

MULTIFACETED SOCIAL INNOVATIONS TACKLING FOOD WASTAGE FOR SUSTAINABLE DEVELOPMENT

Food loss and wastage is not only a major environmental, social and economic problem, but also a crucial ethical issue. Social innovation initiatives that are emerging in different contexts try to minimise losses while simultaneously raising awareness to overcome the knowledge gap associated with the social, ecological and economic consequences of our eating habits.

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INTRODUCTION

According to data, the current problem of undernourishment is far from diminishing. In the medium term, the number of people in the world suffering from hunger will increase to 821 million in 2017, and is expected to rise to 2.3 billion by the year 2050 [1].

These predictions contrast with the fact that one third of all food produced globally is lost or wasted due to the misuse of resources – not just food-related resources, but also other basic resources such as land, water, energy and, of course, labour. Consequently, the generation of food wastage also results in environmental degradation, especially due to the loss of biodiversity, reduction of hydric resources and an increase in greenhouse gas emissions.

In developing countries, food supply chains are short and small-scale farmers dominate the production with limited access to resources and technology. However, 50 % of the world population lives in urban environments and this figure is expected to increase to 68 % by 2050 [2]. According to Soma [3], this rapid urbanisation gives rise to a more complex, long-distance food supply chain and poses significant challenges to the sustainable management of food wastage. In this context, the food distribution points, more connected with rural areas and the food demand, linked to the fast-growing urban areas, are moving away from each other. As result, the challenge of conserving and managing the food products and the risk of producing food wastage along the agri-food chain is also increasing.

The larger the agri-food chain, the less efficient it becomes in terms of food wastage and other environmental impacts, such

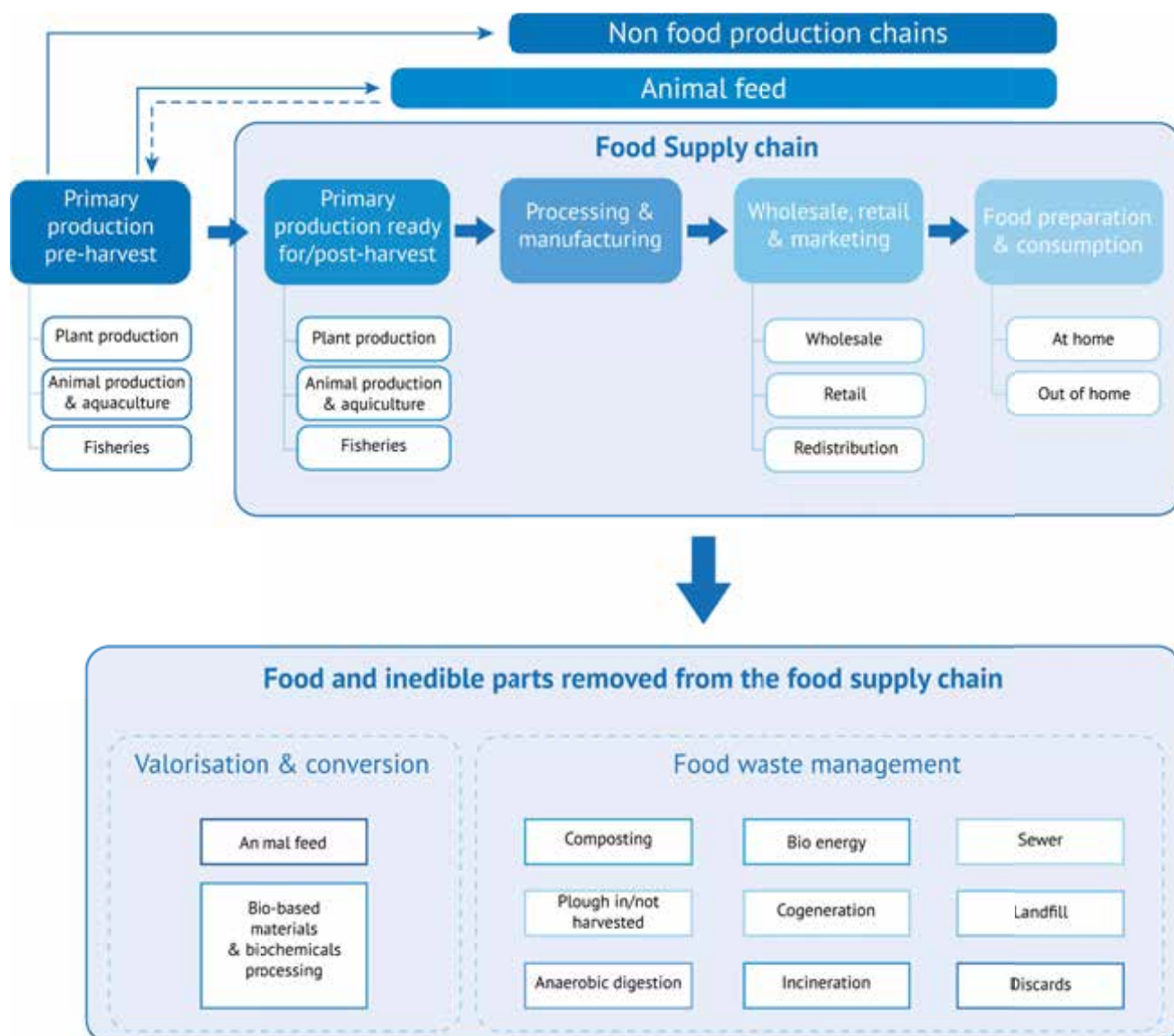
as carbon and water footprints. Food wastage along the supply chain depends on numerous factors, i.e. technology availability in each country or the development level of agricultural production markets [4]. As shown, urbanisation and the decline of the agricultural sector are among the most important challenges we face at a global level.

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Nevertheless, new ways of understanding the agri-food chain are emerging thanks to innovative social and technological solutions and the development of good practices in this field.

STRATEGIES OR FRAMEWORK CONDITIONS TO REDUCE FOOD WASTAGE

According to the European Commission's understanding social innovations are new ideas that meet social needs, create social relationships and form new collaborations. These innovations can be products, services or models that address unmet needs more effectively. These new combinations of social practices in certain areas of action or social contexts are driven by relevant actors with the aim of better satisfying or responding to needs and problems based on established practices. An innovation is therefore social insofar as it is socially accepted and diffused in society, and ultimately becomes institutionalised as a new social norm [5].



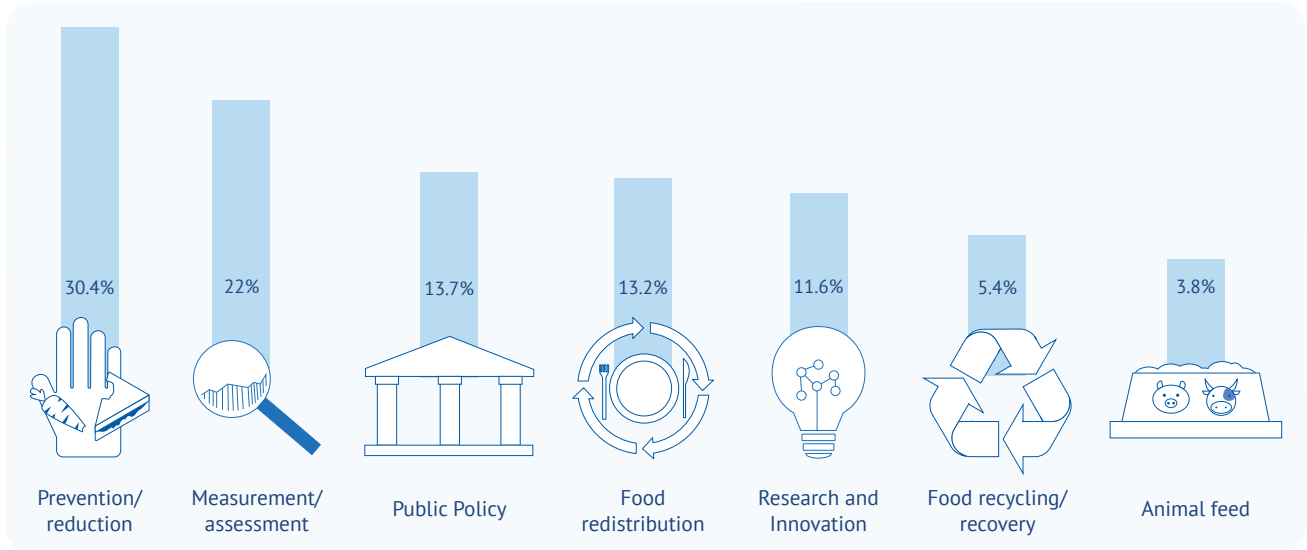
Resource flows in FUSIONS agri-food system

Following the key elements of the definition, reducing food waste will be crucial in order to diminish its current environmental, social and economic consequences, and influencing the system via real and innovative good practices within both local and supra-local contexts will be imperative. In this sense, the European Parliament's Resolution of 19 January 2012 on "how to avoid food waste: strategies for a more efficient food chain in the EU" (2011/2175 (INI)) outlined the need to promote locally based good practices to reduce food wastage.

Parallel to this normative work, in 2012, the EU-funded project "Food Use for Social Innovation by Optimising Waste Prevention Strategies" (FUSIONS; www.eu-fusions.org/) created a European platform of multiple actors pursuing the prevention of food wastage through social innovation solutions.

Among the main recommendations of the FUSIONS project [6], the need was highlighted to stimulate social innovation as a key tool for reducing food wastage through the following four main lines of action:

- Create a favourable legislative framework at European and national level that stimulates social innovation, especially in the key aspects: food distribution, food safety, environmental health, commercial regulations and taxation.
- Develop guidelines for political intervention that promote social innovation to support food wastage reduction.
- Develop guidelines to promote the economic sustainability of the different innovative social actions.
- Encourage the creation and extension of a food surplus exchange network through exchanging social innovation good practices.



Classification by topic

The initiative to create communication platforms among different agents was reinforced by the European Commission communication on “Closing the loop – An EU action plan for the Circular Economy” (COM (2015) 614 final) promoting the creation of a platform dedicated to food waste (www.ec.europa.eu/food/safety/food_waste/eu_actions/eu-platform_en) as a place to exchange experiences and good practices as well as to create a list of initiatives, classified according to different categories.

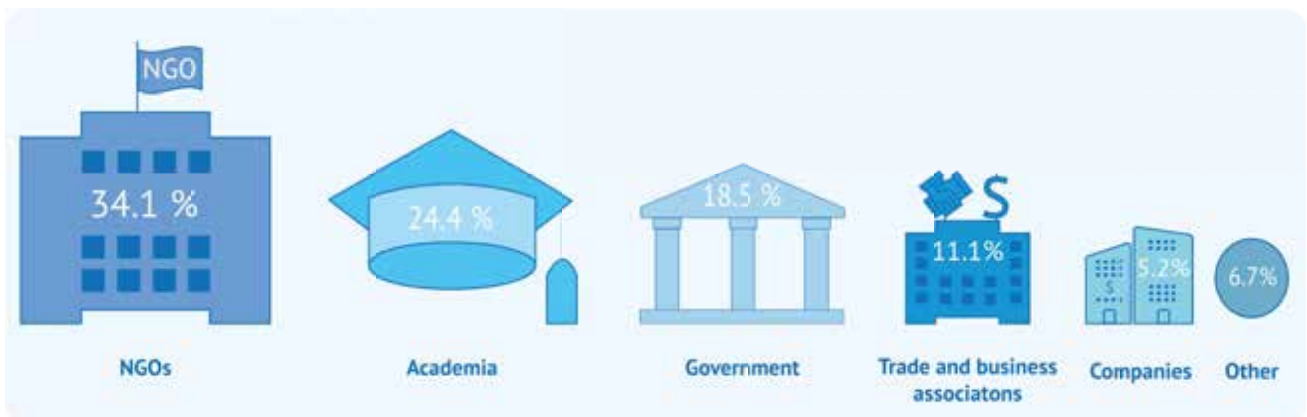
This initial work is being completed thanks to the contribution of the EU-funded project, REFRESH, continuing the work of FUSIONS, and the establishment of the so-called REFRESH Community of Experts (CoE) in charge of monitoring and rising awareness of this important issue.

According to the REFRESH CoE analysis [7], there are several social innovation initiatives associated with different areas of intervention.

30% of the developed initiatives aim at waste prevention and reduction. Another significant percentage of the initiatives (22%) work towards quantifying waste, while just over 10% are dedicated to redistribution, research and development of public policies. Of the initiatives dedicated to prevention, approximately half of them aim at developing awareness campaigns and the other half at introducing improvements in the supply chain.

Furthermore, the majority of the food waste activities (34%) are carried out by NGOs (non-governmental organisations), while universities and government activities follow with 25% and 19% respectively. Surprisingly, trade and business associations are promoting only 11% of the total initiatives and individual companies support the remaining 5%.

As shown, the redistribution of food is mainly aimed at donation, while recycling-related actions are devoted to making compost. On the other hand, most activities related



Classification by actors

Classification by Topic	Distribution of Initiatives
1. Prevention/ reduction	
Awareness campaign	58.2 %
Supply chain efficiencies	41.8 %
2. Food redistribution	
Food donation	45.7 %
Gleaning	10.9 %
Guidelines	28.3 %
Logistics	15.2 %
3. Animal feed	
4. Food recycling/ recovery	
Composting	50.0 %
Anaerobic digestion	25.0 %
Industrial uses	25.0 %
5. Measurement/ assessment	
Attitudes	18.7 %
Behaviour	22.0 %
Impacts	18.0 %
Food waste data	26.7 %
Quantification methodology	14.7 %
6. Public policy	
Date marking	16.9 %
Food donation	19.5 %
Public procurement	2.6 %
Fiscal incentives	3.9 %
Voluntary/ framework agreements	24.7 %
Regulatory frameworks for food waste prevention	15.6 %
Agriculture	13.0 %
Fisheries/aquaculture	2.6 %
Trade	1.3 %
7. Research and Innovation	
Packaging	21.9 %
Products	24.7 %
Supply chain	35.6 %
Food processing	17.8 %

Distribution of initiatives per topic (own elaboration – source taken from REFRESH project)

to public policies aim at facilitating agreements within the framework of volunteering, whereas others aim at food donation, followed by date marking, agriculture and regulatory frameworks for food wastage prevention.

A number of relevant social innovation actions addresses the reduction of the current food wastage ratio throughout a change in the food system, acting from different contexts and approaches. These social innovation activities were selected to demonstrate the wide variety of diverse approaches that can be used to solve the same problem. In this sense, there is a voluntary agreement between private companies within the agri-food sector, public administrations and NGOs, titled the *Courtauld Commitment*, which highlights that it is possible to manage current surpluses in a more sustainable and social manner.

EXAMPLES OF SOCIO-DIGITAL INNOVATIONS PREVENTING FOOD WASTAGE

Digital tools are also relevant in reducing food wastage. Three examples were collected to emphasise that it is not only technologically possible to link food supply with demand, both between citizens and citizens (*OLIO*) or companies and citizens (*TooGoodToGo*), but that it is also important to communicate that food is a valuable resource and sharing food covers economic, societal-cultural and environmental aspects in a mutually reinforcing way. As such, simply measuring food wastage in a company generates social, environmental and economic benefits, as shown by the case of *WINNOWER*, which demonstrates that environmental protection is not at odds with job creation, but precisely the opposite.

Furthermore, it is important to highlight the creation of networks between local people with the clear ethical purpose of self-organising and achieving positive outcomes for the territory, as in the case of *Foodsharing*, thereby avoiding food wastage and creating the possibility of sharing these surpluses between neighbours.

Another different approach to solve this problem is to increase community awareness regarding the issue of food wastage – some initiatives like *Feeding the 5000* try to capture public attention by hosting public feasts made entirely from food that would otherwise have gone to waste.

Beyond new technology, or new ways of solving the problem, an interesting solution based on recovering ancient traditions is helping to reduce the challenges associated with food wastage. This is where the example of gleaning activities comes in, where two innovation campaigns, *Feedback* and *Espigoladors*, based in UK and Catalonia (Spain) respectively, are promoting this age-old tradition that involves citizens collecting leftover crops from farmers' fields that would otherwise rot on the ground. One of these

	INITIATIVE TYPE	DESCRIPTION	URL
COMMITMENT	Courtald Commitment	Agreements between companies and entities working in the agri-food chain are helping to reduce current food wastage figures in the United Kingdom	http://www.refreshcoe.eu/resources/courtauld-commitment-2025-review-released/
APP	OLIO APP TooGoodToGo	These two apps allow food to be donated from people and local companies that have produced surplus products to citizens that are interested in these products	http://www.refreshcoe.eu/resources/olio/ https://toogoodtogo.es/es
SOFTWARE	WINNOW	WINNOW is a software that helps the food service industry to cut down on food wastage by making the kitchen smarter, thanks to measuring the food wastage generated by said kitchens on a daily basis	https://www.winnowsolutions.com/
NETWORK	FoodSharing	Website created and managed by the users themselves in order to facilitate a distribution network of surpluses between companies and individuals	https://foodsharing.de
AWARENESS	Feeding the 5000	This initiative hosts events in large cities around the world where people have the opportunity of a free feast in the open air with ingredients that come from surplus products. Other activities related to this issue are also organised as part of these events (e.g. talks, free distribution of imperfect fruits and vegetables)	https://feedbackglobal.org/campaigns/feeding-the-5000/
CLEANING	Feedbackglobal	Citizen movement that collects agricultural products which are not collected for various reasons and therefore do not enter the agri-food chain. Gleaning these products makes them available to people	https://feedbackglobal.crg/
	Espigoladors	NGO collecting food from local farmers to be transformed to create new value products. This initiative is creating new workstations, especially for those who are most vulnerable.	http://www.espigoladors.cat/es/

campaigns has succeeded in improving the legal framework conditions for fostering gleaning activities within the territory as a useful way of reducing current food wastage ratios.

As shown, there is no unique path in addressing the problem of food wastage, in using the most recent technologies or in returning to old and forgotten traditions, as with gleaning activities, for example. Ultimately, changing the current food chain should happen through a combination of diverse social innovative solutions with the aim of modifying local contexts in line with the 'Think Globally, Act Locally' principle.

CONCLUSIONS

Given the complexity of food wastage, no single solution can solve this problem and actions must be undertaken at different levels. Policies form part of this combination of interventions, together with other, broader social, technical and economic initiatives (e.g. projects reducing food wastage at farms or throughout the food production chain).

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Socio-digital innovations are significant tools in facing the challenges of food wastage through multifaceted approaches, which often require social or behavioural changes towards more sustainable options (e.g. citizens' initiatives to channel food wastage to other uses or consumers). However, there are still many challenges to tackle – there is no authentic community of good practices to facilitate the flow of information between the different actors. This is necessary to achieve a true dialogue between them, and in this way be able to face common challenges such as the economic sustainability of these initiatives or the replicability of these good practices in different territories and/or contexts. To this end, advancing the creation of a European and national regulatory framework that could encourage the implementation and development of these innovative initiatives will be an essential aspect for consolidating social innovation as a key element for reducing current food wastage.

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