



Food Waste Prevention: A multilateral challenge and the Greek reality

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About Hellenic Solid Waste Management Association (HSWMA)

- ✓ HSWMA (**www.eedsa.gr**) is the only scientific, non-profit organization in Greece, which systematically seeks to shape sustainable solutions for solid waste management.
- ✓ It consists of persons and entities involved in all phases of solid waste management and playing important role in decision making.

Aims of HSWMA

- ✓ Promotion of acceptable methods and solid waste management schemes
- ✓ Promotion of relevant scientific methods and applications for contributing to sustainable development, protection of the environment and the protection and saving natural resources and energy.

HSWMA is the National Member of «International Solid Waste Association» (ISWA)

- ✓ ISWA (**www.iswa.org**) operates in 90 countries, consisting of scientists, professionals and entrepreneurs aiming to sustainable solid waste management and dissemination of relevant knowledge worldwide.
- ✓ It is member of several decision-making bodies of many governments, including the EU.

About Hellenic Solid Waste Management Association

(Objectives of HSWMA)

- ✓ Viewpoints and experiences exchange among its members and with other relevant organizations
- ✓ Promotion of scientific research
- ✓ Dissemination of scientific knowledge of Association members and the public through lectures, seminars, exhibitions & conferences
- ✓ Establishment and maintenance of libraries and archives, research results, software, case studies and other documentation for Association members
- ✓ Publication of newsletters, journals , cases studies etc.
- ✓ Promotion of research projects
- ✓ Cooperation with policy decision agencies, to improve methods and procedures solid waste management.
- ✓ Development and maintaining relations with other national and international organizations
- ✓ Exchange of experience and technical assistance to other, in particular developing, countries (taking actions contributing to economic and social development of these countries)

FOOD LOSSES AND FOOD WASTE

(Food and Agriculture Organization of the United Nations – FAO)

“Food losses refer to the decrease in edible food mass throughout the part of the supply chain that specifically leads to edible food for human consumption. Food losses take place at production, postharvest, and processing stages in the food supply chain (Parfitt et al., 2010). **Food losses occurring at the end of the food chain (retail and final consumption) are rather called “food waste”, which relates to retailers’ and consumers’ behavior.** (Parfitt et al., 2010).

“Food waste or loss is measured only for products that are for human consumption, **excluding feed and parts of products which are not edible.** By definition, food losses or waste are the masses of food lost or wasted in the part of food chains leading to “edible products going to human consumption”. Therefore food that was originally meant for human consumption but which unfortunately is removed from the human food chain is considered as food loss or waste even if it is then directed to a non-food use (feed, bioenergy...). This approach distinguishes “planned” non-food uses to “unplanned” non-food uses, which are hereby accounted under losses.”



Source: www.everycrumbcounts.eu

FOOD WASTE DEFINITIONS (1)

(Waste & Resources Action Programme – WRAP UK)

Generic food waste term (including liquids) encompasses all food and drinks discarded throughout the entire food supply-chain, from production through to post-consumption (as defined by WRAP). Additionally, food waste may be disaggregated into three forms of waste, which in contrast to alternative definitions **includes the inedible portion of food (unavoidable waste)**, as well as food of personal preference (possibly avoidable) and edible waste (avoidable waste).



FOOD WASTE DEFINITIONS (2)

(Waste & Resources Action Programme – WRAP UK)

According to the report “Food waste within global food systems” prepared for the Global Food Security Programme (GFS), the inclusion of inedible food waste into the definition is advantageous (Bond et al, 2013):

- ✓ It enables a consideration of food waste infrastructure requirements to be taken (e.g. composting or anaerobic digestion), so that biodegradable waste can be diverted from landfill.
- ✓ WRAP’s classification in fractions provides advantages when investigating patterns of food consumption and disposal in the UK, identifying potential value-adding channels of organic waste-streams and for more accurately determining the collective impacts of waste throughout the supply-chain and in landfill decomposition.
- ✓ The classification is largely relevant for the later stages of the food supply chain, post farm-gate.

The definition included in the “Guidelines for the preparation of food waste prevention programmes” (BioIS et al, 2011) is similar, as it contains inedible materials.

- ✓ Food waste may be raw or cooked.
- ✓ Food loss may occur before, during or after meal preparation in the household, as well as food discarded during manufacturing, distribution, retail and food service activities. WRAP’s fractions are also mentioned.



Source: BCFN, 2012

FOOD WASTE PREVENTION: A MULTILATERAL CHALLENGE

- 1. Environmental**
- 2. Economical**
- 3. Ethical & Social**

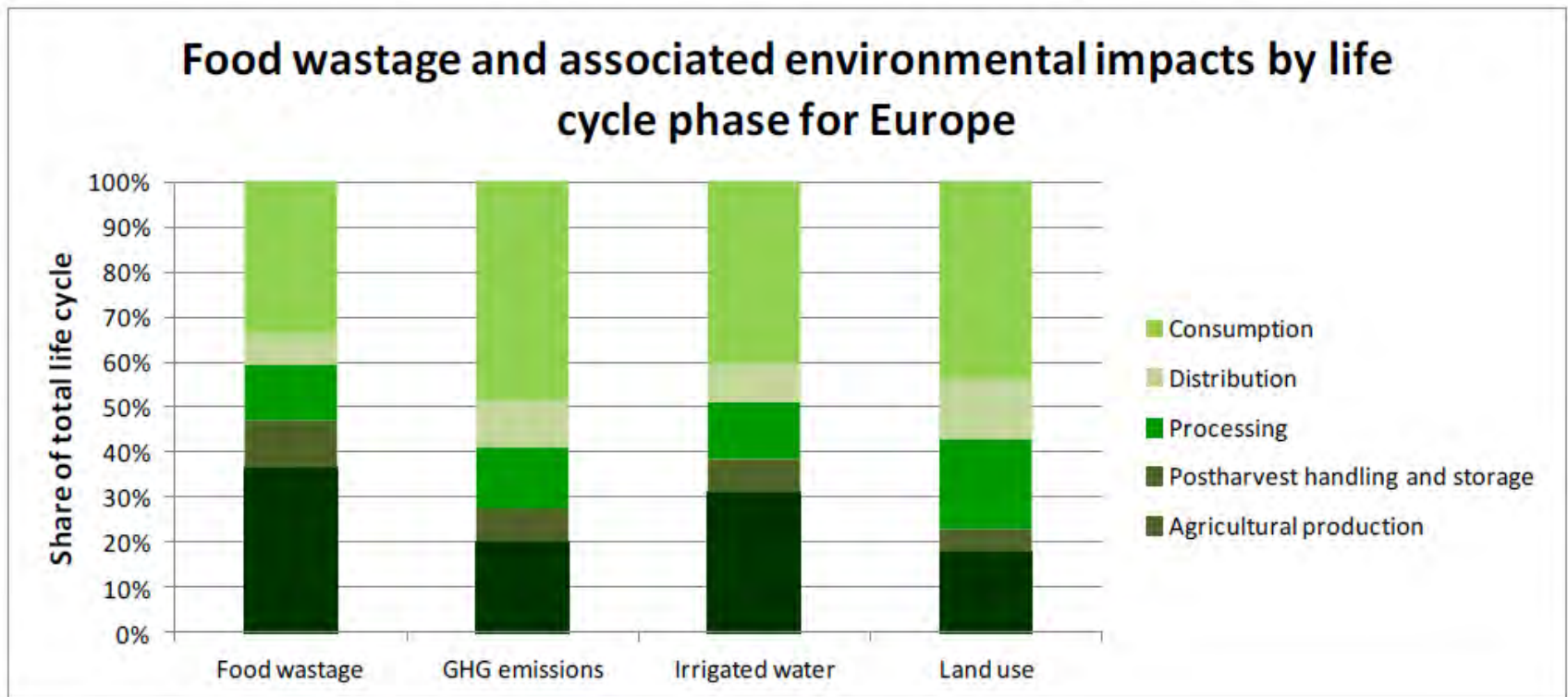
ENVIRONMENTAL CHALLENGE (1)

- ✓ When food is discarded, all of the embodied energy and resources, as well as related environmental impacts such as GHG emissions, are effectively wasted (BIOIS, 2013).
- ✓ Producing, storing and transporting food uses resources (energy, land, water, labour, etc.). **Halving of the avoidable food losses in Germany might save 1.2 million hectares of agricultural land** (Noleppa & von Witzke, 2012, ITAS, 2013)
- ✓ Depending on how food is produced in the future and on the validity of forecasts for demographic trends, **the demand for water in food production could reach 10 to 13 trillion m³ a year by mid-century** (IMECHE 2013).
- ✓ Deforestation and biodiversity loss
- ✓ Food waste accounts for a large proportion of bio-waste (BIOIS *et al*, 2010)
- ✓ Bio-waste is defined by the European Commission in the green paper on the management of bio-waste as biodegradable garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises, and comparable waste from food processing plants.
- ✓ Methane emissions associated with landfilling of food waste and the need to expand the global landfill capacity
- ✓ Emissions during whole life circle:
 - 1.9t CO₂ eq. (at least) emitted per tonne of food wasted
 - 170 Mt of CO₂ eq. (at least) emitted per year
 - ~ 3% of total EU27 GHG emissions (BIOIS *et al*, 2010)

Bio-waste generated in Greece: 44.3% of Municipal Solid Waste – 2,469,617 tonnes in 2011 (NWMP, 2014).

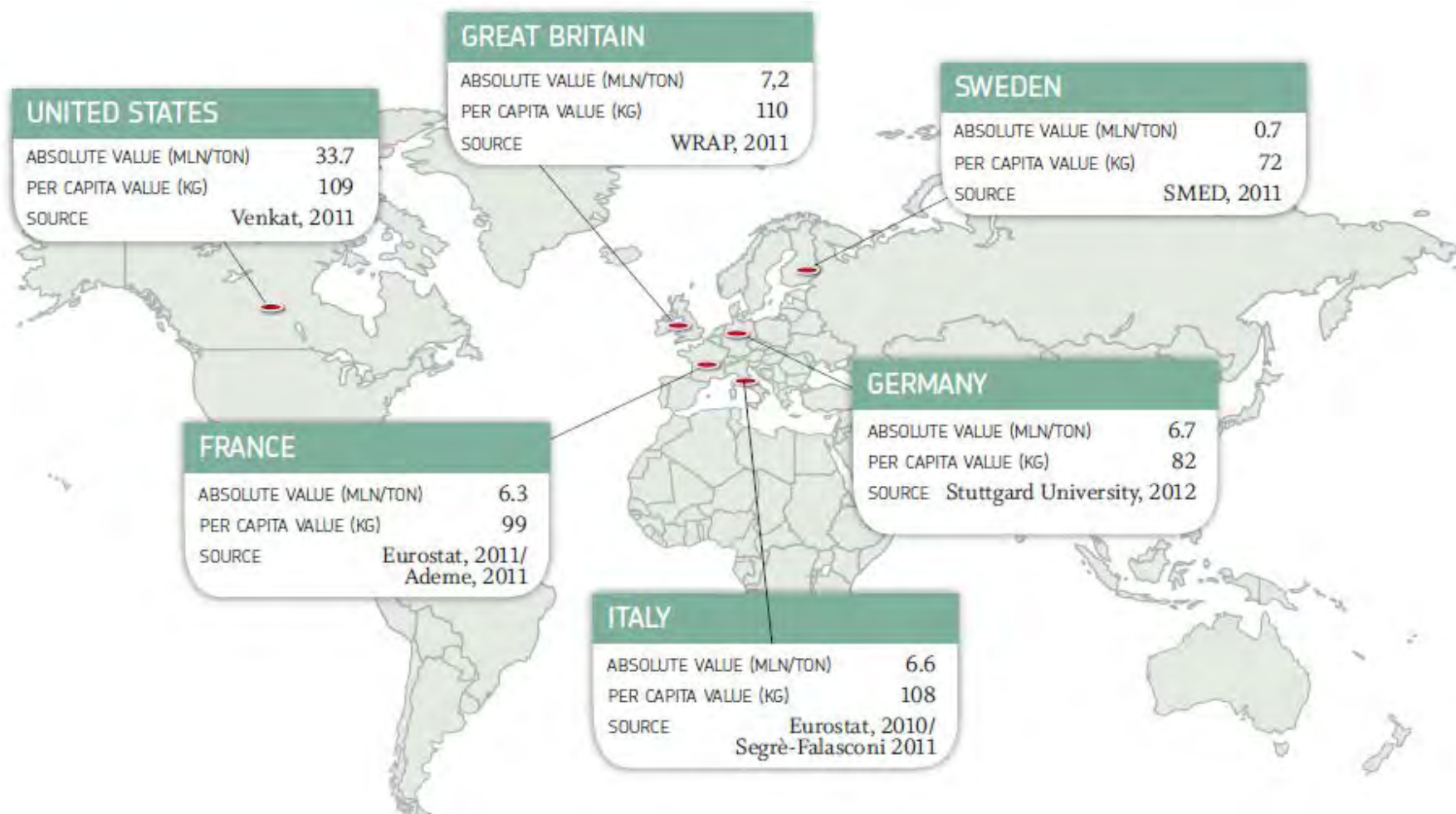
ENVIRONMENTAL CHALLENGE (2)

The environmental impacts of food waste in the EU27 have been estimated by BIO Intelligence Service in the report “Modelling of Milestones for achieving Resource Efficiency, Turning Milestones into Quantified Objectives: Food waste”. The consumption phase causes the greatest cumulative carbon impacts compared to other life cycle phases, though impacts of agricultural production are also high



Source: BIOIS, 2013

THE LEVEL OF FOOD WASTE IN HOUSEHOLD CONSUMPTION

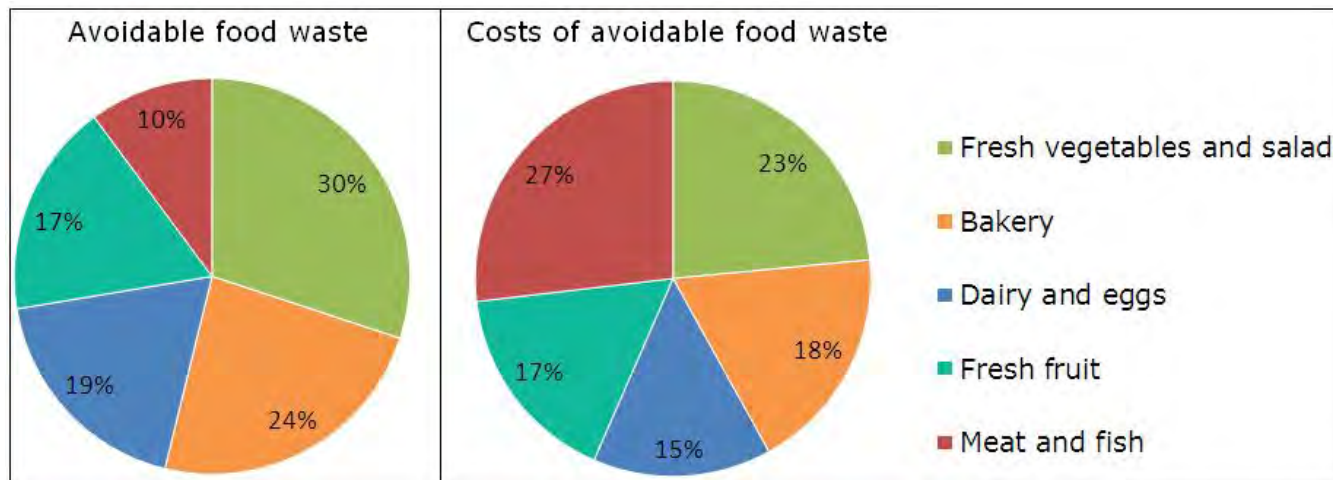


Source: BCFN, 2012

ECONOMIC CHALLENGE

- UK households are still **throwing** away 4.2 million tonnes of household food and drink annually; the equivalent of **six meals every week for the average UK household** (WRAP, 2013).
- **Avoidable food and drink waste** accounted for approximately **14% of the shopping budget** (WRAP, 2013).
- The cost of wasting food and drink, increased with household size, and is **£700 (€ 840) per year (almost £60 (€72) a month)** for the average household with children (WRAP, 2013).
- In the United States, **31 percent**—or 133 billion pounds—of the 430 billion pounds of the available food supply at the retail and consumer levels in 2010 **went uneaten**.
- The estimated value of this food **loss** was **\$161.6 billion (€117 billion)** using retail prices. For the first time, ERS estimated the calories associated with food loss: 141 trillion in 2010, or **1,249 calories per capita per day** (USDA-ERS, 2014).

Proportion of different food groups on avoidable food waste in British households (left pie chart) and their proportion on the resulting economic losses (right pie chart) (ITAS, 2013)



ETHICAL & SOCIAL CHALLENGE

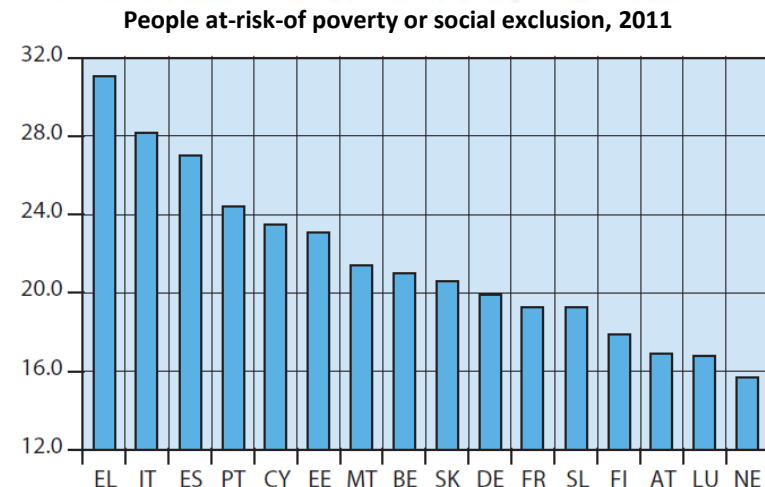
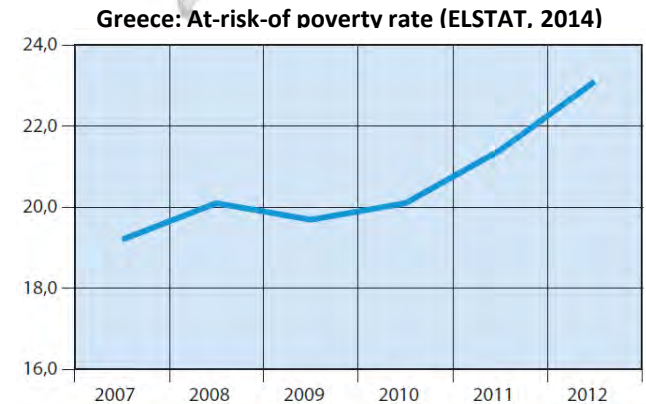
✓While hunger is the world's number one health risk (World Food Program, 2013), about **one third of food** for human consumption is lost or **wasted globally** each year (FAO, 2011)

✓Up to 50% of food gets wasted in EU households, supermarkets, restaurants and along the food supply chain each year, while 79 million EU citizens live beneath the poverty line and 16 million depend on food aid from charitable institutions (EECS, 2013).

✓In 2012, **23.1% of the total population in Greece was at risk of poverty, not including the population groups which are by inference poor. It is the highest percentage recorded in Europe (Hellenic Statistical Authority, 2014)**

✓The current global financial crisis, rising food prices and international food shortages should be taken into account

✓Meanwhile the FAO, the Food and Agriculture Organisation of the United Nations, reports that an estimated 868 million individuals, **or 12% of the world population, are undernourished.**



EXAMPLES OF FOOD WASTE PREVENTION ACTIONS IN GREECE (1)

➤ **Actions Financed via Environmental EU programmes** (e.g. EU FUSIONS, LIFE10ENV/GR/622 project “Development and Demonstration of a Waste Prevention Support Tool for Local Authorities–WASP Tool”)

➤ **Actions of NGO’s, corporations and voluntary organizations**

✓ «Let's do it Greece» Good Practice Guide

The "Let's Do It" global voluntary clean-up campaign focus on public awareness of environmental issues and good practice in waste management. “Let's Do It Greece” tries to document best practices in agencies, associations and schools and municipalities. Hence, it has invited its partners to submit a good practice on good waste management (reduce - reuse - recycling). Among the good practices that are under development is the Food Waste Reduction Guide to households / consumers and Food Waste Reduction Guide for Restaurants.

Currently in Greece there are many actions initiated because of the financial recession.

✓ **Donations of goods to local churches and Social Groceries**

In Greece, it is still common practice to donate preservable foods, clothes and some small household items to the local church or social groceries run by Municipalities, where it is then distributed to people in need. All these actions are not organized and the degree of success and how public responses to these activities are unknown.

✓ **“OLI MAZI BOROUME”** is a voluntary action organized by SKAI (TV and Radio) that raises awareness about people’s needs and gathers food or even clothes and medicines. Most actions are organized with the collaboration of Archdiocese of Athens, who then distributes it to the people in need with the aid of the local churches.

EXAMPLES OF FOOD WASTE PREVENTION ACTIONS IN GREECE (2)

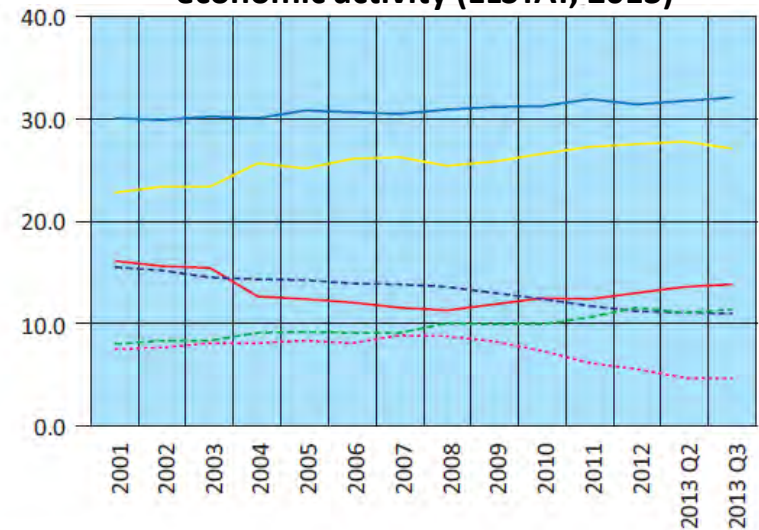
➤Non-profit Organizations Activities

- ✓ A non-profit organization “**BOROUME (WE CAN) – SAVING FOOD – SAVING LIVES**” aims to coordinate the collection of food from catering companies, corporations, hotels, bakeries, grocery stores, etc. and distribute it to a network of 450 institutes throughout Greece.
- ✓ Recently (25-26.01.2014), a festival for the prevention of food wastage was organized in Athens by WWF Hellas “Kaliteri zoi – Better Life” and “Boroume”. “Let’s do it Greece” participated.
- ✓ “**Food Bank – Foundation for fighting against hunger**”. It supports 215 institutes and 27,000 people. It was founded in 1995. The idea of the Food Bank was developed by John Van Hengel in 1967 in Phoenix, Arizona (USA). The idea spread to America as well as Europe. The Greek “Food Bank” is a charitable, non-profit institution (private legal entity) and is dedicated to the fight against hunger and reducing wastage.
- ✓ Other nonprofit organization with similar activities is “**Bread – Action – Food Recycling**” which collects breads, pastries and desserts and events leftovers to be distributed to institutes.
- ✓ Since February, based on art. 46§1 of **Law 4238/2014**, donations of food, medicines, clothes or other goods, other than those subject to excise duty, are exempted from VAT. Those goods may be available for free in public entities or private non -profit organizations, legally established in Greece with proven charitable cause to be distributed solely for the convenience or comfort of vulnerable social groups without consideration , provided they do not pose a risk to public health. As such goods are defined as those which are not suitable for sale or use in particular due to defects or deficiencies in the packaging , labeling or weighing, or due to withdrawal from the market, due to their proximity to the expiration date.
- ✓ It should be noted that most of the actions have been recently launched and have application. They were not part of any policy.

ECONOMIC SECTORS IN GREECE

- The most important sectors of the economy are **hospitality services and trade, food industry and agriculture**.
- The agricultural sector continues to hold a significant share in domestic economic activity, especially when compared with most other EU countries. It also presents significant opportunities for further development, which can be illustrated and used with positive effects and it can be correlated with sectors such as the food industry.

Share of employment by branch of economic activity (ELSTAT, 2013)



Greece: Gross Value Added (ELSTAT, 2013)



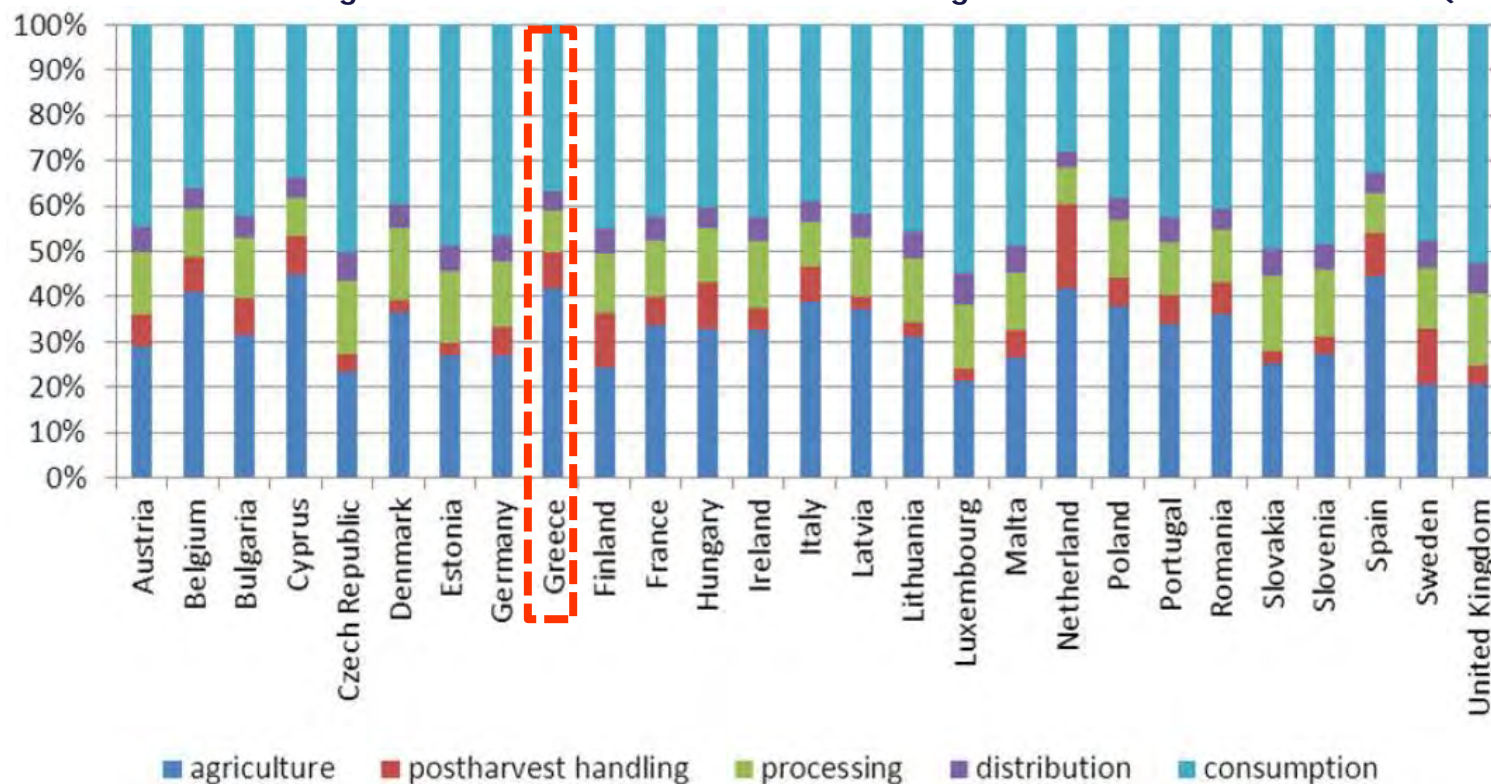
— Γεωργία - Agriculture
- - Βιομηχανία - Industry
... Υπηρεσίες - Services

— Γεωργία, δασοκομία και αλιεία - Agriculture, forestry and fishing
- - Βιομηχανία, συμπεριλαμβανομένης της ενέργειας - Industry, including energy
... Κατασκευές - Construction
— Εμπόριο, ξενοδοχεία και εστιατόρια, μεταφορές και επικοινωνίες
Trade, hotels and restaurants, transports and communications
- - Χρηματοπιστωτικές δραστηριότητες, δραστηριότητες σχετικές με την ακίνητη περιουσία, εκμισθώσεις και επιχειρηματικές δραστηριότητες
Financial, real estate, renting and business activities
— Άλλες υπηρεσίες - Other service activities

FOOD CHAIN AND FOOD WASTE GENERATION

According to the study elaborated during the STOA project ‘Technology options for feeding 10 billion people -Options for Cutting Food Waste’, carried out by the Institute for Technology Assessment and Systems Analysis, agricultural production and postharvest handling and storage (losses during handling, storage and transportation between farm and distribution) contribute to a considerable amount to the total food waste arising in EU-27. These two stages have not been taken into consideration in the BIOIS-study, as it is outside the scope of bio-waste as defined in the waste framework directive and as agricultural waste prevention is a field on its own. **In Greece the share from agricultural production is relatively high, meaning that a large portion is exported and therefore not consumed in the country** (ITAS, 2013).

Share of the different stages of the food chain on total food waste generation across EU-27 in 2006 (ITAS, 2013)



CONSUMER BEHAVIOUR (1)

Flash Eurobarometer survey “Attitudes of Europeans towards resource efficiency” (Flash No 316 – January 2011) gauged EU citizens’ perceptions, attitudes and practices concerning EU households’ food waste production and preferred ways of decreasing that waste. The target sample size in all countries was 1,000 interviews.

✓In Greece, 59% of respondents stated that 15% or less of the food that they bought went to waste and **23% stated that 16% or more went to waste.**

✓More than 8 in 10 respondents in Greece (**81%**) thought that **better estimates of portion sizes** would help them to waste less food.

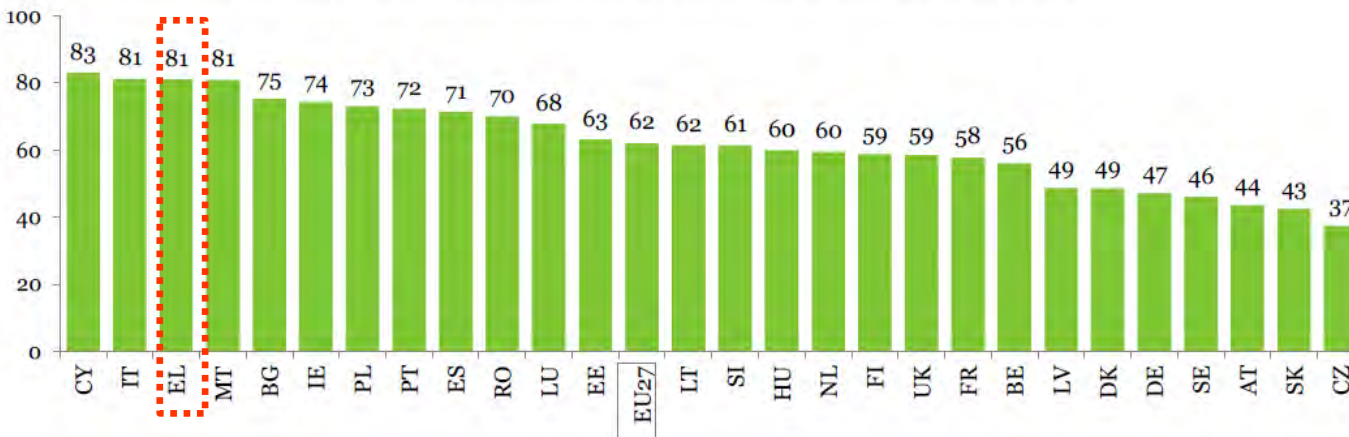
✓**74%** of respondents in Greece said that **better information on food product labels** (for example, how to interpret “best before” dates and more information on storage and preparation) would help them to waste less food.

✓**85%** said that **better shopping planning** by the household would help in food waste prevention.

✓The proportion of interviewees who thought that the best way to help them waste less food was to have smaller portion sizes available in shops was one from the lowest (48%).

What would help people to waste less food?

Better estimate portion sizes (how much food you cook) to avoid excess food



CONSUMER BEHAVIOUR (2)

Results of a research conducted by Harokopio University in 2012, indicate that, based on self-reported behaviour, people in Greece have positive attitudes towards food waste prevention and that their habits are close to the good practices suggested in the literature for reducing food waste. For instance, most respondents do plan their food shopping in a multitude of ways and are very careful in their purchases of fresh food supplies. However, about 40% misunderstand the meaning of food date labels.

The positive findings are strongly influenced by the severe recession experienced in the country, which makes consumers more conscious of their spending (Abeliotis, K., Lasaridi, K., Chroni, C.).

The study identified various methods for reducing the food waste

Adopted actions that yielded the difference in amount of food that is thrown away



Source: Harokopio University, 2012

CONSUMER BEHAVIOUR (3)

United States Department of Agriculture lists reasons consumers trashed their food (USDA, 2014):

- Spillages, abrasion, bruising, excessive trimming, excessive or insufficient heat, inadequate storage, technical malfunction.
- Sprouting of grains and tubers, biological aging in fruit.
- Consumers becoming confused over “use-by” and “best before” dates so that food is discarded while still safe to eat.
- Lack of knowledge about preparation and appropriate portion sizes. For example, lack of consumer knowledge of when a papaya is ripe, how to prepare it, and how to use it as an ingredient are reasons for high papaya loss.
- Psychological tastes, attitudes, and preferences leading to plate waste/scrapings (e.g., human aversion, such as “I don’t eat that,” or refusal to eat a food for religious reasons).
- Consumer demand for high cosmetic standards.
- Seasonal factors: more food is wasted in summer.
- Uneaten or leftover holiday foods.

***In the United States,
this is our pie chart.***

40% of all food in our country is never eaten
while 50 million Americans do not have
consistent access to food.



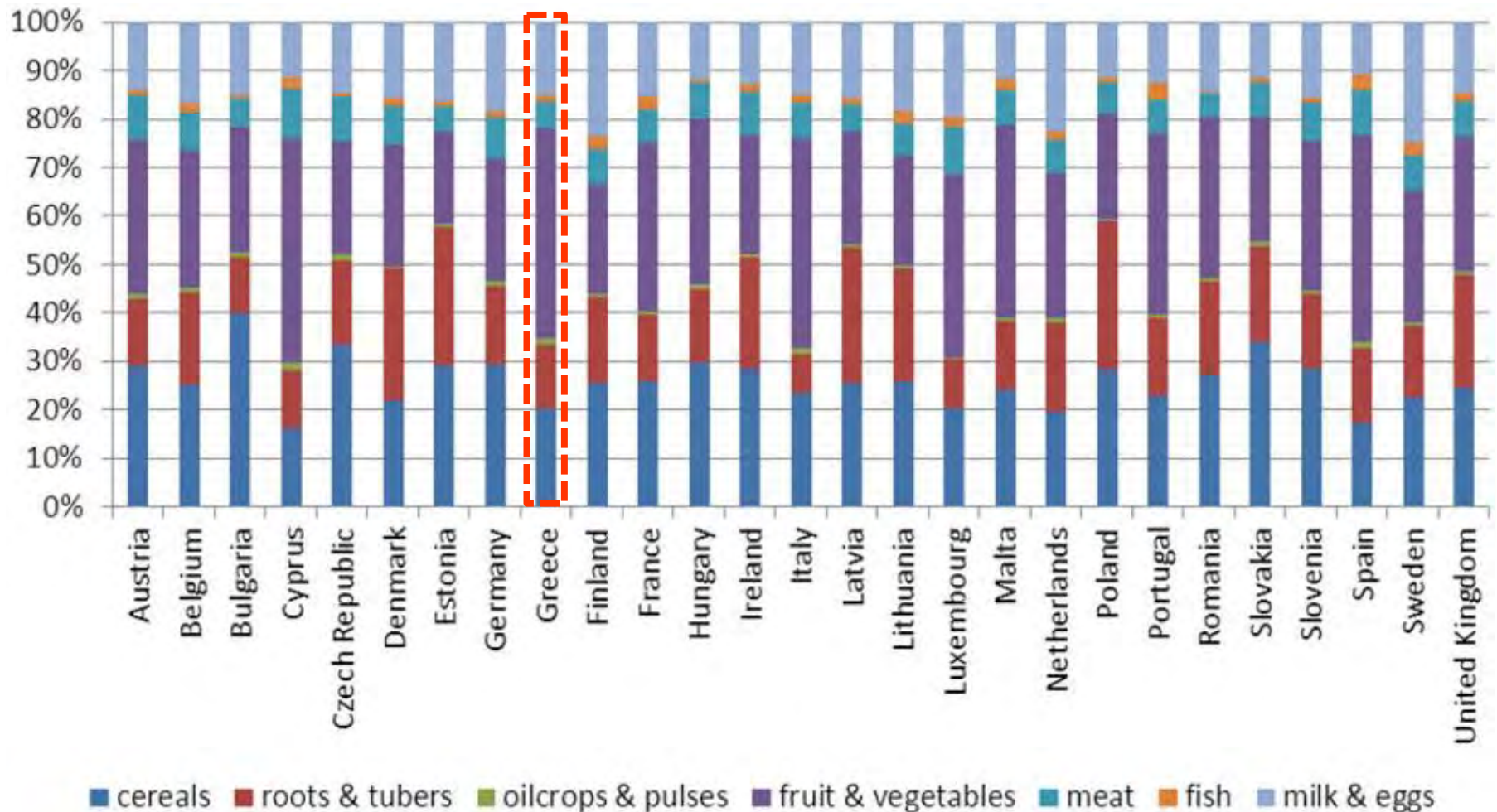
**JOIN THE MOVEMENT TO END FOOD WASTE.
SIGN THE PLEDGE AT FOODSHIFT.NET**

Food Shift
Reducing Waste. Rethinking Consumption.

FOOD GROUPS AND FOOD WASTE GENERATION WITHIN HOUSEHOLDS

For the majority of EU-Member States the most important food group is fruit and vegetables, followed by cereals. **Fruit and vegetables amount to 32% of total food waste on average in Greece.** The share of meat and fish is relatively small and the share of oil crops and pulses can be neglected.

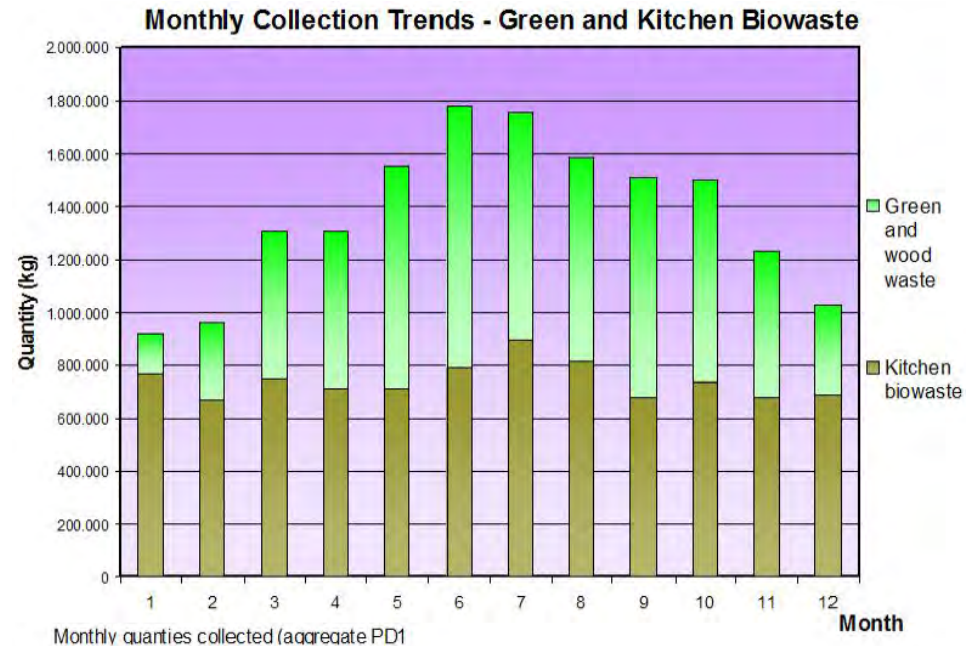
Percentages of different food groups of total food waste generation in the household sector across EU-27 in 2006 (ITAS, 2013)



SEASONAL VARIATIONS

- ✓ United States Department of Agriculture states that more food is wasted during summer (USDA, 2014). According to a Food Waste Collection Guidance issued by WRAP (2009), food waste shows little seasonal variation.
- ✓ The climate of England can be classified as Cfb Temperate Oceanic Climate; a warm temperate humid climate with the warmest month lower than 22°C over average and four or more months above 10°C over average. On the other hand the climate of Greece is classified as Csa Mediterranean Climate; a warm temperated mediterranean climate with dry, warm summers and moderate, wet winters with the warmest month above 22°C over average.
- ✓ **Food can deteriorate during warm summer** as a result of growth of micro-organisms and action of enzymes, resulting in increased food waste generation.
- ✓ It should be taken into account that **easily perishable fruit and vegetables amount to 32% of total food waste on average in Greece (ITAS, 2013).**

Seasonal changes of food and garden waste collected (WRAP, 2009)



HOME COMPOSTING – ISSUES FOR DISCUSSION

For the time being, there are several opinions for and against the consideration whether home composting is a food waste prevention measure or not:

- a. On the one hand, there is the perception that it follows the waste generation, so it cannot be considered as waste prevention.
- b. On the other hand, there is perception that it is an “internal treatment procedure” and in this regard, the “owner” of the biowaste prevents waste generation, so it can be a waste prevention measure.
- c. Through avoiding generally biowaste (therefore the end of the “pipeline”) there are also some direct or indirect benefits, which can defend the opinion of home composting being a prevention measure, eg:
 - Reducing produced biodegradable materials to be collected and treated or disposed
 - Reducing waste quantities for transportation
 - Reducing CO2 emissions (CO2 and methane generated from Landfill)

Reviewing the European experience and practice, it seems that:

1. **Southern Countries** or in general countries which needs **soil enrichment** tend to consider it as **prevention measure** (e.g Ireland, Belgium (Flanders), Spain (Catalonia), Portugal, Italy, France).
2. **Northern Countries** or in general countries with tradition in **energy recovery** of biodegradable waste, tend either not to include in their WPP or clearly not to consider it as a prevention measure (England, Scotland, Austria (Vienna), Germany).
3. Many projects that have been approved and financed by EU (e.g. LIFE) have approved the consideration that Home Composting is waste prevention (e.g. Wasp Tool, RECYCLING SYMPRAXIS, etc.)

CONCLUSIONS (1)

- ✓ Use a food chain approach, covering all steps in the system.
- ✓ Sectoral food waste prevention programs can be elaborated (i.e. manufacturing/industry, wholesale/retail, tourism – hospitality and food service, etc.)
- ✓ The supply chain models should meet consumer affordability, demands and values
- ✓ Agricultural food waste is not covered by the “Guidelines for the preparation of food waste prevention programs”, as it is outside the scope of bio-waste as defined in the waste framework directive and as agricultural waste prevention is a field on its own. However, research on food losses in the agricultural sector should be promoted.
- ✓ In retail, forecasting & inventory management is necessary to minimise surplus whilst maximising shelf replenishment and in-store shelf-life times

Further social research into:

- Alternative models of eating habits (including hospitality research)
- Domestic food management practices (from preparation, cooking, & storage to date labelling). Proper domestic storage practices are important, especially during summer, as high temperatures may promote food spoiling.
- Campaign design and intervention to embed hardest-to-reach groups
- Co-embedding economic, nutrition, sustainability and health messages.

CONCLUSIONS (2)

- ✓ Further promote synergy between reducing food waste and using food surpluses from the food chain to help the most deprived.
- ✓ All actions designed to reduce losses and waste must comply fully with food safety requirements
- ✓ Regarding the food services sector, the training of future chefs should be adapted to include raising awareness of the various aspects of food waste such as stock management, recycling, the potential financial benefits or the consumer-based approach.



THANK YOU FOR YOUR ATTENTION!

