HLPE consultation on the V0 draft of the Report:

Food losses and waste in the context of sustainable food systems

From 23 December 2013 to 31 January 2014


– Collection of contributions received –
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In November 2012, the UN Committee on World Food Security (CFS) requested the High Level Panel of Experts on Food Security and Nutrition (HLPE) to conduct a study on Food Losses and Waste in the Context of Sustainable Food Systems. Final findings of the study will feed into CFS 41 Plenary session on policy convergence (October 2014).

As part of the process of elaboration of its reports, the HLPE now seeks inputs, suggestions, comments on the present V0 draft. This e-consultation will be used by the HLPE to further elaborate the report, which will then be submitted to external expert review, before finalization and approval by the HLPE Steering Committee.

HLPE V0 drafts are deliberately presented – with their range of imperfections – early enough in the process, at a work-in-progress stage when sufficient time remains to give proper consideration to the feedback received so that it can be really useful and play a real role in the elaboration of the report. It is a key part of the scientific dialogue between the HLPE Project Team and Steering Committee and the rest of the knowledge community. In that respect, the present draft identifies areas for recommendations at a very initial stage, and the HLPE would welcome any related evidence-based suggestions or proposals.

In order to strengthen the related parts of the report, the HLPE would welcome submission of material, suggestions, references, examples, on the following important aspects:

1. How to measure Food Losses and Waste (FLW)? FLW can be measured from different perspectives (weight, caloric and nutrition value, monetary value…) with different approaches presenting pros and cons, and methodological issues. Do you think that the V0 draft covers properly the aspects of FLW measurements, including nutrient losses? Is there additional evidence about estimates of past and current food losses and waste, which would deserve to be mentioned?

2. What are the key policy aspects to reduce food losses and waste in order to improve the sustainability of food systems, in different countries and contexts? Is there evidence about the potential of economic incentives, and which ones (taxes, etc.)? What margins for policies in the context of food safety laws and regulations, such as expiration dates?

3. Can respondents submit concrete initiatives or successful interventions having reduced food losses and waste, currently taking place, conducted by governments, stakeholders, private sector, civil society?

4. What is the cost-benefit potential (and barrier to adoption) of different options, including technologies, to reduce and prevent food losses and waste at different stage of the food chain?

5. Cold chains and cold storage (including adaptable low-cost technologies for cold storage such as evaporative cooling, charcoal coolers, zeer pots, etc): what could be cost-effective and adapted solutions to reduce food losses and waste and to improve the sustainability of food systems, given the diversity of national contexts?
6. Systemic approaches and solutions to reduce food losses and waste: Reducing food losses and waste is a matter which concerns the coordinated joint action (and change) by many actors, producers, retailers, consumers, private sector, governments. Which systemic solutions/approaches would be the most effective to reduce FLW, towards more sustainable food systems? At that systemic level, which drivers would create leverage for radical change?

We thank in advance all the contributors for being kind enough to read and comment and suggest inputs on this early version of the report.

We look forward for a rich and fruitful consultation.

The HLPE Project Team and Steering Committee.
Contributions received

1. Selina Juul, Stop Wasting Food movement Denmark (Stop Spild Af Mad), Denmark

"How to measure Food Losses and Waste (FLW)?"

To measure food waste, one must define what is considered edible and non-edible food, which varies greatly from country to country.

Solution:

It’s a good idea to create a Food Waste Matrix, where similar types of edible and non-edible foods are gathered into Country Groups, so the definitions of types edible and non-edible foods can vary from Country Group to Country Group.

Sincerely yours,

Selina Juul,
Founder,
Stop Wasting Food movement Denmark (Stop Spild Af Mad) and Winner of Nordic Council Nature and Environment Prize 2013

2. Erick Baqueiro Cardenas, Independen consulter, Mexico

As manager of a small fruit farm, and as head of environmental regional office, I have experienced and witness the waste and discard of first class fruits for the lack of adequate commercialization channels.

SEMARNAT, office of environmental affairs in Mexico has community projects to promote family orchards and vegetable gardens. The projects are adopted by the community, and most families at any locality where they are implemented, are very successful at producing, but when production is at its peak you can see lines of vendors with their products and no one to buy as everybody in the locality produces the same.

These communities are usually a few hours from larger population centers where the products could be sold. It is necessary to promote the creation of collecting, storing and distribution mechanisms.

3. Thinlay Thinlay, Department of Agriculture, Plant Protection, Bhutan

I think food losses have to be separated into two main parts: they are pre-harvest and post harvest losses.

Pre-harvest Loss: this loss occurs mostly due to insects, diseases, weeds or other pest animals. For example, in Bhutan pre-harvest losses to insects and diseases is estimated to be about 10 to 20 % and losses to weeds about 20-30%. But this figures are just estimate and varies widely depending on the crops, environment and stress problems. Another factor, that causes preharvest losses are
untimely rainfall, nutrient stress and extreme temperatures. For instance, loss of potato in Bhutan to early spring frost in some years is almost 100% in high altitude; and there are 100% failure of crop when spring rain is absent in potato growing area. Preharvest loss of rice to broad leaved weeds (Potomegaton distinctus) in Bhutan is about 30% regardless of where rice is grown.

Post harvest losses: these losses occur in store, processing and milling plants, in cooking and while eating. Storage loss of potato to storage insects such as Potato tuber moth in Bhutan is estimated to be about 10-15%; maize storage loss to insects in warmer parts of Bhutan is more than 30%. Milling loss of rice when it is not properly dried is about 20% in Bhutan. Many families in Bhutan waste food while cooking and eating. They tend to cook more than required and ultimately ends up as waste.

What could be done: for preharvest losses and post harvest losses to fungus and insects, technological solutions are there, but requires implementation with adequate resources especially in developing country like Bhutan. while losses in cooking and eating habits need change of mind set and attitude of people which to my mind is the most difficult part. People do not easily give up bad habits and no amount of persuasion or policy measures can change people’s habit. It has to come with education and realization. Therefore, more than a technical solution to food losses people’s education and awareness are some of the most important measures to be considered.

Thinlay
Bhutan

4. Emad Mahgoub Agricultural Research Corporation, Sudan

Does sustainable intensification imply a particular system or philosophy of agriculture? What about the ‘more food’ issue – how much more, what kind of food, produced where and for whom? How much weight does one attach to the ‘sustainable’ as opposed to the ‘intensification’ part? And what happens when ethical concerns such as animal welfare are added to the mix?

It’s not surprising that people have interpreted ‘sustainable intensification’ in different ways. Some have endorsed it because they see it as equivalent with a system of production that already exists; others reject it for exactly same reasons. And many still argue that sustainable intensification is quite simply oxymoronic – the two words in the phrase are inherently incompatible.

Finally, there are some of us who see it as an aspiration of what needs to be achieved – a goal rather than a particular state of play.

First is that increases in food production are necessary but not sufficient. Many observers rightly point out that we already have enough food in the world to feed everyone – and yet people go hungry. They say that throwing more food at the issue is not going to solve what is at heart an economic and political problem: people are food insecure because of unbalanced power structures, because they cannot afford or access food or the necessary inputs for the means of production, because the shift towards increasingly resource intensive diets diverts essential resources from poor people, and because food losses and waste – the consequences of poverty on the one hand (poor infrastructure) and wealth (careless attitudes to food) on the other – mean

www.fao.org/fsnforum/cfs-hlpe
that food produced goes uneaten. These problems contribute not only to food insecurity in all its forms but also to enormous environmental problems.

We agree. We emphasise that measures to sustainably intensify food production must be situated within a wider framework for action on food security. We need to see policy makers make concerted efforts to improve fairness and equity in the food system, to reduce food losses and waste and to moderate the growing demand for resource intensive foods such as meat and dairy products.

Nevertheless, we maintain that some more food will still be needed. With an anticipated population of 9-10 billion on the planet by 2050 it is simply too risky to assume that any one set of approaches will suffice. Inertia, time lags and ineptitudes in the policy making process make it inevitable that supply will need to increase. This doesn’t mean that we need to increase food by a certain specified amount, nor that more food needs to be produced everywhere: indeed in some areas the need to improve sustainability means that yield reductions will be needed.

5. Lisa Kitinoja The Postharvest Education Foundation, United States of America

Greetings of the season and thank you for the invitation to submit input on this topic.

I see a wide gap between sections 3.4.1 and 3.4.2 -- I would add Prevention of food losses via improved postharvest handling practices as 3.4.2 and add 3.4.3 for the food safety topic

3.4 Reduction of food losses through capacity building, education, training and extension services
3.4.1 Prevention of food losses by good practices in crop and animal production
3.4.2 Prevention of food losses by Food Safety control procedures

A recently completed USAID funded project in Tanzania provides a comprehensive approach to reducing food losses for small farmers, traders and marketers-- it is called a Postharvest Training and Services Center (PTSC). While the planned Wageningen project is promising, it does not yet exist, while this one is in operation in Arusha, Tanzania under AVRDC auspices.

PTSC launch article


Where Food Comes From website


CRSPS.Net Presentation


Harvesting Nutrition website
Promoting best postharvest practices


Here are a few current references that include additional cost/benefit information and practical field based information.


Attached are two white papers from The Postharvest Education Foundation (one on the use of plastic crates for reducing food losses, one on data collection/loss assessment) and an unpublished preliminary Hort CRSP project report with more information on the PTSC concept and its current status.

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6. Lisa Kitinoja  The Postharvest Education Foundation, United States of America

Here is a link to a new article that may provide input for the topic of capacity building and extension:

**OPPORTUNITIES FOR INTERNATIONAL COLLABORATION IN POSTHARVEST EDUCATION AND EXTENSION ACTIVITIES**

Adel A Kader  
http://ow.ly/r1pkU

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7. Mignane Sarr, Conservateur AMP Saint Louis, Senegal

Le niveau de vie de plus en plus développé participe à la perte des aliments dans la mesure où il faut satisfaire les besoins de plus en plus énormes en terme d'alimentation des communautés. Cette exigence fait appel à des techniques de transformations qui participent à la dégradation rapide des aliments à cause de l'utilisation des produits chimiques. La plupart des communautés ne maîtrisent pas les conditions d'utilisation de ces aliments ou de conditionnement de ceux-ci qui engendrent des pertes considérables. Il est donc urgent que les produits ou limants mis à la disposition de certaines communautés qui ne les utilisent pas de façon optimale puissent être envoyés vers d'autres horizons qui en ont besoin car ils assurent difficilement les trois repas. Je considère donc que c'est un problème de répartition de ces nourritures dans l'espace. A quoi bon de produire sans pouvoir utiliser correctement, de stocker des aliments qui finiront dans des poubelles.

Il est important de faire une étude diagnostique des besoins avant de produire et de penser à transformer. N'est ce pas là une forme d'économie de l'énergie qu'ont nos pays du sud en tant que tellement besoin pour faire décoller leur économie. Cette énergie dont nous parlons assure en outre une bonne conservation des aliments. Voila donc un exercice de réflexion dont nous devrons mettre contribuer pour résoudre globalement le problème de perte de nourriture et résoudre localement les problèmes qui se posent et l'en dans nos contrées respectives.

--Cordialement

Cne. Mignane SARR  
Ingénieur Forestier_Agroéconomiste  
Conservateur AMP Saint Louis  
BP:5135 Dakar Fann
8. Judith Appleton, United Kingdom

Re HLPE’s Dec 13 zero draft review of food losses/waste:

**Diarrhoea is also a food loss/waste issue**

There is a **conceptual food-chain issue** that needs addressing if we are to include nutritional aspects of food security in this overview and debate: food losses through diarrhoeas.

Per capita food availability has long been a basic datum when calculating nutritional sufficiency of macro level supply. Unfortunately availability is only the start of the nutritional food chain. Food quality, health status, and quality of drinking water and the sanitary environment all play critical roles in determining how far the food ‘available’, prepared and consumed is actually made use of by the body, or, as in the case of episodes of diarrhoea in which food is excreted before the intestine has had time to extract nutrients from the mass of food presented in the gut, fails to be utilised. Food loss due to diarrhoea can amount to 100% in rapid-transit cases during cholera presenting with violent vomiting and diarrhoea. In communities where children in particular are prone to one or more bouts of mild to moderate diarrhoea per fortnight (the usual question posed in surveys) the children’s personal food security could be compromised by 15 % or more over time.

Understanding this link between food security and gastro-intestinal health should prompt consideration in a food-loss/waste reduction strategy of advocacy for, if not actual collaboration with, increased activity in the domestic water and sanitation sector. This could raise the potential for retention of ‘available’ food in the body long enough for maximum nutritional extraction.

WHO suggests there are 1.7 billion cases of diarrhoea every year (2013), mainly in young children and of those mainly during or after weaning. Figures on food losses are scarce. A notional calculation suggests that even at only 3 days of 10% of energy losses in under-five diets of 1500Kc this amounts to a total annual energy loss/waste equivalent to 225,000,000 MT of grain worldwide. Given that the caseload includes adults, persistent diarrhoeas due to disease, and vomiting as well as diarrhoeas in cholera cases, the actual total waste will be larger than this.

Other readers, who are not buried in rural France for the holidays and have better access to data than I have currently, are encouraged to contribute here their own or any data on food losses during diarrhoeas, in order to complement the WHO references below and build the case for recognition of and collaboration over diarrhoea reduction for increased food security.

**References:**


WHO, April 2013, Diarrhoeal Disease, Factsheet 330

9. Kehkashan Basu, UNEP MGFC, United Arab Emirates

I am the Global Coordinator for Children and Youth at UNEP MGFC and actively involved in the 10YFP initiative on SCP. On World Environment Day, UNEP launched its Think.Eat.Save campaign which essentially strives to engage all stakeholders in reducing food wastage simply by being
aware about the problem. About the one-third of the world's food production is either lost or wasted while thousands, especially young children, die of hunger each day. There is something essentially flawed about the supply chain --- from the farm to the fork delivery mechanism must be made more efficient. The developing nations where most of the food gets produced, supply more than what is required to the global north, for pure economic reasons. This results in tremendous wastage. Urban societies produce copious amounts of waste, many times higher than rural and agrarian societies. Distribution of food needs to equitable in sync with the population and not skewed towards economic profit.

Developing nations also require proper supply chain equipment and there needs to be investments from developed nations into this sector to ensure that food doesnot get wasted while in transit.

Civil society has a defining role to play in controlling food loss and waste generation, especially by controlling its consumption patterns. According to statistics from most surveys, our region’s main economies, rank in the top-ten worldwide in terms of per capita solid waste generation. The gross urban waste generation quantity from Middle East countries has crossed 150 million tons per annum. A majority of this ends up in landfills which is not only costly but also a loss of recycling opportunity. By promoting sustainable consumption patterns within civil society we can positively impact the quality and quantity of residential waste which in most nations constitutes the lion share of total waste.

10. Lizzy Igbine, Nigerian women agro allied farmers association, Nigeria

Reduction of food looses and wastes, Suggestion on use of Systemic approaches. Food looses and Wastes occur along the value chain system. It is a graduating loose as it occurs most frequently at each point along the chain. Total numbers and quantities of food produced by farmers are lost by Farmers, Retailers, Consumers, Private sector and Government. This is because of poor cordinaton along the value chain and poor practices by each player. There are also gaps between each player that are left out unfilled. These are broken lines example is the gaps between the farmer and retailers, between retailers and consumers, and between Private sector and Governments.

These Gaps show looses occuring and opportunities lost in either missing out on job creation, income earning, wealth creation and growth and Development.

To correct this anomaly, there should be a revisit of the value chain system and actors to create room for expansion of responsibility, re-allocation of roles, and modification of actions and interventions.

The Systemic approaches stands the chance of completely reducing food looses and wastes as each line in the chain is involved visited and restuctured.

Government roles are broken and not as well cordinated as it should be, and so the required interventions and activities of Government are centered on publicity. Policy sommersault and poor management in the Government system makes it difficult for the right people to benefit. This also creates huge looses along the value chain.
Practically the farmer and farmer organisations are not been used as agents of change and interventions not based on applicable evidences are not to be suggested or adhered to as such practices are also loosees and wastes along the value chain.

Looses and wastes which are calculated as between 60% and above in Nigeria is alarming and a huge loosees which consequences are poverty amongst farmers. By training and sensitization campaigns these loosees can be reduced.

11. Pratiksha Shrestha, Nepal

Food Technologist can play vital role in minimizing food loss and waste. Post harvest technology, Product diversification, by product utilization and different methods of food preservation technology can best address the food loss and waste.

for eg. if there is 30% post harvest loss in wheat grain, we can reduce it to below 10% by applying appropriate post harvest technology. we can make further process wheat flour to make noodles, and utilize by product like broken noodles for making another variety of snacks.

Similarly, different food preservation technology like, pickeling, salting, brining, fermenting, syruping, freezing, freeze drying, powdering etc. can help reduce the the food loss and waste.

My, concern is to focus in above technology with awareness about importance of reducing food loss and waste in alongways.

12. Ngouambe Nestor, Cameroon

Je pense que les pertes post-récoltes sont causés dès la phase de production d'une culture. la qualité de la semence, la manutention à la récolte, la manutention après récolte sont autant de facteurs à prendre en considération. en 2008, j’ai mené une études sur les pertes post-récoltes de la filière tomate à l’ouest du pays et il a été constaté que les pertes sont d’environ 30% lors de la mise en cageot à cause de la mauvaise manutention. les pertes liées au transport étaient d’environ 10% et plus de 35% étaient perdus sur les marchés de détails à cause des mauvaise conditions de conservation et des méventes.

Une des stratégie de réduction des pertes post-récoltes dans les filières céréales et racines et tubercules est de renforcer les capacités des producteurs aux techniques de conservation et surtout de transformation. Dans la région du centre Cameroun, la transformation du manioc en plus de 20 produits dérivés a permis de réduire considérablement les pertes post récoltes dans cette filière. de nos jours moins de 10% sont perdus.

13. Government of Afghanistan

Comments on the Zero Draft of High Level Panel of Experts (HLPE) on Food Losses and Waste in the Context of Sustainable Food System (from Abdul Razak Ayazi, Agriculture Attaché, Afghanistan Embassy, Rome)
The early submission of the Zero draft, albeit with its imperfections, is appreciated because it gives the Team responsible for the study sufficient time to reflect on the comments received through e-Consultation and be able to produce a good First Draft.

I read the Zero Draft with interest. Probably the Team is unaware that reducing food losses and waste in the Near East and North Africa is on the agenda of the Near East Regional Conference which meets from 24-28 February, 2014, in Rome. However, the background document on the subject has not yet been released. So I do not know what its contents would be.

The two major shortcomings of the Zero Draft are: (a) inadequacy of the section on Conclusion; and (b) the absence of concrete Recommendations which we are informed is still work in progress. We shall deal with these two shortcomings later.

Our overall response to the Zero Draft submitted by the Team is cautiously positive.

In our opinion the following are the satisfactory features of the Zero Draft:

- It is adequately researched, both from the technical angle and one can also say from the policy dimension;
- Judging from the huge numbers of references mentioned, it is undoubtedly evidence-based and some of the explanatory boxes are useful;
- The structure of the Zero Draft can be considered as satisfactory;
- The conclusion, which still needs to be beefed up and polished, is to a large extent in line with the issues discussed in Chapters 2 and 3 of the Zero Draft.

In our opinion, the less satisfactory features of the Zero Draft are:

- It does not read well because it attempts to serve as a compendium of available literature on the subject. Our hope was that the study will be a critical assessment of the existing knowledge and the gaps which still needs to be addressed. The compendium aspect can be justified but not when it turns excessive. When it becomes excessive, the focus of the study is compromised;
- The close reading of each sub-section does not give the impression of an indepth assessment. It conveys the impression of amassing information;
- The text of the Zero Draft is definitely repetitive and gives the temptation to stop reading it. The repetition is particularly noticeable between Chapters 1 and 2;
- Often style is also a point for concern. Sometimes too many reference documents are listed to substantiate a point. For example, in paragraph 2 of sub-section 3.5.2 (page 50) out of 12 lines 9 relate to reference material;
- Paragraphs are not numbered for ease of reference.

Structure of the Zero Draft

By and large we can live with the structure of the Zero Draft. However, we wish to see the beefing of the chapter on Conclusion and Areas of Recommendation. We also think there is room for reducing the 19 pages of Chapter 1 (Food losses and waste and sustainable food system: definition, extent and impact) and the 15 pages of Chapter 2 (Causes and drivers of food losses...
/food waste). On the other hand, we feel comfortable with the 22 pages of Chapter 3 (Reducing food losses and waste for sustainable food systems and food security).

There are 17 boxes included in the Zero Draft, some lengthy and some very short and a few somewhat unique (like Box 7 on tray vs a tray-less system). Of this number, only 8 are country case studies of which 6 relate to developing countries. Within the 6 case studies of developing countries, 4 refer to the experience of India. We suggest that boxes should be confined only to country case studies and there should be an equitable distribution of case studies among the developing regions. For example, FAO’s publication on “Household metal silos: key allies in FAO’s fight against hunger” gives some good examples of affordable silos at household level in several developing countries. There is a fairly good case study on Afghanistan published by United States Agency for International Development entitled “Case study of poultry and grape/raisin subsector in Afghanistan” dated March 2008 and available on the web. AGS, AGA and FII should be consulted for good country case studies.

Introduction

The Introduction is acceptable, though we suggest inserting the statistics in lines 41-48 on page 6 and in lines 1-2 on page 7, after line 9 on page 6.

1. Food Loss and Waste and Sustainable Food Systems: Definition, Extent and Impacts

In sub-section 1.1.1, the discussion on existing conceptual approaches to food loss and waste as shown in lines 16-37 needs to be presented in a more simple language for the average reader and then it should spell the rationale of why the harmonization of definition, methodologies and measurement is so important.

Definitions are always contentious and so is the one listed in lines 17-20 on page 9. What troubles us is the two words “originally intended” on line 18 of page 9. To us this implies that grains intended for human consumption but used to feed animals is not considered as a loss because it eventually is converted into meat and milk to meet human needs. But, such feeding is actually transforming (x) quantity of nutrients from grains to less than (x) quantity of nutrients from animals for human consumption. Also grains and oilseeds intentionally produced for conversion into ethanol or diesel will not be considered as food loss.

We are hesitant to agree with the term “originally intended” and consider both propositions (grains intended for humans being fed to animals; and using grains as fuel feedstock) as losses from the point of view of food security, especially when close to one billion people in the world go hungry. It is like taking it away from the poor and giving it to the rich which eventually leads to social disorder.

For the definition of food waste, we would feel comfortable to see the text after “discarded” eliminated (lines 19-20, page 9).

On the question of measurement of losses and waste, we consider all figures in the Zero Draft as rough estimates with wide margin of error and therefore fully agree with the proposals put forward for harmonization of methodologies under sub-section 1.1.3.
In Sub-section 1.2.1 (sustainable food systems), it is acceptable to reflect on different perceptions of food systems but it is equally important for the study to make a definite choice among different definitions of sustainable food systems, perhaps by the rephrasing of the text on lines 24 to 31 on page 11. Moreover, we find the language of the sub-section to be a bit obfuscated. Incidentally, it is very strange that the GSF document (second version) does not provide any definition for sustainable food system.

We are comfortable with the contents of sub-sections 1.2.2 to 1.2.5 because it is basically the review of available literature, though at times it is a bit of philosophizing, e.g. line 19 to 30 on page 14. By the way, why is table 2 on page 15 restricted to countries with population of more than one hundred million?

We consider the information and analysis of sub-sections 1.3.1 to 1.3.4 as useful and appreciate the contents of 1.3.2, especially table 2 (Impact of losses and waste), as well as of 1.3.3 which includes useful information on the impact of food losses and waste from the well recognized four dimensions of food safety and nutrition. We appreciate the contents of 1.3.4 (Environmental impacts) but wish to point out that there are no references to the work of IPCC, especially the impact of food losses on biodiversity as well as waste management. One or two short paragraphs on IPCC findings will enrich the section.

2. Causes and Drivers of Food Losses/ Food waste

We are fairly satisfied with Chapter 2. All stages of the supply chain are sufficiently covered. However, the examples of losses in pre-harvest and harvesting stages are overwhelmingly from developed countries and not developing countries where the problem is most severe; and that is a drawback to be amended.

In sub-section 2.1.3 (storage stage, pages 29-31), it is disappointing that no examples are mentioned of some successful experiences of on-farm storage in developing countries (please contact AGS for getting some examples).

Sub-section 2.1.4 (processing, page 31) is somewhat disappointing. Food processing is a promising area for development in most developing countries, including opportunities for exports. We would like to see this sub-section strengthened considerably with both successful and not successful examples from developing countries. AGS may be able to provide the experience gained from developing countries. The work conducted by the Asian Institute of Technology on post-harvest losses and consumer food waste should also be visited for successful examples in Asia and the Pacific region.

We consider sub-section 2.1.5 (Distribution stage), sub-section 2.2 (Causes of nutritional losses) and sub-section 2.3 (Systemic causes of food losses: economic development/regional) to be adequate, though 2.3.2 (lack of credit market/institutions) is far too short, given its critical importance in building infrastructure for reducing food losses.

As highlighted in sub-section 2.4, it is true that food waste is the luxury of the rich and this is well demonstrated in pages 36-41. Since there is also food waste in low and middle income countries, the Team should make an effort to provide some information on food waste in selected developing countries.
3. Reducing Food and waste for Sustainable Food Systems and Food Security

We subscribe to the general recipe mentioned by the Team for developing and developed countries (lines 23-31 on page 42) and also lend our support to the idea of culture-specific innovations and technologies across the food supply chain to reduce food losses (line 1-2 of page 44). We most welcome the emphasis by the Team on the cold chain management of perishable food as stated in lines 25-26 of the same page.

On cold storage (sub-section 3.3), there has been progress in some developing countries, especially China and India, but not in many other developing countries. So there is room for opportunities to be exploited, especially by establishing Group Owned Cold- Storage Facility at the village or district level.

Building capacity at national and local level for food loss prevention is of course critical and the Centre of Excellence for Post-harvest Food Losses (CoE) in the Netherlands is a welcome initiative (Box 5, page 47), though not yet put in place. So is the campesino a campesino initiative in Latin America. One can also consider South-South Cooperation as another venue of knowledge sharing among developing countries in food losses and waste. At the national level, we also attach importance to the synergy between advocacy, education and legislation in reducing food losses and food waste.

We are not impressed by the content of sub-section 3.7.1 (Economic aspects). It is somewhat pedestrian and even inconsistent. On one hand, it says that cost-benefit analysis be vigorously conducted (line 16-23 of page 54). On the other hand, the text on page 54 leaves the reader with the impression that due to lack of data, cost-benefit analysis may not be feasible. That is why empirical studies are required (lines 9-15, page 54).

We highly appreciate the narrative on Food Banks given in pages 56-58. Please recheck the statement in line 58 of page 57 to the effect that WFP no longer accepts donation of food surpluses. To my knowledge, this is not the case, though WFP prefers cash donation over commodity donation.

We fully support the notion that campaign against food waste (pages 51-52) should include all the four areas: awareness, innovative technology, cooperation among stakeholders and social innovation.

We welcome the crucial role of women in reducing food losses and waste (pages 52-53) and suggest the further expansion of sub-section 3.6 with particular emphasis on the role of women in pre-harvest, harvest and post-harvest phases. The experience gained by FAO and IFAD can be used to strengthen this section.

4. Conclusion and Potential Areas for Recommendations

The one and half page Conclusion needs to be revised drastically with a view to extracting the major findings (challenges, constraints, potential) as mentioned in Chapters 1, 2 and 3. In our view, the current text on Conclusion falls short of expectation. It is also advisable that for each element covered in the Conclusion reference be made to the paragraph number in the body of the report. Incidentally, the last paragraph of the Conclusion will fit well in the Introduction of the Zero Draft as a challenge. It does not fit in the section on Conclusion.
We can understand that sub-section 4.1 (Areas of Recommendation) is still work in progress. At present, there are 7 paragraphs in this sub-section and we assume that each paragraph will be crystallized into a recommendation. We would feel comfortable if the recommendations are kept limited in number; making sure that they are pertinent and that their implementation can be cost-effective. Recommendation should address food losses and waste in all the key stages of the food chain.

We would most welcome specific recommendations by the Team on: improvement of methodology and quality of data; capacity development at national and local level; technology transfer to the primary producer/operator; strengthening extension services to combat food losses; tailored training programmes for women to prevent food waste; and the strengthening of food banks.

14. Lisa Kitinoja, The Postharvest Education Foundation, United States of America

Greetings and Happy new Year... Input for the draft report:

A few years ago I led a postharvest food losses study for the Gates Foundation, and we took a look back at 12 "agricultural development projects" funded by the World Bank, USAID, USDA, JICA, etc. to see what had worked or did not work in terms of helping smallholders in developing countries to reduce food losses. More than 45 scientists from a dozen countries participated in 2 years of field research including face to face interviews of past project beneficiaries and managers in 6 countries (Egypt, Kenya, Ghana, Indonesia, India and Rwanda).

The report summary can be found online here:

BMGF Appropriate Postharvest Technologies project (WFLO 2009-10)

The key recommendations are as follow:

Building on Lessons Learned

Future projects should incorporate the major lessons learned from the 12 projects that were revisited by our WFLO/UC Davis postharvest teams, and the results of our 30 commodity systems assessments and 24 postharvest losses and quality assessments.

1) Focus on the Beneficiaries

Many of our assessments pointed to the need to advocate agri-business skills, attitudes and aspirations.

- Treat farmers as agri-business people rather than just as farmers. Rural youth are especially interested in developing business and entrepreneurial skills.
- Ask smallholder farmers to consider issues beyond their farm plots – address the entire value chain, take more responsibilities in return for additional opportunities for profit making
• Deliver targeted training or agricultural extension services that help improve the quality of produce, postharvest handling and marketing linkages.
• Provide training in local languages, incorporate audio-visual training aids
• Aim to be not only more productive but more profitable.

Many of the most successful past projects assisted farmers to become active marketers, rather than passively waiting for a trader to arrive at their farm gate and offer a price. When farmers were willing to take on more responsibility for their crops and become direct marketers, by learning how to grade, pack, handle and sell their produce directly to the retailer, they also gained more of the financial rewards.

2) Work through Groups

Whether via informal groups, co-operatives or formal associations, it is vital to work with groups to impact policy and reach large numbers of people.

Groups are the key to:

• Assessing local needs, facilitating targeted training, introducing new crops and technologies
• Improving communication in order to strengthen marketing capacity and market linkages
• Managing contracts and sales beyond capacity of individuals.
• Gathering and incorporating farmer feedback to assist in measuring the effectiveness of interventions
• Building privatization efforts (moving from project provided services to community provided services)
• Development of financing opportunities (micro-credit, creative schemes)
• Designing appropriate, cost effective innovation delivery systems (providing people with the information and skills they need, when and where and in a way they can best understand and use it).

The CSA process we used to gather information on commodity systems during this planning project can be inexpensively and effectively applied to reassess the progress of farmer groups as they try out and adopt or reject new postharvest technologies.

Recent grants from the Bill & Melinda Gates Foundation for micro-finance ($38m) will allow 18 institutions to expand their portfolios, and reach more smallholder farmers.

3) Women’s issues remain important

Access of women to credit, training and extension services remain lower than that of men. Ideas for improvements include:

• Increasing the number and percentage of women hired and trained as extension workers
• Holding training programs and extension meetings close to the homes of women so they can attend more easily
• Holding meetings/trainings in the afternoon since women have a lot of household and farm work to take care of in the mornings
- Offering trainings via video, posters, discussions, role playing, etc (to increase accessibility and relevance for those who are non-literate).

Many of these issues were recently highlighted by a report from the World Food Programme (2009).

4) **Postharvest best practices** should be incorporated early on in projects.

Identifying appropriate interventions is the first step key, since barriers affecting adoption of postharvest interventions include complexity, availability and perceived costs versus benefits. Having a year round supply of vegetables could improve the nutritional status of rural families, and especially for young children and their mothers.

The World Bank estimates that 20–25% of the global disease burden for children is due to undernutrition (World Bank, 1993). Postharvest technology is an important part of achieving food security. According to the UN, Food security is typically subdivided into three components: (i) availability, or the existence of an adequate and stable supply of food; (ii) access, or the ability to obtain (physically or economically) appropriate and nutritious food; and (iii) utilization, or the ability to consume and benefit from nutritious foods (UN, 1996).

Postharvest best practices include:

- Clean and efficient sorting, grading, packing, cooling, storage
- These topics should be addressed via agricultural extension and related to infrastructure development and technology improvements
- Past project assessments revealed that most of the postharvest activities implemented in the assessed projects were too few and too late.

Work is on-going by our economic team members to develop an "expert system" for decision making regarding when to use which postharvest technology for what crops. Key decision making inputs include how the technology can affect postharvest losses, shelf life and market value for a specific crop, and what the technology will cost in a specific location.

5) **Invest wisely in postharvest infrastructure**

- Make investments early in the project (on the farms, at packinghouses, for transport or storage, as well as in the markets).
- Develop the infrastructure to enhance their agri-business (consider location, access, costs, etc).
- Match the facilities (cost, size, scope) to local needs and management capabilities.
- Develop and enhance horticultural value chains by improving communication
- Deliver training to ensure that infrastructure is utilized and maintained properly.
- Build in sustainability by using rational business models for providing businesses services (fee for service)

Training in postharvest horticulture increases readiness and willingness to make changes, but if postharvest infrastructure and marketing support is not there for participants, the results of training can be frustration. Similarly, providing infrastructure without training can be a disaster waiting to happen— successful postharvest management requires complex knowledge and skills.
Improving communication regarding pertinent information (i.e. expected weather changes, availability and prices of postharvest supplies, consumer demands, changes in the needs of traders and market prices) will require outreach efforts via accessible methods such as local radio, inexpensive mobile phones, internet kiosks or via visual means (for example daily updated whiteboards posting market prices).

6) **Build local capacity (strengthen institutions, human resources, community services)**

Training should leave behind a cadre of local trainers and support service businesses to continue the work that is started by a development project. Capacity building includes:

- Postharvest technical and educational program development, especially targeting women and rural youths
- combining lab research with adaptive on-farm or market based fieldwork
- training of master trainers
- network creation (helping members of the value chain meet and get to know each other)
- resource identification and strengthening of support services (local postharvest suppliers, repair services, engineers, credit)
- Building functional local capacity seems to have a strong relationship to sustainability
- Designing appropriate innovation delivery systems depends upon first developing this local capacity.

We recommend that future projects include Commodity Systems Assessment (CSA) as a methodology for training extension workers — the CSA process requires them to work as a team, learn by doing, study all the details on the local commodity system, meet key players, decision makers, producers, postharvest handlers, processors, marketers, and understand the value chain from field to fork. The original CSAM manual is available online from the UN FAO inPHo website (LaGra, 1990).

Several of our consultants recommended that future projects include the methodology for mapping and influencing dynamic agrifood markets (includes Value Chain Mapping) as one of the first steps of any new development project. The manual is available online from [www.regoverningmarkets.org](http://www.regoverningmarkets.org) (Vermeulen et al, 2008).

Hall and Devereau (2000), when studying low cost storage for sweet potatoes in Uganda, found that a combination of lab research centered at modern institutions and a adaptive research fieldwork based approach could be used to improve results and speed the technology validation process.

7) **Projects should have a longer term focus**

- A longer project cycle (7 to 10 years) would increase the likelihood of sustainable results.
- Projects that follow up on evaluation based recommendations (such as those provided in this report) can achieve good results.
- Horticultural development project plans should be flexible enough to allow for adjustments during implementation

8) **Promote an Integrated Postharvest Management System**
Our final recommendation is to promote an integrated postharvest management system beginning with "training of master postharvest trainers".

One of the unplanned side effects of this planning project has been to raise the expectation of potential target groups, since once they learned a little bit about how postharvest technology can help improve their livelihoods they actively have been seeking more information and requesting future training. Direct requests have already been made for:

- Training in the establishment of cool chain management for horticultural crops (Rwanda, India).
- Installation of cool chambers and training of farmers (Rwanda, Ghana).
- Training on simple village level food processing methods (India, Nepal, Benin)
- Training of postharvest trainers (Nigeria, Ghana, Senegal, Cameroon, Kenya, Zimbabwe, India, Rwanda, Sri Lanka, Bangladesh)

The following steps would be required:

- Training of master trainers in each target country – includes training in technical knowledge in horticulture, appropriate postharvest technology, business development skills, cost/benefit analyses, improved teaching/training practices. Master trainers serve to leverage any future training efforts by having a multiplier effect.
- Smallholder farmers could then be locally trained to begin with improving quality on the farm (using maturity indices, gentle handling, pre-sorting, protective packages, and shade)
- Farmers could be encouraged to learn about direct marketing and the many new responsibilities it entails
- Postharvest tools and supplies should be made available for sale at rural postharvest shops (make it easier for farmers to try any new technology)
- Smallholder farmers could be trained to develop decision making skills for utilizing when appropriate, some form of cooling, storage or processing in order to further enhance the market value of their horticultural crops.
- Micro-credit or rent-to own models should be integrated into any outreach efforts.

Initially, the focus of any new development project should be to provide basic information and demonstrations of these simple practices that can reduce postharvest losses. The longer term goal should be to promote the use of cooling and cool or cold storage and transport practices that can protect the investment of the farmers and can further reduce losses. Globally, investments in the cold chain often have been shown to repay themselves in a short period of time (Kitinoja, 2008) — hence the existence of an enormous number of companies around the world that offer services in cooling, cold storage and transport for a fee that is willingly paid by the owner of the produce — and this reduction in waste theoretically allows for three positive outcomes. The grower can receive more for their crops, while the middlemen or marketers lose less during handling and transport, and the consumer gets a better quality product at the same or lower price. By making an investment in appropriate scale postharvest technologies we can therefore achieve a win/win/win situation, where everyone involved in the value chain will benefit. The cool chain simply protects the food supply as it moves along the value chain — so we can end up with more food, of better quality, safer and more nutritious to eat, and at a lower price because we have reduced the level of waste.
15. Ali Meawad Ahmed, Suez Canal University, Egypt

1. Pathological Lesions Survey and Economic Loss for Male Cattle Slaughtered at Ismailia Abattoir

Abstract:

The study was a retrospective abattoir survey, undertaken for a period of one full year at the main traditional abattoir of Ismailia city, Egypt. During the survey, 9880 male cattle were slaughtered and inspected. As a result of postmortem inspections, 8 (0.10%) carcasses were totally condemned and 1456 (14.7%) organs had pathological lesions. Of the 1456 edible organs had pathological lesions; the sum of 1216 Kg was either totally or partially condemned. Based on weight of annual condemned organs, the estimated annual loss was 36480 Egyptian Pound. The gross pathological lesions detected in edible organs were in 117 of heart (8%), in 310 kidneys (21.3%), in 649 lunges (44.6%), in 260 livers (17.9%), and in 120 spleens (8.2%). The present study provides baseline data for the future monitoring of clean meat production in Ismailia abattoir. The condemnation of edible organs represents a significant economic loss to traders and livestock industry.

2. Prevalence, Intensity and Viability of Tissue Parasites Infected Bovine Carcasses at Ismailia - Egypt with Special Reference to their Zoonotic implications

Abstract:

The slaughterhouse represents a key control point of livestock production chain. It could be used to give a full picture about the zoonotic parasitic diseases. Therefore, this article aimed to determine the prevalence, intensity and viability of tissue parasites of bovines slaughtered at the main abattoir of Ismailia city, Egypt. From March 21st 2009 to March 20th, 2010, a total of 10055 cattle, 3811 buffalo carcasses were inspected, followed by parasitological and histopathological examinations. Stool specimens of 1200 farmers were examined for parasite eggs. Results revealed that the total prevalence of Cysticercus bovis was 0.47%, which was higher in cattle (0.57 %) than in buffalo (0.18%). 320 cysticerci were detected in 76 bovine carcasses, of which 103 (32.18%) were alive. The anatomical distribution of cysticerci was 55 (72.37%) heart, 13 (17.10 %) tongue, 7 (9.21 %) masseter, and 1 (1.31%) diaphragm. Hydatid cysts were detected in 106 (0.76%) carcasses. It was higher in buffalo 57 (1.49%) than cattle 49 (0.49%). A total 405 hydatid cysts were detected in 120 carcasses, of which 133 (32.83%) were viable. The predilection sites distribution of hydatid cysts were in the lung 84 (70%), 35 (29.17%) liver, 1 (0.83%) spleen. Sarcocystis macrocyst was detected grossly in buffalo carcasses only in 775 (20.33%). Macroysts were identified to Sarcocystis fusiformis, and anatomically distributed as 403 (49.09%) in esophagus, 333 (40.56%) in tongue, 85 (10.35%) in skeletal muscles. The total prevalence of liver
flukes was 1.94%, which was higher in buffalo (3.23%) than in cattle (1.46%). Fasciola hepatica and Fasciola gigantica were identified. Generally, females showed significantly higher infection rates because of elder ages. In human, taniid eggs were detected in 2 (0.16%), Fasciola eggs 4 (0.41%) in stool specimens. In conclusion, the occurrence of such affections throughout the edible organs reflects their economical and public health impacts in Ismailia province that might be prevalent in Egypt in large. These epidemiologic data could be a base of planning prevention and control programs.


16. Silje Rem, Norwegian Ministry of Trade, Industry and Fisheries, Norway

Our comment is related to fisheries. In some types of fisheries there are problems with discards. This is a type of food waste that should be avoided.

FAO has developed guidelines on this issue: International Guidelines on Bycatch Management and Reduction of Discards (adopted by the Committee on Fisheries at its 29th session in 2011)

http://www.fao.org/docrep/015/ba0022t/ba0022t00.pdf

This issue ought to be included in the final report.

17. Mathilde Iweins, FAO/NRC, Italy

Thank you for this interesting report bringing up key subjects. In general, the causes of FLW as well as the socio-economic impacts of possible solutions to reduce FLW are well covered. But the environmental considerations aren’t reflected enough in the document. Indeed:

1. even if there is a section introducing the FLW impact on the environment, there is nothing on the potential environmental impacts of the solutions to reduce FLW. This is a key question as some reduction actions can have high environmental costs (even higher than the cost of losing/wasting the food). For example, cold chains are presented as one of the key solution to FLW but full cost benefit analysis (including socio, economic and environmental considerations) need to be done to make sure that these are the right solutions. Our team is currently working on such cost/benefit analysis and we will have some results by March. It would be great to introduce these notions at the beginning of the third part and then integrating these considerations when discussing each of the options.

2. the impact on the environment is presented as a side effect of FLW while it should be presented as a potential threat to food security through the degradation of the natural resources agriculture depends on. This is mentioned in the title of the paragraph on the environmental but is not detailed there or emphasized anywhere else in the text. This could be integrated in the introduction and the conclusion of the document.

Finally, in section 1.3.4. you present the inverted pyramid. In the FAO 2013 Toolkit on Food Wastage reduction you will find some environmental justification of the hierarchy presented in the pyramid. Some comparison such as the one between “feeding pigs” and “anaerobic digestion” could be an interesting add on to the existing text.

18. Sofie Bouteligier, Public Waste Agency of Flanders, Belgium

At OVAM (the Public Waste Agency of Flanders) we read with great interest studies on (the prevention of) food waste. Please find below and in attachment some comments to the study, that might help to further develop the study.

**General comments:**

it is not always clear what the purpose of the study is, especially regarding the mentioning of best practices (list is not exhaustive, but it is also not clear on what basis best practices have been selected)

until now, the recommendations are rather vague and mainly point issues we are already aware of. Now that the awareness about food waste is high, policymakers need more concrete recommendations (e.g. how to make possible more coherence between different policy domains that address food issues) so that they can evaluate whether the measures they are taking or planning to take could be successful. Policies regarding the prevention of food waste are already in place in many countries, and there are frameworks that enable policy evaluations, so evaluating existing policies might help to come up with more concrete recommendations.

regarding the question on different sorts of quantifying food losses: it all depends on what the purpose is (what do we want to measure? why do we want to measure it?)

question regarding which actors can make real radical change: in case we really want radical change, it will not come from one specific actor, but from a system change. It is striking how the global food system and how society works is rarely questioned. Wouldn’t it be more useful to think about production - distribution - consumption and how the food system can be changed? If we do not such a rethink, we will probably move no further than small changes, and then radical change will never happen.

Best regards,

Sofie Bouteligier
European and international policy team
Policy Innovation Service
Waste and Materials Management Department
19. Florence Egal, Italy

General comments

The increase in FLW can partly be seen as the outcome of dysfunctional food systems, related to the change in (and distortion of) food systems and diets, and increasing disconnect between agriculture and food consumption/intake. The document should therefore be reframed in a sustainable food systems perspective (as indicated by the title and in the wake of WFD 2013) and emphasize the need to rationalize such systems. Before discussing what food is being wasted or lost, the question should therefore be what food is being produced for what use.

The V0 draft essentially adopts a supply-driven food chain approach and reflects overall the prevailing economic approach, giving insufficient attention to environment and social equity. Consumers (demand) have a key role in limiting FLW and the promotion of sustainable diets (see 3.5.2.) would bring a major contribution. More attention should be given to the determinants of consumer behaviour. Reduction of FLW should not be limited to lowering food prices (see 3.7), but also seen as a means to improve health, quality of life and management of natural resources.

Overall the document does not do justice to the evolution of food systems. FLW is not a major problem in indigenous food systems and all parts of foods (animals and often plants) are/were eaten or re-used. The reference to local food systems (2nd para. p. 14) is well taken, but the issue is why did we depart from/distort local food systems? Shorter food chains (in particular for perishable products) and promotion of relevant indigenous foods, processing and storage practices – including self-consumption and barter - can provide affordable and sustainable solutions. Silos and cold chains are important but should not be seen as the only solution to prevention of FLW.

It is important to avoid over-simplifications and oppose developed and developing countries. FLW drivers are closely linked to socio-economic and rural-urban disparities, as well as culture and geographical context, and vary widely within any given country and/or region (cross-border trade is often discouraged as smuggling, which further contributes to FLW). The institutional dimensions of FLW and related regulations and procedures should be given more attention. We can indeed improve institutional arrangements (see 3.2. p. 45) but we should also acknowledge that existing arrangements are partly responsible of the problem and should therefore be systematically reviewed. The role and responsibilities of both the private sector and civil society should be given more attention.

The prevention of FWL urgently requires and is a major opportunity to promote a much needed partnership between the environment and food security constituencies

I assume the works of Bruce Traill and Tim Lang have been taken into account by the authors?

Specific comments

- 1.2.1.
  - line 4, in environmental issues, please add erosion of biodiversity and degradation of natural resources
lines 24-28, the concept of sustainable diets can provide the appropriate framework for functional food systems.

lines 32 to 45, I was surprised by the reference to WHO? Wording and definitions need to be checked.

Box 2, p. 12, and alternative example could be the consumption of mutton-flap in the South Pacific, which contributes to obesity?

1.2.5.

lines 38 to 48: the wording “high-quality diet” should be avoided when related to diets which generate nutritional problems. Such diets should not provide the basis for food and agricultural planning.

Nutrition is not considered? You may want to refer to the 2011 Chicago Council Report http://www.thechicagocouncil.org/UserFiles/File/GlobalAgDevelopment/Report/Bringing_Agriculture_To_The_Table.pdf?


1.3.3. the importance of international trade, which is only a minor part of the food consumed worldwide, should be put back in perspective.

2.1.1., 2nd para. p. 28, the poor choice of crop varieties is itself often driven by the standardization of raw product and supply of agricultural inputs.

2.1.2. lines 25-26, the determination of quality standards is one of the major drivers of FWL and leads to discarding healthy foods. Do we really need a universal set of standards – which often end up excluding small-scale producers - or locally appropriate regulations?

3.4.1 you may want to include Unmentionable Cuisine – Calvin Schwabe, 19 79 University Press of Virginia, in the bibliography?

3.7.3.

p. 55, consumers should indeed not order too much food, but restaurants should limit portion size and supermarkets be discouraged from promoting “big size” bargains.

re. box 12, you may want to consider explicit reference to the Right to Food?

line 28 p. 56, environmental costs should be mentioned (which is often presented as a brownie point for Food Banks)

20. Violaine Berger, World Business Council for Sustainable Development, Switzerland

Dear colleagues of the HLPE Secretariat,

I first wanted to thank you for providing this opportunity to comment the Zero Draft Consultation Paper on “Food Losses and Waste in the Context of Sustainable Food Systems”. It is a well-structured paper, very useful to understand the FLW issue and its interlinkages with the environmental and socio-economic components of agriculture.

I would just have the following comments/suggestions:
• Page 10: It is a bit unclear why “some inefficiencies or fraction” are not considered as Food Loss and Waste. A short explanation on why each of these items are being excluded would be helpful. In particular, the exclusion of feed from the definition of FLW could be somehow controversial, as meat waste (which is food waste) also represents a waste in terms of feed, and in the end, in terms of land/water/energy use, etc

• Page 10-11: need for harmonized methodology: you could highlight here the Food Loss & Waste Protocol, a project initiated by WRI

• In Section 3 “Reducing Food Losses and Waste for Sustainable Food System and Food Security”: you may want to add a section on the environmental impacts of food loss and waste reduction

• You could also add a specific section on fish loss and waste, as this is an issue that is quite different from the other food waste: a lot of the waste happens through side catches that are then put back to the sea. The solutions are very specific and could be introduced separately.

• In 4.1 Possible Areas of Recommendations:
  o Recommendation 2. The cost-benefit analysis tool should also include what are the environmental costs & benefits of the potential solutions
  o The lack of R&D was mentioned page 43 (“Less than 5 per cent of the funding for agricultural research is allocated to post-harvest systems …”), so increased R&D in this field should be part of the solution.

I also wanted to take this opportunity to let you know that the WBCSD is currently mobilizing its member companies on the topic of food loss and waste reduction. We are participating in the development of the Food Loss and Waste Protocol and are aiming to develop a platform for business action on the topic, gathering companies from different part of the agricultural value chain in order to build more synergies between existing reduction initiatives. I would thus be interested in being kept informed of any FAO-related initiative in this space.

With many thanks and kind regards,

Violaine

Violaine Berger
Natural Capital - Food & Biomaterial Solutions

21. François Delvaux, Entraide & Fraternité, Belgium

First of all, we would like to thanks the HLPE for this Draft zero on such an important topic. Linking Food Loss and Waste (FLW) to sustainable food systems is of utmost importance to us and we are grateful for the work achieved until now. We were equally glad to notice that the report acknowledge that “food wasted while people go hungry is first of all sign of a global food system which does not fulfil its function; whatever the reason. It is a sign and symbol of inefficiency and inequity”. Even though it does not appear clearly in the report, it’s possible to identify the key messages related to FLW. We are welcoming the fact that the report underlines that:

• Reducing food losses and waste would also reduce the pressure on natural resources
• Sustainable consumption is a driver of sustainable food systems
• Food losses and waste can be translated into direct and indirect environmental impacts
• The Role of women to reduce FLW is crucial
• Changes in legislation and business behavior towards more sustainable food production and consumption will be necessary to reduce waste from its current high levels

Nevertheless, we would like to raise some concerns about several points:

• Some major drivers of food loss and waste have been left aside:
  
  o The race to increase yields at any cost through selective breeding has been done, in certain cases, at the detrimental of the nutritional value of the crop.
  o Even if “conversion from plant based resources to meat production or animal products” does not account for FLW, overconsumption (of meat in particular) and changes of habits in food consumption can play an important role in terms of food availability at global level.
  o Even if the report says that “competing needs for food and energy are likely to define the key land-use tensions in the coming decades”, crop that are diverted from food production in order to produce energy are not treated adequately in this report.

These elements are also a symbol of inefficiency and inequity of our global food system, representing a substantial loss and waste of food, and should therefore be addressed by the report.

1. The energy dimension of food and the sustainability of localized food systems: The position regarding energy and localization defended in this report is quite ambiguous: on the one hand, it is argued that “the biggest contribution of local systems to sustainability is probably that they reestablish proximity and contact between food production and consumption thus often giving more value to food, both economic and symbolic, with numerous direct and indirect benefits: more value for producers, better recognition of sustainable practices, indirect incentives to protect farm land against urban spread, and also, especially for fresh products, less need for conservation and transport, thus less energy consumption, and, if well managed (including at consumption level) better nutritional quality”. On the other hand, energy is used as an argument to demonstrate that those arguing that local food systems are the most sustainable are wrong, by putting emphasis on the fact that “on average, only 11% of the emissions generated by food production, half of which being due to the consumers when they shop”. Then again, while acknowledging that “growing urbanization and further globalizations of food markets, with increasing distances travelled by food (including fragile perishables) will make these changes particularly challenging for the sustainability of food systems”, the report underlines that “one reason for losses in the food chain is the increasing distance between the places where food is produced and where it is consumed”. Moreover, this report misses strong arguments in favor of localized food systems as the fact that it is easier to “track energy use and food waste in localized food systems than in highly dispersed and complex food systems at the national and global levels: not only can local communities audit their waste streams with more precision and care than a state or federal entity, but municipalities and regional agencies are already heavily involved in the
management of solid waste streams.” 1. If trade is of utmost importance for food security at global level – trade “compensate for local scarcities of resources and enable a country to spare its resources and manage them more sustainably” –, it shouldn’t prevent this report to make a statement in favor transition towards localized food systems as an adequate mean to tackle the FLW issue.

- Finally, this report assumes that the evolutions of food systems are irreversible. The same goes for the distribution system. That specific position influences the solutions that are proposed and limit the scope of the recommendations. The result is that instead of a report focusing on reshaping our food systems in order to increase its sustainability and reduce FWL, this report focuses on reducing FLW as a means to increase the sustainability of our food systems.

- The recommendations proposed should reflect the need to maximize efficiency, equity and sustainability of the food systems. Alternatives – other than technology, governance, awareness, FLW assessment, good practices … – should be showcased and the role of States should be emphasized – especially in terms of investments in infrastructure such as food hubs, storage facilities, connections between rural and urban area, rural Small and medium agro industries, public procurement for food banks, ...

22. Rick Hodges, Natural Resources Institute, University of Greenwich, United Kingdom

Congratulations on dealing with a very complex subject. Trying to combine both losses and waste is a challenge but then to cover pretty well all agricultural commodities at the same time is a very tough job indeed.

I have a couple of comments.

P. 27 In 26 – postharvest scientists (at least those concerned with cereals) include the process of harvesting in their remit. Basically, they lay claim to the crop as soon as it is physiologically mature. So when estimating postharvest losses they included those losses incurred during the process of harvesting. So a better may of expressing it might be ‘Although the focus of the report is on the losses happening from harvesting to consumption, ...... .

P. 30 In 45 – 55 This paragraph includes loss figures for grain storage that are unhelpful. It is not stated whether they are % grain damage, weight loss or something else. As they stand they look very much like the kind of figures used by FAO before the development of modern loss assessment methods in the late 1970s. My old colleague Peter Tyler has written about the problem of excessive figures for cereal losses (Tyler 1982). From the late 1970s onwards there were several studies and these not only measured the losses but also corrected for farmer consumption patterns (examples De Lima 1979, Golob 1981). Typically, farm storage weight

1 http://www.postcarbon.org/article/1658954-so-much-wasted-energy-rethinking
losses were in the range of 2% to 5%. As a result of the arrival of the larger grain borer in Sub-Saharan Africa in the late 1970s storage weight losses rose to an average of about 10% for those farmers who were affected (Hodges et al. 1983; Dick 1988). However, this is just weight loss and quality losses are potentially important in preventing higher sales. The effect of quality losses were studied by Adams and Harman (1977) in Zambia and later by Compton et al. (1998) in Ghana. In general it could be concluded that quality losses can exceed the financial value of weight losses by a factor of two. A consideration of quality losses is given on the APHLIS website.


Rick Hodges
Visiting Professor of Grain Postharvest Management
Food and Markets Department
Natural Resources Institute
University of Greenwich

23. Government of Switzerland

Contribution to the HLPE consultation on the V0 draft of the Report: Food losses and waste in the context of sustainable food systems

By Switzerland

Congratulations to this quite comprehensive document. Nevertheless, we would like to bring up some issues that could be added or reflected more clearly:
• As mentioned there exists a high uncertainty about the dimension of losses both in physical and in economic terms. Our overall quest remains: we do not really understand the economics of small holder families (composed of many households) in order to understand the rather high losses and the (non-)investment priorities of these economic units.

• In chapter 2.1.3 (last paragraph) the fact that cost of improved storage options as an obstacles for their adoption is pointed out. There are, however, examples were such technologies have been widely adopted and have had huge beneficial impact in poverty reduction and food security (see Fischler et al., 2011 or http://www.sdc-foodsecurity.ch/en/Home/Focus_areas/Post_harvest/document.php?itemID=9562&langID=1)

• In chapter 2.3.2 it says only: “In rural areas of developing countries, credit constraint is one of the primary bottlenecks in investment and adoption of technology to reduce food loss in whole food chain (HLPE, 2013b).” This is not enough. No mention about SACCOS or other forms of traditional credit schemes and their (potential) role or: why do they not lead to higher investments by 44 poor women in food loss reduction should be analyzed and documented.” We agree that these challenges need analysis and further understanding, not just within a household but within larger economic systems (“families”).

• In Africa, countries have committed to increasing investment in agriculture through CAADP framework and this is mentioned in the document. However, as it appears now, the focus is on increasing productivity. These countries need to increase their policy focus on preventing post-harvest loss as well. This dimension has to be given some more attention.

• The FAO (AGS), together with the other Rome-based agencies (IFAD and WFP) with support from Switzerland is in the process of establishing a global Community of Practice (CoP) on reducing food losses in particular at the postharvest stage in smallholder production systems. The CoP will include actors from governments, private sector, research, civil society as well as intergovernmental organizations. It will provide a platform for the exchange of knowledge and experiences on reducing food losses and facilitate concrete collaboration between different actors. We believe that this CoP will be an important complement to the in the report mentioned Centre of Excellence on postharvest food losses (Box 5). The CoP could also be instrumental in regard to several of the proposed recommendations, in particular recommendation 1.

15 Jan 2014

24. Alicia Crespo Pazos, Ministerio de Agricultura, Alimentación y Medio Ambiente, Spain

Please find here the Spanish Strategy "More food, less waste" in English and in Spanish.

English:
25. Pascal Gréverath, Nestlé, Switzerland

Congratulations for this already comprehensive draft document. We propose:

- to include yield gaps in the scope of the food waste definition in order to take into account improvement from better agricultural practices;
- to put more focus on the role of best-before-dates and sell-by-dates in food wastage at consumer level.

26. Judith Hitchman, Urgenci, France

There is no “one-size-fit-all” recipe for building sustainable local food systems, but there are a certain number of key characteristics that are recurrent in successfully building sustainable local food systems, that include a mix of collective solidarity economy-based initiatives, such as CSAs, community gardens, allotments, grow-it-yourself and share, pro-collective local small-scale farmer public procurement policies, re-zoning and protection of land to accommodate urban/peri-urban farming, new forms of collective short-chain distribution systems and small-scale community owned/driven processing units (co-ops and social enterprise are key to this) and many more.

Sustainable food systems need above all to be local and based on a territorial, multi-stakeholder logic. The more community-driven they are, the more sustainable they become, as there is genuine ownership involved. The form that this takes varies from country to country, but there are certainly some constants in terms of sustainable results and virtuous circles. They involve fair prices being paid to local producers, as well as fair wages and social protection for the agricultural workforce (both on farms and in processing units). They equally involve solidarity-based local food kitchens or shops that sell healthy local produce for the socially excluded, or as in the case of CSAs (Community Supported Agriculture), the possibility to include shares at significantly lower prices for those in need. The element of negotiation between consumers and producers and shared risk in CSAs is also a significant aspect that builds solidarity, a key ingredient in any kind of sustainable system. CSAs have developed globally and represent an increasingly significant number of consumers and producers.

The emergence of Local food Policy Councils is one of the keys to taking local diversity and voices into account, and ensuring that both producers and consumers voices are effectively heard.

I have included hereafter various links that I believe are indicative of emerging trends and solutions. They are based on many different regions and several different countries. Although I have not
included any links to initiatives in Brazil, the public procurement and local Feria for small-scale organic farmers are important illustrations of sustainable systems.

There are also an increasing number of Local and Regional governments in France that are paying attention to public procurement that favours small-scale local farmers in sourcing food for school and public authority canteens (Nantes, Poitou-Charentes and others).

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Food Policy Council
http://www.youtube.com/watch?v=-3foJblzhqI&feature=share
http://www.whyhunger.org/portfolio?topicId=37

Sustainable Food Hubs
Ontario (these and many more links available)
http://www.tandfonline.com/toc/cloe20/18/5#.UtqAzvZKGu4
http://www.tandfonline.com/toc/cloe20/18/5#.UtqAzvZKGu4
http://www.sustainweb.org/publications/?id=176

Mapping local food initiatives in Ontario: the interplay between sectors providing a joined-up picture:
http://nourishingontario.ca/wp-content/uploads/2013/04/Appendix_FINAL.pdf

Sustainable Public Procurement in the United Kingdom: Helen Woodcock
http://www.kindling.org.uk/sustainable-fayre-report
Manchester Veg People: growers and buyers coop:
http://www.sustainweb.org/publications/?id=214
Thanks to Helen Woodcock of Kindling Trust

A joined-up regional approach in Scotland:
http://www.nourishscotland.org/
Thanks to Barbara Stütz of Nourish Scotland

Local Authorities and sustainable local food systems
Urban Food network
Eating City: http://www.eatingcity.org/
Local authorities in Japan: http://local-development.blogspot.fr/2010_04_01_archive.html
Making Local Food Work, Plunkett Foundation
http://www.makinglocalfoodwork.co.uk/
Thanks to Ceinwen Lally of Plunkett Foundation

Food waste:
http://foodcloud.ie/
Sharing:
Co-gardening:  
http://www.canadiangardening.com/how-to/gardening-resources/make-a-difference-in-your-community-through-co-gardening/a/29152

Sent as attachments:  
CSM background paper for the FAO Regional Consultations with CSOs and the FAO Regional Conference  
Making Farmers’ Markets Work: Community  
Making Local Food Work: Understanding your Customers  
Introduction of Nourish

27. Susan Atkinson, Woodside Farm, United Kingdom

My husband and I have an 80 hectare farm that has been in my husband’s family since 1919. It has seen many changes in that time and at present is mostly arable and it is also in the Higher Level (environmental) Scheme (HLS).

Systemic Causes

1. How a society views food and how abundant food production is in a country will determine how food is valued and whether or not food waste and losses are regarded as important or not. The UK has a mostly urban population that generally has little or no knowledge of how food is produced. It also means that the UK government wants food to be produced that is afforded by the poorest of the population as comparatively few have the means to grow or produce any of their own food in our society. Unfortunately, this desire has been expressed as food needing to be “cheap” rather than “affordable”. As our society values goods by their price tag, paying thousands of pounds for “designer” handbags etc, food has become devalued in our population’s eyes and so little regarded.

2. This has been matched by the UK’s retail food sector becoming concentrated in the hands of a few large supermarket chains, who have held great power over UK farmers and have driven down farm gate prices to below the costs of production in their race to gain a larger share of the food market by offering customers ever lower prices, at least until the economic downturn of recent years. Their pushing of ever cheaper food has seen our population turn to more and more convenience food in the belief that cheap food equated to good food.

3. At the same time the supermarkets demanded uniform standards for the products they bought from farmers. This was to ensure that the produce could be transported over large distances as their operation became more and more centralised – standardised produce being easier to pack in a mass produced container for transport. The standards were often set in a way that helped the supermarkets make maximum profit from the customer in spite of their claims for being value for money retailers. Apples had to be a size that meant a pound of apples only contained three apples, so a family had to buy more for everyone to have one and cauliflowers were a size that was too large for one person and too small for a family. These practises meant that thousands of tonnes of produce are wasted every year as the supermarkets do not want them. Lately there has
been some movement to supermarkets taking produce that does not fit the contract standard simply because supplies were short.

4. Also the supermarkets promoted “choice” for the consumers so that the customers were faced with products from other part of the world at all times and often could not find the British equivalent even if they wanted it. Strawberries are flown in at the height of the British strawberry season and recently a supermarket claimed that it had to stock New Zealand lamb as no British lamb was available though it was the height of season for British lamb.

5. At the same time it has become the norm for people to eat snacks at their desks through the day rather than take proper meal breaks. Food is regarded more as an inconvenience rather than a necessity. It is known that our workers work the longest hours and yet are the least productive in Europe. When people get home they all too often are too tired to cook a proper meal and so rely on instant meals. The supermarkets have encouraged this by stocking frozen mashed potato, bags of prepared salad (apparently this item is the most likely to be thrown out as no longer fresh), containers containing portions of chopped up fruit and so on. The supermarkets even sell bags of ice cubes!

6. All of these practises and others have led to food being wasted in phenomenally large amounts, all of it representing a great waste of time, non-renewable resources and money. In turn this has led to the UK farming industry becoming highly indebted and under-resourced, both in equipment and farmers, while the country imports almost 40% of its food, much of it from countries where many people are unable to afford sufficient food for themselves and their families.

Food Production

1. Agribusinesses in the UK are forever at the forefront of those predicting vast increases in the world’s population and how farmers will have to produce far more food to feed everyone. This is in spite of aid agencies telling how there is enough food in the world to more than feed everybody but that people go hungry due to the lack of land to grow it and/or the means to buy food. I understand that if food losses were cut to zero there is enough food being produced now to feed several billion more people. These announcements about the need to increase food production are always almost suggestive of the idea that the rest of the world cannot produce any large amounts of food itself. The result is that farmers in the UK set out to produce as much of a crop as possible and are then surprised to find the market is over supplied and they are selling at prices below the cost of production.

2. It is desirable that food is produced to a certain standard of nutrition if to be pronounced fit for human consumption and yet criteria setting the desired standard can be counterproductive, especially to the income of farmers. One example of this is wheat. The standards for wheat required to produce the type of bread eaten in the UK means that every year thousands of tonnes of bread-making wheat varieties grown for the UK market fail to make the grade, the amount failing varying according to each year’s weather patterns. This failed wheat is then re-classified for animal feed and the farmer receives less for it, especially as the UK is an exporter of feed wheat. However, much of this “feed” wheat has high protein levels and as such is still suitable for human consumption elsewhere in the world and is exported abroad for this purpose. Indeed, during the Ethiopian famine of 1984, the aid agencies exported high grade feed wheat to that country as it was both cheaper to buy and yet suitable for the way it would be
cooked in that country. In ordinary circumstances, this sort of wheat can be dumped on markets in other countries, depressing prices for the farmers there.

3. Over-production is not just encouraged in crops but also in livestock. The rising economies of India and China are always being promoted as emerging markets, particularly China. The attitude taken is that the emerging economies will adopt a more western diet as the average income increases and no thought is taken of any potential problems to this theory. A recent farming programme on television featured a Welsh dairy farmer who is planning to greatly increase his herd as he believes UK farmers have to get ever bigger to compete on world markets. He saw China as a vast potential market for dairy products though the fact that Chinese people do not eat items such as yoghurt was mentioned. He was talking about the UK needing to catch up with other countries that were already looking at this, blissfully unaware of the fact that most Chinese adults are lactose intolerant and therefore any market for dairy products is likely to be limited. There is also the issue that even a large dairy farmer would not produce enough quantities of cheese or yoghurt to export directly themselves and just producing liquid milk would hardly be profitable in a country that has seen its own dairy industry decimated in recent years and imports over a million litres of milk every day as it is “cheaper”. For decades the UK farming industry has been subjected to these “race to the bottom” tactics.

4. The drive for “efficiency” (which translates into farmers always reducing costs so the farm gate price can be even lower and big business makes even more profit) also means that the drive is for animals to be housed in ever larger numbers and intensively reared. This is also being applied to the dairy sector, with herds being housed all year round and milked by robots. There is little thought about what such practices are doing to the ecosystem in spite of all the supposed concern about the environment. This farm is in an area that once contained a great many small dairy herds, being part of the region that produces Stilton cheese. The drive to larger herds and falling milk prices meant that farmers gave up their dairy herds (we were one) and now there is only one dairy herd ion this neighbourhood. As the manure from a dairy cow can support up to 200 pounds weight of insects peer year, the numbers of birds also declined due to this loss of a major food source. Also bio-diversity suffered as plant species found in pastures have spent thousands of years being eaten by grazing animals before their seeds have been deposited back on the pasture, with the result that once the animals were removed, the seeds had problems germinating. We are using sheep on this farm at present to spread the rarer plants over greater areas of the pastures. Upsetting the balance of any ecosystem has unlooked for consequences, such as removing species that predate on insects that attack our crops and thus hampering food production unless ever more chemicals are used.

5. It is well known that an over-reliance on artificial fertilisers alone has led to soils being depleted of minerals and trace elements. Now there is concern that the farm machinery is so large it is damaging soil structure, particularly in wet weather. This was especially true in 2012 when the damage caused to many farms means that it would take several years to restore these soils, always assuming weather conditions allow this. As once again the country is suffering from extremely wet weather, this is unlikely. Having relatively small machinery on our farm meant that my husband was able to wait for conditions to be right before combining etc and our soil has not suffered. Yet the land grabbing taking place around the world is for mega businesses to use very large machinery to grow monocultures, which could see soils ruined in a few years. As the world’s climate changes, weather windows to get land work operations completed will be smaller.
Machinery size, labour numbers and farm size will have to adapt to this as the soils must be preserved otherwise average yields will decrease, in effect losing food pre-harvest.

6. Also there is a move to make more and more people dependent on commercially produced varieties of seed rather than continuing the practise of developing their own strains, swapping seeds and growing crops that effectively contain many strains per plot of ground. This traditional way is the most efficient way to cope with climate change, but mega businesses have convinced many governments that their uniform mono-cultures are the most efficient. As governments are mostly or all male while much of the smallholder farming is carried out by women, it is easy for the voice of business to win.

7. Water management is also important, as has been demonstrated by the recent storms in the UK. Rivers and other waterways have not been kept clear, so flooding is more and more frequent in some areas and yet up to December, last year had been very dry and many farms need on farm reservoirs to cope with such conditions. As the climate becomes more extreme, this swinging from wet to drought and back again could become the norm for many areas of the world and the consequences for food production would be enormous.

8. For all the talk about all the world’s population having the right to food and various targets and schemes supposedly aimed to achieve this, the world’s economic system treats food as commodities to be traded in order for a few to make vast profits. Until this is altered so that food is treated as a basic human right, production systems will be manipulated in favour of business interests and the means to produce food, soils, water etc will also be wasted along with the waste and loss of food already experienced.

28. Action contre la faim, France

Food loss and waste -ACF-FR comments on HLPE report

First of all, we would like to thanks the HLPE for this Draft zero on such a complex subject which is also a central topic for food security and nutrition. Linking Food Loss and Waste to the diversity of food systems is important to us and we are welcoming the work done by the HPLE team.

We were glad to notice that the report a underlines that:

- Losses and waste are not evenly distributed around the world. Producer countries and net food exporters have a proportionately higher losses volume and high-income countries, which consume more food, have a high proportion of food wasted.
- “food wasted while people go hungry is first of all sign of a global food system which does not fulfill its function; whatever the reason. It is a sign and symbol of inefficiency and inequity”.
- “It would also allow to better understand who would gain or loose to reduce them, which is key to design appropriate policies and incentives. At global level some analysis have highlighted the fact that losses and waste contribute to higher demand and thus to higher prices.”
- Changes in legislation and business behavior towards more sustainable food production and consumption will be necessary to reduce waste
- Reducing food losses and waste would also reduce the pressure on natural resources
- Women’s role to reduce FLW is of the utmost importance
• The proposition to better integrate food chains and food systems perspectives in any food security and nutrition and agricultural strategy or action.

Nevertheless, we would like to bring up some comments and make propositions

• In all the document; we propose to replace food security by “food and nutrition security” to enlighten the fact that nutrition and the fight against malnutrition is a key objective of the international bodies and policies.

• To insist in the introduction that losses and waste are not evenly distributed around the world, (inequity)

food loss is a key problem for the developing countries (and investments should focus on reduction of food loss in the developing countries through better production, storage and processing, whereas food waste is mainly due to the northern countries (net food exporters)

• recall that the food loss and waste is also an urgent matter because we will need to feed 9 billion people by 2050.

• p14) the distinction between local system and industrialized system is questionable in the given context: we recommend to insist more on the fact that family farming and small holders farmers are not massively contributing to food waste. The question is not only related to carbon print but to the efficiency of the food system to make food available and accessible for consumers. Local food systems have a role to play and local markets for the family farmers should be supported. The nutritional impact will depend on the availability of nutritious foods on the market, the relative prices of nutritious foods and the preferences of the family members who purchase the food. When you quote: “Advocates of local systems also pretend that they generate less FLW. There again it very much depends, on products and contexts.” If you keep this sentence, Please elaborate and mention in which context local food systems generate less FLW.

• P15 could you mention the number of food insecure people in the world and the number of those suffering from malnutrition.

• Figure 2 p 15 regarding the list of the countries in the graph, do you have any figures for sahelian countries, we could guess that the figures would be different and that per capita consumption would no progress according to the same patterns;

• Food safety issues should be reinforced since they are very connected to food storage. Storage is a crucial phase of the food supply chain and could lead to health problems. ACF and CIRAD are currently implementing a study on the potential negative impacts of agricultural project on nutrition. Among the negative impacts of food systems on nutrition, the contamination of Aflatoxins during grain storage pose one of the world’s most significant food safety risks. Aflatoxins is a fungal toxin that contaminates grains and other crops (maize and groundnuts in particular), mainly in developing countries. Aflatoxins is recognized to be highly toxic, even at very low levels. Aflatoxin has proved to favor cancer, illness, malnutrition and death. ACF recommend that the HLPE insist on the potential negative impacts of food processing and storage practices on nutrition (aflatoxin being only an example among others). ACF propose that the report support the design of strategies that control aflatoxin-related risks in the field, post-harvest conditions, and the diet or at least mention the propositions done on this subject (Cf SUN Movement). More generally, the design of food storage policy should be done taking in mind the possible negative impacts on health and nutrition.
29. Slow Food, Italy

Please find enclosed Slow Food's contribution to the consultation "Food losses and waste in the context of sustainable food systems".

The contribution also includes 4 documents:

- annex 1_Slow Food on food sustainability
- annex 2_SFYN_Draft guidelines_Disco soup
- annex 3_SF verso una definizione qualitativa dello spreco (in Italian)

With best regards,

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Slow Food
International relations and fundraising
Piazza XX settembre 5
12042 Bra (CN)

SLOW FOOD’S APPROACH TO FOOD WASTE (question 6)

Reducing food waste is a major challenge and one, which Slow Food is committed to tackling. Slow Food strongly believes that food losses should be kept to a minimum and that it is necessary to restore value to food and sacredness to the moment of its consumption.

In a world where many people do not have enough to eat and resources are limited, prevention and reduction of food losses and food waste must imperatively be given a key place on the political agenda. The system in which we find ourselves as consumers, producers or intermediaries is founded on a mechanism of waste and overproduction and on the rapid selling off of stock to put new products on the market. In other words, waste is no accident; it is organic to the system. World hunger has to be beaten and the war on waste can and must become the emblem of the battle. It is necessary to restore value to the concept of food and, once and for all, stop seeing it as a good (Slow Food, The central role of food, Torino 2012).

Slow Food always frames the fight against food losses and waste in the broader objective of improving the sustainability of the food system. Reducing food waste is one way to raise awareness on sustainable production and consumption as drivers of sustainable food systems.

The issue of food waste has to be tackled throughout the whole food supply chain.

See enclosed the “Slow Food contribution to the debate on the sustainability of the food system” (annex 1) launched in November 28, 2013 on the occasion of the conference “Towards an EU Common Sustainable Food Policy: wishful thinking or reality” that we organised at the European Parliament in Brussels. One of the focuses of the conference was food waste. The topic was discussed by Chantal Bruetschy (European Commission, DG SANCO) and Tristram Stuart (Feeding the 5000).

About FEED and BIO ENERGY

www.fao.org/fsnforum/cfs-hlpe
Turning rejected, unfinished, damaged food, mainly from industry into feed can help to reduce food waste within the system we currently have. Regulated and monitored ways of doing this ensuring health protection are necessary. The risk is to create a value market for damaged, rejected, surplus food and, consequently, this might even be an incentive for producing more since all surplus finds its way into a value market. An ethical approach is to produce as much as food as there is needed for humans and their health. Slow Food pursues this approach by raising consumer awareness and encouraging not to waste food.

From an ethical point of view, turning food waste into bio energy is as problematic as turning food waste into feed. In both cases a proper definition of food waste is urgently necessary. It should be avoided that turning food waste into feed or bio energy creates value markets with attractive prices for waste and does in the end not necessarily contribute to the reduction of food waste but ‘fuels’ the ‘creation’ of waste.

**SLOW FOOD IN ACTION (question 3)**

Over the last years, Slow Food has organized many small and large-scale awareness-raising events (e.g. the Disco soup), implemented and coordinated projects (Presidia, Gardens, etc.), and launched collaborations with other groups (e.g. with Feeding the 5000, Last Minute Market Ltd, EU FUSIONS project) to raise awareness on food waste and propose practical solutions to the issue at producer, retailer and consumer levels.

In particular, Slow Food has developed two sets of tools:

1. **tools** targeted at producers, retailers and consumers aimed at reducing either food losses and food waste by shortening the food supply chain
2. **co-producers-oriented** tools aimed at reducing food waste by changing household consumption patterns

**1. Shortening the food supply chain**

Slow Food promotes and practices local food supply, purchase and procurement. Local food and short supply chains help consumers to understand and learn about origin, production, distribution and value of food. Recognising the value of food is a significant factor for avoiding food waste. Strengthening the short food supply chains, even with financial incentives seems paramount if the aim of consumer education is to be met. Short food supply chain seems to be the most effective aspect of reducing food waste. Everything that has been produced for human consumption by agriculture should be locally made available to consumer. Therefore the retailers should be selling much more local food, including ‘misfits’.

To bring local products onto the tables of schools, nurseries, hospitals, kindergartens and alike would provide excellent food value in terms of nutritional value, the short supply chain would help to save transport costs, CO2.

Civil society can encourage and educate consumers to buy directly however governments have to encourage the retailers to make these products available and to sell them. In order to save food waste consumers have to get access to this kind of products more easily.

On the producers side, Slow Food offers technical support to the **Presidia**, namely groups of small scale producers who safeguard native breeds and local plant varieties, engage in quality

production at risk of extinction, protect unique regions and ecosystems, recover traditional processing methods. There are more than 250 Slow Food Presidia in Europe involving more than 1600 small-scale producers: fishers, butchers, shepherds, cheesemakers, bakers and pastry chefs. Slow Food technical support to Presidia aims to address issues relating to food processing, also to minimise production and post-production losses. More info: www.slowfoodfoundation.com/pagine/eng/presidi/cerca_presidi.lasso?id_pg=11

Through the Alliance Between Chefs and Small-Scale Producer, Slow Food helps link the Presidia and local small-scale producers to local restaurants, so as to facilitate the timely delivery of products and thereby avoid post-production losses. More info: www.slowfoodfoundation.com/ alliance

Presidium products are also sold at Slow Food Earth Markets, community-run markets where local producers offer healthy, quality food directly to consumers at fair prices and guarantee environmentally sustainable methods. Earth Markets are run so as to minimise environmental impact, for instance with waste reduction, biodegradable consumables, recycling, and energy-saving measures. Workshops are also organised at the markets to raise consumer awareness on the importance of eating local seasonal products and reduce food waste. More info: www.earthmarkets.net/

In 2012, Slow Food launched the first edition of the SlowPack prize 2012, held as part of Salone del Gusto 2012, open exclusively to the food producers both from Italy and the rest of the world who exhibit their products at the event. This contest aims to encourage producers to reflect on the impact that non-eco-friendly packaging has on the environment and on the flavor, aroma, and safety of their products, while awarding those who use environmentally friendly packaging.

Slow Food launched the idea of a label that goes beyond the detailing the legally required information, and tells the story behind the product. Slow Food first talked about the narrative label at Cheese 2011, and in 2012 the first 70 labels for Italian and international Presidia were created. A narrative label does not replace mandatory labels, but supplements it by providing additional information regarding varieties and breeds, cultivation and processing methods, areas of origin, animal welfare, and advice on storage and use. More info: www.slowfoodfoundation.com/narrative-labels

2. Awareness raising

Slow Food encourages everyone to become a 'co-producer', a responsible consumer who chooses to enjoy quality food produced in harmony with the environment and local cultures. Slow Food coined the term co-producer to highlight the power of the consumers. When they choose their food they can go beyond a passive role to take an active interest in those who produce their food, how they produce it and the problems they face in doing so. In this way, they become part of the production process and they actively contribute to the reduction of food losses and food waste.

Co-producers support local farmers, fishermen, breeders, cheesemakers etc, not only purchasing their products but also tapping into the wealth of information and advice that they can offer us. In this way we can learn more about quality and increase our understanding of what a healthier, tastier and more responsible diet and consumption mean in our region.
Direct contact between consumers and producers is one of the best ways for this to be able to happen, through farmers’ markets, direct farm sales and Community Supported Agriculture schemes. When direct contact is not possible, consumers can try to seek out retailers who stock local produce and can talk in an informed way about the food they sell (its origin, cultivation and production techniques etc.).

Overall, more than a hundred grassroots events involved citizens and consumers in Europe. These events included conferences in collaborations with other civil society organisations and institutions, practical workshops for adults and school pupils, open-air free meals prepared with products discarded by markets and restaurants, film festivals.

The following are examples of the events organised:

- **“Disco soup”** in Germany, France, Greece and the Netherlands: hundreds of volunteers, mostly young people, collect vegetables that farmers can’t sell because they do not fit the market standards or such that are discarded by markets and restaurants. They rinse, chop and cook them in soups and salads, to the sound of disco music. The free meal is enjoyed together by the participants. See Guidelines attached (annex 2). Consider it is still a draft not for diffusion.

- **Slow Food Day**, Italy: more than 300 Italian convivia (Slow Food local chapters) host free events in piazzas across the country such as markets, tastings, meetings with producers and educational workshops. In 2013 Slow Food Day focused on raising awareness on food waste – and associated waste of energy, water, health and resources.

The 2012 edition of the international Salone del Gusto and Terra Madre world meeting of food communities, held in Turin (Italy), hosted also conferences and practical workshops on food waste (how to reduce waste in the kitchen by reusing as much as possible, looking at leftovers and scraps that are often discarded. Participants learn recipes, tips and ideas, based on a mix of creativity and tradition, for preparing dishes that are just as good as the originals).

Furthermore, Slow Food Italy published 7 booklets on meat consumption, food waste (in collaboration with the Italian Agriculture Ministry), fish and aquaculture, legumes, food and health, food choices and climate change, sustainable food shopping. Another booklet on food waste, “When you shop, use your head!”, is available in 5 languages (English, French, Italian, Latvian and Spanish) and was published in the framework of the project 4Cities4Dev, funded by the European Union.

**Our partners**

In 2010, within the “Torino spiritualità” festival, a conversation on food waste between Carlo Petrini, Slow Food president and founder, and Tristram Stuart, has been organised. At the end, followed a leftovers dinner for thousand people in Torino. Currently, Slow Food is among the organisers of a “Feeding the 5000” lunch in Brussels together with Tristram Stuart.

Slow Food collaborates with Last Minute Market Ltd. to address large-scale retailers in Italy. Last Minute Market Ltd. is a spin-off of the University of Bologna that enhances the recovery of unsold goods in favour of charities, offers services to enterprises and institutions in order to prevent and reduce waste production at its origin.
Currently, Slow Food has been involved in the stakeholders dialogue launched in the frame of the EU FUSIONS project (Food Use for Social Innovation by Optimising Waste Prevention Strategies).

Good practice by ‘Mundraub’ and ‘Marmelade für alle’ (Jam for all’) Slow Food Partners in Germany: young people collecting fruit, nuts, berries and herbs from trees along roadsides, from neglected orchards and making cider, jam and other products from it; there is a number of small businesses, mainly start-ups by young people using ‘culinary misfits’ or fruit and veg that isn’t ‘fit for the market’ because of its looks and size, but perfect in terms of food, nutritional value; also many volunteers’ activities, e.g. ‘garden associations’, working with children, schools using surplus of fruit & veg for preserving and selling it within schools or local food systems.

**Slow Food network**

Within the Slow Food network two national associations, namely Slow Food Deutschland and Slow Food Italia, and the Slow Food Youth Network singled out in the last years for their commitment to fight food waste. Find below a short description of their main achievements.

**Slow Food Deutschland**

In late 2011 Slow Food Germany activated its initiatives on the global issue of food waste and loss. Starting in September, the first action day “Teller statt Tonne” (“on the plate, not in the garbage bin”) combined a free meal with a conference on the FWL issue in a Berlin public square, attracting around a thousand people. Vegetables, fruit and bread used for the preparation of the meal were all “not suitable for the market”, either too small or too big dimensioned, expired since a few days but still edible. The goal was to raise public awareness on this topic and bring together consumers, sustainability oriented organisations and institutions to find possible solutions. In January 2012 in support of the big public demonstration on the CAP called “Wir haben’s satt!” (“We’re fed up!, around 20 000 people attending), a first “Schnippeldisko” (“chopping/dicing disco”) was organised by the Slow Food youth network in Berlin. “Non marketable” vegetables were collected from organic farmers around the city in a city farmers’ market hall on an early evening, then rinsed and chopped by volunteers in order to cook in a soup. The chopping action was combined with electronic music dj sets and attracted around 300 people, mostly - but not exclusively – young people, the majority of whom aged between 16 and 35 years old.

The format of “Teller statt Tonne” and “Schnippeldisko” were successful consumer’s advocacy models. They furthermore represented a direct support for the farmers and attracted the interest of institutional and other non governmental stakeholders. “Teller statt Tonne” gave birth to the collaboration on the national campaign “Zu gut für die Tonne” (meaning, “too good for the garbage bin”) started from the German Ministry for Food, Agriculture and Consumer’s Protection as part of the German governments attempt to cut food waste figures in Germany according to the set EU targets. The Schnippeldisko was replicated during the summer of 2012 (‘Disco Soups’) not only in German cities but all through the international Slow Food young network in France, Greece and the Netherlands.

A specific section on the webpage of Slow Food Germany ([www.slowfood.de](http://www.slowfood.de)) was created on food waste and loss and an informative leaflet with practical advice how to reduce food waste was printed. Furthermore, Slow Food Deutschland started in 2013 an educational project, in order to create food waste activities in primary and secondary schools and a companion for the Schnippeldisko was produced.
All through 2012 and 2013 numerous activities around FWL – large scale with each 1500 to 2000 people involved, as well as local ones with hundreds of people - were put in place, involving several thousands of people in all corners of the German Republic.

**Slow Food Italia**

On May 25, 2013 more than 300 Italian Slow Food convivia hosted free events in piazzas across the country such as markets, tastings, meetings with producers and educational workshops to celebrate the Slow Food Day. This third national Slow Food Day was focused on raising awareness of food waste – and associated waste of energy, water, health and resources.

Slow Food Italia has published, in collaboration with the Italian Ministry of Environment, the booklet “Il nostro spreco quotidiano” ([www.slowfood.com/sloweurope/filemanager/guide/sprechi.pdf](http://www.slowfood.com/sloweurope/filemanager/guide/sprechi.pdf)) addressed to consumers and the document “Towards a qualitative definition of waste” (Verso una definizione qualitativa dello spreco) stressing the difference between the qualitative definition based on the distinction between food losses and waste and the qualitative definition based on the assumption of food as a common good. See document attached (annex 3).

In collaboration with NextdoorHelp, SF Italy launched the first Italian food-sharing platform to fight against food waste while at the same time socialising with the neighbours.

In addition to various ad-hoc conferences and Disco salad events (the Italian version of the disco soup), it has developed a new Master of Taste on “leftovers cooking” and has recently been invited by the Italian Ministry of Environment to join the task force on food waste to work on the National Plan for food waste prevention.

**October 16, 2013: Slow Food Youth Network contribution to fight food waste**

October 16 was World Food Day, an event celebrated annually to mark the day that the UN Food and Agriculture Organization (FAO) was founded. Every year the event has an official theme - in 2013 it was Sustainable Food Systems for Food Security and Nutrition. With this in mind, different groups from the growing global movement against food waste decided to come together and use the day to draw attention to one of the food system’s biggest failures: In a world in which around 870 million people are still chronically undernourished, huge volumes of edible food continue to be thrown away every day.

Food waste occurs at every stage of the food chain, but a significant amount occurs at source. Due to strict cosmetic requirements, reflecting the food industry’s idea of how fruit and vegetables should look, many products never leave the farm, for example over-sized melons, wonky carrots or curvy cucumbers.

Luckily however, due to the growing number of organizations and campaigns working on the issue of food waste, awareness is growing and habits are changing. In recent months, one event in particular has captured the imagination of people around the world: Disco Soup.

**Disco Soup**, with its roots in Slow Food Youth Network Deutschland (Schnippel Disko), sees people, young and old, come together in public places to chop vegetables sourced from local
farms and markets that would otherwise have been wasted; often in huge quantities, always to music. Soups and salads are then prepared and distributed free to the general public. The events have been going from strength to strength with people around the world armed with chopping boards, peelers, pots, pans and disco beats showing that the best thing to do with food that would otherwise have gone to waste is to eat it! Recent highlights include New York, Amsterdam (Disco Soep), Nantes (Disco Soupe), and last week, during Slow Food’s AsIO Gusto, in Namyangju, South Korea (Yori Gamu).

This World Food Day, for the first time, Slow Food Youth Network, Youth Food Movement Nederland, DAMn Food Waste, Disco Soupe, and Feeding the 5000, teamed up for an exciting collaboration to organize simultaneous events, in different cities for what became known as Disco Anti Food Waste Day!

The collaboration was a huge success, with events organized in Belgium, Bulgaria, Canada, the Czech Republic, France, Germany, Greece, Japan, Luxembourg, Macedonia and the Netherlands - reaching a wide audience, the media and even politicians. YFM Rotterdam took part in a record breaking event, cooking continuously for 38 hours, serving 800 people with food that would have gone to waste; while Slow Food Youth in Prague met with students to demonstrate how to easily cook a healthy and tasty meal on just one hob. Meanwhile in Mexico, the Slow Food Network was invited to celebrate World Food Day together with the FAO. In Brussels, Feeding the 5000 used the occasion to officially launch their international campaign against food waste.

30. Government of Germany

General Remarks

Germany highly welcomes the opportunity to comment on the HLPE V0-Draft reviewing policies for reduction of food losses and waste and the challenges and opportunities that they may represent for food security worldwide. Coming from a human rights approach and taking into account obligations embedded within the human right to adequate food, Germany supports the development of joined strategies towards sustainable food systems.

The paper gives a rather good overview over the discussion on food loss and waste (FLW) reduction. It mentions and elaborates on several important problems like different definitions of FLW, data availability and the scope of the discussion.

The overall structure of the report is appropriate. In our opinion the combination of FLW definitions, causes and drivers of FLW as well as solutions to reduce FLW is reasonable, even though there is a quite significant overlapping of contents in several parts of the report. To quote only one example:

- Chapter 2, Page 29, line 11: “Most growers in developing countries lack on-farm cold storage facilities”;
- Chapter 2, Page 29, line 54: “Cold storage facilities are non-existent or inaccessible to the majority of small holder farmers”;
- Chapter 2, Page 30, line 9: “cold storage facilities are rare”;

www.fao.org/fsnforum/cfs-hlpe
• Chapter 3, Page 44, line 45: “The majority of the small holder farmers cannot afford on-farm cold storage facilities”;
• Chapter 3, Page 45, line 4: “For small holder farmers, lack of on-farm cold storage means...”

Besides these we found further repetitions throughout the chapters, which unnecessarily prolong the report reading. Above all it is essential to harmonize the three chapters of the document as constitutive elements by shortening related chapters and thus avoid replications.

Another positive aspect of the report is the well-founded literature base. Almost every section is confirmed by a large amount of up-to-date references and/or data records. Due to this the report delivers an authentic, evidence-based analysis of the topic. From our point of view several chapters provide potential to reduce excessive parts (e.g. 1.2.5 “What are the trends / evolutions of food systems, and related drivers?” or 2.4.1 “Losses in retail outlets”) which also includes the literature information (e.g. 3.5.2, line 24-32).

We found another need for enlargement in chapter 2.3.2 “Lack of credit market/institutions” which consists only of two sentences. There is much more potential for improving this section (e.g. influence of micro-credit in developing countries on the infrastructure and to reduce FLW).

Section 3.7 on “Socio-economic aspects of food losses and waste reduction” is based on too simplistic assumptions. It only considers that food loss reduction leads to higher food supply and to lower prices for consumers. It completely neglects (i) the reaction of producers facing lower prices which could lead to lower production and increasing prices and (ii) the reaction of actors along the food chain processing and trading lower quantities. The latter has to cover the same fixed cost with lower turnover, thus an increase in prices is very likely. Whether there will be a noticeable decrease in food prices or not is not easy to proof – at least it is more complex than section 3.7 suggests.

1. How to measure Food Losses and Waste (FLW)? FLW can be measured from different perspectives (weight, caloric and nutrition value, monetary value...) with different approaches presenting pros and cons, and methodological issues. Do you think that the V0 draft covers properly the aspects of FLW measurements, including nutrient losses? Is there additional evidence about estimates of past and current food losses and waste, which would deserve to be mentioned?

   - FLWL including the definitions of loss and waste is well described and illustrated in a holistic approach. The term “food wastage” as used by FAO covers food losses and food waste along the entire value chain. However, there is a need of clarification in the definition (page 9, line 21+): there is a difference whether a product loss occurs when a product is ready to be harvested or already harvested. Products which are not harvested because they do not meet certain product standards should be either included or not. The definition should be clear in this regard.

   In fact, environmental effects and costs are a very crucial issue (which is already mentioned in 1.3.4) and should be extended and further elaborated. This is why in
addition to measurement criteria for food losses such as weight, quality and economic value, we propose to also look at environmental effects of losses i.e. the ecological footprint summed up over the complete value chain. This valuable approach was applied by the recent study “(Food Wastage Footprint, Impact on natural resources)” from the FAO in June 2013: the study illustrates the impact of food losses and waste on the climate (GHG-Emissions), water, land, biodiversity and economy chances. Example: Post harvest cassava and maize losses in Nigeria correspond to 1.7 million ha of cultivated land i.e. losses ac-count for 21% of the area cultivated with cassava and maize. (See study and further documentation in the endnote “2” of the document).

The environmental impact of FLW is globally important and already covered in a large amount of literature (e.g. Hall KD, Guo J, Dore M, Chow CC (2009) The Progressive Increase of Food Waste in America and Its Environmental Impact). In our opinion the report could give more attention especially to environmental considerations and references concerning the waste management of FLW and in this context questions related to the risks for human health.

We also recommend that a special focus on post-harvest management in changing climates should be addressed by the consultation paper.

- Suggestion to add GIZ as well to the list on page 8, line 46: This is why there is now a strong movement for a harmonization of definitions and measurement (FAO, OECD, EC, FUSIONS, 45 WRI, UNEP, GIZ).

- On page 27, line 26, a better way of expressing might be “Although the focus of the report is on the losses happening from harvesting to consumption...”. Indeed, postharvest scientists (at least those concerned with cereals) include the process of harvesting in their remit. Basically, they lay claim to the crop as soon as it is physiologically mature. So when estimating postharvest losses they included those losses incurred during the process of harvesting.

2. What are the key policy aspects to reduce food losses and waste in order to improve the sustainability of food systems, in different countries and contexts? Is there evidence

Recent publications of GIZ:
Further information:
Global Donor Platform for Rural Development, Postharvest losses and food waste:
Rural21, the International Journal for Rural Development, Vol. 47 Nr. 1 / 2013: Food losses:
about the potential of economic incentives, and which ones (taxes, etc.)? What margins for policies in the context of food safety laws and regulations, such as expiration dates?

- The German National Programme of 2013 (“Abfallvermeidungsprogramm des Bundes unter Beteiligung der Länder”) to reduce waste mentions 34 measures of which 32 are recommended. The measures are initiated by many stakeholders: local authorities, state governments, the federal government, public authorities and private firms. The catalogue of measures includes research in the field of loss reducing processes, development of benchmark indicators, awareness campaigns and dissemination of information, advisory services for enterprises, cooperation among enterprises to reduce loss and waste, voluntary agreements between stakeholders, concerted actions between food industry and retailers.

Measures which are listed but not recommended are (i) the taxation of waste intense products and (ii) the abolishment or reduction of subsidies. Besides the expected positive impacts on FLW reduction these measures have negative side-effects concerning economic and social issues.

- Alongside these 32 positive measures, it must be taken into consideration that there is a fundamental difference between developed and developing countries.

In developed countries awareness raising and regulations (e.g. on expiration dates) can help to reduce food waste (which is the main problem in developed countries).

In developing countries food losses are much more important than food waste. The main driver for the reduction of food losses in developing countries should therefore be the economic incentive. Reducing food losses in the food supply chain means more income for farmers, haulers, processors or retailers. Government authorities can help in improving infrastructure (e.g. roads), or they can provide information on best practices.

In transition countries necessary measures can cover aspects from both, developed and developing countries.

- There is an urgent need for case and/or experimental studies analyzing the waste reduction potential of certain measures, i.e. estimating food losses and waste before and after a measure has taken place. Ideally, the analysis includes the cost of the measure.

Therefore, we propose the following paragraph to be added to chapter 4 “Recommendations”:

“The studies on food losses and waste have already created a consistent perception concerning the magnitude of food losses and waste, even if the indicators may be biased because of different definitions and data problems. Thus, an effective strategy for the
reduction of food losses and waste does not need further studies measuring food losses and waste at one point in time. There is an urgent need for case and/or experimental studies analyzing the waste reduction potential of certain measures, i.e. estimating food losses and waste before and after a measure has taken place. Ideally, the analysis includes the cost of the measure.”

- The EU has asked its Member States to prepare National Strategies to reduce FLW. It would be helpful to review and summarize the proposed measures concerning food. The National Strategies of all EU Member States should be available at the EU Commission since the deadline for submission was December 2013.

- The paragraph on page 30, lines 45 to 55, could define more specifically which damages (quantity losses, weight loss, or something else?) are concerned. Without those explanations is this paragraph unhelpful. From the late 1970s onwards there were several studies and these not only measured the losses but also corrected for farmer consumption patterns (examples De Lima 1979, Golob 1981). Typically, farm storage weight losses were in the range of 2% to 5%. As a result of the arrival of the larger grain borer in Sub-Saharan Africa in the late 1970s storage weight losses rose to an average of about 10% for those farmers who were affected (Hodges et al. 1983; Dick 1988). However, this is just weight loss and quality losses are potentially important in preventing higher sales. The effect of quality losses were studied by Adams and Harman (1977) in Zambia and later by Compton et al. (1998) in Ghana. In general it could be concluded that quality losses can exceed the financial value of weight losses by a factor of two. A consideration of quality losses is given on the APHLIS website. See documentation on the subject in the endnote “3”.


3. Can respondents submit concrete initiatives or successful interventions having reduced food losses and waste, currently taking place, conducted by governments, stakeholders, private sector, and civil society?

- The German Ministry of Food and Agriculture has launched a national consumer awareness campaign named “Zu gut für die Tonne” (Too good for the bin). It comprises e.g. a website (http://www.bmelv.de/DE/Ernaehrung/Wert-Lebensmittel/ZuGutFuerDieTonne/node.html), a recipe app, studies on food waste and losses in Germany, special information on the expiration date of food and hints for consumers to buy and to store food.

- It is unknown, though, to what extent the campaign reaches households or changes behaviour regarding food waste.

- The study by FAO from June 2013 (“Food Wastage Footprint, Impact on natural resources”) gave many concrete and successful initiatives to reduce food losses and waste all along the value chain. It would be useful and meaningful to take them into consideration.

Other examples of successful programs having been implemented in the past are:

Training was conducted on biological control of the Larger Grain Borer (Prostephanus truncatus). The multiplication and distribution of clean and healthy grain reduced the infestation of cassava chips with P. truncatus by 20%. This in turn limited the geographical dissemination of the pest (Malawi, 1992).

The release of the parasitoid Teretriosoma nigrescens seemed to be efficient for the biological control of Prostephanus truncatus population. A reduction of 80% was obtained eight months after the release (it is not clear whether this has been a long lasting effect over years). In addition, appropriate counseling packages were developed for storage and harvesting technology and introduced (early nineties of the past century in Togo).

Fresh cassava roots were left in the ground after harvest. In this way, the root stock was conserved for several months without major losses (Ghana, Knoth, 1993).

To overcome difficulties in storing fresh cassava roots with their high water content, dried chips were produced. The storage of the cassava chips was improved by reducing chip size and by using wind and solar energy for drying. The chips were then stored in baskets, wooden containers, sacks or bulk and in various traditional storage systems used for cereals (Ghana, Anamoh and Bacho, 1994; Henckes, 1994).
4. **What is the cost-benefit potential (and barrier to adoption) of different options, including technologies, to reduce and prevent food losses and waste at different stages of the food chain?**

- There is a lack of studies analyzing the cost-benefit potential of different options and measures. As already mentioned in our answer to the question 2, the support of case studies to close this gap should be of high priority on the international and national working agenda.

- Experience helps to identify more broadly that profitable solutions to reduce food losses in developing countries strongly depend on the local conditions i.e. access to technologies and energy, quality requirements of markets, quantity of produce to be treated, transport and market prices. In rural settings with unreliable energy-availability mainly simple, low-cost technologies are cost-efficient and accepted i.e. simple storage containers, local storage rooms, simple solar and airflow dryers.

In urban environments a range of different more sophisticated solutions may prove profitable again depending most strongly on the local conditions.

5. **Cold chains and cold storage (including adaptable low-cost technologies for cold storage such as evaporative cooling, charcoal coolers, zeer pots, etc): what could be cost-effective and adapted solutions to reduce food losses and waste and to improve the sustainability of food systems, given the diversity of national contexts?**

- The issue of cold chains and cold storage has been well elaborated throughout the document. Challenges remain at all levels of the cold chain and its interfaces with processing and transport.

- At industrial scale (at all levels) cooling technologies are well applied, but often counter environmental protection policies, above all ozone and climate protection. Approaches need to keep the overall concept of sustainable development, not e.g. trading improvements in food security with negative impacts on the climate. Excellent technology examples exist in fishery (for example vessels with efficient freezing aggregates based on ammonia).

The smaller the operation (small-holder farmers) the more challenging is the provision of suitable, affordable technologies. On page 44, the increases in cold chain infrastructure for India, Brazil and China are contrasted with the lacking development in Africa. The subsequent explanation focuses on the lack of on-farm cold stores in Africa and that this is a crucial health concern in the cold chain. While this may be true, Jemlic and Ilic (2012) do not mention whether the improved Indian, Brazilian and Chinese cold chain infrastructure was due to cooling devices for small-scale farmers. The Indian intervention presented in Box 4 clearly focused on large-scale and electric cooling devices. The significance of solutions for small-scale farmers is thus not underpinned by this example.
Given that most examples of small-scale cooling devices rely on water evaporation, they share common disadvantages, e.g. reduced cooling effects in humid areas and food safety concerns when not skilfully maintained. This limits their adaptability. Evaporative cooling has also its limitations in capacity (usually only applicable for relatively small volumes). Furthermore, when large pack sizes are mentioned (page 38), it could also be indicated that larger product sizes require more time to be cooled down, as the surface-area-to-volume ratio decreases. This could be important in keeping the product sufficiently cold along the value chain, and may therefore be another factor to cost-effectively reduce FLW. Use of renewable energies (mainly solar power) or waste heat seems promising for the future also for small scale applications.

In the domain of cooling storage, many options for a program's implementation are conceivable. Economies of scale still need to be achieved for reducing equipment prices. For rural retail activities (traditional markets) concepts for solar, centralized cooling systems seem suitable. Refrigerated trucks would mainly concentrate on energy losses due to bad insulation, secondly on energy-efficient cooling systems (on-board or pre-charged). Supermarkets would concentrate on climate-friendly, energy-efficient combined systems for refrigeration and air-conditioning. Apart from suitable (feasible, viable, affordable) technologies, main challenges persist on logistics, management practices, standards (e.g. HACCP), and behavioural aspects. In synergy with a focus on technical solutions at farm-level, a deeper discussion on logistic solutions on later stages of the value chain might be worthwhile. Farm cooperatives and/or private processing firms could provide the expertise and capital to build cost-effective cold storage facilities and implement high-quality food safety controls (e.g. milk collection centres of Nestlé in China and India).

- Technical solutions need to be economically viable, available, technically proven and safe, but should additionally not affect the ozone layer or the global climate. Therefore ozone- and climate-friendly technologies, mainly based on natural refrigerants (hydrocarbons, ammonia, carbon dioxide, water, air) should be promoted.

6. Systemic approaches and solutions to reduce food losses and waste: Reducing food losses and waste is a matter which concerns the coordinated joint action (and change) by many actors, producers, retailers, consumers, private sector, governments. Which systemic solutions/approaches would be the most effective to reduce FLW, towards more sustainable food systems? At that systemic level, which drivers would create leverage for radical change?

- We recommend 3 guiding principles for situation analysis and improvements:

i. value chain approach (regarding inputs, production, post-harvest, processing, marketing);

Among other stakeholders, enterprises are called upon to take food waste into account in their environmental management systems and to identify it in their
environmental statements. It should be examined whether food waste ought to be considered, in future, as a sub-criterion in various environmental certification schemes or when awarding environmental standards.

ii. Multi-stakeholder dialogue, participatory approach and empowerment, and consideration of the specific role of men and women in post-harvest systems;

Stakeholders could engage in intensive networking throughout the food chain and transcend the limits of individual stages of the value-added chain. It is strongly recommended that round table talks will be held involving all relevant stakeholders in the value-added chain, e.g. farmers, producers, distributors, large-scale consumers (mass and institutional caterers, catering firms, hotel and restaurant industry), final customers, churches and environmental, educational and social welfare organizations.

The farming sector, food industry, retail trade, hotel and restaurant industry, scientific community, and policy-makers can be brought together by initiating an Internet-based network for reducing food waste. A database of best practice measures from the food chain, in the form of an open source, will enable the stakeholders to benefit from the experience gained from successfully implemented measures. The SAFA initiative from the FAO (“Sustainability Assessment of Food and Agriculture systems guidelines”) is an example of a concrete tool to engage small-farmers as well as biggest firms to a self-assessment, attempt of finding his own problems and solutions or simple monitoring of initiative. The SAFA Guideline “has been prepared so that enterprises, whether companies or small-scale producers, involved with the production, processing, distribution and marketing of goods have a clear understanding of the constituent components of sustainability and how strength, weakness and progress could be tackled.” Platforms on more sustainability in the food chain are the key to coping with future challenges arising in the provision of food supplies. In addition, such a portal can be used as an advertising tool for the enterprises’ own projects and thus boost the image of the enterprise itself, keeping in mind that it is also possible to promote voluntary improvement or to initiate the need for enterprises to upgrade their processes to a more climate-friendly production.

iii. Integrated post-harvest management.

In former projects of development assistance, improvements in storage and post-harvest protection were not only achieved by introducing technical infrastructure or innovative storage protection measures but also by awareness creation for problems and training in post-harvest management combined with solutions/options in specific situations. Example of Ivory Coast: When warehouses were constructed, this was taken an opportunity to discuss all the details in managing and marketing of food, and to encourage the associations to look themselves for creative and suitable solutions. The subject matter should be integrated in training schemes in the fields of production, processing, trade, and catering trade. Incentives should be provided for holding of and staff participation
in training schemes, advanced vocational training, and workshops. Staff members should be encouraged to act as disseminators and role models in the responsible handling of food.

In other cases, farmers were involved directly in “Participatory Rural Appraisal” to learn about their situation and develop new strategies and procedures. A special focus was put on the management of warehouses: responsibility, guidelines and tasks, schedule of controls and standardized assessment of storage structure and produce. The experience in African countries showed that often a solution in post-harvest and processing handling is available somewhere (in one village) but not spread (to other villages). Great success would be possible, if existing expertise is up-scaled (freely communicated and tested and accepted by others).

31. European Commission

The *Europe 2020 Strategy - A resource-efficient Europe* calls for an increase in resource efficiency, to: “...find new ways to reduce inputs, minimise waste, improve management of resource stocks, change consumption patterns, optimise production processes, management and business methods, and improve logistics."

The *Roadmap to a Resource-Efficient Europe* follows up on this, and stresses that our natural resource base is being eroded by growing global demand, highlighting the food sector as priority area for taking action - calling for: "...incentives for healthier and more sustainable production and consumption of food and to halve the disposal of edible food waste in the EU by 2020."

The European Parliament also took initiatives as regards food waste.

The Roadmap states that the Commission will assess how best to limit waste throughout the food supply chain, and consider ways to lower the environmental impact of food production and consumption patterns, via a Communication on Sustainable Food.

To prepare for this Communication, a public consultation was held in autumn 2013 based on several questions, including on food waste. More than 600 responses were received, from entities in EU Member States, but also third countries, NGOs...

As the European Commission is currently analysing the results of this public consultation on Sustainability of the Food System in view of preparation of a future Communication on this subject, it is perhaps premature for us to comment in detail, at this stage, on the document. The questions raised in the public consultation – for instance how to define and measure food waste – will be further discussed in the forthcoming process relating to the Communication.

Generally speaking, the draft is comprehensive and outlines the main issues to be considered. The HLPE recommends that food waste prevention/reduction strategies require a holistic approach and integrated/co-ordinated action throughout the food supply chain. They argue that cost/benefit and impact analyses should be carried out taking into account economic costs/benefits, food security and sanitary concerns (both food safety and nutrition/health aspects) as well as environmental impact. Given the global nature of the food supply chain,
sharing outcomes of such analyses as well as intervention strategies carried out in specific countries/markets would be beneficial to all.

However, it is not easy to catch the messages among all the information presented. It could be useful to present "summarizing tables" comparing the differences.

Besides that, some points should be revised. In particular:

- The importance of the urbanization process in developing countries is crucial. How the big distribution is developing there and how it is possible to maintain an acceptable FLW.
- The section on "impacts on access" in chapter 1.3.3 (page 22) deserves more attention. The reference to a WTO study on the correlation between unemployment and trade barriers seems to be too remote from the issue of food waste. How the WTO rules influence the FWL is a complex topic. Either it should be deeply analysed or incomplete references should be specified (e.g. exact linkage to food waste) or removed.
- Some examples (as the one presenting the cow milk production at page 25) seem not too appropriate. If we compare two production systems we must do it considering all the inputs/outputs, not only one (such as milk): if we take into consideration all these aspects the final assessment could be completely different.
- It could be worth to analyse the implications of reducing food losses for the whole global economic system. Would it be possible to significantly decrease food waste without considering what changes would be needed in our economic system based on producing always more? Physics obliging, more food production (more transformation of natural matter and energy in edible matter) implies more waste. There's certainly room for more efficiency, but to what actual extent (based on which postulates)?
- The comparison between FLW in industrialized and developing countries seems to be "stretched of" with the result of not being always clear. It would be easier to consider the food consumption/distribution habits: big distribution (which is well established also in some developing countries) versus small markets...
- On Q1 of the consultation, the draft could explain early on the waste prevention hierarchy which -- whilst recognising the need to reduce food waste at each level of the pyramid -- does not consider the donation of food to people and the feeding of foods to animals as food waste per se. It seems that the document supports this view which could perhaps be stated more clearly.
- Section 3.8 of the document outlines food laws and policies put in place to prevent food losses and waste. With respect to the situation in the EU, this section can be further updated once the Communication on Sustainability of the Food System has been issued. The authors already state that further developments are ongoing in OECD and with respect to the FP7 research project FUSIONS whose results and outcomes will help inform developments in the EU.
- With respect to Q3, should the HLPE not already be aware of the dedicated section on DG SANCO’s website regarding food waste, they may wish to refer to the "best practices" in food waste prevention/reduction, which can be found at the following link: http://ec.europa.eu/food/food/sustainability/good_practices_en.htm

32. WWF UK, Germany, Italy and Netherlands

Introduction
The following comments were jointly made by the following WWF National offices: WWF UK, WWF Germany, WWF Italy, and WWF Netherlands.

We welcome the fact that CFS has asked the HLPE to work on the topic of food losses and waste (FLW). As the world’s largest environmental organisation we are very much aware of the negative effects of wasted food as this has implication on the use of natural resources (water, soils, energy and biodiversity), climate change, habitats and finally the capability to feed the world’s growing population. There are plenty initiatives within the WWF Network related to food waste and sustainable food systems.

As this report will be the basis of very important discussions of the Committee for Food Security (CFS) we would like to make the following comments:

1. Relation food waste and production systems – production projections

   - The report describes very broadly all aspects of FLW. However the relation between possible “savings” of food by the reduction of FLW and the projection of production increase it is not clear yet. The zero draft remains weak here despite the fact that this aspect is very important in order to implement the right strategies and policies for agriculture in the respective regions and countries.

   There are already studies which tried to show this important aspect (WWF 2012 “How to feed the growing billions p. 32- 40). However more information would be important.


2. Extent and impacts (Chapter 1.3)

   - So far the presentation of different levels or fields of impacts of FLW are not coherent. There are impacts which can be found on macro, meso and micro level on the same time. Especially when we look on the environmental impacts one can say that the same problems can occur on all three levels. Our advice is to revise chapter 1.3.2.

3. FLW in different distribution systems

   - When it comes to the losses deriving from distribution systems, public distributions systems are not analysed in a proper way. More in-depth discussion and analyse is needed. These systems may be as well subject of substantial losses and at the same time these systems are a possible field of change where public administration and politics can have direct influence.

4. Environmental impacts of FLW (Chapter 1.3.4):

   - We consider the analysis of environmental impacts of FLW as crucial as overexploited natural resources may cause severe problems in certain areas for the future capability to produce food in the future.
The HLPE is right in saying that most of the available studies refer to the global level when it comes to the impacts if FLW on waste of resources. Depending on natural differences (climate, water availability, soils etc.) waste of resources differs a lot between the regions. Nevertheless the 2013 FAO Report “Food Wastage Footprint” already gives plenty of information about regional footprint of food waste.

- Additionally the report in chapter 1.3.4 on the environmental impacts needs some more additional data, based on a more holistic approach. For example the nitrogen footprint needs an in-depth consideration. It’s needed, as the nitrogen footprint is very much linked to biogeochemical cycles, which have direct impacts on human development. The “Nine-Planetary Boundaries”-Approach (see Rockström et al. 2009) has made clear that if you cross one of the nine planetary boundaries might generate abrupt or irreversible environmental changes.
- Current food production or farming systems are made responsible to the release of antibiotics (deriving from livestock or aquaculture) or substances which have endocrine disruptive properties. Both types of substances may have negative effects on people and wildlife. Reduced FLW may lead to reduced emissions of these toxic substances.
- We suggest using mainly publications which use a peer-review process. To cite publication of cooperates (e.g. Barilla) only might cause the impression that respective statements are biased. (See water footprint and virtual water).
- The scope of Chapter 3.6 should be broadened. It is absolutely true that in many regions with their respective societies, women play the crucial role in reducing FLW. However, the chapter should take into consideration as well on the responsibility of the entire family in the reduction of FLW. As we are facing the situation that in many regions the work in households gets more and more balanced gender wise.

5. Systemic causes of FLW:

- Politics should be part of the discussion about systemic causes of FLW. Hence we would welcome as special subchapter about the politics which are fostering FLW.
- So far an analysis of the international funding lines dedicated to the reduction of post-harvest losses is missing. This is crucial to understand if the funding allocation is appropriate to fight food losses between the fields and the markets. Are there enough founding lines from e.g. The Worldbank or national funds to invest into infrastructures to prevent this kind of losses?

6. Conclusions:

- Conclusions and recommendations remain quite superficial. We would suggest describing the possible roles of scientific bodies like the CIGAR-Network within the prevention of post-harvest losses. The worldwide acting network of agriculture institutes should play a major role not only in advising governments and farmers to increase productivity and sustainability but as well in the reduction of post-harvest losses.
- As there is no analysis of the international funding lines, which are related to agriculture no recommendations for changes are made. We believe that a shift or broadening towards investments into the prevention of post-harvest losses is crucial.
33. Naiara Costa, World Society for the Protection of Animals (WSPA)

The World Society for the Protection of Animals (WSPA) would like to thank the HLPE for the opportunity of contributing to this consultation.

Below follows our contribution:

Page 12 – reference to livestock and grain based intensification:

Livestock play a central role in food security by providing food, employment and income. But livestock production can also negatively affect food security, by consuming a growing proportion of the world’s crops that could otherwise be used for direct human nutrition. Land for livestock is already the largest human use of land and is growing while forests and other land areas are shrinking. With the growth in incomes and urbanization and without adequate policy response, demand for livestock products will increase rapidly. This places additional pressure on land resources through increasing demand for pastures and arable land to grow more crops for animal feed.

Grain-based intensification of livestock farming has allowed vast increases in production and consumption in recent decades. However, it has also resulted in negative impacts on smallholders, food security and animal welfare. Further intensification of livestock production based on cereal and oil crops has the potential to create more competition between cropland for human food and cropland for animal feed. It could also make food security more challenging in areas which are already food insecure, including parts of Africa, Asia and Latin America. Additionally, international trade in animal feedstuffs can increase the vulnerability of these regions to world market-price shocks.

Page 32 - Transportation of food producing animals

Substantial quantities of food are lost or wasted at all stages of the supply chain, from agricultural production to final household consumption. In medium and high-income countries large quantities of food still fit for human consumption are routinely discarded by retailers and consumers. In low-income countries food is lost mostly during the early and middle stages of the food supply chain with much less wasted by end consumers.

There are many causes of food losses and waste in low-income countries. These include financial and managerial inexperience, technical limitations in harvesting techniques, poor storage and cooling facilities in difficult climatic conditions, a lack of infrastructure, and inadequate packaging and marketing systems. Given that many smallholder farmers in developing countries live on the margins of food insecurity, a reduction in food losses could have an immediate and significant impact on their livelihoods.

The FAO notes that loss and wastage occurs at multiple stages of livestock production, including during breeding, transportation and slaughter. Improving animal welfare not only on the farm, but also during transport and slaughter provides an effective solution that makes good economic sense and has demonstrable benefits for animals, productivity and worker health and safety. Moreover, often food and economic losses can be avoided by transporting meat instead of live animals.
Research in Uruguay, for example, estimated that 48 per cent of all beef carcasses ended up with at least one lesion and the loss of two kilograms of meat as a result of poor handling during transport and slaughter. Country wide this was equivalent to the loss of US$100 million or 3000 tonnes of meat annually – enough to feed beef to one million people for a whole year[4]. A number of projects are now being implemented by producers, academics and the Uruguayan government to reduce these losses[5]. Making transporters financially accountable for bruising, poor meat quality and loss of animals can improve handling and transport. In one example in Brazil, bruising in cattle was reduced from 20 per cent to just one per cent through this measure alone.

[1] 53% of oil-crops 38% of cereals are used to feed livestock, Karl-Heinz Erb et al (Vienna 2012), The Impact of Industrial Grain Fed Livestock Production on Food Security: an extended literature review, p.32-33.

34. Laura Brenes, ITCR, Costa Rica

I participated in the last SAVE FOOD Partnership event from FAO. I come from the Academic area in Costa Rica (Instituto Tecnológico de Costa Rica). Due to that meeting I have established contact a fellow-professional from our Ministry of Agriculture, and a few hours ago, he shared this link with me. I understand today is the due date to send comments on the document.

Therefore, I haven’t been able to go through it deeply; however, regarding the questions, I believe all of the approaches are necessary in terms of measuring the loss, since some will have a direct impact in the economy (volume, monetary cost of the wastage), and others in a more social and environmental aspects (nutritional value, volume).

Regarding examples of reduction in food loss, I am currently working with other colleagues in developing processed products for tomato overproduction in some Regions. We are still at a training and research stage so we do not have an assessment of the impact at this point, but we believe that once you mix technical approaches (product development, packaging, variety selection) with management tools (cost-benefit analysis, market research) a positive response can be achieved both for the producer and the consumer.

I just typed this quick comments, however my main interest is to create a link with the Committee, and hope to support in other moments the work you develop.

Dear Ladies and Gentlemen.
I attached my comments regarding to the V0 Draft on food losses and waste.

Kind regards;
Roberto Azofeifa
Sustainable Production Department
Ministry of Agriculture and Livestock
Costa Rica

35. Roberto Azofeifa, Ministry of Agriculture and Livestock, Costa Rica

Document: Food Losses And Waste In The Context Of Sustainable Food Systems V0 DRAFT

General Comment.

The document presents the subjects under a holistic and integral scope. It is a vast proposal which exposes a frame of action to guide programs and projects at the national level, considering the specific conditions in each country.

Specific comments

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<td>20</td>
<td>production cost is very important additional perspective</td>
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<td>Regarding to definition of food losses and waste:</td>
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<td>It is necessary to identify the situation in the different levels. The scope is different if the analysis and proposals are at:</td>
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<td>To reduce food losses and waste and improve the sustainability of food systems it is extremely important to empower consumers through information and knowledge on good consumption practices.</td>
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<td>12</td>
<td>7</td>
<td>storage and processing choices, it is big constrain especially in less developed countries</td>
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<td>49-50</td>
<td>14</td>
<td>The proposal for reduction of food losses and waste must consider initiatives to foster local markets</td>
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<td>Consider the necessity to have statistic to show effects of food losses and waste policies in terms of environmental, economic and social impacts</td>
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<td>31-32</td>
<td>27</td>
<td>The Role of the research Institutes and Extension Services should be strengthened in order to reduce food losses by using appropriate technology and information</td>
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The most relevant gap to work in less development countries is data availability.

To improve the food chain relations is a key point.

36. Barbara Redlingshöfer, INRA, France

Congratulations for this quite comprehensive report, a lot of useful comments have already been made.

I would like to highlight some additional points and add the following comments:

- P.9, point 1.1.2 and 1.1.3 The methodological part of FLW quantification is little developed. Since quantification methods producing reliable, comparable and little cost-intensive data are very important for future actions, a recommendation is to briefly describe the different quantification methods used in literature and to discuss the question of which indicator to use. It could be mentioned that one of FUSIONS goals is to elaborate a standard quantification approach for FLW for EU-27.

- P.11, point 1.2.1 I would add that in sustainable food systems, food needs to be culturally accepted by consumers. Consumer acceptance is a key issue when it comes to innovate in food processing to create food or food ingredients from components that are currently not/little eaten by consumers (offal, vegetable peels, etc.). To increase the share of edible, culturally accepted material from plant and animal production could be one contribution to nourishing future world population in a more sustainable way.

- P. 14, point 1.2.4 A distinction between “local” and “industrialized” food systems is probably not black and white. We should also consider that farms in “local” systems tend to have different farming practices (more simplified, more ecological with less pesticides etc.), which are key to be taken into account since the agricultural stage is often the main important stage in environmental impact assessment. Transport is definitely not the sole aspect to be considered here.

- P.18, point 1.3.2 We should consider that FLW might also generate “positive” impacts, at least for some actors along the supply chain. Food that is lost or wasted at some stage has made some stakeholders earn money with at a prior stage (value creation along the supply chain). Interestingly, Dutch scientists Waarts/Rutten showed by modelling that food waste reduction generates winners and losers. Some actors are better off, some are not when FLW is reduced. This also means that using the term of “inefficiency” in food systems (p.19, line 13 for example) might be simplified. These “inefficiencies” probably do benefit at least to some actors.

- P.27 point 2.1.1 The focus is on developing countries here. Do you consider losses at production stage not to be a problem in developing countries?

- P. 29 point 2.1.3 Do you consider losses to be negligible in modern storage facilities? Some references indicate non negligible losses of apples stores in cold chambers over a couple of months (for example Mila I Canals 2009)

Further comments have already been extensively made by other contributors.

Sincerely yours
37. Simon Costa, World Food Programme, Uganda

The World Food Program has commenced a significant initiative in sub-Saharan Africa to address the post-harvest food losses in this region. With a major focus on preserving existing food production (more so than increasing agricultural production), WFP is providing three important stages of farmer support; Capacity Development (Farmer Education); Action Research; and Project Implementation (Up-scaling). Working closely with fellow UN Agencies (WFP, FAO and IFAD recently signed an inter-agency project to mainstream food loss reduction initiatives), Governments and Country Offices in Uganda and Burkina Faso, the project aims to increase the food security, nutrition and financial income of smallholder families in these two countries. We are gathering a significant amount of information relevant to your HLPE which we are happy to share, however we will need to liaise regarding the most appropriate way of disseminating this information. Please advise.

Best regards,
Simon

38. Martine Rutten, LEI Wageningen UR, Netherlands

I very much welcome the food systems approach used. The rapport is very comprehensive and detailed, so very good work. My comments are mostly on impacts.

Definitions

For many reasons we do not look at pre-harvest food losses, but this does not mean that they do not exist. In fact, they are likely to be substantial. For completeness, it would be wise to mention this in a food note (p9, line 21). I see it is also mentioned later on in 2.1.1.

Data and trends

(p16, line 14) Focus is very much on developing regions. For completeness, mention that in developed regions the financial crisis has had severe impacts on the economy (slow-down in growth, unemployment) and this raises an additional motivation for reducing food waste. Whilst one may reason this, in practice, however, so it seems, food waste is not coming down, but is increasing.

Potential for reducing FLW

(p13) This depends very much on the potential to tackle underlying causes of FLW, the costs involved and if there are costs involved, the available finance to tackle the causes. The causes (and costs) are region, sector and chain specific so to conclude on the basis of purely data on FLW in some regions the potential elsewhere is very crude. It would be wise to include (technical and financial) feasibility aspects here and a link to the causes (p27 and further).

Impacts
(section 1.3.2)

Conceptually it may be easier to start from FLW (as it exists; this is unfortunately the reality) and then proceed the analysis with what would happen if we were to reduce it. The analysis below follows this line of reasoning [and so if taking the perspective of impacts of FLW one has to simply turn it around].

The section is written as if the socio-economic impacts of (reducing) FLW have been investigated and are known. This is misleading as only a few impact studies have been carried out. All in all we know very little. The start of the section should mention this.

“The enormous costs” for the entire production system” (and there are other similar statements in the text) is therefore a very bold statement to make.

1. Only few impact studies have been carried out (explained under point 2) and further studies should be undertaken to improve on these. These studies include:

   http://www.pbl.nl/sites/default/files/cms/publicaties/Protein_Puzzle_web.pdf

Section 1.3.2 should at least summarise the main results of these studies.

2. What are impacts?

   Aforementioned studies are the only studies that use a modelling framework which captures (global) food systems, in line with the view taken in the HLPE report that food losses and waste should be analysed within the context of food systems. [The second study is a follow up of the first and focuses on impacts of reducing food waste in demand in the EU, using FAO data. This should be extended to the analysis of impacts of tackling FLW everywhere in the chain, worldwide and at more detailed level.]

   The few studies that are cited on impacts (costs) do not take into account the market mechanism (price changes), which imply that ultimate impacts will differ from the original size of the food losses/waste. They really only measure the size of FLW (in monetary terms/what is embodied in the waste in terms of natural resources, etc. etc.). The same is true for those measuring climate impacts (section 1.3.4).

3. Impacts on various actors: trade-offs

   Also the impact on different actors, e.g. consumers and producers, is very different. A clear example is that if consumers would waste less food, in the long term they would buy less agri-food products but spend it elsewhere (or save it and spend it in future) so consumer welfare would go up but some (agri-food) producers would be worse off whereas others would benefit. At world scale, the lower food price would benefit net food consumers but harm net food producers. The poor consume a large part of their budget on food (and so a lower price is good) but on the other hand many of the poor earn their income from producing food (and so a higher food price is
good). This already shows that there are trade-offs involved, with winners and losers. These are not mentioned in the section.

It is better to stipulate that there are likely to be trade-offs and that these need further investigation so that in the end better policies can be formulated and better measures can be taken.

4. Indicators to measure impacts

Related to the previous point: impacts can be measured in terms of a variety of indicators: consumption (quantities, prices; dietary quality), production (quantities, prices), trade flows (exports, imports), income, welfare, land use (and prices), employment and wages, the environment (biodiversity, greenhouse gas emissions) etc. etc.

As illustrated with the example, tackling food losses and waste may not have a positive impact on all indicators. So when it comes to sustainability impacts (economic, social, environmental), trade-offs also occur and most likely choices have to be made as to what to target or prioritise.

5. Aforementioned points are explained in much more detail using a framework for analysis elaborated in Rutten (2013), which is about much more than mentioned in footnote 7. It includes aspects of costs (ignored in this section), and underlying causes. FLW happen for a reason – if we would all be better off without it why does it exist? To give an example on the producer side why would a farmer incur losses if he/she would be able to increase his income / lower costs by avoiding losses? Most likely there are costs involved (perhaps due to underlying bottlenecks) and he/she may not be able to finance and/or make up for it (e.g. investment in better storage / transport may be costly, perhaps additional produce cannot be sold onto the market, or can be sold on the market but at lower prices etc. etc.). The impacts discussed in 1.3 cannot be treated independently from the causes and drivers (section 2) and should also include a notion of costs.

Including these points in the analysis would make it much richer and would allow you to go beyond the quick wins (which are easy to realise) onto the more difficult part of those where trade-offs, costs and benefits are involved and/or that require overcoming certain bottlenecks. Ignoring the trade-offs within the economy and business realities would imply continuation as in the past, i.e. setting FLW reduction targets, but nothing happening in practice.

Table 1: unclear what it contains. Many of the cells so these would need further explanation. Some of these are very suggestive and have not been investigated as yet.

Causes

(p32) Description includes estimates of qualitative losses which do not belong there but in the data section earlier on.

Direct causes: a lot of these cannot be seen independently of what you call “systemic” causes as to do something about the direct causes implies for example investment in infrastructure, institutions, capacity building an training and improving interactions within the chain.

Socio-economic aspects of FLW reduction

‘Socioeconomic aspects’ i.e. impacts of FLW reduction are the reverse of impacts of FLW. It is confusing that these are discussed here and that costs and benefits, and more generally trade-offs
that may occur between different actors or different indicators with which to measure impacts are not included in the analysis of impacts of FLW (section 1.3). [Similarly the recognition that there are winners and losers of FLW reduction is inconsistent with the section on impacts of FLW that talks about negative impacts only.]

39. Said Zarouali, HCP Morocco, Morocco

Pour l'approche voir une étude et enquête faite par le HCP -www.hcp.ma.

40. Government of the United States of America

Comments from the Government of the United States of America
Submitted 17 January 2014
U.N. Committee on World Food Security

The U.S. government welcomes the Report on Food Losses and Waste in the Context of Sustainable Food Systems (hereafter “the Report”), which addresses critical challenges to global food and nutrition security. Reducing food loss and food waste can help improve food and nutrition security across developing and developed countries. To strengthen the zero draft, the U.S. government now submits to the HLPE: general comments; answers to the six questions asked by the High-Level Panel of Experts (HLPE); and line-by-line edits, questions, and comments.

GENERAL COMMENTS

(1) The Report provides a good overview of the sources of food loss and food waste (FLW) and addresses important issues often excluded from the discussion. These issues include needs for infrastructure and local/ regional solutions, as well as nutrient loss and the role of food safety. The report already identifies a thorough list of causes and drivers of FLW at various stages of the value chain, and it would be useful for a future draft to clearly indicate the data constraints at each step of the supply chain analysis.

(2) The Report addresses the lack of reliable, comprehensive data on FLW, which is a significant constraint to analyzing the causes and drivers of FLW and to assessing the costs and benefits of measures to reduce loss and waste. The Report could also provide a discussion of data needs and recommendations on how to approach collecting relevant and timely data from diverse stakeholders. An accurate picture of the extent and causes of FLW is critical to devising effecting strategies.

(3) The Report may benefit from distinguishing between food loss and food waste, given the distinct causes, definitions, challenges, and potential solutions for each issue. Regarding the terms, “food loss” and “food waste,” the Report’s definition may be confusing to some readers, since other alternative definitions are used and accepted in the literature. (For example, the FAO focuses on wastage, as demonstrated here.) As further explained below, the Report should also reflect the wide variety of options available, without endorsing any particular technology, as well as the role of the consumer and possible behavioral changes for successful food loss reduction. In this vein, education and technology transfer tools may be identified as key tools for promoting economic development.
(4) The Report will benefit from focusing more narrowly on the issue of food loss and waste. The current draft may be shortened considerably by eliminating or reducing the discussions focused on issues with no direct relationship to food loss and waste. These sections are identified in detail below.

(5) The Report will also benefit from developing a more coherent economic/social model of food waste. The idea that all food waste is “inefficient” serves as an underlying assumption adopted throughout the Report, except in the section on economic aspects, where the issue is treated with more nuance. Even the most efficient food systems produce food loss and waste. An economic/social model that explicitly examines the difference between the private and social costs of food waste would help provide a more consistent analysis.

(6) The United States government agrees that the sustainability framework, when substantiated with concrete examples, is a useful approach to analyzing FLW. The analysis would be enhanced by incorporating the discussion of economic trade-offs currently in section 3 into section 1. This would make the discussion of impacts of FLW on the sustainability of food systems (section 1.3.2) and on food security (section 1.3.3) much more robust. It would also provide a more complete context for the discussion on causes and drivers that follows in section 2. The sustainability framework, when combined with concrete examples, helps to provide flexible options to address specific opportunities and constraints, as well as actors and incentives, varying from market to market.

(7) Four U. S. policies/programs should be added to the section on public policies for reducing food loss and waste:

* The U.S. Food Waste Challenge, which was launched by the U.S. Department of Agriculture (USDA) and the U.S. Environmental Protection Agency (EPA) in June 2013, calls on entities across the food chain to reduce food loss and waste in the United States; recover wholesome food for human consumption; and recycle discards to other uses including animal feed, composting, and energy generation. The goal of the U.S. Food Waste Challenge is to lead a fundamental shift in how food and food waste is managed in the United States. To join the Challenge, participants list the activities they will undertake to help reduce, recover, or recycle food waste in their operations in the United States. The Challenge includes a goal of 400 partners by 2015 and 1,000 by 2020. The U.S. Food Waste Challenge is bolstered by the EPA's Food Recovery Challenge, which offers participants access to data management software and technical assistance to help them quantify and improve their sustainable food management practices.

* The Bill Emerson Good Samaritan Food Donation Act, passed in 1996, provides civil and criminal liability protection to food donors. Its objective is to encourage the donation of food and grocery products to qualified nonprofit organizations. Under this Act, as long as the donor has not acted with negligence or intentional misconduct, the company is not liable for damage incurred as the result of illness.

* Internal Revenue Code 170(e)(3) provides enhanced tax deductions to businesses to encourage donations of fit and wholesome food to qualified nonprofit organizations serving the poor and needy. Qualified business taxpayers can deduct the cost to produce the food and half the difference between the cost and full fair market value of the donated food.
• The U.S. Federal Food Donation Act of 2008 specifies procurement contract language encouraging federal agencies and contractors of federal agencies to donate excess and otherwise discarded wholesome food to eligible nonprofit organizations to feed food-insecure people in the United States.

HLPE QUESTIONS FOR CONSULTATION

(1) How to measure Food Losses and Waste (FLW)? FLW can be measured from different perspectives (weight, caloric and nutrition value, monetary value…) with different approaches presenting pros and cons, and methodological issues. Do you think that the V0 draft covers properly the aspects of FLW measurements, including nutrient losses? Is there additional evidence about estimates of past and current food losses and waste, which would deserve to be mentioned?

U.S. Response: The V0 draft attempts to clarify how FLW can be measured. However, in describing the direct definition of FLW, additional examples would be helpful. The HLPE position on the harmonization of methodologies needs to be clarified, especially with respect to consumer data and trends on FLW in developed countries, as well as post-harvest loss (PHL) in developing countries. Does the Report advise that harmonization be undertaken by civil societies, governments, and smallholder farmers? What are the costs and benefits to such harmonization and protocols, and who profits from them? What are the roles for corporations and private-public partnerships?

(2) What are the key policy aspects to reduce food losses and waste in order to improve the sustainability of food systems, in different countries and contexts? Is there evidence about the potential of economic incentives, and which ones (taxes, etc.)? What margins for policies in the context of food safety laws and regulations, such as expiration dates?

U.S. Response: The Report provides substantial information on the causation and intervention strategies of various FLW/PHL situations. The V0 draft does a good job stating how strategies vary based on region and context. However, the HLPE should also take care to not side with one particular position on food systems and their capacity to address FLW. The HLPE position should note that local, regional, and globalized food systems offer both advantages and challenges to reducing FLW, based on region, culture, and context, which is not clearly acknowledged.

The Report could also highlight the roles of education, capacity-building, training and extension services. These issues are given very little weight, though considered primary components of technology transfer practice. Joint efforts by all stakeholders, through education and knowledge sharing, will clearly affect long-term positive results and maintaining the sustainability of food systems.

Furthermore, the Report could emphasize the need for diverse behavioral change mechanisms as a tool for reducing FLW. Many of the reasons for food waste mentioned in the V0 draft are linked to how food is utilized for human and secondary purposes, especially at the consumer level. Improving behavioral change and the related capacity building should be explained further in this report. At the same time, the Report would benefit from avoiding prescriptive policies for specific technologies used in narrow contexts.
Increased responsible agricultural investment (in the context of both sustainable food systems and food security) may be identified as a key policy goal in reducing FLW. As briefly explained in the V0 draft, overall investments in agriculture by corporations, civil societies, and governments may help abate local and regional issues. However, the document may also explain how responsible investment by stakeholders (corporations and advocacy organizations, for example) may reduce negative environmental and social impact of FLW.

Tax incentives and liability protection for companies donating food can also encourage food donations. These policies have been credited with helping to stimulate the large quantities of food donated to U.S. food banks and pantries.

(3) Can respondents submit concrete initiatives or successful interventions having reduced food losses and waste, currently taking place, conducted by governments, stakeholders, private sector, civil society?

U.S. Response: The Report will benefit from citing concrete interventions and initiatives from various stakeholders. Two examples include:

USAID/Ethiopia’s Feed the Future (FtF) Program through its Agribusiness and Market Development (AMDe) project constructed four sesame warehouses with a capacity of 5,000 MT each and plan to construct an additional seven maize warehouses of 5,000 MT the following year through a cost-share programming.

The World Food Program’s (WFP) Purchase for Progress (PfP) program began purchasing contracted maize in 2013 from farmers’ cooperative unions and will continue through 2016. By 2016, WFP is expected to purchase 300,000 MT of maize from 50 cooperative unions. As a result, cooperative unions are expected to maintain the quality standard of the food purchased, and through technical support in postharvest handling and storage, be able to maintain the grain quality standards established by WFP guidelines.

Yet it is equally important to list specific issues and parts of the world where FLW is an issue and not addressed as thoroughly as needed. These problems should be clarified with information about FLW in each geographical region of the world. For example:

In Uzbekistan, comprehensive data collecting does not exist. Only a handful of packers, cold store operators, transporters, wholesalers and retailers are presently monitoring their individual cold chains in the country. This collection would assure the integrity of perishable, temperature and humidity sensitive products along the points of a cold chain production system. Additionally, comprehensive information management would protect financial interests and public health with better data documenting and auditing of the processes involved.

Additionally, more information on successful interventions, as well as civil societies, governments, universities, and other institutions working on these issues could be mentioned. Data from the ADM Institute for the Prevention of Post-Harvest Loss also provides a good example.
(4) What is the cost-benefit potential (and barrier to adoption) of different options, including technologies, to reduce and prevent food losses and waste at different stages of the food chain?

U.S. Response: Overall, the V0 Draft sufficiently describes the costs, benefits, and barriers of different options for FLW mitigation strategies. However, more emphasis could be placed on FLW reduction strategies in the context of food and nutrition security. We believe this is necessary as food security is an important facet within all types of sustainable food systems.

Regarding holistic systems in agriculture, one key component of reducing PHL for both large and smallholder farmers is the use of integrated agricultural systems. This was briefly mentioned but merits elaboration. One effective strategy for mitigating risk and reducing FLW includes horizontal integration of rotations of crops with livestock systems. Depending on region and context, livestock and multi-cropping (intercropping, cover crops, yearly rotations) systems can provide many different options for producers, including reducing food waste by consumers, PHL in fields, and additional fertilizer benefits. Furthermore, crop rotations, especially in market situations provide many more options by reducing risk through natural occurrences and potential market saturation of various commodities.

(5) Cold chains and cold storage (including adaptable low-cost technologies for cold storage such as evaporative cooling, charcoal coolers, zeer pots, etc): what could be cost-effective and adapted solutions to reduce food losses and waste and to improve the sustainability of food systems, given the diversity of national contexts?

U.S. Response: The Report succeeds in introducing the positive and negative consequences of cool chain technologies, as well as the roles and responsibilities that each stakeholder therein. The subsequent draft should also include investment strategies for various stakeholders to have access to cold storage/supply chains, and how / if the hindrances can be solved by either government or civil society.

(6) Systemic approaches and solutions to reduce food losses and waste: Reducing food losses and waste is a matter which concerns the coordinated joint action (and change) by many actors, producers, retailers, consumers, private sector, governments. Which systemic solutions/approaches would be the most effective to reduce FLW, towards more sustainable food systems? At that systemic level, which drivers would create leverage for radical change?

U.S. Response: The Report should focus on reducing food loss and waste for sustainable food systems and improving global food security. Again, no particular strategy or system works in every context. The Report should reflect the need to reduce food loss and waste holistically, using secondary non-consumable items for other purposes (i.e. livestock feed, consumer products, pet food, etc.).

Another objective should be to educate and improve perceptions of how food is utilized and saved, as well as disposed and used for other purposes, in order to reduce food insecurity, malnutrition, and poverty, while being environmentally sustainable. The scope of the Report
should focus on developing a holistic approach to FLW, identifying the roles of all actors, especially women and vulnerable populations.

**DETAILED COMMENTS**

Pg 6, #41-44: Please note this sentence difficult to follow. Please add a subject for this sentence as “it” refers back to the previous paragraph.

Pg 8, chapter 1.1: Please address the missing text.

Pg 8, chapter 1.1.1: Please note this section is generally difficult to follow. Pg 8, #4: Please substantiate the phrase: “growing concern.”

Pg 8 #5: Please clarify the phrase: “However figures differ often widely.”

Pg 8, #10: Please define the acronym FLW in chapter 1.

Pg 8, #10-15: Paragraph 1 of chapter 1 is generally difficult to follow.

Pg 9: The definitions of FLW adopted for use in the report comport with mainstream definitions and assumptions. The specification of those inefficiencies or fractions that will not be considered as food waste is particularly welcome. Much progress is possible with respect to reducing food loss and waste without delving into the hot-button issues of over-nutrition, yield gaps, animal production and meat consumption.

Pg 9, #17: Please change to “quantity.”

Pg 9, Figure 1: Please note the missing legend. It is unclear whether this chart depicts the full food consumption/waste cycle or if it is partial. It is also unclear if the chart depicts the current state of food consumption/waste or if it shows what is possible. For example, a lot of food loss/waste rots in the field or goes to landfills.

Section 1.2.1: Please consider eliminating or substantially reducing this section. None of this discussion is necessary to understand the relationship of FLW to sustainable development, as it is clearly articulated in section 1.2.2. In addition, this discussion of sustainable development raises a number of red flags, especially the discussion of livestock production and meat consumption. There is no need to address this controversy here, particularly since the authors have already determined that their definition of FLW will not include these issues. What is the value-added of a discussion of trade and equity necessary in a Report on FLW?

Pg 10, #16: Please elaborate on why the need is “pressing.”

Pg 10, #32: Please explain what is the purpose of the evaluation - to establish programmatic priorities?

Pg 10, #27: What makes the common understanding of what “food” is inadequate?

Pg 10, Chapter 1.1.3: The text uses the term “post harvest losses,” which would be helpful to define, alongside food waste and food loss, earlier in the paper.
Pg 10, Chapter 1.1.3: Agreed to the need for harmonized methodologies and protocols.

Pg 11, #1: Please provide better explanation — does this refer to the mapping of the entire global food supply chain among all food products? For use by whom? Is this the goal, and is it ideal to map the entire chain?

Pg 11, #19: Please tighten up language in this section and elsewhere when discussing definitions; please avoid jargon as well and edit for grammar and typos. In this case on this particular line, please avoid the phrase “might be,” or on #17 of the same paragraph, “strictly speaking implies…,” is a contradictory phrase.

Pg 12, #13: This sentence is subjective and highly contextual. Please consider rewording.

Pg 12, #14: Regarding agricultural systems, please note that livestock is not a component per se of a cropping system, nor vice-versa (though they could be integrated). Livestock is a component of a much larger agro-ecological system. Ideally, one system does not hold sway over the other; crops do not have more importance in an integrated farming system than livestock. They are managed together.

Pg 12, #34: It should be assumed in this sentence that the costs of shipping and moving such food do not outweigh the benefits of receiving it.

Pg 13: Please consider eliminating all of section 1.2.4. A detailed discussion of the sustainability of local food systems and transportation footprints is not directly relevant to the issue of FLW.

Page 13, #8: This sentence is poorly structured; please consider rewording for clarity.

Page 13, #11: The term "in vain" is not correct here. Perhaps replace with "unproductively," or describe simply as a waste of resources.

Page 13, #14: Could something be said about population in this context? If the resource base is not degraded as the population is being fed (no matter how inefficient the system is), then the system is sustainable? Please clarify.

Page 13, #20: Please define “margins of improvement.”

Page 13, #36-37: Please provide a reference for this statement.

Pg 14: The long discussion of drivers in section 1.2.5 could be edited substantially to better focus on drivers with a potential impact on FLW. In each case, the connection with FLW should be made explicit. What is the expected impact of population growth on FLW? Urbanization? Population aging? The conclusion that the consumption patterns of lower income countries are beginning to mirror those of higher income countries—including food waste patterns—can be made more concisely, without a two page exposition on the evolution of food demand and food systems. The last couple of paragraphs in the section present all of the information relevant to a paper on food waste.
Page 14, #7: The position taken in this section is still debatable. Local food systems, much like global systems, offer pros and cons, and its sustainability is not defined solely by emissions and transportation. There are many socio-economic and environmental factors that play a role in peoples' desire of expanding local food systems.

Page 14, #22: Please clarify comparability of efficiency with transport and “seasonal” with “local.”

Page 14, #42: Please provide a specific reference for this section.

Page 15, #7: Please reword; the statement is confusing describing the era.

Page 16, Chapter 1.3.1: Given that the zero draft defines the terms, food loss and food waste, differently from the FAO, the text should clearly delineate definition differences when summarizing the results from the FAO 2011 Global Food Losses and Food Waste report.

Page 16, #36-49: Please define the acronym, APHLIS, in the body of the text. It is unclear how APHLIS has defined the terms, food loss and food waste, and whether these terms mean the same thing as defined by the FAO or according to the zero draft.

Page 17, #10: “Guesstimates” is not a formal word shouldn’t be used; please consider "estimates" instead.

Pg 18: The economic/social model underlying Table 1 and the discussion in section 1.3.2 is unclear and seemingly inconsistent. How does food waste lead to lower productivity? To profit reductions or loss? To larger numbers of poor people? The basic assumptions about waste and efficiency buried in these results need to be made more transparent – and assumptions equating all waste with inefficiencies need to be reexamined. Even the most efficient food systems produce food loss and waste. Reductions in FLW could raise costs and reduce revenues and profits. Reductions in food waste and hence food production could reduce employment opportunities. On the consumer side, even the most efficient consumers may generate food waste in an attempt to minimize time costs related to shopping, food prep, etc. An economic/social model that explicitly examines the difference between the private and social costs of food waste would help provide a more consistent analysis than presented here.

Pg 18, section 1.3.2: Substantial editing of this section would help reduce the size of the document and improve the flow of thought. How much of the material starting on line 45 and ending on line 4, pg 20 is really necessary for a Report on food waste?

Page 19, #30: This sentence is a very important part of the document with concepts that should further be elaborated and expanded. Please consider expansion, as well as the point made on Page 20, #4-7 (as relevant to food loss and waste).

Page 20, #28: Please note that any entity, be it government, corporation, or civil society can create data and "impacts" with environmental and social responsibility, especially since the definition of sustainability is most often defined differently than other stakeholders. This may not be as relevant as stated.

Pg 21, paragraph starting on line 18: Nice observation.
Page 21, #8: The HLPE may even go one step further; “rich” countries do not always mean equal wealth of the citizens of the country in question. Is food loss and waste based strictly on income and the development of infrastructure? Do persons of all income levels in a "developed" country lose or waste the same amount of food? What about higher income households in developing countries? This doesn't reflect food waste in supply chains, but might be necessary to highlight these discrepancies; and how household FLW is important in all countries and economic classes.

Pg 22: The material starting at line 19 through line 15 on pg 23 is not germane for the discussion at hand. Consider deleting.

Page 22, #4-12: This paragraph is difficult to follow. It would be helpful to have the questions in bullet format or to change the format from a series of questions to a discussion.

Page 22, #26: Please consider the role of climate change in how FLW is altered, both in positive and negative consequences.

Page 22, #53: Typo.

Page 23, #12: Please edit this run-on sentence, which is not grammatically correct.

Page 24, #8: Please note this is a subjective statement, which implies that long term storage of commodities is not desirable. What about preserved or processed food products? Even if the nutrient density is reduced, consuming them as such is a much better option, depending on region and context.

Page 24, #11: Please consider avoiding statements on how natural processes are absolutely detrimental to PHL and FLW methods. Every food item and processed product will spoil eventually; and this process of decomposition itself should not be considered a FLW mechanism requiring corrections.

Page 25, #11. Please state what the carbon footprint components are in this case: the fertilizer, transportation, the carbon derived from decomposition, of all the energy used to produce the food?

Page 25, #47: In this context, should food security policy have more focus on reducing food waste, PHL, and the like, rather than programs on sustainable intensification programs? If programming on reducing food waste is perhaps the focus, rather than land intensification, will food security be better addressed?

Pg 26: The first paragraph is unclear. Why would waste “compound” the negative externalities of mono-cropping and agricultural expansion? As with the other impacts discussed in this section, the impact of food waste on biodiversity should be proportional to its share in total agricultural production. Why any larger?

Page 26, #3: Post-harvest loss (certain cereals perhaps) can in fact be beneficial to certain wildlife in certain situations, especially in integrated farming systems where certain animals can take advantage of grain spillage following harvest, or consuming plant material from certain
croplands or for the use in habitats, such as pastures, which are part of the larger agroecological system.

Pg 26, #4: Please substantiate the claim that food waste represents an important part of solid waste. Here is a useful fact: “The U.S. Environmental Protection Agency estimates that in the United States food waste is the single largest component of municipal solid waste going to landfills, accounting for over 20% by weight.” Source: Environmental Protection Agency.

Page 26, #5: Please elaborate on the role of biofuels, and the byproducts that are created that are not wasted and used as livestock feed, or as fertilizers for cropland.

Page 26, #8: Please clarify that methanes and carbon dioxide gas production will always occur to some degree when food or plant material is decomposed and broken down; the natural process itself is not a detriment.

Page 26, #23: Please elaborate on the concept of “visual product quality.” This “visual” concept is something that developing countries oftentimes account for higher PHL and food waste due to higher expectations and regulations regarding appearance.

Pg 26: The section on waste management could benefit from a more complete discussion of the environmental impacts associated with food waste management.

Page 28, #12-20: Although Pre-harvest loss is obviously important and connected to PHL/FLW, how should the agronomic developmental principles of crop production be tied into food loss and waste? Should such agronomic/environmental issues be considered in this context of food loss and waste? Pre-harvest loss is a plant/animal production question and is not always researched in this context, and the Draft V0 should mention this in some detail.

Page 29, #16: Please clarify that this section, regarding fruit and time of harvest, is based strictly on crop and geographical location.

Page 29, #31: Please make an additional comment that: integrated systems that can take advantage of "potential" post harvest loss can reduce carbon footprint and reduce total caloric waste where it can be converted into livestock/protein sources. We strongly recommend that HLPE note that one of the primary goals is to salvage and maintain food as feed for animals, when the product can no longer be utilized (especially in the context of improving food security), and where integrated systems can reduce losses during harvest, by cleaning up “spillage,” as well as providing fertilizer options.

Page 30, 41: Please do not discount archaic and traditional methods of storage and preservation. There are still some benefits to these, depending on region.

Page 30, #45: Please note the number >13% is subjective. Not all grains have to be dried below 13% for storage or sale, as it depends on the context, usage of product, duration of storage, and methods used.

Page 30, #48: Regarding the 30% statement, is this figure attributable only in grain that was dried improperly? These are usually exclusive (improperly dried grain and grain storage pests), and one does not always cause the other.
Page 30, #54: This sentence is debatable and should be considered for removal. How are farmers encouraged to produce more in this context? Additionally, it doesn't always stem from the fact that they had to sell when prices were low or that they had to get it out of the field immediately.

Page 30, #57: Please clarify that actellic super is an insecticide; not many would be familiar with this product.

Page 31, #13: Please give specific examples as to what crops can be trimmed and utilized.

Page 32, #16: These examples, while important, do not reflect the overall ideal methods of distribution, and are too specific and are based on regional FLW interventions. Language in this section should be more broadly stated in this case.

Page 32, #31-33: The HLPE should clarify on what is considered avoidable and unavoidable loss. Among these examples, which can be fixed? Are the numbers of pigs that die during transport high? There are too many factors that take place that make this number.

Page 32, #44: Please consider eliminating the phrase: “truckload of beets.”

Pg 33, paragraph beginning on line 14: Not all processed foods are of lower nutritional quality. In fact, in some cases, canning or freezing could increase nutritional content of produce, particularly in comparison to fresh products that are past their prime. The discussion should be edited so as not to suggest that FLW reduction through food processing will necessarily lower dietary quality.

Pg 35, #46: Is the problem the distance or the lack of a well-functioning supply chain?

Pg 35, section 2.3.5: Though the contractual practices in low-income countries may be similar to those in developed countries, it is unclear how “payment terms discouraging small growers” or “standards deterring small holders” impact FLW. Section could be cut.

Pg 35, #39: What is the source of these large welfare losses after the HACCP reg? What proportion, if any, is due to increases in food waste?

Page 35, #43: Does this mean that there are too tight of regulations for countries such as the U.S., or that the standards inadequate in countries with poor food safety infrastructure systems and need to tighten their food chain and safety programs?

Page 36, chapter 2.3.8: The chapter heading is unclear – is this in reference to causes for food loss or food waste? It would be helpful to clearly delineate causes for food loss versus food waste.

Page 36, chapter 2.4.1: It would be helpful to clearly define what is meant by “food waste” in the Institution of Mechanical Engineers report – is it the same term as defined in the zero draft?

Pg 36, #6: Please note this sentence is unclear and requires evidence.

Pg 36, #29: In many areas of the document the language seems rather biased against the
food industry. The use of the word “dictatorship” in this line is a standout.

Pg 36, #48: Though the first line in this paragraph points to consumers as “kings” in driving supply decisions, the primary role of consumers is dismissed in the following discussion, which again describes retailers as dictators.

Pg 37, #8: Please provide references for the statistic that in the U.S., in-store food losses are 10% of the total food supply.

Pg 38, #22: Please delete this paragraph. A number of factors determine whether food waste or packaging have larger environmental footprints. Some additional packaging may provide larger net environmental benefits. The assumption that extra radius is negative is unfounded and contradicts the discussion on the top of page 14.

Pg 38, section 2.4.2: The discussion of food waste does not consider an important driver of food waste, namely: time costs. It may be perfectly efficient and logical for a low-income, single mother with high demands on her time (including for child care, work outside the home, housework, and grocery shopping) to buy an extra bag of carrots just in case she needs it during the week. This expenditure is welfare-maximizing if she values the time it saves her (by avoiding an extra trip to the grocery store) more highly than the cost of the bag of carrots, or the proportion of the bag that may be wasted. The assumptions about efficiency and waste underlying the discussion in this section should be reexamined.

Pg 40, #21: U.S. Federal Law does not require manufacturers to use 3 different date labels! This should be rewritten to: “In the United States, Congress has never mandated a national date labeling regime and the only product for which a date label is federally regulated is infant formula. Manufacturers in the United States have developed a number of date labels, including “sell-by,” which indicates the manufacturer’s suggestion for when the grocery store should no longer sell the product; “best-by,” which is the manufacturer’s best estimate of a date after which the food will no longer be at its best; and “used-by,” which is also typically the manufacturer’s estimate of the last date to use the product while at peak quality.” (The report issued by NRDC and Harvard should be the source.)

Page 42, #27: The recommendations for developing and developed nations should be given in general terms, especially since food waste at the consumer level is determined by personal income in most cases, not the economic status of the entire country.

Page 42, #32: The Technical Solutions Recommendations paragraph is just a short list of examples that have occurred around the supply chain, specific to certain areas. What is needed in this section is a clearer policy recommendation for technical solutions, something accomplished by civil societies, governments, the companies/corporations themselves. What is the role of private-public partnerships, and have there been successful FLW interventions? What is being done in the context of changing the mentality and behavioral components of the region or consumer base?

Page 44, #16: Is this a recommendation for stronger regulation and control measures by governments? If so, it should be clarified as such.

Page 45, #39-40: Please avoid the promotion one particular technology over another.
Page 47, #1. This section could be given greater weight, given its importance for FLW reduction. Education at all levels, for consumers, producers, and those working along the supply chain, offer some of the best technology transfer mechanism for inducing positive change.

Page 49, #45: Please avoid any language or tone that may be interpreted as condescending. The goal should not be to change entirely how certain societies eat and what products they consume, but rather support creating infrastructure that allows for certain foods or byproducts to be used in some other fashion or capacity.

Pg 50, Box 7: The “USA” did not carry out this work. The opening sentence should be changed to “A university study in the United States, examined the impact on plate waste of switching from a tray to a tray-less delivery system in a university dining hall.”

Pg 53: The discussion in 3.7.1 on economic aspects is well-rounded.

Pg 55: Food banks are not the only organizations recovering surplus food. In the United States, a growing number of organizations--both charitable and for profit--are working to recover wholesome excess food to provide low or no-cost meals to families in need. These range from student groups that work to transform unused food from dining halls, grocery stores, restaurants, and farmers’ markets into meals for those in need – to organizations that link food service operators that have surplus food to local hunger relief agencies. For example, one of these groups, called Rock and Wrap, provides 100,000 meals every week from the leftovers from schools, hotels, sporting events, rock concerts, political gatherings, film shoot sand television tapings.

Page 55, #4: The idea that more affluent producers can alter global market prices by improving their PHL is questionable, at best; this concept may undermine strategies to work with both smallholder and large-scale producers. There will always be FLW. Improved infrastructure probably opens the demand for more commodities and products, if it is being sold or disposed properly and not wasted.

Pg 55, #24: Please address the role of integrated horizontal agriculture systems, which can reduce FLW and PHL more readily and improve food security.

Pg 57, #7: The sentence describing the Good Samaritan Act is incorrect. It should be changed to: “In the United States, the Bill Emerson Good Samaritan Food Donation Act provides liability protection to food donors. Its objective is to encourage the donation of food and grocery products to qualified nonprofit organizations. Under this Act, as long as the donor has not acted with negligence or intentional misconduct, the company is not liable for damage incurred as the result of illness.”

Pg 57, #21: The description of tax incentive in the US is incorrect. The sentence, “In the US, food donation is eligible for an enhanced tax deduction and the money donated can be...” should be replaced with: “The U.S. federal government provides enhanced tax deductions to businesses to encourage donations of fit and wholesome food to qualified nonprofit organizations serving the poor and needy. Qualified business taxpayers can deduct the cost to produce the food and half the difference between the cost and full fair market value of the donated food. In addition, the U.S. Federal Food Donation Act of 2008 specifies procurement contract language encouraging
Federal agencies and contractors of Federal agencies to donate excess wholesome food to eligible nonprofit organizations to feed food-insecure people in the United States.”

Pg 59: As mentioned in the introductory comments, the following four U.S. policies/programs should be added to the section on public policies for reducing food loss and waste:

- The U.S. Food Waste Challenge, which was launched by the U.S. Department of Agriculture (USDA) and the U.S. Environmental Protection Agency (EPA) in June 2013, calls on entities across the food chain to reduce food loss and waste in the United States; recover wholesome food for human consumption; and recycle discards to other uses including animal feed, composting, and energy generation. The goal of the U.S. Food Waste Challenge is to lead a fundamental shift in how food and food waste is managed in the United States. To join the Challenge, participants list the activities they will undertake to help reduce, recover, or recycle food waste in their operations in the United States. The Challenge includes a goal of 400 partners by 2015 and 1,000 by 2020. The U.S. Food Waste Challenge is bolstered by the EPA’s Food Recovery Challenge, which offers participants access to data management software and technical assistance to help them quantify and improve their sustainable food management practices.

- The Bill Emerson Good Samaritan Food Donation Act provides liability protection to food donors. Its objective is to encourage the donation of food and grocery products to qualified nonprofit organizations. Under this Act, as long as the donor has not acted with negligence or intentional misconduct, the company is not liable for damage incurred as the result of illness.

- Internal Revenue Code 170(e)(3) provides enhanced tax deductions to businesses to encourage donations of fit and wholesome food to qualified nonprofit organizations serving the poor and needy. Qualified business taxpayers can deduct the cost to produce the food and half the difference between the cost and full fair market value of the donated food.

(7) The U.S. Federal Food Donation Act of 2008 specifies procurement contract language encouraging Federal agencies and contractors of Federal agencies to donate excess wholesome food to eligible nonprofit organizations to feed food-insecure people in the United States.

Pg 63: The U.S. Department of Agriculture funds research into waste reduction technologies and the valorization of the waste stream. Currently, a number of projects are underway to develop new technologies for reducing spoilage of fresh foods and develop new products from waste materials at food processing facilities:

- In collaboration with an industry partner, develop fruit- and vegetable-based powder coatings to inhibit spoilage of fresh-cut produce.

- Develop in-package plasma sterilization system to lengthen shelf life of fresh poultry meat.

- Develop new design and operational procedures for retail display cases so as to maximize shelf life of displayed fresh and fresh-cut produce.
• Investigate genetic/breeding options for inhibiting sprouting of potatoes during storage.

• Investigate use of 1-methylcyclopropene (1-MCP), refrigeration, and alternative packaging to delay ripening of strawberries, blueberries and tomatoes during shipping and storage.

• Develop, in collaboration with industry partner, active packaging to extend fruit and fresh-cut produce shelf life.

• Develop, in collaboration with industry partner, technology to utilize olive-mill wastewater in body-care or beverage products.

• Develop, in collaboration with the University of California-Davis, processes to produce new oils and dietary-fiber products from fruit and vegetable seed byproducts.

• Develop grape seed flour, a byproduct of wine making, as a healthy food ingredient that helps to lower the risks of heart disease and obesity.

• Develop 2-stage anaerobic digestion of potato-processing waste (mostly peels) to produce a substitute for peat moss, an imported non-renewable matrix for potting and garden soils.

• Develop biodegradable biopolymers from polylactic acid and sugar beet pulp, a waste product from sugar beet processing.

Again, the U.S. government welcomes the Report on Food Losses and Waste in the Context of Sustainable Food Systems and thanks the HLPE for organizing the consultation process.

41. Ximing Cai and Majid Shafiee-Jood, University of Illinois at Urbana-Champaign, USA

We applaud authors’ efforts to this report on food losses and wastes (FLW), which has comprehensively addressed the various aspects of FLW impacts and brought up important issues to better explore the opportunities to reduce wastage in the food supply chain (FSC).

We are pleased to take this opportunity to provide a few comments on the draft report, mainly from our engineering perspectives, which can be relevant to the 4th and the 6th aspect.

1. In chapter 1 (sections 1.3.3 and 1.3.4), the authors clearly discuss how FLW can threaten food security and the environment. Nevertheless, some other important issues can be added such as energy used in agricultural production and water quality related to the overuse of fertilizers, which are important factors in environment sustainability as highlighted in the current report, especially in the context of growing food demand and associated increasing environmental degradation in the future. Moreover, it is essential to consider the economic values
associated with those resources, which may raise attention of decision makers and policy makers. Although resources (e.g., water, land, etc.) are not necessarily constraining in some regions in the world right now and there might be no economic incentive for decision makers to invest on different FLW reduction approaches, climate change and population growth may subsequently bring up issues of limiting water resources and agricultural land availability.

Moreover, considering food security, beyond recognizing FLW reduction as an effective option to enhance food security in the world, the report may also discuss engineering and technology options, as well as institutional development.

2. In chapters 3 and A2 of the report, the authors propose different solutions to reduce the FLW and improve FSC efficiency. It would be meaningful to relate the solutions to recent advances in science and technology, (particularly in items listed in chapter A2) such as the web tool for identifying insects in stored grain, aWhere’s weather tool which provides weather information for farmers mainly in developing countries, using cost-effective new materials to build better storage especially in farmer’s house in developing countries, etc. Such discussion would provide implications for science and technology community in terms of FLW prevention.

3. Finally, as sections 3.7.1 and 3.7.2 wisely indicate, the indispensable requisite to implement suggestions and solutions of FLW prevention/reduction is a comprehensive value chain model which can encompass the interrelations and dynamics among different components of FSC in an economic context and through participatory approach. Such a model, at either global or regional scale, can provide valuable insights not only for researchers and scientists, but also for decision makers to efficiently explore different approaches and opportunities to assess the costs and benefits of adopting new technologies.

42. Government of Australia

Australia considers food losses and waste a key issue affecting long term global food security. Australia welcomes the zero draft HLPE report on Food Losses and Waste in the Context of Sustainable Food Systems.

Overall comments

The issue of food losses and waste (FLW) has scientific, policy, social and environmental considerations and requires a multi-disciplinary approach at country, regional and global levels. Reducing FLW would make an important contribution to world food security. However, the report could better explain the policy problem—why governments should be acting.

The report considers reducing FLW in support of food security objectives as well as to support environmental objectives. While there is some overlap, the nature of the problem and possible solutions are likely to be very different. The report could be restructured to consider FLW in the context of food security and environmental objectives separately. Then, for each objective the report might examine the importance of FLW (and reducing it), technical (and other) solutions to
reduce FLW, the rationale for governments to act, and possible policy options. This could increase clarity.

The report should better show how appropriate trade and economic policies could help to alleviate FLW. For example, FLW can be addressed by reducing the use of trade protections and agricultural subsidies which can encourage over production. Removing import and export trade barriers so that food can move more freely to where it is needed most will also assist in addressing FLW. We suggest the report examine the positive role open trade can have.

Overall, the paper highlights most of the major aspects of FLW in the context of sustainable food systems. The paper adequately describes the present conditions and challenges, but lacks a recommended action plan that can alleviate FLW with achievable short to medium term outcomes.

Australia notes that food losses and waste is being explored in a range of multilateral fora. In further developing the report, the HLPE should consider all activities in the space to ensure there is no duplication of effort. For example, APEC is progressing a Chinese Taipei led project ‘Strengthening Public-Private Partnership to Reduce Food Losses in the Supply Chain’.

**General research related comments**

The report indicates that there is a lack of detailed evidence at scientific and policy levels on which to design prospective solutions. Further research into FLW should be a priority consideration for the HLPE. Given the broad reach of FLW, research considerations would need to be realistic in terms of funding, partnerships and key stepping stones as a way forward. A supplementary paper on research deficiencies, priorities and objectives may add value to the report.

The report should consider the impact of increased climate variability in many countries, which adds to the risk of further adverse FLW outcomes. Demographic trends and consumer preferences also warrant further investigation as a key influence on future levels of FLW. Demographic trends and consumer preferences should particularly be considered in the context of urbanisation, which heightens the need for adequate infrastructure and market access opportunities for smallholders in developing countries.

Land and water degradation in many developing countries is impacting negatively on both productivity and food losses, including decreases in food quality and nutritional losses, which are an important component of FLW.

The paper needs to more fully consider the role of appropriate policy settings in addressing FLW. Trade, on the basis of comparative advantages in food production, can help reduce FLW both by enhancing production efficiencies and enabling sufficient scale to facilitate technology adoption and returns in infrastructure utilisation. Policy settings which encourage over production, emphasise self sufficiency or restrict trade can add to the risks of FLW.

**Response to specific questions**

1. *How to measure Food Losses and Waste (FLW)?* FLW can be measured from different perspectives (weight, caloric and nutrition value, monetary value...) with different approaches...
presenting pros and cons, and methodological issues. Do you think that the V0 draft covers properly the aspects of FLW measurements, including nutrient losses? Is there additional evidence about estimates of past and current food losses and waste, which would deserve to be mentioned?

Australia notes that much data about food losses and waste is fragmented and disaggregated. Mason et al. (2011) assessed 1262 studies of food waste in Australia and identified gaps in data. This information may help identify possible data gaps in other countries.

2. **What are the key policy aspects to reduce food losses and waste in order to improve the sustainability of food systems, in different countries and contexts?** Is there evidence about the potential of economic incentives, and which ones (taxes, etc.)? What margins for policies in the context of food safety laws and regulations, such as expiration dates?

FLW is influenced by policies in a number of areas—from lifestyle related programs such as those addressing obesity and over consumption to waste management and recycling. Australia considers that trade and economic policy should be recognised as an important part of reducing FLW. Some incentives can encourage over-production and lead to waste, and trade can also play an important role in allowing surplus food to move to market.

3. **Can respondents submit concrete initiatives or successful interventions having reduced food losses and waste, currently taking place, conducted by governments, stakeholders, private sector, civil society?**

In Australia a number of private sector organisations conduct food rescue efforts from donated, safe and surplus food. The largest food charities in Australia are: Foodbank (all states and territories), FareShare (Victoria and NSW), OzHarvest (NSW, ACT, SA) and Secondbite (Victoria and Tasmania). These organisations recovered over 56,000 tonnes of edible food between 2007 and 2010 (Mason et al. 2011).

Advances in technological innovation can help find alternative uses for unavoidable food waste. For example, there is potential use for compounds in mango peels to help reduce obesity (University of Queensland 2012), and of pomegranate peels to create silver nanoparticles, a useful component in biotechnology and other sectors (Ahmad & Sharma 2012).

The report should consider interventions and initiatives which may benefit FLW without being explicitly established for that purpose. Many institutions, such as the ACIAR and other research partners, undertake a range of research projects with direct or indirect implications for food losses and waste. The justification of such research is more often articulated in terms of productivity and sustainability rather than the FLW gains which can also be harnessed.

For example, the draft paper mentions an example of an ACIAR two stage grain drying technology project in Southeast Asia. Other ACIAR projects—outlined in the ACIAR Annual Operational Plan—which have direct or indirect benefits for food loss and waste include projects on:

- integrated pest management
- crop breeding for climate change management and drought resistance
- livestock production systems and animal health
- agri-business research and value chain improvements
Research projects undertaken primarily for productivity or sustainability which also reduce food losses and waste are also undertaken at multilateral levels by the CGIAR network and individual CGIAR research centres. There is potential to use this research for FLW objectives. Better coordination of existing research would allow it to have greater impact and adoption. There is also a need for discrete research projects to add further scientific evidence and factual data on global regional and national level FLW issues. Research could be broadly divided between better analysis and database of current conditions and constraints.

4. **What is the cost-benefit potential (and barrier to adoption) of different options, including technologies, to reduce and prevent food losses and waste at different stage of the food chain?**

Nil comment.

5. **Cold chains and cold storage (including adaptable low-cost technologies for cold storage such as evaporative cooling, charcoal coolers, zeer pots, etc): what could be cost-effective and adapted solutions to reduce food losses and waste and to improve the sustainability of food systems, given the diversity of national contexts?**

Nil comment.

6. **Systemic approaches and solutions to reduce food losses and waste: Reducing food losses and waste is a matter which concerns the coordinated joint action (and change) by many actors, producers, retailers, consumers, private sector, governments. Which systemic solutions/approaches would be the most effective to reduce FLW, towards more sustainable food systems? At that systemic level, which drivers would create leverage for radical change?**

Trade

Australia considers that a very important part of the global response to food insecurity will be incentives in the market and put forward by individual governments that contribute to FLW. Australia is seeking improved global food security by supporting a rules-based multilateral trading system and open markets, supported by appropriate economic and trade policies and good governance practices at global, regional and national levels.

The report should consider the role of agricultural subsidies, which encourage production beyond the extent dictated by demand, in FLW. Removing import and export trade barriers so that food can move more freely to where it is needed most will also assist in addressing FLW.

**Food chain and logistics**

As emphasised in the HLPE report (particularly section 2.35), logistical and communication barriers between different actors in an increasingly complex food chain are a key challenge in reducing FLW. Information and communication technologies and analytical and decision support tools may be able to address this gap by sharing FLW data facilitating planning for appropriate waste management strategies. A few example tools are provided below for the HPLE’s consideration:
• An online waste exchange and resource recovery initiative to facilitate regional farmers and businesses in identifying collaboration opportunities to reduce and divert waste from landfill (Fyfe et al. 2010).

• Analytical tools for planning and assessing alternative waste management systems with bioenergy potential at a regional level. This tool is similar to a decision support system, and allows the comparison of different scenarios when developing new bioenergy plants and to model how they affect the energy and nutrient flows. The feasibility of future bioenergy applications could potentially be integrated with similar analytical tools (Jakrawatana et al. 2007).

**Consumer behaviour**

In developed countries, consumer behaviour is a significant contributor to FLW. Profiling household attitudes and behaviours on food waste using qualitative and quantitative methods may be useful to identify the drivers of consumer food waste and effectively design and target programs to reduce consumer food waste (Parfitt et al. 2010).

**Specific comments**

*Page 11, lines 32-45.*

The HLPE report should reference the FAO definition of food security.

*Page 24, lines 3-7.*

The report contends that making higher quantities of natural foods available would ensure health security. This analysis is too simplistic. Reducing waste alone will not lead to improved nutritional outcomes. Consumer behaviour and preferences will continue to play a significant role as people will have to want to buy nutritious and healthy food.

**Specific comments on the recommendations of the paper**

Australia notes that the recommendations are under development. The background information and principles are well presented and many suggestions are logical but the missing link is how to trigger the most realistic drivers for early, medium and longer term actions. It could be useful to start with some early actions to start the process of change. We suggest consideration of the following matters:

• Examination of current multilateral, regional and national research themes which have implications for FLW and means by which uptake of such research can be broadened.

• Related to above the need to examine how agricultural research and rural development programs can be better combined to address the implementation of corrective FLW measures.

• A greater push to integrate supply chain approaches to reduce waste and losses by governments and private sector collaborators given the public and private benefits of reduced losses. Such an initiative would need to elaborate on the different challenges that developed and developing countries face and the dynamics of such challenges.
Further attention to policy bottlenecks that reduce incentives to address FLW by producers and consumers and scope to link policy to wider initiatives on dietary health, food safety, biosecurity, and trade/market access.

Concluding comments

Australia thanks the HLPE for developing a zero draft of Food Losses and Waste in the Context of Sustainable Food System and is happy to engage with the HLPE to provide comment on future drafts.

References

Australia suggests the following references may be of assistance to the HLPE.


Baker, D 2010, Measuring and addressing the ecological impact of household food waste in Australia, 16th Biennial Australian Association for Environmental Education Conference-Leading Change: Living for One Planet 26th-30th September 2010, Australian National University Canberra, ACT.

Charles IFE Pty Ltd 2001, Total waste management system at Berrybank Farm Piggery, Charles IFE Pty Ltd.

Fyfe, J, Mason, L, Boyle, T & Giurco, D 2010, WasteNot: the streamline resource exchange. Background, development and case studies, Prepared for Auburn City Council and Parramata City Council by the Institute for Sustainable Futures, University of Technology Sydney.


43. Associated Country Women of the World (ACWW), United Kingdom

Draft contribution to High Level Panel of Experts consultation on food losses and waste

The Associated Country Women of the World appreciate the opportunity to contribute to the HLPE report.

Like others, we applaud the attention paid to women. But we call for specific measures to determine women’s needs and integrate them into policies. Organisations like ACWW, which have large networks of grassroots women’s groups, are well-placed to collect information in an inclusive way. Therefore NGOs such as ours would benefit from support in collecting such information, particularly in the remote areas where many of our members reside.

We would like to call attention in particular to the role of rural women, who are often neglected by funders and policymakers. For instance, the Network of Rural Women Producers – Trinidad & Tobago, one of our member societies, provides training in the processing of mango products, which helps to reduce spoilage. Especially in 2014, the International Year of Family Farming, the international community should be looking for examples of best practices from smallholder farmers, rural residents and grassroots organisations. These groups are at the core of ACWW’s work. Measures targeting these groups should be culturally appropriate and acceptable (in terms of both cost and technology).

ACWW promotes vegetable gardening through its “Grow locally, benefit globally” campaign. One of our findings from both this campaign (which has been deployed worldwide) and our agricultural projects (which are mainly implemented in developing countries) is that people have a strong incentive to reduce food losses and waste when they have a strong connection to the food they both produce and consume. Our project beneficiaries tend to appreciate having ownership over food production. For instance, one project seeking to improve the nutrition of pregnant women in rural Cameroon became more successful after switching from a vegetable distribution model to a “one child, one vegetable plot” strategy. Vegetable consumption increased, and thus waste was reduced, when women became producers rather than simply recipients. We therefore urge the scale-up of this type of small-scale food production.

Specifically for consumers in wealthy countries, simple measures to reduce food waste can be very effective. Under the heading “Why waste food”, ACWW has distributed recipes that make use of leftovers. While this cooperative and practical approach is effective for our members, a combination of strategies – economic incentives, peer pressure, etc. – may be most helpful for others. Thus a system for sharing best practices worldwide is urgently needed.

It would be helpful for the final report to include specific recommendations, broken down by target group. We would be particularly interested in the recommendations for NGOs, which are valuable intermediaries between project beneficiaries and policymakers.

http://www.acww.org.uk
un@acww.org.uk

http://www.fao.org/fsnforum/cfs-hlpe
44. Norwegian Ministry of Trade, Industry and Fisheries, Norway

Thank you for the opportunity to comment on the V0 version of the HLPE report Food Losses and Waste in the Context of Sustainable Food Systems. Our comments are related to fisheries.

In some types of fisheries there are problems with discards. This is a type of food waste that should be avoided. FAO has developed guidelines on this issue: International Guidelines on Bycatch Management and Reduction of Discards (adopted by the Committee on Fisheries at its 29th session in 2011): http://www.fao.org/docrep/015/ba0022t/ba0022t00.pdf. This issue ought to be included in the final report.

We would also like to underline the importance of quality standards throughout the production chain. As regards waste in fisheries, an important aspect relates to the handling of catches at an early stage. In order for the end-user product to remain food as long as possible, it is important to ensure quality standards also prior to industrial processing.

In order to proceed in this important field of study, it is important to develop harmonized methods for measuring food losses and food waste.

45. Nico van Belzen, Netherlands

Thank you for the opportunity to comment. I would like to suggest amending or deleting Table 2 on p. 63, where 2-6% of yoghurt production and 85-90% of cheese production is reported to end up as a side stream.

The vast majority of yogurt contains 100% of the milk input. There is some strained yogurt produced where some aqueous phase is removed, but most of this is now produced using ultrafiltration or mechanical separation and the removed aqueous phase ("whey") is processed in the same way as cheese whey.

Regarding cheese, the image of cheese whey as an inconvenient byproduct is outdated. Whey and products manufactured from whey are now seen as very valuable products by the dairy sector. They are being used as ingredients in infant formulae, sports and fitness drinks and many other applications in human nutrition. Lactose is also used as pharmaceutical excipient. The value of whey is illustrated by the global trade in whey powder and non-liquid whey-based protein products (HS 0404), which grew by 6% to 1.5 million tons in 2012 (IDF World Dairy Situation Report 2013).

Excellent examples of cheese whey valorisation exist and their inclusion would enhance the document.

References (examples, not an exhaustive list)


46. Government of Argentina

Comentarios generales

- En primer lugar debe destacarse la gran cantidad de información volcada en el documento. Al respecto, dado que se percibe una cierta repetitividad en los conceptos, sería deseable rever la redacción para facilitar su lectura.
- Por lo dicho en el punto anterior, debería darse un tiempo mayor y una participación más amplia para emitir una opinión más robusta sobre el documento, entendiendo que la temática así lo amerita. Esto es clave si se piensa en la posibilidad de que los países desarrollados podrían escudarse en algunas cuestiones relacionadas con FLW para imponer barreras para-arancelarias.
- Se manifiesta una total coincidencia acerca de la complejidad de la problemática y la necesidad de un abordaje sistémico, dentro del cual entendemos que los estudios socio-culturales deberían tener un peso importante.
En cuanto al diagnóstico plasmado en el documento, es de destacar la gran variabilidad que existe entre los países (incluso la ausencia de datos en una gran cantidad de ellos) por lo que se sugiere que, entre las iniciativas propuestas y como primera medida (punto 4.1 del documento) se establezcan, en la medida de lo posible, estudios nacionales con grupos interdisciplinarios para establecer los valores de FLW estableciendo una metodología única que permita establecer valores comparables entre los mismos.

Luego de establecido un diagnóstico más ajustado/preciso, si sería necesario establecer un programa de acción elaborado por paneles de expertos en las distintas dimensiones que intervienen en el problema de FLW. Este programa, elaborado a nivel global, debería generar herramientas y recomendaciones que pudieran ser adaptadas según las necesidades locales (esto, como se menciona en el punto anterior, surgiría de los diagnósticos nacionales).

Toda acción que se tome para prevenir o reducir las pérdidas y desperdicios de alimentos o sus materias primas no debería obstaculizar su producción o distribución, incluida la distribución internacional, a fin de no menoscabar el crecimiento de la oferta de alimentos.

Finalmente, consideramos que la importancia de la temática merecería una urgente y amplia discusión en el Comité Mundial de Seguridad Alimentaria, focalizando en el fortalecimiento de datos disponibles sobre pérdidas y desperdicios de alimentos.

Comentarios específicos – Respuesta al Cuestionario.

1. How to measure Food Losses and Waste (FLW)? FLW can be measured from different perspectives (weight, caloric and nutrition value, monetary value…) with different approaches presenting pros and cons, and methodological issues.

Do you think that the V0 draft covers properly the aspects of FLW measurements, including nutrient losses?

Is there additional evidence about estimates of past and current food losses and waste, which would deserve to be mentioned?

No estamos en condiciones de responder integralmente a toda la pregunta en esta instancia. No obstante ello, creemos que medir los FLW en calorías puede ser interesante en términos de contar con una cifra que muestre las calorías producidas en vano para luego ser descartadas. Sin embargo, el cuerpo humano no sólo necesita calorías, sino también vitaminas, minerales, proteínas, agua, entre otras sustancias que en muchos casos suelen estar en déficit, aún cuando la alimentación sea rica en calorías. A modo de ejemplo y teniendo en cuenta la información suministrada por FAO, si la medición se tomara en calorías, el 45% de los desperdicios de frutas y verduras que señala el informe de la FAO no serían medibles, pues tienen escaso o nulo valor calórico, aún cuando su consumo sea indispensable por su aporte en vitaminas, minerales y fibra.

Por otra parte si queremos relacionar las calorías perdidas con su valor potencial de mercado estaríamos perdiendo de vista la diferencia que existe en el precio de una proteína, un hidrato de carbono, o el hierro, tan necesarios en la dieta. etc. Sin embargo, creemos que en la práctica muchos países todavía no cuentan con información sobre las pérdidas y desperdicios reales de alimentos ni siquiera en volumen. Por tal razón estimamos que en una primera etapa se deberían propiciar estudios en los países para que puedan llevar adelante esta primera aproximación al
problema, a los efectos de dimensionar su impacto para la seguridad alimentaria y posteriormente poder estimar otras cuestiones como la pérdida de nutrientes por tipo de producto o grupos de productos afines, a los efectos de dimensionar su impacto para la nutrición. Queda claro que el punto de partida debe ser un debate más amplio sobre el tema.

En otro orden, consideramos que la situación ideal sería tender a “basura cero”, encontrando alternativas que permitan la reutilización de las pérdidas y desperdicios que se generen en cualquier etapa de una cadena, no obstante es un proceso que lleva mucho tiempo pues se requiere de educación, capacitación, conocimientos, tecnología, financiamiento e inversiones.

En la línea 17 del Borrador Cero se presenta la definición de “Perdida de Alimentos” o “Food Loss”, la cual pareciera presentarse acotada solo a las pérdidas en agricultura, es decir granos, semillas, legumbres, oleaginosas, hortalizas, etc. Creemos que esta definición debería ser ampliada. Del mismo modo, al referirse a “dry matter” o “materia seca” se estarían excluyendo las pérdidas que se producen en la ganadería destinadas a la producción de carnes y lácteos, como también la pesca.

En este sentido, se propone agregar a la definición el concepto de “inedible fractions” o “fracciones no comestibles”, ya que debido a diferencias culturales, las fracciones que se desperdician en algunas poblaciones por considerarse no comestibles, pueden ser alimentos para otras poblaciones. Estas diferencias pueden encontrarse entre diferentes clases sociales, entre distintos países o regiones, etc. Un claro ejemplo son las vísceras de animales.

Además, la definición de “pérdida de alimentos” puede resultar imprecisa en relación a la variabilidad que puede existir en los procesos de producción de cada país o región; es decir distintos grupos de productores para llegar a un mismo producto final pueden utilizar distintas partes de los alimentos y desechar otras. En la fabricación de embutidos por ejemplo, algunas industrias utilizan la totalidad del animal y otras desechan algunas partes por razones de equipamiento, formulación, estándares de calidad, destinatarios, etc.

La medición de pérdidas y desperdicios de alimentos y las posibles acciones para su prevención debería englobar toda la cadena productiva, de distribución y de consumo. Esto incluye el análisis de las pérdidas y desperdicios que pueden generarse a partir de restricciones sanitarias, fitosanitarias u otras de carácter técnico sin evidencia científica a lo largo de toda la cadena. En tal sentido resaltamos la importancia de que tales normas se ajusten a los compromisos asumidos multilateralmente en el ámbito de la OMC.

Obviamente consideramos que la definición sobre pérdidas y desperdicios de alimentos debe ser un punto central de esta negociación.

2. What are the key policy aspects to reduce food losses and waste in order to improve the sustainability of food systems, in different countries and contexts?

Is there evidence about the potential of economic incentives, and which ones (taxes, etc.)?

What margins for policies in the context of food safety laws and regulations, such as expiration dates?
En esta instancia no contamos con información al respecto. Sin embargo deseamos llamar la atención respecto a que no estamos de acuerdo con incluir la noción de “sistemas alimentarios sostenibles”, pues no ha sido acordada multilateralmente y su impacto es muy difícil de dimensionar con los elementos actuales disponibles.

Al margen de lo expuesto, se considera indispensable dar a conocer la problemática que existe en torno a las pérdidas y desperdicios de alimentos, así como también difundir sobre la necesidad de cuidar el agua potable, los suelos, la flora y fauna, ya que es el primer paso para entender y poner en práctica la sustentabilidad del sistema, porque hay una clara falta de conciencia de la sociedad y otros estamentos respecto de los alcances que tiene la pérdida y desperdicios de alimentos.

Se considera que las acciones que se realicen dentro de los sistemas de producción de alimentos se deben llevar a cabo con un abordaje integral, incluyendo todas las etapas del proceso desde las primeras hasta el final de la cadena, pero esto es complejo, requiere organización, inversiones, capacitación y un cambio de mentalidad en todos los actores y especialmente tiempo.

En cuanto a alguna herramienta concreta que se puede mencionar que contribuiría a evitar el desperdicio de alimentos creemos que el etiquetado de alimentos es un instrumento que debe mejorarse con este fin. El Código Alimentario Argentino establece una serie de datos que deben detallarse obligatoriamente en el rotulado de alimentos envasados, entre estos se destacan con este fin la fecha de vencimiento, las temperaturas de almacenamiento y refrigeración, la forma de preparación si es que lo requiere, entre otros.

Con respecto a las fechas de vencimiento y formas de almacenamiento, sería interesante reforzar la educación al consumidor de manera que le permita respetar y seguir correctamente las indicaciones, y así evitar los desperdicios de comida que todavía se encuentra apta para consumo humano.

Es importante reconocer sin embargo, que cada país adopta distintas formas de expresar la fecha de vencimiento y esta diversidad puede ser un problema para que los consumidores comprendan la naturaleza de las fechas que se encuentran en la etiqueta. En ocasiones es imposible distinguir si se trata de la fecha de elaboración, o de vencimiento de los productos. El Codex Alimentarius ha acordado revisar el marcado de la fecha en su norma de etiquetado de alimentos preensacados.

Otra información para destacar del rotulado es la que detalla la forma, lugar y temperaturas de almacenamiento de los alimentos, que si no son tenidas en cuenta pueden llevar al deterioro acelerado del producto, y posteriormente puede transformarse en desperdicios. Del mismo modo, la forma de preparación de un producto se torna indispensable en algunos alimentos ya que un error en la cantidad de ingredientes o en la forma de cocción puede conducir a su posterior desecho.

3. Can respondents submit concrete initiatives or successful interventions having reduced food losses and waste, currently taking place, conducted by governments, stakeholders, private sector, civil society?

Existen muchas iniciativas para reducir las pérdidas y desperdicios de alimentos, algunas impulsadas por las instituciones públicas y otras por el sector privado u organizaciones no gubernamentales. En muchos casos se trata de iniciativas orientadas a la reutilización de los
desperdicios de alimentos o su reciclado y no a la reducción de las pérdidas en sí, promoviendo a través de estas iniciativas público privadas la creación de nuevos puestos de trabajo.

En Argentina, en Junio de 2013, la Coordinadora de las Industrias de Productos Alimentarios (COPAL) publicó un documento en el cual se informan las acciones de Responsabilidad Social Empresarial que están llevando a cabo las industrias de alimentos argentinas. En este sentido, se extrae del mismo documento algunos ejemplos de las acciones específicas relacionadas con la disminución de pérdidas y desperdicios de alimentos de ciertas empresas, a saber:

**Grupo CANALE**

Programa de Compra Conciente y Consumo Responsable: Programa destinado a la comunidad, que colabora en la *toma de conciencia del consumidor al momento de realizar la compra doméstica*, como leer el etiquetado nutricional, las fechas de vencimiento y modos de conservación. Además fomenta las prácticas higiénicas del manejo de los alimentos en los hogares.

**IMPACTO:** Más de 90 escuelas participan del programa y unos 2000 niños han utilizado el material en las aulas. En la misma línea de trabajo se han capacitado más de 100 docentes en los últimos tres años.

**Donaciones o ONGs:** Alianza con el Banco de Alimentos y coordinación de donaciones con las organizaciones que lo soliciten.

**Molinos Río de La Plata**

Implementa actividades bajo la campaña *PIENSA. ALIMENTATE. AHORRA*: Propone motivar a los empleados de su empresa en la reducción de la huella alimentaria mediante la difusión de videos, materiales gráficos y actividades que logren disminuir los desperdicios de alimentos.

**MONDELEZ**

Programa de Recupero de Frutas y Verduras: Junto con la Red Argentina de Bancos de Alimentos llevan a cabo este programa cuyo principal objetivo es mejorar la alimentación de niños en edad escolar rescatando frutas y verduras frescas destinadas a enriquecer la dieta de personas que concurren diariamente a las organizaciones que reciben donaciones en forma habitual.

Esta iniciativa consiste en *recuperar aquellas frutas y verduras que aun siendo aptas para el consumo humano, no se comercializan por presentar imperfecciones*, o por ser de un tamaño muy pequeño o en su caso, por no reunir los altos estándares que requiere la exportación. A veces inclusive, son frutos que no se cosechan por resultar anticuomformico.

Además, en el marco del programa se realizan capacitaciones a los responsables de los Bancos de Alimentos y a las organizaciones receptoras (comedores, escuelas, etc.) en términos de higiene, manipulación de alimentos y cocina.

**IMPACTO:** De 2009 a 2012, se rescataron 3.681.670 Kg. de frutas y verduras frescas que enriquecieron la dieta de 230.262 personas que concurren diariamente a las 1.572
organizaciones. Este programa se lleva adelante gracias a la donación de U$S 150.000 que la empresa realizó a la Red Argentina de Bancos de Alimentos.

**Programa de Donaciones:** Está vigente desde 2002. Los beneficiarios son escuelas, comedores y ONG’s. La mayoría de las donaciones son realizadas a través de la Fundación Banco de Alimentos.

**IMPACTO:** Mondelez International lleva donado al Banco de Alimentos de Buenos Aires más de 450,000 toneladas de productos desde el inicio del programa, distribuidos a 560 organizaciones, que ofrecen comida a 88.000 personas cada mes.

**AMBIENTE:** La empresa ejecuta sistemas de Gestión Ambiental e Indicadores de Desempeño Ambiental, que permiten monitorear y evaluar cada progreso. A partir de 2005, desarrolló un plan de acción para organizar la implementación de iniciativas ambientales en todas las operaciones globales. Con este plan de acción se lograron significativos progresos en la reducción del consumo de energía y agua, las emisiones de CO2, la generación de residuos y envases, y el transporte.

**IMPACTO:** La Planta de Pacheco fue distinguida con el premio Regional Sustainability Award por haber reducido más del 60% el total de residuos derivados a rellenos sanitarios (periodo 2005-2008) y la de Villa Mercedes recibió esa distinción por haber reducido el consumo de agua un 46%, mediante mejoras en el proceso en el mismo período.

**Pepsi Co**

**Inclusión socio-económica de los recolectores de materiales reciclables:** Proyecto desarrollado en alianza con BID/FOMIN, Avina y Organización Román. El programa está en vigencia desde el año 2010. Los objetivos son contribuir con el reciclado de residuos sólidos y el cuidado del medioambiente, mejorar la inclusión económica, social y cívica de los recicladors informales.

**IMPACTO:** Por año más de 1.000 recuperadores y sus familias en 3 provincias (Buenos Aires, Córdoba y Entre Ríos), desde el 2010.

**Mastellone Hermanos**

**Campaña de reciclado de aceites vegetales:** Desde 2010, Mastellone Hermanos trabaja en conjunto con el Municipio de General Rodríguez con el fin de reciclar los residuos de aceite vegetal resultantes de su comedor principal ubicado en Planta Central. De esta manera, no sólo promueve la propuesta de reciclado del OPDS (Organismo Provincial para el Desarrollo Sustentable) en torno al tema, sino que también contribuye con una causa social destinando al Cuerpo de Bomberos Voluntarios parte de la recaudación por cada litro de aceite entregado a la empresa recicladora. Cabe destacar que en 2011, Mastellone Hnos sumó a la campaña el acopio de lecitina en desuso.

**IMPACTO:** Finalizado el 2012, el acopio de aceite vegetal para su entrega posterior para reciclado alcanzó los 12.350 lts.

**Ingenio San Isidro**

**AMBIENTE:** Ingenio San Isidro por ser un productor orgánico, ha desarrollado un sistema auto sustentable de producción de la caña de azúcar. Como las normas orgánicas internacionales no
permiten el uso de fertilizantes químicos o sintéticos, debe formular sus propios fertilizantes para la caña de azúcar. Para ello **procesa todos los efluentes que provienen de la fábrica de azúcar y de alcohol, transformándolos en un abono orgánico.**

Ingenio San Isidro por lo tanto no arroja fuera de sus predios ningún tipo de efluente (contaminante) y retorna al cultivo todos los elementos que la caña de azúcar retiró del suelo para su crecimiento.

**Ingenio LEDESMA**

**Inversiones en energías alternativas:** Ledesma sumó al aprovechamiento integral de caña de azúcar el proyecto de energía limpia en base a biomasa de malhoja –la materia vegetal que queda en el campo luego de la cosecha en verde de la caña-. Esto permite **reutilizar esos restos vegetales para producir energía**, reducir el consumo de gas y las emisiones de carbono. Información de prensa indica que actualmente están reemplazando el 26% del gas, con energía que viene del residuo de cosecha; hay realizado inversiones en una caldera de biomasa, y equipamiento agrícola e industrial. Esperan llegar al 100% de reemplazo, avanzando año a año. También es importante subrayar que el reemplazo de gas a esta fuente de energía alternativa ha permitido la generación de varios puestos de trabajo, los cuales se espera que continúen creciendo de manera proporcional al aumento del uso de las energías alternativas.

**Red Argentina de Bancos de Alimentos**

Los **Bancos de Alimentos** son organizaciones sin fines de lucro que contribuyen a reducir el hambre y desnutrición en el país, **solicitando la donación de alimentos aptos para el consumo humano**, a fin de **almacenerlos, clasificarlos y distribuirlos juiciosamente** entre organizaciones de ayuda comunitaria: comedores, hogares de niños y ancianos, centros comunitarios y de apoyo escolar, entre otros. Asimismo, educan acerca de la naturaleza del hambre y sus posibles soluciones.

Asimismo, el **Equipo de Nutrición y Educación Alimentaria de la Secretaría de Agricultura, Ganadería y Pesca de la Nación** realiza, en conjunto con la Representación de FAO en Argentina, actividades de promoción para la disminución de pérdida y desperdicios de alimentos. El Equipo colabora en conjunto con FAO en el armado de marco de implementación para la Campaña PIENSA. ALIMENTATE, AHORRA a fin de contribuir con posibles acciones que se pueden realizar por productores, industrias de alimentos y consumidores para disminuir las pérdidas y desperdicios de alimentos. A estos fines, también se han elaborado materiales gráficos de difusión y se ha colaborado con la sensibilización de la población utilizando varios canales de comunicación (televisión, radio, redes sociales, diarios y revistas).


4. What is the cost-benefit potential (and barrier to adoption) of different options, including technologies, to reduce and prevent food losses and waste at different stage of the food chain?

El informe presenta adecuadamente las herramientas necesarias para la prevención y “tratamiento” de las pérdidas y desperdicios de alimentos en la cadena alimentaria. Asimismo, se considera que la implementación de cada herramienta debería ser analizada internamente en cada país a fin de evaluar su factible ejecución en concordancia con sus políticas internas, situación económica, tecnologías disponibles, situación productiva, nivel de capacitación general y específico, capacidad adaptativa.

Por otra parte, se considera que la implementación de nuevas tecnologías o políticas para la disminución de la pérdida y desperdicio de alimentos debería estar acompañada de una campaña de sensibilización para todas las personas involucradas en la cadena alimentaria. Esta medida colaboraría con la implementación de diferentes opciones para reducir las pérdidas y desperdicios de alimentos a fin de concientizar sobre los gastos económicos generados, la pérdida de recursos y el estado mundial de la alimentación.

Asimismo, la generación de plataformas de discusión técnica sobre soluciones específicas a cada eslabón de la cadena alimentaria, alternativas de gestión de los residuos o alternativas productivas para el reciclado de los desperdicios contribuiría a reducir las pérdidas de alimentos y generarías nuevos ingresos y puestos de trabajo.

Adicionalmente y no menos importante son las fuentes de financiamiento y el acompañamiento para el desarrollo de estas alternativas productivas novedosas, la logística y el transporte.

La adopción de herramientas que colaboren con la huella alimentaria dependerá en gran parte de la educación, la capacitación en herramientas que contribuyan a reducir la pérdida y disminución de desperdicios, las tecnologías y el apoyo económico financiero y fiscal para su implementación y la asistencia técnica.

5. Cold chains and cold storage (including adaptable low-cost technologies for cold storage such as evaporative cooling, charcoal coolers, zeer pots, etc): what could be cost-effective and adapted solutions to reduce food losses and waste and to improve the sustainability of food systems, given the diversity of national contexts?

En este punto es importante hacer hincapié en la diferencia sobre la necesidad de almacenar los alimentos a bajas temperaturas.

Hay ciertos alimentos que requieren necesariamente el almacenamiento a determinadas temperaturas, debido a las características de composición de nutrientes, actividad de agua, ph, nivel de acidez, etc. Ejemplo de ello son: leche y productos lácteos, carnes de diversos tipos (crudas y cocidas), pescados y mariscos, huevos, platos preparados, entre otros.
Existen otros alimentos, como las frutas y las verduras, en los cuales el almacenamiento a temperaturas de refrigeración es importante pero no es indispensable, debido a que su almacenamiento a bajas temperaturas lograría mantener en óptimas condiciones al producto y prolongar así su vida útil.

En los primeros casos es indiscutible el uso de sistemas de conservación por frío. En el segundo caso, para evitar el deterioro anticipado de las frutas y las verduras, se considera correcto proponer sistemas de conservación y almacenamiento en frío de bajo costo, tales como pre-enfriamiento de frutas y hortalizas, almacenamiento en atmósfera controlada, cámaras de maduración, enfriamiento por evaporación, etc.

6. Systemic approaches and solutions to reduce food losses and waste: Reducing food losses and waste is a matter which concerns the coordinated joint action (and change) by many actors, producers, retailers, consumers, private sector, governments.

Which systemic solutions/approaches would be the most effective to reduce FLW, towards more sustainable food systems? At that systemic level, which drivers would create leverage for radical change?

No se pueden plantear soluciones integrales si no se tiene un estudio que permita conocer el estado de situación y destino de las pérdidas y desperdicios en cada uno de los países, pues de lo contrario no es posible focalizar las acciones atendiendo a los puntos donde se concentren las mayores pérdidas, ya que aún con medidas básicas se lograrían resultados efectivos, siempre que fuera viable tecnológica y económicamente.

Como posibles respuestas a las pérdidas de alimentos, se puede mencionar el fortalecimiento de la cadena de suministro, el apoyo a agricultores e inversores en infraestructura, transporte y envasado, programas de transferencia de tecnología y nuevos diseños, así como también de la cooperación entre países.

En el mismo sentido, se señala la necesidad de mejorar la coordinación entre los actores de las cadenas de suministro e impulsar acuerdos entre agricultores y compradores para suavizar el rigor de algunos estándares más vinculados al marketing y a la promoción de las ventas que a la calidad del producto.

Al mismo tiempo, hacen falta campañas de sensibilización dirigidas a industrias, comercios, servicios de comidas y consumidores para concientizar hasta los más pequeños eslabones de la cadena. Específicamente impulsar un cambio en la expectativa del consumidor frente a las frutas y hortalizas para que aprenda a aprovechar al máximo estos alimentos teniendo en cuenta sus características nutricionales, y restando importancia a la estética, que no siempre es necesaria a la hora de preparar un plato nutritivo y sabroso.

47. Ministry of Agriculture and Irrigation (MINAGRI), Peru

Comentarios generales al documento
Saludamos el trabajo realizado por el “Panel de Expertos de Alto nivel sobre Seguridad Alimentaria y Nutrición” del Comité de Seguridad Alimentaria Mundial que ha elaborado el estudio preliminar “Las Perdidas y el Desperdicio de Alimentos en el Contexto de los Sistemas Alimentarios Sostenibles” que reconoce la necesidad de reducir considerablemente las pérdidas de alimentos en cada una de las etapas de la cadena de suministro de alimentos para alcanzar la seguridad alimentaria y nutricional de la población.

Cuestionario

1. How to measure Food Losses and Waste (FLW)? FLW can be measured from different perspectives (weight, caloric and nutrition value, monetary value…) with different approaches presenting pros and cons, and methodological issues. Do you think that the V0 draft covers properly the aspects of FLW measurements, including nutrient losses? Is there additional evidence about estimates of past and current food losses and waste, which would deserve to be mentioned?

Se carece de información que evidencie las pérdidas y desperdicios de alimentos sin embargo se recomienda utilizar indicadores que utilicen las siguientes unidades de medida: peso (toneladas), valores nutritivos y económicos.

2. What are the key policy aspects to reduce food losses and waste in order to improve the sustainability of food systems, in different countries and contexts? Is there evidence about the potential of economic incentives, and which ones (taxes, etc.)? What margins for policies in the context of food safety laws and regulations, such as expiration dates?

• Cada país deberá implementar una comisión multisectorial público - privado que le de seguimiento e implemente políticas nacionales vinculadas al tema. De existir alguna Comisión país sobre seguridad alimentaria, esta deberá incluirlo en su agenda.
• Fomentar la institucionalidad de las buenas prácticas agrícolas en vista que, en algunos países, su implementación es facultativa.
• Promover políticas que incentiven a las asociaciones de productores, empresas, y a demás agentes que intervienen en la cadena alimentaria a minimizar las pérdidas de alimentos a través de buenas prácticas, especialmente en la post-cosecha.

3. Can respondents submit concrete initiatives or successful interventions having reduced food losses and waste, currently taking place, conducted by governments, stakeholders, private sector, civil society?

• Experiencias exitosas del gobierno peruano para la disminución de las pérdidas de alimentos:
  a. El Perú en el mes de diciembre del 2013 aprobó la Estrategia Nacional de Seguridad Alimentaria y Nutricional 2013 – 2021 que en su plan de acción considera el diseño e implementación de un sistema de reducción de pérdidas post cosecha.
  b. Iniciativas privadas de mujeres rurales, esposas de los productores de mandarina, se asociaron conformando la micro empresa “Mujeres emprendedoras”, quienes procesan las mandarinas que no califican para ser comercializados en el mercado, produciendo mermeladas y néctares. Esta experiencia se ubica en la región Lima – Huaral – Palpa.
4. What is the cost-benefit potential (and barrier to adoption) of different options, including technologies, to reduce and prevent food losses and waste at different stages of the food chain?

No se han realizado estudios específicos al respecto. Se sugiere que se promueva este tipo de iniciativa.

5. Cold chains and cold storage (including adaptable low-cost technologies for cold storage such as evaporative cooling, charcoal coolers, zeer pots, etc): what could be cost-effective and adapted solutions to reduce food losses and waste and to improve the sustainability of food systems, given the diversity of national contexts?

Se han tomado iniciativas de desarrollo de infraestructura, especialmente en cadenas de frío para la agroexportación en aeropuertos y puertos. Adicionalmente, cabe resaltar la importancia de contar con infraestructura vial, especialmente en países de América Latina.

6. Systemic approaches and solutions to reduce food losses and waste: Reducing food losses and waste is a matter which concerns the coordinated joint action (and change) by many actors, producers, retailers, consumers, private sector, governments. Which systemic solutions/approaches would be the most effective to reduce FLW, towards more sustainable food systems? At that systemic level, which drivers would create leverage for radical change?

Es importante desarrollar la conciencia sobre la importancia de la reducción de las pérdidas y desperdicios en la seguridad alimentaria, más allá del beneficio económico que pudiera traer. El desarrollo de capacidades y normativa al respecto serían soluciones sistémicas efectivas.

Comentarios específicos

- En la página 21 línea 13 se sugiere la siguiente redacción: treatment to be given to the reduction of losses and waste must be differentiated by regions and products.
- En la página 35 en el item 2.3.7 se sugiere mencionar que en algunos países de América Latina como Perú se exige la aplicación del sistema Hazard en el procesamiento primario.
- En la página 59, ítem 3.8 se sugiere agregar un párrafo relacionado a las estrategias de seguridad alimentaria que se han aprobado en los países de América Latina y su relación con la perdida y desperdicios de alimentos.
- En la página 38, ítem 2.4.2 se sugiere resaltar la importancia de la educación alimentaria para disminuir los desperdicios de alimentos en la etapa final de la cadena alimenticia: consumo.

Recomendaciones al documento

- Resaltar que los países deban realizar investigación científica sobre el tema ya que permitirá mejorar la eficiencia de los procesos de la cadena alimentaria.
- Adicionalmente es necesario que los países cuenten con diagnósticos, indicadores que les permitan medir los avances en la disminución de desperdicios de alimentos.
- Promover que los países incluyan programas de fortalecimiento de capacidades para los funcionarios en la actualización del sistema de inocuida
48. National Council of the Brazilian Industrial Services, Brazil

The role of nutritionists for better understanding of the nutritional waste of foods by consumers should be highlighted. It would be impossible to measure the waste of calories and other nutritional aspects of food being purchased and actually consumed by households without a clear measurement based on different food categories. In fact, representative/valid direct observation research methods are lacking from the international literature on food and nutritional waste. This would be the first step to assess the current levels of waste among households and opportunities for intervention. The research initiative being proposed by FAO and SESI to assess food and nutritional waste among households in Brazil may provide an important contribution for reliable domestic and international comparisons. Most of the studies found in the literature are estimates of waste, focus on specific geographical areas, and very few are current. The document should stress opportunities for direct observation research methods or what methods are considered the most relevant by the committee.

49. Ministry of Agriculture and Food, Norway

Submission by the Ministry of Agriculture and Food in Norway to the open e-consultation on the zero Draft on Food losses and waste in the context of sustainable food systems – 5 February 2014

We appreciate the opportunity to provide inputs to the zero draft. In general, the draft is a solid and valuable document in the important work of reducing food losses and waste.

We would like to raise the attention of the Norwegian, Scandinavian and other European work on food waste, which might include some new and useful information for the further elaboration of the report, sometimes also information that differ from what is already in the draft.

We would especially like to inform the HLPE about some information from the Norwegian “ForMat” project. The project is an industry initiated collaboration between producers, retailers, research institutions, environmental organisations and the government. The last report from the project was recently released in an English translation, we have therefore chosen to enclose it here (http://www.fao.org/fsnforum/cfs-hlpe/sites/cfs-hlpe/files/resources/Food%20Waste%20In%20Norway%202013%20-%20Status%20And%20Trends%202009-13.pdf).

We would also like to raise the attention to the ongoing work on food waste by the Nordic Council of Ministers. Most of these reports are written in English (Marthinsen et al 2012, Stenmarck et al 2011, Sundt et al 2011).

Comments to the draft:

P. 10, l. 20-23: “Developing global protocols for the measurement of FLW is highly complex, having to account for a large number of variables, often different from country to country. (…) there is no recorded data on food waste at the consumer end in the developed countries.” Although the two
sentences here probably are inter-linked, the last sentence may seem slightly misleading, as there are recorded data on food waste at the consumer end in quite a few developed countries as the Scandinavian countries, UK etc. as mentioned at p. 82, l. 1-4 and in our comment on this page below.

P. 13, l. 32-35: “There is not much evidence on the reduction of FLW at national level, partly because of lack of consistent methodologies and data to assess, partly because most of national policies are recent. Some countries (UK, South Korea, Japan) have made the reduction of FLW a high priority topic in early 21th century and some first evidence of their impacts is available”. The Scandinavian countries have also made the reduction of FLW a high priority topic in early 21th century. In Norway the first evidence of their impacts is available (see Hanssen and Møller 2013: pp 1-4).

P. 17, l. 4-8: “Some detailed studies give more precise and accurate perspectives on specific parts of food supply chains. (...) A detailed and comprehensive overview of different sectors (excluding primary production) has been gathered for UK”. The Scandinavian countries at least (and, we believe, also other countries?) have also gathered detailed and comprehensive overviews of different sectors (mostly excluding primary production although an interesting study is also made here, see Franke et. al. 2013), see for instance Hanssen and Møller 2013.

P. 20, l. 20-22: “All the world effort for slowing the pace of climate change is based on international commitments regarding the reduction in the emission of gases and desintensification of the use of natural resources. The reduction of losses and waste could be a shortcut to achieve these goals.” An important point that could be stressed more throughout the document.

P. 29, l. 23-35: The reference solely to the United States and Stuart 2009, can be broadened with reference to the Norway and Sweden in Franke et. al. 2013: pp 22-29, which shows losses of 10-30% of main vegetables, potatoes and berries in Norway and Sweden of the same reasons, although the wastage mostly appears at the storage stage (for example are only 1,6% of the Norwegian carrots left on the field, while 25% of the wastage appears at the storage stage).

P. 35, l. 33-44: (On Food safety aspects). Although the subject is returned to later in the draft, the importance of this subject could be stressed more also here. The references and examples can be broadened with Hanssen and Møller 2013 and Norway.

P. 37, l. 8-9: “In the US alone, it was estimated that the in-store food losses was 10% of the total food supply.” In Norway it was estimated that 18% of the total wasted food was from the retailers (Hanssen 2011).

P. 39, l. 21-23: “According to a survey conducted in 2009 by WRAP (2009) for households in UK 41% of the waste occurs because the meals were cooked or served too much and 54% of waste is because the food was not used in time.” As earlier mentioned, the Norwegian ForMat project analyse trends in the development of food waste over time. Since 2009/2010 ForMat has analysed food waste from producers, wholesalers, retailers and consumers. The reason most commonly given by consumers for throwing away food was that it was “past its expiry date”, which shows that many consumers do not relate rationally to the date stamp. Firstly, the expiry date is by far the most important reason for disposing of yoghurt and sour cream, which are products marked with “best before” and which last well beyond the date stamped on them. Secondly, the expiry date is given as an important reason for both fresh bakery products and fresh
fruit and vegetables, which are products without a date stamp in most cases. The results reveal not only the effects of poor planning and shopping routines but also a narrow focusing on the date stamp in determining whether a product can be eaten or not (Hanssen and Møller 2013: p 16).

P. 39, l. 26 (On methodological problems in measuring waste of fruits, vegetables and cereals from consumers). An important methodological problem in measuring waste in general from consumers, is that consumers are underestimating their own waste in consumer surveys which normally are answers to questionnaires. Sample analyses is a more reliable method, although a much more costly one. A combination of the two methods is probably more realistic. See for instance ForMat 2012: p 12.

P. 40, l. 5-9: “Households with fewer residents waste more because the parts purchased and prepared are typically larger than the consumption capacity (...). It turns out also that there is larger waste in households with greater presence of adolescents and young people”. The ForMat project slows slightly different results in Norway. Young adults (19-26) and young families (26-39) waste most (ForMat 2012: p 13).

P. 40, l. 18-28. (On three different expiration dates in the United States). A similar disposal is taking place in Norway even if we don’t have three different expiration dates. See our previous comment on p. 39, l. 21-23. (Norway apply the EU-rules on date labeling: The 'Use by'-date is used on products which used after this date could put your health at risk. The 'Best before' date is more about quality than safety, so when that date runs out it doesn't mean that the food will be harmful, but it might begin to lose its flavour and texture).

P. 50, l. 7 - p. 51, l. 7 (On action towards consumers). This paragraph can be extended with multiple actions both going on and being possible to start towards consumers, many of them are now only to be found in the appendix (p. 78 l. 24 - p. 79 l. 10) or in boxes scattered elsewhere (Box 9 p. 52 and box 13 p. 58 which also can be broadened with other (traditional) cultural practices (also in the West) of saving food). Alternatively the appendix can be referred to here, or a similar paragraph as the following paragraph on campaigns against food waste in Southeast Asia should be made for Europe. At least should Norway get its’ own box here, certainly with these two examples: 1) In Norway two leading producers of meat and dairy products have changed their labelling of many of these products from “Use by” to “Best before” to reduce food waste. 2) A Norwegian company has made an indicator it claims will reduce food waste. The indicator takes into account the temperature all the way from producer to consumer, and therefore shows a more appropriate durability than the traditional date labelling. The indicator shows how many days the food product retains its quality depending on the storage temperature.

P. 54, l. 45 – p. 55, l. 22 (On food losses and waste reduction: winners and losers). This paragraph seems not to be consistent with the last concluding paragraph (p. 65, l. 14-22).

P. 55, l. 23 Box 11 Saving money through waste reduction: This box might be better placed under paragraph 3.9 Reducing FLW: towards more sustainable food systems (p. 62, l. 1-24. See also comment on that page.

P. 59, l. 12-13: “changes in legislation and business behaviour towards more sustainable food production and consumption will be necessary to reduce waste from its current high levels.” We don’t agree that changes in legislation will be necessary to reduce waste from its current high
levels. It might be necessary, but for instance as shown in our comment on p. 39, l. 21-23, it is the customers’ interpretation of the date labelling which is producing waste, rather than the date labelling legislation in itself. As for p. 57 l. 7-10: “In order to give incentives and facilitate the donations President Clinton proclaimed the Bill of Good Samaritan in 1996, that exempts donor companies from taxes and penal responsibilities. This act was a watershed and boosted the movement of Food Banks. After that many other countries have followed suit”, the Norwegian government in cooperation with the food retailers and humanitarian organizations, decided it was no need for a Good Samaritan law in order to start a food bank in Norway. Now a food bank is started and operating without such a law.

P. 61, l. 5 Box 15 Campaigns against food waste in China, South-Korea and Japan: The delivery date extension experiment described in Japan might not necessarily reduce food waste, but move the food waste from the retailer to the consumer which is left with shorter expiration time.

P. 62, l. 1-24 in general, especially l. 6-7: “Some countries have started to define strategies and targets, most of these actions have not been assessed.” The Norwegian ForMat-project and its’ actions since 2009/10 are continually being assessed (Hanssen and Møller 2013: pp 1-4). As for the Courtauld Commitment in Box 16, the ForMat-project also reports on reduction of food waste and as for the box 11 Saving money through waste reduction (p. 55, l. 23 see own comment), the ForMat-project have also developed a simple calculation tool to assist companies in assessing what food wastage currently costs them in terms of lost revenue and waste management expenses. This paragraph in general can be broadened with more examples of this kind both from ForMat and other projects (like for instance Samma in Sweden). Some of it can preferably be included from the appendices.

P. 74, l. 1 – p. 82, l. 4. Appendices. In general, much of the information in the appendices can preferably be mentioned in the main text. See also our previous comments on p. 10, l. 20-23; p. 50, l. 7 - p. 51, l. 7 and p. 62, l. 1-24 and the comment below.

P. 82, l. 1-4. “In a growing number of developed countries data of post consumer level food waste are consistently measured to monitor trends, based on household waste analysis (e.g. Schneider, 2009; WRAP 2010, 2013; Van Westerhoven, 2010, 2013).” The ForMat-project can preferably be mentioned here (Hanssen and Møller 2013).

References


50. Save Food team, FAO, Italy

INPUTS TO THE SIX ASPECTS

1. How to measure Food Losses and Waste (FLW)? FLW can be measured from different perspectives (weight, caloric and nutrition value, monetary value...) with different approaches presenting pros and cons, and methodological issues. Do you think that the V0 draft covers properly the aspects of FLW measurements, including nutrient losses? Is there additional evidence about estimates of past and current food losses and waste, which would deserve to be mentioned?

The report seriously ignores all the fishery-related work and existing information. In small-scale fisheries at least, lots have been done and should be capitalized here. I refer to the long standing work of the FI department with the UK-NRI which led to the methodology to assess post-harvest losses. Its focus is not limited to quantitative losses (unlike asserted on P. 32). One example: On page 27 are introduced the pre-harvest causes of losses, with only agriculture (crop) related issues cited, while are disregarded the fishing aspects, yet with significant potential environment impact besides the loss in quality or quantity of fish food. causes. The illegal fishing techniques or not selective gears leading to substantial catches which end up being discarded (most of the time at sea, in the case of bycatch), raise the critical issue of natural resource sustainability as well as impact on the ecosystem. These dimensions that are not adequately tackled.

Refer to the work of the APHLIS project of NRI and EU-JRC.

- The HLPE V0 draft report referenced only the FAO 2003 Uganda dairy sector appraisal. However, the project that included this appraisal is more comprehensive: FAO project on Milk and Dairy Products, Post Harvest Losses and Food Safety in Sub-Saharan Africa and the Near East (2003-2010) assessed the informal and small-scale sectors which currently hold the largest share (up to 95%) of the market in the participating countries (Ethiopia, Kenya, Syria, Tanzania and Uganda). The 2010 estimates for economic losses due to spoilage and waste in the dairy sector in East Africa and the Near East averaged as much as US$90 million/year. Project data registered that (i) in Kenya, each year around 95 million litres of milk are lost, at a
value of around US$22.4 million/year; (ii) Cumulative losses in Tanzania amount to about 59.5 million litres of milk/year, for annual losses of around $14.3 million. Overall, over 16% of production is lost in Tanzania's dairy sector during the dry season while losses during the wet season may surpass 25%; (iii) in Uganda, approximately 27% of all milk produced is lost: 6% is wasted at the farm level, while 11% and 10% of production is either lost to spillage or spoilage during transport or marketing, respectively with an estimated economic loss at US$23 million a year. 

- **World Bank, FAO. 2012. The Grain Chain – Food Security and Managing Wheat Imports in Arab Countries.** The study explores the import risks Arab countries are facing — including supply disruptions, food price inflation, and product losses — and identifies opportunities for infrastructure investment and policy reform. From the recommendations: each Arab country should identify the specific wheat import supply chain (WISC) segments that they would like to target for efficiency improvements to reduce the time it takes to import wheat, the base cost of importing wheat, and product loss, which can be as high as 5 percent in some countries.


- **FAO. 2006. Household food waste in Turkey**
  

2. **What are the key policy aspects to reduce food losses and waste in order to improve the sustainability of food systems, in different countries and contexts? Is there evidence about the potential of economic incentives, and which ones (taxes, etc.)? What margins for policies in the context of food safety laws and regulations, such as expiration dates?**

If this report is to draw high attention of policy makers it deserves to be designed to care for this purpose, at least in the headings and rearranging the ideas so as to make visible the responsibility of different stakeholders in the FSC. Somewhere it was reasonably advised that measures to reduce losses and waste rest upon micro-level and macro-level solutions, but then throughout the following more than 10 pages covering this topic, this approach was not clearly evidenced.

In the relevant chapters addressing the environmental impacts, the waste of wood wherever it is used in the food supply chains should be dully considered (example: as fuelwood in processing).

Page 64, lines 43-45: “The role played by women in the prevention of food losses and waste need immediate attention. Women play a key role in reducing food losses in developing countries and the challenges faced by poor women in food loss reduction should be analyzed and documented.” I would put it in a different way: In most food systems women play a key-role in food security, and especially in smallholder-based rural communities food loss reduction benefits women directly, enabling them to improve food security for their families and the community.

- **The policy/regulatory environment is multi-stakeholder (public and private sector, civil society), dynamic, and responsive to changes in the political and economic contexts. It also influences the public-private funding priorities, prioritization of emerging needs (e.g. increased food prices, limited natural resources, technological and social innovation, urbanization) and of innovation opportunities.**
The policy evaluation should therefore not only address policies/regulations themselves but also the processes by which policies are formulated, monitored, and revised.

- The policy, regulatory, and, more broader, the governance environments are both extrinsic and intrinsic to FLW reduction strategies. Specifically, these are part of the broader food system environment (e.g. social, political, economical, technological, and natural resources management) in which partnerships, programmes, standards, and legislation are implemented, monitored and adapted to the degree to which the system itself is able to identify, adopt, and implement emerging trends and support systemic sustainability. This influences the scope and implementation of connected agricultural and food systems strategies, allocated resources and organizational structure, and interactions of stakeholders at local, national, regional, and international level.

- Key policy aspects/elements would consequently require a coherent, comprehensive and integrated approach and be integrated in areas such as: agriculture, fisheries, forestry, taxation/market based instruments, competition, health and education, trade, standards, safety and quality, agro-industry, investment, services, energy, environment/natural resources/climate change, with security and justice included.
- Capacity (e.g. institutional and human) and knowledge opportunities and challenges would need to be mapped and contextualized in order to enable dynamic, adaptive and multi-layered governance and sustained engagement for sustainable change.
- Required ex ante and ex post impact assessments of policy/ regulations (recommendations and concrete implementation) on all four dimension of food and nutrition security (availability, access, utilization, stability).
- Tools (e.g. fora, consultations) enabled by the public sector could facilitate identification and engagement of key stakeholders and prioritization of interventions at local, country, regional level. These tools could also address coordination challenges and opportunities.
  - The tools could work towards integrating a matrix of relevant ministries/focal points involved, with connected external stakeholders and sub-sequent identification of cross-ministerial and multi-stakeholders collaborations and working groups. This matrix could be accompanied by a matrix with current and planned public and corporate policies, legislation, standards related to post-harvest, agro-industry, agribusiness, marketing, extension (e.g. post-harvest technology, rural/peri-urban and urban finance for production and marketing, post-harvest and processing activities, export promotion, market infrastructure development, inter-professional organizations, agro-enterprise and agribusiness, agro-industry investment promotion, market information & research, natural resource management)
  - The exercise should also appropriately address the linkages between urban, peri-urban, and rural systems.

Considerations would also need to take place, at this point in time, for the Post-2015 development agenda that identified prevention and reduction of food waste and loss as a priority within Sustainable and resilient food production and consumption with the role that countries would play as essential.

**With regard to evidence about the potential of economic incentives and which ones (taxes etc.):**

• For consideration:
  
  o LEI Wageningen UR. 2013. Reducing food waste by households and in retail in the EU. A prioritization using economic, land use, and food security impacts.
  o http://ec.europa.eu/environment/envecho/resource_efficiency/, Task 3 report (food waste)

With regard to margins for policies in the context of food safety laws and regulations such as expiration dates:

• Useful reference for consultation: Joint FAO/WHO Food Standards Programme, Codex Committee on Food Labelling, 41st Session (May 2013), Discussion paper on issues related to Date Marking (Prepared by New Zealand). http://ftp.fao.org/codex/meetings/ccfl/ccfl41/fl41_08e.pdf

• FAO. 2011. Why has Africa become a net food importer? 5.4 Institutional Deficiencies, Insecurity, And Conflicts – para 2: “On the consumption side, the absence or weakness of structures that protect consumers’ rights and control the safety and quality of food circulated in the market in many African countries, including the richer ones, is widely known (Henson et al. 2000; FAO/WHO, 2003; Bagumire et al. 2009) has encouraged entry of cheaper foreign products whose sanitary quality are sometimes suspect (i.e., the dumping of expired or nearly expired products). These problems have certainly contributed to the food-trade deficit in many African countries.” http://www.fao.org/fileadmin/templates/est/PUBLICATIONS/Books/AFRICA_STUDY_BOOK_REVIS ED_low_res.pdf

3. Can respondents submit concrete initiatives or successful interventions having reduced food losses and waste, currently taking place, conducted by governments, stakeholders, private sector, civil society?

Food waste reduction initiatives in the UK (WRAP) and Denmark (Stop Wasting Food).


The Database of projects and initiatives that FAO SAVE FOOD is facilitating and hosting could be accessed at: http://www.fao.org/save-food/en/.

SAVE FOOD held a Partnership event for civil society and private sector 10-11 December 2013 in Rome

Presentations and report are available at: https://drive.google.com/folderview?id=0B1Kx7tCE19T0Uxq0b0rbGgSVE&usp=sharing&tid=0B1Kx7tCE19TS212skQ5WGdyQnc


The following list could also be consulted. The list does not imply any endorsement from FAO:

• SDC funded POSTCOSECHA program
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<thead>
<tr>
<th>Number</th>
<th>Source</th>
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<tbody>
<tr>
<td>4.</td>
<td>See e.g. 5 Year Ex-Post Impact Study, Final Report March 2011</td>
</tr>
<tr>
<td>5.</td>
<td>ADM Institute for prevention of postharvest loss, e.g. the archive of the newsletter the institute provides. <a href="http://postharvestinstitute.illinois.edu/">http://postharvestinstitute.illinois.edu/</a></td>
</tr>
<tr>
<td>6.</td>
<td>Harvard. 2012. Putting Local Food Policy To Work For Our Communities</td>
</tr>
<tr>
<td>11.</td>
<td>CIWM Article on Food Waste Management in Malaysia, by Effie Papargyropoulou <a href="http://www.academia.edu/702682/CIWM_Article_on_Food_Waste_Management_in_Malaysia">http://www.academia.edu/702682/CIWM_Article_on_Food_Waste_Management_in_Malaysia</a></td>
</tr>
</tbody>
</table>
- http://foodshift.net/
- http://switchboard.nrdc.org/blogs/dgunders/12_moves_towards_reducing_food.html
- http://www.foodwastealliance.org/
- http://foodwasteproject.wordpress.com/
- http://foodrecoveryproject.eu/
- http://wrc.org/services/food-waste/
- http://www.eeww.eu/european-projects
- http://www.greenru.org/HotelAtKirkwoodCaseStudy_pdf
- http://rtnwaste.co.za/food-for-waste-project/
- http://journal.hotpress.ca/food-waste/
- http://www.matomsorg.no/_attachment/17826/binary/38984
- http://www.wastedfarmers.com
- http://foodforward.org
- http://camillasmatuppror.se
- http://www.mindrematsvinn.nu
- http://www.uglyfood.nl
- http://www.green-cook.org
- http://www.foodwaste.ch
- http://www.reste-essen.de
- http://www.resterechner.de
- http://www.zugutfuerdietaionne.de
- http://lebensmittel-sind-kostbar.at
- http://www.slangintematen.se
- http://www.savefoodcutwaste.com
- http://www.stopspiladafmad.dk/enenglish.html
- http://www.stopfoodwaste.ie/
- "Guidelines on the preparation of food waste prevention programmes", EU DG ENV
4. What is the cost-benefit potential (and barrier to adoption) of different options, including technologies, to reduce and prevent food losses and waste at different stage of the food chain?

5. Cold chains and cold storage (including adaptable low-cost technologies for cold storage such as evaporative cooling, charcoal coolers, zeer pots, etc): what could be cost-effective and adapted solutions to reduce food losses and waste and to improve the sustainability of food systems, given the diversity of national contexts?

Cost-effectiveness has to be considered from economical and environmental point of view, as well as food & nutrition security and the social costs. Technical innovations (food preservation, packaging, logistics) don’t only reduce food losses, but also actually enable transportation of food over longer distance, even around the globe. These lengthened FSCs (see also point 3 above) have a negative environmental effect.

FLW reduction actions can have high environmental costs (even higher than the cost of losing/wasting the food). For example, cold chains are presented as one of the key solution to FLW but full cost benefit analysis (including socio, economic and environmental considerations) need to be done to make sure that these are the right solutions. NRC is currently working on such cost/benefit analysis and we will have some results by March. It would be great to introduce these notions at the beginning of the third part and then integrating these considerations when discussing each of the options.

6. Systemic approaches and solutions to reduce food losses and waste: Reducing food losses and waste is a matter which concerns the coordinated joint action (and change) by many actors, producers, retailers, consumers, private sector, governments. Which systemic solutions/approaches would be the most effective to reduce FLW, towards more sustainable food systems? At that systemic level, which drivers would create leverage for radical change?

Most of the causes of food losses are known, but the problem why sustainable reduction is not met since decades is the inconsistency of the approach. Knowing the hot spots and focusing on them would seem to be more effective. This aspect was touched upon very briefly at the end of the report, in the recommendations (P. 65), but should be better spelt out in this report as it is the key to sustainability of the food systems, sustainability of the solutions.

The level of detail and the way causes are covered sometimes create confusion as to what are direct causes and what actually are systemic drivers at loss and waste levels.

All the systemic causes mentioned are to some extent aggravated by the lengthening of food supply chains – food production is further and further away from food consumption. This trend puts an extra strain on food production by smallholders (in developing countries), as they cannot participate and compete in these global FSCs. A systemic cause which is missing here is ‘regulations, food laws and standards’, which is a special problem in trans-national FSCs.
The solution to systemic causes of FLW should be lead by the public sector, so that the private sector can invest and resolve the direct causes.

The impact on the environment is presented as a side effect of FLW while it should be presented as a potential threat to food security through the degradation of the natural resources agriculture depends on. This is mentioned in the title of the paragraph on the environmental but is not detailed there or emphasized anywhere else in the text. This could be integrated in the introduction and the conclusion of the document.

Page 54, line 53: “In general, reducing FLW increases food supply and drives down the food price, . . .”. As far as I know, this is still an hypothesis, and there is a strong need for research to obtain proof. I can imagine that it would depend on the FSC: for example, if FLW reduction is achieved by expensive technology, it could drive up the food price. By all means, this is an important item for C&R.

SPECIFIC COMMENTS TO THE TEXT OF THE DOCUMENT

The ‘Food Loss and Waste in the Context of Sustainable Food Systems’ – V0 draft – provides a good overview of all the issues that are at stake regarding FLW reduction. Especially chapter 1 (definition, extent and impacts) is extremely thorough and comprehensive. However, on the other hand, my view is that chapter 2 (causes and drivers) and chapter 3 (solutions) go too much into – often technical – details and examples, thereby losing the context of sustainable food systems. As a result, chapter 4 (Conclusions and Recommendations) cannot give the best answer to the main question posed in the Introduction: “what can be the contribution of a reduction in food losses and waste to improve food and nutrition security in the context of sustainable food systems?”.

<table>
<thead>
<tr>
<th>Line number</th>
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<tr>
<td>Overall, there is the need for a more balanced information level on the different product categories to support a food and nutrition perspective.</td>
<td></td>
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<tr>
<td>Terminology of “food loss and food waste” should be coherent throughout the document. The definition of FLW should be revised.</td>
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<tr>
<td>The human right to food should be further explored for its relevance in supporting, enhancing, and facilitating the prevention of food loss and waste.</td>
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<tr>
<td>There is a lack of data on food loss and waste also in industrialized and emerging countries and perhaps the report it should acknowledge this. Please see e.g. the discussions for the EU within FUSIONS, for</td>
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<tr>
<td>P 9 - line 8</td>
<td>Please define better the term “means”. Would Codex Alimentarius definition apply: “Food means any substance, whether processed, semi-processed or raw, which is intended for human consumption, and includes drink, chewing gum and any substance which has been used in the manufacture, preparation or treatment of “food” but does not include cosmetics or tobacco or substances used only as drugs.”</td>
<td>Codex Alimentarius Commission Procedural Manual Twenty-first edition, 2013 ftp://ftp.fao.org/codex/Publications/ProcManuals/Manual_21e.pdf</td>
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<tr>
<td>P 9 - figure 1</td>
<td>“Food banks” should be extended to “food banks and other food recovery and redistribution systems”</td>
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<tr>
<td>p 11 - line 12</td>
<td>Food security is the right term or food utilization (as the fourth dimension of food security)?</td>
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<tr>
<td>P 12 - line 31</td>
<td>Edible or “marketable”?</td>
<td></td>
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<tr>
<td>P 12 - line 34</td>
<td>“contribution to food security of poorer people” – is the transfer of what is less marketable in a region to a different region considered as, necessarily, for “poorer people” and at a lower price? It may not be the case.</td>
<td>Globefish Research Programme, Vol. 112 July 2013: Tuna is mainly marketed in fresh, chilled, frozen or canned form. However, the tuna loin and canning industry generates a considerable amount of by-products and the practice of utilization of these by-products varies in different geographical regions. In this publication, there are case studies of utilization from Asia, Europe and Latin America. Thailand is one of the largest producers of canned tuna and the by-products are mainly utilized as tuna meal, tuna oil and tuna soluble concentrate. In the Philippines, most of the canning industry by-products are converted to tuna meal, but black meat is also canned and exported to neighboring countries. Edible tuna by-products from the fresh/chilled tuna sector, like heads and fins, are used for making soup locally and visceral organs are utilized to make a local delicacy or for fish sauce production. Scrape meat and trimmings are also used for human consumption. In Spain and Ecuador, by-products go to the fish and oil industry and the increasing demand for these commodities, due to the growth of the aquaculture industry, drives the fishmeal and fish oil industry. However, since these are used</td>
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<tr>
<td>P 13 – line 2</td>
<td>Please clarify why only “importing countries”.</td>
<td>mainly as animal feeds, they indirectly contribute to food production.</td>
</tr>
<tr>
<td>P 13 – line 11</td>
<td>Is waste associated only with the consumption stage? It may not be the case as waste can also occur at the production site e.g. out grading due to quality attributes e.g. color and size.</td>
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<tr>
<td>P 14 – lines 19-30</td>
<td>Could this para be also related to food loss&amp;waste? Why: when exported/imported food/raw materials get wasted the natural resources embedded in that also get waste?</td>
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<tr>
<td>P 16 – line 30</td>
<td>Perhaps “only” could be eliminated?</td>
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<tr>
<td>P 16 – line 39</td>
<td>179 kg of food waste per ... ?</td>
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<tr>
<td>P 17 – line 21-22</td>
<td>Quality standards as e.g. water content for cereals may also be a factor taken into consideration that relates also to the economic factors.</td>
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<tr>
<td>P 18 – table 1</td>
<td>sustainable business models could be also considered as cross-dimensional</td>
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<tr>
<td>P 20 – line 49</td>
<td>“Safety” should be perhaps “security”?</td>
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<tr>
<td>P 21 – line 18-23</td>
<td>It may be relevant to underline that the measures, whether in developing countries or industrialized, should take place concurrently.</td>
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<tr>
<td>P 23 – line 15</td>
<td>Please clarify if it is related to the precautionary principle and, if yes, how and if considerations on the proportionality of the measure to the risk are considered.</td>
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<tr>
<td>p 26, line 5-8</td>
<td>The draft report does not yet address the linkages between urban, peri-urban, and rural systems and has quite broad and inaccurate generalizations on rural/urban contexts</td>
<td>and-the-near-east-pfl/en/ \nFAO project on Milk and Dairy Products, Post Harvest Losses and Food Safety in Sub-Saharan Africa and the Near East (2003-2010)</td>
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<tr>
<td>P 26 – line 17</td>
<td>The pyramid shaped hierarchy may not be the most appropriate. \nA standardized horizontal description of raw ag materials, ingredients, and foodstuffs, from production to consumption level identified as resource flows in the food system and that could be referred to with technical precision and description in terms of food loss and waste in any potential context may facilitate different people, saying different things, to identify what are they referring to and how it differs from other interpretations – allowing thus data comparability and harmonization of approaches.</td>
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<tr>
<td>P 27 – line 16</td>
<td>There seems to be an omission caused by the term “unacceptable”. Some of the mentioned causes, e.g. mechanical and psychological</td>
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<tr>
<td>P 31 – line 33</td>
<td>useful reference to consult and consider for packaging</td>
<td><a href="http://feeding5k.org/gleaning.php">http://feeding5k.org/gleaning.php</a></td>
</tr>
<tr>
<td>P 32</td>
<td>Useful reference for consideration</td>
<td>“Food banks can only plug the holes in social safety nets - Donation-dependent, food banks aren't a 'normal' part of support for those in need, but they help identify flaws in social protection” Olivier De Schutter, Wednesday 27 February 2013 09.00 GMT, <a href="http://www.theguardian.com/commentisfree/2013/feb/27/food-banks-social-safety-nets">http://www.theguardian.com/commentisfree/2013/feb/27/food-banks-social-safety-nets</a></td>
</tr>
<tr>
<td>P 33 – lines 32-38</td>
<td>The degree of generalization is too high for the classification of the countries/FLW behavior</td>
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<tr>
<td>P 34</td>
<td>Useful references for consideration</td>
<td>Thomas Reardon, Bart Minten, (2011),“Surprised by supermarkets: diffusion of modern food retail in India”, Journal of Agribusiness in Developing and Emerging Economies, Vol. 1 Iss: 2 pp. 134 – 161 The Quiet Revolution in India’s Food Supply Chains, Thomas Reardon and Bart Minten, 2011, IFPRI.</td>
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<tr>
<td>P 36</td>
<td>Processing inefficiencies should also be considered.</td>
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www.fao.org/fsnforum/cfs-hlpe
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<tbody>
<tr>
<td>P 38 – line 21</td>
<td>Perhaps the appropriate technical term is not “leftovers” but “by-products”?</td>
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<tr>
<td>P 40</td>
<td>EC DG SANCO could be useful in addition to the projects highlighted by the EU FUSIONS website. EC DG SANCO has also published a clarification of “best before” and “use by” labels – N.B. only for the EU jurisdiction - in all EU languages.</td>
<td>Link DG SANCO: <a href="http://ec.europa.eu/food/food/sustainability/stakeholders_en.htm">http://ec.europa.eu/food/food/sustainability/stakeholders_en.htm</a> <a href="http://ec.europa.eu/food/food/sustainability/your_role_en.htm">http://ec.europa.eu/food/food/sustainability/your_role_en.htm</a> Link FUSIONS: page with projects on FW: <a href="http://www.eu-fusions.org/social-innovations">http://www.eu-fusions.org/social-innovations</a></td>
</tr>
<tr>
<td>P 47</td>
<td>The UN Food and Agriculture Organization (FAO), the International Fund for Agricultural Development (IFAD) and the World Food Programme (WFP) have launched in 2013 a joint project to tackle the global problem of FL.</td>
<td><a href="http://www.fao.org/news/story/en/item/211216/icode/">http://www.fao.org/news/story/en/item/211216/icode/</a></td>
</tr>
<tr>
<td>P 48</td>
<td>Relevant to consider: border rejections of food (raw ag. materials, ingredients, foodstuffs) for all jurisdictions that have systems in place. This is relevant in order to acknowledge rejected quantities, reasons for rejection, solutions identified e.g. destruction, return to exporter, sold to another buyer</td>
<td>Sources of information: Regional and national databases.</td>
</tr>
<tr>
<td>P 49 – lines 43-48</td>
<td>High generalization that does not seem to take into consideration cultural shifts. What does “complacent” mean in this context, please clarify.</td>
<td></td>
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<tr>
<td>P 51-3.5.3</td>
<td>Throughout the report: need to be very specific on the jurisdiction of reference to avoid miss-information. E.g. date marking is not harmonized internationally and this needs to be reflected in the report.</td>
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</tbody>
</table>
51. Alexandre Meybeck, FAO/UNEP sustainable food systems programme, Italy

The zero draft provides a good overall perspective on FLW. I would just like to draw attention on a few points, mainly related to the link between FLW and sustainable food systems:

FLW are a very visible sign of inefficiency (in terms of use of resources). As such it should also raise awareness on the need to improve resource efficiency in general (and not hide other inefficiencies).

The draft makes a good synthetic description of causes of food losses (some precisions on animal products, including fish, would be welcome).

More is needed on waste and consumer behavior. Interesting elements for Italy in Segre (2013), for Portugal in Baptista et al 2012. Some questions, (some of which may need more research) on consumer behavior:

- What incidence/link between distribution systems, shopping frequency and waste?
• Is there an incidence of the value given to food (cultural, social...) on waste? For instance what for organic products?

• The impact of the economic crisis reducing waste at consumer level, see Baptista et al 2012, chapter 3; could help analyze the relation between value and waste.

There is also a need to better strengthen the hierarchy of causes, linking it to more systemic approach, which would facilitate the design of recommendations.

In the analysis of causes, and also in relation to sustainable food systems, more could be said about social issues, including working conditions and types of relations. Resistance to the system of Plastic Food container (V0 p 43) is a very good example of how as a contributor said “FLW are build in the system”. Chapter 2 very well explains how a bruise of a fruit at harvesting can, later in the chain cause the loss of the fruit, or even of more fruits. The report could consider how working conditions, types of contracts all along the chain can increase or reduce risks of losses. Yvan Sagnet (2012) describing tomato harvesting, well shows how informal work, paid per box, with workers depending from an external chief, with no interest nor responsibility in the quality of the harvested product, leads to losses. And the link it has with low food prices.

About the definition. Is fish discarded at sea considered and counted as post harvest losses or does the counting begin after landing?

Also about the definition, but in fact broader is the question of edible/inedible mentioned by some contributors. I can understand that, for statistical purposes, it could be necessary to use the definition of a country or group of countries. But it raises some major questions. As some products which are considered inedible are in fact exported to countries where they are considered edible and eaten it could to an actual increase. It is especially the case for meat; most of the parts considered non edible in one country, or simply not preferred, are exported (Hsin Huang 2012). A second point is that it seems that the definition of non edible seems to expand, at least in some countries. Most of the pieces of meat were eaten, including offal. In some countries even bread crust could now be considered as inedible. From a sustainable food systems perspective there should be a distinction between edible/non edible and preferred/not preferred. Even if not accounted as waste in a statistical definition, not to eat something edible because it is not preferred is a waste of resources.

References:


Alexandre Meybeck
FAO/UNEP sustainable food systems programme
Dear Vishweshwariah Prakash and your team,

I am happy to have been among those requested to provide feedback on the document titled Food Losses And Waste In The Context Of Sustainable Food Systems V0 DRAFT.

Generally, I found the document very informative and interesting to read and I look forward to receiving the final version. It may not be within my mandate to highlight some of the minor errors in the document but please bear with me if I have overstepped my mandate.

I am of the view that a list of acronyms be created for easy reference, since there are quite a number of abbreviations: HLPE, FLW, OECD, SFS, GHG, APHILIS, WRAP, BCFN, EPA, IFPRI, HACCP, NCC, EC, UR, GAP, GVP, IICA, CaC, USD, ALRMP, FEBA, WFP, BSE, AVEBE, FSC, to mention but a few. They may look familiar but for those who will find them inconveniencing to memorise, a section on acronyms would be ok.

These words are incorrectly spelt or misused:
‘tor’ instead of ‘for’ (page 21 line 34)
‘loose’ instead of ‘lose’ (page 22 line 14)
‘vegetables’ instead of ‘vegetable’ (page 24 line 18)
‘moist’ instead of ‘moisture’ and ‘rotten’ instead of ‘rotting’ (page 61 Box 15 para 3 last line)
‘marketing’ instead of ‘marketed’ (page 63 Box 17 para 1 last line)
‘way’ instead of ‘ways’ (page 64 line 50)
‘mean’ instead of ‘means’ (page 65 line 28)

The following words are stacked together and should be separated by spaces:
Page 6: line 46 words 9 & 10; line 47 words 4 & 5
Page 8 line 29 words 1 & 2
Page 11 line 10 words 1 & 2 of the new sentence; line 37 words 3 & 4
Page 12 Box 2: entire opening sentence
Page 13 line 34 between countries in brackets and the word ‘have’
Page 16 line 26: inside brackets between the author and ‘et al’
Page 17 line 9 words 6 & 7
Page 18 line 9: 8th & 9th words of the new sentence
Page 19 lines: 21 the last words; 35 12th & 13th words; 37 1st and 2nd words; footnote: ‘foodcommodity’ instead of ‘food commodity’; ‘marketscombined’ instead of ‘markets combined’
Page 20 lines: 5 2nd & 3rd words; 6 last two words of old sentence; 27 4th & 3rd last words
Page 21 line 18: 4th & 3rd last words
Page 22 lines: 17 1st & 2nd words of new sentence; 21 5th & 4th last words; 22 3rd & 2nd last words; 53 5th & 4th last words
Page 23 lines: 15 ‘foodsafety’ instead of ‘food safety’; 22 1st & 2nd words; 30 5th, 6th & 7th words
Page 24 line 52: ‘weightproducing’ instead of ‘weight producing’ & ‘dayin’ instead of ‘day in’
Page 25 lines 34, 38 & 39
Page 26 line 1
Page 28 lines: 25 & 43
Page 29 lines: 3, 20 & 45
Page 31 lines 9, 25, 27 & 42
I also noted that there are references that are indicated in the text but not cited e.g. but not exhaustive:

Alexander (2013)
BCFN (2012)
Bett & Nguyo (2007)
BIOS (2010)
Bulitha et al (2012)
Cohen (2013)
HLPE (2012)
Parfitt (2013)
Ericsen (2011)
Eldin & Farag (2008)
IFPRI (2010)
IME (2013)
Ingram (2008)
Weber (2008)
C-Tech (2004)
Florkowski et al (2009)
Food Chain (2009)
Frimpong et al (2012)
Fox & Fineche (2013)
Gettinger (1996)
Greger (2007)
Humera et al (2009)
Johns (2005)
Kader (2002; 2005)
Kallaberken (2013)
Kankolongo et al (2009)
Kessova (2013)
Lewis et al (2005)
Li (2003)
Ilich & Vukosavlevic (2010)
McCaffree (2009)
Midgley (2013)
Mittal (2007)
Nicholas (2002)
Njie (2009)
Postharvest Hub (2008)
This author is Rutton (2013) (in text) but cited as Rutton (2013) in the list of references.
Schneider (2013)
SEPA (2008)
Thiagarajah (2012)
USDA (2009)
Vereijken & Linnemann (2006)
Webber et al (2001)
Webber et al (2008)
Whitehair (2013)
Williams (2012)
WRAP (2012)
Wyngaard (2013)
Yang (2006)
Yusuf & He (2011)

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