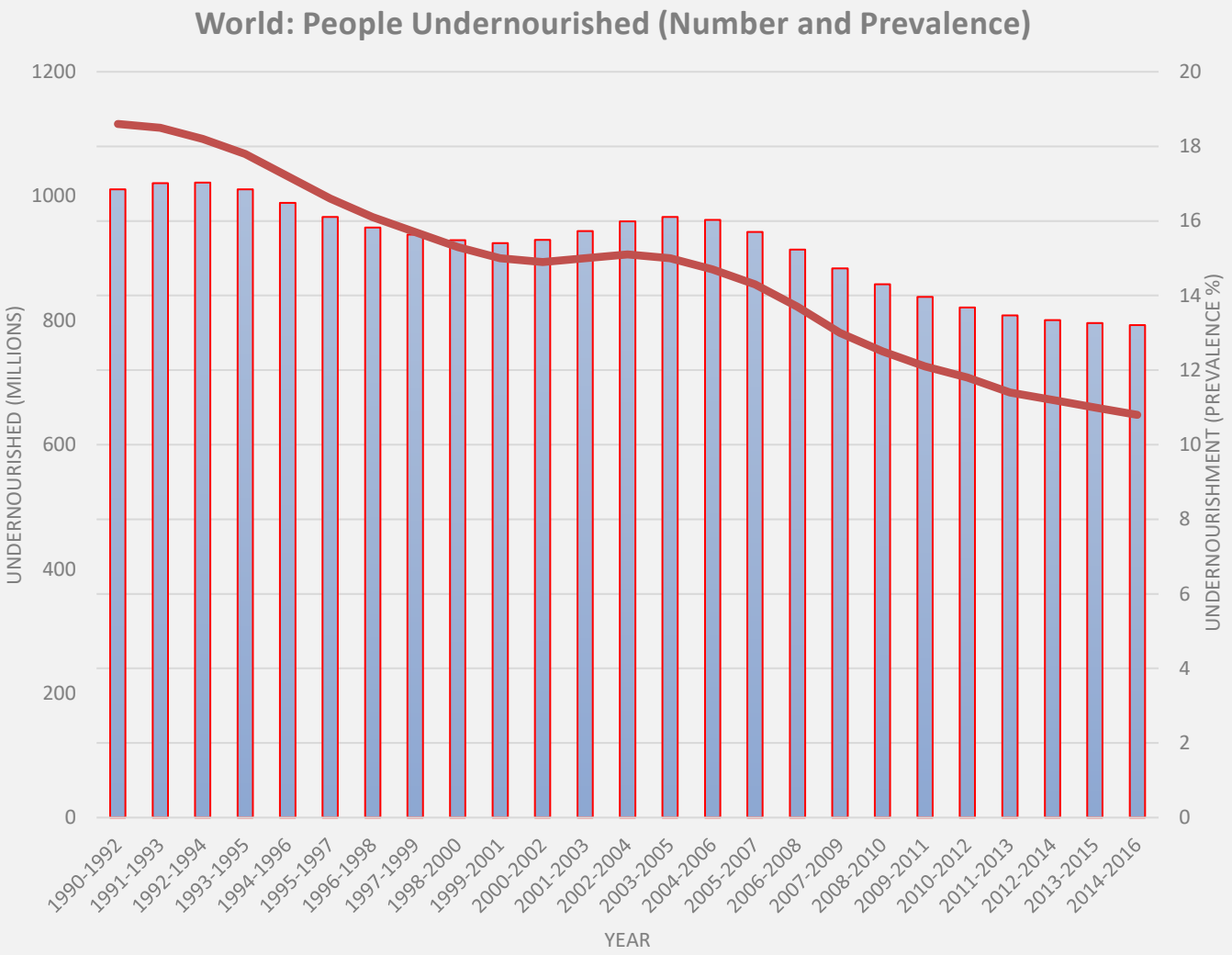
- Rio + 20

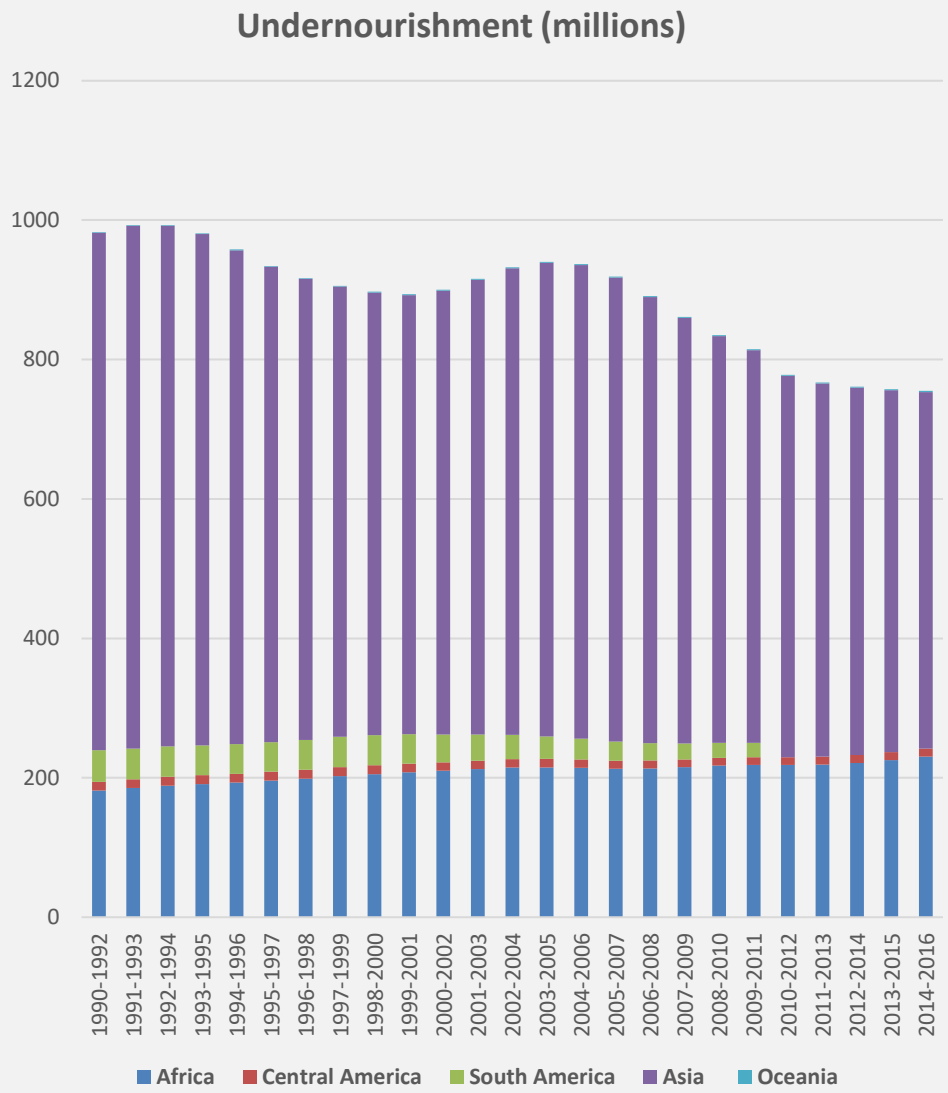
- Zero Hunger Challenge

- COP 21

- SDG 2030 (2015)

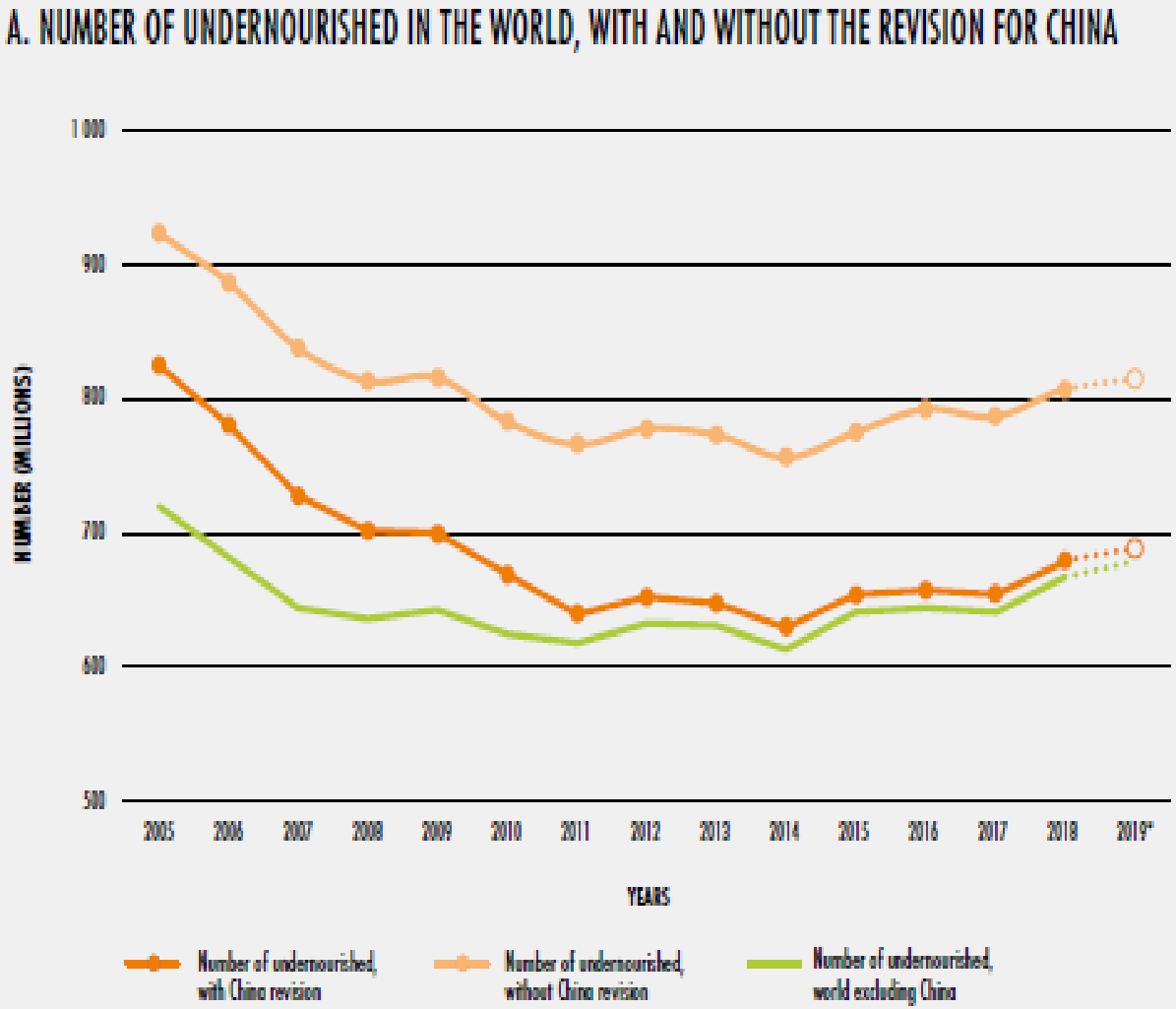
Undernourishment

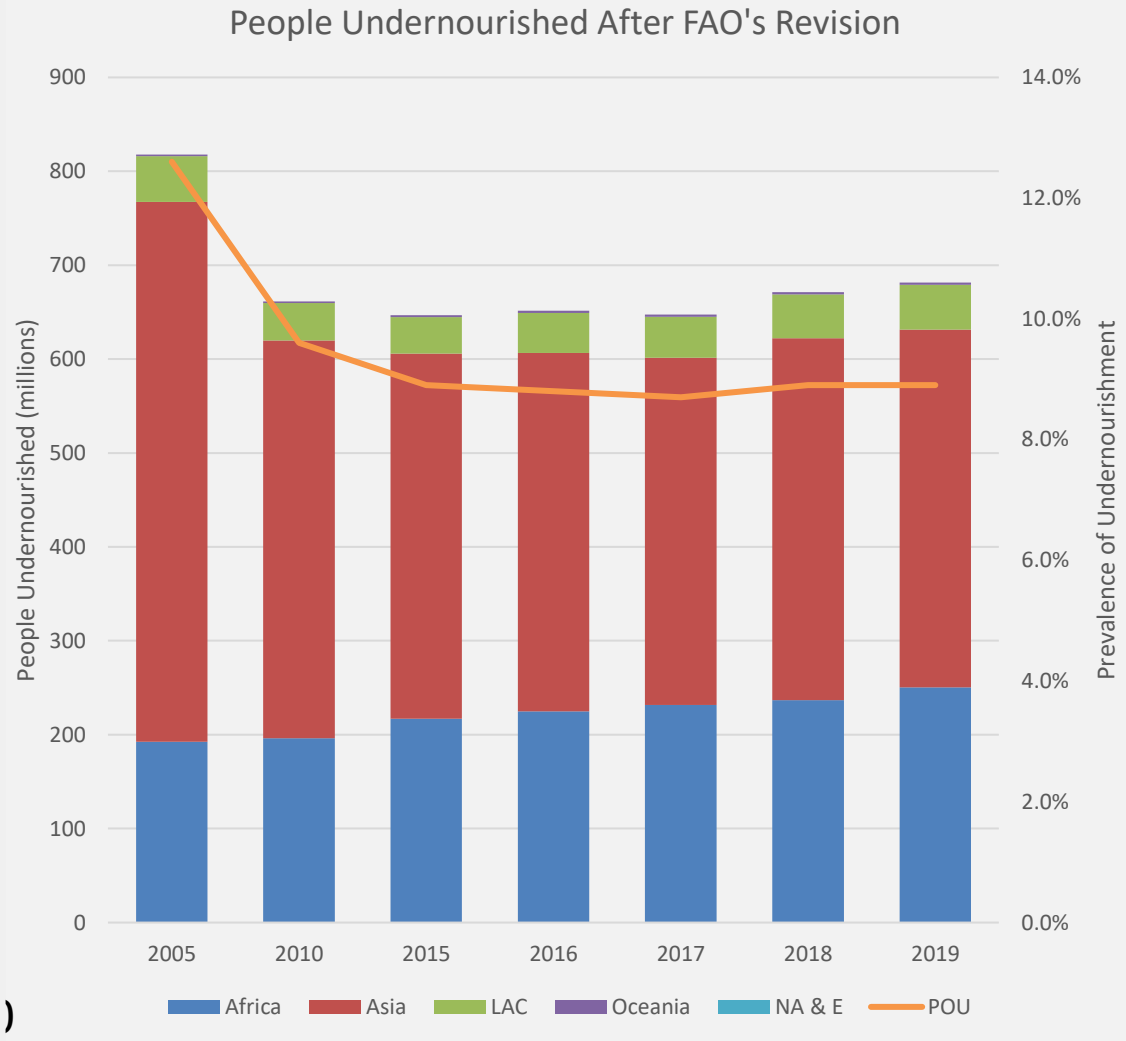




Source: FAOSTAT

Undernourishment: New FAO Estimate





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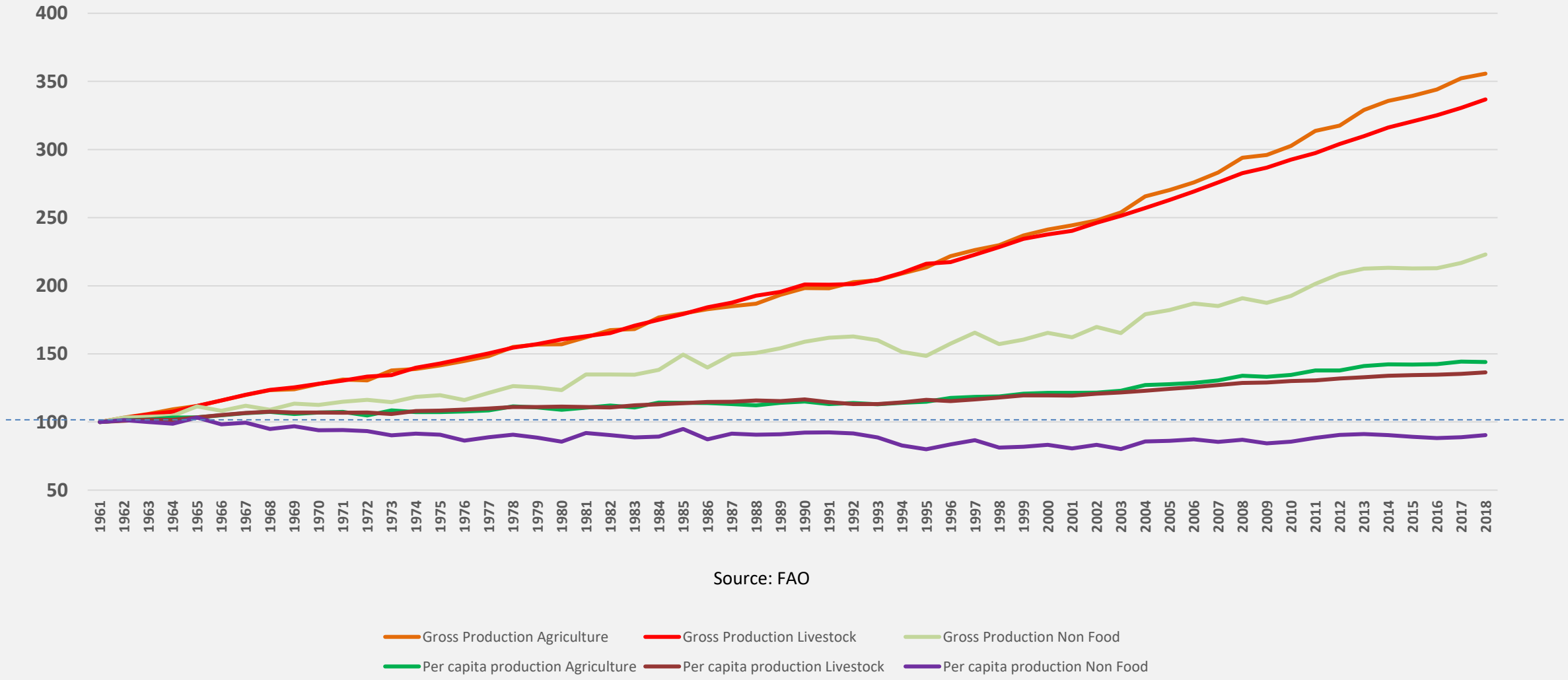
Source: SOFI 2020

World: Food and Non-Food Productions Index (1961=100)



Source: FAO

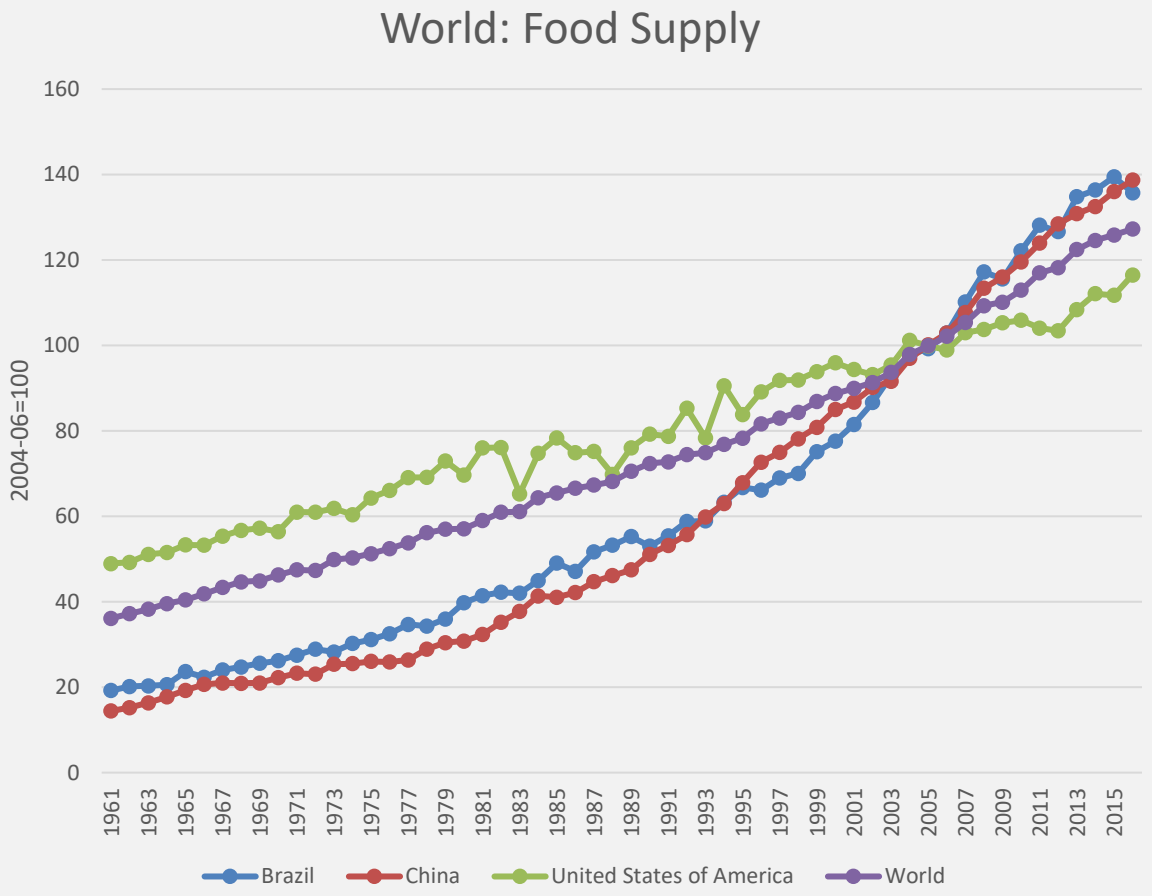
Food Supply Forecast

Yield (ton/ha) growth (% per year)

		1993-2020
Wheat	Developed	1.06
	Developing	1.30
	All Countries	1.17
Rice	Developed	0.53
	Developing	1.08
	All Countries	1.05
Maize	Developed	0.84
	Developing	1.36
	All Countries	1.03

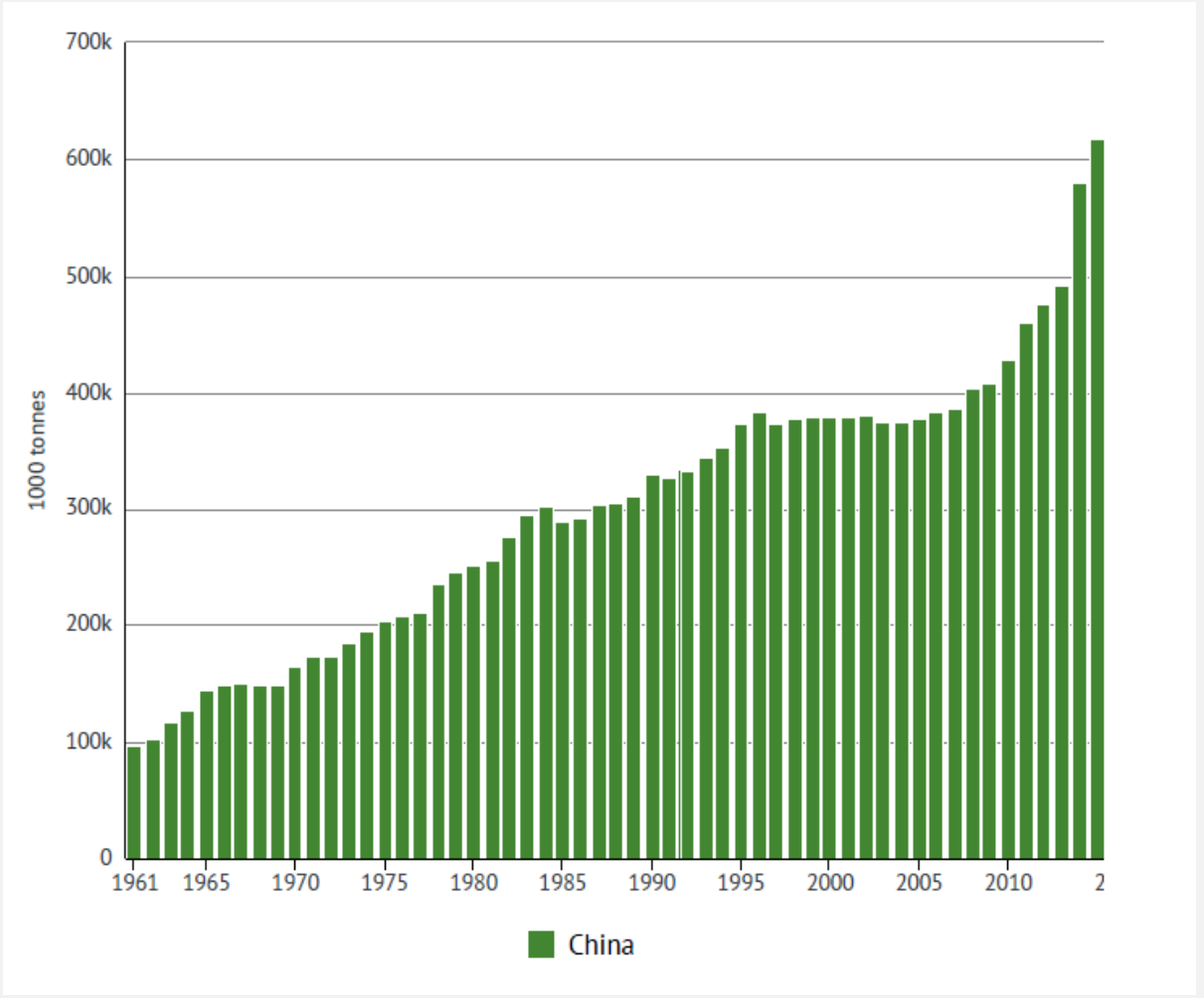
Source: Chang & Zepeda, 2003

China: Growth in Agricultural Production



Source: World Bank

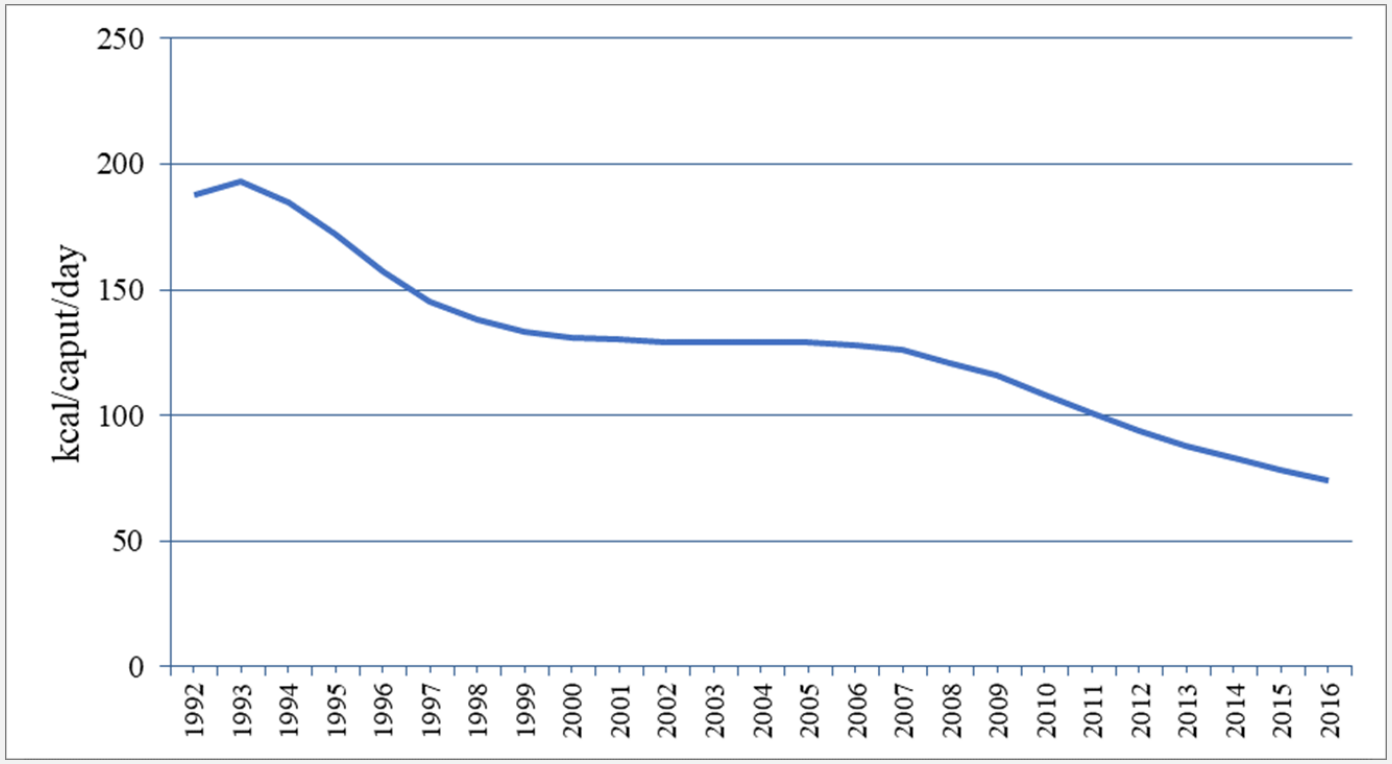
China: Grain Production



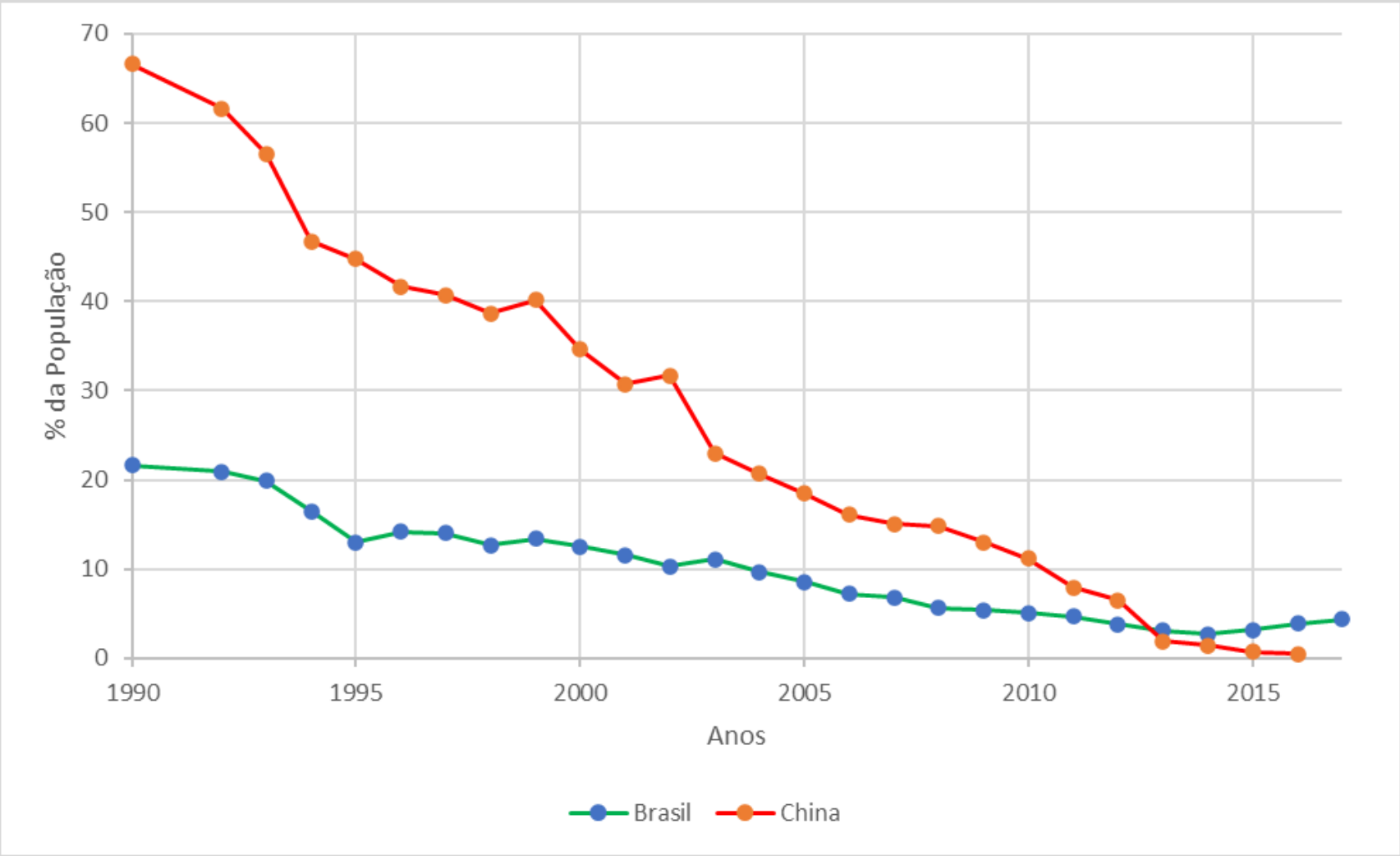
China

19% of World's Population
7% of World's Arable Land
6.5% of World's Water Resources
Only 50% of territory useful for agro production

China: Food Deficit (in Kcal/ capita/day)

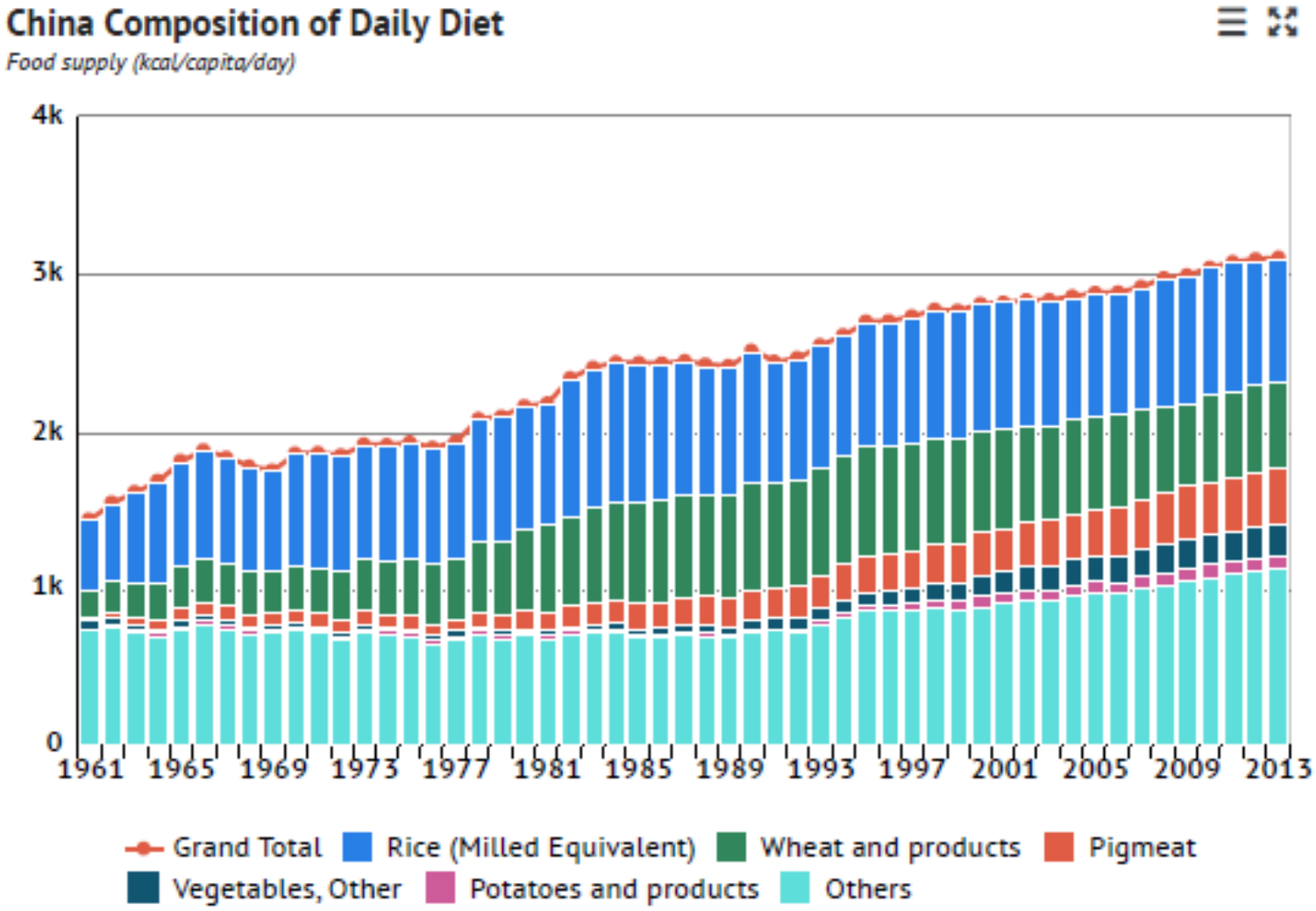


Brazil and China: Poverty US$1.9 day/capita PPP (%)



Source: World Bank

Food Consumption in China

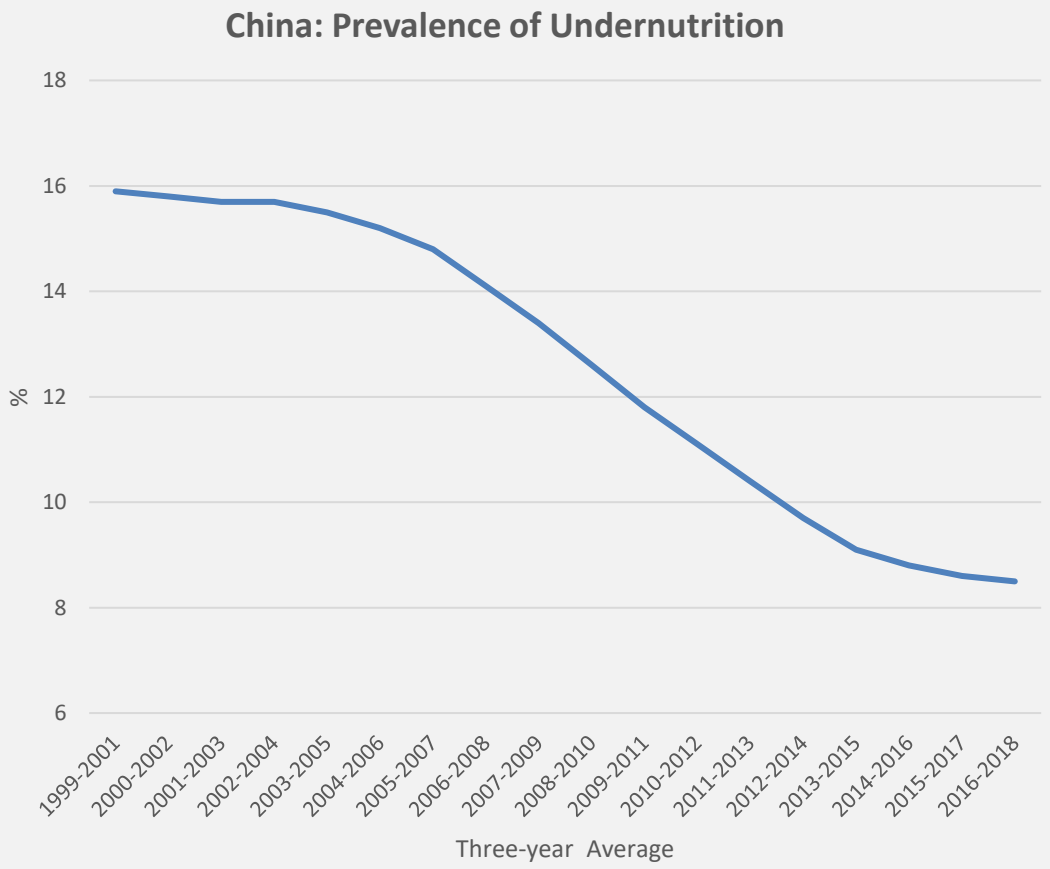


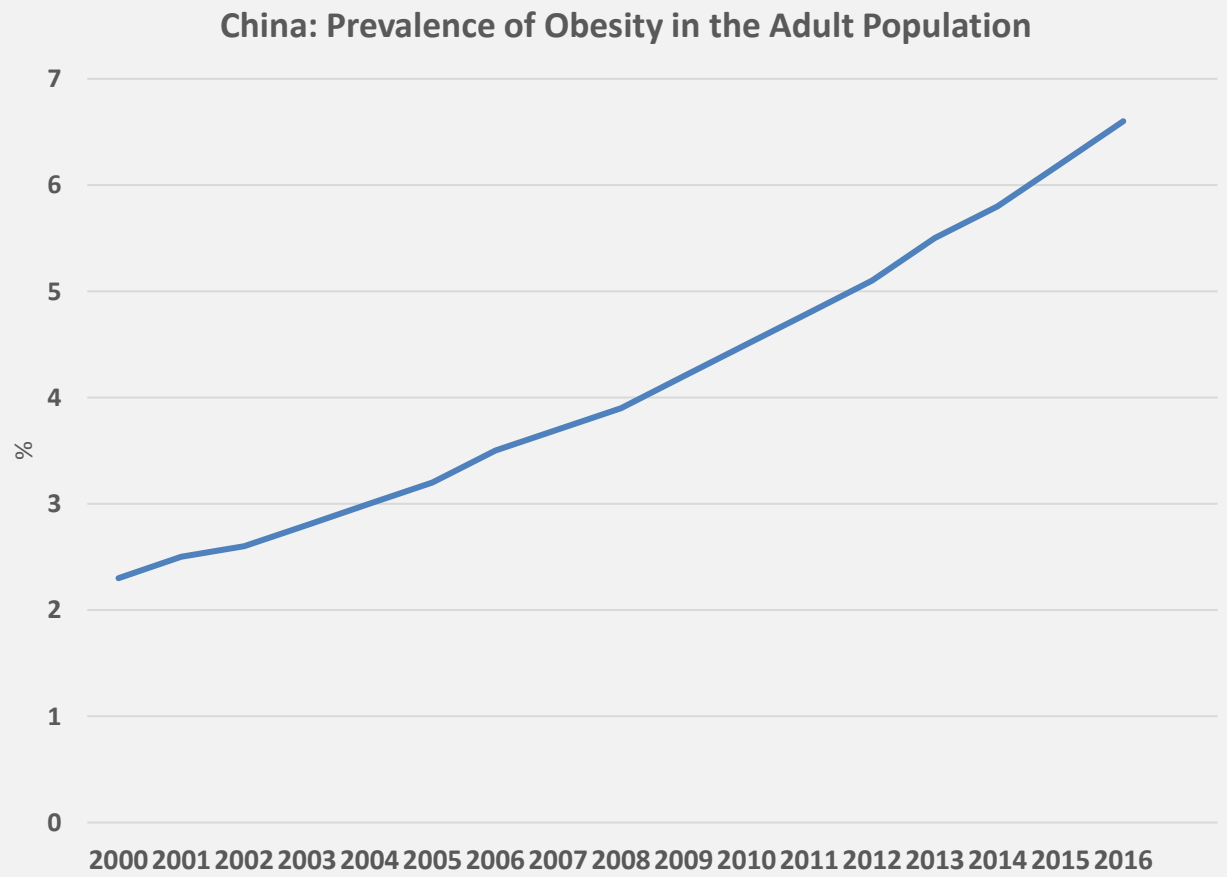
Domestic Supply , 2018

Wheat domestic supply	139,090 thousand tonnes
Maize domestic supply	268,816 thousand tonnes
Barley domestic supply	4,196 thousand tonnes
Rice domestic supply	215,825 thousand tonnes
Vegetable oils domestic supply	33,113 thousand tonnes
Meat domestic supply	92,145 thousand tonnes
Bovine meat domestic supply	8,696 thousand tonnes
Pigmeat domestic supply	57,464 thousand tonnes
Poultry meat domestic supply	19,245 thousand tonnes
Fish and seafood domestic supply	66,872 thousand tonnes
Eggs domestic supply	36,920 thousand tonnes
Milk domestic supply	37,887 thousand tonnes
Vegetables domestic supply	641,341 thousand tonnes
Starchy roots domestic supply	213,836 thousand tonnes
Sugarcrops domestic supply	123,774 thousand tonnes
Fruits domestic supply	123,774 thousand tonnes

China: Nutrition Indicators

Seesaw effect

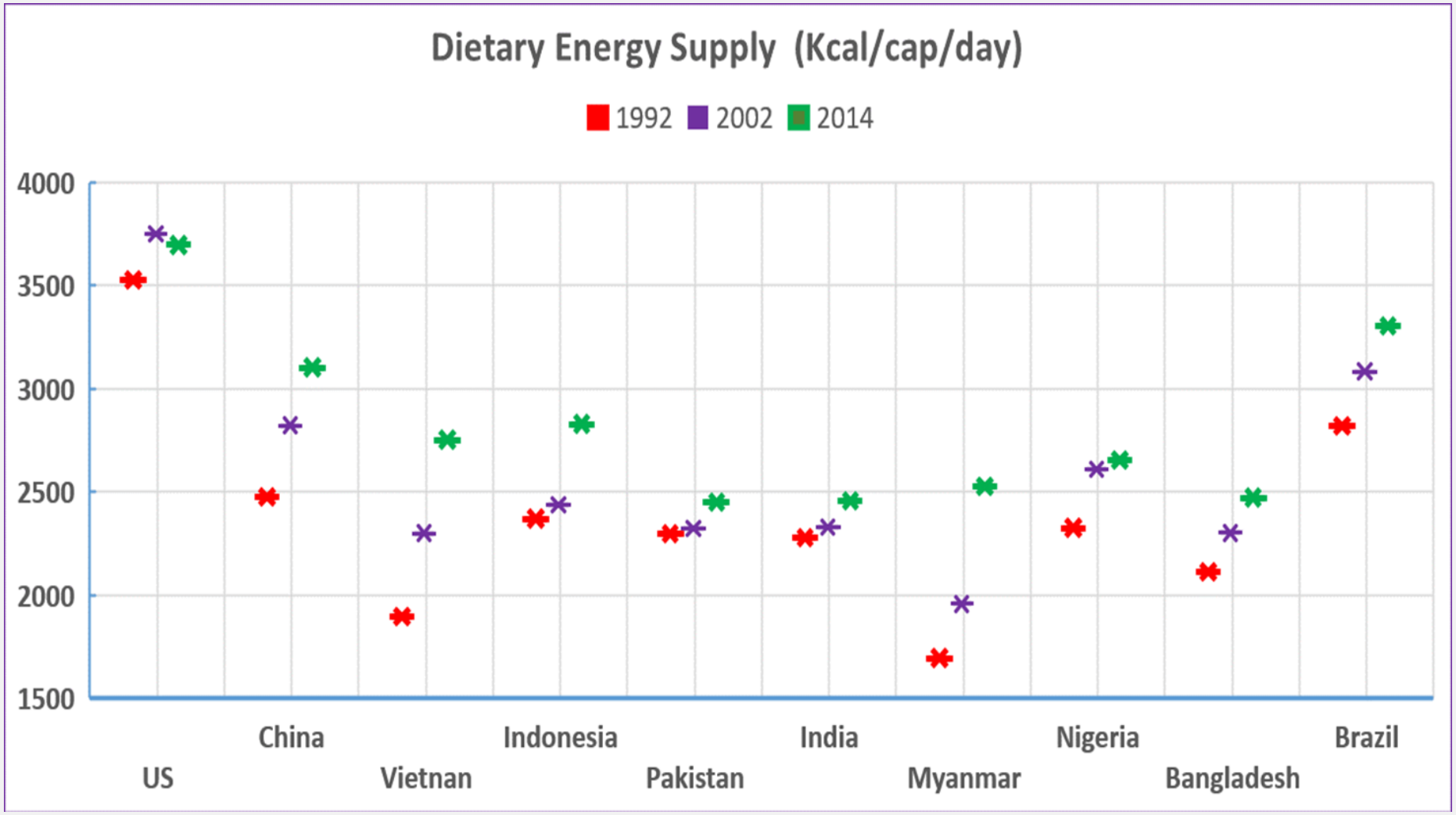




Increase in Income Levels and Change in Consumption Habits

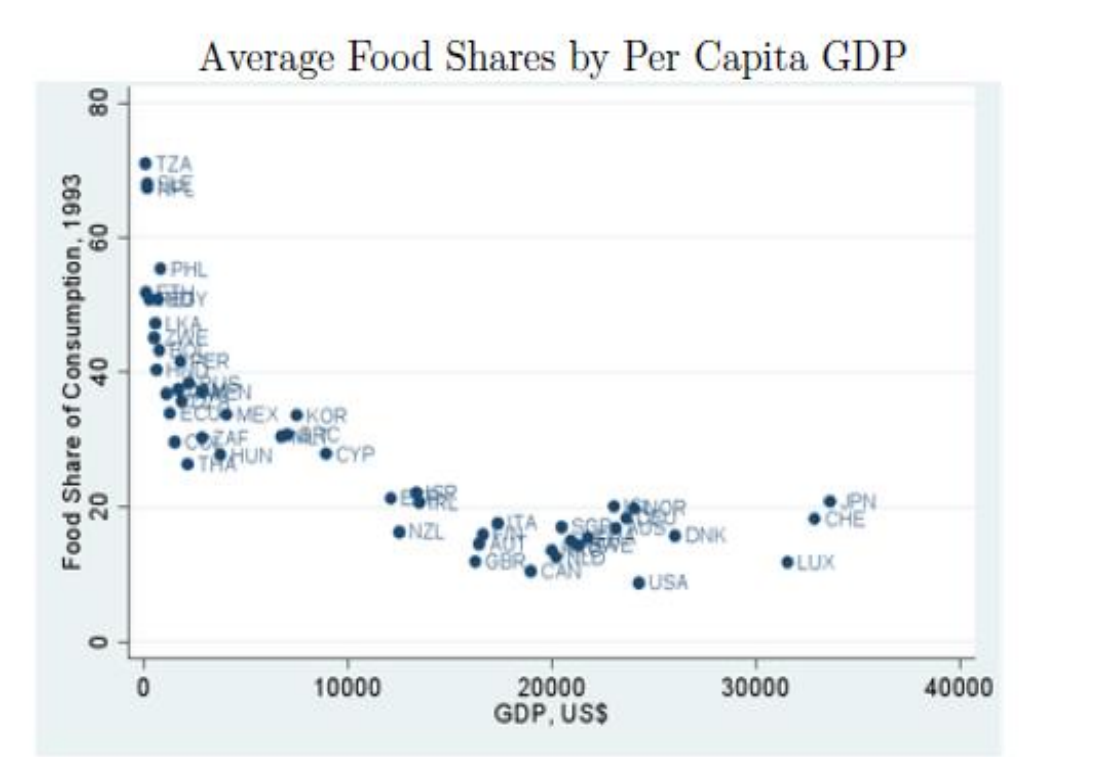
Western consumption habits are not limited only to the intake of food, but the whole process of acquisition, processing and consumption, reproducing the effects downstream of waste in supermarkets, packaging and portions, without regarding the distances covered for transporting food from the outside of the producing regions

Per capita consumption in developing countries with more than 100 million inhabitants 1992-2004



Source: Belik, 2018 from FAOSTAT

Food Consumption Transition



Source: Food Prices and the Welfare of Poor Consumers - Ethan Ligon
Giannini Foundation, University of California, Berkeley, October 10, 2008

Forecast of Demand for Food 2050

Let's produce more! More with Less!

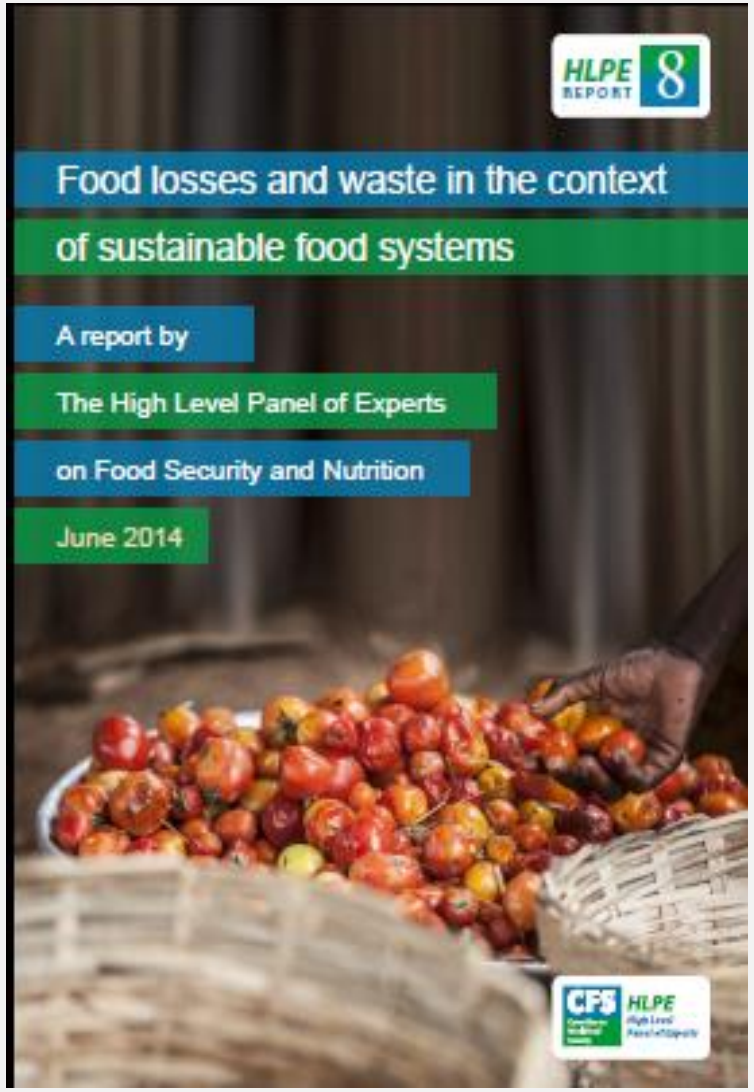
- Dissemination of new technologies (biotechnologies, nanotechnologies, GMO etc.);
- Investment in technology and education;
- Intensification of land use;
- New areas with potential for farming;
- Food 2.0.

Food Supply Forecast to 2050

Let's reduce the Food Losses and Waste ! Less is More!

- **Whereas the losses and waste account for 30% of everything that is produced for human consumption, 50% reduction in waste would solve 25% of the supply problem for 2050;**
- Agriculture accounts for 12-14% of greenhouse gas emissions, reaching 30% if we consider the whole chain of agribusiness and the conversion of new areas for production;
- The emmisions produced by world's FLW corresponds to all gas emissions produced in the United States today;
- The annual consumption of clean water to produce what is wasted represent 230 km3 or equivalent to all the water that runs annually by the Volga River
- The area required for the production of what is lost or wasted is 1.4 billion ha or 30% of the arable land;
- The direct annual cost of FLW (excluding fishing) is $ 750 billion (approx. 20% of Germany's GDP).

Committee on World Food Security



http://www.fao.org/3/a-i3901e.pdf

Definitions

Food Losses

Weight loss or nutritional value losses in primary products intended for human consumption.

Occurs in the initial phase of production (in the field), in transport or storage.

Is due to problems in the production process or any price changes

unintentional

Food Waste

Appropriate food for human consumption that is discarded.

Occurs during marketing, catering or household consumption.

Is due to poor planning or sales forecast (expiration date) or even the lack of consumer awareness

intentional ?!

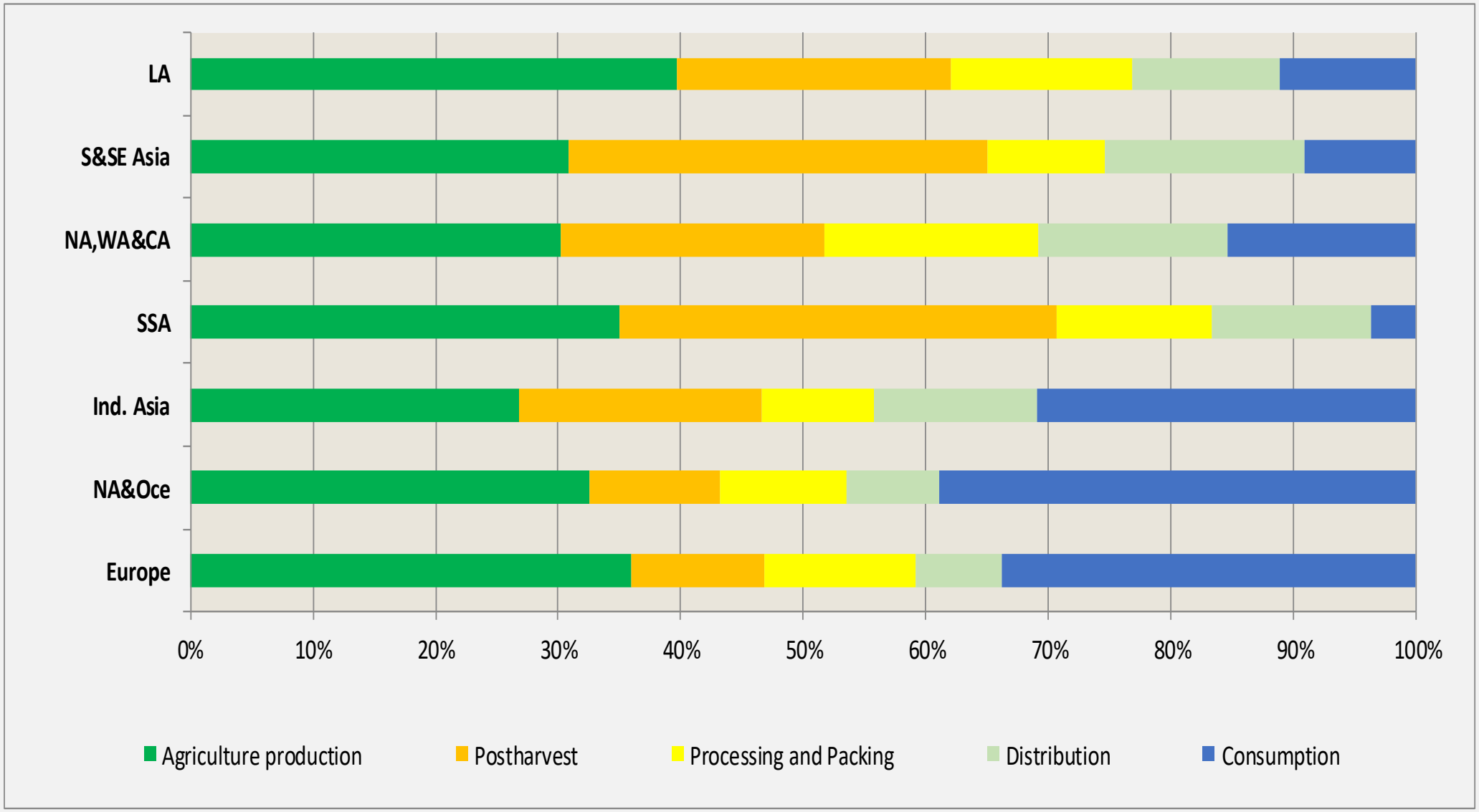
Methodological Problems

- Losses: “normal” versus “abnormal”;
- Year of data selection (mostly in 2009)
- Conversion from weight to energy
- Quality: Conversion loss of the product price to energy
- Edible parts ?

<u>Researchers’ Bias</u>:

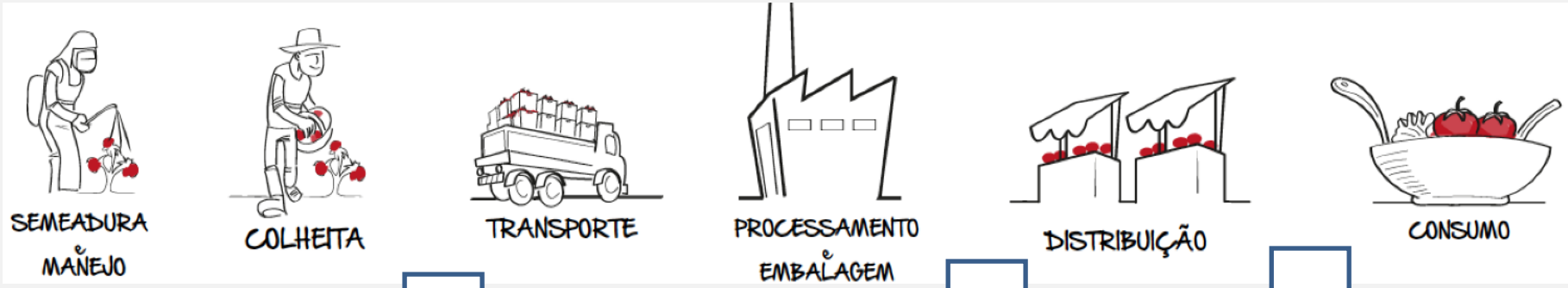
  - Comparison of different production systems
  - Different Food Crops
  - Most references based on case studies
  - Old literature
  - Discard based on weight

FLW by Region and Value Chain Link



Source: Save Food

Traditional Approach on Food Supply Chain

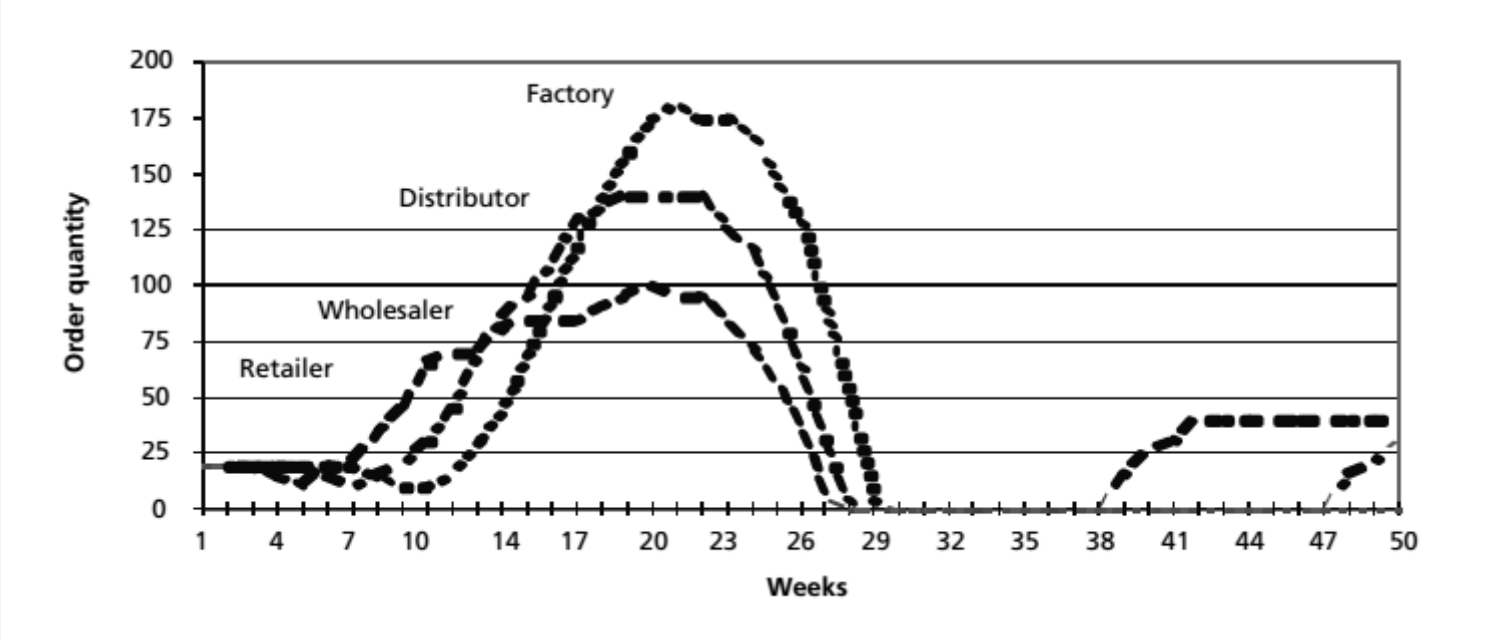


"Beer Distribution Game"

- Starts with small passing stocks
- Local information but no general consumption information
- Purchase orders cannot be canceled
- 2 weeks for processing an order + 2 weeks for delivery

“Beer Distribution Game”

Purchase Orders over 50 weeks



Results:

Oscillation and amplification of purchase orders, high inventories, high costs and losses

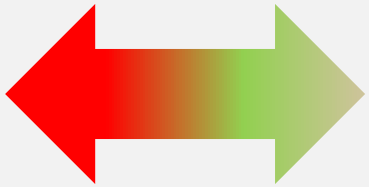
Inventory Decisions by Economic Agents

Inventory will be pushed to:

Previous links in the chain (Upstream)

When you have:

- High perishable products;
- Inaccurate information on demand;
- Demand for specialties.



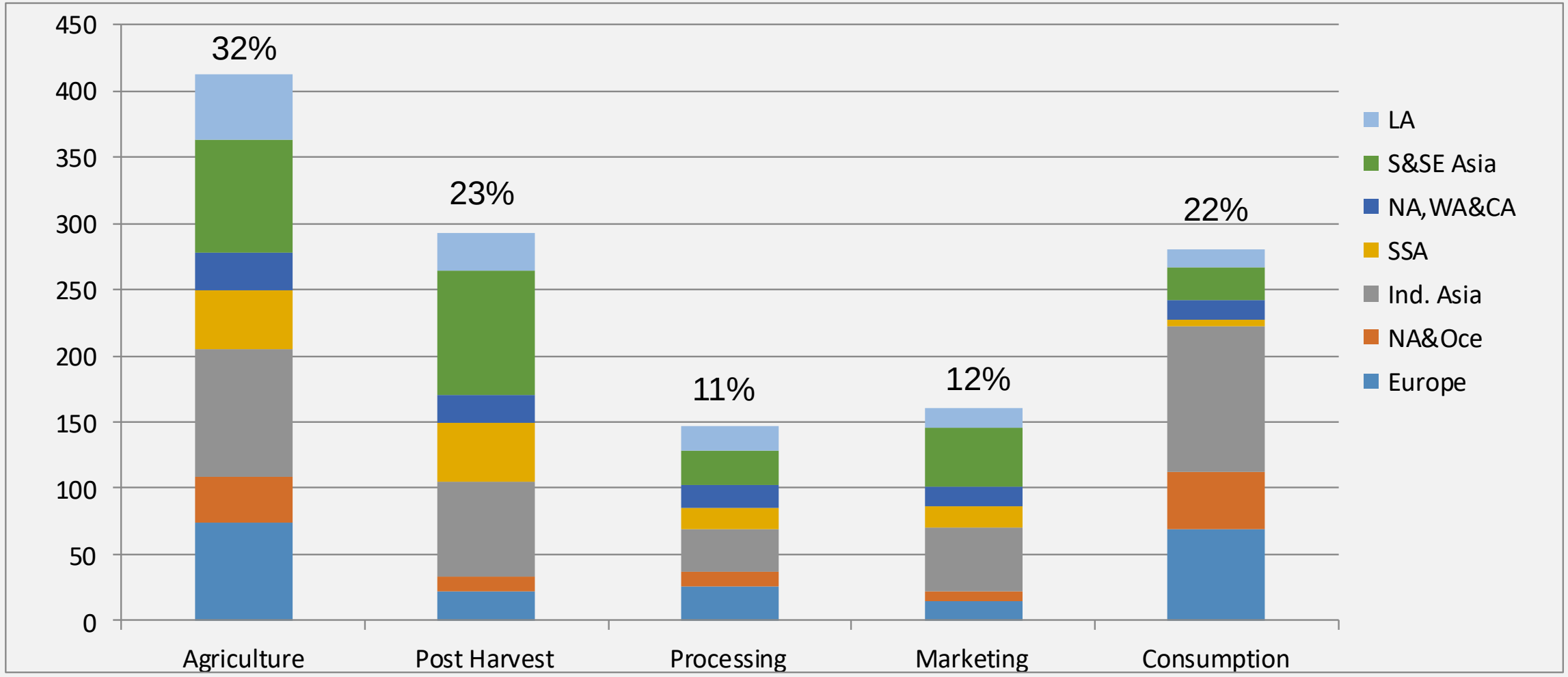
Back links in the chain (Downstream)

When you have:

- Long-term productive process;
- Uncertainties in supply;
- Delays in purchasing decisions;
- Long transportation period.

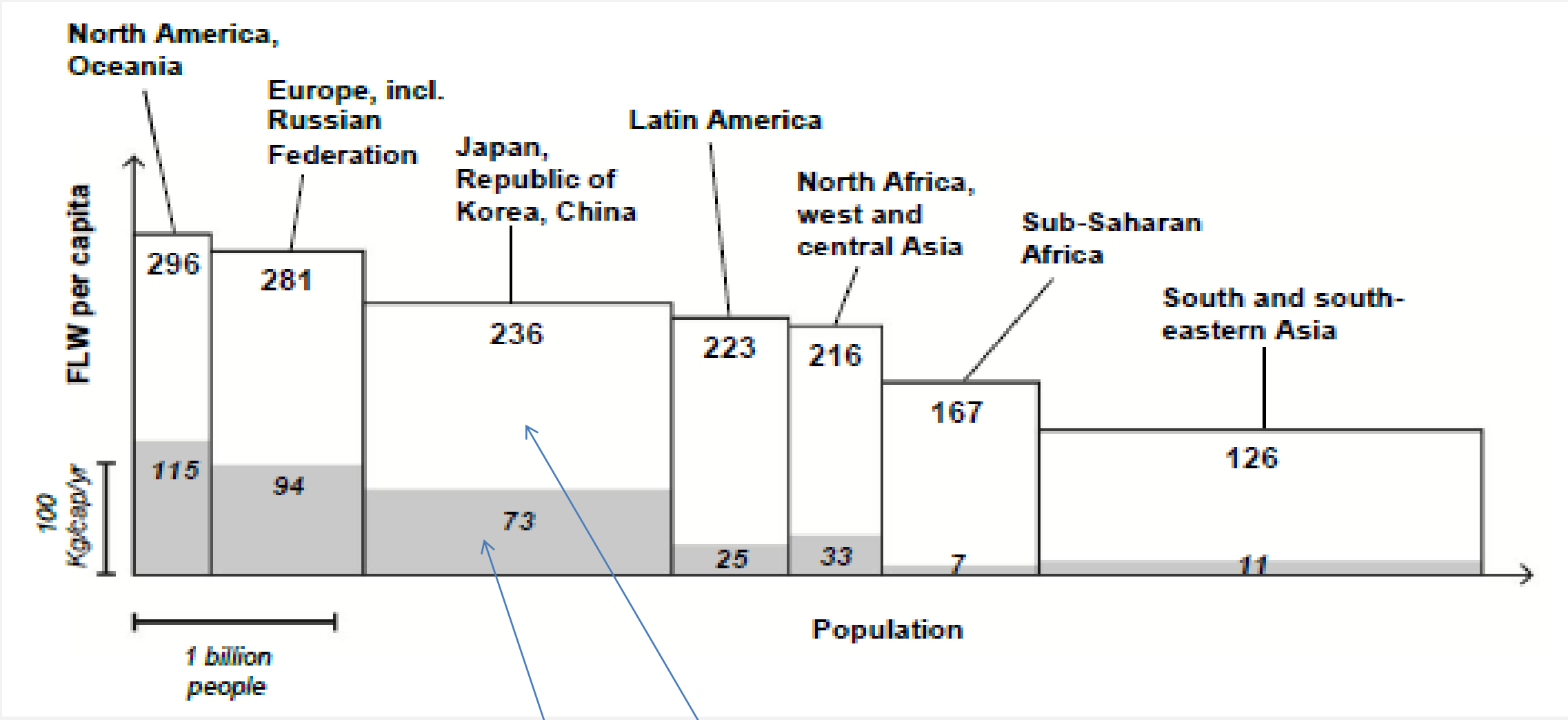
FLW by Chain Link and Region

(millions of tons year)



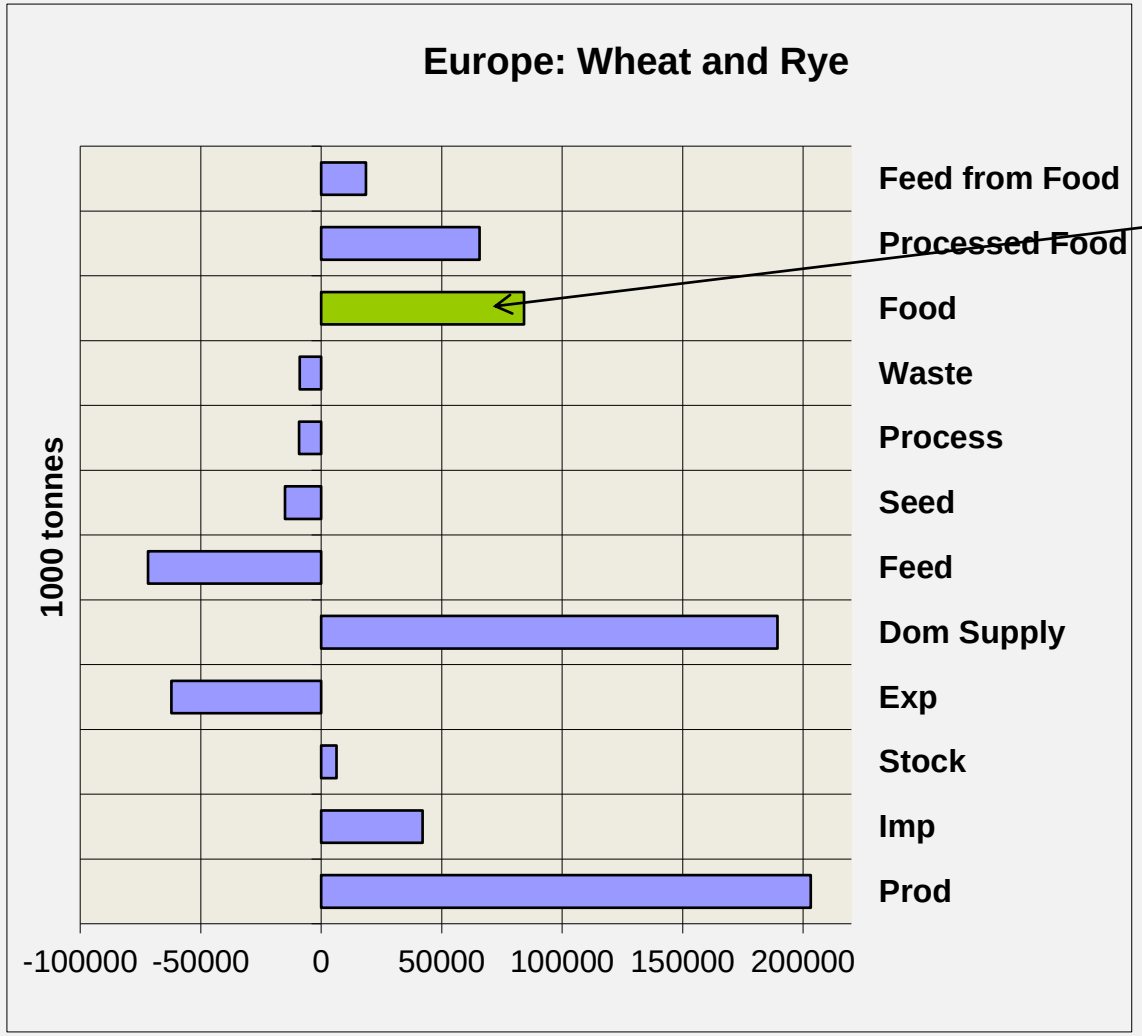
Source: Save Food

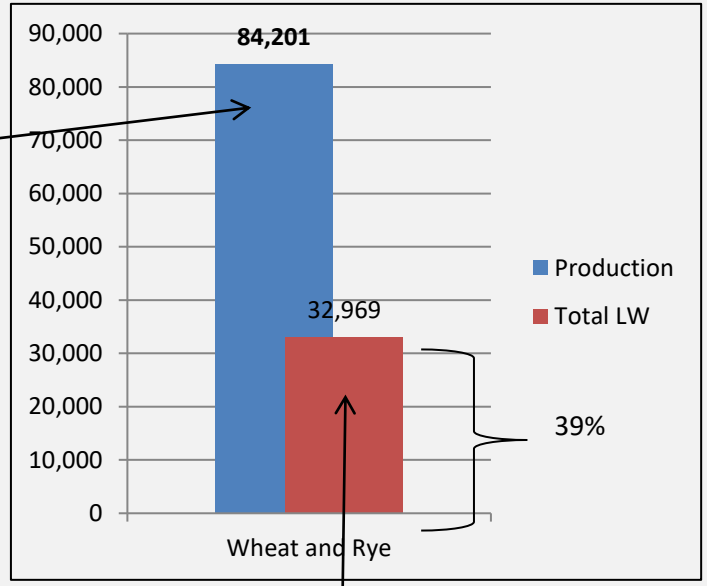
Comparing FLW



Source: HLPE, 2014

Europe: Losses and Waste in the Wheat and Rye Value Chains



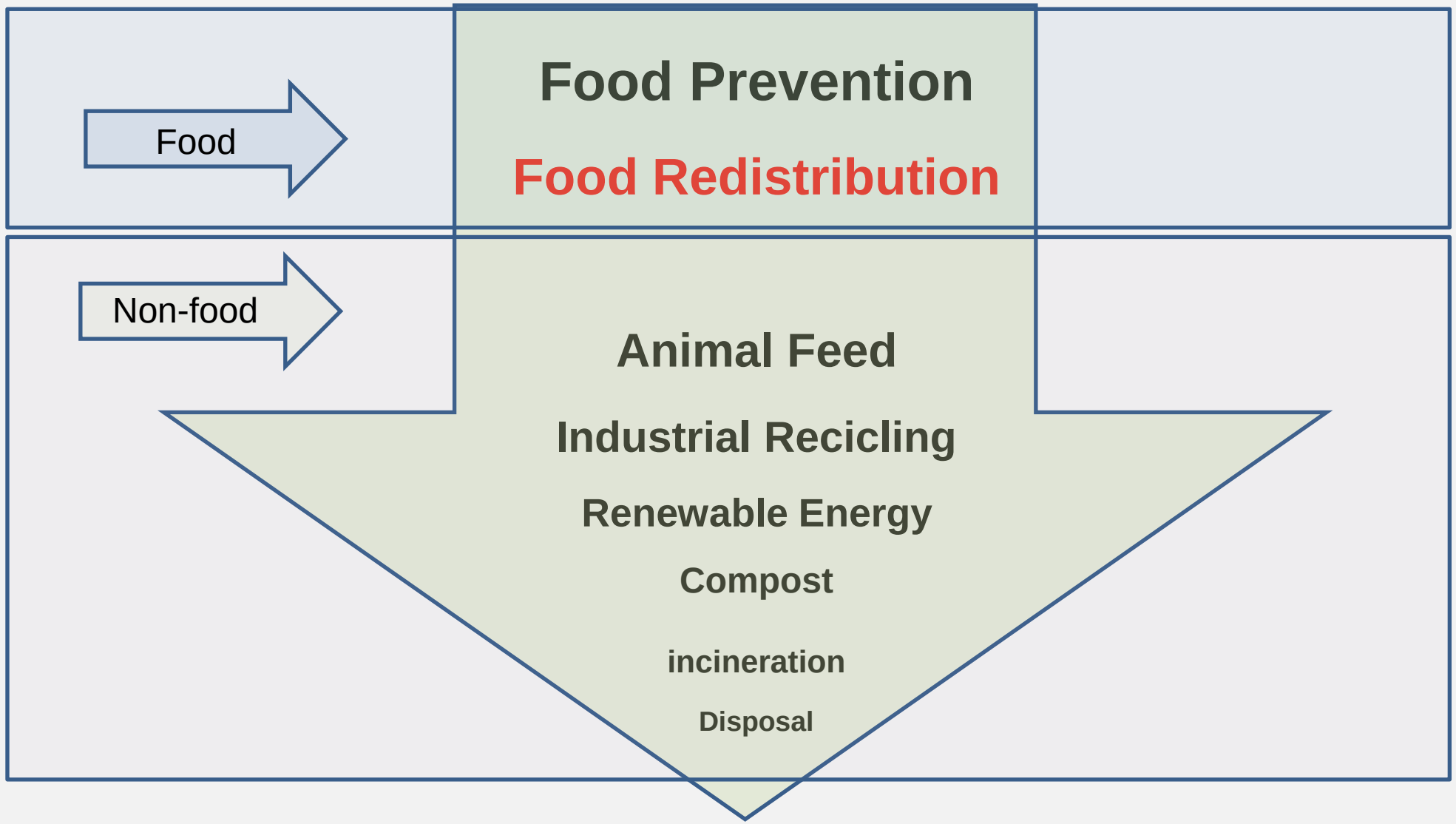


Posharvest	7.329
Milling	421
Industry	7.450
Distribution	1.341
Consumption	16.428

Source: SIK Food Balance Sheets
(Swedish Institute for Food and Biotechnology (SIK))

How to reduce FLW?

A Sustainable Way to Reduce FLW



Food Security & Global FLW

There are linkages between people in need and abundance of food, but no direct and simple solutions

Campaigns against FLW

initiative SAVE FOOD SAVE FOOD BRASIL

FEEDING THE 5000

wrap LOVE FOOD .com hate waste

ZERO

HEALTHY PEOPLE DEPEND ON HEALTHY FOOD SYSTEMS

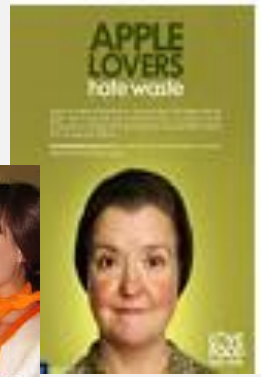
Sustainable Food Systems for Food Security and Nutrition

World Food Day • 16 October 2013

WASTE NO NETWORK

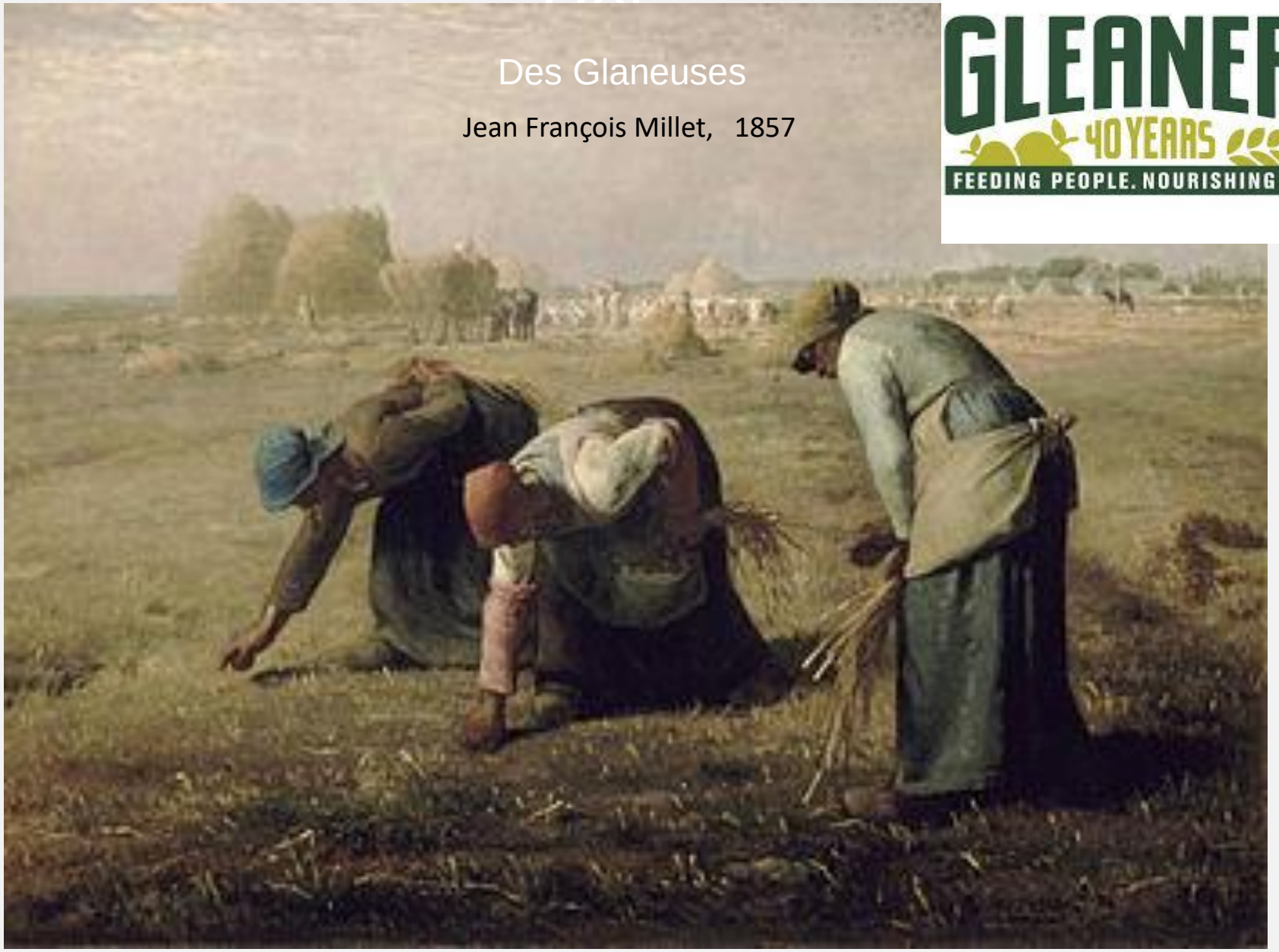
THINK • EAT • SAVE

REDUCE YOUR FOODPRINT



Des Glaneuses

Jean François Millet, 1857



See also: Agnes Varda (2000) Le Gleneur et la Glaneuse
vimeo.com/37089032

Conclusions

- Considering the mean values and the methodological shortcomings of the research we don't know exactly how much are the FLW;
- The collection of food wasted is the best alternative to fight FLW in the short term and is one that does not interfere in the economic system.
- Approaching the productivity gains in different environments (resistant varieties to hydro deficiency) is the more immediate task that might increase productivity itself;
- Rural Technical Assistence, Food Technology and Nutrition, Consumer's Education will reduce FLW and improve the utilization of the food that was lost and wasted before.
- Governments and public authorities can induce these changes by altering relative prices through taxation or subsidy policies of products, financing of new technologies and capacity building.

Thanks