

# **What Do We Know About Food Losses and Waste in the World?**

Walter Belik

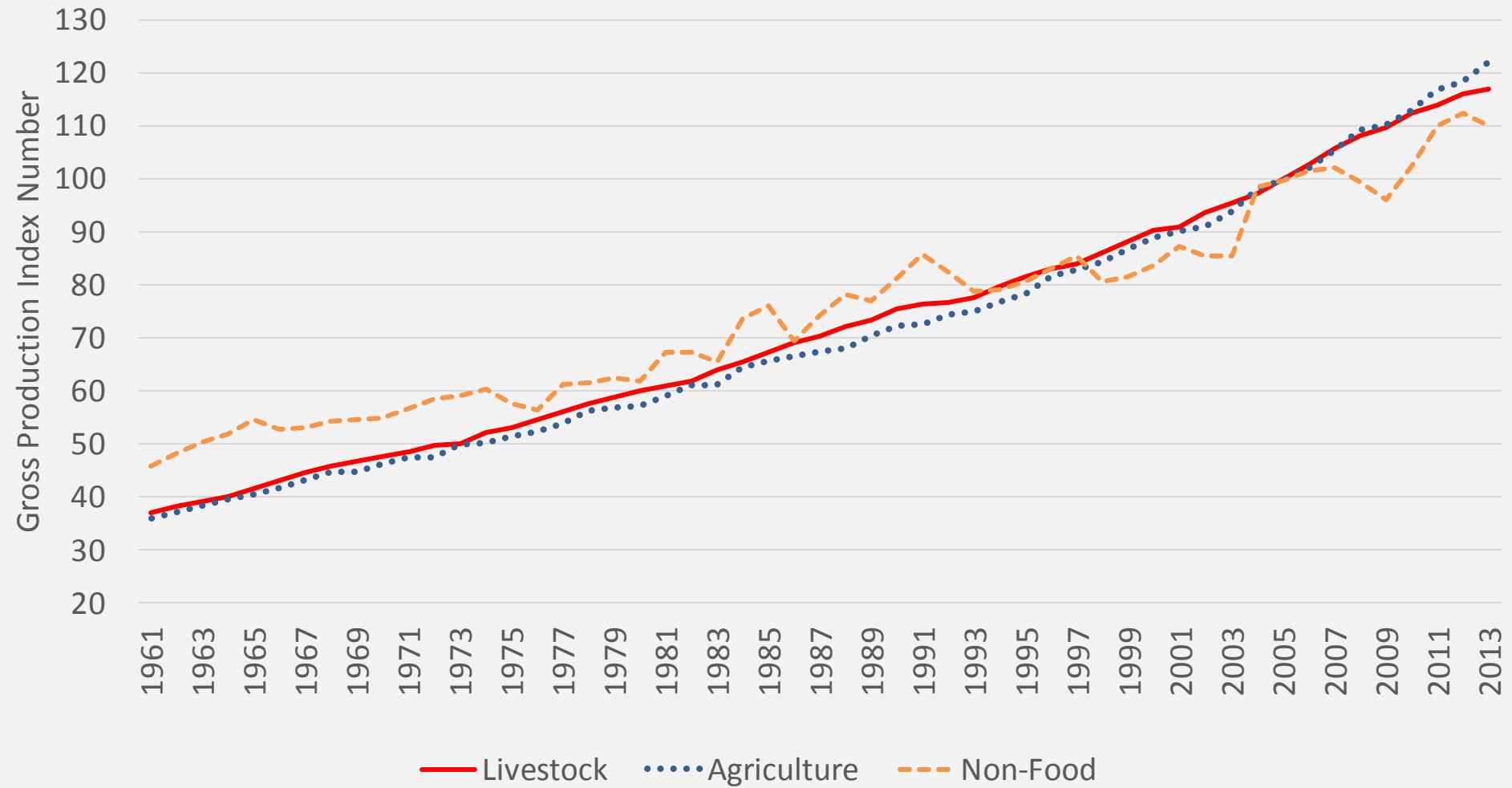
Institute of Economics – Unicamp, Brazil

Washington  
November, 2016

# 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)

World: Production Index (2004-06=100)



Source: FAOSTAT

# Food Supply Forecast

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

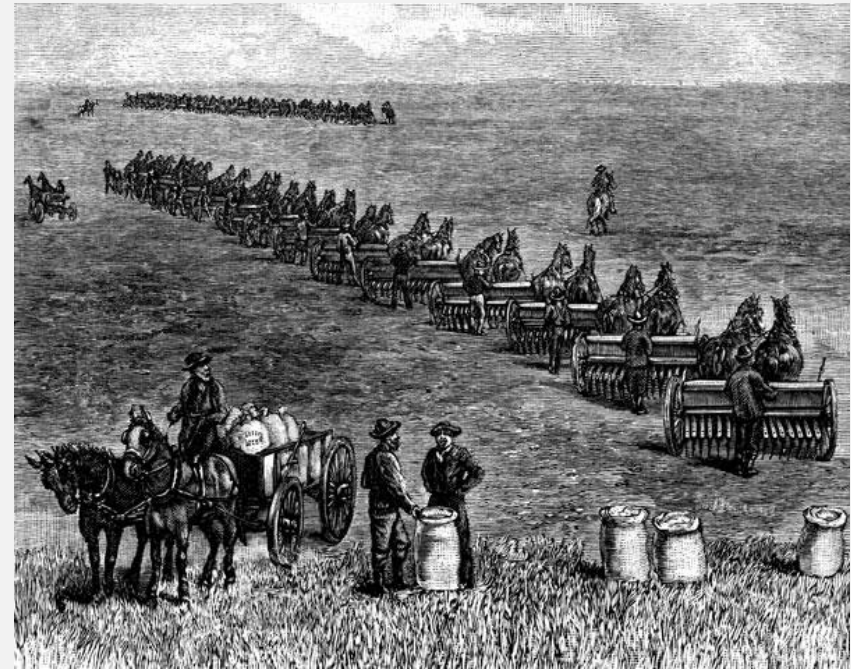
		1993-2020
Wheat	Developed	1,06
	Developing	1,30
	All Countries	1,17
Rice	Developed	0,53
	Developing	1,08
	All Countries	1,05
Maize	Developed	0,84
	Developing	1,36
	All Countries	1,03

Source: Chang & Zepeda, 2003

# 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.”**

# Malthus Fate

Sections The Washington Post

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## This terrifying chart shows we're not growing enough food to feed the world

By Brad Plumer July 1, 2013

It's a question that keeps crop scientists up at night: How are we possibly going to feed the world over the next few decades?

After all, consider what we're up against: The global population is expected to swell from 7 billion today to 9.6 billion by 2050. The rising middle class in China and India is eating more meat than ever. And this is all happening at a time when we're setting aside a greater slice of farmland for biofuels *and* trying not to cut down any more forests (which exacerbates climate change). Doing this in a sustainable manner is tricky.

(Reuters)

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## Population projections

### Don't panic

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A UN study sparks fears of a population explosion. The alarm is misplaced

Sep 24th 2014 | International Like (85)



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"BOOM! Earth's population could hit 12 billion by 2100". That was the headline on [Wired.com](#) which greeted research by Patrick Gerland and others of the United Nations' to 2100. Britain's *Guardian* science, "overturns 20 years

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## Don't Ask How to Feed the 9 Billion

Mark Bittman NOV. 11, 2014

At dinner with a friend the other night, I mentioned that I was giving a talk this week debunking the idea that we need to grow more food on a large scale so we can "feed the nine billion" — the anticipated global population by 2050.

She looked at me, horrified, and said, "But how are you going to produce enough food to feed the hungry?"

I responded like to this question: "But yourself in the nearest place you can

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## An unrecognisable world: Global population of 9 billion will compete for food supplies in 2050

By DAILY MAIL REPORTER  
UPDATED: 12:36 GMT, 22 February 2011



34  
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- Mankind will need to produce as much food in the next 40 years as in the last 8,000

The earth's population could top nine billion by 2050, leading to an 'unrecognisable' world as people compete for scarcer resources a U.S. science conference heard yesterday.

The American Association for the Advancement of Science (AAAS) heard how the world's population's will increase rapidly in poorer countries resulting in the need to produce the same amount of food in a 40 year period as had been produced in the previous 8,000 years.

Population growth is expected to be highest in African and South Asian states, while incomes are also expected to rise in these countries by up to four times.



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## U.N.: World population to reach 8.1B in 2025

AP 6:24 p.m. EDT June 13, 2013

Among the fastest-growing countries is Nigeria, whose population is expected to surpass the U.S. population by mid-century and could rival China as the second-most populous country by century's end.



(Photo: Rafiq Maqbool, AP)

UNITED NATIONS (AP) — The United Nations forecast Thursday that the world's population will increase from 7.2 billion today to 8.1 billion in 2025, with most growth in developing countries and more than half in Africa. By 2050, it will reach 9.6 billion.

India's population is expected to surpass China's around 2028 when both countries will have populations of around 1.45 billion, according to the report on "World Population Prospects." While India's population is forecast to grow to around 1.6 billion and then slowly decline to 1.5 billion in 2100, China's is expected to start decreasing after 2030, possibly falling to 1.1 billion in 2100, it said.

The report found global fertility rates are falling rapidly, though not nearly fast enough to avoid a

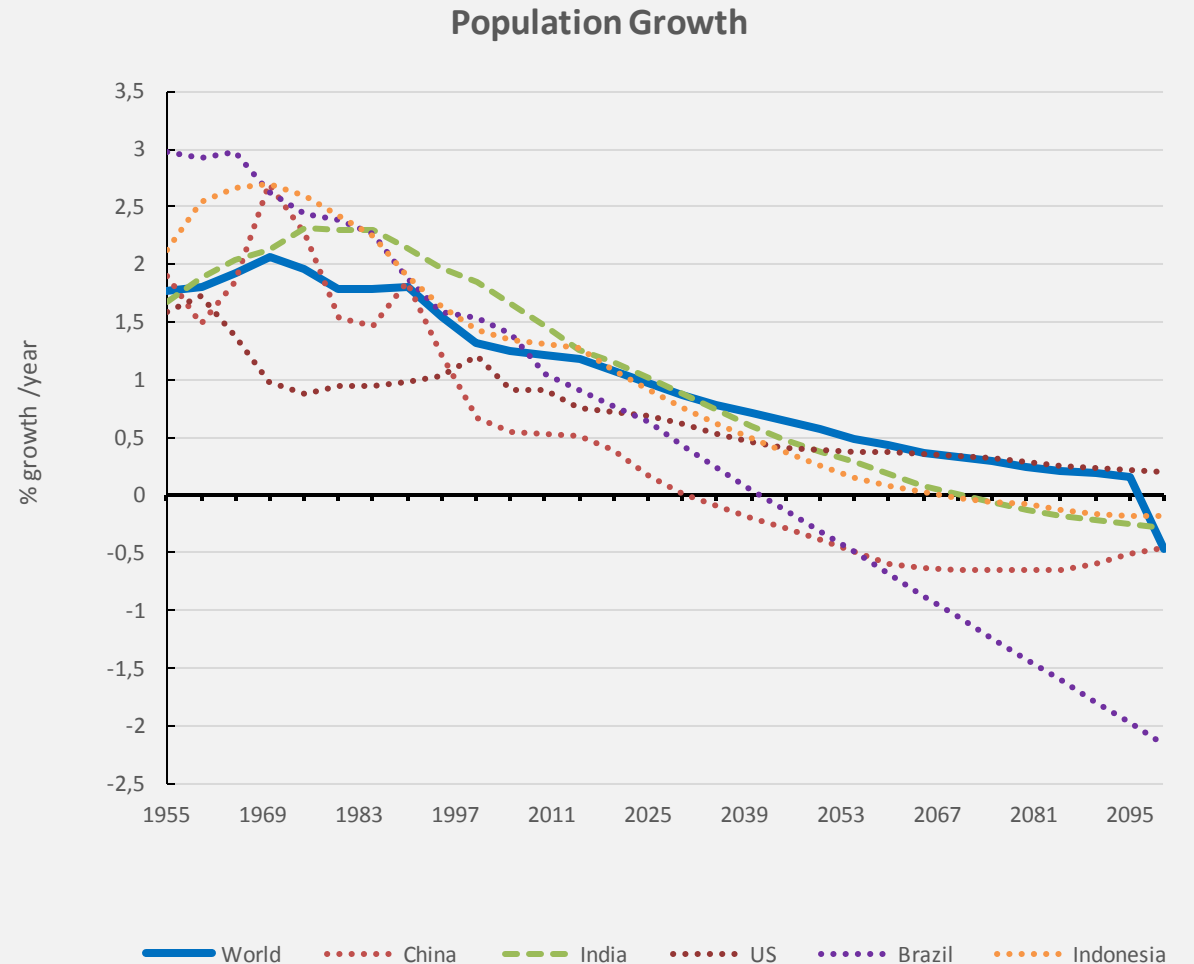
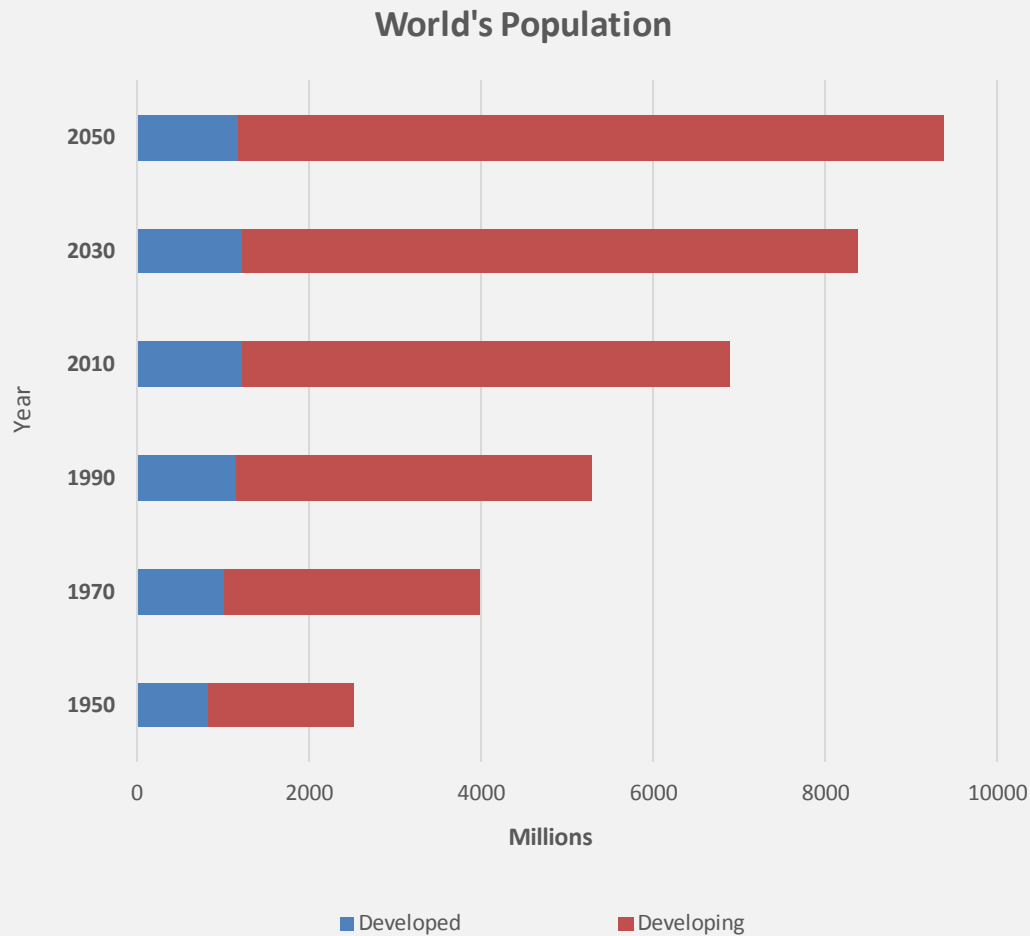
STORY HIGHLIGHTS

- Most growth is predicted in developing countries
- India's population is expected to surpass China's around 2028

POPUL



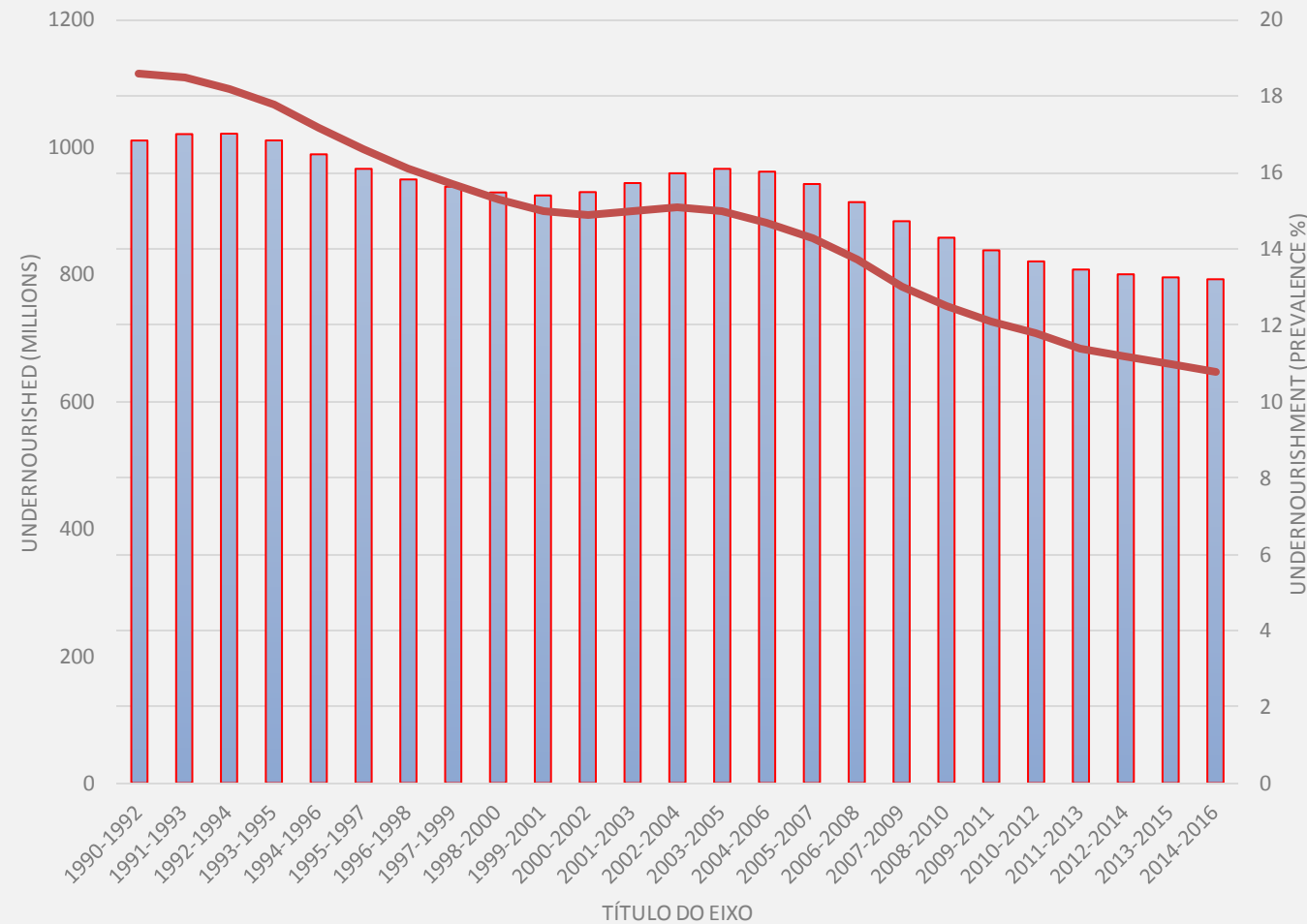
# World's Population Trends



Source: UN Population Division

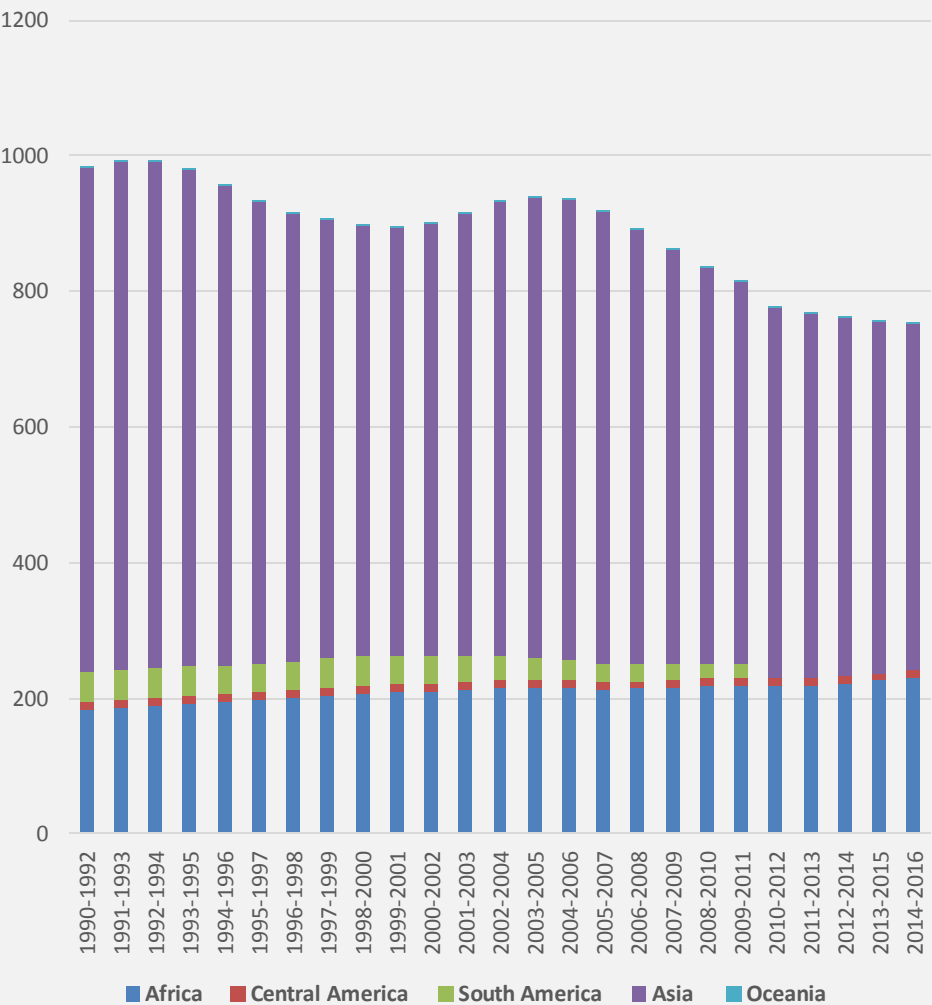
# Undernourishment

World: People Undernourished (Number and Prevalence)



Source: FAOSTAT

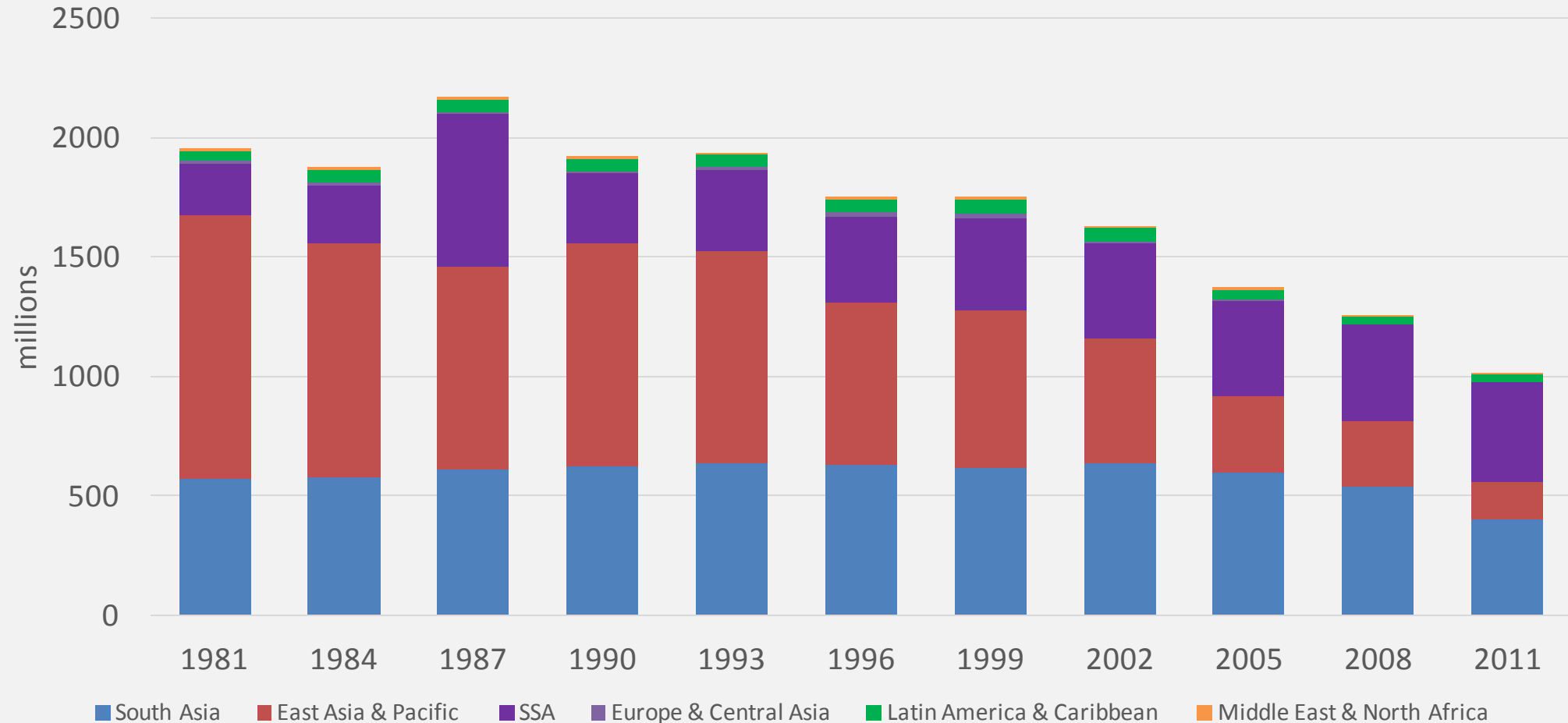
Undernourishment (millions)





# Income Poverty

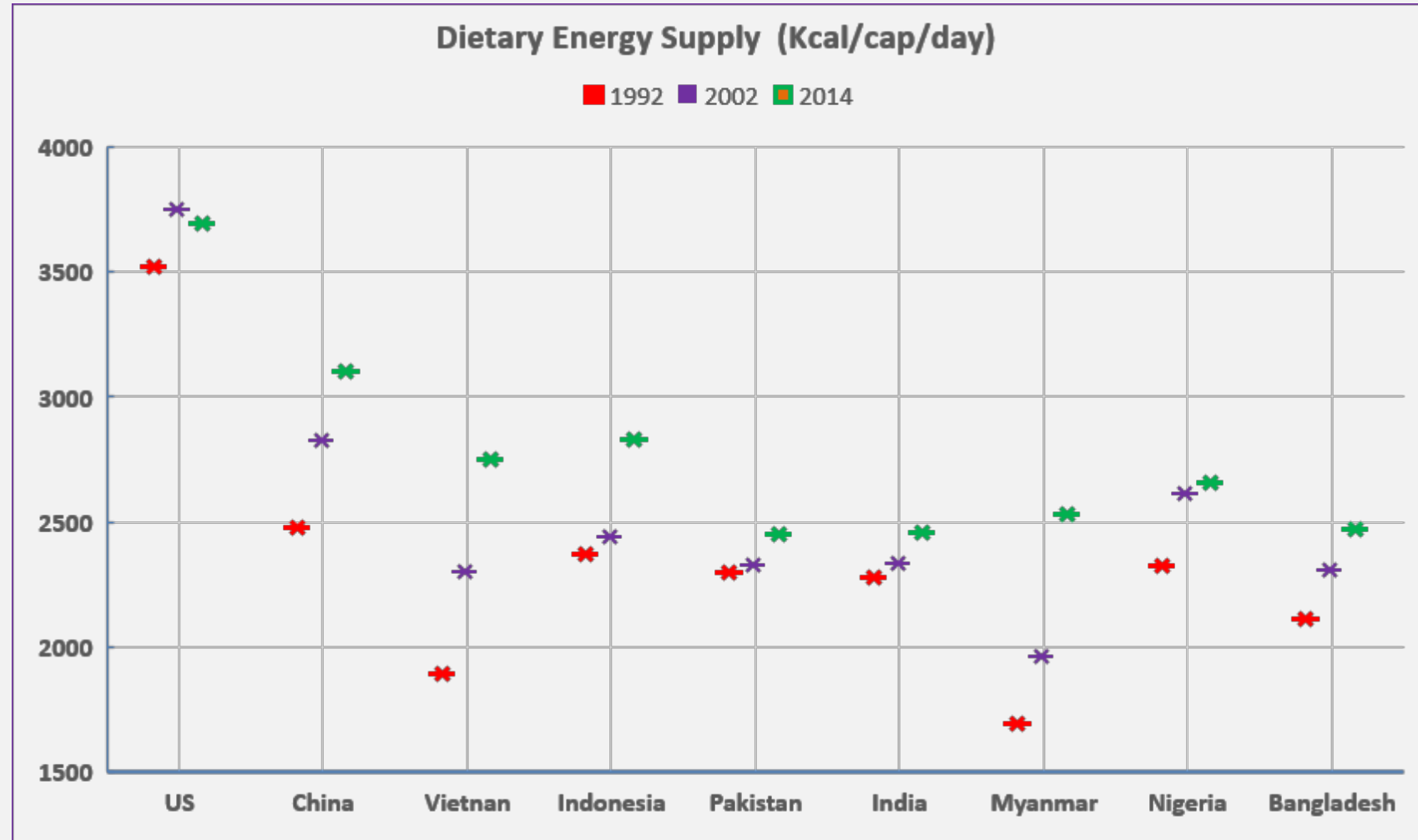
Poverty below US\$1.25 a day PPP



Source: World Bank

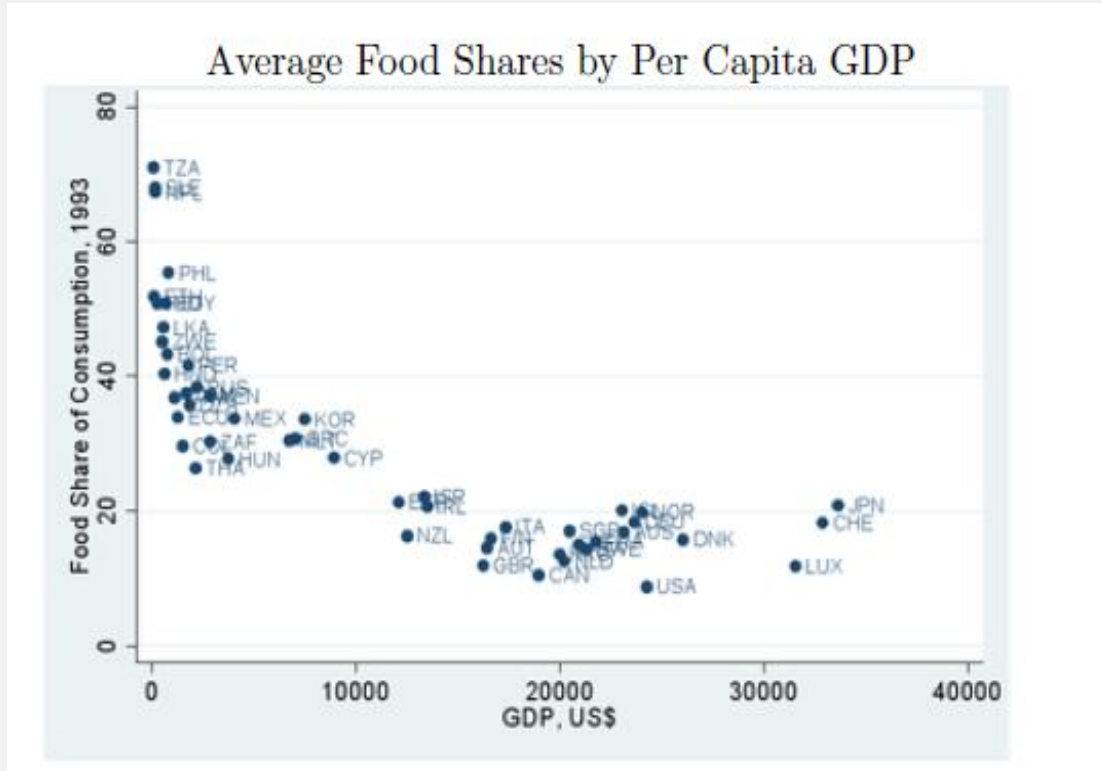
# Economic Development and shift in consumption patterns

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



Source: 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!**

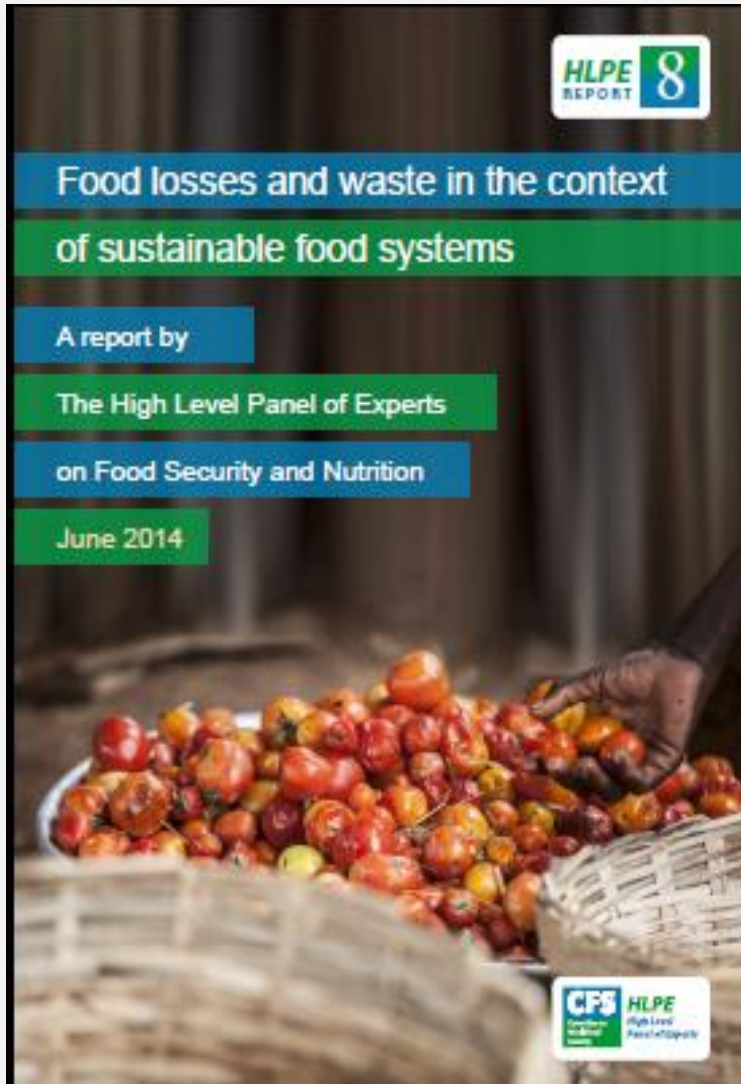
- Dissemination of new technologies (biotechnologies, nanotechnologies, GMO etc.);
- Investment in technology and education;
- Intensification of land use;
- New areas with potential for farming;
- Food 2.0.

# 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 emissions produced by world's waste corresponds to all gas emissions produced in the United States today;
- The annual consumption of clean water to produce what is wasted represent 230 km<sup>3</sup> 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/cfs/cfs-hlpe/en/>

# 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

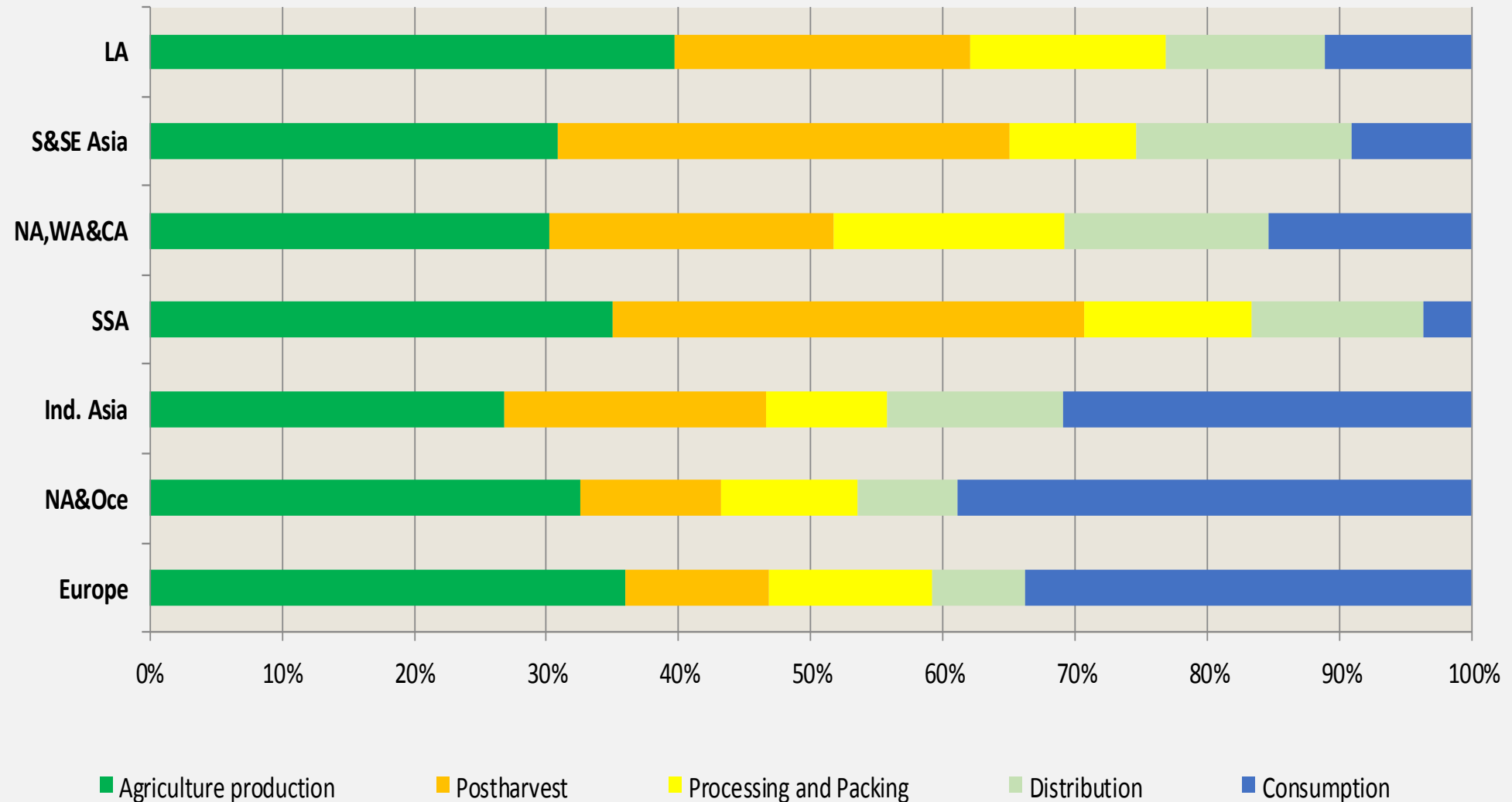
- Losses: “normal” versus “abnormal”;
- Year of data selection (mostly in 2009)
- Conversion from weight to energy
- Quality: Conversion loss of the product price to energy
- Edible parts ?

## Researchers' Bias:

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

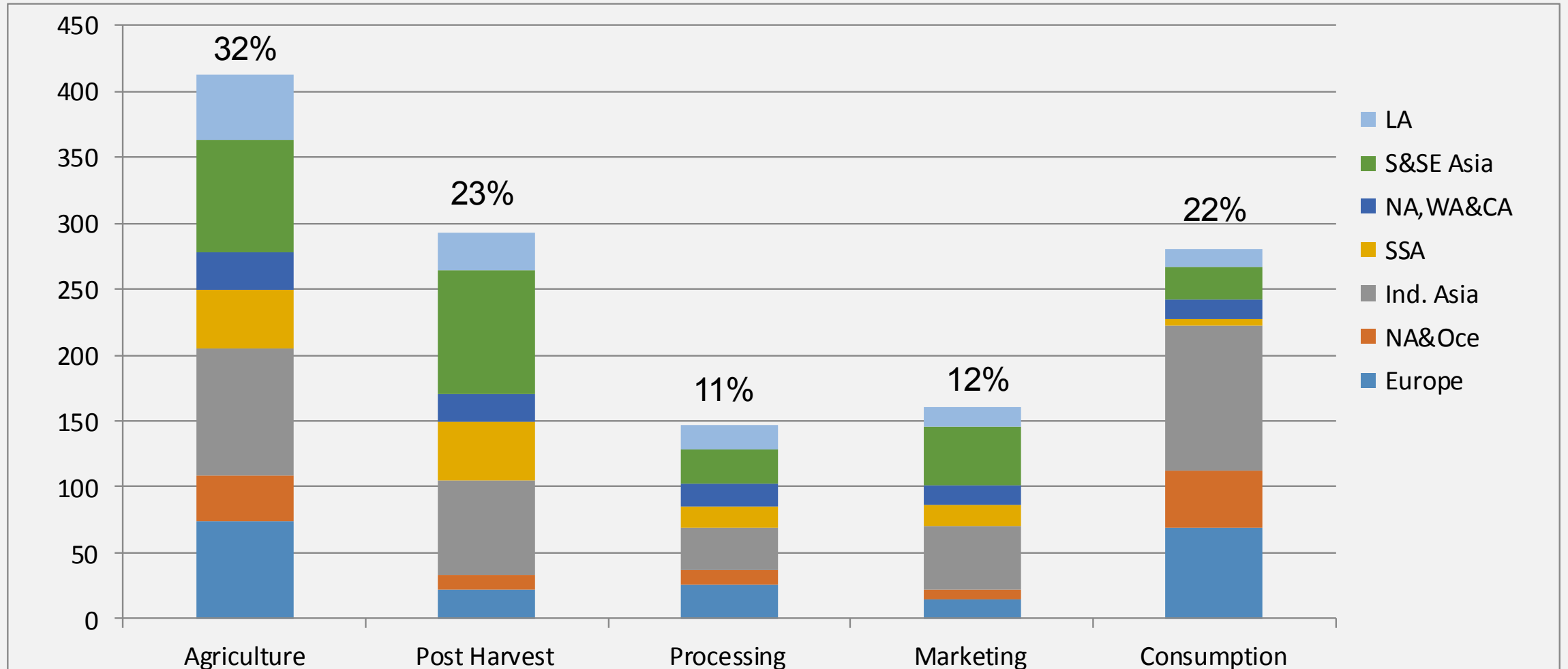


# FLW by Region and Value Chain Link

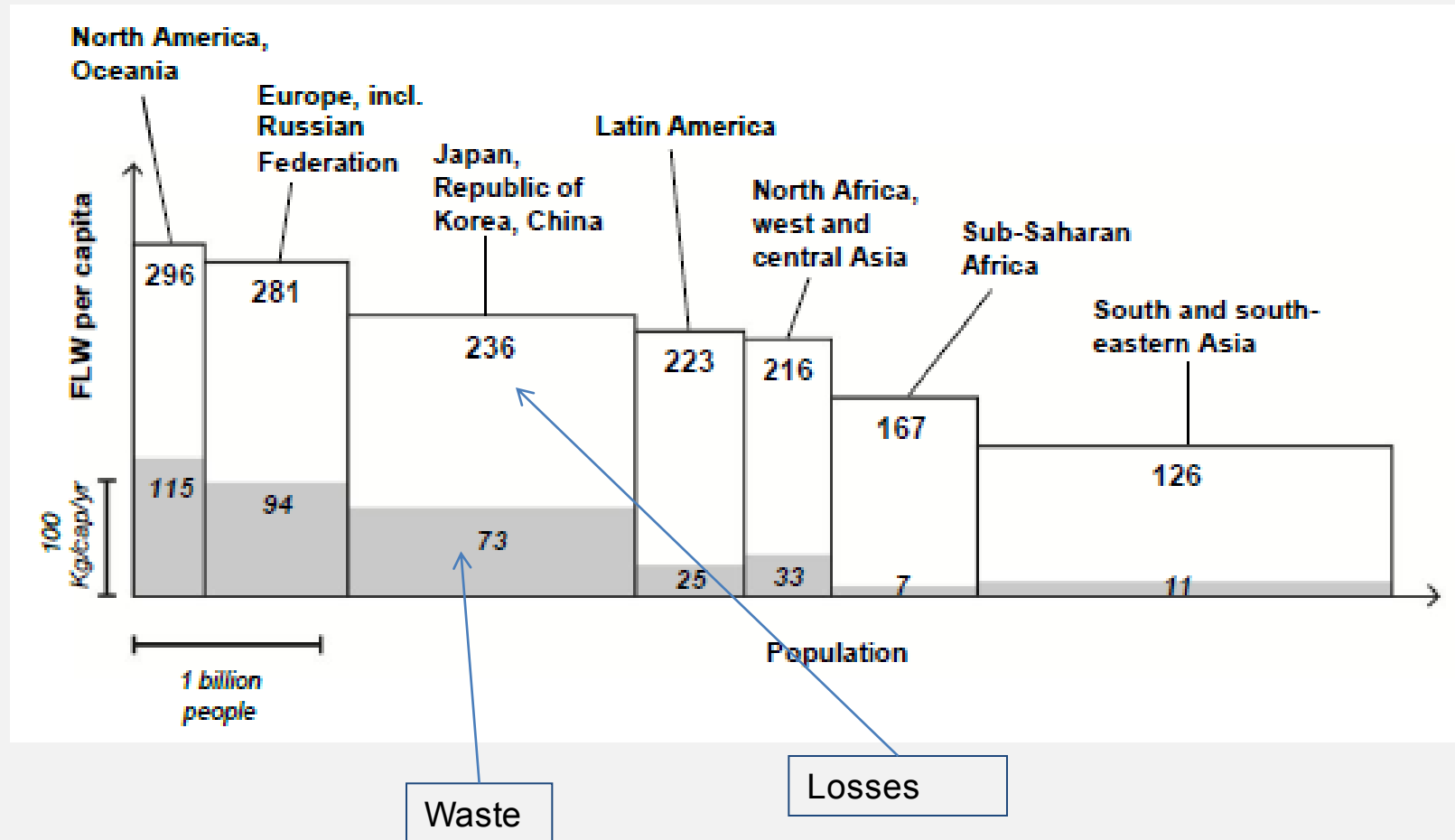


# FLW by Chain Link and Region

(millions of tons year)

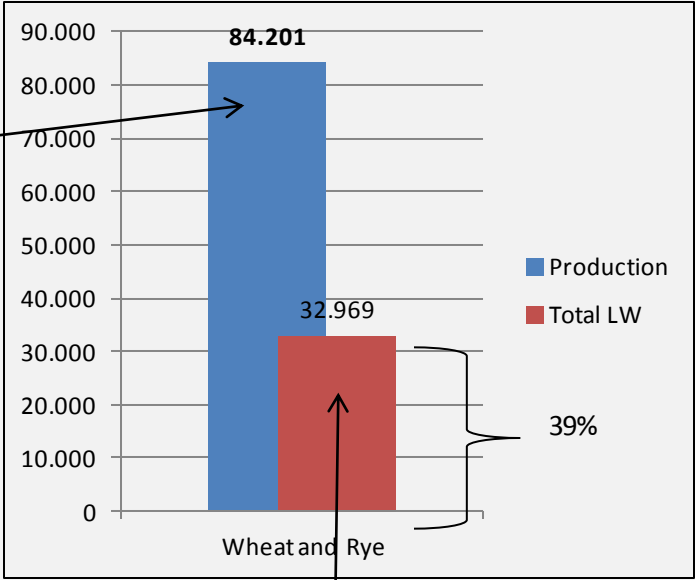
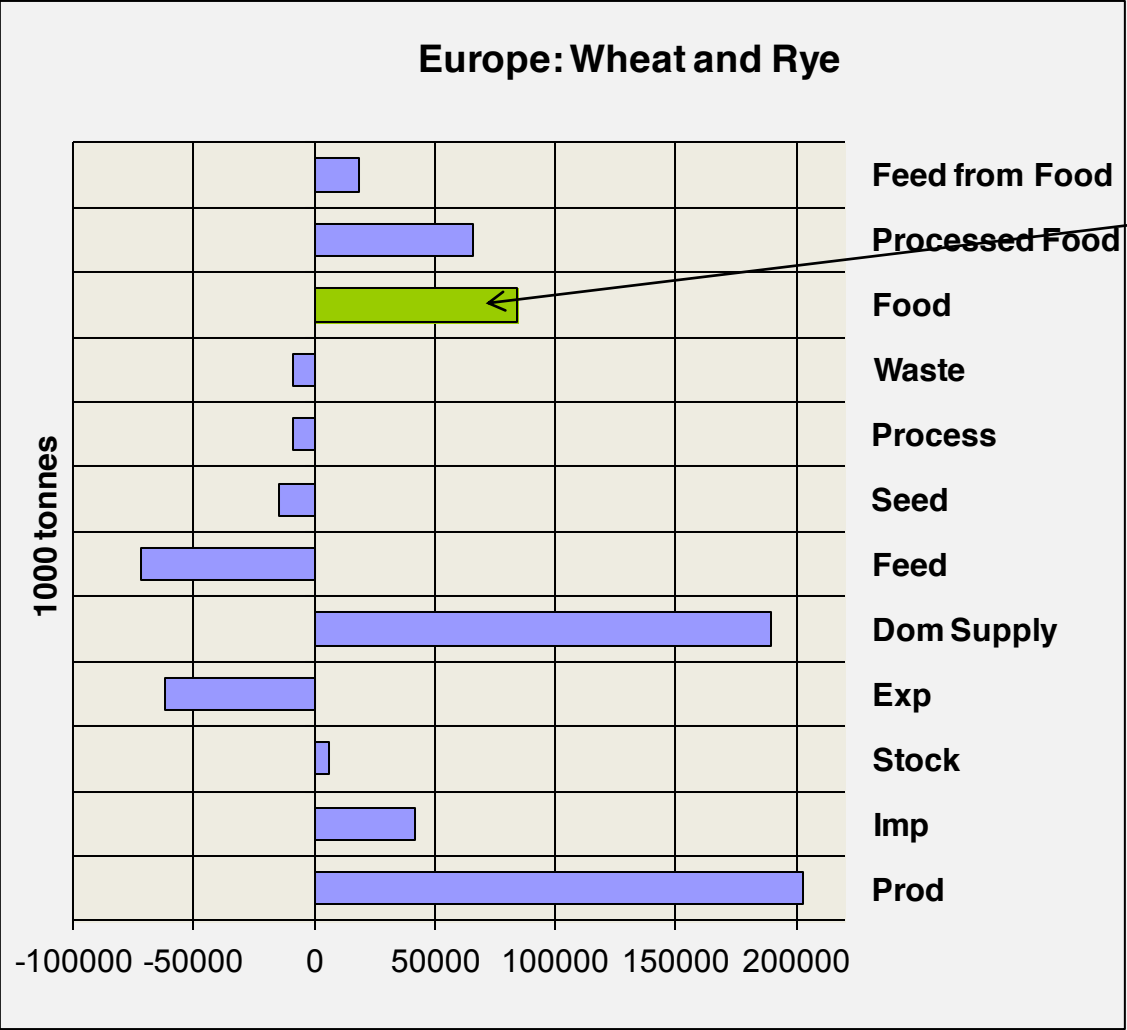


# Comparing FLW



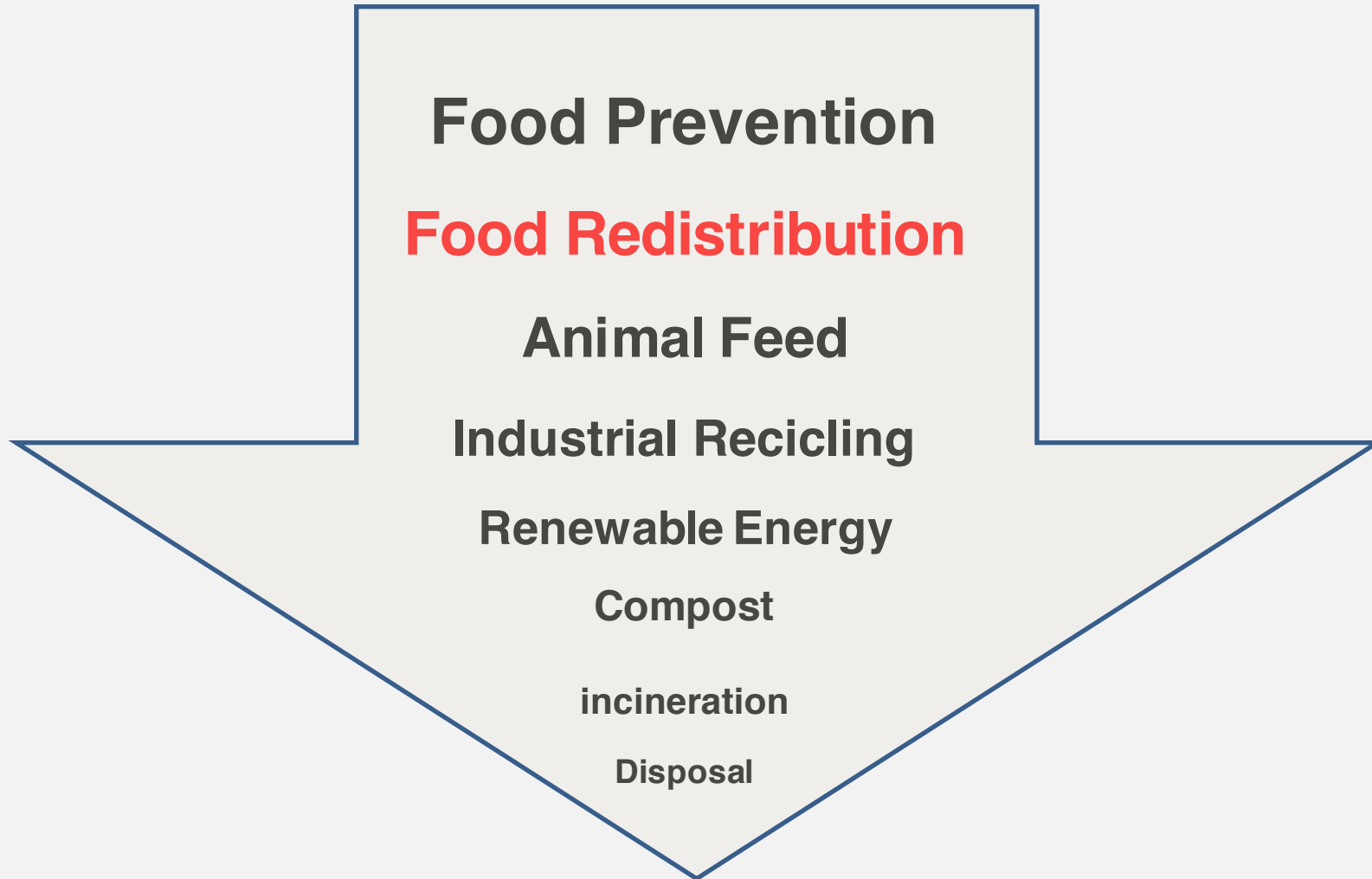
Source: HLPE, 2014

# 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

# How 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



**HEALTHY PEOPLE  
DEPEND ON HEALTHY  
FOOD SYSTEMS**

Sustainable Food Systems for Food Security and Nutrition  
World Food Day • 16 October 2013



# The Gleaners

Jean François Millet  
1857



Varda Agnes (2000) Le Glaneur et la Glaneuse  
[vimeo.com/37089032](https://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 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 Assistance, Food Technology and Nutrition, Consumer's Education will reduce losses and improve the utilization of the food that was lost and wasted before.
- Combat waste is to increase food availability by reducing the pressure on natural resources and the emission of greenhouse effect gases;

# Conclusions

- 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.

# Obrigado

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