



Food Losses and Waste in the Mediterranean

Editorial

Cosimo Lacirignola

Interview of M. Mehmet Mehdi Eker

Turkish Minister of Food Agriculture and Livestock

Food Loss and Food Waste in the World: Facts, Trends and Solutions

Jose Cuesta

Food waste and losses in the Post 2015 Agenda: Enhancing food system-wide thinking

Matthieu Brun, Peter Agamile

Tackling Food Losses and Waste in the Mediterranean: from knowledge to action

Cosimo Lacirignola, Alexandre Meybeck, Roberto Capone, Vincent Gitz, Philipp Debs, Camelia Bucatariu, Sandro Dernini, Hamid El Bilali, Jennifer Smolak

Solving the Global Food Waste Scandal: Opportunities in the Mediterranean

Niki Charalampopoulou, Tristram Stuart, Ian Wilkey

Causes et importance des pertes en post-récolte de fruits et légumes au Maroc

Ahmed Ait-Oubahou, Houssaine Bartali

Food losses and waste in the Spanish agro-food chain

Luis Miguel Albisu

Agir contre le gaspillage alimentaire en restauration collective: le cas de l'Algérie

Isabelle Lacourt, Djamel-Eddine Mekhancha, Lynda Yagoubi-Benatallah, Corinne Colette Dahel-Mekhancha

Where does the Egyptian Food Subsidy go?

Racha Ramadan

Household Food Waste in Italy: estimations and causes

Andrea Segrè, Silvia Gaiani, Luca Falasconi, Matteo Vittuari

Consommation et gaspillage de viandes et produits laitiers en Tunisie

Naceur M'hamdi, Latifa Lanouar

Food Waste in Lebanon: some interesting initiatives to tackle it

Farah Oneissi

Activities in the CIHEAM's Institutes





About CIHEAM

Founded in 1962, the International Centre for Advanced Mediterranean Agronomic Studies (CIHEAM) is an intergovernmental organisation composed of thirteen member states (Albania, Algeria, Egypt, France, Greece, Italy, Lebanon, Malta, Morocco, Portugal, Spain, Tunisia and Turkey).

The CIHEAM is at the service of its member states to promote multilateral cooperation in the Mediterranean in the fields of agriculture, food, fishery, and rural territories, aiming to respond to the needs of the States. The CIHEAM works for the Mediterranean and therefore with Mediterranean populations. Providing concrete solutions, sharing experiences and avoiding the waste of knowledge are among the main objectives of each one of its actions.

The CIHEAM pursues this cooperation mission through specialised training, networked research, scientific diplomacy and political partnership. Thanks to its activities, the CIHEAM therefore contributes to the elaboration of a global, structural and engaging vision for development in the Mediterranean.

170 permanent agents and hundreds of consultants regularly work within the 5 headquarters of the Organisation: the 4 Mediterranean agronomic institutes (MAI) based in Bari (Italy), Chania (Greece), Montpellier (France), and Zaragoza (Spain); the General Secretariat is located in Paris (France).

The Watch Letter

This Quarterly Letter has been published since 2007 and is devoted to major topics in Mediterranean Agriculture, Food and Environment.

While enabling the CIHEAM to gain a widespread recognition, it circulates analyses aimed at a heterogeneous public (policymakers, researchers, journalists, etc.) on emerging agricultural and food issues. The objective of the Watch Letter is to provide brief analyses which will fuel both the discussion on the Mediterranean and the broader global debate on food and agriculture.

The General Secretariat of Paris is responsible for the direction and the management of this bilingual publication (English and French), also available in Arabic.

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Editorial

Cosimo Lacirignola
CIHEAM Secretary General



As a result of the global demographic growth and socioeconomic changes, food demand is likely to increase by 40% to 70% by 2050. In this perspective, it is important to be able to increase the global agriculture production by almost 60%. Environmental constraints of such a productive increase are high. When we remember that global food production tripled between 1950 and 2000, an increase of 60% in forty years does not sound impossible. The reduction of food wastes and losses is clearly a big lever that could be pulled to increase the available offer and the efficiency of food use. A long time neglected issue, food waste and loss is today a priority on the global agenda. It is clearly linked to green growth, sustainable development and food security challenges in the wake of the post-2015 Agenda.

According to the FAO roughly one-third of the edible parts of food produced for human consumption gets lost or wasted globally, i.e. about 1.3 billion tons per year. These losses and wastes take place at different stages (harvesting, storage, transport, distribution or consumption) according to the development level of the countries. Reducing food losses and waste at micro, meso and macro levels should be considered as a means to improve the efficiency and sustainability of agricultural and food production systems and ultimately achieve food security.

Wasting food means not only losing life-supporting nutrition but also precious natural resources (land, water, and energy), human resources (agricultural workforce, or employees of the food chain) and financial resources (capital invested in agriculture). A great amount of food produced and transported for thousands of miles, and which will not be consumed at the end of the chain, means also a great energetic waste. The production and distribution of products (delivery to the consumption centres and then to the final consumers) are stages where greenhouse gas emissions are not negligible. Halving the amount of food waste would not only reduce the pressure on food supplies but would also save money. Post-harvest losses represent potential losses in revenues for farmers. The lack of products sold locally may also lead to price inflation with impacts on consumers.

*In the Mediterranean area, precise and accurate data regarding food waste and losses should be enhanced, especially in a context where the food security of the region's countries is fragile and the sustainability of development is threatened. During the 10th meeting of the CIHEAM member states agriculture ministers, the food waste issue was strongly emphasised. Considering the importance of the topic, the CIHEAM's Governing Board has decided to devote the 2016 edition of the Regional Report *Mediterra* to wastes (natural resources, food and knowledge) and the ways to combat scarcities. The CIHEAM has already launched several research and technical development activities dealing with the issue. Beyond the support given to the national and local authorities of our member countries, the waste issue will probably become a key field of cooperation with regional and international organizations operating in the Mediterranean, especially the FAO that considers this issue as one of the major challenges in North Africa and Middle East.*

The Watch Letter 30 aims at addressing Food Waste and Losses in the Mediterranean region by trying to provide useful knowledge for public action and analyses of the agricultural, food and environmental challenges. The papers provide a broad overview of this strategic issue and some of them focus on specific national situations or experiences. Therefore, I would like to express my sincere thanks to all experts involved and more particularly to the Turkish Minister of Agriculture, H. E. Mehmet Mehdi Eker, who has been interviewed to explain the current strategy developed by his country to reduce Food Waste.

INTERVIEW

Mehmet Mehdi Eker

Turkish Minister of Food Agriculture and Livestock



During your speech at the 10th Ministerial Meeting of the CIHEAM Member States in Algeria last February, you pointed to global warming and drought risks as the 2 most important challenges to agriculture and food security in the Mediterranean region. In light of such a challenging situation, sustainable food systems, meaning sustainable productivity and consumption, are more than anytime necessary to be established; and combating food waste is an integral part of these sustainable systems. What are Turkey's latest developments on sustainable development?

Food security has become a global concern in recent years following the food price volatilities in the world market. Although the impact of the price volatility has been limited in Turkey, food security has become one of our top priorities, as in many countries. Several measures and policies have been implemented in response to the changing climate conditions and global food security challenges. The main aim is to establish a sustainable food system which is an essential step for ensuring the security of food supply in Turkey. In this context, a strategic approach has been adopted and the problems of the agricultural sector have been identified through a series of consultation meetings with sector stakeholders. A strategic framework has been developed with the aim of addressing these problems. A set of measures have been taken to decrease the negative impact of adverse climatic conditions, to increase quality and yield of production, to support rural development and smallholder farms and to fight against food waste and loss, all of which are essential elements of sustainable food systems.

In order to mitigate negative effects of global warming and climate change on agriculture, a Strategy and Action Plan to Combat with Agricultural Drought have been prepared. The institutional capacity to monitor and evaluate the drought risk has been reinforced. In this respect different committees namely; "Monitoring, Early Warning and Forecast", "Risk Assessment" and "Agricultural Drought Management Coordination" Committees have been established. Development and extension of drought resistant varieties has been prioritized. A Drought Test center has been established under our International Agricultural Research Institute in Konya.

Increasing the quality and yield in production is another important component for sustainability. In this regard, the use of certified seed, seedling and sapling has been supported. This has resulted in important amount of increase in agricultural production. For instance wheat production increased 8 percent in ten years as a result of the use of certified seeds. In order to prevent over-supply of products of plant origin in short term right after the harvest, licensed storage system has been initiated, particularly for cereals. Furthermore, organized industrial zones for agriculture have been established with a view to decrease the negative impact of urbanization on agriculture and improve the sector in different regions. On the other hand, systems for registration and control of movements of animals as well as strategies to control animal diseases for improving the quality of animal products have been developed. To encourage farmers, disease free farms have been supported.

Supporting rural development and small farmers is another pillar for sustainable agricultural development. In this respect, Rural Development Investments Support Program with 50% grant for the rural investments has been implemented since 2006 in order to achieve agriculture-industry integration. Within this Program, the investments of processing, packaging and storage of agricultural products, machine-equipment purchase and drip irrigation-sprinkler irrigation are supported. An Agriculture Consultancy System has been established to provide agricultural extension services even in the remotest regions of the country. The investments aiming at increasing value added production have been prioritized. The objective is to improve rural development and enhance farmer's living standards, especially focusing on smallholders, women and young farmers, by increasing their income while increasing the value added production.

"Food losses and waste (FLW)" is a key issue which drew global attention in recent years as one-third of food produced for human consumption is lost or wasted globally, which amounts to about 1.3 billion tons per year. Food losses and waste can be observed throughout the food chain from production to consumption. Different countries have different challenges in this respect. While in low-income countries food is lost mostly during the early stages of the supply chain; in medium- and high-income countries food is wasted at the consumption stage to a significant extent. In Turkey, the highest rates of loss are observed in the first link of the chain; agricultural production. Losses emerging up to the stage of final consumption are relatively smaller. Recent advances in transportation, processing and storage technologies and the preference of firms in the supply chain for new technologies help reduce losses at stages that follow agricultural production. It can be said that losses at the agricultural production stage are mainly associated with farmers' traditional methods, habits and practices. To eliminate this challenge, our Ministry employs extension staff to introduce new technologies to farmers. Losses at the stage of agricultural production can be reduced by training in such issues as region-specific products, practices and problems. On the other hand, storage of harvested products under appropriate conditions is essential for minimizing losses. At this point, licensed warehouses are very important for producers. Some regulations have been made in this regard in Turkey. In the Licensed Warehouse System, after analyzing the products to see whether they meet the EU requirements, they are stored in a healthy environment with modern infrastructure. Rural Development Investment's Support Program supporting the investments of processing, packaging and storing of agricultural products largely contributed to the prevention of losses at the production stage.

By means of all these policies and measures, considerable progress has been achieved in agricultural production in Turkey. Agricultural GDP which was 23 billion US Dollars in 2003 has reached to 62 billion US Dollars in 2013. According to OECD and World Bank data, while Turkey was 11th biggest producer in the world in 2003 now it is the 7th biggest producer. Turkey has the highest agricultural GDP in Europe. Increase in GDP comes largely from the improvements in productivity. Turkey is also a net exporter of agricultural products. Agricultural export has reached to 18 billion US Dollars in 2013.

I would like to mention especially about a legislation that has been put in place recently. One of the main structural problems of agriculture sector was the fragmentation of agricultural lands through inheritance. Some regulations have been introduced during 2005 and 2006. However, we needed more, so in 2013 new legislation aiming to prevent land fragmentation was put into practice. Land consolidation works have gained momentum in the last 10 years. Consolidation works have been completed on 4 million hectares of land in 10 years. By the end of this year, our target is to complete land consolidation on 2 million hectares of land. These efforts will finally lead to a considerable increase in agricultural productivity.

Sustainable development is an important issue which all countries should work on.

"Preventing Bread Waste campaign" launched in 2013 is a very important measure taken by Turkey to combat food waste; Can you elaborate on this campaign, and on other main measures taken or to be taken in this regard? Who are the main actors involved and targeted by your different actions and campaigns?

Regarding the bread waste in our country, three comprehensive studies were conducted in 2008, 2012 and 2013 respectively. The results of these studies showed that there was a huge waste. According to the study, of the total 4.9 million loaves of bread wasted daily in 2013; 3 million loaves (62.1 %) are wasted at bakeries, 1.4 million loaves (27.7 %) are wasted by households, 0.5 million loaves (10.2 %) are wasted at restaurants, hotels and dining halls.

The Campaign, launched on 17th January 2013, has been carried out for more than one and a half year now and coordinated by the Ministry and its subsidiary organization Turkish Grain Board (TMO) with the cooperation of public organizations, governorates, universities, municipalities, non-governmental organizations, private sector and the media.

Nevertheless it was seen with the study in 2013 that the bread consumption patterns of the society has started to shift in a positive way in a short period of time. Thanks to the campaign carried out in 2013 the bread waste at household, staff and student dining halls decreased by 40 % and by 1 % in private sector like restaurants, hotels and bakeries.

The bread waste occurring particularly at bakeries is mostly due to the fact that sales points return the breads to bakeries which they could not sell and these breads are either used to feed animals or thrown away. Thus, the main target for the upcoming period is to seek ways to stop this practice.

While carrying out campaign work, printed and visual campaign materials, the campaign webpage, media, public service ads, campaign music, social media, SMS texts, e-mails and mobile advertisement tools are being used.

Hundreds of events and activities such as panels, symposiums, meetings, conferences, fairs, contests, marches etc. have been organized across the country. In these events books and brochures are distributed, stands are opened, posters and public service ads are used. The campaign has reached to every corner of the country with public service ads and reports released by visual and printed media.

The campaign has had remarkable outcomes although it has been carried out without imposing any legal sanctions and with only voluntary support. This is obvious with the results of the study conducted at the end of 2013 to measure the impacts of the campaign. Thus, as a result of the campaign 384 million loaves of bread have been saved from being thrown away in one year, saving Turkish economy 300 million TL (136 million US\$). Moreover, as a result of public awareness raised for not wasting bread, a decrease in bread consumption occurred as well and 2.5 billion TL (1.1 billion US\$) was saved. Consequently, with the effect of the campaign at total 2.8 billion TL (1.3 billion US\$) saving for national economy was achieved in 2013. The campaign aims to raise public awareness of waste, avoid waste throughout bread production and consumption stages, promote the consumption of whole wheat bread and contribute the national economy.

The target audience of the campaign is the whole society but bakeries, households, restaurants, hotels and dining halls, where there is a huge bread waste, are primary targets. Special target audiences are the children and youth for getting them into the habit of conscious consumption and women of course, considering their position in the society.

This campaign is just the beginning. We plan to continue on this work in the coming period. This campaign was limited to only bread waste. There is a great deal of waste in the whole food value chain. Other sectors where food loss or waste is prevailing can be included in the subsequent campaigns. Regarding the legal framework to prevent bread waste, the work is underway with the participation of relevant governmental and non-governmental institutions.

You mentioned at many occasions, the readiness of Turkey to share its successful experience in the agriculture field with its fellow neighbors, and the CIHEAM countries in particular. What is your vision for Mediterranean agricultural cooperation, in general, and concerning the issue of food waste in particular? What are the main tools to be used and what role can private and public/ national and foreign partnership play in this regard? And what has Turkey in particular to offer towards boosting cooperation?

Today, 842 million people in the world, in other words one in every eight people are undernourished and approximately 10 million people are dying of hunger and malnutrition. On the other hand 1.4 billion people worldwide encounter health problems due to overweight, also one-third of them are obese.

Furthermore, food waste in the world and in our country has reached to significant extents and is continuing to increase. 1.3 billion tons of food worldwide is wasted, the annual value of which is 1 trillion USD and this amount comprises one third of world food production. This also means the waste of inputs like seed and fertilizer as well as the labor force used in the production of agricultural commodities.

Regarding all these, food security is a global concern and needs joint global action. Efforts of individual countries should be coordinated with those of other countries. In that way, better results can be obtained in both achieving food security and decreasing global food waste. Accordingly, policies should be developed in cooperation and by determining a strategy through meetings, sharing knowledge and experience and joint projects. International organizations both regional and global ones are good platforms and forums for member countries to discuss and decide the possibilities of sharing knowledge and experience. In the case of Mediterranean Region, CIHEAM is a unique platform for its member states.

I would like to mention that in the last decade, Turkey has managed to progress in many fields including agriculture and is ready to share its experience in agriculture with the neighboring countries and the countries of the Mediterranean with which we have similar conditions ecologically and socially. This can be both bilaterally or through the channel of International and regional organizations, such as CIHEAM, FAO, Developing-8, Economic Cooperation Organization, etc. We already have a partnership Programme with FAO where Turkey supports the projects to develop and achieve food security in Central Asia and with ECO, where there is a Regional Coordination Center for Food Security in ECO region, based in Ankara. There are a number of research institutes under my Ministry working on different topics and ready for international cooperation. Many meetings are organized at these institutions every year at international and regional level. Workshops, seminars and trainings are provided at these Centers to the interested experts of many countries. We would be happy to increase the number of participants and trainees by hosting colleagues from all over the world.

I would like to mention briefly what we have done regarding the prevention of food waste. First, "Increasing Domestic Savings and Prevention of Waste" and "Reduction of Waste and Preventing Repeated Consumption" subjects have been included in the Tenth National Development Plan of Turkey. In this context it is planned to make a general call to the public for saving. For instance, raising awareness and guidance to reduce bread waste has been one of the elements of this plan. Results of "The Campaign for Preventing Bread Waste" are shared with leading international organizations like FAO and OECD. In this context, the campaign has been cited as a model implementation about waste for its contribution to the studies of wastage in the world. We are also ready to share our experience in this respect.

What are your plans, and expectations for the next important events Turkey will host, like the Expo 2016, and how do you intend to exploit it to affirm Turkey's role and vision for the Mediterranean food security? Could you elaborate on the work in progress and your expectations?

There are a number of important events ahead of Turkey. First of these is the Developing 8th Agricultural Ministerial Meeting on Food Security which will be held in İstanbul on 15-17 October 2014. I believe that this meeting will contribute to strengthening the collaboration and partnership between member countries (namely Bangladesh, Egypt, Indonesia, Iran, Malaysia, Nigeria,

Pakistan and Turkey) and to the continuity of progress achieved in Agriculture and Food Security with solidarity and dedication.

As to Mediterranean Region, second MED-AMIN Meeting will be held in İzmir on 6-7 November 2014. As it is connected to the AMIS which was established within the frame of G20, I think it will contribute greatly to the monitoring and efficient functioning of agricultural markets at regional and global level.

Next, Turkey will assume the G20 Presidency in 2015. As you know G20 has a comparative advantage about agricultural production, consumption and trade globally. G20 countries are responsible for approximately 80% global agricultural production. With Seoul Multi Year Action Plan adopted in 2010, Food Security is included in G20 agenda. G20 has a uniquely broad perspective of economic growth, employment, finance, trade and development, and includes both emerging countries and the wealthiest countries across all continents. I believe that G20 will make a great contribution to the efforts for achieving food security at global level and Turkey during its presidency will give utmost importance to issues related with food security and agriculture.

For the year 2016, FAO European Regional Conference will be held in Turkey. This is a good platform where the Ministers and high level officials of the European and Central Asia Countries come together to discuss the issues regarding agriculture and food security and to determine the priorities to be dealt with.

EXPO 2016 Antalya is one of the most important events that our country has undertaken. EXPO 2016 Antalya is the first EXPO of Turkey and is a botanical EXPO within A-1 category. It will be held in the third most preferred touristic city, Antalya in an area of 1.121 decares. The physical work will be completed in July 2015 and the country gardens will be delivered at this date. Invitation letters have been sent to 187 countries. The theme of EXPO 2016 is "the flower and the child" and its motto is "a green world for the next generations". All work and preparations in the area is in line with this theme and motto. Due attention is paid to the renewable energy resources and to the compatibility of the structures under construction with environment and environmental concerns. Likewise, EXPO 2016 will commence on 23rd of April 2016, which is the only day in the world dedicated to children, in line with its theme and motto and will be completed on the 30th of November 2016.

I would like to invite all our colleagues to these important events to be held in Turkey in the near future.

Thank you*.

Food Loss and Food Waste in the World: Facts, Trends and Solutions

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This article draws from the World Bank Group's quarterly report "Food Price Watch, February 2014"

More details on:

<http://www.worldbank.org/en/topic/poverty/publication/food-price-watch-february-2014>

The Astonishing Facts on Food Loss and Food Waste

According to the World Resource Institute (WRI) and the Food and Agricultural Organization (FAO), food loss and food waste refer to edible parts of plants and animals intended for human consumption that are not ultimately consumed by people.¹ It is widely accepted that food loss typically occurs at the production, storage, processing, distribution, and marketing stages of the food value chain. It is the unintended result of technical limitations or poor infrastructure, widely agreed to mostly happen in developing countries. In developed countries, food waste typically takes place at the retail and consumption stages of the food value chain, the result of a conscious decision to throw food away.

Until the recent onset of cheap food, many considered the deliberate decision to waste food an "embarrassment of riches"²; but after the repeated food price hikes post-2008 and increasing demand from a growing population, food loss and food waste are increasingly attracting global attention. This global attention is fully justified by truly staggering figures:

- Between one-fourth and one-third of all food produced for human consumption—about 4 billion metric tons—is lost or wasted annually. Specifically, according to estimates by WRI and FAO,³ 24% of all food is lost when measured through calories and 32% when measured by weight. More pessimistic estimates by The Institution of Mechanical Engineers (IME)⁴ raise this share to half.
- Cereals represent more than half of all food lost or wasted, 53%, by calorie content. By weight, fruits and vegetables represent, at 44%, the largest share of global food loss and food waste. By food commodity, roots and tubers are the most lost and/or wasted: 63% of production, based on calories. For fruits and vegetables, the lost or wasted share reaches 42%; for cereals, 26%; and for meat, 19%.⁵
- Most losses and waste take place at the consumption (35%), production (24%), and handling and storage (24%) stages of the food value chain. Yet there are marked differences between developed and developing countries and across regions. Overall, some 56% of total food loss and food waste occurs in the developed world; the remaining 44% across developing regions. Figure 1 presents regional breakdowns.

¹ Brian Lipinski, Craig Hanson, Richard Waite, et al., "Reducing Food Loss and Waste," World Resources Institute Working Paper, June 2013; Jenny Gustavsson, Christel Cederberg, Ulf Sonesson, et al., "Global Food Losses and Food Waste—Extent, Causes and Prevention," FAO, Rome, 2011.

² World Bank, "Food Price Watch", Washington, February 2014.

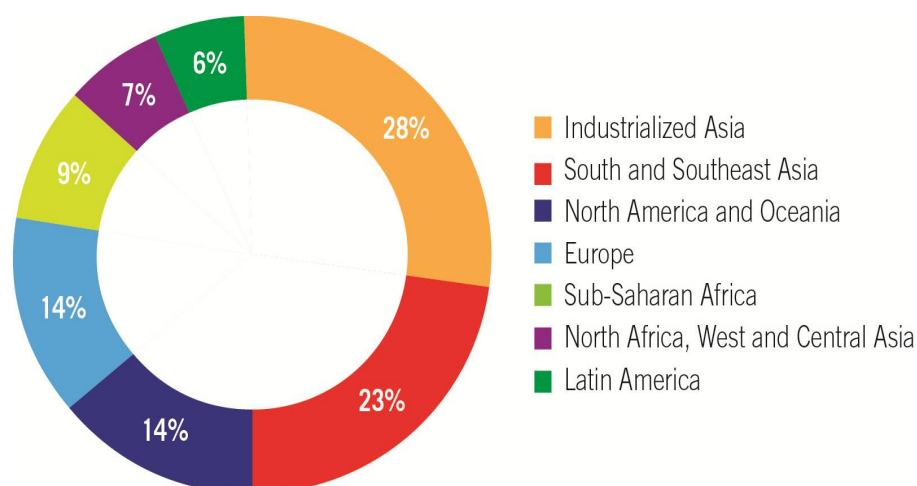
³ Lipinski et al, 2013; Gustavsson et al, 2011

⁴ The Institution of Mechanical Engineers (IME), "Global Food: Waste Not. Want Not," London, 2013.

⁵ Lipinski et al., 2013; Gustavsson et al, 2011.

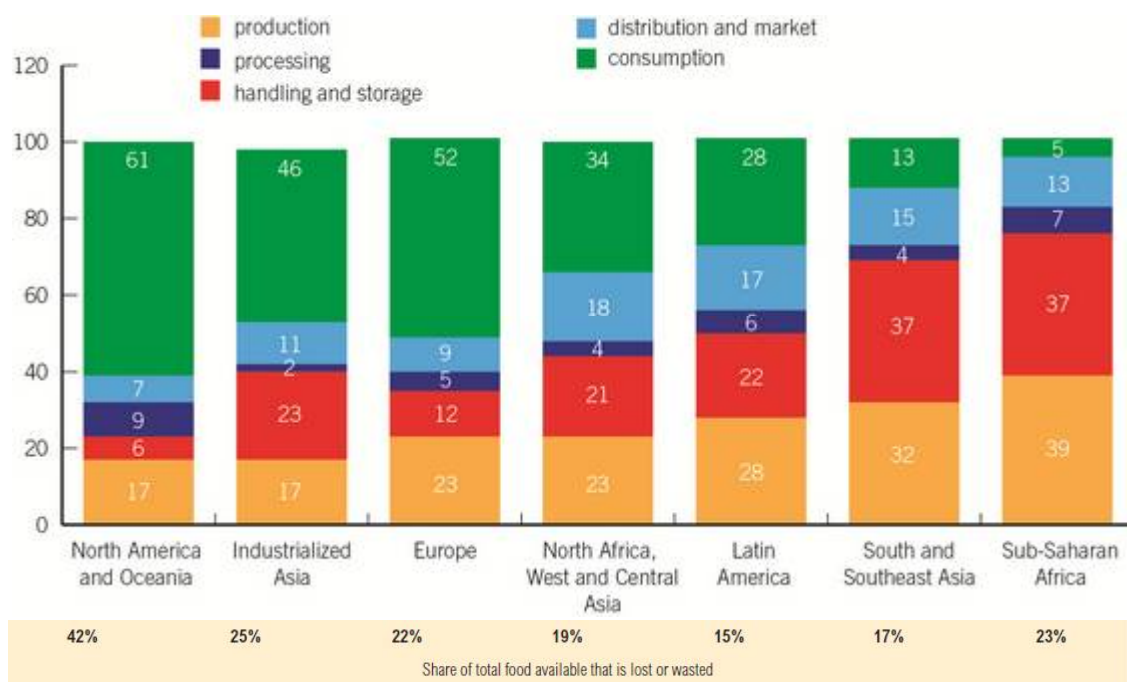
Figure 1
Global Food Loss and Waste by Region

a. Percent of total loss



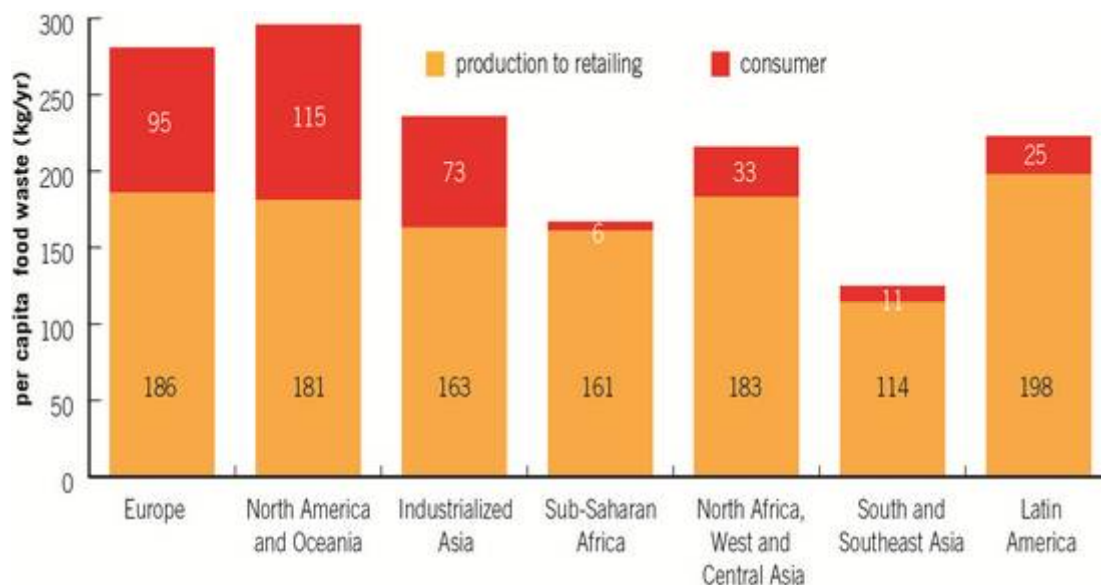
Note: Share of global food loss and waste, 2009, (100%=1.5 quadrillion kcal).

b. By food chain stage



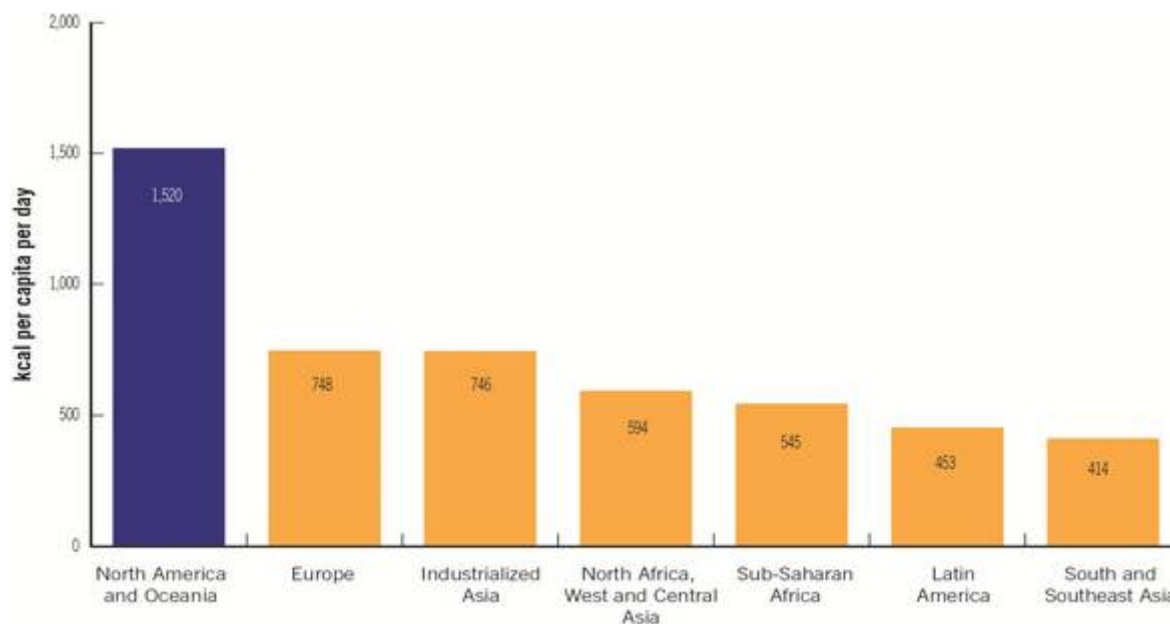
Note: Percent of total kcal lost and wasted, 2009. Numbers may not sum up 100 due to rounding.

c. In annual per capita kilograms



Note: Per capita food loss and waste, kilograms per year.

d. In daily per capita calories



Note: kcal/person/day.

Note: Developed regions include North America and Oceania; Europe; and industrialized Asia (China, Japan, and the Republic of Korea); the rest are considered developing regions.

Source: Brian Lipinski, Craig Hanson, Richard Waite, et al., "Reducing Food Loss and Waste," World Resources Institute Working Paper, June 2013; Jenny Gustavsson, Christel Cederberg, Ulf Sonesson, et al., "Global Food Losses and Food Waste—Extent, Causes and Prevention," FAO, Rome, 2011.

Why Should We Care More about Food Loss and Food Waste?

This astonishing volume of food loss and waste constitutes a serious food insecurity concern, because it reduces the availability of food for human consumption. According to FAO data,⁶ per capita food losses in the developed world average a whopping 250–300 kg per year, of which 75–115 kg are the result of consumers' waste. This total food waste in the developed world amounts to 750–1,500 kcal per person per day! In turn, the developing world loses 120–220 kg of food per person per year, which means that even regions ridden by undernutrition, such as South Asia and Sub-Saharan Africa, lose as many as 400–500 kcal per person per day, every day.

In addition to the food security dimension, food loss and waste also have grave economic, environmental, natural resource, and poverty implications. Food losses represent squandered investment in agriculture; cause unnecessary greenhouse gas emissions; generate enormous inefficiencies in the use of water, energy, fertilizers, and land; and reduce the incomes of (typically small) farmers, while requiring (poor) consumers to increase their spending to satisfy minimum calorie intakes. In effect, inefficiencies in terms of postharvest losses have been estimated to be up to US\$4 billion per year in Sub-Saharan Africa. In China, consumers' food waste is worth US\$32 billion a year, not far from the reported US\$48 billion in the United States.⁷ One hundred seventy-three billion cubic meters of water, 198 million hectares of land, and 28 million tons of fertilizers are used annually to grow food that is lost or wasted, and between 3,300 and 5,600 million metric tons of CO₂ equivalent greenhouse gas (GHG) emissions are created⁸ – representing 24% of all water used in agriculture worldwide and 10–15% of total GHG emissions in 2011.⁹ Ultimately, 1 calorie of food requires, on average, 7–10 calories of inputs to be produced.¹⁰ This average hides large differences across foodstuffs. For example, 36 calories of input are needed for 1 of beef. Similarly, producing 1 ton of apples requires, on average, 822 m³ of water; a ton of rice (paddy) requires 1,673 m³ of water; soybean oil (refined) needs 4,190m³ of water; and coffee (roasted) needs 18,925m³.¹¹

At the household level, in countries like the United States and the United Kingdom, an average family of four wastes US\$1,600 and US\$1,100 per year at the consumption stage, and evidence points to such losses as having increased over time.¹² In the Netherlands, using data from the Ministry of Agriculture, Nature and Food Quality, about US\$800 per family of four would be thrown away by households (€2.4 billion per year out a population of 16.8 million in 2010). By socioeconomic status, recent evidence for Turkey, South Africa, and Australia finds that lower-income groups waste less food than higher income groups in terms of weight, calories, and spending (table 2). All this evidence supports analyses reporting that higher-income households produce more solid waste (food and others) than poorer households.

Table 2
Food Waste by Socioeconomic Group, Selected Countries

Country	Lower-income group	Middle-income group	Higher-income group
Turkey, 2005: Total food waste per household in terms of grams per person per day	274	285	319
South Africa, 2011: Total food waste by household in grams per person per day	410	740	1,290
Australia, 2009: Total food waste by household per year in dollars	518	635	803

Source: Turkey: G. Pekcan, E. Koksai, O. Kucukerdonmez, and H. Ozel, "Household Food Wastage in Turkey," Working Paper ESS/ESA No. 6e, FAO, Rome (2006); South Africa: A. Nahman, W. de Lange, S. Oelofse, and L. Godfrey, "The Costs of Household Food Waste in South Africa," *Waste Management* 32, 2147–53 (2012); Australia: D. Baker, J. Fear, and R. Denniss, "What a Waste: An Analysis of Household Expenditure on Food," Policy Brief No. 6, Australia Institute (2009).

⁶ Gustavsson et al, 2011.

⁷ W. Zhou, "Food Waste and Recycling in China: A Growing Trend?" <http://blogs.worldwatch.org/nourishingtheplanet/food-waste-and-recycling-in-china-a-growing-trend/>

⁸ Lipinski et al, 2013.

⁹ As reported by Lipinski et al, 2013 and Environment Protection Agency (EPA), "Overview of Greenhouse Gases", 2014, <http://www.epa.gov/climatechange/ghgemissions/gases.html>

¹⁰ IME 2008.

¹¹ Lipinski et al, 2013

¹² These figures refer to present estimates as reported by Lipinski et al, 2013, and the Waste & Resources Action Programme (WRAP): http://www.wrap.org.uk/sites/files/wrap/Information%20sheet%20-20reducing%20household%20food%20waste%20in%20the%20UK%202012_0.pdf.

What Can It Be Done Better?

Despite a global problem, the causes of food loss and waste are context specific and multiple. The primary causes of food loss include inadequate agricultural practice knowledge, transport infrastructure and logistic systems, and poorly engineered storage facilities. Food waste is closely related to commercial practices and cultural factors. For example, in developed countries, large supermarkets purchasing policies may incentivize overproduction.

According to IME (2008) overproduction is encouraged when large supermarket chains impose penalties to suppliers if they fail to deliver agreed quantities during the year. Also, large field losses occur if physical appearance of the product pre- or postharvest does not satisfy certain high cosmetic standards. In addition, promotional offers and high-pressure advertising campaigns may encourage overpurchasing behaviors among consumers, which lead to food waste at home. Consumers' poor understanding of complex and conservative "use by" labeling may encourage food waste home. Wherever food is culturally regarded as a cheap and abundant item, it is more likely to become "grossly undervalued" and readily thrown away.¹³

Effective solutions to reduce food loss and waste clearly require multiple interventions. Even though it may not be realistic to expect zero food loss and waste, there are simple, promising, and cost-effective engineering solutions—specific to context and available technologies—already exist. These include evaporative coolers, already in use in Tanzania or India; hermetically sealed plastic storage bags for crops such as cowpeas in Nigeria; small metal silos that have been tested in Kenya; or the use of plastic crates—instead of bags—for harvesting tomatoes, such as in Afghanistan.¹⁴ On a larger scale, developing countries need to improve and expand infrastructure related to roads, railways, electricity generation, potable water supplies, heating, ventilation, and storage facilities. Another solution advocated by some analysts is the transfer of know-how and adaptation of agricultural education, training services, and management systems to less-developed countries

Particularly pertinent in developed countries are the purposeful efforts of the Waste & Resources Action Programme (WRAP) in the United Kingdom; Food Use for Social Innovation by Optimising Waste Prevention Strategies (FUSIONS) in the European Union; or the Food Waste Reduction Alliance (FWRA)¹⁵ in the United States. These initiatives are striving for more efficient waste management, for food and other resources; increased food donations; and changes in the behaviors, perceptions, and preferences of consumers and retailers. Internationally, more coordinated efforts are advocating raising awareness; setting targets; the transfer of knowledge and technologies; and resource mobilization.

A Humbling Corollary

Food loss and waste are much more than just the numbers and good intentions presented here. They are also much more than simply another *embarrassment of the riches* or ludicrous irony. This situation is a quintessential reflection of the world we live in today, and the world we may be leaving to generations tomorrow: future progress in agricultural production and climate change will mean very little to global food security if we keep losing and wasting between a quarter and a third of the food meant to be consumed.

Moreover, as the poorest in each society are the most affected by food crises and shocks, lack of progress in reducing food insecurity and mitigating food related risks will jeopardize the elimination of poverty. And it is convenient to remember that the progress in the reduction of hunger during the last 25 years has been slower than the reduction of poverty.

So, the expected elimination of extreme poverty and the reduction of disparities might not necessarily lead to a similarly substantive improvement in food security and nutrition unless a successful food strategy is in place. Reducing food loss and food waste is an important step in the right direction of reducing food insecurity; vulnerabilities and poverty.

¹³ IME, 2008

¹⁴ Lipinski et al, 2013

¹⁵ <http://www.wrap.org.uk/>; <http://www.eu-fusions.org/what-is-fusions/>; <http://www.foodwastealliance.org/>. For other examples, see Food Tank, "21 Inspiring Initiatives Working to Reduce Food Waste around the World," June 3, 2013, <http://foodtank.com/news/2013/06/twenty-one-inspiring-initiatives-working-to-reduce-food-waste-around-the-world>.

CIHEAM News



Prof. Dr Adel El-Beltagy is President of CIHEAM Governing Board since April 2011. He has been appointed Minister of Agriculture and Land Reclamation in Egypt on June 17th, 2014, joining the first ministerial cabinet under the newly elected president Abdel-Fattah Al-Sisi. He is also, among other positions, the Chairman of the International Drylands Development Commission (IDDC), Chair of the Food and Agriculture Research Council at the Egyptian Academy of Science, Member of the Supreme Council of Science & Technology chaired by the Prime Minister of Egypt, and a Professor of Agriculture, Arid Lands Research Institute, Ain Shams University, Egypt. Prof. El-Beltagy has also served as the Director General of the International Center for Agricultural Research in Dry Areas (ICARDA) from 1995 to 2006, and as Director / Board Chairman of Agricultural Research Center (ARC) of Egypt from 1991 to 1995).



At its 131st meeting in Chania (Greece) on 26th – 27th June 2014, the Governing Board of CIHEAM, formed by representatives of its 13 member countries, has stressed the quality of **Mr. Cosimo Lacirignola's** work since 1st October 2013, when he assumed the role of Secretary General ad interim. The Governing Board of CIHEAM has unanimously decided to extend the mandate of Mr. Cosimo Lacirignola. He will act as Secretary General of the Organisation until 31st December 2016, while keeping his function as director of the Institute CIHEAM-Bari.

Food waste and losses in the Post 2015 Agenda: Enhancing food system-wide thinking

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Twenty years after the Rio Earth Summit in 1992, the signatories of *The future we want* declaration committed themselves to the definition of a post 2015 UN development agenda responsive to both today's and tomorrow's global challenges and worthy of the aspirations of all countries and people for a better future¹. Building on the Millennium Development Goals (MDGs) and through an inclusive, open and transparent process, a set of Sustainable Development Goals (SDGs) is to be developed and will lead the international agenda until 2030. The SDGs are intended to eventually overcome two unresolved challenges for global governance; the one of implementation and the one of policy coherence for sustainable development in each and every country, regardless of their wealth².

Today more than ever³, food security, nutrition and sustainable agriculture are at stake for international governance in a sense that goes beyond food production. Despite the fact that the discussion on a food and agriculture SDG is very complex and encompasses many dimensions, we are here considering the importance to include food waste and losses in the post 2015 agenda, as it is a means to deeply think the sustainability of food systems.

Reducing food waste and losses for a sustainable future

In light of projections that world population will rise to 9 billion by 2050, feeding the planet has been presented as one of the crucial challenges ahead. What is noticeable about global discourses on food and nutrition security is that they are structured around the urgent need to end hunger. However, the main challenge is not one of volume for global production even if increases in food production are necessary and possible in many parts of the world to provide the necessary calories.

However, any increases in agricultural production will certainly also increase its footprint on climate change. Agriculture has been shown to contribute massively to climate change especially through greenhouse gas (GHG) emissions from its various activities and inputs it consumes. The Intergovernmental Panel on Climate Change (IPCC) estimates⁴ that GHG emissions from the agricultural sector account for 10–12% of the total anthropogenic annual emissions of CO₂-equivalents. Therefore simple increment of agricultural production without fixing food losses and waste will mean inevitable wastage of natural resources such as water and nutrients and resultant contribution to climate change without any economic gains in terms of actual produce consumed.

¹ See the Future we want: outcome document adopted at RIO+20 <http://www.un.org/en/sustainablefuture>

² See Voituriez, T. (2013), *A quoi servent les objectifs de développement durable ?*, Working Papers n°13/13, Iddri, Paris

³ FAO, IFAD and WFP. (2013). The State of Food Insecurity in the World 2013. The multiple dimensions of food security. Rome, FAO

⁴ IPCC. (2007). Synthesis report. In O.R.D. Metz, P.R. Bosch, R. Dave, and L.A. Meyer (eds). Fourth Assessment Report: Climate Change 2007. Cambridge University Press, Cambridge, UK

On the backdrop of all these challenges, all options to assure enough food for the projected population need to be pursued including reducing the food losses and waste which economically represented wasted natural resources such as water or nutrients. Conservative estimates suggest that saving the current agricultural output by a mere 50% could massively reduce the burden that world agriculture would have to incur to feed the people⁵.

It must be acknowledged that the challenges of food losses and waste are present at different phases in the food supply chain and are to be differentiated considering the different geographical regions. Whereas in the developed countries, much of the losses and waste occur at the consumption stage, in the developing countries it is in the immediate postharvest stage that most food losses and waste is registered⁶. In developing countries, postharvest losses of cereals and pulses and root and tuber crop deterioration in the field mean people endure food losses seriously affecting their food security status.

The dominant focus in agricultural research circles today seems to be solely bent on increasing agricultural yield. A quick scan of allocation of agricultural research funding shows that more than 90% of the resources are devoted to yield improvement and other related initiatives with very little left to save the yield that has already been attained or even planning to save the resultant yield that would come from such improvement initiatives⁷. It is worth noting that ever since the magic of green revolution in Asia that reputedly saved the region from an eminent food crisis, the focus since then has been on increasing agricultural yield. It is important to notice though that commendable efforts are being put in place to raise the profile of research directed at food losses and waste especially postharvest losses in the developing countries where hunger and food security challenges have remained endemic.

Much as every effort to increase yield is commended, it is equally important that necessary research to address challenges of food losses and waste especially postharvest losses need to be pursued as well, in order to ensure wholesome gains from increases in yield. Agricultural production entails utilisation of scarce natural resources and it is not economically rational to lose the yield. There is now growing realisation that to assure food security for the world, efforts will need to be directed at saving what has been produced as well. In the Mediterranean Basin, where the pressure on resources is one of the most worrying, reducing waste and losses could be helped by improving infrastructure and investments on logistics along the supply chain. The *Mediterra 2014* report suggests some points aiming at promoting a less wasteful and cleaner logistics system⁸.

From MDGs to SDGs

The eight Millennium Development Goals (MDGs) – which range from halving extreme poverty rates to halting the spread of HIV/AIDS and providing universal primary education, all by the target date of 2015 – form a blueprint agreed to by all the world's countries and the world's leading development institutions following the Millennium Summit of the United Nations in 2000.

A political framework was established to invest in development and, despite very mixed and discussed results, the MDGs have galvanized unprecedented efforts to meet the needs of the world's poorest. As the target date of the MDGs is approaching, the UN is working with governments, civil society and other partners to build on the momentum generated by the MDGs and carry on with an ambitious post-2015 development agenda aiming at integrating into a single framework the multiple dimensions of sustainable development.

The Rio+20 Conference held in 2012 mandated the creation of an inter-governmental Open Working Group, that will submit a report to the 68th session of the General Assembly containing a proposal for sustainable development goals.

⁵ Lipinski, B. et al. (2013), "Reducing Food Loss and Waste." Working Paper, Installment 2 of *Creating a Sustainable Food Future*. Washington, DC: World Resources Institute

⁶ Hanson (2013). Food security, inclusive growth, sustainability, and the post – 2015 development agenda. Background Research Paper, submitted to the high level panel on the post-2015 development agenda

⁷ Lele et al (2010). Transforming agricultural for development. The Global Forum for Agricultural Research (GFAR)

⁸ See CIHEAM (2014), *Mediterra 2014 Logistics and agro-food trade, a challenge for the Mediterranean*, Paris, Presses de Sciences Po

Challenges for addressing food waste and losses in the post 2015 agenda

According to FAO estimates⁹, one third of the food produced globally for human consumption is lost or wasted which translates to about an annual 1.3 billion tons. However, it has been suggested that the current estimates of food losses and waste are based on several decades old data¹⁰. Two issues can be identified in order to make more precise the current state of food losses and waste estimation and though to tackle it properly in the post 2015 framework: the methodology used for generating the data and the sheer age of the data. The very poor quality of information on the state of food waste and losses is really a critical challenge for developing countries that continue to suffer massively from food insecurity since they will be constrained in designing sustainable options to address malnutrition.

Perhaps this could be attributed to the minimal attention the issue of food losses and waste received in the aftermath of the Green Revolution when yields increased tremendously. Addressing food losses and waste then became a secondary issue considering that increment of yield of cereals which formed the core of staple foods for the majority became the focus at the detriment of institutional interest and devotion that would generate knowledge on food losses and waste.

In the discussions on the Post 2015 agenda, building indicators which will be measurable and verifiable is a pressing and important challenge. These indicators should reflect political preferences and development pathways and must be economic, socially and environmentally sound without infringing the principle of sovereignty (Voituriez, 2013). As Hanson (2013) suggested, the Open Working Group on SDGs established by the UN General Assembly proposed SDGs¹¹ with indicators such as reducing by 50% global food waste at retail and consumer level or reduce by 50% production and post-harvest food losses.

Regrettable though it may be that the proposed goals and indicators tend to separate food production and consumption instead of adopting a food demand management perspective, we can acknowledge that the post 2015 agenda offers a unique opportunity to put in place universal guidelines. It will certainly galvanise global efforts to reduce food losses and waste.

The challenges of food losses and waste in the developed and developing countries are remarkably different. Whereas in the developed world a huge chunk of the waste and losses occur at the point of consumption, in the developing countries, it is in the immediate postharvest period.

Thinking through the lens of food demand management makes great sense when it comes to postharvest losses in developing countries where losses are mainly attributed to rudimentary storage facilities, which are unsuitable to guard against invasion by pests and rodents and vagaries of weather. There are also issues with handling facilities especially where the food has to travel through the supply chain before it reaches the final consumer.

This has also presented a special challenge for farmers in developing countries who have been attempting to evolve into commercial farming in the sense that they are mostly forced to sell their produce shortly after harvest at the time of abundance and thus fetch low prices. With the changing trends in nutrition in developing countries with growing middle-income consumers eating more animal and fresh horticultural produce, which are extremely perishable, the problem of storage infrastructure is going to be a veritable one.

The environmental and economic "win-win" logic behind a goal to reduce food losses in developing countries is quite obvious since it will be easily translated into projects and investments (storage facility, transportation infrastructure, cold chain...) however, when it comes to food waste in developing countries it is far more delicate to put the global directions into operations. Indeed it comes not only to consumer behaviours but also to marketing and packaging practices and food safety provisions.

On top of that, with the ongoing socioeconomic transformation in developing countries with an ever-growing population moving to urban areas, the food supply chain has to change as well to feed the growing urbanites¹² to be sustainable in the long run. Whether it is in developing or developed countries, the issue of the accountability mechanism is very crucial.

⁹ FAO. (2011), *Global food losses and food waste – extent, causes and prevention*, FAO, Rome

¹⁰ Parfitt et al (2010). Food waste within food supply chains: quantification and potential for change to 2050. *Phil. Trans. R. Soc. B*, 365, 3065-3081

¹¹ SDG2: « End Hunger, achieve food security and adequate nutrition for all, and promote sustainable agriculture » and SDG12: "Promote sustainable consumption and production patterns", *Proposed goals and targets on sustainable development for the post 2015 development agenda*, 2 June 2014

¹² With the current projections more than half of the African population will be living in urban areas by 2030

Identifying responsibilities and accountability along the food supply chain

Contrary to the MDGs, the SDGs will be universally applicable to all countries. They will involve many more stakeholders in the implementation phase to achieve actions at all levels. Building the SDG monitoring and accountability mechanism will be a challenging but necessary process to ensure its future legitimacy¹³. We will raise some questions regarding who will be held accountable for undertaking actions to reduce food waste and losses.

Farmers' handling of produce at harvesting has serious implications on their suitability for downstream consumption. Any damage to produce or inappropriate handling at harvesting could result in rapid deterioration in its quality. This is why farmers or generally growers need all the support and benefit of developments in improved methods of harvesting and immediate postharvest handling to conserve the quality of produce before it reaches consumers or agro processors. Many of these low cost technologies already exist and there is an urgent need to roll them out to farmers¹⁴.

On the other hand, consumer's choices can hugely save the amount of food that is lost and indeed wasted. Looking at the massive produce that never gets sold because of minor bruises is a clear indication that consumer definition of what is worthy for consumption hugely affects food losses and waste. There is need for awareness campaign regarding the way we consume, keeping in mind that the food safety regulations are necessary to ensure the good quality of food. A couple of success stories such the Waste and Resource Action Programme (WRAP) of UK which achieved between 2007 – 2010 13% reduction in household food loss and waste through media campaigns dubbed 'love food, hate waste' offer a ray of hope. Similar initiatives in Rwanda and India have achieved even comprehensive results in excess of 60% savings in food losses and waste by using simple low cost storage and adoption of better produce handling options (Hanson, 2013) and so, public intervention can indeed help to reduce household food loss and waste.

Farmers and consumers are not the only actors to be held accountable for reducing food waste and losses. Indeed, food supply chain actors and markets share a part of the responsibility to the extent of their involvement in the processing of primary production into finished products. The food supply chain does an impressive work in delivering food to consumers and more than often have to undertake elaborate storage and sometimes processing before the food gets to the final consumer.

Considering that the food spends considerable time in their possession, they become a critical actor in addressing the issue of food losses and waste. Efforts on the part of the food supply chain actors involved in the marketing and delivery of food to final consumers in investing in appropriate handling and storage technologies could drastically reduce the current losses and waste. On top of that, they also play a critical role in setting the standards of what consumers get and how producers should produce to make the process of food-processing safer, easier and cheaper. They then have a large influence in setting market preferences upstream and downstream.

The post 2015 Agenda, being an agenda for Development, there should also be some accountability mechanism directly targeting donors and Official Development assistance since their massive contribution in agricultural development and food security gives them a unique position to champion the need to address the challenge of food losses and waste in the developing countries.

Conclusion

Whatever is the degree of hope that the post 2015 Agenda is arousing, one can expect from this new framework that it will trigger in a certain direction the funds available for development. On top of that, the SDGs framework must answer a growing demand, going beyond the global commitment and face internal debates on sustainable development across the world.

The issue of food losses and waste is one of many very specific challenges for designing sustainable food systems where food is produced, processed and consumed in a way that conserves natural resources, mitigate impacts on climate change and raise prosperity for all. Reducing food losses in developing countries seems quite easy, with good will and determination, but exactly how cutting down food waste is a whole can of worms, for sure.

¹³ See Zeitz P, *Joining Forces Through 'Mutual Accountability' to Achieve the SDGs by 2030*, The Huffington Post 7th May 2014

¹⁴ see Lipinski, B. et al. 2013. "Reducing Food Loss and Waste." Working Paper, Installment 2 of *Creating a Sustainable Food Future*. Washington, DC: World Resources Institute

In the light of the Rio+20 Conference outcomes, the Contracting Parties to the 1976 Barcelona Convention, a review process of the Mediterranean Strategy for Sustainable Development (MSSD) has been launched in February 2014 to make sure that the region remains a frontrunner in the area of environmental and sustainability governance. Action to reduce food losses and waste might then be taken by the Mediterranean Action Plan since it stated as one of its objectives to change unsustainable production and consumption patterns. Taking action at the Mediterranean level is already an innovative solution to overcome the challenge of implementing the SDGs since there are, on top of the MSSD, forums of cooperation and multilateral platforms. The CIHEAM - which is one of them - has been called by 13 Mediterranean ministries of Agriculture to take practical steps and concrete action towards reducing food losses and waste¹⁵.

With the definition of the post-2015 Agenda, the Milan Universal Exposition "Feeding the Planet, Energy for life" and the 21st Conference of the Parties to the United Nation Framework Convention of Climate Change, 2015 sounds to be an exciting and promising year to come for the Mediterranean, filled with new scientific opportunities and development challenges.



CIHEAM Best Thesis 2013



The CIHEAM's Governing Board, during its 131th meeting held in MAI of Chania on 26 and 27 June 2014, having read the report elaborated by the Advisory Board, decided unanimously to award the prize for the best CIHEAMS thesis for the year 2013 to:

- Mrs Heval Yildirim (Turkey) for her research work conducted at CIHEAM-Montpellier, and entitled «*Social analysis of the lifecycle for the processed tomatoes exported from Turkey to France* ». This study is significant within and even beyond the Mediterranean region and it should have important implications in terms of rethinking the supply chain approach in a sector strategic for Mediterranean agro-food systems. The methodology developed by the candidate includes a broad set of indicators and direct surveys. The work underlines well the structure of the tomatoes value chain and the contribution provided by actors and institutions involved; suggesting options aimed at reinforce and better balance the process of value creation in the tomatoes sector. The candidate is preparing a manuscript for publication in refereed scientific journals.
- Ms Melissa Si Ammour (Algeria), for her research work conducted at CIHEAM-Bari, and entitled «*Development of LAMP-PCR methodology for Monilinia spp. detection and the correlation with environmental parameters*». This study applies a trans-disciplinary approach to address a topic which is of global importance. The author and her advisors are strongly recommended to consider making the methodologies and results available to the scientific community and the broader public (including the commercial sector) through appropriate dissemination strategies, which would give CIHEAM relevant visibility.

¹⁵ See the Declaration of Algiers, adopted on 6 February 2014, by the 13 ministers of Agriculture of the CIHEAM Member Countries (available at www.ciheam.org)

Tackling Food Losses and Waste in the Mediterranean: from knowledge to action

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Weakest points in the agro-food chain

Worldwide there is growing recognition of the extent of food losses and waste (FLW) all along food chains, from production to consumption, and of the need to reduce them in order to improve the sustainability of food systems and their capacity to ensure food security now and in the future (HLPE, 2014). It is estimated that, at global level, about one-third of food that is produced for human consumption is lost or wasted (FAO, 2011).

Various studies have underlined that FLW impact directly and indirectly food security and nutrition and that reducing them is an essential way to reduce the environmental impacts of food systems and thus preserve their capacity to sustain the increase of the global demand for food in the future. "A sustainable food system (SFS) is a food system that ensures food security and nutrition for all in such a way that the economic, social and environmental bases to generate food security and nutrition of future generations are not compromised" (HLPE, 2014). FLW represent, particularly in the face of persistent hunger and malnutrition, a waste of resources.

At global level, food loss and waste (FLW) and their reduction have thus been identified as a major issue for food security and the sustainability of food systems. Reducing FLW and progressing towards sustainable food systems are two pillars of the Zero Hunger Challenge launched by the Secretary General of the United Nations at the Rio+20 conference in 2012. The Committee on World Food Security is going to discuss FLW in the context of sustainable food systems at its next session in October 2014, informed by a report of its High Level Panel of Experts on food security and nutrition.

Global reports show that, although FLW are important everywhere, their distribution along food chains and their causes, as well as the solutions to reduce them, are very context specific, depending on regions, countries and products. This is why the HLPE (2014) recommends a way forward to food losses and waste in four steps: gather information and data; diagnose and develop strategies; act individually and collectively; and coordinate policies. This paper aims to contribute to such an enterprise in the Mediterranean area. It starts by briefly recalling the sustainability challenges to which Mediterranean food systems are confronted, particularly limited natural resources, and the role that FLW reduction can play to address them. Reducing FLW has been thus identified as an important area of work by FAO regional conferences for the Near East and for Europe as well as by the CIHEAM. This calls in turn for better understanding FLW in Mediterranean countries as well as ongoing initiatives in order to promote action at appropriate levels. It concludes by indicating potential areas of work for FAO and CIHEAM as part of their cooperation on sustainable food systems.

Sustainability challenges for food systems in the Mediterranean area: a role for reducing FLW

Food systems in the Mediterranean area are confronted to major sustainability challenges (Lacirignola *et al.*, 2014). Some countries of the area are still experiencing food insecurity and malnutrition. Population is increasing rapidly and steadily in the South. Food demand in the region is increasing, driven by population and income growth as well as by a shift away from the Mediterranean diet pattern and towards more livestock products consumption. At the same time, agricultural production in the area has to deal with fragile and limited natural resources, particularly in the South. Agriculture is the main water user. Water scarcity is the most critical development problem and a main factor limiting agricultural growth. In many low rainfall areas most of the exploitable water is already exploited and rivers and aquifers are often depleted beyond sustainable levels.

The Mediterranean is also particularly prone to soil erosion and land degradation (CIHEAM, 2014), due to low global rainfalls, long droughts episodes followed by violent rains, combined with a restricted vegetation cover often submitted to overgrazing. These challenges are exacerbated by climate change, with the Mediterranean being considered as one of the regions of the world where global warming will impact the most the environment and human activities that depend on it.

The densely populated and intensely cultivated areas of the Mediterranean, as well as rangelands on fragile soils are considered by FAO as "systems at risk" which are also confronted to increasing competition for scarce resources, water, fertile and flat land, with other economic activities and urbanization, particularly in coastal areas. Many countries in the region are increasingly dependent on food imports and thus exposed to food price volatility. All these reasons make efficient use of resources particularly important in the Mediterranean. Reducing FLW can be key to improving resource use efficiency and preserving scarce resources and fragile ecosystems.

A political momentum to address Food Losses and Waste

FAO regional conferences for the Near East and for Europe, as well as the CIHEAM have identified FLW as a major concern and their reduction as a key area of work.

The Regional FAO Conference for the Near East¹ discussed the issue in 2012 and requested FAO to assist Member countries in addressing the key challenges of reducing food waste and losses by conducting comprehensive studies on impact of food losses and waste on food security in the region and in establishing a plan to reduce food losses and waste in the region by 50 percent within ten years (FAO, 2012). In 2014 it discussed a strategic framework for reducing FLW in the Near East and North Africa Region (FAO, 2014a).

The Regional FAO Conference for Europe² requested FAO in 2012 to prepare a study on food waste in the European and Central Asia region including policy recommendations for reducing post-harvest waste³ and discussed the issue during a ministerial round table in 2014.

The 10th meeting of the Ministers of Agriculture of CIHEAM's member's countries in Algeria in 2014 has identified reducing FLW as a key area of work. At this occasion, it has been emphasized the potential of a collaboration between CIHEAM and FAO on this issue, as part of the work on sustainable food systems. In this context CIHEAM and FAO are developing a program of work on FLW in the Mediterranean area.

Gather available data on FLW, extent, causes, policies to reduce them

Global data have been constructed by extrapolation, bridging knowledge gaps by making assumptions and using data calculated for products and/or countries supposed to be comparable to fill the gaps (FAO, 2011, HLPE 2014). This has two important consequences. First of all, global data have a certain, unknown, degree of uncertainty and there is a need to fill the gaps as accurately as possible. Second, and even more importantly, global or regional figures cannot be down scaled to countries without introducing major error risks. Therefore, action at country or sector level often has to begin by gathering appropriate data.

According to global studies (FAO, 2011; HLPE, 2014), there are major differences between regions and countries in the distribution of FLW along the food chain. In low income countries the biggest share of FLW happens in the beginning of the food chain, during agricultural and post-harvest steps. In high and middle income countries the biggest share of FLW is at retail and consumption stages. Such differences are due to differences of causes, themselves linked to different food systems (HLPE, 2014). Understanding these differences can help identify critical areas as well as means for improvement.

¹ Near East: Egypt, Iran, Iraq, Jordan, Lebanon, Sudan, Syria; North Africa: Algeria, Libya, Morocco, Mauritania, Tunisia; Gulf Cooperation Council States and Yemen: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates, Yemen

² FAO Member Countries in Europe and Central Asia: Albania, Andorra, Armenia, Austria, Azerbaijan, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Luxembourg, TFYR of Macedonia, Malta, Moldova, Monaco, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Russian Federation, San Marino, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Tajikistan, Turkey, Turkmenistan, Ukraine, United Kingdom, Uzbekistan; Member Organization: European Union.

³ Report of Twenty-eighth FAO Regional Conference for Europe, (Paragraph, 27. b) Baku, Azerbaijan, 19 and 20 April 2012.

In response to the request of the FAO Regional Conference for Europe (ERC) 2012⁴, within the framework of the FAO flagship programme *Agrarian Structures Initiative* in Europe and Central Asia, the regional office has initiated work on regional assessment of FLW and the identification of policy options for the reduction of FLW in the region. The project intends to improve the understanding of the underlying causes of FLW along selected food supply chains in developing countries in the region, and contribute to global assessment and initiatives to address the issues of FLW. The project approach was to update and upgrade the assessment of FLW in the Europe and Central Asia region using the methodology applied in the global FLW study, and to identify and analyse critical points of FLW along selected food supply chains in developing countries in the region.

In April 2014 the FAO Europe and Central Asia Regional Office published the Draft Synthesis Report on FLW in Europe and Central Asia⁵ with an overview on three country studies (Armenia, Turkey and Ukraine). The study, based on the methodology applied in the 2011 FAO Global Food Losses and Waste study, presents an overview and analyses FLW critical points along selected food supply chains and provides policy options. In the specific case of the Turkish study, the aim was to quantify FLW and identify reduction options that contribute to food security by increasing food supply, in order to better integrate the need that food and nutrition security has to consider concurrently all four dimensions: availability, access, utilization and stability.

Table 1
The percentages of food loss in Turkey

	Agricultural Production	Post-harvest handling and storage	Processing and packaging	Distribution	Consumption
Cereals	5.1%	4%	2%	1%	5%
Roots and tubers	7%	6%	2%	3%	2%
Oilseeds and pulses	15%	5%	7%	1%	4%
Fruit and vegetables	20%	8%	10%	10%	5%
Meat	10%	0.2%	5%	0.5%	1%
Fish and seafood	10%	0.2%	0.04%	0.01%	2%
Milk	10%	1%	1.5%	6%	1.5%
Eggs	6%	1%	2%	1%	0.01%

Source: FAO, 2014b.

The study has also been used as input for the paper "Food Losses and Waste in Europe and Central Asia"⁶ discussed at the Ministerial Roundtable during the 29th Regional Conference for Europe in Bucharest, Romania (2-4 April 2014). The paper highlights the need for a harmonized definition, comparable appraisal methodologies, and coherent and comprehensive policy measures that help achieve stated objectives of food and nutrition security and sustainable food systems where reduction of FLW has to be integrated in a broader framework.

Towards action

The work on FLW of the FAO's Regional Office for the Near East and North Africa in the Southern Mediterranean stems from heightened awareness of the issue among stakeholders and a growing commitment to concrete action. Information available on the Near East and North Africa region shows that roughly 44 percent of food losses and waste occur during handling, processing and distribution of food while waste at the consumption stage is estimated to be 34 percent, of which most is generated in urban areas.

⁴ Report of Twenty-eighth FAO Regional Conference for Europe, (Paragraph, 27. b.) Baku, Azerbaijan, 19 and 20 April 2012

⁵ http://www.fao.org/fileadmin/user_upload/Europe/documents/Publications/FLW/synthesis_draft_en.pdf

⁶ <http://www.fao.org/docrep/meeting/030/mj621e.pdf>

A request was made to FAO by the Region's governments (FAO member countries in the Near East and North Africa) in 2012 for support in reducing FLW by 50% over a ten year period. To develop the strategic framework, a process was set in motion to take stock of existing data and knowledge and apply strategic thinking to identify causes, potential solutions, and consult broadly with governments and various stakeholders. The process led to (i) the 2012 *Expert Consultation Meeting on Food Losses and Waste Reduction in the Near East Region*; (ii) the 2013 *Consultative Workshop for the SAVE FOOD Regional Network of Near East and North Africa*; (iii) and the 2013 *Regional Multi-stakeholder Workshop on Food Security and Nutrition*.

The key output of the process was the development of a Regional Strategic Framework for *Reducing Food Losses and Waste in the Near East and North Africa Region* presented at the 32nd Near East Regional Conference in February 2014 and endorsed by all Member Countries.

The resulting Near East and North Africa Strategic Framework (FAO, 2014a) proposes four components which respond to the major challenges identified in the Region, and provide a launching point for action: (i) improve data gathering, analysis, and information; (ii) raise awareness and promotion of good practices among farmers, consumers and those who handle food all along the supply chains; (iii) develop policies, regulations, and strengthen collaboration and coordination among people, institutions, and countries; (iv) and promote investment and engage the private sector. Together, these components serve to guide strategies and initiatives for FLW reduction at national and regional level over the next ten years.

The FAO Regional Strategic Framework calls for the full participation and cooperation of a broad range of institutions and stakeholders to reduce FLW all along the food chain in the 19 FAO member countries as well as awareness on food waste by consumers.

The Strategic Framework also points to recent experiences and accomplishments in the region including national and regional consultations; the adoption of national initiatives to reduce FLW in Egypt and the Kingdom of Saudi Arabia; and significant measures that have also been taken in some countries of the region such as Iraq, Iran, the United Arab Emirates (UAE), and Tunisia.

National initiatives

Several Mediterranean countries have initiated policies and programs to reduce FLW (see also in the same issue of this watch letter: the case of Turkey, Lebanon...), either sectorial, as for bread in Turkey and Egypt, a key product in many Mediterranean diets, or for cold chains in Tunisia, or covering the whole food system.

In January 2013 the Turkish Grain Board and the Ministry of Food, Agriculture and Livestock together with relevant stakeholders launched the Campaign on Preventing Bread Waste. The Campaign was initiated after the "Bread Waste and Consumer Habits Research" (2008 and 2012) by the Turkish Grain Board (TMO) revealing that bread waste could occur at any phase of production and consumption stages as a result of "neglect and ignorance". The objectives were therefore tailored from production to consumption level for: (i) awareness; (ii) potential contribution of waste reduction to an efficient national economy; (iii) draw attention that bread used for feeding animals is also wasted; (iv) and promote consumption of whole wheat bread for healthy diets.

At the end of 2013 an assessment⁷ of the Campaigns' impacts was performed. Data collection covered 12 cities with 257 bakeries, 50 flour mills, 53 staff dining halls, 53 student dining halls, 632 hotels & restaurants, 473 staff/students & 5,652 family members in 1,648 households. From 2008 to 2013 the program conducted close to 500 activities among which 19 symposiums and panel discussions, 297 conferences and presentations, 10 fairs, 41 cooking competitions about stale bread, 13 festivals and feasts. The program achieved: (i) a reduction of 18% on average in waste from 2011 to 2012; (ii) a reduction of bread waste which was 5.9 million loaves per day (2.17 billion loaves per year) and in 2012 decreased to 4.9 million loaves per day (1.8 billion loaves per year) in 2013; therefore, 1 million 50 thousand loaves each day, equal to 384 million loaves of bread each year have been saved. The value of bread waste, which was 1.6 billion TL (around 697 million US Dollars) in 2012, has been reduced to 1.3 billion TL (around 565 million US Dollars) with 300 million TL (around 131 million US Dollars) worth of saved bread. Forty percent of this reduction was registered in households, staff dining halls and student dining halls.

There is also a particular attention to bread losses and waste in countries where it is subsidized such as in Egypt as shown by the reform of the *baladi* bread supply chain (HLPE, 2014).

⁷ Turkish Grain Board and FAO, 2014

For perishable foods, temperature management is a key to reducing FLW. Cold chain management often depends on broad interventions involving actors all along the food chain with the support of public authorities. In Tunisia the food security strategy includes the development of the cold chain, harmonization of food safety and quality towards international standards and a reinforcement of controls. The national plan for cold includes investments and incentives. It has enabled to increase by 65 percent in 10 years the cold storage capacity, which is completed by 3000 refrigerated vehicles and 1500 isotherm vehicles. 70 percent of it is dedicated to fruits and vegetables, mainly for export. 87 percent of this storage capacity is managed by the private sector (HLPE, 2014).

Several countries have launched broad multi-stakeholder initiatives. In June 2013 France launched its National Pact against Food Waste after a 6-month consultative process. The pact is multi-stakeholder and targets a 50% FW reduction by 2025 including primary production, industry, hospitality, regulators and potential donors of safe and nutritious surplus food. The 2013-2016 Spanish strategy addresses targets in transparency, dialogue, and coordination with five action areas:

- improve understanding of causes;
- promote good practices uptake;
- review regulatory framework;
- enhanced multi-stakeholders collaboration;
- promote innovative technologies. At subnational level, local and regional authorities often play an important role, as in Catalonia for instance.

A key area for cooperation between CIHEAM and FAO

The HLPE report on Food losses and waste in the context of sustainable food systems (2014) has underlined the diversity of situations and causes and that FLW are in fact very dependent on food systems. It also pointed to the need to improve knowledge on FLW and understand their causes within the diversity of countries and food systems.

The initiatives mentioned above show that solutions have to be context specific and adapted to local situations. To better address the issue thus requires better, context specific, knowledge on the extent and causes of FLW in the Mediterranean and on solutions to address them. A differentiation of levels of causes, such as proposed by the HLPE (2014) can be instrumental to better identify potential solutions, the role of the various actors and in particular of public authorities.

More accurate knowledge of FLW and understanding of their causes in diverse contexts could also help compare situations and thus facilitate up scaling and exchange of good practices. Such comparisons and exchanges would be easier at regional level (FAO, 2013) and could be particularly fruitful in the Mediterranean area given the diversity of countries' situation. They could build on the political momentum to tackle FLW and foster cooperation, both South/South and North/South and coordinate action.

CIHEAM and FAO, as part of their cooperation on sustainable diets and sustainable food systems in the Mediterranean, are joining efforts to gather data and knowledge on FLW and actions to reduce them in the area. It benefits from the various initiatives of the two organizations as well as of the Feeding knowledge network⁸ established for Expo Milano 2015. It will be completed by an inquiry towards CIHEAM member's states and by the results of a public consultation.

This work stream specifically aims to improve knowledge on FLW in the Mediterranean: extent, causes, proven solutions in order to identify knowledge gaps, priorities for research and action and support countries in designing their own strategies and plans of action by providing them available knowledge and good practices. It can then support exchanges of good practices, training and capacity building which have been identified by *The Expert Consultation Meeting on Food Losses and Waste Reduction in the Near East Region* (FAO, 2013) as well as by the HLPE report (HLPE 2014) as key to reduce FLW at every stage of the food chain.

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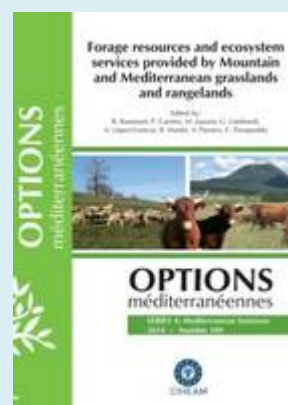
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om.ciheam.org

Solving the Global Food Waste Scandal: Opportunities in the Mediterranean

Niki Charalampopoulou

Managing Director, Feeding the 5000, UK



In the Western world, we waste nearly as much as we eat: between a third and half of all the food produced in Europe and North America ends up being wasted. Focusing on Mediterranean countries, more than 7.6 million tonnes of food are wasted each year in Spain. The statistics are echoed across the European Mediterranean with France wasting 9 million tonnes and Italy 8.8 million tonnes each year. The lack of data concerning the Southern and Eastern Mediterranean Countries means that research and cooperation on this matter needs to be improved. This article aims to provide some global considerations on Food Waste scandal and local initiatives developed across European countries last years, convincing by the capability of Mediterranean Societies to reduce the waste of Food given their historical knowledge to manage scarce resources.

Tristram Stuart

Founder, Managing Director, Feeding the 5000, UK



The Food Waste Pyramid

Wasting this amount of food is ethically wrong in a world with more than a billion hungry people. The resources embedded in food production – such as land, energy and water – massively increase the impact of this scale of waste on our planet's finite capacity to sustain us and other life. About 10% of all greenhouse gas emissions arise from producing food that no-one eats. We are expanding agricultural land and moving into the world's remaining rainforests to grow food that is then wasted in farms, factories, pack-houses, supermarkets, restaurants and homes. Waste has become so endemic to food production that we now accept as common practice attitudes and practices that were taboo to our ancestors. The planet simply cannot sustain this system.

Ian Wilkey

Intern, Managing Director, Feeding the 5000, UK

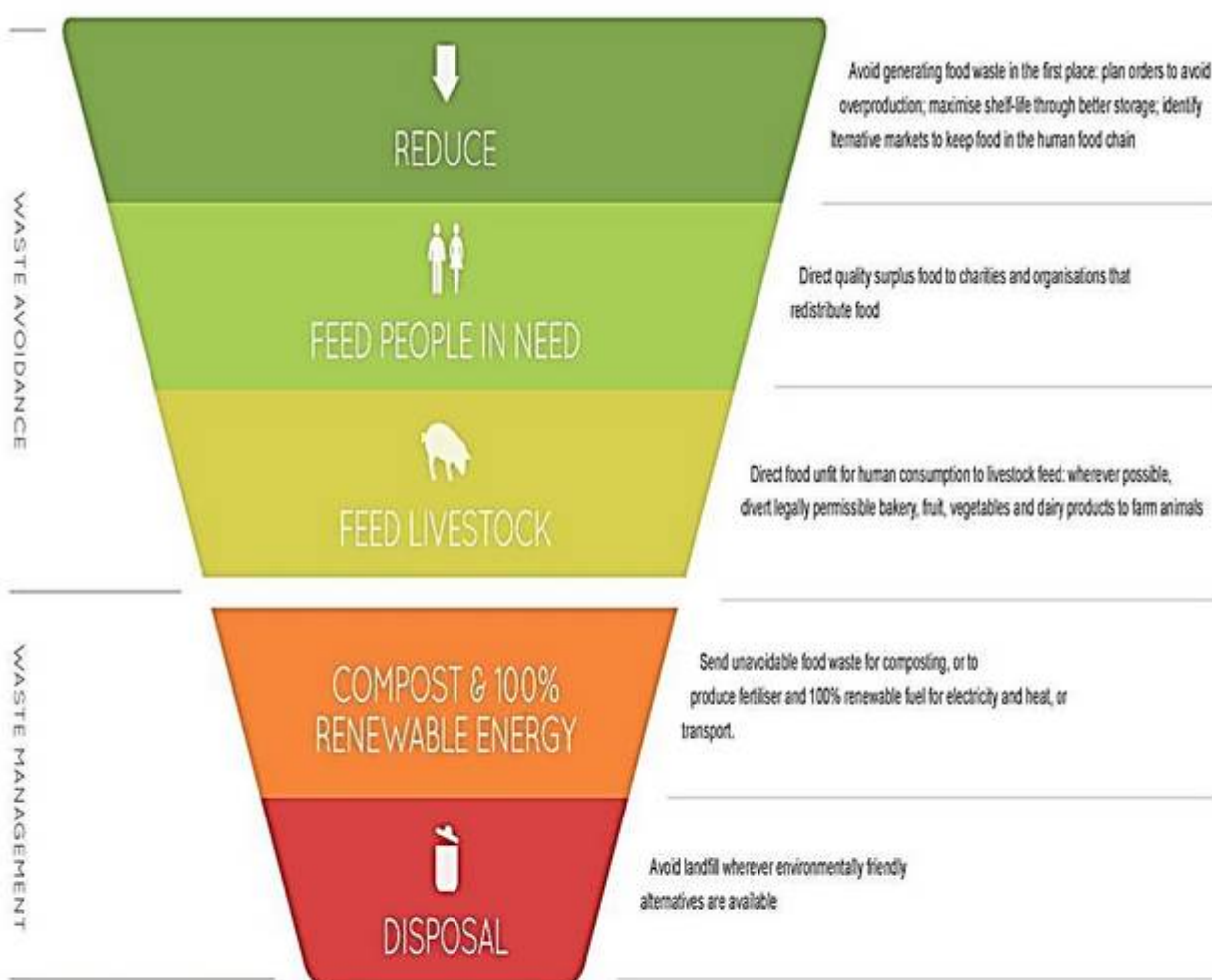


Food waste has different causes at different points of the supply chain. It is a complex problem but the solutions are simple, often require little sacrifice and present substantial benefits for both the industry and households that take measures to reduce it. This is in contrast with the measures necessary to tackle other pressing environmental problems such as climate change, which often require substantial investment in infrastructure as well as taxes on heavily polluting activities that are often met with political opposition. All it takes to solve the food waste problem is bringing common sense back into the food system, a principle which can be summarised in the Food Waste Pyramid (see graph below): utilising what we can and reducing production of unnecessary surpluses; redistributing surplus food to entities that support vulnerable people in need of nutritious food; feeding food not fit for humans to livestock; and only then turning to other waste disposal solutions, such as composting or anaerobic digestion.





the Food Waste Pyramid



Global Waste and Local Challenges

In a globalised food supply chain, the people who depend on the same 'common stock' of resources are no longer necessarily our neighbours, nor even our compatriots. They may live many thousands of miles away, but many people in Asia and Africa still depend on the global marketplace for their food. How do we answer for the estimate that 179kg per capita in Europe¹ are wasted each year while according to the FAO more than 870 million people throughout the world suffer from chronic malnourishment?

In preparation for a recent project in Nairobi, Kenya, in partnership with the United Nations Environment Programme's Think.Eat.Save campaign, our team met many farmers supplying Western markets who were forced by trade arrangements to waste large quantities of food on a regular basis in a country where 3 million people are dependent on food aid. To mention an example, we spoke to a farmer who wastes 40 tonnes of edible green beans, broccoli, sugar snaps, and runner beans every week, primarily because they are the wrong size, shape or colour. This is enough to provide meals for over 250,000 people, and equates to 40% of his entire crop. On another farm a few hundred kilometres from Nairobi every green bean is cut down by around a third before it goes to market. Stringent standards over appearance from European Retailers mean that only straight beans which have been trimmed on both ends for uniform size and length are desirable.

Large retailers often cancel forecast orders, sometimes even when produce has already been grown, harvested and packed - without paying any costs to farmers. As the retailers don't pay for this waste, they have little incentive to reduce it, and farmers have no other choice than to pay for large harvests that they cannot sell. Some of this unwanted produce is sold on the local market or donated, but the quantities are so large that local markets cannot handle the volume and so much of it is either left to rot or fed to livestock.

Whether it is fresh fruit and vegetables rejected by supermarkets for failing to meet arbitrary cosmetic standards, or manufacturers forced to discard millions of slices of good fresh bread because supermarkets don't like their sandwiches to be made from the outer slices of a loaf, or whether it is the waste we all daily witness in our own homes - all of this represents land, water and other resources that could be put to better use than filling waste containers with food.

Wasting food uses up the world's limited available agricultural land. If rich countries wasted less this could liberate agricultural land for other uses - and this applies even for fresh produce grown and purchased within individual nations. If that food wasn't being bought and wasted, the land and other resources could be used to grow something else, including food such as cereals that could contribute to much-needed global supplies.

Concerns in the Mediterranean: the Spanish case

Hunger and malnutrition are not exclusively foreign concerns; millions in the developed world also do not have enough to eat. According to UNICEF, more than 322,000 children living below the poverty line in Greece are unable to meet their daily nutritional needs while at the same time Greeks waste more than an estimated 100kg per capita each year.² In Spain, the number of people living in poverty has been sharply on the rise due to the financial crisis. According to national statistics, about 22% of the Spanish population (more than 10 million people) live in conditions of poverty, which is defined as those earning less than 50% of the Spanish medium income.³ Around 2 million people live on less than €300 per month, which means they are struggling to afford a decent diet. Yet the waste from Catalonia alone, more than 1.18 million tonnes, could feed 500,000 people for one year.⁴

Here one potential solution is for surplus food to be given to organisations such as food banks, or redistribution hubs such as Spain's extensive network of food banks all under the umbrella of the *Federación Española de Bancos de Alimentos* (FESBAL). FESBAL has reported a sharp increase in the demand for its services, attending to the needs of 1.3 million beneficiaries up from 1.15 million in 2010. In terms of quantities, in 2010 FESBAL's food bank members redistributed 80 million kgs of food and in 2013 this number increased to 100 million kgs of food that would have otherwise been left to perish. Demand for nutritious meals from people who cannot afford them has risen as a result of the economic crisis in Greece as well. Some Food Banks in Athens have reported more than a tenfold increase in the number of people coming to them for food aid.

¹http://ec.europa.eu/environment/eussd/pdf/bio_foodwaste_report.pdf

²http://athens2014.biowaste.gr/pdf/abeliotis_chroni_et_al.pdf

³ EAPN (2011) Las cifras de la pobreza y la exclusión social en España, Madrid, 2011

⁴[http://www20.gencat.cat/docs/arc/Home/LA Agencia/Publicacions/Centre%20cata%20del%20reciclatge%20\(CC R\)/guia_consum_responsable_EN.pdf](http://www20.gencat.cat/docs/arc/Home/LA Agencia/Publicacions/Centre%20cata%20del%20reciclatge%20(CC R)/guia_consum_responsable_EN.pdf)

Many countries in the Mediterranean are beginning to recognise the importance of addressing food waste across the supply and consumption chains. Preliminary findings from the Spanish Ministry of Agriculture, Food and Environment (MAGRAMA)⁵, the Italian *Programma Nazionale di Prevenzione dello Spreco Alimentare* (PINPAS)⁶, the French Agence de l'Environnement et de la Maitrise de l'Energie (ADEME)⁷ and the Greek Study entitled "Food Waste Within Households: A Review on the Generated Quantities and Potential for Prevention"⁸ all emphasise that there are major data shortages when it comes to measuring food waste in the supply chain. Across the Mediterranean there is an urgent need for more data on where, how and why food is being wasted, so that governments, civil society and innovative entrepreneurs can put in place the measures that will tackle the issue.

Feeding the 5000

The *Feeding the 5000* campaign's (www.feeding5k.org) flagship events provide a free hot meal to 5,000 members of the public, made entirely from fresh produce that would otherwise have been wasted: wonky carrots, misshapen potatoes, offal and other delicious but unwanted food. The aim is to engage people from all walks of life, who taste the food and wonder: why should this ever be wasted? The event has taken place in London in 2009 and 2011 and has so far been replicated in many cities throughout Europe and beyond, including Amsterdam, Paris, Nairobi, Brussels and Nantes.

The *Feeding the 5000* team has partnered with EU Fusions, a four year project to tackle food waste across the EU and UNEP's 'Think.Eat.Save' campaign to organise many of these events. Two events are planned for the autumn of 2014 in Thessaloniki and Barcelona where we will be bringing together a coalition of governmental and non-governmental organisations that provide positive, local solutions addressing the global problem. The events will aim to build a national movement against food waste and the level of awareness and mass mobilisation among citizens, governments and businesses that is needed to take effective action.



Feeding the 5000 Campaign, Trafalgar Square in London (UK), 2009

In addition to our awareness raising feasts, *Feeding the 5000* addresses food waste through two main campaigns, The Pig Idea and the Gleaning Network.

- Following the outbreak of the Foot and Mouth disease in Europe and its devastating consequences on British farming in 2001, the UK government and later the European Union introduced a ban on feeding catering waste to pigs. As a result, currently much of Europe's livestock feed is made on the basis of soy grown in South America where the rainforest is being cut down at an alarming rate. 97 percent of global soy production is used for animal feed and Europe now imports 40 million tonnes of soymeal a year, contributing to deforestation, biodiversity loss and climate change. Food prices are rising as pigs are fed the very same wheat, soy and maize that humans could eat instead, thus contributing to global hunger. In the UK, thousands of British pig farmers have gone out of business largely owing to the soaring prices of animal feed, and this issue is particularly pertinent in Spain as well where in 2012 more than 25million pigs were raised. Yet scientific evidence shows that cooking leftover food renders it safe for pigs. 'The Pig Idea' aims to encourage more use of the already legally permissible food waste that can be used as feed (i.e. bread, dairy, fruit and vegetables), and is campaigning to change European law to allow food and catering waste to be diverted for use as pig and chicken feed. At the same time one of its primary goals is to restore public confidence in the ancient practice of feeding surplus food to pigs through establishing the parameters for a rigorous, biosecure system of collecting and processing of surplus food for livestock feed;

⁵http://www.magrama.gob.es/imagenes/es/Libro%20de%20la%20estrategia_ENG_baja_tcm7-286285.pdf

⁶<http://slowpress.slowfood.it/upload/201401/dbed2581ac38591bc1f2ffd09916f41d/files/lineequida.pdf>

⁷http://www2.ademe.fr/servlet/getBin?name=70EECF71FAE196ED61647A272FF2C754_tomcatlocal1355328479206.pdf

⁸http://athens2014.biowaste.gr/pdf/abeliotis_chroni_et_al.pdf

- 'The Gleaning Network' has been a successful voice for change in the UK to address the problem of farm level food waste. Millions of tonnes of fresh fruit and vegetables are left unharvested in European farms every year because they fail to meet strict retail cosmetic specifications or they are surplus to requirement. The Gleaning Network campaign aims to salvage this fresh surplus produce by coordinating local volunteers, growers and food redistribution charities to bring this nutritious food to the most vulnerable members of society. The project has harvested more than 48 tonnes of fresh produce that would have otherwise been left in the field in the second half of 2013 alone, equal to more than 650,000 portions of fresh fruit and vegetables, with a projected 160 tonnes to be gleaned in 2015.

In addition, through raising awareness of the issue of farm level waste and its solutions, gleaning helps change the market for fresh produce. In the UK and in 2012 alone, and in part due to the bad weather, the National Farmers Union reported that more than 300000 tonnes of misshapen fruit and vegetables were saved from waste due to a relaxation of retail cosmetic standards. The British Retail Consortium reported that imperfect fruit and veg is now the fastest growing sector in the fresh produce market. By liaising with retailers and governments to promote more relaxed cosmetic standards we can also increase access to cheap fruit and veg for the food insecure.

As part of FUSIONS and its work on social innovation, we are now working with Spanish and French organisations, 'Espigoladors' and 'Reseau de Glanage' respectively, to help them develop and expand local gleaning networks by replicating the success of establishing gleaning in the UK. Mediterranean countries which are traditionally agrarian and produce much of Europe's food have immense potential to use this model to increase agricultural efficiency, change the market for fresh produce and help get more nutritious food to those who need it.

New Medit

Based in Italy, this journal is produced under the direction of the CIHEAM-Bari. Agro-food economy, rural systems and environmental issues are the main topics addressed.

Established in 1990, *New Medit* is a quarterly publication. This peer-reviewed journal is evaluated in the "Journal Citation Reports (JCR) Science Edition". The articles are referenced in the "Web of Science Core Collection".

Its peer recognition makes it even more attractive for researchers and scientists in the Mediterranean and elsewhere. Since 2014, the editorial board of *New Medit* has opted for the free access policy by making all articles available online.

Economics, agriculture, and environment are the key words of the subjects dealt with in the review.



You can find all the articles published in the review since 1990 on the official website

newmedit.iamb.it

Causes et importance des pertes en post-récolte de fruits et légumes au Maroc

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Un enjeu multidimensionnel à considérer davantage

Au Maroc deux modèles d'agriculture coexistent. Le premier est moderne, performant, relativement bien organisé et dont la production est orientée en grande partie vers l'export ou l'agro-industrie. Il constitue le pilier I du Plan Maroc Vert (PMV) et englobe, entre autres, la filière des fruits et légumes. Cette dernière est très importante au niveau national avec une production annuelle dépassant 8 millions de tonnes et un volume export de plus de 1,5 million de tonnes dont 800 000 tonnes de produits maraichers et de 600 000 à 700 000 tonnes en fruits divers. Grâce à un bon encadrement et à la maîtrise de la chaîne de production, les pertes observées sont relativement faibles et sont maintenues à des niveaux acceptables. Le second modèle de l'agriculture marocaine est qualifié de traditionnel car la production est destinée à la consommation locale s'appuyant sur des techniques de culture et de récolte rudimentaires qui ne garantissent pas des conditions optimales pour atténuer les causes de détérioration et des pertes en post-récolte pour les productions.

A l'instar des pays en développement, les quantités en fruits et légumes perdues annuellement au Maroc restent élevées. Ces pertes sont quantitatives et qualitatives. Elles représentent aussi une perte économique. Les pertes quantitatives englobent la perte en poids, les quantités de produits avariées par des altérations pathologiques ou physiologiques et celles écartées pour des raisons de surproduction ou suite à des dégâts liés aux aléas climatiques. Les pertes qualitatives sont liées à l'hygiène et la qualité esthétique et nutritionnelle du produit. Pour obtenir une vue globale sur les pertes en post-récolte, l'analyse des systèmes de production et de manutention en post-récolte s'avère ainsi essentielle pour essayer de mieux comprendre les origines et les causes des pertes tout au long de la chaîne de production et d'approvisionnement. Les résultats d'une telle analyse serviront pour l'élaboration de stratégies pour sinon endiguer, du moins réduire, ces pertes.

En outre, l'importance accordée aux opérations de post-récolte demeure encore faible chez les différents intervenants (agriculteurs, intermédiaires, responsables des unités d'entreposage, commerçants, etc), alors que la question des pertes s'intègre pleinement avec les objectifs de sécurité alimentaire. Ce manque de sensibilité est l'une des conséquences de l'absence de la normalisation et du contrôle de la qualité du produit, du mode et des conditions de transport, de la qualité de l'emballage, mais aussi des conditions d'entreposage des différents produits. En somme, c'est toute la dimension logistique qui sépare les champs de production aux tables des consommateurs qui mériterait d'être davantage considérée. Ce fut d'ailleurs le message stratégique adressé dans l'édition 2014 du rapport Méditerranée du CIHEAM.

Quelles sont les causes principales de ces pertes ?

En tenant compte des connaissances limitées sur les opérations de post-récolte chez de nombreux intervenants dans ce secteur, l'offre importante lors des pics des productions, les dégâts mécaniques, les infestations par des ravageurs et pathogènes, les altérations physiologiques, les effets des aléas climatiques et le manque ou l'insuffisance des infrastructures d'entreposage et de conditionnement et d'unités de transformation, contribuent énormément à la détérioration des productions à différents étapes de la récolte à la commercialisation.

Stade de récolte

Par manque de critères ou indices de maturité bien établis et vulgarisés auprès des agriculteurs, la détermination du stade de récolte par ces derniers se base sur des évaluations subjectives comme l'appréciation visuelle de la couleur et le calibre. Ce type de jugement, conduit très souvent à des erreurs d'appréciation et par conséquent à des récoltes précoces de produits immatures ou à des cueillettes tardives à des stades de sur-maturité. Dans ce dernier cas, les produits sont exposés à de nombreux désordres, comme l'éclatement des bananes ou des grenades, le gaufrage des fruits d'agrumes, la chute des abricots et des dattes, le développement des fibres dans les gousses d'haricot vert, le développement excessif des graines chez le petit pois et le concombre, la perte des sucres chez le maïs doux et le petit pois, etc.

Malgré la disponibilité des informations sur les méthodes de détermination du stade de cueillette des pommes, les agriculteurs marocains dans certaines régions du Haut et Moyen Atlas, se basent sur l'accroissement du taux des chutes des pommes de l'arbre et sur leur teneur élevée en sucres. Ces deux critères correspondent, physiologiquement et scientifiquement pour la pomme (un fruit climactérique), à la sur-maturité et au début de sénescence qui rendent le fruit plus fragile et par conséquent vulnérable aux différentes dégâts à la récolte, lors du transport, à la conservation et à la distribution. Or, de nos jours, du matériel et des méthodes simples d'appréciation de la maturité existent et peuvent être mis à la disposition des vulgarisateurs, des agriculteurs, des responsables des unités d'entreposage, du transport et des commerçants pour juger du stade idéal de maturité et par conséquent de récolte des produits. Parmi le matériel pratique et facile à utiliser on cite le réfractomètre, le pénétromètre, le mètre ruban, les anneaux de calibration dimensionnelle, les codes / cartes à couleur, le code d'amidon, etc.

Conditions d'exécution de la cueillette

L'opération de la récolte est souvent considérée, par les professionnels, responsable de près de 50% de problèmes rencontrés en post-récolte pour causes les conditions et les précautions prises lors de son exécution par les ouvriers. La qualité de la main d'œuvre constitue un prérequis pour la réussite de l'opération de la récolte des produits frais caractérisés par leur périssabilité. De ce fait, une formation et un encadrement strict s'imposent.

Pour les produits destinés au marché local et à l'autoconsommation, les bonnes pratiques de récolte ne sont pas toujours respectées et par conséquent des dégâts importants sont observés à cause des blessures et meurtrissures provenant de l'arrachage des pédoncules, de la pression des ongles et des doigts des ouvriers, des chutes des fruits, des dégâts mécaniques dus à la mauvaise utilisation des outils de récolte (échelles, sécateurs, couteaux, coupes-fruits, hoes, charrues, etc.), du versement brutal dans les contenants de transport, etc.

En plus de ces altérations et dégâts, la cueillette est réalisée parfois à n'importe quelle période de la journée, tant qu'il y a une production à ramasser et une main d'œuvre disposée à le faire. Ceci vient du fait, qu'il y a une ignorance ou une négligence des effets négatifs des conditions de chaleur élevée et d'humidité relative faible sur la vitesse de la détérioration de la qualité des produits. Même dans les grandes exploitations, comme celles des agrumes, les fruits récoltés parfois restent au soleil pendant plusieurs heures sans aucune protection avant leur transport vers la station de conditionnement. Chose qui favorise la perte en poids par transpiration, le ramollissement de la peau et l'affaissement pédonculaire des fruits et par conséquent une augmentation des écarts de triage lors du conditionnement. Il conviendrait donc de travailler davantage sur le respect des moments les plus favorables à la récolte et à la préservation des productions si l'on souhaite limiter les pertes.

Emballage

La nature et la qualité des contenants de ramassage et de transport conditionnent la protection des produits contre la compression et les détériorations diverses. A l'échelle du Maroc et selon les régions, une multitude d'emballages (comme des caisses en bois ou plastique, des sacs en jute ou en plastique, des seaux en plastique ou métallique, des paniers en bambou, en palme du palmier, etc.) sont utilisés pour acheminer la production à sa destination finale. Beaucoup de ces contenants ne sont pas suffisamment rigides pour éviter l'entassement et l'écrasement de leur contenu et ne sont pas (ou peu) aérés pour éviter l'accumulation de la chaleur autour du produit.

Par ailleurs, le manque de contrôle de la qualité des caisses en bois fait défaut ce qui engendre, très souvent, des écorchures, des coupures et des piqûres des produits à cause des parties tranchantes, mal clouées et/ou mal agrafées... Pour les détaillants, les pertes occasionnées par des emballages non adaptés à la fragilité du produit peuvent représenter 10% de la marchandise, alors que ce taux peut être plus élevé dans le cas d'utilisation des sacs non rigides pour des produits fragiles (ex : dattes molles, tomate, carottes, aubergines, etc.). Bien que les caisses rigides en plastique commencent à être davantage utilisées pour le transport des produits dans les zones rurales éloignées des grandes villes, la méthode d'utilisation de ces emballages laisse encore à désirer.

Transport

La qualité de l'opération de transport du champ vers les lieux d'entreposage ou vers les marchés n'est pas toujours assurée de façon optimale. Les manipulations brutales lors du chargement et de déchargement, l'utilisation des emballages inadéquats, le remplissage excessif des emballages, l'empilement inadéquat, l'utilisation des cordes pour serrer et maintenir les emballages dépassant la hauteur des moyens du transport et le transport en vrac ne font qu'amplifier le risque de détérioration des produits transportés (photos de la série 1).



Photos Série 1

Mauvaises conditions de transport de la tomate par camion sous bâche, les carottes et navets en vrac et de la laitue dans des caisses trop pleines.

L'entassement et l'écrasement par compression et le réchauffement de l'air entourant les produits à cause de la respiration et faute d'une aération suffisante sont aussi le résultat d'un mauvais transport. L'état mécanique des véhicules, la vitesse excessive et les secousses dans les pistes et routes mal entretenues aggravent la détérioration des produits transportés. Ces mauvaises conditions de transport peuvent être la cause de 5 à 10% de pertes selon la nature du produit. Pour certains fruits comme les pêches, les abricots, les prunes, les nectarines, le raisin de table et les figues, transportés dans des caisses en bois trop remplies, le pourcentage de fruits endommagés et/ou présentant des meurtrissures apparentes peut représenter jusqu'à 20% lorsqu'il arrive sur les marchés et chez le détaillant (photos de la série 2).



Photos Série 2

Les dégâts par compression et de maladies sur les abricots et les pêches à cause de mauvaises conditions de transport et d'emballage

Infrastructure de post-récolte.

Le pays dispose d'une bonne infrastructure pour les opérations de post-récolte des fruits et légumes destinés à l'export et ceux disposant d'une bonne valeur commerciale. Ces infrastructures incluent les chambres d'entreposage spécialisées (froid normal ou en atmosphère contrôlée), des systèmes des prétraitements (ex. pré-refroidissement et traitements chimiques avant le stockage), différents types d'unités de conditionnement, des unités de production de différents types d'emballage et le transport frigorifique pour le contrôle de la température des produits depuis la station de conditionnement jusqu'à l'arrivée à destination. Cependant, les marchés de gros, les marchés de détail et les souks souffrent d'une insuffisance d'infrastructures de chambres froides, des endroits climatisés et d'une couverture générale des lieux pour limiter l'effet des chaleurs, des faibles humidités relatives de l'air et des vents.

Pour le secteur traditionnel composé essentiellement de petits agriculteurs dont la production est orientée essentiellement vers le marché local, les techniques de post-récolte sont faibles bien que de nombreuses technologies ont été développées ailleurs et pourraient donc être introduites et vulgarisées (Kitinoja et al. 2010; Kader, 2005). Parmi ces technologies, figurent les systèmes de refroidissement par évaporation pour réduire la chaleur du champ des productions récoltées. Le simple fait de réduire la température des fruits à la récolte par l'enlèvement de la chaleur du champ, entrainera la réduction de l'activité métabolique et par conséquent la préservation de la qualité de la production. Un autre exemple d'une technique non-coûteuse est la protection des légumes-feuilles ou légumes avec feuilles par un tissu mouillé ou juste les asperger avec une eau fraîche et les placer à l'abri du soleil réduit sensiblement leur flétrissement, la perte de leur fraîcheur et de leur poids (photos de la série 3).



Photos Série 3

Vente des produits frais en vrac par terre exposés au soleil (à gauche) et une protection des produits par un tissu mouillé contre la chaleur (à droite) dans un marché à Agadir.

Entreposage des produits

Bien que le pays dispose d'une bonne infrastructure d'entreposage frigorifique privée et étatique, la maîtrise des opérations d'entreposage de nombreux produits reste largement perfectible. Même dans les grandes unités industrielles, on continue à observer des détériorations, comme celles liées aux pourritures, aux désordres physiologiques de l'écorce (dégâts de froid) ou du cœur des produits, à la germination ou au départ végétatif (cas de la pomme de terre stockée à des températures autour de 3°C qui fait augmenter le taux des sucres simples dans les tubercules au détriment de l'amidon), au ramollissement ou encore au flétrissement (à cause de l'humidité relative faible et/ou au taux de renouvellement d'air élevé, etc.). Ces pertes sont dues en grande partie à l'absence de maîtrise des conditions de conservation. Aussi, il s'avère que l'on ne prenne pas suffisamment en compte pour chaque produit certains paramètres comme la qualité et l'homogénéité du stade de maturité, la compatibilité du mélange variétal, la température et l'humidité relative optimales, la durée d'entreposage, le niveau de gerbage, la disposition des palettes pour assurer la circulation et le brassage de l'air autour des produits stockés, la protection des produits par des traitements préventifs avant l'entreposage, etc. Les taux de pertes liées à l'entreposage pour les agrumes et les pommes se situeraient entre 1 et 5 % selon les variétés et la durée de conservation.

Quant au secteur traditionnel, l'entreposage des produits se fait dans des conditions qui peuvent être considérées comme très archaïques. Ceci est dû, en partie, à la taille réduite des exploitations et la faiblesse des productions, au manque de structures adéquates de conservation dans les zones rurales, au manque d'organisation des agriculteurs et à un système de vulgarisation défaillant. Ainsi, de nombreux produits sont conservés chez l'agriculteur sans aucune maîtrise des paramètres de conservation et le résultat des pertes observées est alarmant et sera élucidé par des chiffres dans les exemples qui sont décrits dans les paragraphes suivants.

Illustrations de la problématique à travers certains produits

Dattes

La production nationale en dattes oscille autour de 100 000 tonnes /an alors que les importations annuelles se situent entre 35 000 et 40 000 tonnes. Le Maroc est parmi les premiers pays importateurs de dattes dans le monde et paradoxalement, il perd annuellement entre 40 et 50% de sa production nationale. Ces pertes sont liées aux problématiques suivantes:

- Des techniques de récolte défaillantes. A part pour les dattes disposant d'une valeur économique pour l'agriculteur, aucune précaution notable n'est prise lors de la récolte. En effet, le régime est coupé par le récolteur qui le laisse chuter du haut du palmier sur le sol ou sur une bâche placée à son pied. Il en résulte des dates écrasées, cassées et souillées par la terre ou tombées à l'intérieur des touffes des rejets. A cause de la hauteur élevée des palmiers dans les palmeraies traditionnelles, les récoltes ne se font plus par manque de moyens d'arriver au sommet des palmiers et leur production est soit attaquée par les oiseaux ou tombe sol sous l'effet des vents. Les quantités perdues à ce stade sont estimées selon les responsables du développement agricole de Ouarzazate entre 5 et 15% ;
- Infestation par la pyrale *Ectomyeloisceratoniae* Zeller, communément appelée mouche des dattes présente dans tous les oasis de production de dattes. Le ravageur qui infeste la date peut la réduire à son noyau lors de la conservation à température ambiante. Les dégâts de la pyrale sont importants compte tenu de l'absence de protection des régimes à la palmeraie à l'approche de la maturité des dattes ou durant la maturité complémentaire mais aussi de la non application des traitements de désinsectisation communément utilisés sur les dattes comme le bromure de méthyle (qui sera interdit dès 2015), de la phosphine, de la chaleur ou du dioxyde de carbone. L'absence des unités d'entreposage frigorifique dans les zones de production pose par ailleurs problème. Il est à noter qu'une dizaine d'unités ont été construites dans les oasis entre 2011 et 2013. Parmi ces unités de conservation et de conditionnement, sept d'entre elles ont été construites dans le cadre du Plan Maroc Vert et du programme *Millenium Challenge Account* (MCA), avec une capacité totale de 4000 tonnes ;

- Effets des aléas climatiques, particulièrement la pluie automnale, responsable de l'éclatement et la fermentation de nombreuses variétés de dattes sur pied, et des oiseaux qui détruisent de grandes quantités de production.

Il est à noter que 60% des dattes marocains sont de qualité moyenne à faible et par conséquent les quantités correspondantes sont conservées à hauteur de 40 à 60% chez les agriculteurs. Les méthodes d'entreposage dans les oasis marocains sont soit le vrac en tas ou étalé sur des nattes en plastique ou en palme, dans des sacs en plastique ou en jute et sous forme de dattes pressées dans des sacs ou pots en plastique, dans des jarres en argile ou dans des caisses en bois (photos de la série 4).

Sous ces conditions, les dattes sont prédisposées à des attaques de la pyrale car aucun traitement n'est généralement effectué. La moyenne des pertes dues à la pyrale se situe entre 30 et 40% des quantités stockées. Ces taux peuvent, dans d'autres situations, être plus élevés. Les résultats des travaux réalisés dans la région d'Errachidia par El-Hasnaoui et Ait-Oubahou (1998) ont démontré que les dattes désinfectées à une température de 65°C pendant 2h et conditionnées en sachets plastiques pour plus de 5 mois ont présenté moins de 1% de dattes infestées par les larves de pyrale. Alors que les dattes non traitées par la chaleur et conservées à température ambiante ont été infestées à plus de 80% après 5 mois de conservation.



Photos Série 4

Emballage dans des sacs en plastique et des caissettes en bois (en haut) et la qualité des dattes altérées par la pyrale (en bas).

Oignon

Un autre cas illustratif est celui de la production d'oignon. Avec une production nationale estimée à plus de 500 000 tonnes, cette culture est sujette à des pertes importantes en post-récolte à cause du mauvais contrôle des maladies cryptogamiques comme le botrytis, l'aspergillus qui peuvent continuer leur infestation et développement sur les bulbes en post-récolte, le non-respect du taux de la tombaison du feuillage, indicateur de la maturité et le début de l'entrée en dormance des bulbes, le non-respect du délai nécessaire entre la dernière irrigation et la récolte, les conditions de ressuyage ou le séchage des tuniques externes et la fermeture du collet et enfin aux techniques archaïques de conservation encore utilisées au dans le pays.

Après la récolte, le séchage des tuniques et du feuillage se fait à l'air libre dans un coin de la parcelle de production entre mi ou fin-juillet à la mi-septembre avant de transporter les bulbes vers les lieux d'entreposage. Durant cette longue opération, les bulbes sont exposés aux différents aléas climatiques qui affectent leur comportement par la suite lors de l'opération d'entreposage. Cette dernière se fait dans des structures, communément appelées, silos horizontaux ou séchoirs construits le long d'un trancher de 70 cm de largeur, surélevé des deux côtés d'une petite muraille de pierres de 80 cm de hauteur et de longueur variable pouvant dépasser 50 à 60 m par structure. Une couche de paille est placée à la base du trancher avant son remplissage par des bulbes à une hauteur de 120 à 140 cm. Une autre couche de paille est placée sur le tas suivie d'un film plastique de 220 microns d'épaisseur de couleur jaune, marron ou bleue (photos de la série 5.). La région d'El-Hajeb est devenue la zone de choix par excellence pour le stockage traditionnel d'oignon à cause de son climat froid en hiver et frais le long de l'année. Les quantités stockées dans la région dépassent 200 000 tonnes par an.



Photos Série 5

Mode d'entreposage de l'oignon dans la région d'El Hajeb,

Les pertes d'oignon enregistrées dans ce type de structures durant la campagne 2013-2014 ne diffèrent pas de celles enregistrées dans la même région en 1999 par Ajghaider et Ait-Oubahou, 2014). En effet, les taux des pertes dues aux pourritures aubotrytis et Aspergillus, au départ végétatif du cœur et à l'émission des racines (photos de la série 6), se situent autour de 10, 30 et 50% respectivement pour des durées de stockage de 1 mois, 2 mois et 5 mois. Cette augmentation en flèche des pertes en fonction de la durée de stockage est due la non-maitrise des paramètres de conservation (température, humidité relative, aération, etc.). Dans le cas des structures (photos de la série 5), l'oignon est à la merci des conditions climatiques et particulièrement, les vents, les pluies en automne et la neige en hiver.



Photos Série 6

Ampleur des pertes dans les structures d'entreposage

Il s'avère aberrant qu'au Maroc, on continue à tolérer de telles pertes alors que les techniques de conservation modernes existent. L'entreposage au froid ou dans des entrepôts ventilés assurent une bonne conservation de l'oignon pour plusieurs mois avec des pertes relativement faibles.

Pomme

Pour les exploitations modernes du pommier, les techniques de production et la conservation des pommes en chambre froide normale ou en chambre à atmosphère contrôlée (AC) voire en AC-ULO (ultra faible concentration d'oxygène) assurent une bonne qualité et peu de pertes des produits après 6 à 8 mois d'entreposage. Alors que chez les petites exploitations de certaines régions du Haut Atlas où la production a été introduite durant ces dernières années, les pertes sont très importantes aussi bien en pré qu'en post-récolte. En pré-récolte, les pertes dues au Carposcapse à l'approche de la maturité peuvent atteindre dans certains cas 20% de la charge de l'arbre et à plus de 60% si aucune précaution ou traitement n'est appliqué.

En post-récolte, les agriculteurs ne commencent la cueillette des pommes que lorsqu'ils s'aperçoivent que les chutes des fruits sous les arbres augmentent d'un jour à l'autre et que les fruits sont bien sucrés. Il y a une méconnaissance totale de la part des agriculteurs et des acheteurs intermédiaires des indices de maturité pour les pommes et la relation existant entre le stade optimal de cueillette et la durée de conservation. Les deux critères suivis pour la récolte sont des pommes sucrées prêtes à la consommation et l'accroissement de chute des fruits sous les arbres.

La conservation des pommes dans ces régions qui produisent des milliers de tonnes se fait en vrac au sol dans des locaux construits en torchis et ne disposant d'aucun moyen d'aération ou de ventilation ou d'augmentation de l'humidité relative autour des fruits. Avec l'intensité respiratoire des pommes, la température dans le local augmente favorisant, ainsi, le développement rapide des pathogènes sur les parties blessées et accentuant le ramollissement des fruits suite à la perte excessive du poids. Il est à noter que les murs en torchis absorbent l'humidité du local et par conséquent contribuent à la perte en eau des pommes. Dans plusieurs locaux situés entre Imlchil à Rich et Tinghir, les pertes peuvent atteindre entre 30 et 50 % des quantités stockées en raison de pourritures et du ramollissement de l'écorce des différents fruits (photos de la série 7).



Photos Série 7

Entreposage des pommes en vrac dans la région d'Imlchil dans le Haut Atlas et ramollissement des pommes après stockage suite à une perte importante en poids.

Agrumes

Au niveau des agrumes, l'un des secteurs les plus développés au Maroc, les pertes en post-récolte déclarées par plusieurs responsables des stations de conditionnement oscillent entre 1 à 2 % de perte en poids occasionnées entre le transport de la ferme à la station suivi de 2 jours d'opération de ressuyage à température ambiante, de 3 à 7 % pour l'opération de déverdisage et de 2 à 5 % pour toutes les pourritures confondues (Photo 8.). Il est à signaler que 20 à 30% des fruits sont écartés lors de l'opération du triage sur la chaîne du conditionnement et qui constituent une perte économique importante pour les responsables de ces stations exportatrices. Cependant, ces quantités sont écoulées sur le marché national ou utilisées pour la production de jus. En moyenne les responsables des stations de conditionnement évaluent le taux des pertes sèches pour les agrumes autour de 15%.



Photo 8

Exemples des pourritures causées par différents pathogènes en post-récolte

Autres fruits et légumes

Plusieurs autres fruits et légumes sont sujets à des pertes importantes à cause de leur cycle de post-récolte très court. Leur production saisonnière fait que le marché n'arrive pas à absorber toutes les productions disponibles pendant quelques semaines. Certains de ces produits englobent, les fraises, abricots, pêches, nectarines, raisins, nèfles, cerises, prunes, figues, etc. Tous ces produits sont très périssables et nécessitent des conditions de manutention et de conservation bien établies pour préserver leur qualité en post-récolte.

Cette périssabilité et fragilité, associée aux mauvaises conditions de récolte, d'emballage, de transport et d'exposition aux conditions environnementales difficiles de température élevée, d'humidité relative faible et d'une mauvaise protection contre les rayons solaires surtout dans des endroits ouverts, ne font qu'augmenter le taux des pertes pour chaque produit qui peut atteindre selon les estimations et observations au niveau des marchés de gros et de détail à Inezgane et à Agadir entre 20 et 30% (photos de la série 9).

La même remarque est aussi valable pour les légumes feuilles qui sont très sensibles au flétrissement à cause de leur taux de transpiration élevé et des mauvaises conditions de d'emballage, de transport et de vente. En général, pour les produits disposant d'une valeur commerciale élevée, les différents acteurs le long de la chaîne prennent beaucoup de précautions lors des différentes manipulations afin de ne pas endommager le produit. A titre d'exemple, les dattes Majhool, bien prisées par tous, sont bien suivies depuis la pollinisation jusqu'à leur écoulement sur le marché. De même, les petits fruits comme les myrtilles, la framboise, le bluet, les mûres, etc. sont très demandés et par conséquent ils sont récoltés, conditionnés et conservés avec beaucoup de précautions, comparativement aux produits peu rentables pour l'agriculteur.



Photos Série 9

Vente de fruits (fraises, cerises, pêches, etc.) le long des routes ou des rues en ville sans protection contre le soleil.

En ce qui concerne les figues de barbarie dont la production nationale dépasse 400 000T/an, les fruits sont récoltés, transportés et vendus sous des conditions déplorables qui ne font qu'accentuer le volume des productions perdues. Le groupement d'intérêt économique du cactus de la région du Souss Massa Draa, évalue les pertes de cette filière à plus de 40% dont une grande partie est due aux pourritures à cause de l'arrachage des fruits sans pédoncule (photo 10) et le manque d'une infrastructure adéquate pour la valorisation des excédents des productions.



Photo 10

Figues de barbarie cueillis sans pédoncule (une condition du développement des pourritures).

Conclusions

Il est clair que les pertes en post-récolte des fruits et légumes restent très élevées à l'échelle du pays. Les estimations situées entre 20 et 40% selon les produits sont énormes et constituent une perte économique importante pour les agriculteurs et pour le pays en général à cause de l'utilisation des ressources naturelles déjà limitées en particulier, l'eau, les engrais, les produits chimiques, la main d'œuvre, etc. Le Maroc ne peut pas tolérer indéfiniment ces déperditions. Pour réduire ces pertes, il est judicieux d'accorder l'importance nécessaire aux causes et facteurs responsables de ces dernières.

Parmi les actions à entreprendre, il conviendrait notamment de souligner celles-ci :

- Améliorer le système de vulgarisation qui reste loin des aspirations des petits agriculteurs et des intervenants le long de la chaîne de la ferme au marché à travers l'encadrement et les démonstrations, la dissémination des informations selon le besoin ;
- Encourager le regroupement des petits agriculteurs en coopératives ou les associer avec un agrégateur pour mieux tirer profit de leurs efforts et pour utiliser en commun les moyens et infrastructures disponibles ;
- Assurer le désenclavement des zones de production dans les régions montagneuses et améliorer l'infrastructure routière ;
- Encourager les constructions des unités d'entreposage adaptées selon les produits et les conditions des régions concernées ;
- Développer l'infrastructure dans les marchés pour créer des conditions adéquates pour la manipulation et la vente des produits ;
- Encourager la valorisation des produits à travers les méthodes appropriées comme le séchage et la transformation aussi bien au niveau des coopératives qu'au niveau industrielle pour absorber les excédents de production et assurer une régularité de la qualité du produit ;
- Encourager la recherche scientifique pour trouver des solutions aux problèmes des régions éloignées ou enclavées.

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Food losses and waste in the Spanish agro-food chain

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Weakest points in the agro-food chain

It is necessary to distinguish between food losses and food waste (MAGRAMA, 2012)¹. Losses along the agro-food chain result from inefficiencies, natural disasters or climatological adversities. They are more intense on economic developing than developed countries. Waste is related to poor buying, consumption and management habits along the agro-food supply chain considering production of raw materials, transformation, commercialisation and consumption, which can be improved in the future and it is particularly acute in developed countries.

Fresh products suffer most waste in comparison to other types of processed food. The need of using refrigeration along the supply chain increases chances of both losing and wasting food. Spain is a great producer and consumer of fruits and vegetables but also other fresh products for daily intakes. In many situations Spanish firms carry on all processes from production to distribution.

Along the agro-food supply chain there are losses linked to the biological nature of the products. For example, some fruits and vegetables, which are strategic products for the Spanish agriculture and economy, might have short periods of production. As a consequence, oversupply might exist or the need to select the first quality categories and the rest is not introduced in the market trying to avoid low prices. This is a common practice trying to support producers' low income and it has negative effects on food waste.

¹ Ministerio de Agricultura, Alimentación y Medio Ambiente (MAGRAMA), *Estrategia "Mas alimento, menos desperdicio"*, 2012.

According to (AECOOC, 2012)² food waste is distributed in the following manner: households (42%), food enterprises (39%), Hotels, restaurants and bars (14%) and distribution (5%). The first two groups concentrate over 80% of total waste, in Spain, and it should concentrate public attention.

Current situation

Spain is among the economic developed group of countries. It is estimated that it is the sixth country in Europe because its waste. Food waste figures vary among different data sources. They might also vary depending on the year the survey was carried out because, since the crisis started in 2008, attitudes have changed in the last years. However, there is scarcity of serious and thorough studies for the entire country, and the most important are reviewed in this work.

According to Albal (2011)³, Spanish consumers' waste 18% of the total food they buy and 50% of that waste corresponds to fruits and vegetables. However, consumers' think they only waste 4%. The contrast between estimations and perceptions is not a surprise and means that sensitiveness on this issue remains too weak. Food waste, according to the source, amounts to 11 thousand million euro per year, which corresponds to 2.9 million tons of food and translates to 250 € per consumer and year. But, according to Unilever (2013) food waste in the Spanish households reaches 7.7 million tons per year which differs a lot from previous estimates.

According to Hispacoop (2012)⁴, Spanish households waste 1.5 million tons per year, which is the lower than previous mentions. This survey is based on the information provided by 413 households, which were each monitored during a week. Waste, in this case, was considered for not recycled food.

The survey shows that bread, cereals and pastry is the group with more waste (19% out of the total), followed by fruits and vegetables (17%) which are above two groups with equal percentage (13%), one represented by milk, yoghurt, cheese and milk products and the other by pasta, rice and legumes. Those four groups amount to 62% of total waste. The other 8 groups are below 10% and the least percentage is for eggs (3%).

² AECOOC, *La alimentación no tienen desperdicio, aprovéchala*, 2012.

³ Albal, *Save Food*, 2011

⁴ Hispacoop. Confederación Española de Cooperativas de Consumidores y Usuarios *Estudio sobre el desperdicio de alimentos en los hogares*, 2012.

The two groups of the top are characterised by having a greater consumption frequency during the day because they are consumed at different meal occasions. Some food products are related to a particular meal during the day, such as milk and milk products at breakfast and pasta, rice and legumes at the main meal. The principal motive for the waste is that the food is leftover after the meal (85%) followed by poor or lengthy conservation (64%), which is up to 73%, for fruits and vegetables. For fish, the reason of keeping leftovers to be consumed but forgotten reaches 58%.

In Spain the consideration about expired and preference dates for food has created great debates and confusions. To the extent that there are norms explaining the meaning of those terms but public authorities have sent messages to consumers about not being so strict when deciding whether eating or not eating food products. For example, yoghurts will not have expiring date on their labels and only the preferred date. To refresh the concepts CEACCU (2104)⁵, the first consumers' association in Spain, explains the difference between those two terms. All food enterprises have to put, on the label, a limit date to consume the food product without causing any quality problems to the product and health consequences to the consumer.

Only two thirds of the entire population knows exactly what the deadlines for expired and preference dates mean. The rest, either they do not know or they confuse those terms by thinking that the expiring date means the preference date. It happens that quite a percentage of households think that eating food over the preference indicated date on the label could have negative healthy effects. Thus, 29% think that food can not be consumed immediately after the eating deadline has expired, which 40% is up to for milk and milk products and 10% refuses food because the eating preference date is over. It is important to keep in mind those percentages because they are related to labelling policies and future approaches towards them.

Households with four or more members and of high income are those more respectful with respect to food waste. The first group indicates a need to take care of food bought to feed large families and the second group most probably is related to higher education and awareness. According to MAGRAMA (2012), 86% of the food waste in the Spanish households is due to leftovers after meals and 64% is because poor and extra time related to conservation and storage.

The distribution system can not be blamed of great impact on food waste as it is estimated that only, on average, reaches 6% of the total. Almost 80% of the distributors take away food products from their premises because they have an expired date. The private sector shows awareness and commitments towards food waste. An example is AECOC (2012). According to their data sources up to 2.9 million tons of food is wasted in Spain annually. Food banks have proliferated in Spain after the economic crisis as it is estimated that there are 54 all over Spain and they gather around 100 million tons. They collect usually uncooked food which is not used or given on purpose to be distributed among poor people.

There is a campaign called "*La alimentación no tiene desperdicio. Aprovéchala*" ("Food does not have waste. Take advantage of it") organised by AECOC. More than one hundred food enterprises, many associations, different administrations and an association related to food banks have agreed to act together. All involved enterprises have decided to follow a list of recommendations to apply in their food business. Two are the objectives: a) to reduce waste and b) to optimise leftovers. In order to reach the first objective a code of good practices have been developed, which affect the exchange of information, recommendations dealing with logistics and transport, relationships between food firms and distributors, etc. For the second objective, a better redistribution of food and improving the actual conditions are the means. Another example in the same direction has been taken by Unilever (2013)⁶, as a result of a broader policy dealing with sustainability by this enterprise, and joining efforts with the Spanish Ministry of Agriculture. They have elaborated a practical guide to diminish food waste. They divide their guide in three sections dealing with planning, cooking and reutilization. It supposes to be something that consumers could follow easily.

Further steps in the future

In Spain, it is believed that around 50% of food waste could be avoided but, in order to improve the situation, common efforts should be taken in many directions. Consumers, the food industry and the administration should act together. There is consensus that information, (in order to increase awareness) and education are two key elements that could be enhanced from the public sector. Food planning and storage need to be improved at households.

⁵ CEACCU, *La fecha de caducidad y de consumo preferente en los alimentos ¿Cómo distinguirlas?*, 2014.

⁶ Unilever, *Guía práctica para reducir los desperdicios alimentarios*, 2013.



***The value chain in Mediterranean sheep and goats.
Industry organisation, marketing strategies, feeding and production systems***

Organised by:

CIHEAM-Zaragoza and UMR SELMET, Systèmes d'Élevage Méditerranéens et Tropicaux, Montpellier (France)

The value chain can be defined as the set of different activities required to bring a final product (e.g. meat, milk, leather, fibre) from the initial production phases to its final market destination. Value chain analysis is essential to an understanding of markets, the risks and the added value in each step, the participation and organisation of different actors, and the factors that limit the income and competitiveness of farmers.

Small ruminants are important for income generation and security, food supply and for the empowerment of rural livelihoods in the Mediterranean areas especially in mountainous and marginal regions. Nevertheless, Mediterranean sheep and goat sectors do not always produce and market their products efficiently, there being an important potential for increased livestock production output in quantity, quality and prices; and to improve economic margins through a more efficient marketing and distribution organisation. Mediterranean systems of production of sheep and goat produce a large variety of typical products (meat, cheeses ...) that could be valorised on some local or regional markets, if they are properly identified and marketed. As a consequence, the adaptations needed in the Mediterranean sheep and goat value chains in order to improve the products value and to optimise farmers' income and competitiveness are of a different nature. Those modifications deal with the appropriate feeding strategies, adaptation of the production systems to the environmental conditions (e.g. water and heat stress), the market requirements, the building of new qualifications for the segmentation of the market, and the improvement of farmers' organisations to enhance the capacity of all actors in the value chain to deal with the standards and regulations of local, regional and international markets.



The objective of the Seminar is to encourage participation and interaction among scientists and technicians involved in small ruminant production systems, with a view to: (1) introduce the concepts and methodologies for value chain studies; (2) analyse the production systems enhancement, with special attention to feeding systems, needed to optimise the added value of sheep and goat products and/or to enhance the typicity of the local products; (3) to show the different options regarding the segmentation of the value chains into different "sub-chains", able to valorise some typical products, and address the questions of the governance of these "sub-chains". A particular focus will be done on the question of long and short distribution channels depending on the type of product; and (4) to study the impact of sector governance models on the value chain. Specific presentations of the consequence of feeding strategies on dairy and meat products will be held by the "FAO-CIHEAM Sheep and Goat Nutrition Subnetwork". The organisation of this joint seminar by the two subnetworks (Production Systems and Nutrition) will be a good opportunity to develop discussions and collaborations in order to promote small ruminants raised under different production systems and emerging challenges like climate change.

Free contributions are welcome for all sessions, either as theatre presentations or posters. Participants who wish to present a free communication should submit their summary (maximum 250 words), indicating their preferred session, through the online submission form available at intranet.iamz.ciheam.org/forms/montpellier2015 **before 31 October 2014**.

For more information
www.iamz.ciheam.org/montpellier2015/

A survey shows that there is a correlation between households which have improved their economic situation and the increase of food waste (Hispacoop, 2012). It is a worrisome conclusion because future positive economic perspectives could have a negative impact on total food waste. It has also been found that those households with greater food consumption have a tendency to have greater food waste. It is only through information and education that the situation could be improved in the future.

The economic crisis, in Spain, has increased awareness about the meaning of labelling dealing with expired and preference dates for food. The percentage of the population with a clear understanding of those concepts is relatively low among Spanish consumers. Future information should be linked to organoleptic characteristics, smell and taste, that consumers could evaluate by themselves having the dates in mind. Again, only education could solve misunderstandings and we can not expect that the food industry should dedicate a great amount of money to those issues.

Food waste has conflicts between individual and collective interests. For example, fruits and vegetables seasonal production is usually sold to consumers in big packages in order to reach lower prices. Consumers have a tendency to buy more than what they need along the week and, as a result, part of the produce is wasted. Consumers should be aware of the implications of buying too much and be willing to pay more for the adequate quantity. The food industry should provide the adequate packaging. The Spanish food crisis has put some limits because consumers are consuming more fresh products in bulk and adapting to more precise needs. Better consumers' planning is crucial for minimising waste but also handling leftovers. Empirical findings, in Spain, show that individual households are less careful about food waste and expectations are that the percentage of that group in the entire population will increase in the future. Currently, only about one third of the population does constantly plan their buying to accomplish their weekly menus. It is common that the person in charge of the household cooks more than needed and the problems is that afterwards the food is wasted.

Careful storage in the refrigerator could help future good practices. For example, by placing food according to expiring dates or in special containers so they could be recognised more easily. Communication tools are constantly improving and smart phones are used in many households. There are already applications that can be implemented, which could be very valuable for more accurate planning and consumption (Dial, 2008)⁷.

A week planning could help food waste if menus are established and buying quantities calculated according to more realistic household food consumption. Low income groups have less understanding and more limited means to change their habits in the future. So, public authorities should dedicate more emphasis to correct their behaviour. Policies should start at public schools where young generations are educated. Restaurants could improve their food waste by having more limited number of dishes in their menus. The economic crisis has favoured this tendency in Spain and it will be important, in the future, that customer expectations should be in accordance with those habits.

The Spanish Ministry of Agriculture (MAGRAMA, 2012) has implemented a plan for three years to improve food waste as part of a program for sustainable policies, affecting several sectors, and of multidisciplinary and multifactor nature. It is based on recommendations, voluntary agreements and self-regulation. Dialog and coordination among agro-food chain actors and the administration should be essential. The ambitious program includes actions such as:

- The realization of studies to know better how much, how, where and why food waste occurs with special emphasis on indicators that could follow trends in the future;
- Reporting and promoting good practices and actions to raise awareness among wholesale and retail distributors as well as promotion campaigns for consumers and restoration with information through Internet and self-assessing programs;
- Establishing administrative rules in order to improve quality standards, local commercialization, reutilization of food products and by-products management for non-food use;
- Voluntary collaboration among agro-food agents between the public and private sector including the enhancement of social corporate responsibility of food banks to gather useful food that could be distributed among needed consumers;
- The development of new technologies.

There is great concern among food industries to apply better norms and to incorporate them as part of their social corporate responsibility (CIHEAM, 2014)⁸. It is a manner to merge private and public interests as part of their business strategies. Big firms have started to do so and, many small and medium size enterprises should follow.

⁷ Dial, *Programa para evaluación de dietas y gestión de datos de alimentación*, 2008.

⁸ CIHEAM (eds.), *Corporate social responsibility in the Mediterranean Agro-Food Sector*, Watch Letter, 29, June 2014.

Agir contre le gaspillage alimentaire en restauration collective: le cas de l'Algérie

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Le problème causé par la surproduction des déchets est le revers de la médaille de notre modèle de consommation. Dans un rapport publié par la Direction Générale de l'Environnement de Commission européenne en 2010, il ressort que 89 millions de tonnes d'aliments sont jetés tous les ans sur l'ensemble du territoire communautaire, dont 14% par la restauration collective (RC). Selon certaines estimations, un tiers des aliments produits chaque année dans le monde pour la consommation humaine, soit environ 1,3 milliard de tonnes, est perdu ou gaspillé (Gustavsson et al., 2011). Ces pertes sont généralisées au niveau mondial, même si elles se répartissent différemment au niveau de la production ou de la consommation selon les pays.

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Certes, les enjeux économiques de ce phénomène sont colossaux et justifient à eux seuls une action corrective de grande envergure. Mais ils ne doivent pas occulter les autres impacts qui découlent non seulement de la gestion des déchets causés par le transport et le traitement, mais aussi des techniques de production intensives ; celles-ci étant induites par la nécessité de garantir des rendements suffisants pour couvrir les besoins, engendrant surplus perdu ou gaspillé. Car pour atteindre des objectifs de productivité agricole de plus en plus ambitieux, des efforts sont déployés au prix de contre-sens environnementaux, mais aussi de la dégradation des conditions sociales des agriculteurs. Par ailleurs, tolérer le gaspillage participe à la dévalorisation intrinsèque de la nourriture. Et quand ce gaspillage concerne la consommation du repas, c'est également, en quelque sorte, l'équilibre nutritionnel qui est remis en question.

La problématique des déchets alimentaires

L'enjeu des déchets ouvre un débat d'autant plus nécessaire qu'il est constructif, car il dépasse la seule problématique de la gestion correcte des poubelles. Il concerne d'abord la définition du gaspillage alimentaire. Selon la FAO, cela correspond à tout aliment comestible jeté ou détourné de l'alimentation humaine. Toutefois, il faut différencier la surproduction, permettant de garantir la sécurité alimentaire, des déchets résultant de l'inefficacité des systèmes de production, distribution et consommation. Ces derniers comportent un gaspillage évitable (nourriture parfaitement comestible jetée parce que ne convenant pas au goût des consommateurs, vendue en surplus, mal utilisée) et de gaspillage inévitable (parties impropres à la consommation).

La gestion des surplus alimentaires et la prévention des déchets, requièrent de repenser totalement les systèmes alimentaires actuels selon trois axes : surproduction par rapport aux besoins nutritionnels, distinction entre ce qui est considéré comme comestible et ce qui l'est réellement et différenciation entre prévention et gestion des déchets (Papargyropoulou et al., 2014). Par ailleurs, un premier atelier *Eating City* réalisé en 2012 sur les impacts environnementaux liés à la production des déchets de la RC avait conclu sur la nécessité d'une quantification préalable des différentes catégories de déchets et successivement la mise en place d'un plan d'action à moyen et long terme, prévoyant les 3 niveaux suivants: politique et législatif, technique et culturel (sensibilisation et éducation).

Parmi les priorités identifiées par les participants à ces différents niveaux, il faut adapter la législation relative aux appels d'offre à l'achat de produits alimentaires et rééquilibrer les critères relatifs au prix et à la qualité. Il faut en particulier considérer le lien entre l'alimentation et la santé, l'environnement, ce qui existe déjà dans le cadre des achats publics écologiques et de l'offre économiquement avantageuse. Il est également important de réviser les outils de production et en particulier de redéfinir le rôle des cuisines centrales et des restaurants collectifs.

La diffusion d'une nouvelle culture alimentaire est indispensable. Il ne s'agit pas seulement d'obliger le personnel à collecter les déchets en fin de chaîne. La conscience de la question des déchets doit imprégner le travail de ceux qui conçoivent les menus, décident les achats, cuisinent les mets, servent les repas et enfin de ceux qui les mangent. La revalorisation des métiers de la RC est une autre piste très intéressante. Le développement durable devrait devenir la spécialisation des cuisiniers travaillant en restauration collective, rendant cette profession moderne et plus attractive pour les jeunes, de fait utilisant la formation professionnelle

comme levier pour une nouvelle dynamique, catalysant et accompagnant le changement à grande échelle. A ce sujet le projet de la maison de l'alimentation mis en place initialement par la ville de Copenhague pour former les cuisiniers de la restauration collective illustre parfaitement les enjeux sociétaux et économiques d'une telle évolution.

C'est pour explorer les questions liées au gaspillage et à sa réduction en RC, afin d'identifier des thèmes clés et mettre en place un plan d'action à court et moyen terme, qu'un nouvel atelier *Eating City*, organisé conjointement par Risteco et le laboratoire de recherche Alimentation, Nutrition et Santé (Université Constantine 3 et Université Constantine 2), avec le soutien de la Fondation CLM pour le Progrès de l'Homme, a réuni à Constantine en Algérie, les 14 et 15 mai 2014, des chercheurs et des professionnels de la RC originaire d'Europe et du bassin méditerranéen (France, Suisse, Italie, Egypte et Algérie), pour échanger leurs idées et expériences. Il faisait immédiatement suite au Colloque International « Restauration Collective Durable » (CIRCD) qui a permis de définir des priorités sociétales pour la RC en Algérie, dont celle sur la réduction des gaspillages et gestion des déchets de la RC (Mekhancha et al. 2014).

L'atelier *Eating City* a permis de confronter les expériences européennes et algériennes, notamment sur la quantification du gaspillage et des déchets alimentaires en RC qui s'enrichit en permanence de nouvelles données suite à de vastes campagnes menées à l'échelle internationale. Ces déchets sont maintenant bien identifiés. Dans le cas de la RC en Italie, 600 grammes de déchets sont produits, en moyenne par patient, par journée d'hospitalisation, dont 55% de bio-déchets, 350 grammes en moyenne pour un repas en restauration d'entreprise, dont 55% de bio-déchets, 260 grammes pour un repas en restauration scolaire dont 70% de bio-déchets (Risteco, 2010). Ces données inhérentes aux modalités d'organisation du service ne permettent pas de faire des projections sur la situation au Maghreb et sur l'Algérie en particulier.

Toutefois, les experts s'accordent sur la nécessité de mettre en place un suivi quantitatif en préalable à toute action pour réduire les déchets alimentaires, avec au moins trois effets positifs.

- En premier lieu, la quantification des déchets passe nécessairement par le tri sélectif. Cette opération, si elle est effectuée directement par les convives, par exemple au restaurant, permet de les sensibiliser de manière directe et concrète sur les quantités de nourriture gaspillée ainsi que sur les déchets dérivant de couverts à usage unique ou encore des emballages de produits monodosés.

- En second lieu, il devient très simple de peser toutes les différentes catégories de déchets une fois qu'elles sont triées, et séparées dans des sacs, pour avoir des données précises et répétées qui peuvent être mises en relation avec différents paramètres tels que la composition du menu, les effectifs et la fréquentation réelle du restaurant. Cela permet ainsi d'avoir une compréhension fine des causes du gaspillage, mais aussi d'évaluer l'efficacité des solutions testées, lorsque le suivi accompagne une expérimentation par exemple.
- En troisième lieu, il est possible de faire une évaluation du coût du gaspillage, en terme économique et environnemental, en ce qui concerne l'achat, le stockage inutile de matières premières, la consommation énergétique dérivant de la préparation, éventuellement du transport des repas mais aussi le coût dérivant de la gestion des déchets.

La diminution du gaspillage en RC relève de l'économie circulaire puisqu'elle permet de valoriser les déchets en limitant les impacts sur l'environnement. Les techniques de valorisation (bio-déchets : production de compost, méthanisation, recyclage des huiles de friture ; emballages ; recyclage du verre, du plastique, du métal, du carton) sont aujourd'hui parfaitement rodées, mais nécessitent l'implication des collectivités territoriales.

L'exemple européen montre comment les filières de traitement, valorisation et recyclage des déchets peuvent bénéficier de la création de réseaux d'échanges de bonnes pratiques, comme c'est le cas de ACR+, (Association des Cités et Régions pour le recyclage et la gestion durable des Ressources), un réseau international de cités et régions qui partagent l'objectif de promouvoir la consommation durable des ressources et la gestion des déchets à travers la prévention, la réutilisation et le recyclage. L'objectif est d'obtenir des retombées économiques réellement intéressantes en facilitant la mise en place d'infrastructures et de filières efficaces.

Toutefois, la valorisation des déchets ne doit pas devenir une fin en soi et la prévention doit demeurer l'objectif prioritaire. C'est pourquoi l'étude du comportement des usagers en matière de gaspillage revêt une telle importance, que ce soit à la maison et dans le cadre de la restauration hors foyer. En effet, l'observation de différences significatives, montre où et comment sensibiliser pour désamorcer des comportements inconscients et subjectifs. Mais elle mène également à l'identification de pistes d'action dans la conception des menus, la préparation des repas et du service.

Pour accompagner l'innovation des porteurs de projets, un travail doit également être entrepris sur la législation. En effet, la prévention des déchets passe aussi par la mise en place d'une législation adaptée pour redistribuer les repas non consommés. La Loi du bon Samaritain, adoptée en Italie dès 2003 (L155/03), autorisant la redistribution de nourriture intacte dans un cadre de respect des normes hygiénico-sanitaires en est un exemple. Elle s'adapte très facilement à la redistribution de pain et de fruits frais. Ce décret fait suite à la loi L179/02 qui précise les conditions à respecter pour nourrir les animaux avec des restes alimentaires. Dans le cas de l'Algérie, par exemple, et très certainement dans tous les pays de la rive Sud de la Méditerranée, le pain (et produits assimilés comme galettes, couscous, ...), aliment symbole, fait l'objet d'une attention particulière et son gaspillage est inadmissible. Il est récupéré et redistribué aux animaux mais il pourrait être utilisé, même s'il n'est plus frais, pour la fabrication des repas successifs selon des recettes à base de pain sec.

Les pratiques ménagères ont intégré depuis longtemps l'art de cuisiner avec les restes pour optimiser l'économie domestique. Bien que relevant du bon sens, elles peuvent sembler une solution anecdotique si on ne prend pas la mesure du phénomène global du gaspillage et si de telles solutions ne sont pas rendues compatibles avec les exigences de la sécurité sanitaire des aliments et le concept induit de marche en avant qui régit le flux des denrées alimentaires. De nombreuses recettes existent, comme par exemple, dans le cas du pain, le *pudding* anglais la *panzanella* italienne, ou encore le pain perdu français... En restauration collective, de plus en plus des saladiers sont proposés aux convives pour qu'ils composent eux-mêmes leurs assiettes de crudités, selon leur goût et leur appétit. Non seulement les cuisiniers gagnent du temps, il y a moins de restes dans les assiettes, mais si conservés correctement, les légumes non consommés sont réutilisés le lendemain comme base pour préparer d'autres plats, comme par exemple de la soupe de légumes.

En parallèle, la société civile œuvre pour briser les tabous comme le démontrent les manifestations populaires de plus en plus fréquentes, comme à Turin en Italie, visant à organiser des repas avec des produits comestibles mais invendus, normalement destinés à la destruction. Ces actions spontanées sont symptomatiques de l'intérêt à réviser la fonctionnalité de la filière alimentaire, pour maximiser la prévention du gaspillage en favorisant l'accès à une nourriture encore bonne mais dévalorisée par la surproduction de la filière alimentaire quelle que soit la phase considérée : production, transformation ou distribution.

Il est fondamental de réaliser que la prise en compte des déchets et du gaspillage permet une remise en question efficace de toutes les phases liées à la préparation et à la consommation du repas donnant lieu à la recherche de solutions conduisant à des économies tout en maintenant la qualité. Au cours de l'atelier de Constantine, en mai 2014, le travail de réflexion mené par les participants a permis d'approfondir les moyens d'action en procédant à une analyse des causes et solutions possibles dans une optique d'analyse de cycle de vie, en considérant la production de matières premières (agriculture, pêche, élevage, intrants divers), la transformation (industrie agroalimentaire, préparation des repas), la logistique (transport, stockage, distribution) et la gestion des déchets.

Mais si la mise en évidence de solutions techniques est un point central de la démarche, il n'est pas nécessairement prioritaire, à un stade préliminaire, pour la mise en place d'un processus durable de lutte contre le gaspillage. En effet, les participants algériens ont estimé que l'efficacité des dispositifs était assujettie d'une part au besoin d'un état des lieux qui permette à la fois de quantifier le problème et de déterminer les causes et d'autre part à la nécessité d'informer et de sensibiliser les différents acteurs pour les mobiliser. Une telle action pourrait déboucher, dans une forme plus élaborée, sur des programmes de formations professionnelles et diplômantes, s'appuyant sur des activités de recherche, vecteurs de solutions fonctionnelles et innovantes. Assurément, l'atelier *Eating City* organisé à Constantine a donné la possibilité d'approfondir les liens étroits entre la recherche et la formation définissant en particulier le rôle clé des universités. Plusieurs types de formations peuvent et doivent être mises en place : formations continues, formations diplômantes à différents niveaux : enseignement supérieur (ex. master en RC, formations universitaires continues des personnels de RC) et enseignement professionnel (ex. filière hôtelière). Ces formations doivent intégrer les aspects environnementaux liés à la production alimentaire, et responsabiliser les jeunes devant affronter ces nouveaux enjeux.

A court terme, il semble possible et judicieux de réaliser :

- des études bibliographiques sur les textes réglementaires ainsi que sur les travaux existants;
- des enquêtes de terrain, permettant d'obtenir des données quantitatives et qualitatives sur la production des déchets et le gaspillage, sur le comportement du personnel et des convives, en particulier en termes d'attentes et de préférence;
- un état des lieux sur les infrastructures existantes permettant de gérer et valoriser les déchets produits est indispensable.

A plus long terme, il s'agira de concevoir des outils de sensibilisation destinés à plusieurs publics cibles tels que les professionnels, la population des mangeurs, diversifiée et les décideurs. Mais l'action ne doit pas se limiter à la connaissance et à l'éducation et sensibilisation.

L'université peut jouer un rôle moteur innovant et amorcer ainsi le développement de secteurs économiques porteurs d'emplois, que ce soit en restauration collective, pour la préparation de repas de qualité, minimisant déchets et gaspillage alimentaires, ou bien dans le secteur de la valorisation des déchets. Pour cela, la collaboration avec le secteur productif est indispensable, pour mettre en place des programmes de recherche fondamentale et appliquée, débouchant sur des expérimentations, en vue de retombées concrètes. Deux secteurs précis de la RC ont été proposés pour mener ce travail :

1. La restauration en entreprise, ayant un budget et des moyens plus importants et donc moins de contraintes, peut devenir un lieu propice pour tester différents systèmes d'approvisionnement (en particulier approvisionnement de proximité) et modalités de préparation des repas et de service afin de réduire les déchets.
2. La restauration scolaire et universitaire peut devenir le lieu idéal pour mettre en place des tests sur le tri sélectif et la valorisation des déchets, ainsi que l'étude de comportement et la sensibilisation des élèves et des étudiants.

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Call Pre-Announcement

Renewable Energies, Water Resources and their connections for the Mediterranean Region

ERANET-MED programme aims to enhance Euro-Mediterranean co-ownership through innovation and competitive research in the societal challenges of the region. The programme also aims at reducing fragmentation of programming in the Mediterranean region by increasing coordination among national research programmes of European Member States, Associated Countries and Mediterranean Partner Countries.

The present statement is a pre-announcement of the joint transnational research call of ERANETMED co-funded by the following Euro-Mediterranean countries: Algeria, Cyprus, Egypt, France, Jordan, Greece, Germany, Italy, Lebanon, Malta, Portugal, Tunisia, Turkey, Spain.

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Where does the Egyptian Food Subsidy go?

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"Bread, freedom, social justice and human dignity", this was the slogan of the 25th of January revolution 2011. The high poverty rate (45% of the population lives below 2 dollar a day) and food security (17% of the Egyptians suffered from food insecurity in 2011) are two major challenges facing the Government of Egypt (GoE) (United Nations Newsletter, 2013 and Ghoneim, 2014).

Food Subsidies are one of the most important tools of public policies to reduce poverty, malnutrition and ensure food security by providing basic goods to low-income individuals at prices lower than the market ones. Moreover, it protects the poor from the impact of high food prices during turbulent periods as subsidized food accounts for nearly fifth of poor households' food expenditure (Breisinger et al., 2013).

However, the Egyptian food subsidy system suffers from increasing budget that reached 19.2% of the total subsidy budget (including fuel subsidies) that worth 852 02 Million EGP in the FY2013/2014 (CAPMAS, 2014), along with problems of targeting, waste and leakage. Important amount of wheat and subsidized products are lost through the food subsidy system. Such losses increased the government budget, food insecurity in addition to pressure on different scarce natural resources such as water and land (FAO, 2013). Recently, the GoE applies new rules and pricing for both food and fuel subsidies in order to reduce subsidy bill, budget deficit and waste.

The Egyptian Food Subsidy System

The Egyptian food subsidy system started after the Second World War in order to provide the Egyptians with their basic needs and protect them from food shortage during turbulence periods. The system is divided into two sub programs; *"baladi"* bread program and ration card program. In 2013, the *"baladi"* bread constitutes 61 percent of food subsidies, while ration card-based commodities represent 39 percent (Breisinger et al., 2013).

The first sub program includes the subsidized 82% wheat flour and the dark country-style bread known as *"baladi"* bread. These are the major commodities of the system given the importance of wheat and its products in the Egyptian diet. The *"baladi"* bread accounts for 71 percent of bread consumed by poor households. The 82% wheat flour is mainly consumed by the poor in rural areas where they prefer the home baked bread. The price of subsidized *"baladi"* bread is very low, typically less than 1 cent a loaf. It is a "universal" subsidy, as bread is available to all consumers without restrictions, on first come first served basis (Ramadan and Thomas, 2011 and Center for Economic and Social Rights, 2013). Most of the wheat used in the production of the subsidized bread is imported. This makes the bread subsidies budget vulnerable to the volatility of the international wheat price.

The second sub program is the ration card program. This system offers fixed monthly quota of some commodities per person per households holding the cards. These products are sold to the card holders in specific outlets at a fixed price lower than the free market price. The commodities included in the card system vary over years; however sugar, cooking oil, rice and tea are always available through the cards. Starting from July 2014, there will be 20 different subsidized products available in the ration system, including meat and poultry.

Waste and Leakage in the Egyptian Food Subsidy System

The Egyptian food subsidy system suffers from increasing budget, in addition to problems of waste and leakage. Given the weak targeting and the corruption resulted from the system structure, some non-poor groups reap the benefits of the system. The leakage is considered as the amount of subsidized food that does not reach intended consumers. In 2008/2009, the *"baladi"* bread accounted for 68% of the leakage of the system, while the rationed cooking oil accounted for 20% (Wold Bank, 2010).

For the "*baladi*" bread, waste and leakage take place in the different stages of the bread supply chain; pre and post wheat harvest, storage, transportation, conversion of wheat to flour and bread consumption. According to the Food and Agriculture Organization (FAO, 2013), 43% of the purchased wheat are not converted into bread and the annual losses of locally produced and imported wheat are estimated over 6.6 Billion EGP. And according to the World Bank (2010) the leakage is higher in the metropolitan areas.

The lack of adequate transport infrastructure (roads, railways and harbors) is a major factor of wheat losses. The high cost of inland transport in Egypt increases grain bill by 21% and inadequate infrastructures cause 10% losses of the grain collected. Adequate logistical infrastructures are necessary to transfer wheat from surplus areas to food deficit areas and to reduce import bill, food losses and waste. Other main factors of wheat losses are the lack of storage facilities and the open storage bunkers. Wheat, as other cereals, is harvested once a year while it is consumed daily, therefore, the grain's storage should be efficient to maintain the wheat consumable throughout the year (Abis et al, 2014).

Losses occur as well from the long distribution process and the large number of transactions of the bread supply chain which increase the opportunities for losses and leakage. Moreover, the system structure induces smuggling and corruption given the difference between the subsidized price and the market price. This price difference gives incentives to the different agents of the supply chain to sell the subsidized wheat products in the black market at higher price. Therefore, the subsidies did not reach intended consumers (World Bank, 2010 and Ramadan and Thomas, 2011).

According to the FAO, 2013, the lack of regulatory framework and strong institutions are other important causes of food losses and wastage in the Egyptian food subsidy system. For instance, there are five ministries and 16 separate authorities responsible on different subcomponents and regulations of the "*baladi*" supply chain.

Finally, at the consumption level, waste occurs because of Egyptians' consumption habits. Egyptian consumers buy more bread than what they need and they use the remained as animal feed (World Bank, 2010 and Breisinger et al., 2013)

For the ration card system, the waste happened as the ration food items did not reach intended consumers. Three quarters of those covered by the ration system are not considered as poor, while fifth of the poor are excluded. Many of the poor households in Egypt cannot access ration cards; they face difficulties to obtain national ID numbers since they are illiterate (Ahmed and Bouis, 2002; FAO, 2009; Ramadan and Thomas, 2011, Omar, 2012, United Nations Newsletter, 2013 and Center for Economic and Social Rights, 2013). Therefore, improving targeting of the system through household's geographical location or other household's characteristics to reach the poor is required to reduce leakage of the ration system.

It worth noting that for the ration card system, leakages are higher in Upper Egypt and the leakage rate differs between the different ration products. In 2008/2009, the highest leakage rate was for cooking oil with 31.4%, followed by sugar with 20% and finally rice with 11% (World Bank, 2010).

Policies and strategies for reducing subsidy food losses and waste

The Egyptian subsidy system has become unsustainable, however, the food subsidy, especially the "*baladi*" bread, is a kind of social contract between the government and the Egyptian population. Any intention of decreasing or removing food subsidies will be faced by social and political unrest as what happened in 1977 (Food Riots) and 2008 (bread crisis). Removing the subsidy system without any protection system in addition to rising food prices will negatively affect the standard of living of Egyptians, mainly poor households. In 2010/2011, it was estimated that further 9% of the population would fall into poverty if subsidies had not been in place (Ramadan and Thomas, 2011 and Ghoneim, 2014 and Center for Economic and Social Rights, 2013)

Therefore, reforming the food subsidy becomes a necessity given the actual context of the Egyptian economy of high poverty rate and food insecurity, in addition to alarming budget deficit (almost 14% of GDP). A gradual reform of the subsidy system to make it more efficient would lead to savings that could be invested in more targeted food security and nutrition interventions as well as job-creating initiatives in poorer areas (FAO, 2013 and Ghoneim, 2014). According to the World Bank (2010), if leakages are eliminated and coverage is narrowed, the GoE would save up to 73% of food subsidies cost.

Any reform of the system should be communicated to the people with time table and incentives allowing people to adjust to such new reform. Moreover, as described by the FAO (2013), reducing the losses will solve the problem of undernourishment in Egypt, as the calorie content of the food losses will offset the number of calories needed to lift the undernourished from their status (FAO, 2013 and Ghoneim, 2014).

The reforms are required at the different stages of the wheat supply chain to render it more efficient and reliable. At the production level, more programs should be implemented to improve production practice, harvesting capacities and developing farmers' capacities. The costs of imported wheat can be reduced by improving the trending process and developing strategic partnerships with reliable grain traders and key grain exporting countries to strength procurement (CIHEAM, 2012).

Optimizing the wheat supply chain, with appropriate logistics and storage facilities, would reduce losses, increase Egypt's wheat stock, reduces the risk of disruption and wheat's sector costs. Improving ports infrastructure and the ability to accommodate and unload ships would protect Egypt from the volatility of the international wheat price. And at the storage level, the efficiency of the system can be achieved by covering the open bunkers, building new silos to reduce wheat losses, in addition to packaging and labeling bread. It worth noting that, recently, there is shared investment between public and private sector in port storage infrastructure in addition to a State investment for building fifty silos (Breisinger et al., 2013 and Abis et al, 2014).

Increasing investment in the infrastructure and the advanced food and agricultural research are required for reducing food waste and leakage, in addition to encouraging private sector to invest in reducing losses and adding values in the post production chain. More monitoring and evaluation are required at all stages of the food value chain. While for the consumption habits, awareness campaigns should be raised about dietary requirements, food purchase, handling, storage, preparation and consumption (FAO, 2013).

The GoE starts implementing several reforms and strategies, for both food and fuel subsidies, in order to improve the subsidy system efficiency and reduce losses and budget deficit. The ration card system was replaced by a smart card system. This new system has embedded chips that contain data on the household head's monthly quota of subsidized goods and other household information as well. Such reform would enable the government to track both the distribution and consumption of goods included in the system in an easy electronic method in order to reduce wastage and leakage (World Bank, 2010; Ghoneim, 2012).

For the "*baladi*" bread, the GoE separate between the production and the distribution, in addition to an attempt to liberalize the wheat flour market. Removing the subsidies from the different stages of the bread supply chain will eliminate the incentives of smuggling and black market. The government may intervene only in the final stage by buying the bread from bakeries at free market price then sell it to the needy consumers at subsidized price (World Bank, 2010 and Ramadan and Thomas, 2011).

Finally, a new system was implemented, in March 2014, starting by Port Said as a pilot governorate. By October 2014, this new system would be implemented in all Egypt's governorates. The new system provides 150 loaves of subsidized bread per month per person in household with ration card. For individuals with no ration card, they can get smart card for bread by providing a photocopy of their national ID number (Ministry of Supply and Internal Trade, 2014).

According to the Ministry of Supply and Internal Trade, in this new system, when individuals consume less than their quotas (5 loaves per day), they get points that can be exchanged with other subsidized products from the specific outlets, in addition to their specific quotas of ration products. Such system would benefit the consumers, especially as food price may rise after the increasing fuel prices implemented by the government in the beginning of July 2014 as another procedure for reducing the subsidy budget and the government budget deficit. This new bread system permits to follow the individual's consumption and reduce corruption and waste

Conclusion

Food security and poverty are major challenges facing the Egyptian economy. Addressing food waste and leakage in the food subsidy system becomes a priority on the GoE's agenda, not only for reducing the increasing subsidy's budget but also to protect the poor Egyptians from food insecurity and malnutrition.

Better targeting and narrowing coverage would reduce the leakage of the ration card system. While for the subsidized bread, improving wheat production practice and infrastructure, increasing the efficiency of the bread supply chain and raising the awareness of the Egyptian consumers are important steps toward eliminating black markets, reducing losses and increasing food security.

Finally, it worth noting that, even if the Egyptian food subsidy played an important role in protecting the poor, especially during food crisis, more food security programs and nutrition interventions are required to complement or substitute the actual system. Such programs can be implemented using the savings from the reduction of food subsidy waste and losses.

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Household Food Waste in Italy: estimations and causes

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Introduction

While for agricultural production, food processing and distribution there are reliable statistics that provide consistent data on the amount of food losses, food waste at household level is more difficult to be estimated. A limited number of researches have addressed this topic (Segrè A., Gaiani S., 2011) and methodologies for post-consumer/ household food waste analysis vary: from small numbers of households weighing food waste or using kitchen diaries to waste compositional and behavioural studies involving thousands of households (WRAP 2008). Some studies have measured household food waste as a percentage of total consumed calories, others as a percentage of the total weight of consumed food or of the consumed food items. In many analysis food scraps fed to domestic animals and sink disposals were not included thus yielding inaccurate estimates for total food waste (T. Jones 2004).

The present work on household food waste in Italy is largely based on a survey conducted in the frame of Waste Watcher, the Italian Observatory on Food Waste, an initiative developed thanks to the collaboration of the Department of Agricultural and Food Sciences of the University of Bologna, Last Minute Market and SWG. The results of the survey - based on answers provided by a sample of the Italian population - provide insights on the causes and impacts of food waste at household level. The data provided are based on self-perceptions and are simply estimations.

Methodology: a nationwide survey

The survey is made up of 100 questions organized in five main sections (family background, consumption habits, consumption attitudes, food waste behaviour and potential solutions to reduce/prevent food waste) and was submitted to a representative panel of 2.000 individuals during April-May 2013. The panel is constituted by a very heterogeneous sample of population – the persons interviewed differ in terms of age, income, political orientation, education and region of residence.

Aims of the survey are to investigate social and behavioural reasons behind household food waste, to identify the general consumption patterns and to provide preliminary estimations about the quantity of food wasted at household level. Authors are aware that this typology of surveys suffers of significant limitations regarding the estimations of food quantities since they are largely based on respondents' perception. In order to analyse the data collected quantitative and qualitative methodologies are utilized to quantify household food waste and explain the cause-effect relationships among different characteristics of the members of the panel. Policy segmentation techniques allowed to cluster respondents into 9 major consumers' profiles.

Data are analysed at the regional level in order to detected common trends and differences in food waste generation among regions. The technique used for data collection is CAWI, the latest version of a suite of applications for the development and management of online interviews. Respondents, when compiling the questionnaire, run a flash client application that communicates with the Web Service in reading and writing and producing the graphics. Data are collected on the database and are immediately available for queries and processing in real-time. CAWI allows the execution of complex questionnaires that contain single and multiple-choice questions, grills, textual and numeric open-ended questions and automatic fields.

Results: estimation and causes of household food waste

Italians throw away food every year for a value of approximately 8.7 billion euros that correspond to wasting money for a value of approximately 7.06 euros per family per week. At the same time 90% of the Italians consider food waste a serious issue, 78% affirm that they are worried by it, and 89% would like to receive more information on the consequences of food waste and the systems in place to reduce it.

57% of Italians declare that they "almost never" throw leftovers away and they do so only when food is no longer good, 27% throw food away less than once a week, while 14% at least once a week. The main products wasted are vegetables (41.2%), cheese (30.3%) bread (27.8%), milk (25.2%), yogurt (24.5%) and meat (24.4%). When it comes to cooked foods the products with the higher share of waste are pasta (9.1%), prepared food (7.9%) and pre-cooked food (7.7%). The results suggest a correlation between the amount of money spent weekly on food and the value of food thrown away monthly: the less families spend on food, the less they waste. Conversely, the more they spend, the more they waste. Families, who spend less than 50 euros in food every week, waste on average between 0 and 5 euros per month. While families who spend more than 300 euros per week on food, waste on average between 16 and 20 euros per month (table 1). The overall importance of each reason is reported in table 2.

Table 1
Correlation between money spent weekly on food and the value of food thrown away (all data in euro)

weekly food purchase	Amount of food waste			
	from 0 to 5	from 6 to 20	more than 20	I don't know
Below 50	64,3	22,5	2,1	10,9
Between 50 and 100	50,0	35,7	4,5	9,6
Between 100 and 200	36,8	41,6	10,1	11,4
Between 200 and 300	27,3	37,7	18,7	16,1
More than 300	29,4	36,7	17,6	16,1
I don't know	32,0	12,6	4,8	50,4

Source: Waste Watcher, 2013

Table 2
Causes of food waste

	%
Food is mouldy	38.94
Food has expired	32.31
Fruits and vegetable are kept in refrigerators and when brought back home they don't last	29.69
Food has a bad taste	25.58
Too much food has been cooked	13.29
Shopping has been miscalculated	13.15
My family goes shopping once a week and often products don't last	10.89
I don't know	9.35
Packaging was too big	8.32
I am worried by not having enough food at home	7.04
I have bought food I don't like	6.61
Others	5.18
I buy too much food	4.99
I don't like leftovers	4.02

Nota bene: Respondents were able to select more than one answer
Source: Waste Watcher, 2013

Household food waste causes: regional differences

The regions where people seem to throw away the least "almost never" are Liguria (68%), Sardinia (66%) and Campania (47%). Abruzzo, Apulia, Calabria and Campania are characterized by a higher frequency of the response "I cooked too much food": with waste occurring in the very final stage of the process of domestic consumption. In Piedmont and Friuli Venezia Giulia, the main causes of food waste are those related to the fast perishability of the purchased products. In Umbria and Veneto "too large packaging" emerged as the main cause of food waste: the generation of waste in this case is attributed to the packaging solutions adopted by the distribution industry. In Emilia-Romagna and Sardinia residents consider themselves and their eating habits as the main causes for food waste: they often buy products they don't like. In Sicily and Basilicata food waste occurs when food smells or tastes bad. In Liguria people are scared of "not having enough food at home" therefore the result is often an excess of stored food. In Latium residents are strongly affected by organizational problems: the relatively low food shopping frequency - once per week - often lead to mistake in food planning (Camillo F., Adorno V., 2013).

Table 3
Reasons for household food waste according to regions

Abruzzo	Families miscalculate the quantities of needed food Families cook too much food		Toscana	Food molds
Puglia	Families cook too much food Families miscalculate the quantities of needed food		Lombardia	Food molds
Calabria	Families do not like leftovers Families buy things they do not like Families cook too much food		EmiliaRomagna	Families buy things they do not like
Campania	Families cook too much food Families buy too much food Food does not have a good smell/taste		Sardegna	Families buy things they do not like Families fear not to have enough food at home
Friuli Venezia Giulia	Fruits and vegetables are often refrigerated and once they are brought home they go bad		Sicilia	Food does not have a good smell/taste Families do not like leftovers
Piemonte	Fruits and vegetables are often refrigerated and once they are brought home they go bad Families go shopping once a week and often good things do not last so long		Basilicata	Food does not have a good smell/taste I do not know
Veneto	Families buy too big packs Food does not have a good smell/taste Food molds		Liguria	Families fear not to have enough food at home
Umbria	Families buy too big packs		Lazio	Families go shopping once a week and often good things do not last so long Families buy too much food
			Marche	I do not know Others
			Molise	
			TrentinoAltoAdige	
			ValleAosta	in line with national data

Source: Camillo F., Adorno V., Waste Watcher elaboration 2013

The survey led to the identification of 9-Waste types (Camillo F., Adorno V., 2013) marked by an evocative name (Table 4).

Table 4
The 9 Waste Types

Types	Weekly data in euro		
	Weight (%)	Household waste	Waste pro-capita
The concerned, who wastes only if there are no alternatives to discard food	34.4	4.8	1.7
The unaware, is not paying attention to social and environmental concerns	8.6	4.8	1.8
The isolated	5.2	5.0	2.1
The shopping maniac, fan of fresh food	14.2	6.9	2.9
The fanatic for "cooked and eaten"	3.7	7.9	3.1
The excessive cooker	12.7	8.1	2.9
The disillusioned from packaging	6.6	9.6	3.7
The disappointed experimenter	6.2	10.5	4.3
The obsessive accumulator	8.4	12.1	4.2
General mean		7.1	2.7

Source: Camillo F., Adorno V., Waste Watcher elaboration 2013

The sensorial person who wastes only if there are no alternatives to discard food represents 35% of the sample of respondents. This Waste Type throws away almost nothing: the family wastage = 4.8 euros per week, compared with an average of about 7 euros. Mould, bad odour and taste, alongside too big packaging, are the only causes of waste for this Waste Type. Other salient characteristics of this group is that when food is expired, they check if it has not gone bad and possibly reuse it; they think the amount of food that is thrown away represents a very serious problem in social and environmental terms; they buy occasionally pre-cooked meals; they almost always have dinner at home and they go on holiday less than 7 days in a year.

The unaware of food waste, which is not paying attention to social and environmental concerns, is the Waste type that does not know the answer to a significant number of questions and is characterized by an emblematic lack of substantive opinions. These persons are generally low educated and are not informed about the difference between best before and expiry dates on food products.

The isolated nostalgic person is extremely reflexive, does not watch TV, goes seldom out, supports local productions and personally encounters many difficulties in everyday life, also in planning food shopping.

The shopping maniac has a pretty hectic lifestyle between work and home, lives in the suburbs of northern cities, buys at supermarkets, is a great consumer of fresh products, is sensitive to the issues of sustainability and eating healthy, has dinner at home about 6 days a week, believes that the amount of food that is thrown away daily for the planet represents a serious challenge.

The other 5 Waste types are the fanatic of cooked and eaten, the exaggerated cooker, the disillusioned from packaging, the disappointed experimenter and the obsessed accumulator. In the case of these non-virtuous groups, waste is embedded to their lifestyle: they waste almost 13 euros per week on food (as in the case of the Accumulator Obsessed). The key determinants are different, but surely they show a medium-high standard of living, they would like to receive more information and believe technologies could help solving the food waste challenge (Camillo F., Adorno V., 2013).

Conclusions

Results suggest that most Italians consider food waste a serious issue and would like to have more information on its impact and on the potential reduction strategies. Despite this concern food waste accounts for about 7 euro per week and regards a variety of products (vegetables, cheese, bread, milk, yogurt and meat) that register an overall level of waste higher than the 20%.

In economic terms results indicate a correlation between the amount of money spent weekly on food and discarded food: the less families spend on food the less they waste; more they spend on food more they waste. The causes of food waste vary across the country with significant differences among the regions, especially comparing North with South, and also within the regions on the basis of households different characteristics. Household size and composition (adults waste more in absolute terms than children, and larger households waste less per person than smaller households), household income (the lower the income, the lower the food wasted) household demographics (young people waste more than older people), and household culture, attitudes and values are all factors that may help to explain variation in quantities of household food waste generated.

Some factors affecting post-consumer food waste worldwide (i.e. household culture and attitudes) may require solutions that involve direct communication and awareness-raising campaigns. Others may require government interventions and the support and cooperation of the food industry itself, such as improving the clarity of food date labelling and advice on food storage, or ensuring that an appropriate range of pack or portion sizes is available so to meet the needs of different households.



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EuroMed Conference

Palermo, November 28th, 2014



Italian Presidency
of the Council
of the European Union



In the framework of the Italian EU Presidency in the second semester of 2014, the Italian Authorities have decided to hold a Euro-Mediterranean Conference on agriculture in Palermo (Sicily) on November 28th, 2014. This Conference ideally follows the path of dialogue set out with the First Euro-Mediterranean Conference on agriculture that took place in Venice on November 27th, 2003.

The Union for the Mediterranean Member's Countries and several representatives from International and Regional Organisations have been invited to attend the Conference. The discussion will focus on the role of young generations in developing agriculture (i) and on the importance of research, cooperation and exchange of experiences for a sustainable agriculture (ii). The Conference is intended to relaunch the debate on the need for a Mediterranean agricultural policy and to back up collaboration and cooperation EU initiatives with North African, Middle Eastern and Balkan Countries.

The Italian Minister of Agriculture, Mr. Maurizio Martina, asked CIHEAM to provide a scientific and technical support to prepare the Conference, given the role played by the Organisation in the Mediterranean Dialogue and Cooperation in the field of agriculture, food and rural development.

Consommation et gaspillage de viandes et produits laitiers en Tunisie

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A l'instar des autres secteurs stratégiques, le domaine alimentaire en Tunisie a longtemps été l'apanage de l'Etat qui a, dans les faits, combiné productions nationales et importations, et même subventions alimentaires parfois. Actuellement, la filière lait en Tunisie recèle une ambivalence dans la mesure où l'aval connaît une croissance sans précédent tandis que l'amont n'arrive pas à satisfaire toute la demande exprimée malgré les efforts fournis par l'Etat. La viande et les produits laitiers ne font pas figure d'exception. Ils sont parmi les denrées alimentaires les plus demandées surtout pendant le mois de surconsommation (Ramadan). Cela a d'ailleurs poussé l'Etat Tunisien à importer des quantités importantes pour faire face à la hausse de la demande. Toutefois, depuis les années 1990, la Tunisie paraît s'orienter vers des modèles alimentaires occidentaux (riches en produits animaux) et s'éloigner du modèle méditerranéen (riche en glucides complexes et en fibres).

La production de lait et produits laitiers

Le secteur laitier contribue à hauteur de 11% à la valeur totale de la production agricole en Tunisie et à hauteur de 7% de la valeur de l'industrie agro-alimentaire. La production laitière a connu un essor remarquable durant les dernières années suite à un ensemble de mesures d'incitation touchant tous les maillons de la filière (tableau 1).

Tableau 1
Evolution des quantités de lait produites et collectées (millions de litres)

	2004	2005	2006	2007	2008	2009	2010	2011
Quantités produites	864	920	971	1006	1014	1030	1050	1076
Quantités collectées	483	517	560	579	589	599	639	664

Source : GIVLait, 2011¹

¹ GIVLait, *Présentation de la filière lait*. Rapport annuel, 2011.

En 2013, la production laitière était de l'ordre de 1155000 tonnes de lait de vache et 20000 tonnes de lait de brebis. Bien que la quantité collectée au réseau national soit de 748 millions de litres qui représente 77% de la production nationale (GIVLait, 2014a)². Toutefois, 4 millions de litres de lait ont été importés de Turquie en 2013 pour faire face à la pénurie de lait sur le marché tunisien. Malgré la perturbation qu'a connue le secteur du produit laitier, une évolution de 8% a été affichée au niveau de la production.

Le réseau des centres de collecte du lait de vache a connu un développement remarquable depuis le début des années 1980. Actuellement, plus de 230 centres de collecte, avec une capacité totale dépassant 2,5 millions de litres collectent environ 640 millions de litres, soit plus de 60% de la production nationale de lait cru (Lactimed, 2013)³. Le lait collecté représente plus de 59% du lait produit et les centrales laitières s'approvisionnent à hauteur de 85% du lait frais au près des centres de collecte. Le secteur laitier tunisien compte près de 43 unités de transformation d'une capacité de plus de 3 millions de litres par jours, sans oublier la présence sur le territoire de nombreuses petites unités de transformation artisanale.

Tableau 4
Les produits de la transformation du lait (Millions de litre)

	2004	2005	2006	2007	2008	2009	2010	2011
Lait UHT	336	347	360	378	419	400	456	447
Yaourt	100	112	125	140	144	155	140	145
Fromage	83	85	95	110	116	130	120	130
Autres dérivés	28	35	35	40	46	55	44	48
Lait en poudre	2	6	7	12	-	-	-	10
Total	559	585	622	680	725	740	760	780

Source : GIVLait 2011

La production de viandes

La production de viandes rouges provient principalement des viandes bovines, ovines et caprines et d'une façon secondaire des viandes camélines et équines.

Tableau 1
Evolution de la production de viande rouge en Tunisie (millier de tonnes)

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Viandes bovine	47,8	49	52,4	53,7	51,6	55,8	54	54,5	56
Viandes ovine	45,7	48,4	49,4	51,5	49	50	50	48	48,5
Viandes caprine	8,5	9,15	9,6	9,7	9,8	9,4	9	9,3	9,5
Autres viandes	8	7,6	8,8	8,6	6,8	7,5	8	7,2	7,2
Total	110	114,2	120	123,5	117,2	122,7	121	119	121,2

Source : GIVLait, 2014b⁴

Les viandes blanches sont issues des poulets de chair, des volailles de réforme, dinde et viande cunicole. La production de viande de poulet de chair a atteint en 2012 près de 112,000 tonnes contre 100,000 tonnes en 2010, soit un taux d'accroissement de 10,7% (GIPAC, 2011)⁵. Le taux annuel moyen de croissance des viandes de volailles pour les dix dernières années a été de 5,8 % (FAO, 2012)⁶.

² GIVLait, *Présentation de la filière lait*, Rapport annuel du GIVLait, 2014 (a).

³ Bencharif H., Ben Mosbah A., H'Mad Z., Lapujade J., Sta S., Tozanli S., Zaiter M., *Valorisation des produits laitiers typiques de Bizerte et Béja. Diagnostic et stratégie locale*, Rapport du programme LACTIMED, Novembre 2013.

⁴ GIVLait. 2014b. *Filière viande rouge*, Rapport annuel du GIVLait, 2014 (b).

⁵ GIPAC, *Le secteur avicole en 2011*, Bulletin d'information avicole, numéro 48, 2011.

⁶ FAO. *Particularités du secteur avicole en Tunisie*, 2012.

Tableau 2
Evolution de la production de viande de poulet (en tonnes)

	2000	2002	2004	2006	2008	2010	2012
Production	73637	76641	93943	66172	87672	100050	112000

Source : FAO, 2012

La production de viandes de dinde a atteint en 2010 environ 47,800 tonnes (GIPAC, 2011). L'ensemble des autres viandes estimé à 11,900 tonnes soit 7,6 % des viandes avicoles provient des élevages de poules pondeuses ou de reproductrices de réforme ainsi que des élevages de poules de basse-cour. Faute de statistiques suffisantes, les viandes issues des autres espèces de volailles de basse-cour (dindes, pintades, canards, oies), les cailles les autruches ne sont pas incluses dans ces productions. Ces quantités sont néanmoins négligeables. En outre, le secteur de la cuniculture a enregistré au cours des dernières années une progression à tous les niveaux. La production annuelle de la viande de lapin a atteint 2256 tonnes en 2012 soit 2% de la production nationale de viandes. Elle est absorbée essentiellement par le secteur de l'hôtellerie et l'armée nationale (GIPAC, 2012)⁷.

Consommation et comportements alimentaires

Lait et produits laitiers

Les Tunisiens consomment en moyenne 110 litres de lait par personne et par an, soit près de ¼ litre/jour. La consommation annuelle de lait aromatisé a atteint 0,6 litre par personne en 2012 et le segment représente aujourd'hui 2% du marché des produits laitiers liquides. La hausse de consommation alimentaire pendant Ramadan concerne plusieurs produits, notamment les produits laitiers et les viandes; dont la consommation mensuelle passe de 0,9 litre par personne, tout au long de l'année, à 2 litres durant Ramadan». La consommation de yaourt progresse, aussi, sensiblement passant à 12,9 pots par personne, contre 5,4 pots mensuellement le reste de l'année.

En effet, le mois de Ramadan s'affiche clairement comme un mois de surconsommation. Les ménages consomment plus de produits, notamment des produits coûteux tels que la viande et les poissons. De plus, ce mois sacré semble correspondre à une phase d'achats excessifs de biens, qui souvent ne correspondent pas à de réels besoins. Au cours du Ramadan qui commence chaque année avec des augmentations de prix des produits alimentaires, les achats des citoyens se multiplient et se diversifient, que ce soit en qualité ou en quantité. Viandes, poissons, lait et produits laitiers sont achetés en quantité abondantes, laissant parfois place à des gaspillages inévitables quand trop de nourritures sont préparées. Jeter ces aliments s'avère pourtant socialement irrespectueux quand de nombreuses familles tunisiennes pauvres restent incapables d'accéder aux produits de base les plus élémentaires.

Viandes

La consommation nationale totale en viandes rouges a accru entre 2004 et 2012 pour passer de 116,2 à 122 millions de tonnes. Par contre, la consommation moyenne annuelle par habitant a légèrement diminué de 12 à 11 kg entre 2004 et 2012. La chute de la consommation par habitant est due principalement à la baisse du pouvoir d'achat et l'élévation des prix des viandes rouge (GIVLAIT, 2014b)⁸.

Tableau 4
Evolution de la consommation des viandes rouges (millions de tonnes)

	2004	2005	2006	2007	2008	2009	2011	2012
Consommation	116,2	115,5	119,25	123,5	126.46	122.16	125.75	122

Source : GIVLait, 2014b

⁷ GIPAC, Campagne de sensibilisation sur le poulet abattu dans les abattoirs contrôlés, 2012.

⁸ GIVLAIT, Filière viande rouge, Rapport annuel du GIVLait, 2014b.

Le Tunisien consomme, durant le mois saint, 1,1 kg de viande ovine (0,75 kg en dehors de Ramadan), 0,5 kg de viande bovine (contre 0,22 kg par mois habituellement) et 1,8 kg de volailles (contre une moyenne de 1,28 kg par mois en dehors de la période de Ramadan). La consommation par habitant et par an, en 2010, est estimée à 15,1 kg pour les viandes avicoles, dont 9,5 kg de poulet de chair et 4,6 kg de dinde, le reste représentant les autres viandes (réformes de reproducteurs et de pondeuses et volailles de basse-cour). Par contre en 2012 la consommation par habitant et par an est de l'ordre de 18,8 kg de viande avicole dont 10,5 kg de poulet (GIPAC, 2012).

Tableau 3
Evolution de la consommation de viande avicole (kg/habitant)

Année	2000	2003	2005	2007	2008	2009	2010	2012
Consommation	11.2	11.7	12.9	13.2	13.4	13.8	15.1	18.8

Source : GIPAC, 2012

Cependant, la viande de lapin occupe le 5^{ème} rang en Tunisie après les viandes de volailles, bovines, ovines et camelines. La consommation est de l'ordre de 0,250 Kg/habitants/an (0,3 Kg/habitants/an au niveau mondial). La consommation des viandes de lapin reste très marginale, ceci s'explique par la réticence du tunisien à consommer la viande de lapin, vu ses connaissances limitées quant aux vertus de ce produit, outre la méthode de présentation de ce dernier à la vente, généralement sous forme non découpée mais le consommateur tunisien plus exigeant et cherche la qualité, la fraîcheur, le bon goût et de plus en plus des produits découpés. La viande de lapin aura sa place dans un futur proche et n'échappe pas à cette tendance.

Pertes et gaspillage sur ces productions stratégiques

Le gaspillage alimentaire est un problème qui touche surtout les stades de la commercialisation et de la consommation. En Tunisie, la plupart des pertes alimentaires ont lieu durant les phases de postproduction, récolte, transport et stockage et sont essentiellement dues à des infrastructures inadéquates, alors que le gaspillage par les consommateurs est nettement plus limité en matière de viandes bien qu'il est légèrement supérieur en lait et produits laitiers. Durant le mois de Ramadan, viandes, poissons, lait et produit laitiers sont trop souvent achetés en quantité importante et supérieure aux besoins des foyers. Il serait assurément opportun de réfléchir aux actions de sensibilisation à mettre en place pendant ce mois spécifique afin de promouvoir des pratiques alimentaires plus responsables et réduire les gaspillages.

Plus globalement, c'est toute une politique anti-gaspillage des aliments qu'il conviendrait de développer, depuis les champs jusqu'aux tables des consommateurs, en passant par les étapes de collecte, de transport et même de transformation. Pour l'heure, le plus important semble néanmoins d'identifier les principales causes de ce gaspillage et de se mettre d'accord sur le principe de faire de la lutte contre les pertes et le gaspillage alimentaire l'un des piliers dans le développement durable de la Tunisie. Le contexte sociopolitique actuel s'y prête sans aucun doute.

Sécurité alimentaire, économie des ressources, durabilité de la croissance, démarche inclusive des différents acteurs sont autant de priorités affichées dans les discours du moment. La lutte contre les gaspillages, notamment dans les filières aussi stratégiques que celles des viandes et des produits laitiers, pourrait représenter un domaine d'expérimentation concrète à ces objectifs déclarés. Un débat doit donc s'ouvrir en Tunisie sur le sujet. Plusieurs pays méditerranéens se mobilisent déjà. La Tunisie ne saurait manquer ce rendez-vous.



Food Waste in Lebanon: some interesting initiatives to tackle it

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The Mediterranean region is directly concerned with the problem of food losses and waste especially when put in the context of the larger food security challenges it faces. The situation is particularly alarming in the southern Mediterranean, because while it is true that huge amounts of food is being wasted in the northern part, it is true also that southern Mediterranean countries lose and waste huge amounts of food while depending enormously on food imports.

The actions taken up to now to combat these losses and waste have been compromised among others, by the lack of data concerning food losses and waste for specific products and places, by the lack in investments, and by the lack in awareness targeting the concerned actors.

Lebanon is no exception when it comes to these problems, and it is not possible to talk about great progress made in the field of combatting food losses and waste in the country, especially with the consecutive governments failing to stand up to their obligations regarding this issue along with many other social and economic ones, in the context of growing political and security uncertainties.

However, an important work tackling in particular the waste part (occurring at the consumer level), which it can be hoped to trigger more initiatives and awareness, is being done by civil society organizations, along with some campaigns and programmes financed by the United Nations and regional organizations. This article aims at shedding the light on some of the work that is being done in this regard.

The Lebanese Food Bank

The Lebanese Food Bank (LFB) is a non-profit organization, a member of Food Banking Regional Network (an Arab Network aiming at unifying the efforts of the food banks operating under its umbrella), created 3 years ago by a group of business men, and officially launched in May 2013. The organization's main objective is to eliminate hunger from Lebanon by 2020, by building on strong partnerships in the public and private sectors (the LFB has more than 30 partners from banks, to hotels, to bakeries etc.,) as well as on cooperation, and donation from individuals let it be food or money (www.helpforleb.com is a fundraising website where individuals can help in supporting the organization).

LFB's action is divided into 4 main axes: The Feeding Programs aiming at feeding the needy who are unable to work, which means Elderly and Disabled People, People suffering from Chronic diseases etc.; the Development Programs which aim at developing the capacities of the needy who are still able to work in order to actively reintegrate them into society through education, vocational training capacity building, and through granting them credits for small projects; encouraging volunteering to provide various services thanks to many different and specialized talents and skills; and the Awareness Program: "Not To Waste Food".

The Awareness Program or campaign targets hotels, restaurants, catering companies, food factories, and individuals. Instead of throwing away the excess food, the LFB distribute it to orphanage, nursing homes, and NGOs (LFB supports more than 30 NGOs) by using refrigerated trucks to preserve the quality. It's worth mentioning that the work of LFB is a continuous one, but also seasonal in the sense that special efforts are made during the big holidays in Lebanon when wasting food can be more than the usual (Christmas, Ramadan, Adha, Easter). Awareness is being also raised in schools and universities.

The Lebanese Food Bank can be considered among the most important organizations operating in this domain let it be by the scale of its actions, its continuity in time, the size of the organization, and the advertising of its work through media campaigns. The website of the organization, its Facebook page are regularly updated, plus CDs, and brochure are being made. Members of the LFB go also on TV to explain about their work. In addition to that, a 'bilan' of the year 2013 has been made.

Regarding the waste issue in particular, reports indicating the exact locations that have received the food, are published at the end of each month and distributed on the contributing restaurants, bakeries etc., in order to preserve the reputation of the organization. The main actors of the organization emphasize also its anti-confessional ethics that helps it to cover by its actions all Lebanese people and regions, thing that can be sadly missed in a lot of organizations and charities in Lebanon. Until now the work of the LFB can be seen as a success, but it's too early to make a formal conclusion especially that the objective it sat for itself is to be achieved by 2020.



Source: www.lebanesefoodbank.com/en/

Think.Eat.Save

In June 2013, The UN Information Center in Beirut (UNIC-Beirut) and the UNEP- Regional Office of West Asia (ROWA) launched in Lebanon, the international campaign Think.Eat.Save supported by Save Food: Global Initiative on Food Loss and Waste Reduction of FAO and Messe Düsseldorf. The campaign presents itself as seeking to "add its authority and voice to these efforts in order to galvanize widespread global, regional and national actions, catalyze more sectors of society to be aware and to act, including through exchange of inspiring ideas and projects between those players already involved and new ones that are likely to come on board".

A short TV spot featuring singer Ragheb Alama (UNEP ambassador) was made about the campaign and was broadcasted on Lebanese and Arab TV channels. A video is also available on YouTube. The video is very short, because it aims mainly through strong messages, numbers, and pictures to convince people to visit the main website of the Think.Eat.Save campaign.

Such campaigns are really important for awareness, and the choice of popular figures like singers is a very good one for advertising especially in the Arab World. However, it can be argued that such campaign could have been advertised more. The official launching at the international environment day is certainly very important, but such campaigns should be advertised beyond special events, or at least it should target many special events to cover the year.

The only references to this campaign go to 2013 so to one year ago, and the TV sport was only broadcasted during the month of June 2013. The continuity in time, building on the experience of the past, of any action to combat food security is very important. Of course, the importance of investments is a very crucial issue, and here we go back to what was said in the introduction about the lack in investments being among the major reasons why measures adopted to fight food waste are not so effective.



www.thinkeatsave.org/

The MED-3R project

The Med-3R project (MED-3R Euro-Mediterranean Strategic Platform for a Suitable Waste Management) is a waste management project financed by the European Union in the framework of the ENPI CBC MED Programme (Cross-Border Cooperation in the Mediterranean). The project (2012-2015) is of a budget of 4 787 062 euros and operates mainly in five Mediterranean states: France, Italy, Jordan, Tunisia and Lebanon.

Med-3R has three Lebanese Partners: The municipality of Jbeil-Byblos, the municipality of Blat (which are direct partners), and the Lebanese Ministry of Environment which is an associated partner). The actions carried out in Lebanon in the framework of the project which includes stands to promote it, and technical seminars seem rather modest until now.

Concerning Food Waste, a great campaign was applied in the city of Nice in France, which let us think that it is also important to carry out such campaign in the concerned partner municipalities in Lebanon. It is the stop waste campaign carried out in the framework of the project that targeted over 70 restaurants in the city to encourage the restaurants and the clients to get to be used to the habit of respectively proposing and asking for "doggy bags" which means basically to ask to take away the food that clients were unable to finish. The campaign explains that the concept of doggy bag is still predominately an Anglo-Saxon one, and not really in the habit of French people. However, the majority of the restaurants and the clients that experimented the idea were happy about it. This is perfectly true when it comes to Lebanon where people do not have the 'culture' of taking away the remaining food, and applying such campaigns in Lebanese cities will surely have a positive effect.

Conclusion

On 24-28 February 2014, the 32 Session of FAO Regional Conference for the Near East on Reducing Food Losses and Waste in the Near East & North Africa Region took place in Rome, Italy. The conference attended by Lebanon endorsed the "Strategic framework for the reduction of Food Losses and Waste in the Near East and North Africa" which objective is reducing the Food Losses and Waste in the MENA region by 50% during the next 10 years. The strategic Framework focuses on:

- "Data gathering, analytical research and knowledge generation";
- "Awareness raising and promotion of good practices at all levels of the supply chain";
- "Developing policies/regulations, and strengthening collaboration and networking";
- "Promoting investment and specific projects".

All actors of the food supply chain, the governments, NGOs, and local communities should be involved in the implementation of the strategic framework. Lebanon is to host the next session of the conference in 2016, which should put more pressure on the different Lebanese authorities and actors to make important progress concerning the adoption of national measures to reduce food losses and waste, and the implementation of the strategic framework. As we saw in this paper, Lebanon has important initiatives and partners to build on.

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News from CIHEAM Bari

8th European Organic Congress

From 10 to 12 September 2014 CIHEAM Bari hosted the 8th European Organic Congress "Implementing Innovative Ecological Solutions for Farmers and Rural Communities". This event was organized by IFOAM EU Group, CIHEAM Bari, the Italian Ministry for Food, Agriculture and Forestry and the Italian EU Presidency. The Congress gathered around 120 European organic sector stakeholders to meet policy makers and decision makers from the Italian EU Presidency, the European Commission and Parliament to discuss the opportunities and challenges that lie ahead for EU organic food and farming. The Congress focused on Rural Development Programmes, the European Innovation Partnership for Agriculture and the Organic Regulation Review.

As for Rural Development Programmes, one of the aims of the 8th European Organic Congress was to discuss the impact of the new CAP and Rural Development Programmes on farmers and rural communities throughout Europe and to articulate ideas on how to use the new programmes to stimulate greater delivery of public goods and green job creation.

As for the opportunities of the European Innovation Partnership for Agriculture, stakeholders discussed how they might be used to put eco-functional intensification at the heart of the EU productivity and sustainability objectives. Farmers, experts and political representatives attending the Congress have proposed and shared solutions on the contribution of the organic sector on the development of the Partnership.

As for the new Organic Regulation, the Congress was an opportunity for the organic stakeholders to reach out to policy makers and decision makers as well as the general public to offer solutions for how the new legislation can help to make Europe more organic and drive innovation in sustainable food production.

About IFOAM EU Group: it is an independent regional group within the International Federation of Organic Agriculture Movements (IFOAM). They advocate for the development and integrity of European organic food and farming and fight for the adoption of ecologically, socially and economically sound systems based on the principles of organic agriculture – health, ecology, fairness and care. With more than 160 member organizations from the EU-28, the EU accession countries and EFTA, their work spans the entire organic food chain and beyond: from farmers and processors, retailers, certifiers, consultants, traders and researchers to environmental and consumer advocacy bodies.

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Road-show event « From Seed to Food »

In the frame of the Italian Presidency of the European Union, the Italian Cooperation Agency « *Alleanza delle Cooperative Italiane* » and the Italian Ministry of Foreign Affairs/General Directorate for Development Cooperation have organized a road-show of 5 conferences dealing with crucial issues of cooperation. On October 18, 2014 CIHEAM Bari will host one of these events, devoted to food security. The title of the event is "From seed to food: cooperation for sustainable agriculture and food security".

The conference will gather key decision makers, officials and research institution representatives who will be invited to reflect on solutions to be adopted in order to put in place a smooth process leading from "seed" to "food". In particular, based on a Concept Note which will be distributed prior to the event, participants will discuss the potential creation of a structure encouraging dialogue among society, research and policy makers, where needs are the main inputs and innovative solutions are the main outputs. Such a structure should act as an open learning resource for sustainable agriculture and food security, able to make the best use of research and knowledge in a competitive way, backed by consultation with stakeholders and institutional/private incentives.

In this context, reflection on the following issues will be encouraged:

- Could an ad-hoc structure/initiative help to reinforce and channel dialogue among civil society, research, private sector and institutions?
- What structure could be put in place to ensure that effective and sustainable solutions are translated into practice, at the same time maximising the synergies between and the impact of the efforts of the various actors involved (enterprises, cooperatives NGOs, research institutions, governments)?
- What is the role of the Italian cooperative system and international cooperation in this process?

The outcomes and conclusions of the event will be reported in a document which will be presented to the European institutions.

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News from CIHEAM Chania

MEDLAND 2020

The final conference of MEDLAND2020 Design of a future common Integral Land Management Scheme to protect natural resources in synergy with social and economic valorization (ICAP-MED12-19) project will be held in Marseille, on Thursday the 18th of September 2014, at the Villa Méditerranée.

In the auditorium, the participants will discover the process and the results of the project. Then, a round table grouping specialists will propose a fresh perspective on the question of the future of natural Mediterranean areas facing the global change and the new needs of the society.

In the afternoon, we will inaugurate the "initiatives village" to the participants that will meet there the 13 actors of the project to take benefit of the knowledge and exchange on the topic of natural resources management in the Mediterranean area. Four "village square" will be settling in the Agora around the amphitheater of the Villa, corresponding to the four main topics of the project, i.e. Integral management of natural protected areas; Natural Risks Management especially wildfires; Social & economic valorization of the territory; Smart natural resource management through innovation and new products.

CIHEAM-Chania, which participates in MEDLAND2020 with the project SYLVAMED Mediterranean Forests for All (MED 2007-2013) will present the outcomes/best practices of this project that was mainly related with designing pilot actions employing the Payment for Environmental Services (PES) tool.

The day will end with the conclusions of the project and the presentation of the next program of the European Projects of cooperation. The day after (Friday 19th September), a field trip will be organised in Roussillon (Vaucluse) that has been a pilot site of several projects capitalised in MEDLAND2020.

www.medland2020.eu

Mediterranean Diet

CIHEAM-Chania participated as Coordination Point, at the 2nd Mediterranean Diet Fair held in the town of Tavira, Portugal, one of the emblematic communities which inscribed Mediterranean Diet as Intangible Cultural Heritage (UNESCO Representative List) between September 5 and 7 of 2014.

CIHEAM Chania has been assigned the coordinating role for the Network of the Mediterranean Diet on UNESCO's representative list of Intangible Cultural Heritage, from 1 May 2014 to 30 April 2015. The Member Countries and Emblematic Communities of the Mediterranean Diet as Intangible Cultural Heritage are Koroni (Greece), Brac and Hvar (Croatia), Agros (Cyprus), Cilento (Italy), Chefchaouen (Morocco), Tavira (Portugal) and Soria (Spain).

The fair was a celebration of the Mediterranean Diet having been considered Intangible Cultural Heritage of Humanity by UNESCO. The Camara Municipal de Tavira organized this festival to promote the Mediterranean Diet and was ceremonially opened by the Hon. Minister for State and Regional Development.



News from CIHEAM Montpellier

Jonction agropastorale du Pinde

Le CIHEAM-Montpellier participe à l'organisation et de journées intitulées « Jonction méditerranéennes du Pinde. Histoire, Patrimoine et projets », du 30 septembre au 3 octobre 2014. L'Agence de Développement du Trikala et l'Université de Volos sont les principaux partenaires de l'organisation de ces journées. Celles-ci se dérouleront en trois temps : une première fera le bilan d'un programme Leader international « Transhumanza » (*Routes et civilisation de l'héritage mondial de la transhumance* qui capitalise l'action de 10 programmes Leader européens.

La seconde est un séminaire de recherche consacré au thème « Histoire environnementale, économique et sociale et paysages culturels » sous l'égide du Comité scientifique de l'Entente interdépartementale qui gère le Bien Unesco *Les Causses et les Cévennes* inscrit sur la liste de patrimoine mondial, au titre des paysages culturels évolutifs de l'agropastoralisme méditerranéen et qui cofinance la manifestation. Enfin la troisième journée est une réunion dite « de consortium » destinée à faire échanger et élaborer les participants sur les principes de base d'une réponse conjointe à des appels d'offre ou des outils européens cherchant à combiner la dimension patrimoniale et l'injonction de développement économique sur des territoires donnés.

Plus d'informations: lerin@iamm.fr

Conférence annuelle EURAGRI

La Conférence annuelle d'EURAGRI aura lieu au CIHEAM-Montpellier les 29 et 30 septembre prochains. EURAGRI (euragri.org) est une association réunissant les principales institutions de recherche agricole européennes ainsi que les Ministères de tutelle de ces institutions. EURAGRI constitue un lieu d'échanges informels entre acteurs de la recherche agricole européenne et organise des rencontres thématiques sur des sujets d'intérêt commun. Son activité contribue à la formation d'une vision partagée à l'échelle de l'Union européenne.

A l'heure où de nombreux défis globaux remettent en question la durabilité des systèmes agricoles et alimentaires dans le monde, il importe que les pays de l'Union européenne mettent en place des réponses coordonnées et synergiques et que ces réponses soient discutées dans le cadre global. La recherche agricole au sens large constitue une source importante de ces réponses et dès lors, la coordination des efforts de recherche en Europe est devenue une impérieuse nécessité, de même que la coopération en recherche agricole avec les institutions et les équipes de recherche des autres continents. C'est précisément le thème de la prochaine conférence d'EURAGRI qui a pour titre : *Programmation à long terme pour la recherche et l'innovation dans l'agriculture : les enjeux du partenariat Nord-Sud.*

Un focus particulier sera apporté sur la question de la coopération euro-méditerranéenne en recherche agricole pour des systèmes agricoles et alimentaires durables, avec notamment une présentation du contexte géostratégique euro-méditerranéen, par Sébastien Abis du CIHEAM-Paris, une présentation des activités de l'EraNet ArimNet par Florence Jacquet de l'INRA et une intervention portant sur l'initiative PRIMA visant à préparer un grand programme euro-méditerranéen de recherche dans le cadre de l'article 185 du traité de l'Union, par Claudio Bglioti du CIHEAM-Bari. Après un mot d'accueil de Pascal Bergeret, directeur de l'IAMM, la conférence sera ouverte par François Houllier, Président de l'INRA et close par Michgel Eddi, Président du CIRAD. Le CIHEAM-Montpellier, qui accueille la conférence dans ses locaux, a contribué à son organisation et à l'identification d'intervenants internationalement reconnus.

Plus d'informations: bergeret@iamm.fr

Séminaire ENPARD au Liban

Le séminaire de clôture de la première phase du programme ENPARD-Liban se déroulera mi-octobre 2014 à Beyrouth. A cette occasion, les responsables de l'équipe ENPARD présenteront le guide méthodologique destiné à appuyer l'élaboration de la future politique agricole et rurale libanaise.

Depuis janvier 2013, le programme ENPARD Liban a développé ses activités de soutien technique au Ministère de l'Agriculture libanais autour de deux thématiques

- l'évaluation de la stratégie agricole 2010-2014 qui a fait l'objet d'un premier rapport en mars 2014
- l'appui à l'identification des priorités de la future stratégie agricole 2015-2019

Les activités du projet ont été menées dans un partenariat étroit avec le MoA et avec un souci permanent d'associer les professionnels et la société civile à la réflexion sur la stratégie agricole (3 ateliers de travail réunissant 140 participants et 24 institutions publiques et privées). Une dizaine de sessions de renforcement des capacités techniques sont venues compléter ce dispositif d'appui.

Ces formations ont apporté des éléments et des outils techniques sur le renforcement des filières, la gestion durable des ressources hydriques et les outils de diagnostic et d'élaboration de projets. 159 participants ont bénéficiés de ces activités (cadres du MoA, professionnels agricoles et ONG).

Plus d'informations: belhouchette@iamm.fr

News from CIHEAM Zaragoza

FORESTERRA Open call for proposals

FORESTERRA "*Enhancing FOREst RESearch in the MediTERRanean through improved coordination and integration*" is a FP7 ERA-NET, aiming to reinforce the scientific coordination and integration of Mediterranean forest research programmes as well as scientific cooperation with Mediterranean-area countries (including EU and non-EU member states) and with countries from other Mediterranean Climate Areas (MCA).

Under the leadership of the Spanish Ministry of Economy and Competitiveness, FORESTERRA launched a transnational joint call for project proposals based on funds from 13 organizations of the participating countries, and targeting two topics identified through wide consultation among project partners and stakeholders: (i) Understanding global change drivers, indicators and impacts on Mediterranean forest ecosystems: a Mediterranean scale approach; and (ii) Fostering forest system resilience through managing biodiversity, from genes to communities.

The call, budgeted at more than 1.5 million Euros, closed on January 2014. The Networking action MedWildFireLab (Global Change Impacts on Wildland Fire Behaviour and Uses in Mediterranean Forest Ecosystems, towards a « wall less » Mediterranean Wildland Fire Laboratory) was selected for funding and will start in the forthcoming months, while the Collaborative Projects FORENANCES (Mediterranean Forests Response to Climate Variability and Extreme Events: an Integrative Approach Combining Dendrosciences and Forests Genetics) and INFORMED (Integrated Research on Forest Resilience and Management in the Mediterranean) have been invited for the second evaluation phase which will conclude in October.

CIHEAM-Zaragoza was a member of the call Steering Committee and has been responsible for providing electronic and documental support to the call by developing a specific page at the project website linked to a data base and a document repository where proposals were submitted, as well as the elaboration of the call framework documents. The Institute also supported the Scientific Advisory Committee which was in charge of evaluating the proposals.

More information on www.foresterra.eu

Collaboration with the generation challenge programme

CIHEAM-Zaragoza has collaborated for the last three years with the GCP as training site for the Integrated Breeding Platform. This advanced lifelong-learning activity, largely funded by the Bill and Melinda Gates Foundation, was structured into three two-week annual modules focusing on:

1. Informatics and Data Management;
2. Molecular Breeding;
3. Quantitative Methods in Plant Breeding.

In the first year, one session was held in the Netherlands and two in Zaragoza. In the past two years, we have hosted all three training sessions at the Institute. In total, more than 150 plant breeders from more than 25 countries, mainly in West, East and Southern Africa, China and Southeast Asia, but also from Algeria, Tunisia and Morocco have followed this programme.

The interest of this three-year specific activity for our Institute, beyond the international cooperation in the advanced training of agricultural professionals, lies in the fact that Plant Breeding is one of our main areas of activity.

This programme has strengthened collaboration with scientists from international CGIAR centres and other organizations, breeders from commercial companies and professors from leading agricultural universities worldwide, including the University of Cornell (USA), and Wageningen in the Netherlands.

*More information on www.generationcp.org
and
www.generationcp.org/platforms/integrated-breeding-platform*

Watch Letters published

2007

1. Water Resources and Agriculture
2. Identity and Quality of Mediterranean Products
3. Zoonoses and Emerging Diseases

2008

4. Aquaculture Sector
5. Sociopolitical Impacts of the Rising Food Prices
6. Forest Fires
7. Organic Farming

2009

8. Agro-Business
9. Drought Management and Desertification
10. Agricultural Policies Outlook
11. Agriculture and Fisheries in the Islands

2010

12. Climate Change and Agriculture
13. Food, Nutrition and Health
14. Women in Agriculture
15. Agricultural Trade and Liberalization

2011

16. Olive Growing
17. Financing Agricultural and Rural Development
18. Urban Agriculture
19. Labelling Mediterranean Products

2012

20. Agri-Food Chain and Logistics
21. Enhancing Research
22. Education and Training
23. Cereals Trade and Markets

2013

24. Rural Development
25. Mediterranean Forests
26. Farmer's Trade Union
27. EU CAP Reform and the Mediterranean

2014

28. Land Issues in the Mediterranean
29. Corporate Social Responsibility
30. Food Waste and losses

Next Issues

2014

31. Fisheries and Sea products

2015

32. New Food Security Indicators
33. Emerging Diseases and Invasive species
34. Agenda post-2015
35. New Technologies and Innovation in Agriculture

Access to the Watch Letter

All the issues are available on www.ciheam.org

- English and French Version from n°01 to n°20
- Arabic Version since n°12
- Bilingual Version (English/French) since n°21

Communication Policy

The Watch Letter is dispatched electronically to more than **20,000 recipients** in the Euro-Mediterranean World (decision makers, ministers, journalists, researchers, students, documentation and research centres, universities, etc.).

Constant efforts are made to ensure a wide variety of contributor profiles in both geographic and professional terms. In the 30 issues published so far, we have published **197 articles** involving **303 authors**.

Contributing to the Watch Letter

We invite persons who have relevant expertise in Agriculture, Food and Rural Development Areas (teachers, researchers, students, decision makers, etc.) and wish to contribute to the Watch Letter to contact us at the following email: abis@ciheam.org





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