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# REDUCTION OF FOOD LOSS AND WASTE – THE CHALLENGES AND CONCLUSIONS FOR ACTIONS

FINDINGS AND RECOMMENDATIONS FOR ACTIONS OF AN INTERNATIONAL CONFERENCE BY THE PONTIFICAL  
ACADEMY OF SCIENCES WITH THE ROCKEFELLER FOUNDATION

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## INTRODUCTION

The global food system is malfunctioning, leaving large segments of the population undernourished or malnourished, and causing large environmental damage. Food losses in the production, processing and marketing parts of the food systems are part of the problem. Food wasting at the retail, household and restaurant levels is a serious problem too. The analyses and calls for action in this volume are motivated by the United Nations Sustainable Development Goal (SDG) No. 12, i.e. Ensuring sustainable consumption and production patterns, and specifically, “By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses”.

This goal is very much in line with the Encyclical *Laudato Si'*, where Pope Francis calls for changes to overcome the “throwaway culture”. Food Loss and Waste (FLAW) is a moral issue because of the adverse effects on people and our planet. It is detrimental to the planet due to greenhouse gas emissions and the wasting of the water and land used as inputs, and to people – the poor in particular – whose labor is squandered and whose livelihoods are compromised when FLAW occurs.

## SDG 12 – ENSURING SUSTAINABLE CONSUMPTION AND PRODUCTION PATTERNS

By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses”. Since loss and waste are related but distinct phenomena, each may merit a unique indicator, as stated by FAO:

**Sub-Indicator | Food Loss Index:** The Food Loss Index (FLI) focuses on food losses that occur from production up to (and not including) the retail level.

**Sub-Indicator | Food Waste Index:** A proposal for measuring Food Waste, which comprises retail and consumption levels, is under consideration. Clarity on content of these indicators could be helpful to measure and guide actions.

**Source:** <http://www.fao.org/sustainable-development-goals/indicators/1231/en/>

An aim of this conference and its proceedings volume<sup>1</sup> is to reach different but complementary communities that can broaden the alliance needed to address the challenge of food loss and waste. Key objectives are to share the latest scientific evidence on how to reduce food loss and waste and thereby contribute to global food and nutrition security. Secondly, to provide recommendations for expanded global and national actions, including public and private investments and initiatives by citizens, corporations, governments, and international organizations. Moreover, the alliance of actors must become broader to make significant improvements globally in reducing FLAW.

To fulfil these objectives, we focus on clearly defining food loss and waste, while adopting a value-chain approach. When considering the magnitude of the food loss and waste challenge, summing up the tonnage of different foods is not appropriate; not only weight but the economic and environmental cost of wasted and lost food must be considered. The latest approaches to measurement in economic, caloric, or quality-adjusted weight terms are presented and discussed.

Further, food loss and waste reduction has huge benefits but also costs and these costs must not be ignored when aiming for efficient solutions. Benefits and costs must consider environmental as well as food and nutrition security effects. We know that environmental change and people's health cannot be easily captured by economic calculations.

Successfully meeting SDG 12.3 requires approaches that foster education and awareness, behavioral change, a renewed global dialogue, and coordinated global action. Ultimately, we need to create incentives that will strengthen the business case to tackle food loss and waste and move to more sustainable consumption patterns.

As we aim to unite and improve our understanding and strengthen our conviction to act on food loss, we are aware that these phenomena are embedded within a broader food systems context. The plan put forward by the UN Secretary-General to hold a Food Systems Summit in 2021 will provide an opportunity to translate global goals into actions for FLAW reductions.

It is encouraging that actions to reduce food loss and waste are already planned or in place in many countries, but so far do not add up to sufficient global impact and joint learning. The most promising actions can and must be enhanced. By bringing together a group of prominent leaders, actively engaged with this issue, from academia, religious communities, private sector, government, civil society, and the United Nations (UN), we aim to create an interdisciplinary space for analysis, sharing of knowledge and focused solutions. Ultimately, reducing FLAW

requires a change in mindsets among those who waste food and large-scale investments in value chains that are losing food. How to go about these challenges is emphasized in the chapters of this volume and summarized in the statement on conclusions and proposed actions.

## CONCLUSIONS AND PROPOSED ACTIONS - STATEMENT BY CONTRIBUTORS AND SUPPORTERS (SEE BELOW)

### 1. Motivation of the conference

In the Encyclical *Laudato Si'* Pope Francis calls for global changes to overcome the "throwaway culture". A representation of this culture is Food Loss and Waste (FLAW), which has serious moral repercussions, in view of the prevailing hunger of more than 820 million people and lack of access to healthy diets by 2 billion people (FAO's SOFI report 2019). Resources such as water and fertile land are becoming scarcer because food is produced but never eaten.

FLAW significantly contributes to greenhouse gas emissions (SOFA 2019) and thereby to climate change and its consequences. FLAW is detrimental to the planet and its people. It is morally, economically and environmentally unacceptable in the era of the Sustainable Development Goals (SDGs). We call on our leaders, and on all of us, for increased commitment to action toward SDG 12.3, i.e. by 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including postharvest losses – an achievable goal based on existing knowledge and technology. Yet, even though it is within our ability to tackle, FLAW reduction needs more attention and investment.

Successfully achieving Target 12.3 of the United Nations SDGs requires a new perspective on how to reduce the use of resources and increase the efficiency of the production, preservation, processing and distribution of food at the producer, intermediary, processor and wholesale level (i.e. losses in the value chain). It also requires addressing our "throwaway culture". For that, education, awareness, and behavioral change among consumers and retailers, are critical. Our conference therefore calls for renewed global dialogue at the highest levels of government, business, religion, and civil society to achieve the target of halving FLAW by 2030.

### 2. Objectives of the conference

The conference took note of new reports on FLAW problems, such as the State of Food and Agriculture Report (2019) by the Food and Agriculture

<sup>1</sup> Conference Proceedings, 2020 [http://www.casinapioiv.va/content/dam/accademia/pdf/pas\\_sv147.pdf](http://www.casinapioiv.va/content/dam/accademia/pdf/pas_sv147.pdf)

Organization (FAO) of the United Nations, and Reducing Food Loss and Waste: Setting a Global Action Agenda (2019) by World Resource Institute (WRI) and a coalition of partners. The findings of these, and other reports, provide a basis for action. The three key objectives of the conference were to:

1. Share the latest scientific evidence on how to reduce FLAW and thereby contribute to a more sustainable and inclusive global food system;
2. Provide recommendations for expanded global and national actions, including public and private investments and initiatives for citizens, the private sector, governments, and multilateral organizations; and
3. Broaden the alliance of actors to make more significant improvements in reducing FLAW.

### **3. Localizing the FLAW problem, while tapping into global solutions**

Data deficiencies mask the diversity of the FLAW problem – which varies greatly across regions and value chains. While a high percentage of food is currently lost at production, handling and processing stages in low-income and emerging economies, food is wasted in retail and consumption stages in higher income countries due to market design and consumer behavior. Yet market design and food waste patterns are increasing in low- and middle-income countries as the global middle class grows and urbanizes. Solutions are within reach for all country groups, but will need to be tailored to each specific context, and differentiated by food loss versus food waste as these are related but distinct concepts. Food waste happens due to lack of appropriate infrastructure, regulations, profit-seeking, and negligence, time scarcity and economic abundance at the consumer level. Food loss occurs due to unfavourable climatic conditions, improper post-harvest handling, and incentive structures leading to food loss as a rational economic option, as well as lack of information, education, technology, infrastructure, affordable financing and market access. FLAW has social equity and gender implications. Food production, not only in low-income countries, involves large shares of women’s unpaid labor and often low-paid workers, including migrants, producing cheap food that might be undervalued and thus wasted by customers. In addition, all steps in supply chains should be reviewed and monitored in order to prevent the use of forced labor and modern slavery (according to SDG 8.7).

Value chains of perishable and nutrient-rich foods (both crops and animal-sourced protein) are significantly affected. More nutritious and healthier dietary patterns require managing and preserving these nutri-

tious foods and attention to food safety (as addressed in the Conference by the Pontifical Academy of Sciences and the Global Alliance for Improved Nutrition on Food Safety and Healthy Diets in 2018).

FLAW requires our attention along with all aspects of wasteful processing, transportation, packaging (e.g. the plastics issue) and energy usage along food supply chains – issues that a circular economy and bioeconomy are trying to address systemically. Attention to prevention, not just reduction, should be considered, and solutions need to consider further the possible impacts on food access and affordability.

### **4. Strengthening of information and data**

Only when sound data are gathered and made available, measurement and monitoring progress against benchmarks becomes feasible and viable for investors and companies. When considering the magnitude of the FLAW challenge, summing up the tonnage of different foods does not appropriately capture food, environmental, and economic issues. We must move beyond a weight metric and assess the economic, environmental, institutional, health, and human costs of lost and wasted food. The hotspots in value chains where food losses occur are increasingly identified, as are effects in terms quality losses, economic costs and emissions costs (FAO’s SOFA report 2019).

While FLAW reduction has huge benefits, the costs of action cannot be ignored when aiming for effective and efficient solutions. A comprehensive approach of cost of action versus cost of inaction may be helpful.

Efforts to collect and analyze data need to double down, not only for reporting purposes, but also for the identification of causes of FLAW and decision-making for action by all players in value chains. We encourage agencies in charge of these metrics and analyses to step up efforts in these areas, donors to enhance financial support, and call upon the private sector to report on a volunteer basis. The conference explored approaches to measurement in economic, nutrient, and quality-adjusted terms, and called for broader country coverage of data as well as reporting on progress towards 2030.

### **5. Research in science, technology and extension**

We took note of progress made in terms of research, science and technology to address the FLAW problem. For example, the research initiatives by FAO, WRI, IFPRI (International Food Policy Research Institute), UNEP, the World Bank, the IADB, the InterAcademy Partnership, universities and others, highlight opportunities and challenges for research on food and nutrition security and sustainable food production, and propose priorities for natural science, social science

and food postharvest and food technology research on FLAW reduction.

Close cooperation among research communities and different stakeholders across the food system is called for to make progress on evidence-based FLAW reduction and action, including food market analysis, to understand the potential of solutions and innovations, and the feasibility of their adoption. The FLAW problem needs further clarification as to what it means to people and planet, and what it takes to move towards a more sustainable future. As waste is partly a behavioral issue, research on the behavioral aspects of FLAW needs more attention.

The causes of FLAW from a food system perspective need to be comprehensively investigated in order to avoid trade-offs across interventions if practiced within silos, and in order to point at their policy implications in the short and long term. The main knowledge gaps and the research agenda have been outlined in various recent publications, such as the InterAcademy Partnership report on “Opportunities for future research and innovations on food and nutrition security and agriculture” (2018).

We note the need for urgent action, especially in Sub-Saharan Africa, Central and Southern Asia and other developing regions affected by high incidence of food insecurity and food loss.

Pathways to effective alliances need to reflect a systemic approach to FLAW reduction, incorporating innovations in science and technology, and in monitoring food items transiting through the system. There is a role for extension services in dissemination, and for universities in building FLAW into their curricula. Information and communication technologies (ICT) and data science prove to be game changers in this respect. This conference is calling on the research community to communicate, coordinate and collaborate, and on governments, business and foundations to invest new resources to fund FLAW research.

**Civil society actions:** Civil society is taking action in areas related to FLAW. Different groups across the globe lead campaigns and disseminate information and good practices, educating consumers across all age groups and youth in particular, and advocating for more sustainable consumption patterns. Consumers are becoming aware of their environmental footprint when making choices on food purchases, portion sizes, packaging materials, and distance that foods travel. Other groups, such as Food Banks, have developed models to collect, repurpose and re-distribute food in urban settings.

We call for a broadening of efforts at the grassroots level from national or regional networks towards

a global network. Efforts led by conscious youth need support, including consumer and producer/farmer perspectives that care about the sustainability of planet and people.

Education, for instance through the global sharing of experiences of successful actions, can help countries identify solutions pertaining to issues of relevance tailored to specific circumstances. Toolkits in many languages for civil society organizations would be helpful. Dialogue on FLAW needs to be replicated more globally, reinforcing positive social norms, and engaging influencers and role models.

## **6. Religious communities’ actions**

Our conference was unique in terms of combining the science, policy, NGO and business communities with religious and ethics debates. As Pope Francis put it, “Fighting against the terrible scourge of hunger means also fighting waste. Waste reveals an indifference towards things and towards those who go without. Wastefulness is the crudest form of discarding. I think of the moment when Jesus, after the distribution of the loaves to the crowd, asks for the scraps to be gathered up, so that nothing would go to waste (cf. Jn 6:12). Gathering in order to redistribute; not production that leads to waste. To throw food away means to throw people away. It is scandalous today not to notice how precious food is as a good, and how so much good ends up so badly”. (2019).

We call upon all religious communities not just to join actions to change behavior for waste reduction and investment initiatives for loss reduction, but to engage in leading such initiatives. Both loss and waste are moral issues causing harm beyond their economic and environmental tolls. Faith-based communities should initiate dialogues on acting together to support, advocate, and partner on reducing FLAW. We call on believers of all faiths to communicate through prayers and articulations by their leaders and communities for sustained change toward achieving SDG 12.3, halving FLAW by 2030.

## **7. Government actions**

Governments at all levels need to set explicit, ambitious, and realistic FLAW reduction targets, measure the level and change of FLAW, and implement an effective and economically efficient FLAW reduction strategy. Some countries have invested in developing plans and actions to reduce FLAW. So far, however, they do not add up to sufficient global impact and joint action.

Investments in critical value-chain infrastructure need to be prioritized in low- and middle-income countries. Such investments would allow for vertical coordination and modernization of value chains. The

need for such investments is particularly acute when dietary patterns are changing, and demand for a more diverse and nutritious food basket, especially in urban areas, is rising. We take note of innovative solutions to finance such government plans. A case is the Sustainable Development Bond launched by the World Bank, and innovative financing solutions such as a Fund for investments for FLAW reduction might facilitate progress in this area.

Governments should also seek to redress incentive structures (including through price and regulatory measures like standards) such as those that encourage farmers and other supply chain actors, as well as retailers and consumers, to adopt practices that help reduce FLAW.

Furthermore, two issues need government consideration at macro scale: diversion from rule-based free trade can accelerate FLAW and needs attention; as FLAW accounts for a significant share of GHG emissions, the issue should feature on the action agenda of climate negotiations and Nationally Determined Commitments (NDCs).

## 8. Business case and corporate actions

A business case for addressing FLAW seems to exist, yet needs to be clearly demonstrated. Public support is initially required for implementation at scale and to reap societal benefits. A case in point is connecting to small farmers: As food companies aim to create value, business can lead the way in developing models that are more inclusive, also sourcing from small-scale producers. New product lines that are more sustainable will result from implementing business solutions that create shared value, and measure progress towards tangible targets. However, to convince customers, corporations need to assure transparency of actions and results in terms of FLAW targets.

Creativity is encouraged. For example, FLAW reduction can be a large domain for innovative start-ups targeted by the financial sector. Voluntary efforts being taken by businesses can be an effective mechanism if transparency of results is assured. Market-based approaches can help, but attention to impacts on low-income people and to the indirect effects on environments is necessary. Given simple metrics, setting targets and following up company by company, including input suppliers and employees of companies, is a practical approach.

Taking a shared value approach is promising when FLAW issues are included in corporate monitoring, auditing and reporting to shareholders. There are also roles for farmers, farmer organizations and small- and medium-sized enterprises to create awareness of the benefits of FLAW reduction and, where possible, seek

collaborative responses (e.g. cooperative-organized cold chain development and other value chain improvements).

## 9. Joint actions, leadership and governance

This conference brought together representatives of all key groups of actors. Action areas for each of them have been outlined actor-by-actor in the previous points. Yet, to address the FLAW challenge effectively requires more collective action. We call for joint government, and private sector action at the global, regional, country levels, with engagement by religious communities, civil society and consumers. Such joint actions were identified at the conference and include, for instance:

1. Alliances of different actors require clearly defined strategies to reduce FLAW (e.g., among farmers, traders and the corporate sector, as well as among funders);
2. Government commitments to measure and report on FLAW metrics are essential for joint actions. For this SDG 12.3.1.a (for losses) and SDG 12.3.1.b (for waste) are the indicators that need to be collected;
3. Institutional innovations and incentive systems are required to bring together broad, stable and well-funded alliances for the reduction of FLAW;
4. Examples of joint actions need to be systematically assessed and evaluated in relation to their effectiveness. This can provide the bases for good storytelling;
5. Increased, aligned, and coordinated investments (and information on investment returns) will help to expand investments further;
6. Initiatives for complementary and joint action between civil society and businesses can be win-win if based on mutual respect and well-defined goals;
7. Joint action for FLAW must also address food safety, to ensure that foods are properly handled, stored, and prepared according to strict health and consumer protection standards. Moreover, supply chains should be carefully checked to prevent the use of forced labor and modern slavery;
8. Pathways toward a global action plan and key commitments to address existing knowledge and research gaps and investments for the realization of SDG 12.3 need to be promoted;
9. Our conference could be catalytic at best. Much more is needed. A focused food loss and waste summit conference should be con-

sidered, and the planned 2021 United Nations Food Systems Summit led by FAO with IFAD, WFP, and others, in addition to other global high-level gatherings, should include a strong focus on FLAW reduction. FLAW reduction action for the achievement of SDG 12.3 needs a facilitating mechanism, adhered to by United Nations, governments, civil society and the private sector;

10. We aim for coordinated communication efforts to raise the profile of the FLAW issue in the media and mobilize civil society and the religious communities to embed FLAW reduction efforts as part of an inclusive and sustainable food system.

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