

**THE FUTURE OF AGRICULTURE BETWEEN  
GLOBALIZATION AND LOCAL MARKETS**

**53° SIDEA CONGRES**

**San Michele all'Adige/Bolzano 22-24 Settembre 2016**

**Food production and consumption:  
from global trends to individual behaviours**

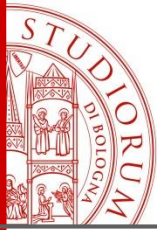
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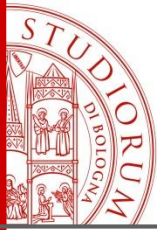


# **MACROECONOMIC FRAMEWORK**

**The forces governing** the global transformation that started in the early 1990s **are changing the world** ever more strongly and rapidly. The world is becoming steadily **more complex, more challenging** and also **more insecure**. What once seemed a linear progression towards greater democracy, more open markets and peaceful international cooperation appears to be weakening.

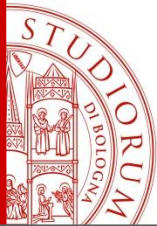
**Three main revolutions** are characterizing this period and they will affect the strategic challenges that World will have to address:

- an economic and technological revolution
- a social and democratic revolution
- a geopolitical revolution



# MACROECONOMIC FRAMEWORK

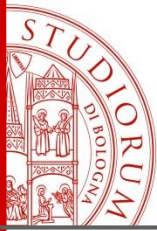
**Economic and technological revolution:** the multiplication of digital tools available and affordable to large part of population, everywhere and for virtually any purpose, will profoundly change the way economies and societies are functioning. The new 'Knowledge society' presents huge opportunities, in terms of productivity. But it can also bring major societal disruptions (eg. rise of unemployment in low skill jobs; an increase of inequalities within societies etc.).



# **MACROECONOMIC FRAMEWORK**

**Social and democratic revolution:** more empowered and better connected individuals will be more creative, more dynamic, less wedded to life-time jobs, but also more demanding and critical.

**Geopolitical revolution:** Asia's rise looks set to continue. Together with the emergence of other powers in Latin America and possibly Africa, this will lead to an increasingly multi-polar world. Globalisation will no longer be driven and dominated only by "Western countries". This change of paradigm may well bring about a more confrontational mode between key actors.

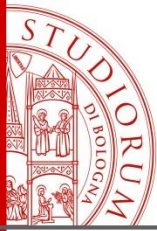


# **MACROECONOMIC FRAMEWORK**

This macroeconomic framework inevitably influence the way agriculture and food production develops.

Agriculture, fishery and forestry tend to reduce their relative size in the economy as countries experience economic growth and income increases, their degree of integration with other economic activities tends to increase. Primary production activities become less isolated, and more exposed to the opportunities and the vagaries generated in other sectors, from technology, to services, to price volatility.

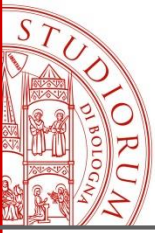
What are the global trends that affects agriculture and food sector?



# MAJOR GLOBAL FOOD TRENDS

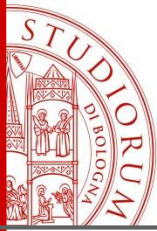
In accordance to FAO and UNDP the 10 major Global Trends are:

- Food demand is increasing while patterns of food consumption are changing towards more livestock products, vegetable oils and sugar
- Growing competition and diminishing quality and quantity of natural resources and loss of ecosystem services
- Energy security and scarcity – the landscape and trends
- Food price increases and price volatility
- Changing agrarian structures, agro-industrialization and the globalization of food production



# MAJOR GLOBAL FOOD TRENDS

- Changing patterns in agricultural trade and the evolution of trade policies
- A growing impact of climate change in agriculture
- Science and technology as a main source of agricultural productivity and production increases is progressively becoming a private good and the processes are dominated by the private sector
- Evolving development environment: increased recognition of the centrality of governance and a commitment to country-led development processes
- Increased vulnerability due to natural and man-made disasters and crisis

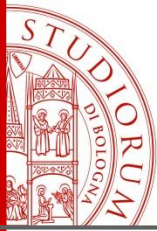


# **Key determinants of consumers' choices** **in relation to the global food trends**

The individual food choice are affected by a number of factors. These have been divided into 6 key determinants:

1. Biological determinants such as hunger, appetite, and taste
2. Economic determinants such as cost and income
3. Physical determinants such as access, education, skills and time
4. Social determinants such as class, culture, and social context
5. Psychological determinants such as mood, stress and guilt
6. Attitudes, beliefs and knowledge about food.





# **Key determinants of consumers' choices** **in relation to the global food trends**

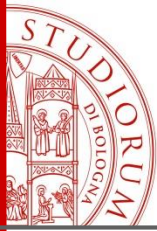
## **1. Biological determinants such as hunger, appetite, and taste**

Humans need energy and nutrients in order to survive and will respond to feelings of hunger and satiety.

Palatability, taste, smell, texture and appearance of a food, increase as the pleasure an individual experiences from eating a food increases. For example, some foods have a high sensory appeal and have higher palatability meaning that the food may be consumed for pleasure rather than as a source of energy and nutrients.

## **2. Economic determinants such as cost and income**

The cost of food and the ability of an individual to afford specific foods (related to income) are primary determinants of food choice. Low-income groups are usually reported to consume unbalanced diets. Increasing the amount of available income for food choices, however, does not necessarily mean that individuals will consume a more balanced and healthy diet.



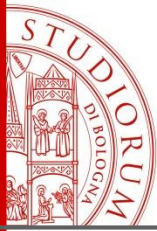
# **Key determinants of consumers' choices** **in relation to the global food trends**

## **3. Physical determinants such as access, education, skills and time**

Accessibility and the availability of foods in the markets can influence food choice, but improving access does not necessarily mean that individuals will change their food choice.

Individuals that are educated and knowledgeable about 'healthy eating' are more likely to opt for healthy dietary choices. This, however, depends on whether the individual is able to apply their knowledge.

Time constraints can affect food choices.



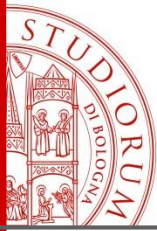
# **Key determinants of consumers' choices** **in relation to the global food trends**

## **4. Social determinants such as class, culture, and social context**

There are differences in food choices in different social classes. It is thought that higher socioeconomic groups have healthier diets because they may have higher educational levels and may be more health conscious and have healthier lifestyles.

Cultural influences impact on diet choices and food preparation – evidence has shown that traditions, beliefs and values are among the main factors influencing preference, mode of food preparation, and nutritional status.

Social context includes both the people who have an impact on an individual's eating behaviour and the setting in which an individual consumes their food.



# **Key determinants of consumers' choices** **in relation to the global food trends**

## **5. Psychological determinants such as mood, stress and guilt**

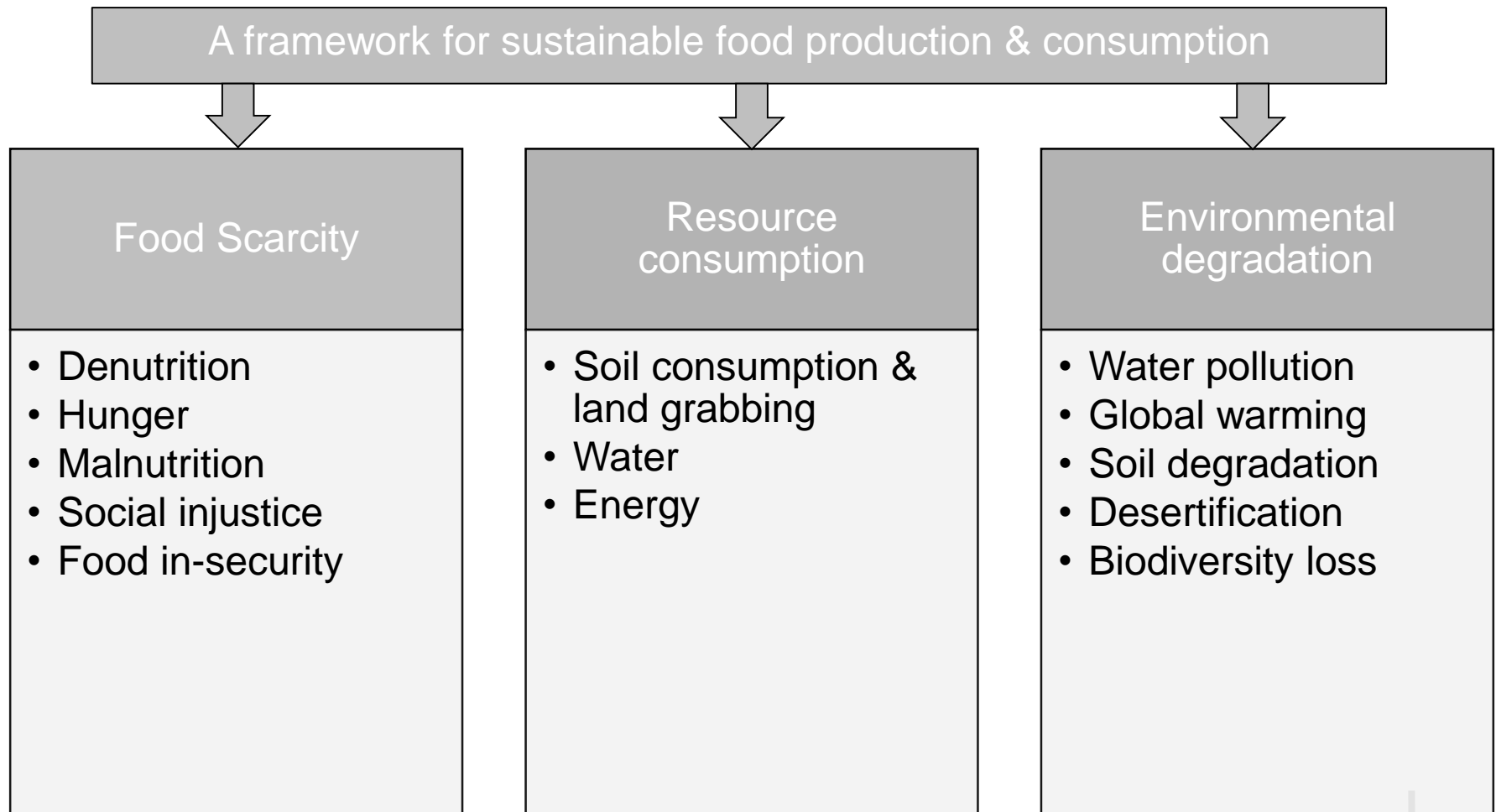
Stress and mood can trigger change in human food behaviours that affect health

## **6. Attitudes, beliefs and knowledge about food.**

Consumer attitudes and beliefs vary by individual, within groups of a population and across countries. The Pan-European Survey of Consumer Attitudes to Food, Nutrition and Health found that the top five influences on food choice were 'quality/freshness' (74%), 'price' (43%), 'taste' (38%), 'trying to eat healthy' (32%) and 'what my family wants to eat' (29%).



# **GLOBAL TRENDS AND CONSUMERS' CHOICES UNDER A SUSTAINABILITY FRAMEWORK**





# **SUSTAINABLE DEVELOPMENT** **GOALS POST 2015**

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On September 25th 2015, countries adopted a set of goals to end poverty, protect the planet, and ensure prosperity for all as part of a new sustainable development agenda. **Each goal has specific targets to be achieved over the next 15 years.**

## **SD Goal 12: Ensure sustainable consumption and production patterns**

Sustainable consumption and production is about promoting resource and energy efficiency, sustainable infrastructure, and providing access to basic services, green and decent jobs and a better quality of life for all.

### **SD Goal 12.3 focuses on food waste**

“By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses.”

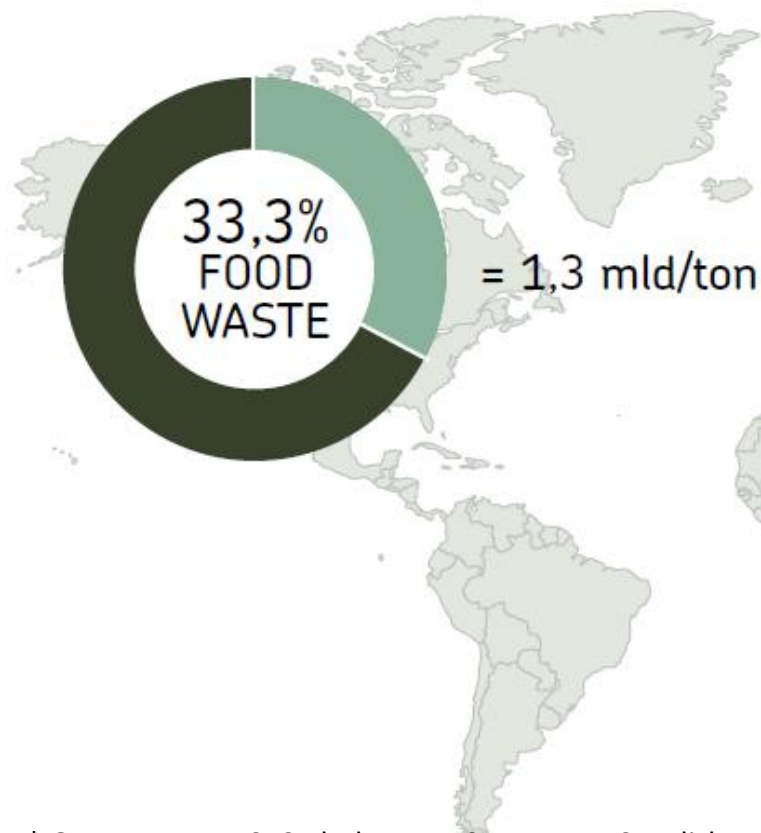
# FOOD WASTE: A DEFINITION



“Food waste is any food, and inedible parts of food, removed from the food supply chain to be recovered or disposed (including composted, crops ploughed in/not harvested, anaerobic digestion, bio-energy production, co-generation, incineration, disposal to sewer, landfill or discarded to sea).”



# FOOD WASTE: A GLOBAL CONCERN



The estimate of the global food waste and food losses along the whole supply chain is strongly influenced by the limited availability and high heterogeneity of data at country and regional level. According to FAO\* roughly one-third of food produced for human consumption is lost or wasted globally, which amounts to about 1.3 billion tons per year.

\* Gustavsson, J., C. Cederberg, U. Sonesson e Swedish Institute for Food and Biotechnology (SIKGothenburg) (2011), *Global Food Losses and Food Waste*, FAO.



# FOOD WASTE: A EUROPEAN CONCERN

**According to FUSIONS the EU-28 produces about 88 Mtonnes of food waste, amounting to an estimated 143 billion euros**



The FUSIONS dataset estimate is aligned to 2012 and it includes both edible food and inedible parts associated with food, as according to FUSIONS definitional framework. The sectors contributing the most to food waste are **households** ( $47 \pm 4$  million tonnes) and **processing** ( $17 \pm 13$  million tonnes). **These two sectors account for 72% of EU food waste.** The food service sector comes third ( $10.5 \pm 1.5$  million tonnes), followed by the production sector ( $9.1 \pm 1.5$  million tonnes) and wholesale and retail ( $4.6 \pm 1.2$  million tonnes).

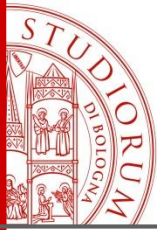
# FOOD WASTE: A EUROPEAN CONCERN

The total estimate equates to **173 kilograms of food waste per person** in the EU-28. As the total amounts of food produced in EU for 2011 were around 865 kg/person, this would mean that in total **20 % of the total food produced is wasted**. There is a moderately high uncertainty around this estimate of food waste amounts; the approximate 95% confidence interval is  $\pm 14$  Mtonnes (or  $\pm 16\%$ ). Given that the approach is new the results for in particular the production and processing sectors are likely to change when more studies become available. Moreover, according to FUSIONS calculations, the generated food waste costs the EU-28 **around 143 billion euros**.

The larger part  
of food waste is  
generated at  
the household  
level



Sector	Food waste (million tonnes) with 95% CI*	Food waste (kg per person) with 95% CI*
Primary production	9.1 $\pm$ 1.5	18 $\pm$ 3
Processing	16.9 $\pm$ 12.7	33 $\pm$ 25
Wholesale and retail	4.6 $\pm$ 1.2	9 $\pm$ 2
Food service	10.5 $\pm$ 1.5	21 $\pm$ 3
Households	46.5 $\pm$ 4.4	92 $\pm$ 9
Total food waste	87.6 $\pm$ 13.7	173 $\pm$ 27



# FOOD WASTE: CURRENT RESEARCH

## *Food waste: the complexity of the phenomenon*

FUSIONS identified over 240 drivers - organized in three different categories: technological, institutional, social - that can lead to the generation of food waste in the different stages of the FSC. The identified drivers suggest a wide and multifaceted problem, which involves deeply and in very diversified ways all the segments of the food supply chain, from primary production in farms, up to final consumption in food services and households.

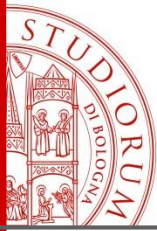
**EU project  
FUSIONS**

Influence of the **economic context**: different types of relationships between “individual income – household FW behavior” (poverty influences the raise of waste of high value added food products)

**British  
Food  
Journal**

Consumers **limited self-perception** of own FW behavior (NIMBin “Not In My Bin”)

**forthcoming**



# FOOD WASTE: CURRENT RESEARCH

## *Food waste: consumer behaviors*

### **Heterogeneity** of household FW behaviors:

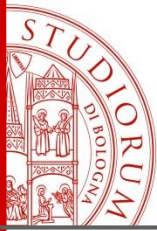
- FW frequency per consumer typology and foodstuff category,
- influence of the social context / geographic area

**Waste  
Watcher**

### Prospect theory and risk aversion in the consumer food chain:

- prevalence of the **purchasing phase** in the household FW generation

**Waste  
Watcher**



# **FOOD WASTE: FUTURE RESEARCH**

**Consumer food waste behavior: a complex phenomenon where**

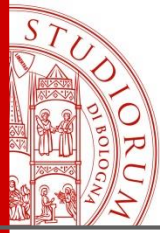
- individual heterogeneity,
- food variety,
- context dynamics

**converge**

**A double need emerges:**

- to increasingly take behavioral issues into account,
- to adopt multidisciplinary approaches: where economics meets sociology and psychology.

**Analysis of individual behaviors as an answer to the raising food waste “glocal” problems.**



# **FOOD WASTE: FUTURE RESEARCH**

**Research hypothesis in agricultural economics:**

## **A. Evolving socio-economic contexts**

**Analysis of the main socio-economic conditions driving the consumer food waste behaviors:**

- what are the influences of economic conditions (e.g., prices, income) ?
- what are the impacts of socio-cultural contexts (e.g., social norms, education) ?
- what are the repercussions of commercial policies (e.g., large-scale retailing practices, foodstuff quality) ?



# **FOOD WASTE: FUTURE RESEARCH**

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**Research hypothesis in agricultural economics:**

## **B. Individual nonstandard decision-making**

**Analysis of the main types of consumer food waste behavioral patterns (e.g., habits, emotions, limited attention):**

- how do they influence the food waste at household and community (scholastic, working, residential, ...) level ?



# **FOOD WASTE: FUTURE RESEARCH**

**Research hypothesis in agricultural economics:**

## **C. Integrated policy measures targeting at consumer behaviors**

**Analysis of the policy impacts on consumer food waste behaviors:**

- how policies (e.g., incentives) influence the food waste - related socio-economic conditions ?
- how policies (e.g., voluntary and negotiated agreements) influence the food waste - related supply conditions ?
- how policies (e.g., nudge) influence the food waste - related social norms and consumers behaviors ?



THANK YOU FOR YOUR ATTENTION

