



Recommendations and guidelines for a common European food waste policy framework

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Reducing food waste through social innovation

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Main authors	Matteo Vittuari, Unibo - University of Bologna, Italy Paolo Azzurro, Unibo - University of Bologna, Italy Silvia Gaiani, Unibo - University of Bologna, Italy Manuela Gheoldus – Deloitte Sustainability, France Stephanie Burgos – Deloitte Sustainability, France Lusine Aramyan, Wageningen University and Research, The Netherlands Natalia Valeeva, Wageningen University and Research, The Netherlands David Rogers, WRAP, UK Karin Östergren, SP Food and Bioscience, Sweden Toine Timmermans, Wageningen University and Research, Netherlands Hilke Bos-Brouwers, Wageningen University and Research, Netherlands
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Project leader	Toine Timmermans and Hilke Bos-Brouwers; Wageningen University and Research, The Netherlands (FUSIONS Project Coordinators)
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Executive summary and key recommendations

FUSIONS (Food Use for Social Innovation by Optimising waste prevention Strategies) is a EU FP7-funded project running from 2012 to 2016, that has the ambition to contribute to achieving a resource efficient Europe by significantly reducing food waste across the supply chain through socially innovative approaches. To achieve this ambitious goal, FUSIONS focuses on the harmonisation of the definitions of food waste, on the assessment of different methodologies and information sources to collect reliable data, on the identification of opportunities to improve food use by developing and evaluating feasibility studies for creating a better understanding of the impact and appropriateness of specific social innovation options. Moreover it contributes to policy making at the EU and national level by identifying and analysing socially innovative solutions for optimised food use, including socio-economic incentives and improved legislation aimed at food safety and hygiene regulation, labelling, food redistribution, and awareness and education campaigns, based on the discussions and findings of the FUSIONS European Multi-stakeholder Platform.

Based on the findings of the FUSIONS project, six groups of recommendations concerning policies, practices and effective approaches for food waste prevention and reduction in the EU-28, on both European and Member State (MS) level, are suggested. These recommendations and guidelines can support the development and implementation of a common European policy framework for food waste prevention. The recommendations are listed below.

1. On defining food waste and developing a methodology for its measurement

➤ **Recommendation 1.1: Establish a common framework for food waste definition.**

A major finding within FUSIONS entails the establishment of a harmonized definitional framework to measure and monitor food waste across EU-28. The advantages are manifold and deliver a baseline for progress monitoring and identification of hot spots for prevention and reduction measures. It supports facts-based policy development as well as serving as a benchmarking instrument demonstrating successful endeavors to tackle food waste on MS and EU level. Therefore, the EC should adopt a common definition of food waste to be used by Member States as a reference for food waste quantification, monitoring and reporting. We recommend using the definition and related definitional framework developed within the FUSIONS project through careful and concise analysis and consultation, resulting in a flexible, encompassing framework, that allows for different perspectives in scoping desirable and undesirable destinations to fractions of food removed from the food supply chain.

➤ **Recommendation 1.2: Establish a standardised methodology for data collection.**

The FUSIONS food waste baseline estimate study (published March 2016) identified the gaps and lack of sufficient, high-quality data to measure food waste across EU28. This largely originates from a lack of standardised methodologies used across the MS. Making

the collection of food waste data at national level in accordance with a common methodological framework mandatory for all MS will significantly contribute to the availability of reliable data sources. This will support the development and monitoring of food waste prevention programmes at EC and MS level. Additionally, incentives for developing national Food Waste Quantification Studies (NFWQS) should also be provided. FUSIONS recommends the adoption of the methodology developed within the project. The FUSIONS quantification manual provides practical guidelines for a standard approach for EU MS on how to quantify food waste in different stages of the food supply chain.

2. On encouraging a dialogue among Member States and food chain stakeholders

➤ **Recommendation 2.1: Strengthen the EU Platform on Food Losses and Food Waste.**

The EC should continue to strengthen the EU Platform on Food Losses and Food Waste to share knowledge and best practices on food waste prevention. The existing platforms developed by other organizations should be taken into account, and the opportunity to create regional platforms to tackle issues of particular relevance in certain regions should be considered.

The networking, consultation and best-practice sharing / peer-to-peer learning functions of a multi-stakeholder Platform can contribute to more successful implementation of food waste prevention strategies and increase the replication and upscaling of proven approaches across the EU-28. The Platform should create opportunities for meetings and dialogue using IT-facilitated communication options.

In this sense the FUSIONS European Multi-stakeholder Platform has been a proven sound way to:

- attract and involve interested stakeholders from the entire food supply chain, to provide them with a forum for exchange ideas, best practices and knowledge on social innovation and food waste prevention/reduction;
- engage key stakeholders, with a sound reputation and influence in the field;
- organize targeted and focused consultations for input and consensus building on specific issues and topics;
- create a sense of commitment stimulating active involvement in knowledge sharing and consultation processes.

3. On stimulating social innovation for food waste prevention

➤ **Recommendation 3.1: Develop guidelines for policy interventions stimulating social innovation to achieve food waste reduction/prevention.**

The EC should publish guidelines supporting MS to identify policy interventions aimed at stimulating social innovation for food waste reduction/prevention. FUSIONS identified a number of potential interventions, like the provision of specific socio-economic incentives to:

- create new business models for achieving a collaboration between regular and social economy;
 - stimulate inter-sectoral and intra-sectoral private-private partnerships and dialogue, including the introduction of voluntary and negotiated agreements;
 - invest in research and innovation on success factors of social innovation;
 - promote awareness and education;
 - identify and set up indicators for policy evaluation.
-

➤ **Recommendation 3.2: Develop guidelines on how to secure financing sources for social innovation initiatives.**

The most significant barrier identified within the FUSIONS Feasibility Studies concerns the way to achieve a sustainable financing of socially innovative projects. Project managers of new initiatives indicated that the lack of funding posed challenges to further development of their initiatives. To address this barrier, an organisation which identifies various grant possibilities social innovation projects can bid and apply for is proposed as a solution. The inconsistencies in local funding among MS also makes the replication of social innovation activities difficult.

➤ **Recommendation 3.3: Stimulate an entrepreneurship / “learning by sharing” approach to replicate social innovative initiatives across EU-28, including the creation and expansion of a food surplus social innovation network.**

Creating links among like-minded individuals can facilitate the exchange of information on best practices and a learning process, especially if creative entrepreneurs are able to meet and share their work first hand with each other. Up until now, this has proved difficult to be achieved, as the visibility of social innovation projects is limited. Therefore, a network that keeps track of these initiatives, and connects all active social innovation projects addressing food surplus throughout Europe should be promoted.

4. On facilitating food donations

➤ **Recommendation 4.1: Support creation of a favourable EU and national legislative framework to promote social innovation initiatives on (increased) food donations.**

The EC should foster MS to identify measures to stimulate a policy environment that enables social innovation initiatives and other activities to promote food redistribution. FUSIONS Feasibility Studies showed that the EU and national legislation on food redistribution should be further clarified and where possible and beneficial harmonised. This includes guidelines on health and food safety aspects, environmental health, trading standards, as well as taxation incentives. Policies and laws which unnecessarily hinder the re-distribution and prevention of food waste should be further analysed and best practices identified and shared, to explore whether a more favourable policy framework might be created.

➤ **Recommendation: 4.2 Harmonizing VAT rules for donating food.**

It should be ensured that VAT rules for donating food to charitable organizations are implemented in a harmonized way in all MS. The EC (DG Taxud) should amend Council Directive 2006/112/EC, clearly specifying that the VAT has NOT to be paid when food is donated to food banks.

➤ **Recommendation 4.3: Adopting a EU-wide scheme to encourage food business operators to donate their unsold edible food to charities.**

The EC should examine the possibility of adopting, in cooperation with the actors of the food supply chain, a EU-wide scheme to encourage food business operators to distribute their unsold edible food to charities, as required by the EU Parliament (EP) under the resolution “Resource efficiency: moving towards a circular economy” of July 9th, 2015

(2014/2208(INI)) (point 47). Specific guidelines for the application of fiscal incentives for food donors by EU MS could be adopted within this context.

➤ **Recommendation 4.4: Develop guidelines on food donation at EU level and support the fostering of the adaptation of national guidelines.**

The EC should develop, in co-operation with MS and stakeholders, guidelines to facilitate food donations in the EU. These should identify the food safety and hygiene regulations food business operators must comply with, as well as the fiscal rules applied to food donation. The donation of food beyond its “best before date” should be clearly allowed (currently, this is allowed in some MS and prohibited in others). Different legislative models to limit the liability exposure of food donors should be examined to identified best practices aimed at boosting surplus food donation. Moreover, the EC should foster the adoption of national guidelines on food donation that comply with the EU Guidelines, and ask MS to clarify any national peculiarity.

5. On a more effective role of government

➤ **Recommendation 5.1: Improve cooperation and coordination among EU Directorates-General (DGs).**

Food waste is a multilevel and multisector issue, and is therefore included in different legislative and policy areas. FUSIONS advocates an integral approach in tackling food waste throughout the food supply chain, and recommends to intensify the collaboration across various EC DGs. The efforts by DG Health and Food Safety (SANTÉ) in leading the European food waste policy agenda, together with the supporting actions in the framework of the Circular Economy Package, led by the DG Environment, can achieve larger impact, effective implementation and management of a comprehensive food waste reduction strategy by increasing their alignment in ambitions and targets, creating synergies in their joint actions, collaborating in involving the other Directorates-General – including but not limited to the DGs Agriculture and Rural Development (AGRI), Maritime Affairs and Fisheries (MARE), Taxation and Customs Union (TAXUD) and Internal Market, Industry, Entrepreneurship and SMEs (MARKT) –, and clarifying the legislations by removing legislative contradictions and barriers.

➤ **Recommendation 5.2: Launch a pan-European awareness-raising campaign.**

Although it is difficult to measure the direct and short-term impact of awareness raising campaigns, they are a key step to raise awareness of the food waste issue and to voice the call for action. The EC has a leading role in launching a pan-European campaign at targeted audiences to raise awareness of the need to reduce food waste and emphasize the role each individual and group plays or could play. This role can include the formulation of targeted key messages addressing known food waste drivers, and the provision of positive examples of practical action to tackle food waste. This will provide both a sense of urgency and opportunity for action, changing behaviours at consumer level and further upstream along the supply chain. The EC is thus recommended to foster the implementation of National Campaigns across all EU-28 MS. Given the availability of relevant experiences achieved in a number of MS, the EC can provide information and share tools to be included, as well as emphasize the main points of attention to be addressed in the campaigns. Harmonised information provision will enforce a strong message resounding in similar ways across the EU-28.

➤ **Recommendation 5.3: Evaluate the potential impact in terms of food waste when**

conducting an impact assessment on new relevant legislative proposals.

The EC should evaluate the potential impact on food waste when conducting an impact assessment on new relevant legislative proposals, as required by the EP resolution “Resource efficiency: moving towards a circular economy” of July 9th, 2015 (2014/2208(INI)) (point 47).

➤ **Recommendation 5.4: Define a common framework for the evaluation of policy interventions.**

The EC should adopt specific guidelines for the evaluation of policy interventions/strategies/programmes addressing food waste implemented at EU, national and local level.

➤ **Recommendation 5.5: Increase consumer understanding of the interpretation of date labels.**

The EC should promote, in collaboration with MS and private sector organisations, a better understanding of the interpretation of date labels. This should be targeted at all stakeholders, with a focus on consumers, and should provide clear information and instruction how mandatory date labels including “best before date” and “use by date” should be interpreted, in order to prevent unnecessary food waste. Also, alternative terminologies could be considered to increase consumer understanding.

➤ **Recommendation 5.7: Foster the use of former foodstuffs and by-products for feed production.**

The EC should improve the existing legislative framework regulating the use of former foodstuffs and by-products from the food chain for feed production, and improve the knowledge by food business operators of currently available tools and opportunities.

➤ **Recommendation 5.8: Improve (by-)catch restriction rules.**

The EC should set clear rules that allow for the valorisation (out of market) of landed fish, carry out scientific studies aimed at identifying which species have “high survival rates”, support the development and implementation of new technologies allowing species-focused fishing.

6. On Stimulating further research

➤ **Recommendations 6.1 and 6.2: Improve the knowledge on food waste drivers and on their environmental, social and economic impacts.**

Improving knowledge on food waste drivers and on their environmental, social and economic impacts is essential for the design and implementation of effective prevention policies at EU, national and local level. The EC should examine how to better prioritize research in this area in the framework of the existing EU funding programmes, and how to stimulate a better coordination of the research activities carried out at national level.

➤ **Recommendation 6.3: Address the waste of food linked to the presence of contaminants in food.**

The EC should promote actions and research aimed at improving the knowledge about the implications of contaminants in food for human and animal health. It must be taken into account that, for some substances, the zero tolerance criterion could lead to unnecessary food waste generation, due to improved detection methods.

The report includes also a number of additional, potentially relevant, policy options not directly based on FUSIONS work, but that emerged as non-secondary issues during the consultation sessions held within the FUSIONS European and Regional Platforms meetings. These options should not be considered as specific recommendations, but could be taken into further consideration for the identification of a common European food waste policy framework. Other relevant policy options to be considered include:

- establishing mandatory separate collection systems (and targets);
- introducing binding targets for food waste prevention;
- adopting a legally binding food waste hierarchy;
- redressing perverse financial incentives;
- promoting short food supply chains;
- establishing a minimum standard for enforcement bodies across Europe;
- introducing food waste prevention criteria within the EU GPP criteria for food and catering services;
- introducing food waste prevention requirements within the European Ecolabel for tourist accommodation services and camp site services;
- fostering MS to adopt National Food Waste Prevention Programmes;
- promoting R&D in the field of food saving packaging.

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Glossary

National strategies on food waste prevention: high level plans/programmes designed as a comprehensive set of policy measures specifically addressing food waste prevention. Key sectors addressed in the plan could include local authorities, households, the hospitality industry, the retail supply chain, businesses and institutions (such as schools and hospitals) as suggested by the EU Guidelines on the preparation of food waste prevention programmes (BIO Intelligence Service (2012)).

Market-based instruments: policy measures that encourage behavioural change through market signals rather than through traditional regulations. Examples include environmentally related taxes, charges and subsidies, emissions trading and other tradable permit systems, deposit-refund systems, environmental labelling laws, licenses, and economic property rights.

Policy approach: a policy approach identifies a group of policy measures/instruments based on a similar method applied to a problem or issue.

Policy instrument: a specific policy measure that deals with a problem on the basis of a specific approach.

Public provision of services: a policy approach based on the provision of public goods/services.

Regulatory approach: a policy approach that require changes in behaviour by introducing penalties for parties who do not comply with regulatory provisions.

Regulations and regulatory instruments: governmental or ministerial orders having the force of law. Regulatory instruments are sometimes called "command-and-control"; public authorities mandate the performance to be achieved or the technologies to be used.

Suasive approach: a policy approach that encourage changes in behaviour through the provision of information.

Voluntary agreements: alternative courses of actions such as self-regulations developed by the industry and agreements between public and private organizations generally aimed to deliver the policy objectives faster and/or in a more cost-effective manner compared to mandatory requirements. An example is the Courtauld Commitment, a voluntary agreement promoted by WRAP aimed at improving resource efficiency and reducing waste (including food waste) within the UK grocery sector.

Abbreviations

B2B:	Business to Business
CAP:	Common Agricultural Policy
CEP:	Circular Economy Package
CFP:	Common Fisheries Policy
CSO:	Civil Society Organisation
CSR:	Corporate Social Responsibility
DG AGRI:	Directorate-General for Agriculture and Rural Development
DG ENTR:	Directorate-General Enterprise and Industry
DG ENV:	Directorate-General for the Environment
DG MARE:	Directorate-General for Maritime Affairs and Fisheries
DG MARKT:	Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs
DG SANTÉ:	Directorate General for Health and Food Safety
DG TAXUD:	Directorate General Taxation and Customs Union
DG:	Directorate-General
EC:	European Commission
EESC:	European Economic and Social Committee
EPM:	FUSIONS European Platform Meeting
ERDF:	European Regional Development Fund
ESC:	European Social Fund
EU-28:	European Union 28
EWC:	European Waste Catalogue
FEAD:	Fund for European Aid to the Most Deprived
FLW:	Food losses and waste
FQLW:	Food Quality Loss or Waste
FWQM:	Food Waste Quantification Manual
FSC:	Food Supply Chain
FUSIONS:	Food Use for Social Innovation by Optimising waste prevention Strategies
FW:	Food Waste
FWH:	Food Waste Hierarchy
GHG:	Greenhouse Gas (Emissions)
GPP:	Green Public Procurement
GWP:	Global Warming Potential
HLPE:	High Level Panel of Experts on Food Security and Nutrition
ICTS:	Information and communication technologies
LCA:	Life Cycle Assessment
MBI:	Market Based Instruments
MRLs :	Minimum Residue Levels
MS:	Member State
NFWQS:	National Food Waste Quantification Studies
NGO:	Non-Governmental Organisation
NFWPP:	National Food Waste Prevention Programme
NWPP:	National Waste Prevention Programme

PAYT:	Pay as You Throw
PBI:	Price based instrument
R&D:	Research and Development
RPM:	FUSIONS Regional Platform Meeting
SDG:	Sustainable Development Goal
SWD:	Staff Working Documents
TAC:	Total Allowable Catch
UTP:	Unfair Trade Practice
VAT:	Value Added Tax
WFD:	Waste Framework Directive
WRAP:	Waste and Resources Action Programme
WRI:	World Resource Institute

Structure of the Guidelines

The report is structured as follows:

Chapter 1 provides general information about the scope and purpose of the document and contextualizes the food waste issue within the framework of EU strategies on resource efficiency;

Chapter 2 presents the different policy approaches identified by FUSIONS to reduce and prevent food waste;

Chapter 3 provides a set of recommendations addressed to EU policy makers around a set of key topics. Each topic is generally presented by a brief introduction followed by an analysis/explanation carried out by providing answers to specific questions. Answers are mostly based on the results presented in the different reports published within the FUSIONS project. The main recommendations related to each topic are anticipated at the beginning of each section, alongside the relevant FUSIONS reports, and summarized in the “key recommendation” section.

Chapter 4 lists and discusses other potentially relevant policy options not strictly based on the FUSIONS work but emerged within the different FUSIONS European and Regional Platform meetings.

1. Scope, background and use

Background

Food waste has a number of interrelated implications in terms of food security, human health, economic development and environmental impact. From a life-cycle perspective, food waste represents, beyond a missed opportunity to feed the growing world population, a huge pressure on the natural capital both in terms of natural resources consumption (e.g. energy, water, fish stocks, agricultural land), environmental pollution (water, air, soil) and biodiversity loss. What exacerbates the concern is the staggering amount of food waste currently generated at global and EU level¹ alongside the projections on world population growth, change of dietary habits and reduction in food production capacity due to the effects of climate change, soil erosion and of the growing demand of land for energy purposes.

Despite the growing attention from the academic world, civil society and policy makers, the debate on food waste is still affected by a lack of a consensus over its definition, scope boundaries and drivers that lead to its generation and by the lack of common quantification and reporting methods along the food supply chain. Moreover, as policies and policy proposals are emerging, there is a greater need to establish criteria to be used for the evaluation of their impact and effectiveness. Although efforts are made on European and Member State (MS) level to develop dedicated food waste policy, they could benefit from a sound knowledge base and an integrated, comprehensive approach.

Against this background, FUSIONS - Food Use for Social Innovation by Optimising Waste Prevention Strategies - aims at improving and consolidating the knowledge base on food waste (definitions, causes, drivers, impacts, quantification tools, policy measures, evaluation criteria etc.) and to provide EU policy makers with a set of tools and evidence-based recommendations to support EU strategy on food waste prevention. Within the Project's timeframe, FUSIONS has developed a robust methodology for food waste data collection across Europe on the basis of a common definitional framework alongside a general framework for the evaluation of policy interventions. It also substantially contributed to stimulate the dialogue between food supply chain stakeholders, to promote a harmonised approach to EU food waste legislation and improved national implementation, and to generate a shared vision to prevent and reduce food waste across the food supply chain, especially through social innovation.

Policy Context

The recently published "Closing the loop – An EU action plan for the Circular Economy²" by the European Commission (December 2015) presented the EC's ambitions on stimulating Europe's transition towards a circular economy with a view to boost global competitiveness, foster sustainable growth and generate new jobs. Food waste prevention is included as integral part of achieving these ambitions.

¹ The amount of food waste generated at EU-28 level has been recently estimated by FUSIONS in 88 million tons/year (Stenmark A. et al, 2016) equal to 173 kilograms per person per year.

² <http://tinyurl.com/jdo7naj>

Within the so-called Circular Economy package, EU and Member States are committed to meeting the United Nations' Sustainable Development Goals (SDGs), adopted in September 2015³, including a target (12.3) *"to halve per capita food waste at the retail and consumer level by 2030, and reduce food losses along the food production and supply chains"*. To support achievement of the SDG targets for food waste reduction in the EU, the Commission foresees that it will:

- elaborate a common EU methodology to measure food waste consistently in co-operation with Member States and stakeholders;
- create a new platform involving both Member States and actors in the food chain in order to help define measures needed to achieve the food waste SDG, facilitate inter-sector co-operation, and share best practices and results achieved;
- take measures to clarify EU legislation related to waste, food and feed and facilitate food donation and the use of former foodstuffs and by-products from the food chain for feed production, without compromising food and feed safety;
- examine ways to improve the use of date marking by actors in the food chain and its understanding by consumers, in particular "best before" labelling.

Moreover, the revised waste legislative proposal⁴ included in the package calls on Member States to take action to reduce food waste at each stage of the food supply chain, monitor food waste levels, and report back regarding progress made.

The importance of food waste reduction within the context of EU strategies on resource efficiency has been earlier highlighted and addressed both by the EC and the EP through some key non-legislative acts: the EU's Roadmap to a Resource Efficient Europe (EC, 2011) identified food as a key sector where resource efficiency should be improved, and set an aspirational goal to halve the disposal of edible food waste in the EU by 2020. A few months later, on January 19th 2012, the European Parliament adopted a non-legislative resolution on how to avoid food wastage (EP, 2011) that called for action to halve food waste by 2025 and improve access to food by the needy. The Resolution highlighted the importance of food waste prevention policies within the context of EU strategies on resource efficiency. It explicitly asked the Commission to take concrete actions to reduce food wastage within the context of *the resource-efficient Europe flagship initiative*. Moreover, the need for a common EU strategy against food waste has been further highlighted within the 7th Environmental Action programme (EAP) adopted in November 2013 (EP, 2013) where the EU Commission is required to *"present a comprehensive strategy to combat unnecessary food waste and work with Member States in the fight against excessive food waste generation"*.

In this context the European Commission has been discussing and analysing options for EU actions to reduce food waste without compromising food safety with stakeholders, experts and Member States.

The measures addressed to food waste reduction, foreseen within the Circular Economy Package, should be intended as a starting point toward the definition and implementation of a more common EU strategy to address food waste.

³ <http://www.un.org/sustainabledevelopment/sustainable-consumption-production/>

⁴ <http://tinyurl.com/zqjllse>

Purpose

These “Recommendations and guidelines” are developed as a key deliverable of FUSIONS WP3 “Recommendations for a Common EU Policy” with the aim to support the development and implementation of a common European food waste policy framework on food waste prevention.

However the report reflects the vision of the entire project and finds its foundations in all the work carried out also in the other FUSIONS WPs:

- WP1: Reliable data and information sources, trends and assessment criteria;
- WP2: FUSIONS Multi-stakeholder Platform;
- WP4: Feasibility studies.

Additional inputs for the recommendations were collected through the FUSIONS European Multi-stakeholder Platform meetings⁵ at EU and Regional levels (WP2), and through interaction with the External Experts Advisory Board and the participation to external meetings to disseminate the FUSIONS Project’s results. These activities and interactions contributed also to identify a set of potential emerging issues going beyond the FUSIONS’ scope.

The recommendations and guidelines channel all these inputs into a structured framework for the identification, implementation and monitoring of effective food waste prevention policies. This framework is meant to support the EU and its MS with a knowledge base for the future planning of a common European policy to tackle food waste.

Scope

The recommendations and guidelines for developing and evaluating policies to prevent and reduce food waste included in this report mainly cover the following aspects:

- general objectives and priorities;
- policy approaches;
- food waste (FW) definition;
- food waste drivers;
- quantification methods and harmonisation of food waste monitoring;
- EU policies and legislation: implications for FW;
- criteria for the evaluation of policy interventions.

Its scope is linked to the aim of the FUSIONS Project, to generate a shared vision and strategy to prevent food loss and reduce food waste across the supply chain through social innovation: new ideas (products, services and models) that simultaneously meet social needs (more effectively than alternatives) and create new social relationships or collaborations. Therefore it will contribute significantly to the development of a common European food waste policy.

Target audience

These policy guidelines are mainly addressed to EC policy makers and subsequently policy makers at MS level. More broadly these recommendations are also expected to inform the stakeholders in the FSC and to connect with their interests and roles, as policy is a two-way action. The recommendations are developed to support the identification and prioritization of policy interventions aimed at food waste prevention and reduction.

⁵ FUSIONS European Multi-stakeholder Platform meetings: <http://www.eu-fusions.org/index.php/events/platform-meetings>

2. Policy approaches to foster food waste prevention

This section presents the policy approaches identified and considered in the development of the FUSIONS work.

A policy approach identifies a group of policy measures/instruments based on a similar method applied to a problem or issue; **a policy instrument** is a specific policy measure that deals with a problem on the basis of a specific approach, while a strategy is a high level plan designed as a comprehensive set of policy measures that should jointly contribute to the achievement of a strategic (higher level) goal. Therefore, **a strategy** can consist of a mix of several policy measures based on different policy approaches.

Relevant FUSIONS Reports

[9] *Policy options to stimulate social innovation initiatives addressing food waste prevention and reduction*

[10] *Market-based instruments, food waste, incentives, voluntary agreements*

[11] *Review of current EU Member States legislation and policies addressing food waste*

[17] *Review of EU legislation and policies with implications on food waste*

[19] *Stimulating social innovation through policy measures*

Which types of policy approaches can be used to foster food waste prevention?

Policy strategies are usually based on a mix of policy approaches. According to the FUSIONS work (Easta 2014) these approaches can be classified as follow:

A. **Suasive approach:** policy measures that encourage changes in behaviour through the provision of information fit in this category. Producers, households, local authorities and corporate entities can be persuaded to behave in an ethical and environmentally responsible manner if they have access to relevant information. Moreover, the availability of public and comparable information related to the level of commitment (or performances) of food business operators toward the achievement of socio-environmental goals, can stimulate other organisations to do more in the same field. This is also generally true in the case of public administrations, whereas the performances achieved in a particular field become a “socially recognised indicator” of good governance.

In the case of food waste prevention and management, policy measures based on a suasive approach include for example:

- communication campaigns;
- public events (e.g. street festivals, exhibitions, meetings, conferences, seminars, workshops, contests and competitions);
- educational activities/programmes targeted to schoolchildren;
- training programs addressed to food business operators and non-profit organisations;
- guidelines on food waste prevention and surplus food donation/recovery;
- benchmarking tools on food waste prevention performances of food business operators;
- informational tools based on IT technologies (e.g. on-line database of

projects/initiatives/organisations/best-practices; specialised web sites/newsletters; food sharing platforms and apps etc.);

- voluntary agreements between public and private organisations;
- voluntary labelling schemes based on retailers' (or other food business operators') performances on food waste prevention.

B. **Regulatory approach:** policy measures that require changes in behaviour by introducing penalties for parties who do not comply with regulatory provisions fit in this category. Regulations and regulatory instruments are governmental or ministerial orders backed by the force of law. Regulatory instruments are sometimes called "command-and-control"; public authorities mandate the performance to be achieved, operational procedures to be followed or the technologies to be used.

In the case of food waste prevention and management, policy measures based on a regulatory approach include for example the introduction, within the legal framework of:

- a legal obligation (e.g. addressed to Member States or to large food business operators) to adopt specific food waste prevention plans/programmes until a certain deadline;
- a legal obligation (addressed to Member States) to put in place food waste collection and recycling schemes;
- a legal obligation (e.g. addressed to food business operators) to separately collect the food waste stream;
- mandatory targets for food waste prevention, separate collection of food waste and food waste recycling;
- mandatory reporting requirement for food waste data;
- legal obligation (e.g. for large retailers) to donate edible food withdrawn from the market;
- the ban on food waste landfilling;
- the prohibition to include surplus food donation prohibition clauses within contracts;
- a legal obligation to achieve certain specific performances/standards (or to perform certain specific activities according to a specific standard);
- a legal obligation addressed to public administrations to adopt existing Green Public Procurement (GPP) criteria within public tenders.

Besides regulations and regulatory instruments specifically addressed to the achievement of food waste prevention goals, it must be taken into account that food waste prevention can be indirectly affected by existing and new regulations in a number of policy areas (see Par. 0). Therefore, in order to set and deliver an effective EU food waste prevention strategy, the EC should also consider to review such existing regulations and to take in consideration the food waste issue when planning new regulations potentially impacting on the generation/management of food waste. The FUSIONS Report "Review of EU legislation and policies with implications on food waste" (Vittuari et al. 2015) specifically reviews and analyses EU legislation and policies with potential implications on food waste generation/management. The main recommendations drawn up on the findings of this report have been included and discussed within Chapter 3.

C. **Market based instruments:** policy measures that encourage behavioural change through market signals rather than through explicit directives fit in this category. There are a range of types of market based instruments including trading schemes, offset schemes, subsidies and grants, accreditation systems, stewardship payments, taxes and tax concessions.

Since market based instruments and economic incentives are among the main important tools for stimulating food supply-chain operators and households toward the adoption of food waste prevention and reduction practices, FUSIONS has deeply concentrated on them (in the report FUSIONS T3.2.1 Market-based instruments (MBIs) and other socio- economic incentives enhancing food waste prevention and reduction).

The analysis has identified a number of market-based instruments and incentives that could potentially be applied to the design of food waste prevention policies. The identified instruments are mostly **price-based instruments (PBIs)** based on positive and negative incentives. Positive incentives seek to motivate actors to certain actions by promising a reward, whereas negative incentives aim to motivate actions by threatening a punishment. Examples of positive incentives are subsidies granted to businesses for food waste reduction technologies, tax breaks addressed to Charities for purchasing machineries and equipment for transporting and preserving recovered food or fiscal incentives for food waste donation. Examples of negative incentives are “pay-as-you-throw” (PAYT) schemes or the introduction of additional costs/taxes for dismantling food.

Positive price-based instruments are assumed to have a voluntary character, entailing close collaboration between governmental and private initiatives. At large these tools usually imply costs for governments and occasionally also for the chain operators. Yet, benefits from waste reduction are considered to offset the costs, since implementation of such tools is considered to be practically easy with low risk involvement, with economic and social benefits due to waste reduction and job creation.

Through a qualitative impact assessment analysis based on experts’ opinions⁶ FUSIONS identified a number of PBIs including:

- **Subsidies and grants for:** surplus donation, gleaning, stimulating knowledge exchange & co-operation between chain operators, stimulating food waste prevention & reduction projects, developing new technologies, enabling environment for social innovation projects.
- **Tax credits:** to stimulate voluntary agreements & social innovation initiatives and to exempt VAT on donated food.

Negative price-based instruments are mainly represented by “pay-as-you-throw” (PAYT) schemes and various taxes. The PAYT principle was identified as one of the most promising tools and it is anticipated to have a major positive impact on food waste prevention and reduction. This is due to assumption that in order to pay less, consumers and supply chain actors will reduce food waste. At the same time this tool may stimulate the implementation of food waste prevention measures as well as possibilities to use food otherwise wasted in alternative ways (e.g. donation or as ingredient in cooking recipes).

D. Public provision of services: policy measures that have the characteristics of public goods/services fit this category.

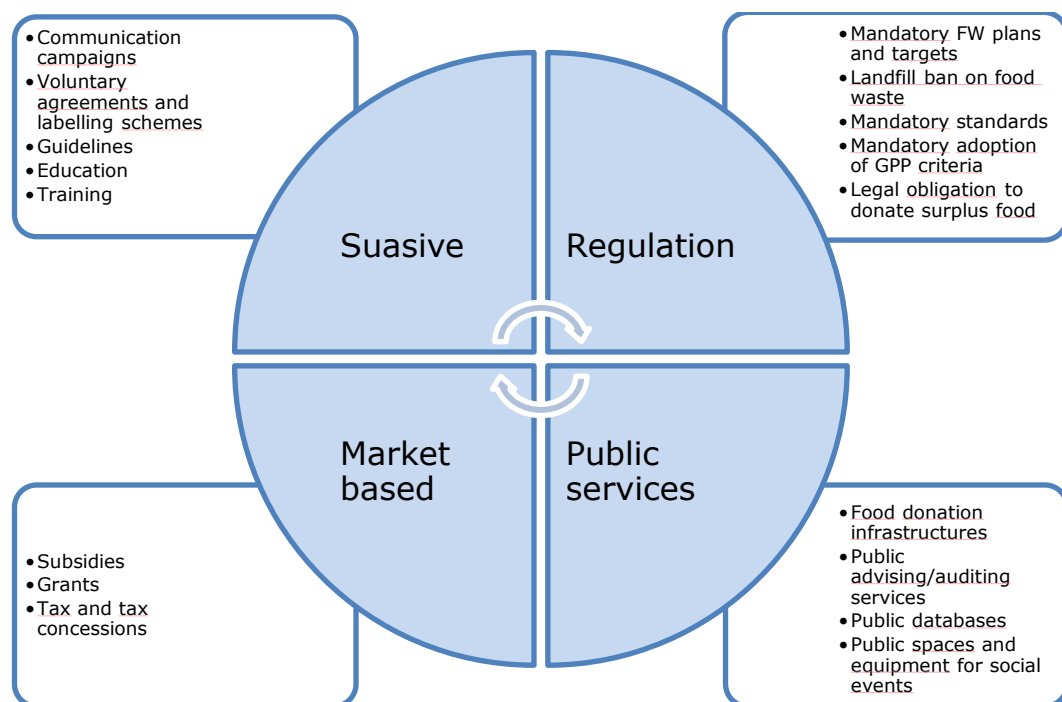
⁶ The analysis was carried out using a four step approach that included: 1) an inventory of available information on food waste drivers, 2) a literature review, 3) a set of expert interviews and 4) a qualitative impact assessment analysis of the select market-based instruments.

The provision of public utility services - such as health care, education, sanitation, municipal waste management, water services, etc. - is a key task for government. Public services provide the most common interface between people and the state, and their functioning shapes people's sense of trust in and expectations of government. At a national level, public services underpin human welfare and economic growth.

Public services need to be delivered with integrity, centred around citizens, and responsive to their needs, particularly the needs of the most vulnerable. Promoting greater transparency and enabling ordinary citizens to assess the quality, adequacy and effectiveness of basic services, to voice their needs and preferences, and to become involved in innovation offers an opportunity to enable better use of public funds, and improve service delivery (Ringold et al, 2013). Public services usually account for a large share of government budgets.

With regards to food waste, the public provision of services may refer to the provision of efficient infrastructures for food surplus recovery and donation but also: public informative services and tools (e.g. through web sites, on-line database, mobile apps, free-toll numbers, info points) for helping consumers, businesses and local authorities in reducing and preventing food waste; public advising /auditing services, to help businesses identifying and implementing effective measures for food waste prevention; the provision (free of charge) of public spaces, areas and equipment for social events and initiatives having the potential to improve awareness on the importance of reducing food waste.

Figure 1- Classification of policy approaches according to FUSIONS



The same goal can be addressed by the policymaker using different policy approaches or a mix of policy approaches: according to a regulatory approach, whereas for example the pursued goal is the disclosure of food waste data by the food industry, food business operators should be compulsorily required to disclose their food waste data to the public on the basis of mandatory reporting guidelines; in this case for example, the policy maker could bind the renewal of the business licence to the disclosure of the required data. Conversely, according to

a suasive approach, policymakers could promote voluntary agreements between food business operators and the public administration that include the requirement of food waste data reporting. Such voluntary agreements could also embed a market based approach, providing for example financial incentives proportionally to the amount of surplus food donated or in the case a particular level of performance has been reached.

3. Policy options to foster food waste prevention

3.1 On defining food waste and developing a methodology for its measurement

Recommendation 1.1: Establishing a common framework for food waste definition. The EC should adopt a common definition of food waste to be used by Member States as a reference for food waste quantification, monitoring and reporting. FUSIONS recommends the adoption of the definition and of the related framework developed within the project.

This section presents the FUSIONS definitional framework for food waste and the criteria used to develop it. It explains why a common definition is needed and highlights the main differences from the definitional framework developed by FAO.

Relevant FUSIONS Reports

[20] *FUSIONS Definitional Framework for Food Waste*

Why is there a need for a common definition of food waste?

Internationally the food waste definitional debate has been influenced by the perspective to which definitions are developed, targeting amongst others food security, resource efficiency, and/or nutritional quality aspects of food production and consumption. The absence of a common framework for defining food waste to date has led to the establishment of datasets that are not always comparable or transparent.

To develop reliable food waste estimates, which can be accurately repeated over time, it is necessary to produce data within a robust methodological framework. This must comprise a consistent definition of food waste and its components, and coherent system boundaries for the food supply chain.

To this aim FUSIONS (Östergren et al. 2014) has carried out an extensive comparison of definitions and has developed a definitional framework for food waste where it is referred to as “any food, and inedible parts of food, removed from the food supply chain to be recovered or disposed (including composted, crops ploughed in/not harvested, anaerobic digestion, bio-energy production, co-generation, incineration, disposal to sewer, landfill or discarded to sea)”. The FUSIONS definitional framework enables Member States to accurately track the rate of food waste generated at national level along the different stages of the food supply-chain on the basis of a common definition and clear system boundaries. It is at the core of the FUSIONS Food Waste Quantification Manual (FWQM) described within Recommendation 2, thus contributing to the need of comparable data among EU countries and to the need of evaluating the effectiveness of food waste prevention strategies.

The development of such a framework for defining food waste is a milestone towards improving our understanding of the food waste challenge in Europe and its consistent use will

help measure progress towards both resource efficiency and food security goals.

What are the key aspects of the FUSIONS definitional framework?

Based on the resource flows in the food system, the FUSIONS Definitional Framework has been built up systematically, *setting boundaries* and *providing definitions for food, food supply chain and food waste as follow*:

- **Food** – Food means any substance or product, whether processed, partially processed or unprocessed, intended to be, or reasonably expected to be consumed by humans. Food includes drink, chewing gum and any substance, including water, intentionally incorporated into food during its manufacture, preparation or treatment” (EU Regulation No 178-2002). As inedible parts of food are excluded from this definition, they have been separately brought out, and included in the framework.
- **Food supply chain** – The food supply chain is the connected series of activities used to produce, process, distribute and consume food. The food supply chain starts when the raw materials for food are ready to enter the economic and technical system for food production or home-grown consumption (**Error! Reference source not found.**, A2). This is a key distinction in that any products *ready for harvest or slaughter* being removed are within scope, not just those that are harvested and subsequently not used. The food supply chain ends when the food is consumed (**Error! Reference source not found.**, A5) or “removed” (**Error! Reference source not found.**, Section B) from the chain.
- **Food waste** – Food waste is any food, and inedible parts of food, removed from the food supply chain to be recovered or disposed, including the following destinations: composting, crops ploughed in/not harvested, anaerobic digestion, bio-energy production, co-generation, incineration, disposal to sewer, landfill or discarded to sea but not including food or inedible parts of food removed from the food supply chain sent to animal feed or used for the production of bio-based material/biochemical processing.

In addition, packaging is not included in the food waste definition and shall not be taken into account in the food waste quantification.

The framework for defining food waste proposed by FUSIONS clearly provides a reference that could be used to identify and consequently measure food waste on a homogenous basis all over Europe.

It is intended to be:

- unambiguous;
- applicable to all types of food;
- applicable in all parts of the food supply chain;
- applicable to food supply chains at different levels; e.g. regional, national, local, sectorial or at the level of single companies/households;
- usable for the practical work on quantification, evaluation, monitoring and understanding different drivers of food waste;
- focused on recording mass of waste, from which other equivalents can be calculated (e.g. nutritional loss, embedded water used etc.).

Resource flows in Agri-Food System

The diagram illustrates the resource flows in an Agri-Food System, categorized into five main components:

- A Food Supply chain:** This central flow starts with **A1 Primary production pre-harvest** (1 Plant production, 2 Animal production & aquaculture, 3 Fisheries). It moves to **A2 Primary production ready for/post-harvest** (1 Plant production, 2 Animal production & aquaculture, 3 Fisheries), then to **A3 Processing & manufacturing**, **A4 Wholesale, retail & marketing** (1 Wholesale, 2 Retail, 3 Redistribution), and finally to **A5 Food preparation & consumption** (1 At home, 2 Out-of-home).
- D Non Food production chains:** Biobased production chains including bio-materials, biofuels, pet food, etc. These chains receive inputs from A1 and A2.
- C Animal Feed:** This component receives inputs from A1 and A2, providing feed for the animal production and aquaculture sectors.
- B Food and inedible parts removed from the food supply chain:** This section details the fate of waste and by-products:
 - B-i Valorisation & conversion:** Includes B1 Animal feed, B2 Biobased materials & biochemical processing, B3 Composting, B4 Plough-in/ not harvested, B5 Anaerobic digestion, B6 Bio-energy, B7 Co-generation, B8 Incineration, B9 Sewer, B10 Landfill, and B11 Discards.
 - B-ii Food Waste:** This sub-section is part of the broader B category, detailing the management of food waste.

The diagram uses color-coded boxes and arrows to show the flow of resources between these components, highlighting the integration of food production, non-food production, and waste management.

The FUSIONS definitional framework allows separating and quantifying all resource flows leaving the food supply chain; it establishes the system boundaries and the definition of food waste, provides general guidance on boundary conditions relating to food, the food supply chain and the differentiation between edible and in-edible parts of food, which will facilitate the collection of comparable data. The FUSIONS definition of food waste does not separate edible and inedible fractions, but considers the total resource flow removed from the food supply chain. However, where possible, distinction between edible and inedible fractions is encouraged within the quantification exercise.

Key criteria

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framework should meet the following criteria:

- enable evaluation and monitoring of EU/EU-nations' waste prevention initiatives and policy goals on food waste prevention;
- take into account the way data are collected today (level of detail and types of data) using a reasonable combination of approximations to estimate/best quantify food waste;
- give guidance on how to move forward within the suggested framework (i.e. to progress from how/what data are collected now to more comprehensive and granular data collection in the future). This part has been developed in the tiered structured approach presented in the FUSIONS Quantification Manual (see Recommendation 2);
- allow evaluation of key environmental and socio-economic impacts from waste generation.

Furthermore, it was agreed that the framework:

- should be applicable for both data gathered using national and international statistics as well as for data gathered through local/business-level studies. In other words, the framework should be applicable for all relevant levels of the food supply chain; e.g. regional such as the EU; national such as specific countries; a city or a single company or production line;
- should be applicable for all relevant sectors in the food supply chain; e.g. the agricultural sector or the household sector;
- should take into account those data sets which are currently available and work to improve these;
- should be general, recognizing cultural and geographical differences and preferences;
- should be developed considering ongoing global initiatives to optimise food use and improve food security;
- should not be a unaffordable bureaucratic burden for the food supply chain actors but should rather motivate to and contribute to the ongoing internal waste reduction work;
- should provide consistent and reliable indicators for monitoring food waste generation for consecutive years to be able to compare food waste on a consistent basis between parts of the value chain, between different types of food and between nations as well as taking into account variation/differences in consumption, population and production;
- the methodology should be robust enough so that waste streams are visible, in other words, it should not be possible to 'move' waste beyond the scope of any definition e.g. by processing fish at sea, by processing vegetables in the field etc;
- it should provide explicit criteria, where appropriate, for what to include and not include in each part of the food supply chain, and indicate any inter-connections with non-food sectors that need to be taken into account;
- it should be clear how it relates to the Waste Framework Directive and supports the waste hierarchy.

Reasons for including inedible parts of food within the "food waste" definition

The primary objective of FUSIONS is to support the EU and Member States to optimise food use and improve the resource efficiency of the European food supply chain. The exclusion of inedible parts from the definition may lead MS not to consider them within the different management options as suggested by the waste/food use hierarchy. Furthermore, capturing information on inedible parts also highlights the potential of this fraction for improved food use (e.g. bringing currently 'inedible' food into wider food use, such as turning orange peels into

marmalade). Anyway, where possible, the definitional framework recommends that the edible and inedible fractions should be separately analysed or estimated in order to allow the development of accurate management strategies for the different resource flows.

Why are materials sent to bio-energy referred to as “food waste”, while those sent to valorisation and conversion (Fig.2, section B-i) are not?

The FUSIONS definition is based on the waste hierarchy taking into the consideration the wider scope of a circular (mass) flow as well as the importance of innovations/businesses as a driving force for improving resource efficiency in the agri-food system.

We assumed that the conversion of bio-based materials from the food supply chain (e.g. into feed, bio-based materials and bio-chemicals, including plastic packaging and products), can be almost as resource efficient as producing food, and may also add substantial economic value to the producing companies. By recognizing that valorisation is an option for *reducing* food waste as well as prevention, innovative solutions and business models are encouraged. Moreover mass converted to a resource for energy production can be seen as an end-of-life treatment.

How is the FUSIONS Definitional Framework different from the FAO definition of food waste and losses (The CfS – HLPE definition in “Food losses and waste in the context of sustainable food systems”; The FAO Definitional Framework of Food Loss)?

The HLPE report adopts a food security and nutrition lens and defines food losses and waste (FLW) as “*a decrease, at all stages of the food chain from harvest to consumption, in mass, of food that was originally intended for human consumption, regardless of the cause*”. The report makes the distinction between food losses, occurring before consumption level regardless of the cause, and food waste, occurring at consumption level regardless of the cause. It further proposes to define food quality loss or waste (FQLW) which refers to the decrease of a quality attribute of food (nutrition, aspect, etc.), linked to the degradation of the product, at all stages of the food chain from harvest to consumption. (FAO 2014a)

The FAO Definitional Framework of Food Loss defines food waste as a distinct part of food loss. FLW includes all resource flows including by-products or secondary products that are meant for human consumption, but that in specific supply chains cannot be transformed; food that is fit to enter the FSC, but intentionally discarded or redirected to non-food use in the pre-harvest phase; food that is harvest-mature and unintentionally getting spoilt in the pre-harvest phase; food that is fit to proceed in the FSC, but redirected to non-food use or discarded in the post-harvest phase of sorting and grading (fruits, fish discards, etc.) without getting spoilt or spilled; food that is redirected to animal feed or compost; food that is not re-entering a FSC as defined within the scope of the work (FAO 2014b)

FUSIONS definitional framework focuses on a resource efficiency perspective, describing the use and destinations of food & associated inedible parts throughout the food supply chain and its destinations. Also, the associated environmental, social and economic concerns are addressed. The HLPE report refers to food losses and waste, distinguished by its origin in the FSC, whereas the FUSIONS definitional framework sees the parts removed from the food supply chain going into recovery & disposal destinations as ‘waste’, regardless of the cause or origin of the flow.

The HLPE report excludes inedible parts of food as food waste. The FUSIONS definitional framework includes them within its technical framework. The FAO definitional framework

excludes food that is consumed in excess of nutritional requirement or that incurs a decrease of market value due to over-supply or other market forces, and not due to reduced quality.

Table 1 - Comparative table: FUSIONS' vs. FAO's definitions

	Edible food fractions that is fit to enter the FSC, but intentionally discarded or redirected to non-food use in the pre-harvest phase	Edible food <i>not</i> being valorised*	Inedible parts of food** <i>not</i> being valorised***	Edible parts to be valorised including feed	Inedible part to be valorised including feed
HLPE Report	✓	✓		✓	
FAO D. Framework	✓	✓		✓	
FUSIONS D. Framework		✓	✓		

* Including food that is harvest-mature and unintentionally getting spoiled in the pre-harvest phase,

** Including inedible parts of food that is harvest-mature and unintentionally getting spoiled in the pre-harvest phase

*** Practically special rules are given on how to apply this rule in the FUSIONS manual to make the cut in a reasonable and practical way.

Recommendation 1.2: Establishing a standardised methodology for data collection.

Making the collection of food waste data at national level in accordance with a common methodological framework mandatory for all MS will significantly contribute to the availability of reliable data sources. This will support the development and monitoring of food waste prevention programmes at EC and MS level. Additionally, incentives for developing national Food Waste Quantification Studies (NFWQS) should also be provided. FUSIONS recommends the adoption of the methodology developed within the project. The FUSION quantification manual provides practical guidelines for a standard approach for EU MS on how to quantify food waste in different stages of the food supply chain.

Relevant FUSIONS Reports

[7] *Food waste quantification manual to monitor food waste amounts and progression*

[8] *Estimates of European food waste levels*

[21] *Standard approach on quantitative techniques to be used to estimate food waste levels*

[22] *Report on review of (food) waste reporting methodology and practice*

[24] *Review of EUROSTATs reporting method and statistics*

The option of a regulatory policy response, targeted at food waste prevention (both in terms of reporting requirements and mandatory targets) has already been highlighted within the Commission staff working document "Impact assessment on measures addressing food waste to complete SWD (2014) 207 regarding the review of EU waste management targets" (EC 2014c).

It must be also mentioned the discussion

regarding the measurement and monitoring of food waste at national level held during the second meeting of the Commission's Expert Working Group on Food Losses and Food Waste on 24 April 2015. In this context MS supported overall the proposed manual developed by FUSIONS to facilitate quantification of food waste at national level, as long as it was not too prescriptive and took into account national differences. Better reporting on food waste data

from all Member States is crucial to allow better defining, prioritizing, targeting and monitoring over time of food waste prevention efforts.

This section presents the most common food waste reporting methodologies and practices, the quantitative techniques that are commonly used to estimate food waste levels, and analyses to what extent the current methods and statistics used by EUROSTAT are consistent with the needs for food waste levels monitoring at EU level. Moreover, it provides inputs on how to establish a food waste monitoring system for the EU28 Member States and how the FUSIONS Food Waste Quantification Manual addresses the need for developing a Common EU methodology to measure food waste as indicated both within the EU Action Plan for a Circular Economy and within the proposed Directive on Waste included in the Circular Economy Package.

Why is there a need for harmonisation of food waste monitoring?

Previous studies show the necessity for more consistent and comparable data in order to decrease the uncertainties and making it possible to better understand the magnitude of the problem, and the scale of the potential opportunities. As highlighted within the Report "*Estimates of European food waste levels*" (Stenmarck et al. 2016) there are many data gaps in statistics on food waste from national authorities. Moreover, the available data sets are often of insufficient quality and hardly comparable since the different purpose of the data collection affects the system boundaries and the definition used within the different studies.

Although food waste prevention efforts can be initiated without having detailed information on the amounts of food waste, food waste quantification is necessary in order to get a better understanding of the magnitude and location of food waste arising within the food chain which may inform waste prevention measures. This allows in turn better defining, prioritizing and targeting of prevention efforts, as well as tracking progress in food waste reduction over time. Design, implementation and monitoring of food waste prevention strategies and measures will be facilitated by appropriate food waste quantification. Ultimately quantification will support improvements in economic efficiency and environmental sustainability. Quantifying food waste in terms of weight could also be a first step to further evaluate its corresponding economic value and environmental impact (e.g. in terms of GHG emissions generated, land used).

What reporting methods and statistics are currently used by EUROSTAT? To what extent are these methods consistent with the needs for food waste levels monitoring?

The establishment of EU food waste data reporting requirements on the basis of a standardised methodology for food waste data collection entails the revision of EUROSTAT's reporting requirements. Nowadays, no common and harmonized methodologies for gathering food waste data are prescribed.

In June 2013 FUSIONS released the Report titled "Review of EUROSTAT's reporting method and statistics" (Jørgen O. et al. 2013). The report contains the results of a survey aimed at evaluating how national statistics in Europe related to food waste/waste are registered and reported and at assessing how they are further used by Eurostat. It was concluded that the Eurostat system has some formal and methodological elements that make it difficult to use for generating food waste statistics. First, there are no common methodologies prescribed for gathering waste data nationally, and Eurostat does not have the authority to define one common methodology for gathering data or for up-scaling data from a sample of waste generating units to national statistics. The consequence is that each country chooses its own methods and that national waste figures (total and per capita) are not fully comparable.

Second, the waste categories defined in EWC-Stat (European Waste Categories) used at present to report national and EU28 statistics are on an aggregated level, making it difficult to sort out relevant food waste as such as well as different categories of food waste. However quality reports provided by the MS showed that most countries are collecting data based on the List of Waste (LoW) categorization and then use a key for transformation to EWC-Stat categories. Thus data are many times gathered at a higher resolution than reported.

Eurostat launched a food waste plug-in in 2013 to be reported together with the standard reporting of the year 2014. The food waste plug-in builds on what is already reported to Eurostat, namely waste codes (EWC-Stat codes) and branches (according to NACE-division). What is unique with the food waste plug-in is that it asks for data on waste in LoW-codes from the branches that *might* contain (or *are likely to* contain) food waste. Also data on treatment of this waste was to be reported. Since the LoW-codes used also contains waste material other than food waste it was however hard to obtain an estimate for food waste only from the data supplied for the plug-in and it could be concluded that the data reported does not give the full picture of food waste arising in EU (Tostivint C., 2016).

What are the most recent estimates on food waste at EU level?

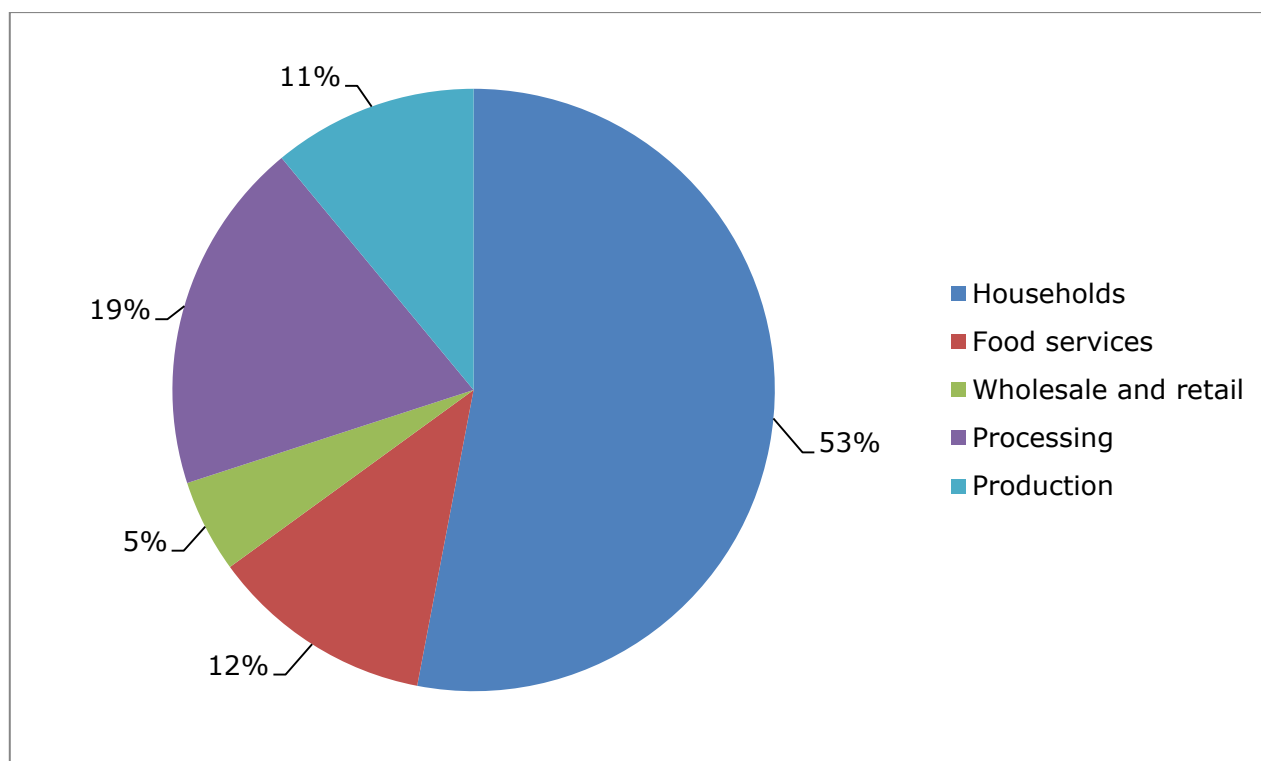
The Food waste data set for EU-28 (Stenmarck et al., 2016) provides a split of EU- food waste by supply-chain stage. Food waste at EU level has been estimated at 173 kilograms of food waste per person, for a total of 88 million tons. These figures relate to 2012 and include both edible food and inedible parts.

Table 2 – FUSIONS estimates of food waste in EU-28 (reference year 2012)

Sector	Food waste (million tonnes) with 95% CI	Food waste (kg per person) with 95% CI
Primary production	9.1± 1.5	18 ±3
Processing	16.9± 12.7	33 ± 25
Wholesale and retail	4.6 ± 1.2	9 ± 2
Food service	10.5 ± 1.5	21 ± 3
Households	46.5 ± 4.4	92 ± 9
Total food waste	87.6 ± 13.7	173 ± 27
Food waste estimates includes food and inedible parts associated with food CI=*Confidence interval		

It appears that the sectors contributing the most to food waste are households (47 million tonnes ± 4 million tonnes) and the processing sector (17 million tonnes ± 13 million tonnes). These two sectors account for 72% of EU food waste, although there is considerable uncertainty around the estimate for the processing sector. Of the remaining 28% of food waste, 11 million tonnes (12%) come from food service, 9 million tonnes (10%) come from production and 5 million tonnes (5%) come from wholesale and retail.

Figure 3 - Split of EU-28 food waste in 2012 by sector



Food and inedible parts associated with food are included

There is moderately high uncertainty around this estimate of food waste amounts; the approximate 95% confidence interval is ± 14 million tonnes (or $\pm 16\%$). Therefore, the range of results within this confidence interval is from 74 million tonnes to 101 million tonnes. Regarding the different sectors the uncertainty varies, and it needs to be acknowledged that data might change significantly as more studies will be carried out.

The costs associated with food waste for EU-28 in 2012 are estimated at around 143 billion euros. Two-thirds of the costs are associated with food waste from households (around 98 billion euros). This is due to households a) having more edible food waste than any other sector and b) the costs accumulated along the supply chain and associated with a tonne of food (e.g. processing, packaging, retailing costs).

When it comes to the interpretation of these data to identify what stage of the FSC is mostly responsible for food waste generation, caution should be taken. It has to be highlighted indeed, that the causes of food waste generation in one stage of the FSC do not necessarily lie in the same stage: strict aesthetic standards utilized by the retail sector on fruit and vegetables, or last minute order cancellation - to make some examples - lead to food waste generation accounted for in the agricultural sector; take back clauses imposed to the food manufacturing sector (e.g. to the bakery sector) lead to food waste generation accounted for in the bakery industry etc.

What are the key aspects of the FUSIONS Food Waste Quantification Manual?

The FUSIONS Food Waste Quantification Manual addresses the challenge of establishing harmonized conditions for monitoring the implementation of food waste prevention measures at EU level by providing practical guidelines for a standard approach on how to quantify food waste in different stages of the food supply chain. The Manual is intended to be used by Member State authorities. It can also be used as a reference by researchers collecting data on

behalf of national authorities as well as national statistical offices. Its goal is to support them in developing coherent methods for acquiring national food waste data covering all sectors of the food chain.

The guidelines are built on previous FUSIONS reports: "FUSIONS Definitional Framework for Food Waste" (Östergren K. et al., 2014), "Standard approach on quantitative techniques to be used to estimate food waste levels" (Møller H. et al., 2014) and the partners own experience and knowledge.

The main activities covered by the guidelines are the following:

1. quantifying food waste in each stage of the food chain;
2. combining sectoral quantifications using a common framework at national level;
3. reporting the results of a national food waste quantification study at country level in a consistent and comparable manner.

The Manual begins with a presentation of key terms (chapter 2) and subsequently provides a definition of food waste (chapter 3, with further details in appendix 1) and a national approach to quantification (chapter 4). Finally, it details the approach for each sector of the food supply chain (chapters 5 to 9). The core requirements marked in red throughout the Manual indicate what is necessary for a MS to be able to quantify food waste amounts. If all Members States would follow the core requirements of the Manual, then it would be possible for them to:

- develop a national food waste quantification study in close cooperation with stakeholders in the food supply chain;
- on a basic level, track food waste generation over time at national level;
- determine how much food waste is arising in each sector within the MS;
- enable comparison between MS to benchmark performances and to build knowledge;
- consolidate MS data at the EU level.

The Manual also includes optional recommendations that can help fulfilling secondary (additional) objectives like, for instance to:

- understand how much and where food waste is occurring in the MS (e.g. across sectors, regions, food categories, etc.); this implies generating food waste statistics with higher granularity and increased analytical possibilities, as identification of "hot spots";
- understand why food waste is being generated (root causes);
- inform which strategies and measures are most appropriate for reducing food waste;
- monitor and evaluate the efficacy of food waste reduction strategies and measures;
- develop models of future trends in food waste generation.

Member States are not compelled to use the manual, but if a Member State claims to have used the manual's approach for quantifying and reporting food waste at national level, then it needs to follow at least the core requirements to ensure uniformity and consistency.

It should be emphasized that the Manual is not in itself an operating procedure for on-site quantification of food waste (in e.g. farms, factories or restaurants). However, it does highlight, for each sector, certain operational quantifications methodologies that are deemed suitable, including:

Direct measurement and scanning: weighing may be used as a stand-alone method or combined with another system approach like waste composition analysis. Scanning is used in retail and market to register the value or mass of waste flows. The pros for the measuring method is that primary data are collected directly from relevant companies which can ensure that the data are fully relevant to the study and help improve consistency. However, primary data collection is costly and time-intensive. Scanning is mainly used for packed products since the bar code is used for the purpose, therefore the data collected are mainly second-hand based on logged information.

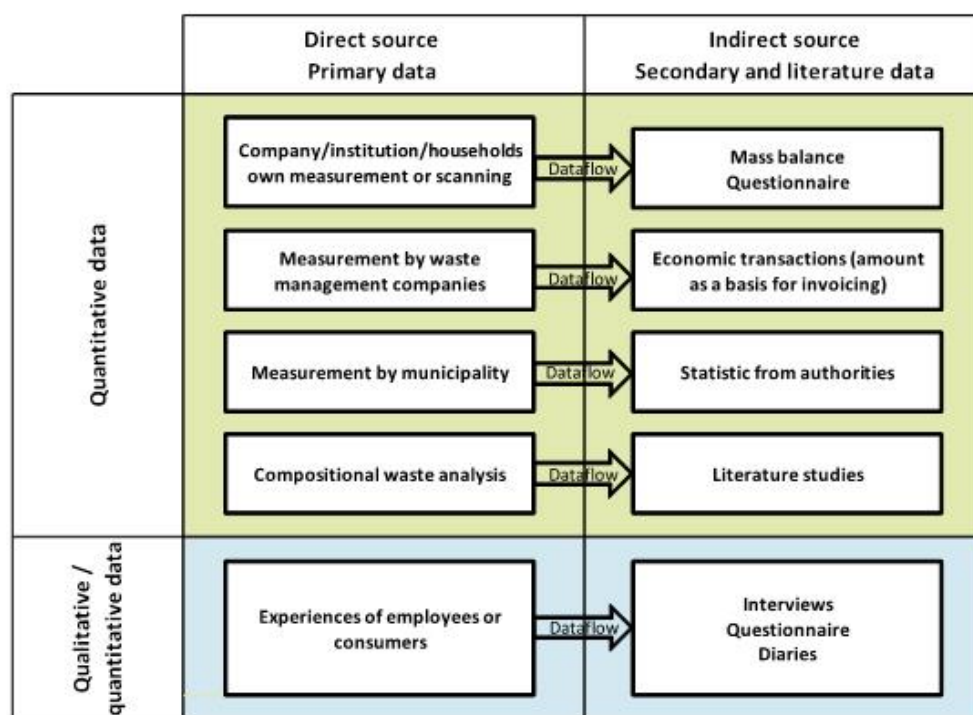
Waste composition analysis: the waste composition analysis implies the physical separation, weighing, and classification of waste in homogeneous fractions. The food waste fraction can be further analysed through the same technic in sub-fractions on the basis of several criteria; e.g. avoidability, product category, life cycle stage, packaging etc. When it comes to the extrapolation to an higher scale of data gathered through this technic, it must be taken into account that food waste mass and the percentages of the sub-fractions can be significantly influenced by a number of factors, including: number and size of the samples; location of the samples; seasonal/temporal variations; waste sampling and sorting procedures etc. If the analysis is related to household food waste the data can be also influenced by settlement structure (eg. rural/urban); household size (number of occupants per household) and type (single or multi-family dwelling) collection system in the area (eg. door-to-door, kerbside collection; home composting); presence of a separate collection scheme for bio-waste; etc...

Mass-and energy balance: it represents a way of structuring data from other sources, and not a data source in itself. It can be used to calculate food waste by using data for raw material input and amount produced. A mass balance is usually used at company or national level or to cover the whole supply chain. It requires good quality data: assumptions and estimations have to be made if representative data are not available.

Questionnaire: it is a formal, structured way to collect quantitative and/or qualitative data from respondents. A questionnaire is used when a contact person is available and a common methodology is used for data collection from companies and institutions. A challenge of using the method may be that it is difficult to get a large enough proportion of responses and it imposes a major responsibility on the contact person to provide reliable data.

Food waste diary: it can be used to compile both qualitative and quantitative data from households and enable researchers to determine quantities, disposal routes and reasons for disposal. Using diaries to collect data from households is both time-consuming and costly. It is a major responsibility on the individuals who are writing the diary to provide reliable data.

Figure 4 - Quantification methods and type of data in relation to the data source



How is the FUSIONS Food Waste Quantification Manual different from the WRI Protocol on Food Loss and Waste?

The FUSIONS Food Waste Quantification Manual (or FUSIONS Manual) has been developed in close collaboration with the team of experts contributing to the World Resource Institute's "Food Loss and Waste Accounting and Reporting Standard V1.0" -or FLW Standard- (WRI 2016). Although, the FUSIONS Manual is not in itself an operating procedure for on-site quantification of food waste as already highlighted, it does highlight for each sector certain quantification methodologies found to be suitable. These quantification methodologies (see appendix 3 of the FUSIONS Manual) are coherent with the FLW Standard approach as well as the destinations in the two documents.

While the Protocol is a broad, multi-user tool, the FUSIONS Manual has a more focused objective: to support EU Member States to quantify their food waste. This focus enables MS to track progress towards a potential food waste reduction target, using agreed definitions of food waste and supply chain sectors, and to report results in a manner that is coherent with the global Protocol and consistent between MS.

Finally the FUSIONS Manual provides a definition of food waste while the FLW Standard keeps the definition of food waste open leaving this to the user.

Figure 5 - FLW Standard vs. FUSIONS manual

<i>FLW Standard</i>	<i>FUSIONS Quantification Manual</i>
<ul style="list-style-type: none"> • Global • All types of entities (companies, researchers, nations, cities, etc.) • Allows users to define “food loss and waste” in relation to their goals 	<ul style="list-style-type: none"> • Voluntary • Multi-stakeholder • Consensus based • Uses common terminology to describe components of food waste • Establishes requirements • Provides recommendations and guidance • Suggests but does not prescribe quantification methods
	<ul style="list-style-type: none"> • EU Member States* • Defines “food waste”

*The Manual is aimed principally at the Member State authorities. In practice, these may include Ministries, Agencies or Authorities within the MS covering issues relating to the environment, agriculture, waste (or resource) management, or other food-related issues (e.g. price, food security). It can also be used as a reference by researchers collecting data on behalf of national authorities as well as national statistical offices.

How the FUSIONS Manual addresses the need for developing a Common EU methodology to measure food waste as indicated within the Circular Economy Package (2015)?

According to the circular economy package (CEP), “Member States should take measures to promote prevention of food waste in line with the 2030 Agenda for Sustainable Development, adopted by the United Nations General Assembly on 25 September 2015, and in particular its target of halving food waste by 2030”



12 RESPONSIBLE CONSUMPTION AND PRODUCTION



12.3: “by 2030 halve per capita global food waste at the retail and consumer level, and reduce food losses along production and supply chains including post-harvest losses”

To monitor progress toward the achievement of the SDG target for food waste reduction in the EU, MS are required to monitor and assess the implementation of their food waste prevention measures by measuring food waste on the basis of a common methodology to be established by the Commission itself. (See the new Art. 9 “prevention of waste” of the proposed Directive on waste included within the CEP).

Although the FUSIONS Manual provides a common framework for the collection of food waste related data at MS level, it must be highlighted that the FUSIONS definition of food waste that underpins the quantification exercise encompass a broader spectrum of streams, including streams that do not fit the definition of waste provided by Art. 3 of the WFD (eg. fish discarded to the sea, food thrown away through the sewer, fruits and vegetables ready for harvesting but not harvested or plugged into the soil; food by-products used for energy production etc...).

This must carefully be taken into account during the forthcoming work to set up the “common methodology” foreseen by the CEP (discussion updated at July 2016).

3.2 On encouraging a dialogue among Member States and food chain stakeholders

Recommendation 2.1: Strengthening the EU Platform on Food Losses and Food Waste.

The EC should continue to strengthen the EU Platform on Food Losses and Food Waste to share knowledge and best practices on food waste prevention. The existing platforms developed by other organizations should be taken into account, and the opportunity to create regional platforms to tackle issues of particular relevance in certain regions should be considered.

The networking, consultation and best-practice sharing / peer-to-peer learning functions of a multi-stakeholder platform can contribute to more successful implementation of food waste prevention strategies and increase the replication and upscaling of proven approaches across the EU-28.

Relevant FUSIONS Reports

[9] *Policy options to stimulate social innovation initiatives addressing food waste prevention and reduction*

[11] *Review of current EU Member States legislation and policies addressing food waste*

In this sense the FUSIONS European Multi-stakeholder Platform has been a proven sound way to:

- attract and involve interested stakeholders from the entire food supply chain, to provide them with a forum for exchange ideas, best practices and knowledge on social innovation and food waste prevention/reduction;
- engage key stakeholders, with a sound reputation and influence in the field;
- organize targeted and focused consultations for input and consensus building on specific issues and topics;
- create a sense of commitment stimulating active involvement in knowledge sharing and consultation processes.

The FUSIONS project also promoted the creation of Regional Platforms (i.e. Central Europe; North West Europe; Scandinavia; Southern Europe) that worked as territorial focal points that lead to the identification of issues of special relevance for certain regions.

Existing platforms developed by other organizations with different scopes and geographical perspectives should also be considered to avoid duplication and stimulate integration and coordination.

What food waste prevention policy measures have been nowadays adopted in the EU-28 Member States?

FUSIONS launched a wide consultation to build up the inventory of national “food waste related” policies at Member States level. The Consultation is still open (July 2016). It aims specifically at updating and integrating a preliminary version of country reports identifying policies that have an impact on food waste generation/prevention/management. The term “policy” is intended in this context in a broad sense, including, besides rules and legislations adopted by the government, almost every other initiatives developed and/or implemented by any type of organisation impacting on food waste.

Data were gathered in EU Member and Associated States covered by the consortium, drawing on existing literature and publicly available information. A preliminary version of the Country

Reports has been drafted for Austria, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Netherlands, Spain, Sweden, United Kingdom, Norway and Turkey (GROUP A). More detailed information is still missing for the remaining EU countries: Belgium, Cyprus, Croatia, Czech Republic, Estonia, Latvia, Lithuania, Luxembourg, Malta, Poland, Portugal, Slovak Republic, Slovenia, Romania and Bulgaria (GROUP B).

To date, a complete overview on existing national policies and legislation throughout Europe is still lacking; however, a wide range of tools, initiatives and policies expressly aimed at the prevention of food waste have already been identified either:

- within national programmes/strategies dictated by the European Commission (e.g. national waste management plans⁷, national waste prevention programmes⁸, national strategies for biodegradable municipal waste management⁹);
- within national programmes/strategies voluntarily adopted by national governments (e.g. National food waste prevention plans/strategies/pacts/initiatives; natural resource strategies, sustainable food strategies);
- not included in any national plan/programme/strategy/initiative.

The available Country reports can be currently accessed at the following link [Accessed on August 2016]: <http://www.eu-fusions.org/index.php/country-reports/>

⁷ Dir. 2008/98/EC - Article 28: "Waste management plans" - "Member States shall ensure that their competent authorities establish, in accordance with Articles 1, 4, 13 and 16, one or more waste management plans. Those plans shall, alone or in combination, cover the entire geographical territory of the Member State concerned."

⁸ Dir. 2008/98/EC - Article 29: "Waste prevention programmes" - "Member States shall establish, in accordance with Articles 1 and 4, waste prevention programmes not later than 12 December 2013". - "Such programmes shall be integrated either into the waste management plans provided for in Article 28 or into other environmental policy programmes, as appropriate, or shall function as separate programmes. If any such programme is integrated into the waste management plan or into other programmes, the waste prevention measures shall be clearly identified."

⁹ Under the landfill Directive (DIR. 1999/31/CE), MS are required to submit national strategies for biodegradable municipal waste management to the European Commission, describing how they will meet landfill diversion targets and improve biodegradable municipal waste management.

3.3 On stimulating social innovation

Recommendation 3.1: Creating a favourable EU and national legislative framework.

The EC should foster MS to identify measures to stimulate a policy environment that enables social innovation. FUSIONS Feasibility Studies showed that the EU and national legislation on food redistribution should be made clear and concise. This includes health and safety, environmental health, trading standards, as well as taxation. Policies and laws which unnecessarily hinder the re-distribution and prevention of food waste should be reconsidered to determine whether a more favourable policy framework might be created.

Recommendation 3.2: Developing guidelines for policy interventions stimulating social innovation to achieve food waste reduction/prevention.

The EC should publish guidelines supporting MS to identify policy interventions aimed at stimulating social innovation for food waste reduction/prevention. FUSIONS identified a number of potential interventions, like the provision of specific socio-economic incentives to:

- create new business models for achieving a collaboration between regular and social economy;
- stimulate inter-sectoral and intra-sectoral private-private partnerships and dialogue, including the introduction of voluntary and negotiated agreements;
- invest in research and innovation;
- promote awareness and education;
- identify and set up indicators for policy evaluation.

Recommendation 3.3: Developing guidelines on how to secure financing.

The most significant barrier identified within the FUSIONS Feasibility Studies concerns the way to achieve a sustainable financing of socially innovative projects. Project managers of new initiatives indicated that the lack of funding posed challenges to further development of their initiatives. To address this barrier, an organisation which identifies various grant possibilities social innovation projects can bid and apply for is proposed as a solution. The inconsistencies in local funding among MS also makes the replication of social innovation activities difficult.

Recommendation 3.4: Stimulating the creation and the expansion of a food surplus social innovation network.

Creating links among like-minded individuals can facilitate the exchange of information on best practices, especially if project managers are able to meet and share their work first hand with each other. Up until now, this has proved difficult to be achieved, as the visibility of social innovation projects is limited. Therefore, a network that links all active social innovation projects addressing food surplus throughout Europe should be formed.

Relevant FUSIONS Reports

- [1] *Scenario analysis on current trends of food waste generation*
- [2] *Policy Brief. Social innovation projects to reduce food waste: key recommendations for policy makers*
- [3] *Policy Brief Social innovation projects to reduce food waste: key recommendations for the private sector*
- [4] *Testing Social Innovation. Evaluation Report*
- [5] *Testing Social Innovation. Evaluation Report. Appendices*
- [9] *Policy options to stimulate social innovation initiatives addressing food waste prevention and reduction*
- [14] *Systematic food donation in the food service and hospitality sector*
- [15] *Hospitality food surplus redistribution guidelines*
- [16] *Surplus food redistribution system*
- [19] *Stimulating social innovation through policy measures*
- [23] *Feasibility study selection criteria*
- [25] *How can social innovation help reduce food waste?*

This section presents the definition of social innovation, how it works, its role in food waste prevention and reduction, the lessons learnt from the implemented FUSIONS feasibility studies and how policy interventions could stimulate social innovation addressing food waste reduction/prevention.

What is social innovation?

As highlighted within the “Science for Environment Policy In-depth Report: Social Innovation and the Environment” (Science Communication Unit, University of the West of England, Bristol, 2014), social innovation “involves social groups and communities creating,

developing and diffusing ideas and solutions to address pressing social needs”. More recently, social innovation has been gaining policy attention, providing a means to stimulate new ideas that address complex issues alongside ensuring citizen participation. Due to its participatory and creative nature, it is well positioned to address environmental challenges, which are multifaceted and often require societal or behavioural shifts towards more sustainable options”.

Social innovation can be summarised as having the following key attributes:

- it has socially recognised goals (in this case, reducing food waste);
- it is grounded in deep reflection on the problem and direct action from those engaged in it;
- it represents co-creation and learning;
- it is people-focused, both in terms of its delivery and its beneficiaries. This aids its diffusion or institutionalisation;
- it is delivered through, and builds capacity for, relationships and collaboration - often through a multi-stakeholder approach.
- it affects the process of social interactions;
- it is a new combination of activities and/or delivered into a new setting.

Social innovations are usually new combinations or hybrids of existing elements, rather than being wholly new in themselves; putting them into practice involves cutting across organisational, sectoral or disciplinary boundaries; and they leave behind compelling new social relationships. In bringing together people who were previously not working together, social innovations create new relationships which matter greatly to the people involved. This aspect contributes to the diffusion and embedding of the innovation, and fuels a cumulative dynamic whereby each innovation opens up the possibility of further innovations.

Social innovation has a hugely important role, as part of the mix of interventions needed, to reduce food waste.

What role for social innovation in food waste reduction/prevention?

The aspect of social innovation that blends past elements with new innovations and uses extended networks to support and manage relationships can make a difference in food waste reduction/prevention. It complements other mechanisms that target the development and introduction of new technologies, undertake research to build evidence or raise awareness and the motivation to act through communications activities. Social innovation seems to add a new dimension to this pattern of responses by putting people and actively at its heart. Given the complexity around food waste, no single-tiered solution can work and we need to use all possible interventions in order to make a positive contribution to improving global food use. Policies are part of this intervention mix, just as are wider social, technical and economic solutions.

Social innovation can be used at any stage of the food supply chain, with projects reducing food waste on farm, in food production and at home. Considering the FUSIONS definitional framework, we can see how social innovation can take place within the food chain, with food redistribution activities being an established example, but particularly at the interface between different actors in the food chain. Potentially an important role for policy is to help stakeholders across the whole food chain to take a system view on the social innovation opportunities rather than a linear view. Voluntary collective action brokered by government to legitimise collaboration and dialogue is a prime example.

How can social innovation for food waste reduction/prevention work?

Evidence-based examples of how social innovation can work for food waste reduction and prevention are provided by the socially innovative pilot projects that were launched within FUSIONS. Specifically the feasibility studies were six: Cr-EAT-ive Schools, Disco Bôcô, Social Supermarkets, Food Service Surplus Solution, Gleaning Network EU, Surplus Food, Order-Cook-Pay.

- **Cr-EAT-ive Schools** has developed a programme that teaches children and parents key strategies to reduce their food waste. Educational games for children, guidelines for parents and teachers, meal planning, and events were launched within this pilot study.
- **DISCO BÔCÔ** has tackled food waste by raising public awareness through organising community events to make jams, chutneys, pickles and vegetable purees in a unique, fun and musical atmosphere. The ingredients were surplus fruits and vegetables collected from supermarkets, markets or directly from the field that would have gone otherwise wasted.
- **Social Supermarkets**: the feasibility study connected to Social Supermarkets has reviewed existing social supermarkets, their set-up, on-going operations and good practice in four EU member states (France, Germany, Austria & UK) plus Switzerland.
- **Food Service Surplus Solution** has developed new relationships between food service sector and food banks providing a replicable model for collaboration to support food distribution.
- **The Gleaning Network** has aimed to facilitate gleaning events in Belgium, France, Spain and Greece through regional partner organisations by providing a model for collaboration between growers, grassroots volunteers and charities across Europe, as well as giving specific support to groups starting up new gleaning networks.
- **Food Surplus**: the aim of the Food Surplus project was to test the possibility of setting-up an IT system in Denmark that would connect organisations like supermarkets, who have surplus food on a daily basis, with local charities such as homeless shelters.
- **Order-Cook-Pay**: the aim of Order-Cook-Pay project was to investigate the interest

among municipalities in attending the development of a web-based pre-ordering solution to reduce food waste in Swedish school kitchens, by planning the number of meals cooked based on actual demand.

What are the main priorities to be addressed by policy makers at EU and national level to stimulate social innovation? Lessons learnt from the implemented FUSIONS feasibility studies

Based on FUSIONS feasibility studies, the following priorities to be addressed by policy makers at EU level have been identified:

- to create a favourable EU legislative framework. FUSIONS feasibility studies illustrated that the EU laws related to food redistribution should be made more clear and concise (see section 3.3 for details). This covers health and safety, environmental health, trading standards and also taxation. Policies and laws which unnecessarily hinder the re-distribution and prevention of food waste should be reconsidered to determine whether a more favourable policy framework might be created. It would be helpful if policies and laws could be interpreted and applied consistently across EU countries.
- to maintain a high profile for the topic of food waste and positive messages about social innovation – such as keeping it as a priority policy area – in order to stimulate stakeholders to design and deliver new solutions addressing the food waste issue.
- to develop tools to identify appropriate funding. The most significant barrier identified within the FUSIONS feasibility studies is how to carry out sustainable financing of social innovative projects. Project managers of new initiatives indicated that lack of funding posed challenges towards further developing their initiatives. To address this barrier, an organisation or online forum which identifies various grant possibilities that social innovation projects can bid and apply for was proposed as a solution. Moreover the EU could use its existing financial instruments, such as ERDF and ESF to provide more consistent levels and focus of funding for social innovation.
- to build and expand a food surplus social innovation network. A network which links all active social innovation projects addressing food surplus throughout Europe should be formed.
- to encourage dialogue around food reduction and redistribution. Actors across the food chain such as project managers, individuals in the academic sector, as well as commercial organisations could be brought together to launch dialogue on relevant EU-wide issues related to food waste prevention and food surplus management. Concretely, an annual physical or virtual conference on European food reduction and redistribution could be a first practical and easily implementable solution.

Priorities to be addressed by policy makers at national level can be identified as follows:

- to raise awareness and influence behaviour of children at kindergartens and their parents on food waste prevention. It is necessary to teach proper eating behaviours: in this sense educational games for children and guidelines for parents and teachers could be good dissemination tools;
 - to raise awareness through organising community events, creating social cohesion, building relationships between farmers and urban consumers, as well as valuing and sharing participants' recipes and know-how;
 - to establish good practices related to social supermarkets;
 - to develop new relationships between the food service sector and food banks, and
-

-
- provide a replicable model for collaboration to support food distribution;
 - to understand the opportunities and challenges to further catalyse gleaning movements by disseminating best practice guidance and supporting the creation of national gleaning networks to redistribute wasted fruit and vegetables from farm level to charities. Gleaning can be organised relatively quickly and with minimal funding when fuelled by the enthusiasm;
 - to identify barriers in setting up an IT (Information Technology) solution to connect donors and recipients and the possible strategies to overcome them.

Which measures can stimulate the creation of an enabling policy environment?

Measures aimed at the creation of an enabling environment might include:

- **the promotion of specific measures and tools** as the introduction of food waste voluntary reporting for retailers;
- **the provision of specific socio-economic incentives** to create new business models for collaboration between regular and social economy or to stimulate behaviours at business and consumer level;
- **the stimulation of inter-sectoral and intra-sectoral B2B partnerships and dialogue** as the introduction of voluntary and negotiated agreements;
- **the introduction of social and environmental responsible practices** by including food waste prevention and reduction requirement in green public procurement procedures or extending corporate social responsibility (CSR);
- **the promotion of public dialogue** among communities, entrepreneurs and other stakeholders;
- **investments in research and innovation**;
- **the support to innovators and CSOs at the local level** (providing venues for events, equipment for cooking, transport for surplus food and for volunteers);
- **the development of networking activities** through projects and by promoting ICT access, use and skills;
- **the dissemination of information and ideas** (e.g. information on the role of innovative packaging solutions and the links among packaging, product protection and food waste);
- **the promotion of awareness and education**;
- **the identification and set up of indicators** to measure and identify innovation outcomes.

Social innovation and policies for a more sustainable food system have a powerful role to play in the fight against food waste. An enabling system based on a risk-sharing approach that is institutionally embedded at EU and Member States level and gives proactive support to individuals as employees, entrepreneurs, family members and citizens when engaged in creating value is necessary at a time of shrinking budgets and workforces.

3.4 On facilitating surplus food donation

Recommendation 4.1: Harmonizing VAT rules for donating food.

It should be ensured that VAT rules for donating food to charitable organizations are implemented in a harmonized way in all MS. The EC (DG Taxud) should amend Council Directive 2006/112/EC, clearly specifying that the VAT has NOT to be paid when food is donated to food banks.

Recommendation 4.2: Adopting a EU-wide scheme to encourage food business operators to donate their unsold edible food to charities.

The EC should examine the possibility of adopting, in cooperation with the actors of the food supply chain, a EU-wide scheme to encourage food business operators to distribute their unsold edible food to charities, as required by the EU Parliament (EP) under the resolution "Resource efficiency: moving towards a circular economy" of July 9th, 2015 (2014/2208(INI)) (point 47). Specific guidelines for the application of fiscal incentives for food donors by EU MS could be adopted within this context.

Recommendation 4.3: Developing guidelines on food donation at EU level and fostering the adaptation of national guidelines.

The EC should develop, in co-operation with MS and stakeholders, guidelines to facilitate food donations in the EU. These should identify the food safety and hygiene regulations food business operators must comply with, as well as the fiscal rules applied to food donation. The donation of food beyond its "best before date" should be clearly allowed (currently, this is allowed in some MS and prohibited in others). Different legislative models to limit the liability exposure of food donors should be examined to identified best practices aimed at boosting surplus food donation. Moreover, the EC should foster the adoption of national guidelines on food donation that comply with the EU Guidelines, and ask MS to clarify any national peculiarity.

Relevant FUSIONS Reports

[11] *Review of current EU Member States legislation and policies addressing food waste*

[14] *Systematic food donation in the food service and hospitality sector*

[15] *Hospitality food surplus redistribution guidelines*

[16] *Surplus food redistribution system*

[25] *How can social innovation help reduce food waste?*

Food donations represent a crucial support for the most deprived and constitute an effective lever in reducing food waste. Although food surplus donations has significantly grown in the EU in recent years, there are neither common EU policies on donations nor aggregated data on the amount of food donated in the different MS. Policy frameworks and national approaches vary, enabling and encouraging donations at different levels. Furthermore organizations established at local level to donate food differ in the way they operate and in MS there are still different

regulations and different interpretation of EU regulations (e.g. about the possibility to donate food that has passed its "best before" date). As the demand for food aid raises sharply, the dissemination of good policies and the establishment of a clear harmonised framework among EU countries become priorities.

As highlighted within the FUSIONS work and especially within the Report "Review of current EU Member States legislation and policies addressing food waste" (Vittuari et al. 2015), and before within the "Comparative Study on EU Member States' legislation and practices on food donation" (O'Connor C., et al. 2014), there are five main legislative areas impacting food donation and namely: product liability, food safety and hygiene, food durability and date marking, tax legislation, and the food waste hierarchy. Alongside addressing the existing barriers to surplus food donation within the current EU legislative framework, fostering social innovation in this field is crucial to speed up the spread of the practice among food operators across the EU (see Par. 0 for more information)

HARMONIZING VAT RULES FOR DONATING FOOD

According to the EU VAT legislation (Council Directive 2006/112/EC), food donations are taxable (Article 16) and *"the taxable amount is the purchase price at the moment of the donation adjusted to the state of those goods at the time when the donation takes place"* (Article 74). Problems arise from the legal uncertainty as to whether the value of food that is close to its "best before/use by" date (or, for any other reason, has to be withdrawn from the market even if it is still perfectly edible), is countable/taxable (therefore a VAT-able base) or small or zero (no VAT to be paid).

The EU VAT Committee agreed on 7 December 2012 on new guidelines to harmonize the application of the Directive across EU MS¹⁰. The Directive specifically interprets the content of Articles 16 and 74 on food donation¹¹. However, it does not address the grey area of the value of donated food close to its "best before/use by" date.

According to the FUSIONS work, some MS¹² do not impose VAT when food is donated to food banks or charities. These States interpret Article 74 in such a way that the value of the donated food close to its "best before/use by" date is small or zero as recommended by the European Commission in 2013 in a reply to a Parliamentary Question on the matter.¹³

Although considering the value of donated food as *"fairly low or zero"* for tax purposes could be considered as an option, it must be taken into account that this option may negatively impact Member States that provide a (percentage) corporate tax credit to companies on the value of food they donate, nullifying the value of that tax credit. It is thus recommended, in accordance with the "Comparative Study on EU Member States' legislation and practices on food donation" (Clementine O'Connor et al. 2014), that "abandoning" VAT on donated food, rather than valuing donated food at zero, would be a more effective incentive, given its compatibility with other (potentially more significant) fiscal incentives such as tax credits.

¹⁰ The Commission has published all the guidelines of the VAT Committee at

http://ec.europa.eu/taxation_customs/taxation/vat/key_documents/vat_committee/index_en.htm

¹¹ "Donation of foodstuffs to the poor, made by a taxable person free of charge, shall be treated as a supply of goods for consideration, in accordance with the first paragraph of Article 16 of the VAT Directive, unless this donation meets the conditions laid down by the Member State to be considered as a gift of small value within the meaning of the second paragraph of Article 16 of the VAT Directive. In cases where such a donation must be treated as a supply of goods for consideration, the taxable amount shall be the purchase price of the goods (or of similar goods or, in the absence of a purchase price, the cost price of the goods) donated, adjusted to the state of those goods at the time when the donation takes place, as provided for in Article 74 of the VAT Directive"

¹² DA, ET, DE, FR, HU, IR, IT, LT, NL, PL, PT, SL, UK.

¹³ In the reply to the EP's written questions :E-003730/13 , E-002939/13 the EC recommended setting *"fairly low or even close to zero"* the value of foodstuffs close to their 'best before' date or which cannot be sold due to their external appearance.

<http://www.europarl.europa.eu/sides/getAllAnswers.do?reference=E-2013-002939&language=EN>

ADOPTING AN EU-WIDE SCHEME TO ENCOURAGE FOOD BUSINESS OPERATORS TO DONATE THEIR UNSOLD CONSUMABLE FOOD TO CHARITIES

It is commonly recognised that fiscal incentives through tax credits and tax deductions for food donors can encourage food donation. According to the review of current EU Member States legislation and policies addressing food waste legislation carried out by FUSIONS (Vittuari et al. 2015), only two EU Member States offer nowadays fiscal incentives to food donation. In France, food donors benefit from a 60% tax credit from their income corporate tax, whereas in Spain they benefit from a 35% tax credit meaning that food donors in these Countries are allowed to deduct that percentage of the value of the donated food from the corporate tax on their revenue.

It should be noted that a recent food waste reduction bill in Italy¹⁴, drawing on the experience gained in these countries, proposes to apply a 20% tax credit in the near future. Moreover, in most of the examined Member States, food donation can be treated as a deductible tax expense and can reduce the taxable income (equal to the income basis used to calculate the income corporate tax), within certain limits and thresholds depending on the MS.

In order to harmonise and foster the application of fiscal incentives for food donation in the EU's MS, it is recommended that the EC adopts specific guidelines on the matter, within the context of an EU-wide scheme aimed at encouraging food business operators to donate their unsold consumable food to charities.

DEVELOPING GUIDELINES ON FOOD DONATION AT EU LEVEL AND FOSTERING THE ADOPTION OF NATIONAL GUIDELINES

The potential benefit of guidelines on food donation at EU level and the importance of appropriate guidance ensured at national level have been highlighted during the second meeting of the Commission's Expert Working Group on Food Losses and Food Waste of 24 April 2015 (EC 2015). In this occasion MS agreed to establish an ad hoc consultation group to help the EC in developing such guidelines in co-operation with interested stakeholders.

Organisations willing to donate their surplus food to food banks or directly to charitable organisations have to comply with a range of rules often subject to different interpretations by local authorities. Different legislative models to limit the liability exposure of food donors should be examined to identified best practices aimed at boosting surplus food donation. Only few MS have already adopted specific Guidelines on food donation addressed to food business operators.¹⁵ Alongside the effort to clarify, simplify and harmonize the legal framework related to food donation at EU and MS level, the EC should develop guidelines to clarify the relevant aspects (those related to EU-level norms) and stimulate MS to adopt and make available their own national guidelines (to take into account any national peculiarities).

PROMOTING SOCIAL INNOVATION

There are several examples of social innovation applied to food donation like establishing 'directory' style services, to link up those with food surplus with those who are in food poverty. While this could be considered as an information and networking activity, these sorts of activities are so prevalent and distinct from general information provision that they may deserve their own investigation. They operate either with a focus on redistributing food surplus from businesses or, in a relatively new development, redistributing household-level food surplus. Please see section 3.3 for additional details.

¹⁴ The so called "Puppato's bill" - S.2320 Disposizioni per favorire la riduzione dello spreco alimentare (Regulations to foster the reduction of food waste)

http://parlamento17.openpolis.it/singolo_atto/64162

¹⁵ Germany, France, Portugal

3.5 On a more effective role of government

Recommendation 5.1: Improving cooperation and coordination among EU DGs.

Food waste is multilevel and multisectoral because different legislative and policy subjects impact on it. Although DG SANTÉ has become the Directorate-General responsible for food waste reduction and prevention strategies a strong collaboration involving the other Directorates-General is a prerequisite to effectively implement and manage a common food waste reduction strategy.

Food waste generation and management are affected by different policy areas at different policy levels (European, national, local) with a number of interconnected and indirect effects (see Figure 6). Food and feed safety, waste management, agriculture, fishing, are just some examples of policy areas where EU-level policies have a strong influence on the national and local context.

Relevant FUSIONS Reports

[17] *Review of EU legislation and policies with implications on food waste*

Figure 6 - Main EU policy areas (and related DGs) with potential implications on food waste



Potential for improvement of such legislation with the aim to foster food waste prevention exists in a number of cases as highlighted below and more in detail in the following paragraphs.

General, financial and institutional matters

This policy area consists of several sub-chapters related to principles, objectives, and tasks of the Treaties; governance and administration of institutions; and financial and budgetary provisions. Only one legislative act [COM (2011) 571] has been inventoried with implications for food waste. In this case, the act proposes a roadmap to a resource-efficient Europe that cannot be achieved if a significant amount of resources continues to be lost in the absence of any food waste prevention strategy.

Agriculture

The agriculture sector has obvious implications for food. Twenty legislative acts referring to this policy area and impacting on food waste have been inventoried. The specific EU policy is the Common Agricultural Policy (CAP), which is under the responsibility of the Directorate-General for Agriculture and Rural Development (DG AGRI).

Partially in conjunction with other DGs dealing with structural policies, DG AGRI promotes the sustainable development of Europe's agriculture and tries to ensure the well-being of its rural areas. As seen in the previous sections, this policy area is connected to food waste in terms of both potential generation and potential reduction. For instance, the marketing standards set in the CAP context contribute to food waste generation because edible products can be taken out of the food supply chain for aesthetic reasons (e.g. related to size and shape).

Otherwise, the CAP includes a measure of free distribution that allows and provides incentives for the supply of agricultural products withdrawn from the market to deprived persons.

Several measures and topics in this area are potentially connected to food waste, including agricultural productivity, income and price stability, sustainable management of natural resources, and territorial development. The CAP has been recently reformed in order to achieve a more efficient and competitive agricultural system. A sector cannot be efficient if it does not eliminate or cut its waste, which also has a negative economic impact. Thus, food waste prevention should be an integral part of agricultural policies.

Fisheries

Fisheries are another policy area with obvious implications on food. Seven legislative acts refer to this area, which is governed through the Common Fisheries Policy (CFP) by the Directorate-General for Maritime Affairs and Fisheries (DG MARE). The CFP is a set of rules for managing European fishing fleets and for conserving fish stocks.

The recent development of the CFP aims to ensure healthy seas, prosperous coastal communities, a safe and stable supply of seafood, and sustainable fisheries. However it does not duly take into consideration the issue of food waste prevention as highlighted in Recommendation 21.

Taxation

Only one legislative act referring to this area with implications for food waste has been inventoried [Directive 2006/112/EC]. However, taxation seems to be an area in which strategic changes could lead to effective food waste reduction measures.

This area is under the responsibility of the Directorate-General for Taxation and Customs Union (DG TAXUD), which plays an active role in achieving the strategic aims of the European Union. DG TAXUD manages, defends, and develops the customs union as part of protecting the

external borders of the EU; and encourages changes to tax systems so that they support Community objectives, such as competitiveness and sustainable development.

One issue connected to food waste is the application by MS of the EU regulation on VAT (value added tax) to surplus food donation, which could hamper the cooperation between potential donors and food banks or charities. (See Par. 3.3 - Recommendation 5)

Economic and monetary policy and free movement of capital

Only one legislative act belonging to this area has been included in FUSIONS inventory as food waste does not seem to be a priority in the integration of EU economies, unlike monetary union and capital movement. However, it would be simplistic to assume that there are no connections between food waste and economic issues. An effective prevention strategy requires the participation of many DGs and policy areas, as well as the coordination of environmental, technical, economic, financial, fiscal, and administrative matters. Indeed, a revision of economic paradigms and production and consumption models would promote caution in resources management, reducing waste occurrence.

Industrial policy and internal market

Several Directorate-Generals and Services are involved in this area. The main DGs for these subjects are the Directorate-General for Enterprise and Industry (DG ENTR) and the Directorate-General for Internal Market and Services (DG MARKT).

Five legislative documents under the responsibility of these DGs have been inventoried regarding food waste. They represent about 10% of the EU laws identified in the FUSIONS study. This is quite a significant and justifiable percentage because one of the objectives of these policies is the promotion of smart, sustainable, and inclusive growth throughout all industrial sectors, contributing to make Europe's economy more competitive, innovative, and resource-efficient. Considering the economic (as well as environmental and social) relevance of food waste on enterprise and the market, any prevention strategy should also involve these areas.

Environment, consumers and health protection

Food waste clearly impacts the environment, both in terms of impacts linked to waste management and disposal and in terms of environmental impacts (including natural resources consumption) related to the whole life cycle of food products. The main EU administrative departments involved in this policy area are: the Directorate-General for the Environment (DG ENV) and the Directorate-General for Health and Consumers (DG SANTÉ). DG ENV aims to protect, preserve, and improve the environment for present and future generations. It is also concerned with the quality of life of EU citizens. DG SANTÉ aims to make Europe a healthier and safer place, where consumers can be confident about the safety of food products placed on the market. While a zero-risk society is likely only a utopian objective, regulations to reduce and manage risks for consumers are imposed via measures that are sometimes too strict. These measures try to ensure food safety to protect and improve public, animal, crop, and forest health. However, excessively rules might lead to generate unnecessary food waste or discourage innovation in the food industry and, in wider terms, in society.

Recommendation 5.2: Launching a pan-European awareness-raising campaign.

The EC should launch a pan-European campaign to raise awareness of the need to reduce food waste; moreover it should foster the implementation of National Campaigns in each EU-28 Country. Given the relevant experiences achieved in a number of MS the EC should suggest which tools should be included and which food waste aspects/implications should be mainly addressed.

Relevant FUSIONS Reports

- [1] *Scenario analysis on current trends of food waste generation*
- [10] *Market-based instruments, food waste, incentives, voluntary agreements*
- [11] *Review of current EU Member States legislation and policies addressing food waste*
- [18] *Drivers of current food waste generation, threats of future increase*

Under the Resolution of September 7, 2010 on fair revenues for farmers: A better functioning food supply chain in Europe (2009/2237(INI)) the European Parliament already called on the Commission (see point 61) “to take action via an awareness-raising campaign about the essential value of food”. Moreover, the need to develop awareness raising campaigns and educational tools (in particular for children and teenagers) to empower consumers has been raised several times both within FUSIONS Regional Platform Meetings and within meetings of

the EU working group on food losses and waste.

Among the **drivers of current causes of food waste generation** identified by FUSIONS, 16 are related to consumers’ behaviour and lifestyles (Social drivers). According to FUSIONS work some of these drivers are easily modifiable through information and strengthened awareness. The drivers classified in this group refers for instance to consumer attitudes towards food shopping, the way food is served by restaurants, the level of general information and awareness about food, social norms, etc.

National awareness raising campaigns are already in place in several EU Countries, including the UK, Italy, France, Spain, Germany, Austria, Denmark, Finland, Greece, Hungary, Ireland, Netherlands, to name a few. While these campaigns are delivered at a national level, a number of awareness raising campaigns/initiatives at a more local/regional level have been identified in several countries, especially in Italy, Austria, UK and Germany. These campaigns engage a wide array of stakeholders along the food chain (including businesses and their associations, non-profit organisations, consumer associations, public bodies, local and national institutions) and some of them can be easily replicated in other countries. Best practices of voluntary initiatives in the UK, Italy and Netherlands were also chosen due to their innovativeness and level of stakeholders’ engagement across the food chain sectors.

Within this context, the EC could adopt/implement several measures/initiatives aimed at improving awareness-raising on food waste prevention among EU citizens. It could both launch its own communication campaign at EU level and foster the delivery of awareness-raising campaigns at national level so to take into account the complex culturally-specific causes of food waste. To be effective, national campaigns should be developed in collaboration with local partners, such as local government, education institutions, consumer associations, retailers, NGOs and food producers.

To this end the EC could, for example:

- elaborate guidelines for developing and implementing awareness raising campaigns tailored to specific segments of the populations (children, students, families, etc.);
- provide funding for the development, delivery and monitoring of the campaigns at national level;
- develop and make communication/training/educational materials available so to be used within the national campaigns;
- establish a European day/week/year for food waste prevention;
- establish a European award on food waste prevention;
- integrate the food waste issue within the existing web-based European Knowledge Platforms.

Recommendation 5.3: Evaluating the potential impact in terms of food waste when conducting an impact assessment on new relevant legislative proposals.

The EC should evaluate the potential impact on food waste when conducting an impact assessment on new relevant legislative proposals as required by the EP resolution of 9 July 2015 on resource efficiency: moving towards a circular economy (2014/2208(INI)) (point 47).

Recommendation 5.4: Defining a common framework for the evaluation of policy interventions.

The EC should adopt common guidelines for the evaluation of policy interventions/strategies/programmes addressed to food waste prevention delivered at EU, national and local level.

Relevant FUSIONS Reports

- [6] *Policy Evaluation Framework*
- [12] *Criteria for and baseline assessment of environmental and socio-economic impacts of food waste*
- [17] *Review of EU legislation and policies with implications on food waste*

This section explains why the EC should provide a common framework for the evaluation of policy interventions/strategies/programmes addressed to food waste prevention; defines what a policy evaluation framework is, what it should achieve, who its target audience is and how it should look like. Furthermore the evaluation criteria and indicators that can be used to assess the efficacy/efficiency of

policy interventions addressed to food waste prevention are presented.

Why is there a need for a policy evaluation framework?

No methodology currently exists on how to prepare and conduct evaluations of food waste policies. A policy evaluation framework can help policy makers to assess, monitor and track progress of policy measures to prevent and reduce food waste, including (but not limited to) social innovation, to present indicators and criteria to evaluate such policies, and to identify any barriers that policies may indirectly cause in reducing and preventing food waste.

What are the key aspects of the FUSIONS food waste Policy Evaluation Framework?

The FUSIONS food waste Policy Evaluation Framework provides policy makers (at the EU, national, regional and local level) with a methodology on how to prepare and conduct a food waste prevention and reduction policy evaluation. The Framework has therefore been

developed to be flexible enough to address all the different levels mentioned above. Furthermore, it provides guidance on how to interpret policy evaluation findings in order to optimise policy measures and the related impacts.

The **policy measures** addressed within the FUSIONS Policy Evaluation Framework are classified as follows:

- National strategies on food waste prevention
- Market-based instruments
- Regulations and regulatory instruments
- Voluntary agreements
- Communication and campaigns
- Projects and other measures

Is the FUSIONS evaluation framework inspired by other EC evaluation tools?

To date, at the European Commission (EC) level, the EU Better Regulation Guidelines¹⁶ methodology is used as a support tool on how to prepare a policy evaluation, for example via impact assessments, in order to ultimately assess the actual performance of EU interventions compared to initial expectations. The Commission is committed to evaluate in a proportionate way all EU spending and non-spending activities intended to have substantial impacts on society or the economy.

The FUSIONS policy evaluation framework is inspired by the EU Better Regulation Guidelines and illustrates policy evaluations as a non-linear process. A policy is set to unconditionally and flexibly realign its objectives and rational according to results brought forth through habitual monitoring exercises, extensive evaluations, and a realignment of policy objectives, which are set forth through applied revisions.

What evaluation criteria have been taken into account?

The FUSIONS Policy Evaluation Framework is set up in a hierarchical manner. As seen in the figure below, at the top of the framework's hierarchy are the **five evaluation criteria** derived from the EU's "Better Regulation Toolkit"¹⁷, which, according to the European Commission, are the key to carrying out successful evaluations. Each evaluation criterion is split into various *non-exhaustive* **orienting questions**, which categorise **indicators** per policy measure. The objective of organising indicators in this hierarchical manner is to facilitate structure and organisation within the evaluation. Further steps such as addressing data gaps are outlined later on in the document.

What indicators have been taken into account?

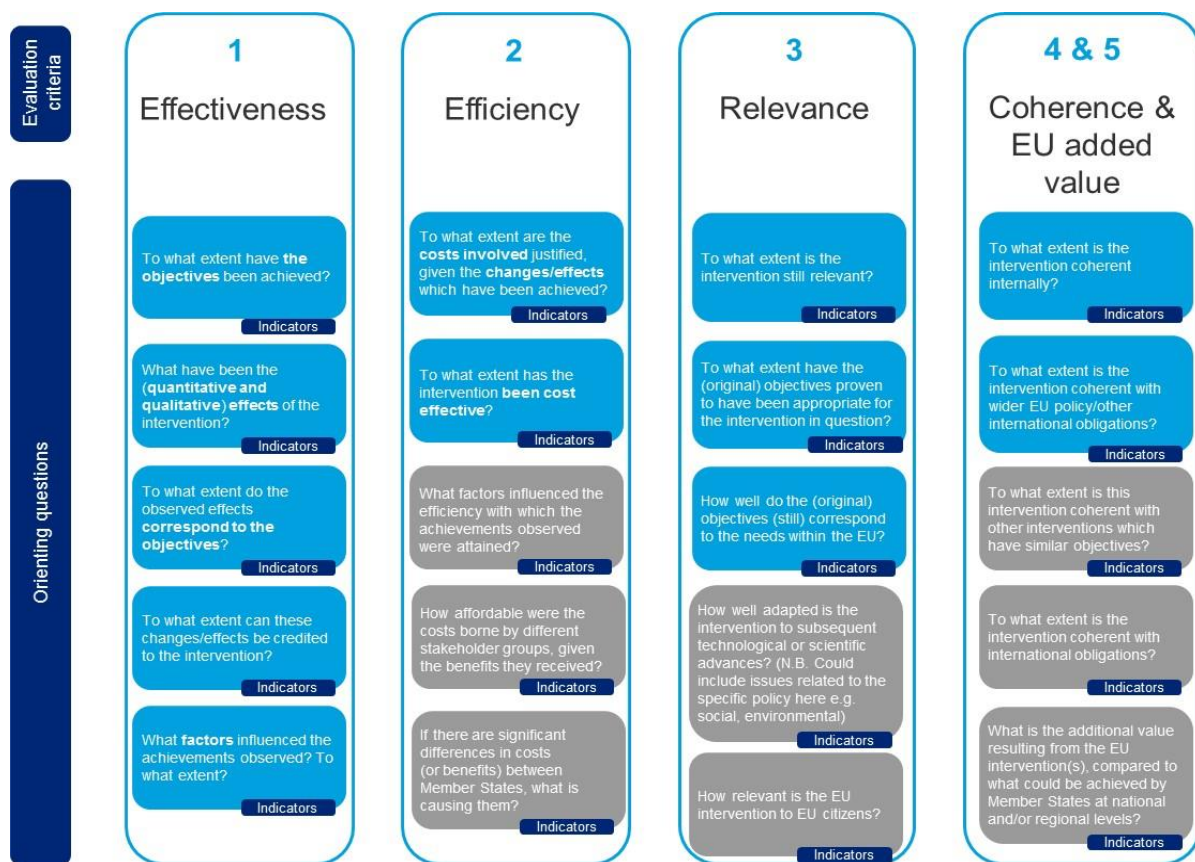
Indicators are essential to a policy evaluation, as they are key tools that, when addressed/calculated, provide a clear, comparable measure of the impact of a policy.

¹⁶ European Commission (2015), Better Regulation "Toolbox", available here http://ec.europa.eu/smart-regulation/index_en.htm
http://ec.europa.eu/smart-regulation/guidelines/toc_tool_en.htm

¹⁷ European Commission (2015), Better Regulation "Toolbox", available here http://ec.europa.eu/smart-regulation/index_en.htm

The methodology provides a non-exhaustive, yet concrete list of indicators that can be applied to the categories of policy measures mentioned at the beginning of the present section. Furthermore, criteria are provided on how to self-develop and use appropriate indicators to evaluate the social, economic and environmental impact of different policy measures. However, not all indicators listed within the FUSIONS Evaluation Framework are applicable to all policy measures. A specific Chapter within the FUSIONS Policy Evaluation Framework Report (Chapter 5) illustrates how specific indicators may be used to evaluate specific policy measures within case studies.

Figure 7 - The evaluation scheme: Evaluation criteria → orienting questions → indicators



By undergoing policy evaluations, the Commission takes a critical look at whether EU activities are fit for its expected purposes and if they deliver, at a minimum cost, the desired changes to European businesses and citizens as well as contribute to the EU's general role.

The objectives of a food waste Policy Evaluation Framework are to assist policy makers in assessing, monitoring and tracking progress of policy measures (in place and to be developed) to prevent and reduce food waste, to present indicators and criteria to evaluate such policies, and to identify any barriers that policies may indirectly cause in reducing and preventing food waste.

The FUSIONS food waste Policy Evaluation Framework is aimed to provide support to policy makers at the European Union (EU), national, regional and local level, therefore it is intended to be flexible enough to address different policy levels.

The benefits of this Policy Evaluation Framework would best be seen when considering the need to have a structured guideline on how to evaluate direct EU and national policies concerning food waste in an ex-post fashion, as no methodology currently exists on how to prepare and conduct evaluations of food waste policies.

Recommendation 5.5: Formulating clearer and more direct date labels.

The EC should formulate clearer, more direct date labels and promote greater understanding among all actors about what date labels such as “best before date” and “use by date” mean in order to prevent unnecessary food waste.

Relevant FUSIONS Reports

[11] *Review of current EU Member States legislation and policies addressing food waste*

[17] *Review of EU legislation and policies with implications on food waste*

Reg. No 1169/2011¹⁸ establishes the rights of consumers to safe food and to accurate and honest information. Labelling should help consumers make informed choices while purchasing. However, this information is sometimes unclear. As highlighted within the Report “Review of EU legislation and policies with implications on food waste” (Vittuari M., et al. 2015)

and reported in several scientific and informative studies, confusion about the different meanings of “best before,” “use by,” and “sell by” dates is still one of the main causes of food waste. This is the case in foodservice where employees are often required to throw out perfectly good products in bulk once they have reached a certain date as well as at home, where many consumers don’t know that:

- the “best before” date indicates that the characteristics of a product can change after that date, but the product does not become harmful for human health and can therefore be sold and consumed;
- “use by,” which should appear only on highly perishable food, means that after that date the product could become unsafe for human health and cannot be sold or consumed;
- the “sell by” date, which is intended for stocks to permit inspection, sometimes still appears on packaging, even if unfrequently, thus causing confusion in consumers’ minds.

A more uniform and easily understandable date label system could better communicate appropriate information to consumers as well as to companies within the foodservice sector, thus contributing to a reduction of food waste.

Another option to simplify date marking on foodstuffs is the extension of the list of foods which are exempt from the obligation to include a “best before” date on food labelling (as specified in Annex X of Regulation (EU) No 1169/2011). Today these include foods such as vinegar, sugar or salt. In the future, other non-perishable foods for which the removal of date marking would not pose a safety concern could be also included in the list. This option has already been discussed within the 3rd Meeting of the EC’s WORKING GROUP ON FOOD LOSSES & FOOD

¹⁸ Regulation (EU) No 1169/2011 of the European Parliament and of the Council of 25 October 2011 on the provision of food information to consumers, amending Regulations (EC) No 1924/2006 and (EC) No 1925/2006 of the European Parliament and of the Council, and repealing Commission Directive 87/250/EEC, Council Directive 90/496/EEC, Commission Directive 1999/10/EC, Directive 2000/13/EC of the European Parliament and of the Council, Commission Directives 2002/67/EC and 2008/5/EC and Commission Regulation (EC) No 608/2004 Text with EEA relevance

WASTE¹⁹ on 8 May 2014 (EC 2014) and also, during the second meeting of the Commission's Expert Working Group on Food Losses and Food Waste of 24 April 2015 (EC 2015).

Recommendation 5.6: Fostering the use of former foodstuffs and by-products for feed production.

The EC should improve the existing legislative framework regulating the use of former foodstuffs and by-products from the food chain for feed production and improve knowledge among food business operators about currently available tools and opportunities.

Relevant FUSIONS Reports

[17] *Review of EU legislation and policies with implications on food waste*

Legislation on animal feed is harmonised at European Union (EU) level. It applies principally to feed for farmed livestock, but also covers feed for other farmed and non-farmed animals (like horses, pets, farmed fish etc.). Despite using food chain by-products for feed production is already quite a common practice in many EU countries and for many food business operators²⁰, substantial room for improvement still exists both through clarification of EU and national legislation related to waste, food and feed and through improving knowledge about currently available tools and opportunities. In particular the EC should promote a wider knowledge of the opportunities brought by Regulation 68/2013 of 16 January 2013 *"on the Catalogue of feed materials"* that introduced the definition of "Former foodstuffs" providing the legal basis for using them in feed production.

It must be highlighted that the Circular Economy Package already includes a commitment by the EC to *"take measures to clarify EU legislation related to waste, food and feed and facilitate food donation and the use of former foodstuffs and by-products from the food chain for feed production, without compromising food and feed safety"*

Recommendation 5.7: Improving catch restriction rules.

The EC should set clear rules that allow for valorisation (out of the market) of landed fish; carry out scientific studies aimed at identifying which species have an "high survival rates"; support the development and implementation of new technologies allowing species-focused fishing.

Relevant FUSIONS Reports

[11] *Review of current EU Member States legislation and policies addressing food waste*

[17] *Review of EU legislation and policies with implications on food waste*

Marine fisheries must comply with the Common Fisheries Policy (CFP) of the European Union (EU), which is aimed at sustainable management of fish stocks. Several Regulations implemented in this area include catch restrictions. One of the related measures is named "total allowable catch" (TAC), defined as the quantity that can be taken and landed from each fish

¹⁹ WORKING GROUP ON FOOD LOSSES & FOOD WASTE of the ADVISORY GROUP ON THE FOOD CHAIN, ANIMAL AND PLANT HEALTH

²⁰ In Italy, according to ASSALZOO (the national association between feed producers) estimates, the feed industry exploits about 650.000 tons of by-products coming from the food industry

stock every year. Each EU Member State is allocated a quota (a proportion of the TAC) to be distributed among the fishermen; thus, when a fishermen exceeds the limit, the over-quota cannot be marketed. Beside over-quota fish, unwanted by-catch and undersized caught fish both contribute to the generation of food waste, threatening at the same time the marine ecosystem.

However, Regulation (EU) No 1380/2013 introduced the obligation for all species subject to limitations as well as for those species subject to minimum sizes in the Mediterranean - to land all catches (Article 15). This measure, called the “discard ban,” should reduce food waste, even if some issues are still unclear. The first unclear issue regards the use of the fish after landing if it cannot be marketed. The second regards the exception that the discard ban cannot be applied to species with high survival rates as demonstrated by scientific evidence (Article 15, paragraph 4b). Unfortunately, no such evidence has yet been provided.

3.6 On stimulating further research

Recommendation 6.1: Improving knowledge on food waste drivers.

Improving the knowledge on the interrelated drivers of food waste and on their interconnected environmental, social and economic impacts is essential for the identification of hot spots and key levers for (behavioural) changes and for the design of more responsive and effective policy measures at EU, national and local level.

The EC should examine how to better prioritize research in this area within the existing EU funding programmes and how to stimulate a better coordination of the research activities carried out at national level.

Relevant FUSIONS Reports

[18] *Drivers of current food waste generation, threats of future increase and opportunities for reduction*

[10] *Market-based instruments, food waste, incentives, voluntary agreements*

FUSIONS carried out an in-depth analysis on food waste drivers. Expert views and literature review were the basis to inventory and categorise what have been considered as the primary causes of food waste, the aspects

which threaten an increase in food waste, and those which suggest possibilities for food waste reduction in the future.

Although FUSIONS work provides a framework of reference for understanding the main causes and drivers of food waste along the supply-chain and their related impacts, further research is needed since the proper identification and prioritisation of FW drivers within national food waste prevention strategies require to in-depth analyse the different food supply-chains and the related interconnections among the different supply-chain stages from primary production in farms, up to final consumption in food services and households.

This section presents the food waste drivers and the context categories (technological, institutional and social) they belong to as identified by FUSIONS. Precisely the drivers of current causes of food waste generation, those leading to a potential increase of food waste and those facilitating a potential reduction of food waste are introduced. Priorities for possible actions to reduce food waste are highlighted.

Which types of drivers were identified?

FUSIONS identified three typologies of drivers:

- the current causes of food waste generation (current causes);
- the main threats of food waste increase in the future (future threats);
- the main opportunities for food waste reduction in the future (future opportunities).

Which context categories were identified?

FUSIONS grouped the drivers in four context categories: (i) technological; institutional, divided in (ii) business management and (iii) legislation and policy; (iv) social.

What are the drivers of current causes of FW generation?

FUSIONS has identified 105 drivers as current causes of food waste generation: 28 drivers are related to technology, 38 to business management and economy, 23 to legislation, and 16 to consumer behaviour and lifestyles.

Table 3 - Grouping of identified drivers of current food waste causes

<i>Context categories</i>	<i>Grouping of identified drivers of current food waste causes</i>		
Technological	Drivers inherent to characteristics of food, and of its production and consumption, where technologies have become limiting	Drivers related to collateral effects of modern technologies	Drivers related to suboptimal use of, and mistakes in the use of food processing technology and chain management
Institutional (business management)	Drivers not easily addressable by management solutions	Drivers addressable at macro level	Drivers addressable within the business units
Institutional (legislation and policy)	Agricultural policy and quality standards	Food safety, consumer health, and animal welfare policies	Waste policy, tax, and other legislation
Social	Drivers related to social dynamics which are not readily changeable	Drivers related to individual behaviours which are not readily changeable	Drivers related to individual behaviours modifiable through information and increased awareness

Technological drivers have been grouped according to possibilities of intervention through application of available technologies. Institutional drivers have been grouped according to the possibilities of business management solutions and to the type of legislation and policy to which the identified drivers refer to. Social drivers have been grouped according to the potential effectiveness of actions aimed at increasing social awareness and information.

What are the drivers leading to a potential increase of FW?

77 drivers for the future threats of food waste increase have been identified. 18 drivers are related to technology, 32 to business management and economy, 19 to legislation, and 8 to the social context.

Table 4 - Grouping of identified drivers of future threats of food waste increase

<i>Context categories</i>	<i>Grouping of identified drivers of future threats of food waste increase</i>		
Technological	Future threats related to changes driven by environmental, policy, and macroeconomic developments	Future threats related to changes driven by business decisions	Future threats related to changes driven by consumers choices
Institutional (business management)	Future threats related to changes driven by policy and macroeconomic developments	Future threats related to changes driven business decisions	Future threats related to changes driven consumers choices
Institutional (legislation and policy)	Future threats from current regulations and changes in the agro-food policy and legislation	Future threats from current regulations and changes in other legislation and policies	Future threats from insufficient regulation
Social	Future threats related to current social dynamics	Future threats related to individual behaviours which are not readily changeable	Future threats related to individual behaviours modifiable through information and increased awareness

What are the drivers facilitating a potential reduction of FW?

89 drivers for future possibilities of food waste reduction have been identified: 20 drivers in the Technology context, 37 in the Institutional (business management and economy) context, 27 in the Institutional (legislation and policy) context, and five in the Social context.

Table 5 - Grouping of identified drivers of future possibilities of food waste reduction

Context categories	Grouping of identified drivers of future possibilities of food waste reduction		
Technological	Future possibilities driven by development of new technology	Future possibilities driven by improved use of existing technology	Future possibilities driven by improved organisation and skills
Institutional (business management)	Future possibilities driven by policy and macroeconomic developments	Future possibilities driven by improvements in organisation and technology	Future possibilities driven by improvements in information management, knowledge and communication
Institutional (legislation and policy)	Future possibilities from improvements in current regulations and policies	Future possibilities from (non-regulatory) initiatives undertaken by governments	Future possibilities from new initiatives undertaken by enterprises and society
Social	Future possibilities from improved consumers' behaviour directly induced by food waste information and campaigning	Future possibilities from improved consumers' behaviour not directly induced by food waste campaigning	-

Which clusters are recognizable by referring to the current causes of FW generation?

Considering the current causes of food waste it is possible to distinguish:

- A. Food waste related to the characteristics of food products and the ways in which they are produced and consumed (i.e. perishability of food, limited predictability of supply and demand, limited capacity to adapt quickly the supply to the evolution of demand, limited possibility of consumers to accumulate individual stocks of food, etc.);
- B. Food waste related to social factors and dynamics in people habits and lifestyles that are non-readily changeable (e.g. single-person households, young age of household members, young couples with small children, increased consumption of meals out-home, etc.);
- C. Food waste related to individual preferences of consumers that are non-readily changeable (e.g. expectations on food aesthetics, freshness, possibility of acceding to broad quantities and varieties of food independently on places, season, and time, etc.).
- D. Food waste related to private and public stakeholders choices (e.g. food waste generation may be a minor concern - with respect to other priorities- both for the private and public stakeholders. For example, for private companies profit is a first priority and this justifies choices that balance potential wastage of food with increase of product sales, reduction of production costs or diminished risks of damages to the company's brand image from non-complying with safety or other commercial standards. For public authorities improving food safety, food security, consumer information, and animal welfare may come as priorities over food waste generation).
- E. Food waste related to non-use or sub-optimal use of available technologies, organisational inefficiencies of supply chain operators, inefficient legislation, and bad behaviours of consumers depending on unawareness, scarce information, and poor food skills.

The probability to modify the causes of food waste in the above list is increasing from A to E. In the first part of the list most of the potential change lays in technological innovations that

ease the constraints related to intrinsic characteristics of food products and to the ways they are produced and used. At the end of the list, changes are potentially more feasible, since they largely depend on improvement of efficiency along the food supply chain through correct application of available technology, better organisation, more accurate policy design, and increased consumer awareness.

Food waste drivers are deeply connected and interrelated so the establishment of clear and direct cause and effect relationship is particularly difficult. Moreover such a complexity leads also to significant challenges in the identification of targeted policy measures. A better understanding of the drivers would facilitate the identification of hot spots and key levers for (behavioural) changes facilitating the design of more responsive and effective policy measures.

Recommendation 6.2: Improving the understanding of environmental and socio-economic impacts.

Improving knowledge on food waste environmental, social and economic impacts is essential for the design and implementation of effective prevention policies at EU, national and local level. The EC should examine how to better prioritize research in this area within the existing EU funding programmes and how to stimulate a better coordination of the research activities carried out at national level.

Relevant FUSIONS Reports

[12] *Criteria for and baseline assessment of environmental and socio-economic impacts of food waste*

This section presents the work carried out from FUSIONS on the multiple impacts of food waste and in particular:

- impacts on health and nutrition of food waste;
- socio-economic impacts of food waste;
- social impacts from food redistribution organisations, such as food banks or social supermarkets;
- environmental impacts of food waste.

The FUSIONS socio-economic and environmental assessment of food waste suggested that there are major data gaps and significant needs for a more comprehensive assessment. Table 6 summarizes the object of impact assessment, the approaches, the data sources, and the data gaps.

Table 6 - Approaches used to assess socio-economic and environmental impacts

Object of impact assessment	Approach used with FUSIONS	Data sources	Data gaps
Health and nutritional factors	Calculation on product group level	Food composition databases; Literature; FUSIONS food waste data set (from Oct. 2015)	<ul style="list-style-type: none"> • Nutrient concentrations in inedible parts of food • Matching data on nutrient concentrations and actual food waste data (on a product or product category level) • Food waste data at product level
Anti-nutritional factors	Literature review	Literature	<ul style="list-style-type: none"> • Amounts of food waste which is unsuitable for human consumption or animal feed
Socio-economic factors	Comparative matrix based on literature review	Literature	<ul style="list-style-type: none"> • Reliable food waste data by product category level • Costs and benefits (short, medium and long term) of prevention and reduction measures along the supply chain
Social factors of food redistribution organisations	Identification and analysis of social indicators	Literature; Workshops; Survey	<ul style="list-style-type: none"> • Need to carry out personal interviews to investigate individual motivations (high cost); • Snapshot of the situation in a specific time
Environmental factors	Global Warming Potential via bottom-up approach	Literature; FUSIONS food waste data set (from Oct. 2015)	<ul style="list-style-type: none"> • Lack of periodic repetitions as database of environmental emissions are based on specific literature sources • Varying system boundaries and the assumptions required to standardise to a common end-point • End of life stage • Food and inedible parts removed from the supply chain for valorisation and conversion

What are the impacts of food waste on health and nutrition?

The estimated amount of vitamin C lost in a year as a result of food waste corresponds to a daily intake of 90 million people.

The impact on health and nutritional factors was analysed using nutrients, micronutrients and partly anti-nutritional factors. Based on The Nederland and Sweden composition data base, results of the baseline assessment show that the estimated amount of vitamin C that is lost in the EU in a year (2011) as a result of food waste is equivalent to the amount of vitamin C that is needed by 90 and 97 million people a day respectively. Losses of retinol equivalents equal the amount needed for 407 and 150 million people a day in NL and SE respectively. Losses of total dietary fibre are estimated equal the amount needed for 139 and 173 million people a day in NL and SE respectively and losses of total iron to 157 and 169 million people a day in NL and SE respectively. Losses of zinc amount to 181 and 210 million people a day regarding their recommended intake on nutrients. For a more accurate assessment of the composition of food waste, disaggregated nutrient concentrations of inedible parts and food waste data on the product and product category level are needed as well as data on nutrient concentrations with food waste data on a corresponding level of detail (product level versus product group level).

What are the socio-economic impacts of food waste?

Socio-economic causes of food loss and waste were detected in a theoretical framework that encompasses micro-economic theory, behavioural economics, and macro-economics. The analysis shows that causes at the farm and firm (business) level include limited market access and weak competitiveness while at consumer level low purchasing power and low planning capacity are listed. At the macro-economic level relevant factors such as inadequate infrastructure in developing countries and food price inflation were revealed. FLW prevention and reduction are taking place in the EU concurrently to actions in other Regions and the potential impacts on food prices and welfare need to be researched and projected for intra- and inter-regional impacts (FAO/LEI, 2015). This research also shows that high level

considerations on the socio-economic impacts of food loss and waste need to be balanced with a value chain analysis. For instance, if food becomes cheaper, households may waste more or trade-up and spend the saved income from the reduction of food waste on other services or higher quality food.

What are the impacts of food banks and other initiatives?

Food redistribution plays a key role in improving food security and integrating marginalised social groups within the society.

The assessment of the impacts of food banks and other initiatives aimed at the food supply to marginalised social groups was carried out using the methodology of social capital (World Bank 1998; World Bank 2004). The methodology was tested through a distribution of a questionnaire to 211 food redistribution organisations in Europe with a response rate of 15%. The results showed that food redistribution can not only have a positive effect on food security and safety but also on the basic components of social capital, in particular trust, networks, and cooperation. In a thorough literature review, social, economic and psychological impacts of food redistribution activities as well as impacts on nutrition and health were furthermore detected for different stakeholders: impacts on people in need (e.g. overcoming individual isolation, increasing purchasing power, improving nutritional situation and self-determination), impacts on people involved in redistribution activities (e.g. compliance with social and ethical norms, education and training), impacts on donors (corporate social responsibility e.g. impact on staff morale, but also e.g. reputational risk or tax benefits) and impacts on communities and society in general (e.g. public education impact, dignity and social justice).

What are the environmental impacts of food waste?

Food waste related emissions in EU-28 are approximatively the equivalent of Netherlands' total GHG emissions.

The Life Cycle Assessment (LCA) methodology was used to carry out environmental assessment of food waste in the EU-28, which accounts for emissions from cradle to grave covering most of the steps of the food supply chain. Two approaches were tested: the bottom-up approach, starting from specific indicator products and ending with an extrapolation of results to the total food consumed, and the top-down approach, starting from greenhouse gas emissions at an aggregated level over certain steps of the food supply chain and ending at results for emissions related to the total consumed and wasted food. Results for the total global warming potential (GWP) associated with food consumed in the EU in 2011 arrive at a very similar figure for both approaches (around 1,380 Million tons CO₂ eq.). Food waste related emissions estimated at 16% to 22% of the total emissions of consumed food, which are equal respectively to 227 Mt CO₂ eq. in the bottom-up approach and 304 Mt CO₂ eq. in the top-down approach. The top-down approach appears to offer a rapid way of approximating the Global Warming Potential whereas the bottom-up approach provides results on an indicator product level and from the perspective of the polluter pays principle, which can serve as a good basis to set targeted waste prevention activities. The latter has also been extended to calculate the acidification and eutrophication impacts of food waste.

As for the drivers, a better understanding of food waste environmental and socio-economic impacts would facilitate the identification of hot spots, informational needs and key levers to design of more responsive and effective policy measures.

Recommendation 6.3: Addressing food waste linked to the presence of contaminants in food.

The EC should promote actions and researches in order to improve knowledge about the implications of contaminants in food for human and animal health.

Relevant FUSIONS Reports

[17] *Review of EU legislation and policies with implications on food waste*

EU legislation has set Maximum Residue Levels (MRLs) for contaminants in food, which is wasted when these levels are exceeded. MRLs apply to pesticides, medicines, and microbiological contaminants that

could threaten food safety for animals and humans. Food safety must be guaranteed; however, some studies have highlighted potential connections between MRLs and avoidable food waste (Waarts et al., 2011). In particular, the zero tolerance criterion for some substances could lead to food waste generation due to improving detection methods. Technological innovation makes it easy to find negligible amounts of banned substances. At the same time, however, additional scientific evidence and improved knowledge about the real implications of these substances for human and animal health should be sought to avoid the waste of edible and healthy food.

4. Other emerging policy issues

This chapter includes a number of other potentially relevant policy options not directly based on FUSIONS work but emerged during the consultation sessions held within the FUSIONS European and Regional Platforms meetings. These options could be taken for further consideration in the identification of a common European food waste policy framework.

Food waste collection systems (and target)

Establishing mandatory separate collection systems (and targets)

Establishing mandatory separate collection systems (and targets) for food waste or biodegradable waste within the EU-28 Member States; provision of adequate subsidies for the development of separate collection and treatment infrastructures.

A recently published report on the separate waste collection systems in the EU-28 countries conducted by BiPRO and commissioned by the European Commission (EC 2015b) shows that collection systems, especially for bio-waste, still vary widely among all EU-28 Member States. Unlike the mandatory separate collection for other waste streams (paper, glass, metal, plastic) the WFD in Article 22(a) only requires Member States to take “*measures to encourage the separate collection of bio-waste*”, with a view to composting and anaerobic digestion.

Although separate collection of food waste is not a prevention measure per se, a number of stakeholders noted the “waste prevention effect” of separating food waste at household, food service operators and retailers levels. Although this relationship has not yet been proven quantitatively, the act of separating food waste from other waste streams is deemed to have a positive effect in terms of awareness rising, by confronting participants directly and regularly with the quantity of food waste they generate (BIO 2010). The establishment of separate collection systems for the food waste stream could be particularly effective in terms of food waste prevention where accompanied by public awareness campaigns.

It must be noted that the revised legislative proposals on waste included within the Circular Economy Package already incorporates a requirement for Member States to ensure separate collections for bio-waste (including food waste) but only “*where technically, environmentally and economically practicable and appropriate*”.

Food waste prevention targets

Introducing binding targets for food waste prevention

Introducing binding targets for food waste prevention within the revised EU Directive on waste. Clear and suitable baselines for food waste reduction targets could be introduced along with agreement on definitions and data measurement and evaluation. The inclusion of on-farm losses in the reduction targets might represent an additional opportunity to

Under the resolution of 9 July 2015 on resource efficiency: moving towards a circular economy ([2014/2208\(INI\)](#)) (at point 47), the European Parliament called on the Commission “*to propose, by the end of 2015, targets, measures and instruments to efficiently tackle food waste, including setting a binding food waste reduction target of at least 30% by 2025 in the manufacturing, retail/distribution, food service/hospitality sectors and the household sector*”.

However, national targets to reduce food waste by 30% between 2017 and 2025 proposed in the earlier circular economy package (CEP) have been dropped from the new version adopted on December 2, 2015. National targets were replaced by the statement included in the new UN Sustainable Development Goals (SDGs). The 17 established goals set the world's sustainable development agenda for the next 15 years. Within Goal 12 there is now an international target (12.3) of halving per capita food waste at the retail and consumer level and reducing food losses along production and supply chains until 2030. Several stakeholders criticised this softening of ambition asking for the re-introduction of an EU-specific food waste reduction target of at least 30%, and accounting for food waste over the full supply chain. This option has moreover been recently raised by the European Committee of the Regions within the Draft Opinion on Food waste presented during the 118th plenary session – 15 and 16 June 2016 (European Committee of the Regions 2016) where it urges the Commission *“to consider the possibility of setting individual reduction targets for every phase of the food production chain: production, processing, selling and distribution, catering services, households and food waste treatment [...]”*

Food waste hierarchy

Adopting a legally binding food waste hierarchy

The EC should consider adopting a legally binding food waste hierarchy that interprets and applies the waste hierarchy provided by Article 4 of the WFD in the context of food waste. In order to help MS implementing the FWH at national level the EC should publish specific guidelines as already proposed within the *“Comparative Study on EU Member States’ legislation and practices on food donation”* and supported by the UK House of Lords Committee,.

Redressing perverse financial incentives

The EC should examine and deeply analyse the nexus between the EU Energy Policy and the “food waste” hierarchy. In particular there is a need for more information about the effect of economic incentives that encourage the use of food waste for biogas production when better options - higher in the food waste hierarchy- exist (e.g. feeding people or livestock).

The “waste hierarchy” provided by Article 4 of the WFD does not properly reflect the different prevention and management options that can be applied to the case of food. According to the available scientific literature, a food waste hierarchy should clearly prioritise prevention and redistribution of surplus food and use of non-edible food for animal feed over waste management options such as anaerobic digestion, composting and landfilling.

In order to support MS to integrate the principles of the food waste hierarchy into their legislative framework, the EC should publish specific guidelines on how to identify the existing barriers and opportunities that hamper/reflect this prioritisation. The guidelines should help MS to identify interventions (e.g. simplification/harmonisation of the policy framework; financial/economic incentives/disincentives; better infrastructures for surplus food management etc...) that make higher ranked options more practical and more convenient than lower ranked options.

Redressing perverse financial incentives

The Directive 2009/28/EC of 23 April 2009 establishes a common framework for the promotion

of energy from renewable sources and encourages energy recovery from the anaerobic digestion of food waste. This could be a potential disincentive for the prevention of food waste when viable options exist - higher in the food waste hierarchy. This is the case for example in Italy where the Ministerial Decree n° 6/2012 includes by-products potentially suitable for human and/or animal consumption among those that can benefit from economic incentives when used to produce biogas in anaerobic digestion plants. The need for a better understanding of the existing link between food waste prevention and EU energy policies has already been highlighted during the second meeting of the Commission's Expert Working Group on Food Losses and Food Waste on 24 April 2015 where MS were invited to provide contributions and information in order to help the Commission to prepare a more in-depth discussion to be held during the next meeting.

Sustainable agricultural practices

Promoting farmer-managed food supply chains

Examining ways to support and promote farmer-managed food supply chains, short supply chains and farmers' markets.

In 'Fair revenues for farmers: A better functioning food supply chain in Europe'²¹ the European Parliament called on the Commission to *'propose the adoption of instruments to support and promote farmer-managed food supply chains, short supply chains and farmers' markets, in order to establish a direct relationship with consumers and to enable farmers to obtain a fairer share of the value of the final sale price by reducing the number of middlemen and of the stages of the process'*.

Although more in-depth researches on the relationship among short food supply chains, consumer attitudes and waste reduction need to be carried out, it is interesting to note that some studies underline how consumers tend to attach more economic/emotional value to products purchased directly on farms or at farmers' markets compared to those bought at supermarkets. As a consequence they tend to consume such products in a more efficient and conscious way and to waste less.

However, taking into account the relatively small share of short food supply chains and local food systems in global production, processing and distribution, the potential impact of these systems should not be over-estimated.

In order to get a better view of local farming and direct sales across the European Union (EU), the Commission has already undertaken a broad range of activities, including Member State and stakeholder consultations, creating a dedicated working group and an external study (Knefsey, M. et al. 2013)

²¹ European Parliament resolution of 7 September 2010 on fair revenues for farmers: A better functioning food supply chain in Europe, P7_TA(2010)0302.

Unfair trading practices

Establishing a minimum standard for enforcement bodies across Europe

This standard should include the ability for enforcers to initiate investigations to identify abuses within the supply chain and to set up anonymous complaints procedures. It should also coordinate enforcement across the EU so to cover the entire supply chain both inside Europe and overseas and envisage financial sanctions.

Following the “Communication on tackling unfair trade practices 2014” (EC 2014b), on January 29th 2016 the European Commission published a report on unfair business-to-business trading practices (UTPs) in the food supply chain (EC 2016).

According to the report, UTPs are “*practices that deviate grossly from good commercial conduct, are contrary to good faith and fair dealing and are unilaterally imposed by one trading partner on another*”. These practices (including last-minute orders cancellation, retrospective changing of supply agreements, etc.) could lead (among other social, environmental and economic negative impacts) to getting food wasted.

To address the problem linked to UTPs, the Communication encourages operators in the European food supply chain to participate in voluntary schemes aimed at promoting best practices and reducing UTPs, and emphasise the importance of effective and independent enforcement at national level.

Although FUSIONS did not carry out an in-depth analysis of the link between UTPs and food waste, this issue has been raised in several occasions, e.g. during the FUSIONS Regional Platform Meetings (RPMs) organised each year, that brought together FUSIONS members and various stakeholders from across the food chain.

Moreover, this issue is at the core of the “[Stop Dumping Campaign](http://feedbackglobal.org)”²² lead by Feedback, the widely known environmental organisation that campaigns to end food waste at every level of the food system.

Food waste prevention and GPP policies

Introducing food waste prevention criteria within the EU GPP criteria for food and catering services

Requirements related to the adoption of specific food waste prevention measures (including surplus food donation, food waste quantification and reporting) could be included within the next version of the EU GPP criteria for food and catering services, currently (June 2016) under revision by the Joint Research Centre’s Institute for Prospective Technological Studies (JRC-IPTS).

The EU GPP criteria have been developed for a range of products/services to facilitate the inclusion of green requirements in public tender documents. For each product/service group two sets of criteria are included:

- core GPP criteria address the most significant environmental impacts, and are designed to be used with minimum additional verification effort or cost increases;
- comprehensive GPP criteria are intended to be used by public authorities seeking to purchase the best environmental products available on the market.

²² Stop Dumping Campaign available at <http://feedbackglobal.org>

Among the product/services categories addressed by the EU GPP Criteria, the “Food and catering services” category is the one dealing with food products.

For food, the core criteria address organic production methods and packaging waste. The comprehensive criteria also address other aspects, such as the procurement of food produced according to Integrated Production standards and animal welfare.

For catering services, the core criteria focus on organic food, waste minimisation (waste from cutlery, glassware, crockery and tablecloths) and selective collection; the comprehensive criteria focus in addition on environmental selection criteria, the use of paper and cleaning products, kitchen equipment, nutrition etc.

It must be noted that in both cases, the aspects related to food waste prevention have not been taken into account.

Food waste prevention and EU-Ecolabel scheme

Introducing food waste prevention requirements within the European Ecolabel for tourist accommodation services and camp site services

Requirements related to the adoption of specific food waste prevention measures (including food waste quantification and reporting) should be included within the next version of the European Ecolabel for tourist accommodation services and camp site services.

Currently, neither the mandatory criteria nor the optional criteria for the assignment of the European Ecolabel for tourist accommodation services and campsite services take into account food waste prevention measures. Since tourist accommodation services and campsite services can both include the provision of food services, this omission should be addressed in the interest of food waste prevention strategies.

National food waste prevention programmes

Fostering MS to adopt National food waste prevention programmes

The EC should consider adopting a regulatory approach to foster the introduction by MS of NFWPPs. A regulatory approach could be more effective than voluntary-based actions. Subsidy for the development and implementation of such programmes should be granted by the EC alongside with the provision of new in-depth EU Guidelines suggesting what policy measures should be included.

The EU is made up of different countries with heterogeneous cultural backgrounds and substantial administrative and political differences. This diversity emerges particularly strong in any issues related to food including food waste. This results in a variety of governmental approaches, laws and regulations, initiatives, and business and consumer behaviours towards food waste. In this scenario, some MS have devised specific approaches and policies expressly aimed at reducing, preventing and improving the management of food waste while others still need to substantially progress their strategy and tools. The adoption of national food waste prevention programmes/strategies in every EU Country on the basis of a common EU framework could stimulate the progress towards the aim of halving food waste by 2030 as foreseen by the SDG 12.3.

Innovative packaging

Promoting R&D in the field of food saving packaging

The EC should ensure that policies and legislation on packaging take account of packaging's role and contribution to (food) waste reduction and sustainability. Support and incentives for R&D in the field of food saving packaging could also stimulate innovation in this field. The EC in close collaboration with innovators and packaging companies should stimulate research, innovation and market uptake of innovative food saving packaging.

Packaging plays a pivotal role in preserving and protecting food as it moves through the supply chain to the consumer. If properly used, food packaging can provide benefits to prevent food waste by:

- ensuring product safety, quality and freshness during its shelf life;
- extending product shelf life (e.g. innovative packaging materials and technologies, such as modified atmosphere packaging and oxygen scavengers);
- protecting product from physical damage and other deterioration (e.g. oxidation);
- preventing contamination ensuring food safety;
- providing information on storage and use conditions, and smart label indicators (temperature/use-by date/ripeness/freshness/ easy to empty packaging).

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