Food is never waste

A global initiative[1] to halve food loss and waste by 2030

1) Objective of this Solution Cluster

The objective of this cluster[2] is to slash the level of food loss and waste ("FLW") globally, to meet SDG 12.3 and to benefit multiple other SDGs – from zero hunger and climate action to sustainable cities. The cluster unites food system actors to collaborate towards maximizing the effectiveness and efficiency of entire food systems, instead of 'fixing' specific elements. This coalition emerges from the dedication to FLW reduction of Champions 12.3, who will continue to provide strong advocacy and leadership – combined with countries who stand up both to reduce their own FLW and to help other countries do so.

Specific objectives of the Solution Cluster include:

- To make **measurement** of FLW a routine globally, to build a case for action, track progress and identify FLW hotspots
- To support governments in designing **national action plans**, set FLW reduction targets, form national coalitions and help draft and implement national policies that help reduce FLW and encourage the formation of a circular food economy
- To ensure that different forms of **on-farm[3] and fishery[4] losses** are addressed and that solutions are implemented
- To boost **investment** in FLW reduction and circular food economy and to implement various financing and funding solutions that will support investment in the entire food system to drive uptake of policies, programs, behavior change, technology and process redesign that reduces FLW, GHG emissions and depletion of natural resources, and benefits farmers' and fishers' living incomes and inclusion and food-insecure people
- To design an **investment and de-risking** facility to accelerate implementation of FLW reduction measures and circular food economy investments
- To advocate the use of **control mechanisms** like Target, Measure, Act or Plan, Do, Check, Act for FLW interventions by countries and companies
- To change **social norms** around the world so that it is no longer considered acceptable to waste food from households, retail or hospitality
- To create a **global policy framework** and implement market interventions that ensure the rescue of surplus food into high added value applications (recycling or conversion) or recycling, and to see that landfill and incineration of FLW is phased out.

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1 We thank the tens of experts from UN organizations, World Bank, governments, NGOs and companies who have contributed directly to this document, and the hundreds of champions who increasingly put food loss and waste on the mind-map

2 The Action Area Food Loss and Waste and the Solution Cluster Food Loss and Waste coincide. It is an Action Area with one Solution Cluster. The different components are listed in section 3.

3 The term "Farm Losses" as used here includes losses pre-harvest, during harvesting and post-harvest. It includes both involuntary losses e.g. from adverse weather events, as well as intentional decisions like a decision not to harvest. For these intentional losses, the term "Farm Wastage" is sometimes used. We don't, to avoid confusion with retail and consumer waste.

4 For some countries, losses in fishery are a significant component of total FLW. Section 3 contains a separate component on fishery losses that may be included in the national action plan. In many places of this document, wherever speaking of farmers one could add "and fishworkers."

2) What is the problem this solution cluster is trying to address?

Globally, at least 1/3rd of food is lost or wasted between the farm and fork each year:

- [UNEP 2021] estimates 17% of total food available to consumers – or 931 mln Mtons – got wasted in households, retail, hospitality and food services, in 2019
- [FAO 2019] estimates that 14% of all food produced gets lost between harvest and retail
- [WWF 2021] suggests that pre-harvest wastage on farm, not included in the SDG 12.3 definition of food loss, may be considerable both in developing countries and mature economies.

FAO estimates the economic costs of FLW at USD 1 trillion per year, with environmental costs amounting to USD 700 bln and social costs to USD 900 bln. This amount of FLW consumes 1/4th of freshwater usage by agriculture, is grown on a farmland area greater than the size of China, and emits around 8% of global greenhouse gasses. This is more than any country except China and USA.

This wastage of food occurs in a world where 690 mln people suffer chronic hunger, another 130 mln are at risk of chronic hunger due to COVID19 and more than 3 bln people are unable to afford a healthy diet. The current levels of FLW are a reproach in a world where 1 in 10 people goes to bed hungry every day.

An estimated 70% of biodiversity loss is attributed to agriculture and aquaculture and the cultivation of food, fuel and fiber. This is not specifically linked to FLW, but obviously higher loss and wastage aggravates the issue. A synthesis [EMAF 2019] by the Ellen MacArthur Foundation finds that cities contribute around 500 million tons of food waste, e.g. 66% of all waste. Less than 2% of available nutrients embedded in our food are recycled. The annual GHG emissions footprint from decomposition of organic waste is 800 million tons of CO_{2eq}, with only an estimated 12% of global food and organic waste composted or diverted from landfill. With organic waste volumes expected to more than double by 2050, opportunities for circular food systems remain widely untapped.

Food wastage at retail, food services and consumer level is estimated at nearly 1 bln Mton/year [UNEP 2021]. Recent research shows that household food waste is a global problem. The average household in high income countries waste 79 kg/year, in upper middle-income countries 76 kg/year and in lower middle-income countries it is 91 kg/year. At present, only 17 countries have robust food waste data in one or more sectors, while 42 have medium-confidence data.

Only 11 countries mention FLW reduction in their Nationally Determined Contributions to the Paris Agreement while meeting the FLW reduction targets cuts 4% of GHG emissions. Countries will not be able to achieve net zero emissions from food systems and are unlikely to deliver the Paris Agreement targets without tackling FLW.

Failure to act will have an impact on food security for hundreds of millions of people, cost most countries billions of dollars in wasted food, lead to more unnecessary deforestation and grassland conversion to feed the growing world population and make tackling climate change even more challenging. In a world where food production leads to unacceptable pressure on natural resources and where over 690 million people suffer from chronic hunger and under-nutrition, these levels of FLW are unacceptable and can and should be significantly reduced. Although SDG 12.3 calls for dramatically reducing rates of FLW by 2030, and we know how to do it, the world is not yet on track.

Our vision on solutions reducing Food Loss and Waste

Previous experience shows that reducing FLW is often not as simple as it seems. Mere introduction of technological solutions often leads to unexpected side-effects further down the chain. Our vision is that it needs a food systems approach to solve the complex and intertwined problems going along with FLW. Interventions with significant impact on food and nutrition security, that have a positive business case and contribute to environmental impact reduction, should be identified and prioritized. Interventions with a positive business case still often encounter difficulty in accessing finance. This is even more so for interventions that require systemic changes. New funding opportunities for such developments are critical to implement these interventions and make them successful. Therefore we suggest an integrated approach with a cluster of solutions that can be applied by national coalitions dedicated to reducing FLW.

Working with participating countries and drawing on our shared, international experience, we will:

- Measure existing levels of FLW, identify FLW hotspots en developing an action plan
- Aim at reducing food waste by at least 50% and food loss by at least 25%[5]
- Under the guidance of a national governance body, endorsed by the government, execute the action plan, keep monitoring and reporting FLW levels, draw lessons and feed them back into the national and international coalition to make our approach more effective.

3) What are the components of the Solution Cluster? How do they work alone and together?

We propose to launch a global initiative in which governments of at least **50** countries[6] prioritize FLW reduction across the entire supply chain from farm to fork. The aim is to at least halve food waste by 2030, cut food loss by at least 25%[5] and to deliver a more sustainable and more circular food system, a.o. by preventing food waste from going to landfill and incineration. Each country will set FL and W reduction *targets*[7] with special focus on identified hotspots, *measure* FLW to set a baseline and monitor progress over time, and *act* via policies and practices to reduce that FLW – target, measure, act.

This global initiative will work with countries in a 2-stage approach to help them implement the most appropriate approaches that fit their circumstances from the following list of proven interventions – categorized in Strategy, Monitoring and Evaluation; Action and Impact; and Enabling Environment. Stage 1 basically comprises country diagnostics, baseline measurement, hotspot analysis, target setting and development of a national action plan. In this stage, the necessary investments (public and private sector) and funding needs will also be estimated. After stage 1 each country government has a go/nogo decision to enter stage 2 – implementation. For stage 2 various components are available. The scheme on the next page reflects the different components that can be used in national FLW reduction plans:

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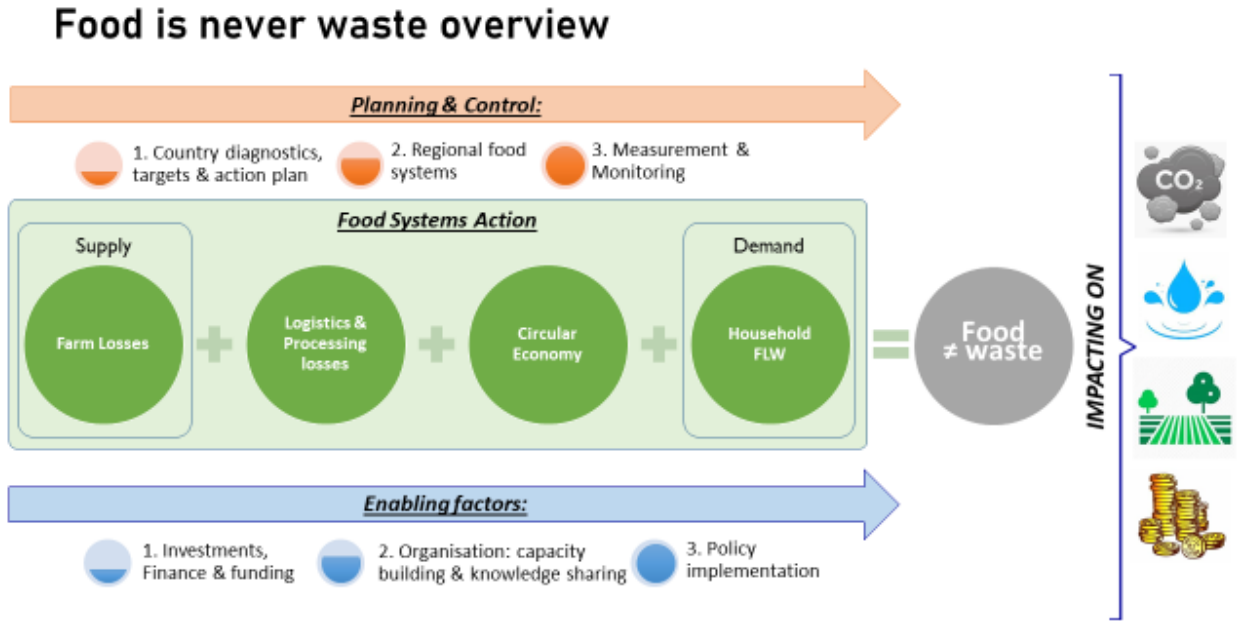
5 Strictly speaking, SDG 12.3 does not contain a specific target on food loss reduction other than "reducing it" – by any unspecified amount. The expert group that has contributed to this report agrees on a food loss reduction target of 25% minimum – while many of its members would rather opt for 50%. In the country assessment and target setting, each country can decide on its individual target. Food loss reduction of 25% was also used by FOLU as the basis of its calculations in [FOLU 2019].

6 Besides at least 50 countries, we are specifically targeting countries with a significant potential in FLW savings. Altogether, through this initiative we hope to realize the targeted reduction for at least 75% of global FLW. Having said that, the coalition is obviously open for any country that wishes to reduce FLW.

7 Countries may find reasons to calibrate their specific targets on FLW reduction e.g. because of previous interventions or findings from the assessment. See also footnote 5 on the previous page.



Strategy, Monitoring and Evaluation

- ***Country Level Diagnostics and Targets: World Bank, IDB, FAO, UNEP, UNDP, WFP, WUR***
  Working with domestic and international research institutions and NGOs, conduct a base-line assessment of country FLW levels and "hotspots" [WB 2020-1] [WUR 2021], set FLW reduction targets[8], identify priority areas of action and corresponding and context-appropriate solutions, and estimate potential economic, food security and climate benefits of FLW reduction.
  This process of national diagnostics, target setting and context-appropriate interventions can help determine Nationally Determined Contributions (NDCs) under the Paris Agreement and help shape the contribution of FLW reduction to National Adaptation Plans (NAPs). [UNDP 2021] and [DRAW 2021] contain views of how FLW reduction can contribute to climate action, to food security and to economic benefits. The diagnostics can also serve as a framework for food system design thinking in developing countries where land use change (biodiversity) and food security are critical issues. This component is particularly suitable for countries at the start of the FLW reduction journey and basically comprises stage 1 of the 2-staged approach the initiative offers UN member states.

- ***Design of Regional Food Systems: WWF, WFP, WUR, FAO***
  Of particular importance will be designing food systems in a regional context. A high priority in Sub-Saharan Africa, for instance, will be placed on minimizing land conversion and encroachment upon wildlife habitat and corridors, while at the same time providing livelihood improvements and nutrition security to a growing and more affluent population. In addition, tourism is expected to dramatically increase post COVID-19, which will in turn increase food demands. This requires a call for strategic design of food imports and local production planning. It might be more efficient to centralize production of certain products in established growing regions like South Africa, Zambia, Zimbabwe and Arusha Region, and investing in better transportation, cold-chain and post-harvest handling, versus

[8] Where applicable, align with binding reduction targets of the EC or other applicable frameworks.

expanding local production in regions like Victoria Falls/Livingston; especially when local production can come with higher loss/waste rates and expansion into critical habitat and depletion of water resources. Another example of design in regional context is that shared waste legislation in regions like the EU. As such, this component will be about strategic development of regional food strategies to reduce FLW while preserving and enhancing habitats and natural ecosystems and promoting circular food systems.

- ***Monitoring & Measurement: FAO, UNEP, WWF, WRAP, WUR, WRI***
  A critical element of the approach will be to help countries, cities and companies measure and monitor FLW levels from farm-to-fork. After the initial assessment, this will help countries and food system actors to keep tracking the development of overall FLW levels, the performance in specific hotspots and the identification of newly emerging ones – with indicators that allow for transparent and regular reporting across country, cities and private sector industries and key players.

  Without investment into consistent and normalized measurement, progress globally cannot be accelerated. Measurement will help identify where in the value chain interventions are most promising (e.g. in fresh fruits in the EU, more than half of all waste occurs in households). It will also help to assess the final effectiveness of interventions and introduce a learning loop in FLW interventions planning.

  SDG 12.3 Mandated Monitoring and Measurement
  The UN Member states have mandated FAO and UNEP to monitor SDG 12.3:
  - The Food Loss Index by FAO [FAO 2018-2] with its associated tools for data collection and estimation methods
  - The Food Waste Index by UN Environment [UNEP 2021] with its associated tools for data collection and estimation methods.

  When it comes to monitoring progress with regard to SDG 12.3, these measurement frameworks are the only ones approved by UN Member States. Implementation and data collection is in some states an ongoing process, in others still has to be initiated.

  Additional Monitoring and Measurement tools
  Several additional resources for Monitoring and Measurement exist, often developed to provide practical guidelines in measuring FLW reduction in specific industries or parts of food systems[9]:
  - The Food Loss and Waste Accounting and Reporting Standard [FLWP 2021]. Several industries have developed reporting protocols leveraging this standard, e.g. the Food Waste Roadmap [WRAP 2019][10] and a protocol used in countries around the globe to harmonize measurement of food waste generation in the hospitality sector
  - There is ongoing work on an international ISO standard on Food Loss and Waste
  - The Atlas tool [WWRI 2020] was developed to enable countries, companies and other organizations to report how much FLW is created and identify where it occurs
  - Several measurement protocols are now being developed out of Europe and the US that aim to standardize data collection from farms; see [WRAP 2020]. One on-farm measurement methodology in the US is run by the Sustainability Index for Specialty Crops (SISC). These standards can be used for example by the Sustainability Initiative for Fruits and Vegetables which plans to establish pilot projects in Europe and Africa

[9] Obviously there is an overlap between Monitoring and Measurement, and Diagnostics on the next page.

[10] [WRAP 2019] contains details guidance on the measurement of FLW across the supply chain. It was developed with businesses and is also used by the Consumer Goods Forum.

- The ReFED Insights Engine was developed to bring in data from public and private sectors and is currently tested through the US West Coast Voluntary Agreement to Reduce Wasted Food [PPC 2021]
- The Agro-Chain GHG Emissions (ACE) calculator [ACE 2019]
- New research conducted by WWF after on-farm FLW [WWF 2021][11].

This component will ensure consistent and practically working measurement of FLW in participating countries.

Action and Impact

- ***National FLW Coalitions: WRI, WRAP, FAO, UNEP, WWF, NRDC, national private sector, WUR***
  Launch national Public Private Partnerships across the supply chain to cut food loss by 25% or more and help consumers, retailers and food services halve food waste (such as those implemented in the Netherlands [NL 2014], USA [PCC 2021] [NRDC 2021] and the UK [WRAP 2019]). This component will support countries, by establishing multi-stakeholder national partnerships, to plan and implement the prioritized FLW interventions and to measure and monitor progress by leveraging the following:
  - Help convene Public-Private Partnerships in-country to ensure businesses and NGOs prioritize FLW reduction and drive this reduction across the national food system
  - Bringing companies to become national "anchors" for the domestic partnerships[12]
  - Support networking among local governments, grassroots influencers and organizations to support FLW reduction
  - Bring financial institutions into the effort
  - Monitor progress, publicly profiling successes, and maintaining momentum
  - Provide feedback to the national coordinating unit and the government
  - Benchmark and share learnings with other countries
  - Providing "how to" guidance, proven tools and leadership on each component.

  This approach has proven to drive significant change, reducing food waste by millions of Mtons and saving companies and citizens billions. For example, the partnership in the UK has helped reduce food waste by 1.7 mln Mtons/yr saving USD 7 bln/yr [WRAP 2021] and this particular approach is being used in 10 countries worldwide already.

- ***Farm Loss Reduction: FAO, WFP, AGRA, Rabobank, WUR, UNEP***
  1.2 bln Mton of food is lost on farms each year with an estimated carbon footprint of 2.2 Gton CO2eq, greater than 400 million cars driven for one year [WWF 2021]. Farm losses occur due to a variety of reasons including lack of infrastructure and equipment, lack of knowledge and training, cost of logistics, adverse weather events and pests. In addition, socioeconomic factors such as gender inequality or marginalizing of vulnerable groups and

[11] Important to note on the definitions and prioritization of how we approach loss and waste reduction. "If the emphasis on food loss and waste interventions pushes more food material into animal feed and other landfill diversion routes, then the outcome in terms of reduction in greenhouse gas emissions will be far more limited, missing a globally significant opportunity to make agriculture more climate friendly and reducing its land use and forest and grassland conversion impacts. For example, where food surplus or that which is deemed unfit for market can be diverted into the feed system without being considered waste, there is little incentive to address the market issues driving overproduction and food loss. This is why defining definitions and prioritizing loss and waste definitions is so critical.

[12] Platforms like CGF, WBCSD, WEF and national platforms may help identify these companies.

minorities, are amongst causes of value inefficiencies leading to food losses. Lastly, institutional and political settings may lead to increased losses.

Farm losses decrease farmer income and increase GHG emissions and loss of nutritious food products. Interventions often benefit multiple value chain actors and require a full value chain approach – also to avoid unwanted side-effects in any of the other SDGs. Interventions may in certain situations be linked to women or youth empowerment.

Interventions often require a change in business or production model and investment in new technology and capacity development – changes that are adequate to the targeted processes and affordable to involved value chain actors. Operations and sustainable technical practices that reduce on-farm and near-farm food losses include other harvesting techniques, drying, storage, cold-chain, post-harvest crop care, changes to unnecessary cosmetic standards and transfer of otherwise wasted produce to secondary markets or as inputs to other processes. Climate change will also impact pre-and-post harvest losses in unpredictable ways, making investments into pre-harvest technology and waste reduction a critical component.

Various research initiatives have identified food loss "hotspots" and identified proposed interventions that can be applied to reduce the losses. Within the context of the international coalition and national coalitions, this component aims to establish action coordination centers that will focus on raising awareness, education and advocacy for FLW reduction; identify the most promising interventions and replicate and scale established good practice; raise necessary funding and investment; coordinate implementation of the agreed interventions; build capacity and share knowledge; promote inclusive approaches (including empowerment of women, minorities and youth); monitor the effects using the agreed measurement frameworks; apply corrective measures to optimize the results; and draw lessons ("excellence in FLW reduction") to be used elsewhere.

Integrated cold chain[13] and logistics should begin at farm gate and ideally extend to the household level[14]. Promoting integrated and sustainable cold chain development also drives rural livelihood development, improves rural community access to energy and cooling and integrates cold chains for health ánd food. Which automatically leads to ….

- ***Logistics & Processing Loss Reduction: WRI, Rabobank, FAO, WFP, WUR, UNEP***
  Apart from on- and near-farm losses[15], FLW also occurs more downstream in the value chain - e.g. during transport and storage and primary and secondary processing. Again, evidence is available that identifies value chain "hotspots" and proposed interventions that can be applied to reduce the losses [WB 2020-1] and [WUR 2021]. These interventions include context-appropriate transport and storage systems, integrated cold chain and

13 Initiatives include the "Community Cooling Hub" as demonstrated by the UNEP-led Cool Coalition, the United for Efficiency Programme and the Centers of Excellence on Cold Chain and Post-Harvest Management in India and Rwanda, as well as the mobile, solar-fed cool hubs of "the Cool Move".

14 Besides full loss of produce, quality losses upstream often result in larger loss (quality ánd quantity) downstream. Fresh and perishable produce that is not cooled immediately after production, will deteriorate further down the chain – and the reverse process is almost never feasible. The same goes for grains that need to be properly dried after harvesting, e.g. with maize to avoid aflatoxin formation. Special attention for interventions at farm level and initial aggregation is therefore imperative.

15 In many cases there is a strong relationship between farm losses and losses down the supply chain, e.g. in logistics and processing. Therefore we will observe these relationships and apply an integrated value chain approach to all interventions.

alternative processing technologies that extend shelf life ('first mile' solutions that benefit loss reductions further down the supply chain and intensive technologies like freeze-drying or vacuum cooling). The solution cluster will work through the same organization as "Farm Loss Reduction" but have a specific focus on downstream food loss and foster specific excellence in identifying the most promising interventions and measurement frameworks. The action coordination centers will work with supply chain actors (including SMEs, farmer organizations and government-linked entities) to implement the interventions.

- ***Effective fish loss and waste reduction: WWF, WorldFish, UN Nutrition, FAO***
  Aquatic food loss and waste compromise the diets of millions of people, especially the poor, by depriving them of nutrient-rich foods. Full nutritional benefits can result from the consumption of the entire fish of small species, as their head, bones and skin are rich in micronutrients. Exploring the use of safe, nutrient-rich, edible parts that are usually lost or wasted for consumption can offer a viable solution to increasing nutrition in vulnerable and marginalized groups and reduce FLW. Besides nutritional benefits, reducing fish loss and waste can lead to a reduction of pressure on fish stocks and water quality and improve fishers' and fish workers' incomes.

  In fisheries and aquaculture, in most regions of the world, total fish loss and waste lies between 30 percent and 35 percent (source FAO 2011). Data however tend to focus on highly traded finfish species and processing methods common in high-income countries. Additional data collection will in many cases be required. Effective fish loss and waste reduction requires appropriate policies, regulatory frameworks, capacity building, technology, services and infrastructure, as well as physical access to markets. Understanding how these different factors interact in a given context is important, with the interaction and priorities varying according to location, species, climate and culture.

- ***Circular Economy: WWF, GFBN, WRAP, NRDC, WUR***
  Food is typically the single largest input by weight in global municipal waste streams where it causes social and environmental harm and forms a significant cost to municipalities. This component will help countries develop policies that deliver a more circular food economy:
  - Creation of markets for remaining food loss and waste
  - Incentives to rescue surplus food
  - Upcycling of organic processing waste to produce food products whilst generating social benefits
  - Support to businesses (often SMEs) to improve efficiencies, divert food waste for donation and reduce waste and effluents
  - Investment in waste management infrastructure and measurement.

  Food waste is valuable. Waste contains valuable nutrients and represents an economic value[16]. Having reduced food waste for human consumption as much as possible, there is a number of options to use the remaining waste:
  - Upcycling food waste. This amounts to reprocessing food waste (or "recycling food") into food for human consumption (whilst ensuring all safety and quality requirements are met)
  - Waste can be a feedstock for composting and bioenergy production (such as treatment through Anaerobic Digestion (AD))

[16] Estimated at USD 46.7 bln with compound annual growth rate 5%, see [FFDV 2019].

- Waste can be used as feedstock for alternative protein, e.g. to feed black soldier fly of which the larva serve as an excellent alternative protein in animal feed
- The solid and liquid outputs from these processes make high quality fertilizer, reducing the reliance on fossil fuel-derived fertilizers
- Encourage any other high added value product development in the re-use of food.

The development of safe added value markets for wastes, for human food, for animal feed or as a feedstock for other biochemical processes, helps keep food out of landfills and will help achieve instant GHG reduction through methane emission reductions. These outputs can also improve soil health and nutrition, boost profits for farmers, and feed more people.

Policy interventions like landfill bans or taxes, as well as stimulants for bio-fertilizer, can incentivize the development of alternative markets for the processing of food waste into valuable produce and stimulate investment. Several examples of this exist globally. France became the first country to pass a national regulation specifically against food waste in 2016. NL banned landfill with organic waste in 1995 and since then, 16 of 27 EU countries have passed similar legislation. The UK has instigated landfill taxes and Scotland has completely banned food waste to landfill. The US recently proposed its Zero Food Waste Act aiming at massive investment in a circular food economy. California has recently passed SB 1383 [PCC 2021] which establishes targets to achieve a 50 percent reduction in the level of state-wide disposal of organic waste from 2014 levels by 2020, and a 75 percent reduction by 2025. Colombia provides tax incentives for high level alternative use of waste e.g. through food banks. These policy levers have accelerated action to make reducing food waste the norm across the supply chain. They have also increased public investment into infrastructure development which can't be entirely financed by the private sector.

- ***Reducing Household Food Waste: WRI, WRAP, NRDC, UNEP***
  Household food waste is a problem in all countries regardless of income. Country-level research to understand the key causes and drivers of household food waste, to assess the policy context and to identify existing local solutions that have proven effective, can be conducted in parallel to measuring household food waste. With the outcomes, a locally relevant behavior change programme may be designed, comprising:
  - Policies (such as separate food waste collection)
  - Education (including school curricula, school catering staff, school gardens)
  - Media campaigns (including the engagement of role models and social media)
  - Collaboration with food retailers and hospitality.

  We need to raise awareness and make it easy for people to reduce food waste and separate it from traditional waste streams. The ultimate goal must be to shift the social norms so that it is no longer 'normal' to waste food and ensure that inedible or unavoidable food waste is processed through a circular food system. This initiative would launch a domestic behavior-change campaign to encourage and empower households to reduce their food waste. This would be a combination of information, messaging and support from government, retailers, brands and grassroots organizations and influencers, underpinned by research on the causes of food waste locally. We would seek to create a network of grassroots influencers and organizations to implement locally-tailored approaches, supported by a growing toolbox of approaches that are known to be effective. In addition, we would encourage the development of technology and innovative ideas that change the way people manage food waste in their homes. Household refrigeration in low income countries is one of the ways to significantly reduce household food waste.

Done well, substantial change can be delivered. For example the UK has reduced household edible food waste by 31% and the Netherlands has reduced it by 25% by running effective campaigns, that are widely supported by businesses and the public sector, and which mobilize influencers and grass-root organizations. These campaigns are still going on and their effect continues to increase, suggesting that a target of 30% reduction of food wastage through this approach could be adopted by other countries as well.

Enabling Environment

- ***Investment, Finance and Funding: Rabobank, WB, FAO Investment Center, IFAD***
  Finance is an essential facilitator of any kind of food systems transformation – and certainly also of FLW reduction. Needs for finance and funding need to be addressed in an early stage to avoid delays once implementation stages in countries take off.

  This component of the cluster takes care of:
  - Drafting project budgets, recording funding commitments, reporting budget use over time and set against project progress and ensuring financial accountability and transparency
  - Analyzing finance and investment needs of project components and advising food systems actors on the preferred finance solutions, based on existing finance mechanisms and where necessary complemented with additional mechanisms
  - Monitoring the business cases of all actors involved and coordinating the (financial side of) RoI reporting and ex post assessment of impact vs. investment.

  Further detailing of the topics of funding, investment and finance is given in section 11 and Annex B.

The initiatives listed above are all interlinked. Measurement underpins everything. The supply chain work will extend back to farm level so link to the work to address farm losses. It also extends to consumers and the issue of household food waste. The requirement for more circular policies covers the whole supply chain – from farm through to end consumer. We need to prevent FLW from happening and find ways of capturing any losses and waste so they can be put to beneficial use. The end result should be that food is never wasted and instead is valued as a resource.

4) What is needed to make the components impactful at scale, and what is stopping them from scaling right now?

The following is needed to make these components impactful at scale:

- Baseline setting and reporting under SDG 12.3 using Food Loss and Waste Indices
- Widespread adoption of existing measurement and monitoring systems
- Better understanding of FLW underlying causes and socioeconomic drivers; to this purpose, integrated assessment of root causes of FLW in a systemic approach, with focus on economic, environmental (including climate) and social impacts; prevention, reduction, valorization and digital solutions; and risks and KPIs of the intervention
- Although already growing, ever more awareness and "top-of-mind" position of avoiding FLW. Basically, allowing a certain level of FLW should simply become "not done"
- Helping consumers adopt simple behaviors that rapidly and substantially reduce household food waste
- Implementing food loss reduction solutions in a systemic approach

- The formation of partnerships between governments, businesses and society, committed to delivering SDG 12.3, helping producers, businesses and consumers to reduce FLW
- Policy interventions such as food waste landfill bans; further development of, and research into, landfill diversion technologies and infrastructure (e.g. upcycled foods, anaerobic digestion, waste-to-animal feed, composting)
- Efficient and large-scale use of digital platforms, apps, AI, satellite imaging and other technology and IT for knowledge transfer, behavior change, technology transfer, market linkages, access to finance and improvement of visibility and transparency throughout the entire value chain
- An active community of practice that shares insights on measurement and the impact and cost-effectiveness of different interventions.
- A continuous learning cycle and sharing of lessons learned and proven FLW interventions through global technical platforms – including a suite of toolboxes, how-to guides, playbooks, documentation of proven interventions etc.

What is stopping the components in section 3 to scale right now are a lack of:

- Understanding of the scale of FLW, where it occurs and what causes it – highlighting both technical, economic, political and socio-economic factors
- Awareness of the climate change mitigation potential[17] from investing in food waste upcycling into added value products, recycling into compost and acting as a feedstock for renewable energy production
- Incentive to be a good steward of natural resources by reducing FLW
- Pricing in externalities in the price of food, which implies those externalities are also not priced in in the value of food going to waste
- Cost-effective FLW reducing innovations, access to suitable finance and funding options
- Access to innovation and knowledge of available solutions
- Application of systemic approaches[18] in food loss reduction which undermines the impacts of certain interventions
- Funding for Country Level Diagnostics[19]
- Direct connection of farmers with markets in order to facilitate better translation of understanding of market demands into farm planning

17 Methane is an at least 20 times more potent greenhouse gas than CO2. For developing and low-income countries, financial incentives and low-interest loans must be established so there can be immediate investment into waste reduction, edible food distribution, waste-to-feed pathways and end-of-pipe recycling/processing technologies.

18 [WWF-UK 2021]: "Farm stage interventions can no longer be focused on technology alone. Effective interventions to reduce farm stage food losses must involve multiple elements rather than single solutions. Interventions in the past have tended to focus on discrete technical solutions addressing issues with farm technology or storage, whilst largely ignoring socio-economic and market factors that shape the agricultural system. Crucially, these wider influences involve actors and agencies beyond the farm gate such as retailers, food manufacturers and brands. Although technological solutions remain an important component of interventions to reduce losses, they need to be suitable for the given region and culture and be affordable and dovetail with changes to procurement practice, cosmetic standards, and a supply chain focus on making the maximum amount of edible food from what is grown, rather than internalizing the cost of food loss and waste in prices."

19 A diagnostic framework has been generally defined and accepted by coalition partners, it simply needs to be funded. Based on active projects currently underway in Europe and the US, we assume that diagnostic and baselining projects will require an initial, average investment of approximately $ 2 million per country. For 50 countries, this would require investment of $ 100 million.

- Awareness[20] among government, businesses and households of food loss and waste, their causes and impacts
- Funding[21] for awareness campaigns at all levels and investment into waste management at home
- Policies that drive more resource-efficient and circular food systems
- Alternative proximity marketing channels (localized food systems, farmers markets) to sell fresh produce directly to consumers.

All of these barriers can be overcome by the coalitions that are currently forming, the ever increasing awareness of FLW as a lever for food systems transformation, the growing knowledge base on FLW, the many proven solutions for FLW reduction and the business case for FLW.

5) Who are the key types of stakeholders that need to work together to make the components work?

Key stakeholders are:

1. Governments
2. Advocacy organizations and leaders
3. Businesses (including SME, farmers and farmer organizations)
4. Consumers and consumer organizations
5. Relevant UN organizations
6. NGOs
7. Research institution
8. Financial institutions

Ad 1. **Governments:** The FLW cluster will result in national platforms in at least 50 countries. These national platforms do exist in a few countries: UK "Courtauld Commitment 2025", Denmark "ONE/THIRD", the Netherlands "United Against Food Waste", USA "Champions 2030", "Pacific Coast Food Waste Commitment" and "Food Matters" Network, National Commissions in Chile, Argentina, Cuba and the Dominican Republic - etcetera. These national platforms have already booked their first, and in some cases considerable, successes.
Country, municipality and local government officials are critical stakeholders to include since public polices will require enforcement and investment of improved waste management. Enforcement of waste diversion (separating food waste from trash) is typically the most difficult element and will also require strong collaboration between government and private sector food businesses.
Also procurement policies, best-before-date policies and others can play a role.

Ad 2. **Advocacy organizations.** Champions 12.3 is an advocacy initiative that has made great progress in putting FLW reduction on the international agenda. In a way, the current initiative was

[20] There is currently a lack of recognition of the scale of the issue of food waste (over half a billion Mton globally), the importance, the benefits of taking action as well as a lack of knowledge about what can be done. There isn't widespread recognition of the fact that the per capita levels of household food waste are similar in all countries but the poorest.

[21] Many parallels can be made to the energy sector where investing in energy efficiency technology has been normalized over the last 20 years and given equal priority to green energy generation like solar and wind. Just like homes have invested better lightbulbs and thermostats, we must seed innovation and investment into home waste management and recycling (smart trash cans, improved composting, and at-home food waste processing).

born in conjunction with Champions 12.3 and will continue to evolve in conjunction with Champions 12.3.
Media influencers, chefs and other role models play an important role in increasing awareness.

Ad 3. **Businesses** include farmers and farmer organizations, manufacturers, logistics providers in transport, storage and distribution, retailers, hospitality sector and the waste management sector. The International Food Waste Coalition (IFWC) is a coalition of European businesses that is setting targets aligned with SDG 12.3, primarily focused on food service and hospitality.

Ad 4. **Consumers** are key as a major part of all FLW occurs at home. Consumer-representative organizations are important, as well as role models and media.

Ad 5. **UN Organizations.** In the various components the participation of FAO, IFAD, WFP and UNEP have been mentioned. Other UN organizations e.g. UNDP or UN Foundation, may join. FAO has published its landmark SOFA [FAO 2019] and Global Food Loss Index and UNEP has launched The Cool Coalition and the Global Food Waste Index.

Ad 6. **NGOs.** FLW knows a number of very passionate and visionary NGOs who have made great inroads into the topic, both on loss and waste side. Food banks are an important vehicle to channel surplus food to low income consumers.

Ad 7. **Research institutions** are needed to identify the most effective interventions and technologies to reduce FLW, to do data collection and interpretation of results and to relate FLW to other systemic issues in food systems. This also includes national institutions and local organizations involved in country level diagnostics and data collection (based on the methodology laid down by the global partners) to ensure ownership of results by the countries and relevance of the findings at local level.

Ad 8. **Financial institutions.** With the Finance Lever of the UN Food Systems Summit and the evolving Finance Network, we will address a range of Investors and Asset Managers, Financiers, MDBs/DFIs/Funds, Impact Investors and other actors in the finance industry.

In section 3, we have indicated a number of organizations that are willing to co-lead the different components. These names are certainly incomplete but provide a first start to forming coalitions. Most of the partners mentioned in section 3 are already engaged in one or more coalitions aiming of FLW reduction. These coalitions typically make progress on several fronts but lack funding and resourcing to take these initiatives to scale.

6) Why is the cluster/its components actionable? Which named stakeholders (i.e., member states, agencies, donors, businesses, civil society groups) are enthusiastic about it?

This cluster is actionable because:

- FLW is a global problem of which we basically know how to analyze and measure it and how to deal with it. We have evidence of solutions proven effective, we know how to tailor and contextualize solutions. FLW is a topic ready for action, for prioritizing and for execution
- Multiple and a consistently increasing number of countries is extremely serious about reducing FLW. Annex A lists 40 countries that have one or more initiatives in place and with most of whom discussions on joining the coalition are ongoing. This movement of 40+ countries increasingly brings scale and allows for valuable exchange of lessons learned

and effective approaches. This creates a "FLW reduction movement" in which countries and companies do not want to be "left out"
- The cluster and coalition are designed to be flexible allowing countries and companies to focus on their priorities – hotspots, national or local issues. The approach is not prescriptive and can be adapted and contextualized
- Quantification of the economic and food security benefits of FLW reduction adds to the existing solid political and economic case for action
- Good measurement frameworks exist
- The solution cluster leverages the market power of major domestic food retailers and manufacturers to encourage their suppliers to tackle FLW
- While requiring funding and de-risking of the transition, most interventions are in principle bankable or interesting from an investor point of view because they result in lower food losses, higher net productivity and greater consumer satisfaction
- Most interventions to reduce food loss and proven approaches to combat food waste are based on existing technology and programs. Apart from occasional innovation needed, most interventions are proven and ready to be scaled
- The awareness of the need of a systemic approach, rather than restricting interventions to merely introducing a single technological fix, should significantly reduce unwanted side-effects
- FLW reduction is generally seen as the "no-brainer" in food systems transformation. While implementation in reality is still demanding, the time is completely ready for large scale initiatives to combat FLW. There is a convincing return on investment, both economically as well as in climate impact, water efficiency, nutritional value, food security and market stability.

So far, interest in this cluster and interest to participate in the cluster has been expressed by:
- To date, over 40 countries have shown interest, 5 of which (US, Brazil, Ecaudor, Italy and Indonesia) have committed to participate in, or co-lead the formation of, the coalition
- Many other countries have already initiated own FLW initiatives or shown interest without final commitment yet
- Supra-nationals including 5 UN agencies, AU, EU and World Bank Group
- Over 20 NGOs and Not-for-Profits
- Various Science and Research institutions and Universities
- Farmer organizations and over 10 international industry leaders.

A full list of names in each category is included in Annex A. Please note that inclusion in this list indicates that interest has been expressed but final commitments may not have been made yet. For countries to engage with the coalition, the proposal is to follow a 2-stage process:
- Assessment stage:
  - Baseline measurement of FLW using the Food Loss and Food Waste Indices
  - Assessment of priority topics and hotspots using various tools and assessments
  - Discussion with government and other stakeholders of findings and targets
  - Target setting, work plan and national coalition(s)
  - Budgeting and fundraising
- Go/nogo decision
- Implementation stage:
  - Installing regular measurement and monitoring
  - Installing national governance
  - Kick-off of coalition(s)

- Execution of work plan according to Target – Measure – Act approach.

"Committing" to the FLW coalition as a UN member state means committing to go through the Assessment stage and to take the Go/Nogo decision. Only in case of a Go decision, a commitment to the Implementation Stage will become relevant.

7) How does the cluster contribute to all 5 Action Track Goals?

- **AT1 Safe and nutritious food for all**. Reducing the amount of food that is lost or wasted will mean that more safe, nutritious food is available for those who need it. FLW reduction prevents the loss of valuable nutrients and increases availability and affordability of nutritious food
- **AT2 Shift to sustainable consumption patterns**. It is vital that we reduce the amount of food that is lost or wasted if we are to make the food system sustainable, to achieve global goals on greenhouse gas emissions and move towards net zero. Reducing food waste in homes and hospitality and food service sectors directly reduces GHG emissions – as well as saves money. By advocating portion control[22] as proven option to reduce waste, this can also reduce calorie intake and encourage healthy dietary choices – especially in communities with high obesity rates
- **AT3 Boost nature-positive production**. Tackling food loss is vital to this goal. Food loss contributes to unnecessary biodiversity loss and land use and unnecessary and extremely harmful GHG emissions [ACE 2019]
- **AT4 Advance equitable livelihoods**. FLW has a greater impact on low income families and countries than on relatively wealthy communities. Conversely, reducing FLW should be expected to benefit low income families more than wealthy communities. While not intrinsically gender- or youth-sensitive, FLW action, because of its economic, environmental and dietary rationale and its global application, can easily be combined with a focus on gender-equality and focus on youth or minorities, and should address any underlying social causes where applicable
- **AT5 Build resilience to vulnerabilities, shocks and stress**. COVID-19 demonstrated the fragility of the food system and there were shocking examples of FLW which could have been prevented by having more agile supply chains, measurement infrastructure, better communication and collaboration. Increasing collaboration, transparency and communication are all clear deliverables from this cluster of initiatives. FLW reduction can also increase resilience against price shocks and market risk. FLW reduction also includes harvest-tenure rights provided by mobile grain storages to reduce post-harvest losses in Sub-Saharan Africa (a game-changer presented by AT5).

8) What are key sources of evidence to support the solution cluster?

A number of assessments have considered what interventions will most effectively reduce greenhouse gas production. Tackling FLW is consistently high on the list. To deliver this impact, a range of policy and programmatic interventions have been shown and documented to work. These range from Public, Private Partnerships (PPPs) which work across the supply chain, investment in mechanization, storage and climate-friendly cold chain, implementation of policies that encourage food surplus donation and discouraging or banning disposal to landfill, to running behavior change campaigns to help citizens reduce FLW. The impact of this work in a range of

[22] The application of portion control is context-specific. In cases where this would lead to adverse effects on hunger or nutrition security, portion control is obviously not to be advised.

countries has been significant. For example, using PPPs, food manufacturers in Norway have reduced their food waste by 15% in 3 years and by 26% in the UK in 6 years. Policies and voluntary action have helped triple redistribution of surplus food in the UK and increase this in France.

Cold chain in developed countries and in export-targeted value chains in developing countries, directly relates to significantly lower value chain losses in local modern trade systems, e.g. in dairy, fruits and vegetables and meat and fish. Policies implemented in Japan and South Korea have reduced food waste and have, as a secondary effect, significantly increased recycling of the remaining household waste. Action on helping citizens reduce food waste in homes has helped reduce edible food waste by 28% in the Netherlands and 31% in the UK. Given that research has shown that per capita food waste levels in the home are broadly the same around the world, this is an important priority for any FLW reduction program.

The impact of these programs has been to reduce greenhouse gas emissions, increase food availability and save money. The value of food no longer wasted in the UK alone is over $7 bln/annum and research has shown that the payback on FLW investments is in many cases rapid (1-2 years) and significant. A return of $5 back for every $1 invested or more has been regularly found by research. [CCAF 2021] reports a FL reduction of 920 kg rice per farmer, income increase of USD 338 and reduction of 3 Mton CO_{2eq} amongst 700 smallholder farmers in Nigeria[23].
Thus, the components of this cluster have been tried and tested in countries around the world, but the combination of measures has not yet been implemented in a single country. By implementing these measures together, rapid progress can be made to halve FLW by 2030, bringing huge benefits to mankind and the planet we live on.

9) How is the cluster aligned with other related initiatives?

Tackling FLW is closely linked to the following initiatives:

- Champions 12.3 – see section 5 under Advocacy
- Food security, end hunger and nutrition initiatives
- Initiatives to increase access to nutritious and diversified diets
- Initiatives specifically addressing obesity or malnutrition
- Climate change initiatives, carbon farming and carbon credits
- Economic and socio-economic development initiatives
- Smallholder farmer-focused initiatives
- National policies and programs to reduce organic household waste
- Initiatives that promote inclusivity of women, youth or minorities
- Other clusters of solutions that require de-risking of transition, large-scale blended finance for multiple, smaller recipients, and special attention for access to finance of special interest groups.

FLW occurs throughout food systems and is often caused by the current state of food systems. This proposal makes a plea for an integrated approach throughout food systems:

10) How does the cluster involve/take into account empowerment of women, gender equality and youth engagement?

[23] Information by the involved company shows a break-even point of the investment in thrashers and other equipment between 2 and 3 years.

- **Empowerment of women**. Recent studies and project experiences are progressively revealing situations in which gender inequalities are found to be an underlying cause of food loss; e.g. [FAO 2018-3]. Despite their primary role in food production and post-harvest activities, rural women face a series of constraints due to gender-based discrimination, including social norms and institutional settings, which limit their access to and ownership of key resources, access to information, and decisions making power, and capacity to take part in innovative solutions. This in turn negatively affects their productivity and their ability to engage in more efficient production systems that maximize returns and reduce FLW.
- **Gender equality**. Empowering women in food systems transitioning to a circular economy contributes to food loss and waste reduction while also generating employment and income for them. Moving towards a more circular economy provides in this way opportunities to reduce gender inequalities.
- **Youth engagement**. Education has an important role to play in helping ensure that future generations value food and understand where it came from and the impacts of wasting it. Young people are also consumers who can demand better from governments and businesses so they have an important role to play in increasing the 'pull' for change. Youth engagement also includes vocational training of youth to support the technological base required to sustain and maintain efficiency of food value chains and reduce FLW.
- As indicated before, because of the inherently economic, ecological and dietary rationale of FLW reduction, FLW initiatives typically easily combine with a gender-equality, youth or minorities focus when and where needed.

11) How much will the cluster components cost (with explanation)? And how will they be financed?

To estimate the overall needs of investment, finance and funding, the following considerations are of importance:

- On global level, [FOLU 2019] contains an estimate of USD 29 bln each year, over the decade 2020 – 2030, as investment needed to reduce FL by 25% and FW by 50% globally. This constitutes 10% of overall investment in food systems transformation as estimated in [FOLU 2019]. The estimate is provided here as a reference. A further breakdown over public/private sector and blended finance/investment and over different countries and interventions is needed, as well as a confrontation with expected returns.
- In principle, FLW reduction should be a good business case in itself. If losses in value chains or waste at consumer and retail level are reduced – with market demand for food gradually increasing with the growth of global population – profit margins or consumer spending levels should benefit[24]. On the loss side, for instance, loss reduction can lead to higher volumes of marketable produce, higher average quality (hence price) of produce and potentially additional benefits in the sense of carbon credit or other pay-for-nature income. This "better business case" [CH12 2017] should in all cases form the basis for investment and access to credit. It should account for the majority of investment needed.
- Non-viable business cases should as much as possible be avoided. Investment in cold chain should not be advised if the annual cost of it is more than the realized savings and additional income (including payment for nature services) – nor should, as a general rule, be governments advised to subsidize those negative business cases.

[24] Obviously, local market situations need to be taken into account and flooding the market with food surplus needs to be avoided. Therefore a careful, full value chain monitoring with an eye on further systemic effects is necessary to avoid adverse effects e.g. on smallholder farmer incomes.

- Pricing in externalities, reward for nature-based services and repurposing of adverse subsidies should as much as possible be included in the financial structuring.
- Existing finance structures should be used wherever available. In Brazil, for example, engagement with the national development bank BNDES is advised.

What, then, after taking into account the self-financing capability of FLW reduction, are the remaining finance and funding needs that we foresee for the cluster of solutions and where are public sector resources needed?

We see 5 main purposes:

1. To fund the non-redeemable expenses ("project costs") of the interventions
2. To finance investment in public sector infrastructure[25].
3. To de-risk the transition period of implementing FLW interventions or new business models that are needed for the transition and to provide proof of concept of the new business models to convince investors and financiers
4. To address the deficiencies in currently available development finance offerings
5. To ensure equal access to finance and investment for women, small enterprises, youth, indigenous people and ethnic minorities.

Ad 1. The need for funding. FLW interventions incur expenses that can not always be recharged to direct beneficiaries. These expenses included the costs we will make for FLW hotspot analysis; for executing market studies and forming public-private partnerships; for providing advisory and technical assistance; for public policy implementation and advocacy; for measurement and monitoring; and, last but not least, for executing behavior change programmes. While some of these costs can maybe born by direct beneficiaries (e.g. farmers paying for technical assistance they receive), in the far majority of cases such recharge will not work. In those cases we will seek funding from governments, multilateral institutions and funds, international development organizations and other donors.

Ad 2. Public sector infrastructure. Country by country, the need for public infrastructure development or improvement will vary. In some cases physical transport infrastructure, power grid, warehousing, but also policy development (e.g. repurposing subsidies) may be needed. In the country analysis, the needs for public sector infrastructure development will also be assessed.

Ad 3. Transition risk. Reduction of on- and near farm food losses, as well as of value chain losses and waste, often requires a change of business or production model and in many cases investment in new technology or innovations in either primary production, processing or logistics (both in developed and developing countries). These investments disrupt the going concern of production processes and therefore come with a - temporarily - higher risk to entrepreneurs, financiers and investors – the transition risk. In banking terms this is also known as project risk, and includes for instance "completion risk": the risk that, having started building a cooled warehouse, the warehouse will never be completed. To cover this kind of transition risks, we need to de-risk private sector investment and –financing and, in some cases, to provide risk-carrying capital (equity or quasi-equity). A de-risking facility is sketched in Annex B.

Ad 4. Deficiencies in currently available development finance. Current offerings – e.g. from MDBs, DFIs, national development banks (PDBs) or local commercial banks – have a number of deficiencies when considering large scale implementation of FLW interventions:

[25] To be complemented with additional information.

- Smaller ticket sizes – MDBs, DFIs and even PDBs typically require transaction sizes that are way beyond the amounts in the first years of implementation
- Local currency – other than local commercial banks and PDBs, local currency financing is hardly available
- Tenors – investment in infrastructure or fixed assets require longer tenors than available in many countries. Also, the transition typically requires an grace period at the beginning of the tenor of a loan up to a few years, that is typically beyond the risk appetite of a local commercial bank and very often even of an MDB or DFI
- Need for (quasi-)equity rather than debt – in some cases, the need for de-risking is rather on the equity or junior debt side than on the senior side. If an SME is de-risked on its senior debt, it may risk to become over-leveraged. Effective instruments in those cases include (quasi-)equity investments, first loss risk sharing and leasing
- Processing time of the finance application process – current blended finance structures work on a deal-by-deal basis only and typically take around 12 months to complete. For smaller ticket transactions in high numbers, a dedicated, standardized vehicle is needed, where the blending is done on the overall vehicle level rather than deal-by-deal
- In-depth knowledge of FLW reduction measures – once FLW interventions have been designed, tested, piloted and adjusted for large scale rollout, the financing should become a standardized "arrangement" with accompanying standardized impact measurement. Financiers should have in-depth "sector knowledge" of the impacts, risks and expected outcomes of FLW reduction measures
- Alignment with our measurement framework – see previous point
- Risk appetite and return expectations. MDBs and DFIs typically work with pre-designed programs with a set of pre-agreed conditions and requirements. Other impact investors typically have more flexible conditions but also higher return expectations. Taken altogether, for programmes that expect to do high numbers of finance transactions, it is typically far more interesting to seek agreement on risk profile, return and impact on a financial vehicle (e.g. programme) level than for individual transactions.

Ad 5. To ensure equal access to finance and investment. There is a risk that smallholder farmers, small enterprises, women, young entrepreneurs, indigenous people or ethnic minorities are disadvantaged by the FLW interventions. FLW interventions may require investment or financing that is more accessible to larger farmers, bigger entrepreneurs, men, people from the ethnic majority etc. Our goal should be to have FLW reduction accessible for all, hence additional support to ensure access to investment and finance for certain interest groups may, depending on the specific context, be advised.
The risk flagged here can be mitigated by tailored finance conditions for these groups. Again, in-depth knowledge of the FLW interventions is needed to avoid mis-use of this approach.

Our initial estimate for funding (point 1 above) is in the order of USD 2 mln per country on average, to cover expenses of country assessment, hotspot analysis and development of a national FLW action plan. Obviously this is an estimate of average costs, actual cost may vary significantly from country to country, depending on size, status of the food system in the country and measure already taken.

At this moment it is hard to give a specific estimate for public sector infrastructure investment (point 2). This topic will be detailed in the country assessment. Annex B contains some thoughts for an "Investment and De-Risking Facility" that addresses points 3 through 5.

12) What kind of impact can be expected over what time frame?

The primary expected impact of these initiatives, taken together and if widely implemented, is to put participating countries on track to meeting their FLW reduction targets. Doing so is expected to reduce GHG emissions globally by around 4%[26], to save over USD 500 bln annually and to make many more people food-secure with nutritious (often perishable) food.

As secondary, but equally important, impacts we expect increased resource efficiency; decreased deforestation; increased economic viability of SMEs and living incomes for smallholder farmers[27]; more localized value chains and strengthening of local food systems; job creation and investment in innovative technology; increased resilience against climate and market shocks; and reduced pressure on precious terrestrial and aquatic habitats.

Measurement frameworks – or major elements of them – are in place to measure most of these impacts.

[26] Once kicked off, the coalition will initiate calculations of the potential impact on GHG emissions in the targeted 50 countries, develop a monitoring and measurement system to track the actual impact and assess where these reductions can be monetized in carbon credits; see [ACE 2019]

[27] Famer income, also disaggregated by gender and age, and SME gross and net profit are among the baseline and measurement KPIs to be tracked.

Annex A Stakeholder interest

Listing countries, companies or any other entities here does not imply a binding commitment but does mean that contact with those entities has taken place on participation in the coalition and/or that the entity is known for significant work on FLW reduction already.

Countries/ Public Sector	Countries cont.	NGOs/Science	NGOs cont.	Private Sector
USA (USDA/EPA)	Brazil	WRI	Champions 12.3	Farmer orgs.
Italy	Ecuador	WRAP	Too Good To Go	Rabobank
Indonesia		IFPRI	WBCSD	OLAM
		World Farmers Org.	Feedback Global	Accenture
Japan	Switzerland	IDH	Stop Waste Now	Maersk
South Korea	Sweden	WWF	FOLU Coalition	Kelloggs
Mexico	Egypt	Wageningen Univ.&Research	BMGF	BASF
Australia	Mauritius	Consumer Goods F.	P4G	Unilever
Chile	Netherlands	CIAT	Chatham House	Nestlé
UK	South Africa	CGIAR – CCAFS	Wasteless	Kuradashi
Qatar	Uganda	Fight Food Waste Australia	ONE/THIRD	Winnow
Saudi Arabia	UAE	Global Cold Chain Alliance	Rockefeller Fnd.	Apeel Science
Colombia	Germany	Global Food Banking Network	NCDR	International Food
Cuba	Dominican Rep.	Sustainability Initiative for Fruits & Vegetables		Waste Coalition
Qatar	Costa Rica			
Belgium	Denmark			
France	Argentina			
Mauritius	Nigeria			
Uganda	Ghana			
China	Philippines			
Malaysia	Uruguay			
Bahrain	Jordan			
Palestine				
UN FAO, UNEP, IFAD, WFP, UNDP				
AU				
EU / European Commission				
World Bank Group				

Annex B Investment and De-Risking Facility

This Annex should be read in conjunction with section 11 of the Food is Never Waste proposal. The assumptions listed there unequivocally apply to the proposed facility here:

- In principle, FLW reduction should be a good business case in itself, hence the majority of FLW interventions should prove to be self-financing (especially over time)
- Non-viable business cases should as much as possible be avoided and governments should not be advised to subsidize such negative business cases
- Pricing in externalities, reward for nature-based services and repurposing of adverse subsidies should as much as possible be included in the financial structuring
- Existing finance structures should be used wherever available
- The proposed facility shall exclusively be used to address points 3 through 5 in section 11:
    - Transition risk
    - Deficiencies in current development finance offerings from FLW point of view
    - To ensure equal access to finance and investment for special interest groups
- The facility shall develop its own risk appetite and risk and investment policy that is specifically geared towards FLW reduction, in which quantified FLW reduction and accessibility for special interest groups are taken into account.

A blended finance architecture addresses the last bullets above by providing equity investment and de-risking of private sector investment and -financing with patient, public sector capital. A similar de-risking need is also seen in other Clusters of Solutions (e.g. the Global Soil Hub and Aquatic and Blue Foods) – hence, the UN Food Systems Summit may arrive at proposing a more generic Investment and De-Risking Facility that can serve several of these similar needs.

The reasons to seek a blended finance architecture[28], based on finance from private sector resources (commercial banks, leasing companies, asset owners and –managers, impact investors etc.), de-risked by a public sector facility, rather than a dedicated vehicle to FLW investments, are:

- The need for de-risking is temporary. The final new situation should reflect a positive business case for all actors involved and hence, bankability or invest-ability

[28] Investment in FLW reduction in general can come from different sources, including:

- Public sector investment
    - Government participations, risk participations, grant funding, public infrastructure investment, subsidies or tax benefits and in-kind resources like government-funded research
    - Multilateral institutions' investment, finance, grant funding and research
    - National development banks' investment, finance and grant funding
- Private sector investment
    - Equity investments by institutional investors, insurance companies, asset owners, asset managers and impact investors
    - Equity investments or loans by private sector third parties other than the above
    - Commercial bank financing and (quasi-)equity and risk participations
    - Leasing
    - NBFI financing
    - Supply chain partner financing i.e. supplier credit, off-taker finance, out-grower schemes, warehouse receipt finance, etc.
    - Internal financing by supply chain partners
- Society
    - Different kinds of impact investment, funding and finance schemes by NGOs, crowd funding etc.
- Blended finance
    - Various structures involving multiple actors mentioned above, combining impact strategy, risk appetite and return expectations of various in a way to enhance individual financiers' products

- A blended finance architecture prepares best for private sector financing
- A blended architecture releases higher amounts of financing than a dedicated, fully public-sector funded vehicle, will be able to do. The leverage ratio public:private finance is targeted at 1:2 or higher during the transition phase and will, after graduation of the transition, be effectively much higher than that.

As flagged before, current blended finance solutions on a deal-by-deal basis are not practical for large scale initiatives like Food is Never Waste (see "Deficiencies" in section 11). The proposed Investment and De-Risking Facility addresses these issues and complements existing facilities (e.g. Food Securities, LDN and AGRI3 Funds, GCF, GEF, MDB/DFI and private sector financing in general).

Based on these starting points, the proposed Investment and De-Risking Facility should:

- Provide investment and de-risking facilities, complementary to and where possible combined with, existing public, private and blended sector finance offerings
- Focus on economically viable investments that have clear potential for FLW reduction and meet agreed criteria of environmental and social sustainability
- Provide products that are focused on de-risking the transition, on the special product characteristics required by FLW interventions and on securing access to finance and investment for special interest groups
- Be preferably based itself on a blending of public and private sector financial resources.

Assessment of solution cluster's finance needs

We have assessed the need of the different components of our solution cluster in terms of self-finance (internal or external private sector finance), blended finance (with public sector engagement), funding needs and included the non-financial requirements of organizing a coalition and policy measures.

This leads to the assessment in the table on the next page. The conclusion is that, especially for transition periods and associated risks of introduction of new technology, different production, processing and logistics process and new behavior, blended finance solutions are frequently needed – basically to de-risk the project risk of the transition and to provide grace periods and extended tenors *beyond* what is typically available on a commercial basis.

This de-risking can take the place of equity investments or risk-share arrangements, basically dependent on the prevailing finance structures, tenors required and needs of the value chain actors involved. Given the project risk of implementing the transition, and to avoid over-leveraging the balance sheets of actors, senior debt will often have to be accompanied by a (quasi-)equity component. For introduction of new equipment (not intrinsically linked to real estate), leasing with partial government guarantee or subsidy of the up-front payment will often be an option. For working capital and trade finance solutions, a risk-share arrangement with the local FI providing the working capital will suffice. Altogether, a wide range of finance products will be required.

Enabling factor **Solution cluster component**	Self-finance	Blended finance	Funding	Org. coalition	Policy
Planning and Control					
Monitoring & Measurement			√	√	√
Regional Food Systems			√		√
Country Diagnostics			√	√	
FLW Interventions					
Farm Loss Reduction	√	√	√	√	
- Pre-harvest loss & conversion	√	√			
- Harvesting losses		√			
- Post-harvest on-farm crop care and processing		√			
- Post-harvest on-farm storage	√	√			
- Other	√	√			
Logistics & Processing	√	√	√	√	√
- Cold Chain					
o rural cooling		√			
o central cooling & freezing		√			
o cooled Transport	√	√			
- Processing					
o drying	√	√			
o pulping	√	√			
o extracting	√	√			
o natural sealing	√	√			
o dry freezing	√	√			
o other	√	√			
- Transport	√				
- Packaging	√	√			
National FLW coalitions	√	√	√	√	√
- National PPP's for FLW reduction					
Circular Economy	√	√	√	√	√
Household food waste			√	√	√

In terms of size, it is difficult to make precise calculations at this stage. Key topics of food systems transformation, including nature-positive production, reducing emissions and soil health improvement and FLW reduction, but also eradication of hunger, transition to more nutritious diets and more social equity in food systems, will all require significant investment; see [FOLU 2019]. The order of magnitude for halving FL and cutting FW in the years up to 2025 by 25% is in the order of USD 5 bln of public sector investment and a multiple of this amount in private sector investment. Obviously this requires further validation, as well as identification where synergies with other Clusters of Solutions may be found with similar investment and de-risking needs. Also, commitments can be phased over time according to progress made in assembling national plans, developing project pipelines and initiating individual interventions.

Our preliminary proposal to UN member states then is to commit USD 5 bln of public sector resources for the first 4 years 2022 – 2025. These resources will be applied as follows:

- 10% will be non-redeemable grant funding to cover technical assistance, pipeline development, applied research, organizational costs and fund management
- 30% will be grant funding to be used as first loss in the finance facility, allowing other (private sector) investors to come in on a more senior basis
- 60% will be capital at risk, used as revolving funds with an RoI on soft loan basis. Realized returns will be used to cover losses and will be reinvested in the fund. Proceeds of lower food losses will in principle fall to farmers, processors and service providers who will use it to service debt and dividends
- The private sector will be expected to come in at a minimum of 1:2 leverage, hence with a total of at least 2 * 90% * USD 5 bln = USD 9 bln. Altogether, USD 500 mln will be available for out-of-pocket expenses and USD 13.5 bln will be invested
- The performance of the facility will be evaluated and reported on a bi-annual basis. The size of the fund will be reconsidered in year 3 and 4. Assuming satisfactory performance, additional tranches may be considered.

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