

Collaboration Initiative Food Loss and Waste launched at MACS-G20

Annual update on activities



© F. Schneider

December 18th, 2020

Johann Heinrich von Thünen Institute

Federal Research Institute for Rural Areas, Forestry and Fisheries

Institute of Market Analysis

Bundesallee 63

D-38116 Braunschweig

Contact: Dr. Felicitas Schneider

Tel.: +49 531 596 5335

E-Mail: felicitas.schneider@thuenen.de

With kind support from Cornel Adler (Julius Kühn Institute/Germany), Iman Al-Hirsh (Ministry of Education/Jerusalem center for women/Palestine), Liliana Annovazzi-Jakab (United Nations Economic Commission for Europe/Switzerland), Héctor Barco Cobalea (University of Deusto/Spain), Josef Efken (Thünen Institute/Germany), Maria-Angeles Fernandez-Zamudio (Valencian Institute of Agricultural Research (IVIA)/Spain), Liz Goodwin (World Resource Institute (WRI)/UK), Gilmar Henz (Embrapa/Brazil), Stefan Lange (Thünen Institute/Germany), Gustavo Porpino (Embrapa/Brazil), Barbara Redlingshöfer (National Institute of Agricultural Research (INRAE)/France), Thomas Schmidt (Thünen Institute/Germany), Kirsi Silvennoinen (Natural Resources Institute Finland (LUKE)), Eva Sternfeld (Sino-German Agricultural Centre (DCZ)/China), Richard Swannell (Waste and Resources Action Programme (WRAP)/UK), Annika Thies (Thünen Institute/Germany), Sébastien Villeneuve (Agriculture and Agri-Food Canada/Canada).

Braunschweig/Germany, 18.12.2020

Table of contents

1. Preface.....	4
2. Introduction.....	4
3. Overview on activities within the Initiative and beyond.....	5
Topic 1: Sharing information & experience.....	6
Global Food Loss and Waste Research Platform.....	6
G20 under presidency of Kingdom of Saudi Arabia.....	7
4 th regional FLW Workshop in Riyadh, Saudi Arabia	10
Update on FLW activities in Brazil	12
Update on FLW activities in other Latin American and Caribbean (LAC) countries	13
Call for Papers for Sustainability Special issue on National FLW Prevention Strategies and Monitoring Approaches.....	14
Update on FLW activities in Germany	16
Selected FLW activities in Spain	17
Update on FLW situation in Russia	18
Topic 2: Awareness Raising & Capacity Building	18
International Day of Awareness of Food Loss and Waste	18
Joint conference session with Brazil.....	20
Cooperation with Sino-German Agricultural Centre (DCZ)	21
Cooperation with “Bread Recycling Project” started in Palestine	21
Cooperation with University Centre of the Westfjords (Iceland).....	22
Topic 3: Stimulating research cooperation	22
Cooperation with TempAg	22
Project cooperation with Canada - an update	22
Research cooperation with Spain on FLW quantification	23
Research cooperation on primary production losses in Spain	24
Participation in German-Israeli agriculture research cooperation workshop.....	25
Topic 4: Matching ideas & funding.....	25
German Chancellor Fellowship for Prospective Leaders.....	25
Government of Canada launches Food Waste Reduction Challenge.....	26
Topic 5: Fostering cooperation at implementation level	27
EIP-AGRI focus group „Reducing food loss on the farm“	27
Cooperation with United Nations Economic Commission for Europe (UNECE).....	27
Cooperation with United Nations Environment Program (UNEP)	27
Recent literature from Initiative participants.....	27
International news.....	30

1. Preface

In 2020, the Collaboration Initiative Food Loss and Waste launched at MACS-G20¹ finished its fifth year. Due to the changed framework conditions caused by the pandemic, the year was a special challenge both professionally and privately. Temporarily interrupted international and national food supply chains (FSC) due to the failure of individual actors, labour shortages in various sectors due to discontinued or impeded passenger transport or illness and huge changes of the common purchasing procedures have highlighted the urgent need to adapt the established food supply system to modified conditions on a global, national and regional level. One topic that was mentioned in most of the various online discussions and conferences as an important tool for contributing to resilient, sustainable food supply chains and increased food security also for future generations² is the global reduction of food loss and waste (FLW). The essence of the discussions³ is that achieving SDG 12.3 - halving FW on per capita basis and reducing FL along FSC by 2030 - is challenging but feasible if global society is able to find a way of fruitful cooperation among stakeholders, harmonise different sustainability goals and implement a bundle of measures in parallel. Let's be part of it!

As last year, we - Stefan and Felicitas from the Federal Research Institute for Rural Areas, Forestry and Fisheries (Thünen Institute) - invited our partners to contribute with a brief summary not only on our joint but also on their own further FLW activities to the report. This approach contributes to our aim to share knowledge and experiences within our network. Enjoy!

2. Introduction

The Collaboration Initiative on Food Losses and Waste launched at MACS-G20 was founded in 2015 at the MACS-G20 in Izmir, Turkey. Germany took leadership of the Initiative and from 2015 until mid of 2017, Stefan Lange who is research coordinator of Thünen Institute and part of German MACS-G20 delegation, was responsible for the German contribution to that FLW Initiative. Since mid of 2017 he supervises the coordinator and takes part in selected activities. Since then, Germany finances the position of a coordinator. The coordinator is located at Thünen Institute in Braunschweig (Germany). The position is filled by [Felicitas Schneider](#).

The aim of this report is to summarise already finished and ongoing activities derived from our FLW Initiative, to foster the sharing of knowledge and experience and to invite interested G20 and further countries and stakeholders to participate in joint activities. The present report provides a brief update and summarises the activities from 2020. In addition, we asked our collaboration partners to provide a brief insight into their activities beyond the Initiative to provide a broader picture.

This report is published [online](#) and in addition sent out per e-mail to a selected group of interested people dealing with the issue of food loss and waste. Most of them participated in the kick-off workshop held from June 20th to 22nd, 2017 in Berlin where participants from 17 countries as well as from FAO, OECD and EU-Commission were present. Furthermore, the report is sent out to the subscribers of our [Global FLW Expert and Project database](#). If you are also interested to receive information on the activities, please do not hesitate

¹ MACS means Meeting of Agricultural Chief Scientists, more details see <https://www.macs-g20.org/>. G20 is the international forum which brings together more than 80% of world GDP, 75% of global trade and 60% of the population of the planet. Further details see <https://www.g20.org/en/il-g20.html>.

² For further information see e.g. [Searchinger et al. \(2018\)](#) or [Clark et al. \(2020\)](#).

³ For further information see e.g. Champions 12.3 2020 [Progress Report](#).

to contact the coordinator by writing an e-mail to felicitas.schneider@thuenen.de and to visit the website of [FLW Initiative](#). You are welcome!

If you are interested to learn more about our Initiative and if you wish to contribute, please do not hesitate to contact the coordinator. Furthermore, if you have additional ideas or wish to host a FLW workshop or contribute to the prevention of FLW with any other approach, please contact us too!

The activities derived from the FLW Initiative launched at MACS-G20 are focusing on G20 members but are not restricted to them. As the food supply chain is global, also our activities should address global interaction and include also non-G20 members in order to consider inter- and transdisciplinary issues, interactions between different levels of the food supply chain and the corresponding actors as well as the impact of local framework conditions.

3. Overview on activities within the Initiative and beyond

Our activities - finished within this year as well as ongoing - are briefly described according to the main topics of the FLW Initiative (Figure 1).

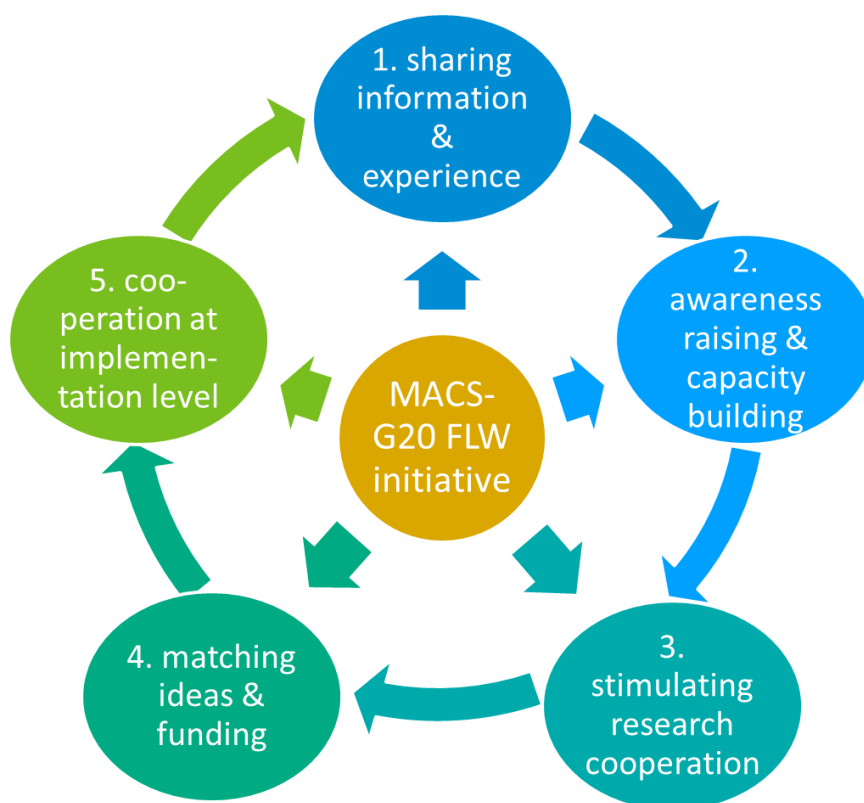


Figure 1 Scheme of the main topics of FLW Initiative launched at MACS-G20

Topic 1: Sharing information & experience

Global Food Loss and Waste Research Platform

The Global Food Loss and Waste Research Platform is an [online](#) database where experts register in order to make their contact information and their FLW projects more visible on a global level. Aim of the Platform is to offer easy access to focused information for policy decision makers, companies and researchers to facilitate networks building, knowledge sharing and corresponding action.

Since its launch in spring 2016, 133 researchers (2019: 115) from 32 countries (2019: 24) entered their contact data into the database and provide information on 105 projects (2019: 95) related to FLW (see Figure 2). As already in last year, most projects (56) deal with the question on how to reduce FLW by quantity. The most targeted food product groups are vegetables (76), fruits (73) as well as cereal products (69).

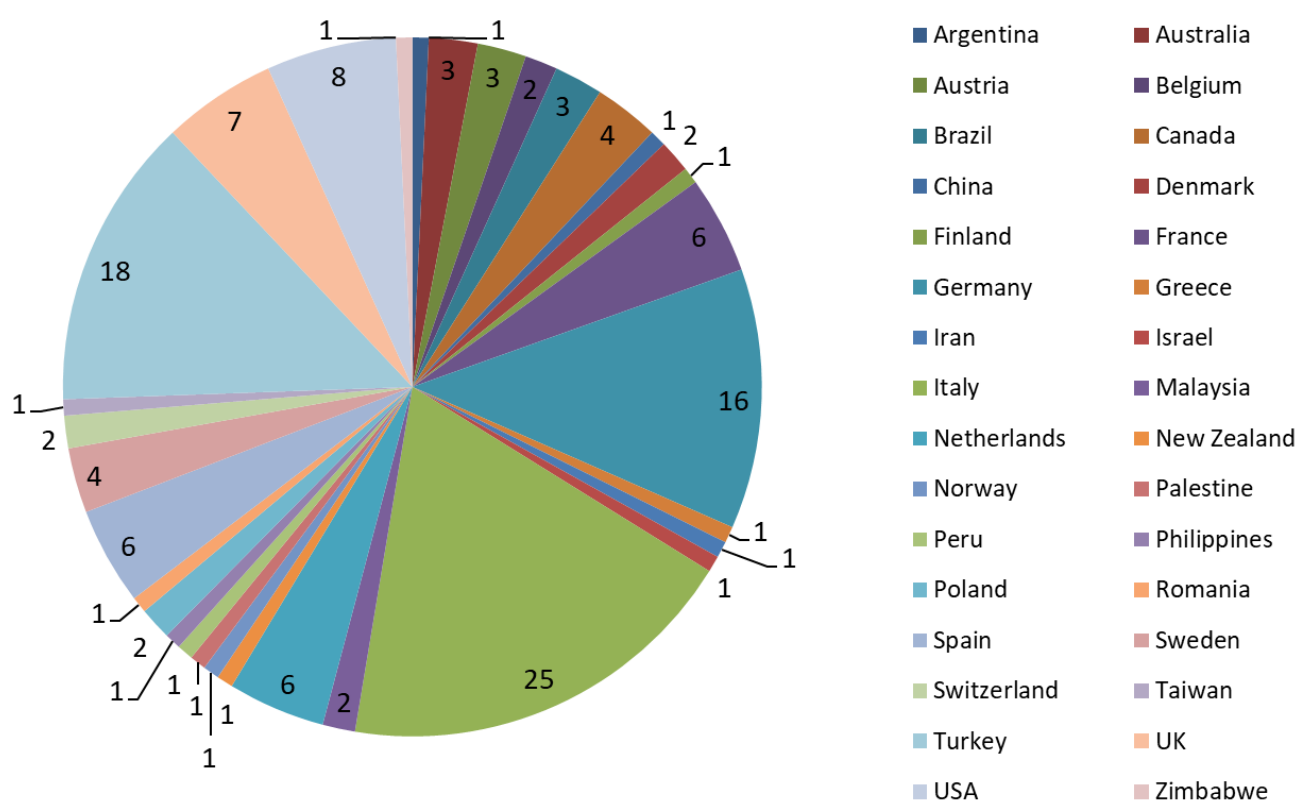


Figure 2 Global distribution of researchers in the Global Food Loss and Waste Research Platform (as of December 10th, 2020).

All interested colleagues are welcome to contribute further knowledge to the database by inviting additional experts also from non-G20 countries to register and by using the content for own investigations and network establishment.

In order to obtain evidence of the Platform's recognition at global level, a set of facts were assessed in relation to the website's access rates. From early December 2019 to early December 2020, 1,713 accesses were counted for the website in total which represents +75 % increase of access compared to recent years (2019: 997, 2018: 920, 2017: 854). Figure 3 shows the visitors' countries of origin. The majority of the visitors came from USA, China, Germany, Italy, Japan, Spain, Mexico, Brazil, Norway, UK, France, Chile, Poland and Columbia which represents American, European and East-Asian region. Australia ranks on 16th place with 26

visits while South Africa takes up the position 26 with 13 visits as most frequent country from the African continent. Thus, our aim to increase our range could be implemented successfully not only by absolute number of countries (+ 33 %) but also by countries per continent.

About 838 visitors (49 %) arrived directly on the website while 736 visitors (43 %) were redirected from other websites (mainly www.fao.org). 132 visitors (7 %) were directed to the website by using search engines and for the first time also some visitors (0.4 %) arrived via social media channels which we used this year as new intervention.

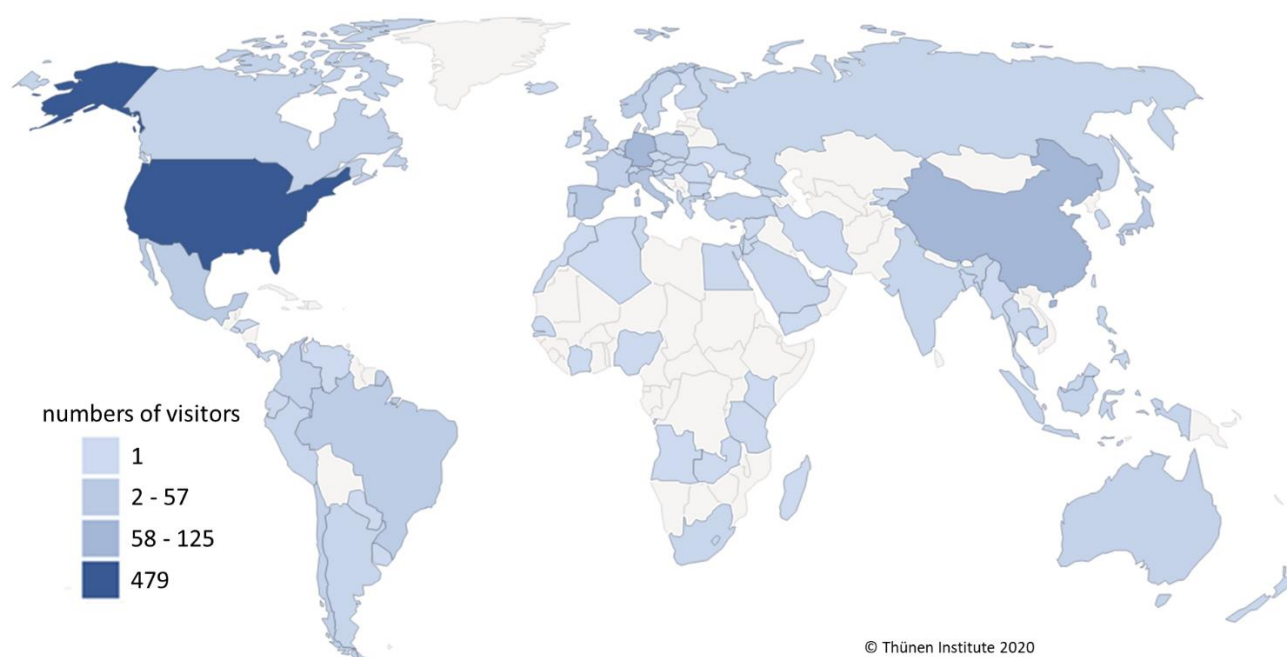


Figure 3 Numbers of visitors at the Global Food Loss and Waste Research Platform in 2020.

G20 under presidency of Kingdom of Saudi Arabia

This year's presidency focused on three overarching topics: Empowering people, safeguarding the planet and shaping new frontiers. The issue of Food Loss and Waste was mentioned specifically within the second focus and came together with promotion of food security and responsible agricultural investments.

The cooperation of our Initiative with the representatives from Saudi MACS-G20 office already started in Argentina 2018 where one delegate kindly joined the regional FLW workshop and was continued in 2019 by participating in our Tokyo workshop. However, the issue of FLW was not only connected to some of the meetings throughout the G20 year but also international players called for tackling FLW on G20 basis:

1. Champions 12.3, World Resource Institute and WRAP Briefing paper

To encourage leadership by G20 within the fight against FLW, [Champions 12.3](#), [World Resource Institute](#) and [WRAP](#) submitted a briefing paper in January 2020 to the present G20 presidency which highlighted three important steps to be committed by G20 leaders at 2020 summit. The steps consist of (i) committing SDG 12.3 and report on progress on a regular basis, (ii) to establish national baselines in line with UN indicators by 2021 and (iii) cooperation among countries with advanced and less experienced level of knowledge.

2. Agriculture deputies' meeting

Our coordinator Felicitas was kindly invited to present key issues on FLW within the Agriculture deputies' meeting in Riyadh held in January 2020. In her presentation "Safeguarding the Planet by targeting Food Loss & Waste Prevention", she pointed out the core global FLW problems and introduced promising strategies which could be supported by G20 in order to push international FLW prevention progress significantly. Those suggestions included the implementation of the target-measure-act approach (commit to SDG 12.3, set baselines in 2021, report progress, support among countries with different level of experience), to address FLW within G20 agri-ministers' as well as G20 leaders' declaration and to promote the International Day of Awareness of FLW⁴. The topic was underlined in almost all sessions by different speakers, such as FAO, UN Water and the World Organisation for Animal Health (OIE), illustrating the cross-cutting characteristic of FLW and the interrelation to different Sustainable Development Goals.

In addition, the Saudi organisers took the chance to raise awareness of the delegates to enjoy the delicious Arabian food but to take only what they eat on their plates. The signs were placed directly on the buffet among the great food but also provided at high tables (Figure 4). This valuable initiative could be taken as role model for all in-person G20 meetings in future!



Figure 4 Signs calling for mindful eating habits at Agriculture deputies meeting in Riyadh (credit: Felicitas Schneider).

3. MACS-G20 meeting

In Khobar/Saudi Arabia, Stefan Lange, one of the German delegates to MACS-G20 and research coordinator at Thünen Institute, [summarized](#) the current activities of our Collaboration Initiative FLW and called for further steps in order to facilitate FLW prevention at G20 level in February 2020. The bullet points included to support FLW measurement and monitoring on national level, to establish partnerships among advanced and less advanced countries (e.g. in terms of setting up baselines, etc.) and to push the FLW issue towards G20 leaders' declaration. As in previous five years, FLW was included to the 2020 MACS-G20 [communiqué](#).

⁴ See also Top 2.

4. Working group on Climate Change meeting

Liz Goodwin, FLW director at World Resource Institute ([WRI](#)), presented the global FLW situation and made suggestions on further progress of G20 towards FLW reduction at the meeting held in March 2020 in the Kingdom. She called to show leadership as the G20 to set targets and start to establish national baselines as well as to consider FLW issues as part of National Determined Contributions ([NDCs](#)) and other reporting towards climate change goals.

5. International Virtual Workshop on Water, Energy, Food Nexus

The workshop in August 2020 was already included into the MACS-G20 agenda as mentioned in the MACS-G20 communiqué released in February 2020. According to the identified topics, presentations related to FLW were included to session 2 “Innovative tools and system approaches to optimise agricultural food production and reduce losses”. Four contributors presented their results from research and practice including our Thünen Institute colleague Thomas Schmidt who introduced [sustainability assessment](#) methodology to evaluate FLW prevention measures for monitoring purposes and as information basis for decision makers. Further inputs addressed the achieved contribution of innovative public-private [partnerships](#) in the UK, the huge [economic opportunity](#) of sustainable food systems within bio-economy as well as the [water and energy footprints](#) of produced and landfilled food in the USA.

6. Regional FLW workshop

As part of the series of our regional FLW workshops in cooperation with the corresponding G20 presidency, we organised an event in October 2020 in Riyadh. More details can be found in the section below.

7. G20 Agriculture and Water Ministers’ communiqué

On initiative of the Kingdom of Saudi Arabia, the 2020 [ministers’ communiqué](#) was endorsed by both ministers responsible for agriculture and water issues in November 2020. The communiqué includes FLW under section IV highlighting the challenges due to COVID-19 pandemic caused by broken global food supply chains and calls for “increased cooperation and action by G20 members through improved awareness, novel practices and innovative approaches”. The ministers acknowledge “the need for an integrated and comprehensive food system approach and call for cross-sectional inter-ministerial cooperation as appropriate”. Further, close work with a number of global actors (e.g. FAO, IFPRI, UNEP, OECD) and initiatives (e.g. our Initiative) is suggested to achieve progress on reducing FLW. Efforts should be accelerated to ensure G20 members have reduction targets and monitor progress towards. The goal to introduce voluntary intermediate country-specific targets to strengthen effort towards SDG 12.3 achievement is acknowledged. Specific action is mentioned which could support to reach the goal including the need of collaborative research, knowledge and experience sharing as well as information gathering about the current status of emerging and existing transboundary plant pests and diseases and animal diseases which also contribute to FLW.

8. G20 leaders’ declaration

In parallel to the G20 agriculture and water ministers’ meeting also the leaders met in November 2020 virtually. Only one FLW specific issue of the before mentioned was adopted by the [G20 leaders’ declaration](#) which is “the goal of voluntarily establishing intermediate country-specific targets to strengthen efforts towards halving global per capita food loss and waste by 2030”.

4th regional FLW Workshop in Riyadh, Saudi Arabia

One aim of our activities is to organise a regional FLW workshop annually. In order to take the G20 responsibility more into account, the workshops are a cooperation of Thünen Institute with the corresponding G20 presidency. The workshop series started with the [kick-off workshop](#) in Berlin/Germany in 2017. It was followed by a regional FLW workshop which was organised for Latin America and the Caribbean countries (LAC) in November 2018 in [Buenos Aires/Argentina](#). In 2019, the target region included Southeast and East Asian countries while the workshop took place in [Tokyo/Japan](#).

Due to the pandemic and the challenge to plan an international event in advance, several ideas have been developed in cooperation with [MEWA](#), the Ministry of Environment, Water and Agriculture of the Kingdom of Saudi Arabia, but could not be implemented at the end. The present target region was the Gulf Cooperation Council (GCC) countries and Yemen. Finally, we were able to organise a half-day hybrid workshop on October 15th, 2020. The Saudi participants met in person in Riyadh while all other participants joined virtually. The 65 participants from Saudi Arabia, United Arab Emirates, Oman, Lebanon, Egypt, Bahrain and Germany as well as from the United Nations Environment Programme (UNEP) represented the scientific community, companies, interest groups as well as authorities.

The aim of the workshop was to provide impetus for the establishment of regional networks and cooperation along the food value chain to facilitate further monitoring of food loss and waste and implementation of prevention measures in GCC countries. Particular emphasis was placed on the link between food security and food waste, business models for prevention, the contribution of households to the topic and the role of an unbroken cold chain as well as reliable infrastructure. Participants also reported on the impact of the COVID-19 pandemic on the food supply chain in their countries and the measures taken to secure the supply and avoid unused surpluses. Special emphasis was placed on the cultural characteristics of the region, such as the joint celebration of large festivals, which lead to above-average amounts of surplus food. In addition to technical solutions to the special challenges posed by the region's climate, the conference therefore called for awareness-raising measures targeting all stakeholders.



Figure 5 Family photo of in-person participants at the hybrid FLW Workshop in Riyadh in October 2020 (credit: MEWA).

The agenda, all presentations as well as some photos are provided to the public for further inspiration and networking at the Initiative's [website](#). Figure 5 to Figure 7 provide insight to the virtual workshop setting.

We would like to thank our Saudi colleagues from MACS-G20 office for their generous hosting of the FLW workshop and the fruitful cooperation despite all challenges due to the pandemic! The 2021 FLW workshop of this series will take place in Italy with kind support of United Nations' Environmental Programme (UNEP).



Figure 6 Family photo of online participants at the hybrid FLW Workshop (credit: MEWA).



Figure 7 Felicitas Schneider (left) and Stefan Lange (right) from Thünen Institute participated as virtual moderators at the hybrid FLW Workshop (credit: Michael Welling).

Update on FLW activities in Brazil

Beside the cooperation between Thünen Institute and Embrapa⁵, significant activities are going on in Brazil since the last report. In order to address the aim “Sharing information & experience” within the Initiative, please find here an update⁶:

a. Legislative dimension

A new Bill ([Nr. 14016/2020](#)) was approved in the Brazilian Congress in June 2020 to foster donation of food products and prepared meals. According to this new Bill, any establishment that produces meals, such as supermarkets, bakeries, restaurants, cafeterias, and even hospitals, can donate unsold surplus food to families or individuals in need. The regulation states that food donations must meet certain criteria, including having a valid expiry date and being suitable for human consumption. They must also be stored according to the manufacturer’s specifications and be undamaged from a food safety perspective even if the packaging is partially damaged or they have a “commercially undesirable” appearance.

[Embrapa](#) has contributed to the discussion of laws related to FLW mitigation during the last 10 years, including participation in technical sessions on the subject in the Brazilian Congress. The approved law is not as broad as PL⁷ 5958/2013, which is still under discussion at the Brazilian Congress. The bill 5958/2013 aggregates 20 bills related to food loss and waste mitigation which were proposed in the past 10 years in the Brazilian Congress. It aims to establish the National Policy to Mitigate Food Losses and Wastes which will aim to increase the availability of foods for human, animal or compost use. Some of the Bills aggregated to the PL 5958/2013 mention the creation of the national week for food waste mitigation, and they also highlight the role of food banks for improving food and nutrition security as well as the possibility of non-edible foods being directed to composting plants. The bill 5958/2013 was approved in 2018 in two commissions at the Brazilian Chamber of Deputies: environment and sustainable development as well as social security and family. Since August 2019, the bill is being evaluated by the finance and fiscal policy commission, and it still has to be approved by the constitution, justice and citizenship commission before being sent to the Senate.

b. Entrepreneurship dimension

Embrapa is also engaged in interactions and mentoring virtual sessions with foodtechs and agritechs aimed at helping start-ups to scale-up and to identify new market opportunities for entrepreneurs. Once a month, Embrapa and partners, such as Bayer, organise a virtual meeting with foodtechs and agritechs, called “Café com agritechs”, to offer free of charge mentoring to start-ups. This program was launched during the pandemic, and some participants are offering solutions to mitigate postharvest losses or waste at the retail and consumer levels. FoodFlow and [Restin](#), for example, are applications for mobile devices focused on connecting retailers with consumers to foster the commercialisation of food products close to the expiration date for reduced price.

c. Public Awareness on FLW

Embrapa’s staff are often involved in on-line webinars and live discussing the opportunities to mitigate food losses and waste with researchers, food industry representatives, government officials, and civil society.

⁵ See Topic 2 of the present report.

⁶ Information for this section was kindly provided by Gustavo Porpino and Gilmar Henz from Embrapa/Brazil.

⁷ PL means “Projeto de Lei” in Portuguese which can be translated with “draft law”.

During the pandemic, a series of webinars were organised by Embrapa and partners to give guidance to urban consumers on how to buy, prepare and store unprocessed foods (e.g. [fruits and vegetables](#)⁸).

Embrapa Instrumentation (São Carlos – SP) and Embrapa Food Agroindustry (Rio de Janeiro – RJ), for example, have organised on-line events to debate [food safety and food conservation techniques](#)⁷. Embrapa Food and Territories, the newest Embrapa research center based in Maceio (Northeast Brazil), is also involved in such initiatives with a special attention to contribute to urban food policies. Embrapa Food and Territories also joined efforts with the Brazilian Packaging Association in a [webinar](#)⁷ aimed at presenting opportunities to engage the private sector in the food waste reduction activities. Embrapa Vegetables (Brasília-DF) offered a free on-line course about management of pedagogical school gardens.

To celebrate the International Day of Awareness of Food Loss and Waste, on September 29th, Embrapa has partnered with FAO Brazil and WWF Brazil to debate public policies and strategies aligned with FLW mitigation in a [webinar](#)⁸. Researcher Gilmar Henz also joined the FAO's Regional Round Table discussion during the International Day of Awareness of FLW as the representative of Latin America and the Caribbean.

Another important on-line event was conducted during the Brazil-Sweden Innovation Week with special [FLW session](#), in November 2020. Representatives from Embrapa Foods and Territories, Ministry of Regional Development and the Swedish Environmental Protection Agency discussed the role of public policies to mitigate food waste. Brazil has a network of 168 food banks, and this initiative has received new investments during the pandemic since the demand for foods in such facilities have increased significantly.

d. National FL Index

In 2017, Brazilian government started a multi stakeholder effort to tackle FLW, establishing a national committee to design a strategy to address the subject⁹. As a result, in 2018 the National Plan to reduce and mitigate FLW was launched with four basic guidelines (1. research and innovation; 2. capacity building; 3. communication and awareness; 4. legislation). In 2020, IBGE (Brazilian Institute of Geography and Statistics) established a committee to assess losses in agricultural products in Brazil, following the FAO methodology (FL Index). Embrapa participates in this group with four members (Murillo Freire, Gustavo Porpino, Gilmar Henz, and Valeria Hammes).

Update on FLW activities in other Latin American and Caribbean (LAC) countries¹⁰

During 2020, the COVID-19 pandemic increased the importance of FLW prevention as one of the strategies to reduce impacts on food and nutrition security. In Latin America and the Caribbean, various events such as the closure of wholesale markets, the restriction of mobility and commercial logistics, and panic purchases were some of the main events related to FLW in the countries.

In this sense, FAO carried out various monitoring, awareness-raising, regulation and exchange of experiences on reducing FLW in times of COVID-19, and the identification of innovation initiatives, key to the recovery of food systems. Below, links and information on actions of FAO Latin America and its partners during 2020 are shared:

⁸ In Portuguese only.

⁹ For details see also our annual report [2018](#).

¹⁰ Information for this section was kindly provided by Sara Granados from FAO Regional Latin America and the Caribbean.

- ✓ FAO and United Nations Economic Commission for Latin America and the Caribbean (ECLAC/CEPAL) [Newsletter](#)¹¹: Analysis and responses of Latin America and the Caribbean to the effects of COVID-19 on food systems: How to reduce food loss and waste.
- ✓ In November 2019, the United Nations Assembly approved the declaration of September 29 as the International Day for Awareness of the Reduction of Food Loss and Waste. This proposal was raised by Argentina, and unanimously welcomed by the member countries. In 2020, the first FLW Day commemoration was held, and in LAC national actions were carried out in 9 countries, a regional virtual event, and a series of messages, infographics, columns, interviews and other audio-visual material that were disseminated in various media and social networks.
 - [Regional event](#)¹²
 - [Chile](#)¹²
 - [Argentina](#)¹²
 - [Mexico](#)¹²
 - [Map with national events](#)¹²
 - Op-eds for the first International Day Against Food Loss and Waste continue to appear in the region's media, this time in El Salvador's [La Prensa Gráfica](#); [El Universal](#) and [El Nacional](#) from Venezuela; and [Diario El Peruano](#) of Peru.
- ✓ Food Waste in Supermarkets and Self-serve Markets in Argentina: Causes and Estimations: First [study](#)¹² prepared and validated in conjunction with the Consumer Goods Forum LATAM Board, Inter-American Development Bank, GS1 and the Ministerio de Agricultura, Ganadería y Pesca of Argentina, highlighting the collaboration with the private sector in the fight against food waste.
- ✓ Legislative study on legal frameworks for the prevention and reduction of FLW, where more than 70 national laws of 13 countries¹³ are analysed, presented and validated, which incorporate a comprehensive food system approach. A virtual [seminar](#)¹² "Food loss and waste: legal frameworks and donation initiatives in times of COVID-19" presented the results.
- ✓ [Series](#) COVID #SinDesperdicio: developed virtually in collaboration with Logyca and the Inter-American Development Bank and available online, with an emphasis on technological innovation, food systems and collaboration with the private sector.

Call for Papers for Sustainability Special issue on National FLW Prevention Strategies and Monitoring Approaches

Only 10 years are left to achieve Sustainable Development Goal 12.3, which aims to halve food waste at retail and consumer levels per capita and to reduce food loss along the up-stream food supply chain by 2030. There is finally global awareness regarding food loss and waste, and numerous activities have recently been implemented to tackle the problem on different levels of the food supply chain. Nevertheless, the quantification of FLW on national level is still a challenge and suffers from data gaps. Each quantification methodology bears pros and cons which have to be counterbalanced with national legal, societal, economic and structural frameworks already in place, as well as available financial resources versus expected contribution to scientific knowledge. Beside the quantification of FLW generation itself (e.g., to establish a first baseline), also the setup of reliable long-time national time series, the comparison of collected data with other countries and the holistic impact assessment of implemented prevention measures or the effectiveness

¹¹ Available in English and Spanish.

¹² In Spanish only.

¹³ Argentina, Brazil, Colombia, Uruguay, Dominican Republic, El Salvador, Mexico, Panama, Paraguay, Peru, Chile, Costa Rica, Guatemala

of prevention policies challenge decision makers, researchers and practitioners on a global scale. The actual preparedness of countries to quantify food loss and waste and to monitor trends, as well as to draw conclusions from the corresponding data, is poor in general and large differences can be observed among countries. In addition, the literature is lacking in strategic discussions and comparisons of different approaches to tackle FLW on a global scale in line with existing agreements such as SDGs.

The above-mentioned situation is reason for Thünen Institute experts Thomas Schmidt, Stefan Lange and Felicitas Schneider, to support a special issue entitled "[National Food Loss and Waste Prevention Strategies and Monitoring Approaches—an Interdisciplinary Challenge for Decision Makers, Researchers and Practice](#)" within Sustainability Journal as guest editors. Aim is to address FLW prevention frontrunners and latecomers to the same extent: Both those countries which already have FLW quantification systems in place and struggle to match them with late introduced requirements related to SDG 12.3 indicators provided by FAO and UNEP or other regional legal conditions (such as EU member states), and those countries which have not worked on FLW so far and have the chance to include the latest definitional and methodological requirements into their newly established national FLW strategies, policies and methodologies from the very beginning. Key questions include the following:

- How to overcome the need of shared inter-ministerial responsibilities related to FLW influencing factors?
- Where to set the focus on FLW prevention—edible/non-edible, avoidable/unavoidable or total food waste?
- Should we consider all food and drinks as well as all disposal paths and alternative utilization for animal feed, industrial use and non-food purposes?
- Should there be a “resource-efficiency”, a “reduce hunger” or a “legal waste definition” based focus?
- Should we be building up a collaborative approach to close data gaps and to foster cooperation among different stakeholders or implement legal obligations and incentives, or should there be both in parallel?
- Which data should be collected in addition to aggregated quantities in order to be able to use the same data also for other national and international reporting tasks such as sustainability, climate (e.g., nationally determined contributions), environmental impact or other SDGs?
- How to encourage stakeholders to participate and how to highlight the advantages for all of them and to lower possible negative impact?
- How to include expected changes in FLW generation due to climate change, rapid growing cities and change of consumption patterns into national strategies?

We explicitly invite researchers, policy advisors and policy makers from all countries/federal states/regions to contribute with their specific national/regional strategies to overcome the above-mentioned challenges as well as authors comparing different approaches highlighting the commons and differences in a suitable manner. Our special issue should provide the best practice, but also obstacles for the implementation of FLW monitoring in order to contribute to further focused discussions, cooperation and research. We encourage authors to submit high quality contributions sharing experiences on building up national/regional strategic networks, cooperation among stakeholders and nations, reliable data collection structures and reporting systems as well as assessment/evaluation of strategies, data and measures.

Deadline for [manuscript](#) submissions is **15 May 2021** but each paper is published online immediately after successful completion of the peer-review process. An Article Processing Charge (APC) applies for publication in this open access journal but there are different discounts available e.g. for organisations participating in

Institutional Open Access Program ([IOAP](#)) of MDPI¹⁴. Please do not hesitate to contact us or MDPI for [further](#) information.

Update on FLW activities in Germany¹⁵

The German National Strategy for Food Waste Reduction was introduced in 2019. There and also within the present [Coalition Agreement](#)¹⁶ which was released in 2018, a participative approach was announced in order to agree on sector-specific targets, regular measurements and the implementation of prevention measures. The so-called National dialog forum unites stakeholders from the entire food supply chain while five specific dialogue fora - one per sector: primary production, processing, wholesale and retail, out-of-home consumption, household - focus on specific levels. To sign a voluntary agreement per sector is the main output of those dialog fora and the first, the forum on out-of-home consumption, will be finalised early next year. Thünen Institute together with partner organisations is actively involved in primary production, processing (started both in early December 2020) as well as [wholesale and retail forum](#).

The National Strategy for Food Waste Reduction was drawn up jointly by the Federal government in cooperation with the Federal states and associations from the food industry and civil society. The target agreements, measures and the progress of the strategy are successively published on the [website](#)¹⁶. A Federal government/Federal states working group is responsible for evaluating the implementation process and will identify further fields of action during the process and set new priorities. It creates a coherent policy framework and identifies conflicts of objectives. Finally, a Working Group on Indicator 12.3 cares for the national monitoring approach where Thünen Institute supports with methodological expertise.

Since 2012, the awareness-raising campaign "[Too good for the bin](#)" is implemented in Germany. Each year innovative projects and activities focusing on FLW prevention are awarded with the Federal prize. Since 2020, the prominent jury members are supported by an [expert advisory board](#)¹⁶ to which Thünen Institute also contributes.

In our 2019 report, we reported about an international workshop which was organised by [REFOWAS](#) (pathways to REduce FOod WASTE) project. The goal of that Thünen-led project was to analyse the portion of avoidable FLW, and strategies and approaches for measures to avoid or reduce food waste. Two perspectives were linked within the project - we carried out a holistic sectoral analysis of the entire food system and we studied the obstacles and possibilities for action on the basis of three case studies with bakeries, vegetable and fruit producers as well as school cafeterias in practice. On the basis of the results in cooperation with our partners we identified and evaluated possibilities to develop a new consciousness of sustainable action and find ways to avoid food waste. Relevant actors were included to develop strategies and discuss possible measures to develop incentives for respective behaviour. REFOWAS was finished in 2020, project [results](#) can be found at the website.

In the [ELoFoS](#) (Efficient Lowering of Food Waste in the Out-of-Home Sector) research project, Thünen Institute and partners are investigating efficient measures to reduce food waste in the out-of-home sector in Germany. In the process, strategies and innovations are being developed using the practical example of a commercial kitchen with suppliers. First, we collected information on the generation, composition and value of food waste as well as their disposal reasons at four locations in the hotel business. Next, we optimised the

¹⁴ MDPI means "Multidisciplinary Digital Publishing Institute".

¹⁵ This section was supported by Thomas Schmidt from Thünen Institute.

¹⁶ In German only.

supply chain between the hotel business and its suppliers for fish and meat products. Our food waste reduction measures were evaluated in a further FW monitoring in three large kitchens in the care sector. From these results, complemented with literature research, we will draw strategies and measures for avoiding FW. The costs for prevention, such as the cost of staff training, were considered when evaluating our avoidance measures. Furthermore, the transferability of the strategies and measures to other out-of-home sectors are investigated. Publications can be found at section “publications” within the present report and at the project [website](#).

A [PhD-project](#) started at Thünen Institute on a topic concerning ‘Food loss reduction between primary production and retail: an impact assessment of regulatory and market-based policy instruments’. This year, a row of interviews was conducted to evaluate the approach: Bargaining power at the producer-retailer interface and resulting food losses of highly perishable produce: a qualitative assessment of actor relationships at early stages of the food supply chain.

Selected FLW activities in Spain¹⁷

While cooperation activities between our Spanish colleagues and Thünen Institute are described under topic 3, here some selected project information is provided to facilitate knowledge sharing among our network. Héctor Barco Cobalea from University of Deusto collaborated with different projects which targeted topics also suitable for his research interest which is quantification of the FLW along the entire agrifood chain at local and supra-local scales. In this regard, he collaborated e.g. with [SAVINGFOOD](#) Project with the following objectives:

- ✓ Identification of potential FW generation focus, differentiating between large generators (large catering company) and small generators (hotels and restaurants), as well as the delivery points of food donation within the province of Gipuzkoa/Spain.
- ✓ Determination of the most efficient food donation routes between the FW generation points and the receipt of the food donation, by using Geographic Information Systems.
- ✓ Design of a food donation protocol for cooked surpluses generated by the catering company to the delivery entities involved.

During the first two months of implementation of the food donation protocol, 923 kilos of cooked food were donated. This amount of food is more or less equivalent to 3,232 individual food rations.

Apart from that, Héctor was involved in the project titled “The analysis of the food waste in households within the province of Gipuzkoa”, led by the Provincial Council of Gipuzkoa, University of Deusto and the NGO “Prosalus”. Two different approaches were designed to measure the FW problem in households: a qualitative and a quantitative method. Thus, this project aimed to measure the FW generated in households and to identify the root reasons why it is produced in order to improve the future awareness campaigns. Furthermore, particular emphasis was placed on the identification of gender biases within the household chores and the existence, or lack, of differences in the FW problem between urban and rural areas.

Furthermore, University of Deusto joined the international university network called “[Presidents United to Solve Hunger](#)” (PUSH) where Mr. Barco prepared the signature process. The University of Deusto is the first Spanish university becoming part of the PUSH initiative.

¹⁷ The text was provided by Héctor Barco Cobalea from University of Deusto/Spain.

For further expertise in the course of the PhD work, Héctor participated in the working group about the measurement and diagnosis of the FW within the Plan of Actions against Food Waste in the Basque Country. This working group is led by the Basque Government. As a researcher on an individual basis, Mr. Barco is engaged within the organisation “[Right to Food Watch](#)” in Spain. Furthermore, he is part of a knowledge network to share, collaborate and working together with other researchers, entities and NGOs to address the FLW problem called [Red Sin Desperdicio](#). Currently, he is working in the NGDO¹⁸ called “[Enraíza Derechos](#)” related to the Right to Food collaborating in a research project led by the Provincial Council of Gipuzkoa. Aim is to quantify FLW in households of Gipuzkoa and the analysis of possible changes of the food habits in households during the COVID-19.

Update on FLW situation in Russia

A considerable improvement of legal framework conditions was achieved in Russia. In June 2020, a Federal Law on amendments to the Tax Code was set into force and provides incentives for legal entities to donate to charity organisation which also includes food banks. The tax amendments include both product and monetary donations which supports also general operation of non-profit organisations.

Within the next two years it is expected that a ban related to food waste disposal in municipal solid waste landfills will be released. The ban will cover FW generated by legal entities only.

Topic 2: Awareness Raising & Capacity Building

International Day of Awareness of Food Loss and Waste

Finally, after the proposal was submitted by the Government of Argentina in 2018¹⁹ the first International Day of Awareness of Food Loss and Waste was celebrated on September 29th, 2020! Food and Agriculture Organisation (FAO) provided advertising material (Figure 8) and organised a half-day event including panel discussions, ted talks and regional round tables which was broadcasted [online](#).

Also other stakeholders organised online global events and regional for public and experts close or on September 29th such as the European Federation of Food Banks ([FEBA](#)) or the [Champions 12.3](#).



Figure 8 Sujet for the first International Day of Awareness of FLW created and offered for use by FAO (credit: FAO).

¹⁸ Non-governmental development organization

¹⁹ For further information see our annual reports [2018](#) and [2019](#).

We at Thünen Institute are very proud to were able to support this great idea from the very beginning in 2018 and of course, we did not hesitate to implement an awareness raising event although pandemic-related restrictions were in place in Germany. In total, we had four different approaches:

- a. national press release introducing the problem within Germany and possible solutions in general
- b. regional press release with problem, solutions and local event announcement
- c. local Day of Action at Braunschweig city centre targeting local population
- d. Thünen-wide online presentation of research results related to meat losses in out-of-home consumption

ad a.) The national press release targeted general public, introduced to the topic on [global and national](#) scale and provided links to recent project results from Thünen FLW activities.

ad b.) The regional press release focused on the local event (see c.) and announced the different practical issues which were offered on-site for direct implementation into real life. The link to more information was also provided but less prominent.

ad c.) As Thünen Institute headquarter is located in Braunschweig, which is a medium size German city of approximately 250,000 inhabitants in Lower Saxony, we collaborated with civil society organisations for raising awareness of the public on September 26th, 2020. Together with Slow Food Braunschweiger Land, foodsharing, Stadtgarten Bebelhof, Transition Town Braunschweig, Technical University Braunschweig, proveg international, Volksbegehren Artenvielfalt and Solawi Dahlum we emphasised the value of food in general, primary food production, fair food pricing, impact of animal-based food on sustainability, understanding biochemical food aging processes, community supported agriculture, how to prevent surplus food at home and activities towards rescuing food from the bin. As public cooking of rescued food products was not possible due to pandemic restrictions, the cooperation partners jointly prepared jams, chutneys and soups in advance as incentives for interactive participation by the public.

As Thünen Institute, we provided insights into our research results by offering posters, a video about innovative professional fishing equipment reducing by-catch and interactive online memory and quiz suitable for different age groups (Figure 9).



Figure 9 Thünen Institute colleagues Ronja Herzberg and Manuela Kuntscher at the stall (credit: Felicitas Schneider).

Although there was lot of rain on that day, our joint Day of Action had good communication with passers-by and achieved some local print and TV media response including the most important regional daily newspaper. Thus, we were satisfied with the result and have already fixed the cooperation for next year!

ad d.) In the course of the pandemic measures, most Thünen Institute staff members received access to online video conference tool which made it possible to offer a FLW discussion for all of our 14 specialist institutes and back-office units located at nine different places in Northern Germany. On September 30th, we offered results from a study conducted by our colleagues Annika Thies and Josef Efken, answered questions and discussed FLW in general²⁰. In total, the video conference reached about 90 Thünen staff members from more than 12 different specialist institutes and back-office units.

Achievement of more sustainable consumption is particularly important for meat, as its production is resource-intensive. There are already scientific studies on the generation of meat losses in Germany, but those do not apply to the out-of-home market which accounts for a large share of total meat consumption. Therefore, the aim of the study is to record meat losses based on a survey of companies in the out-of-home market, as well as to determine the places of origin and reasons for losses in order to derive measures for prevention. Initial results show that the loss rate in relation to the purchase of goods is rather low compared to other foodstuffs, but in relation to the total loss volume there is definitely a need for action. Publication of results is in progress – we will keep you updated!

Joint conference session with Brazil

In order to continue our fruitful cooperation, there was the idea of organising a joint session at an international conference. Due to cancellations and postponement of events we had to adapt our initial proposal and finally found a suitable format at the [8th World Sustainability Forum](#) held virtual in September. The session “Food losses and waste mitigation: a Latin American perspective” was prepared by the team from Embrapa – Gilmar Henz, Senior Researcher at Secretariat of Intelligence and Strategic Affairs, and Gustavo Porpino, Senior Analyst at Secretariat of Innovation and Business. Luciana Vieira (Getulio Vargas Foundation), Daniele Eckert Matzembacher (Federal University of Rio Grande do Sul, UFRGS), Andrea Lago da Silva and Camila Colombo de Moraes (Universidade Federal de São Carlos)²¹ completed the Brazilian delegation. Felicitas from Thünen Institute contributed from German side to the [organising team](#)¹² (Figure 10) and acted as moderator and first speaker. The session added to the discussion how the mitigation of FLW in the developing world might contribute to improve food security and nutrition, presented data on recent studies conducted in Brazil and provided insights on how COVID-19 is impacting FLW situation. A total of 46 participants joined the session and provided positive feedback and interesting questions. The [recording](#), the [abstracts](#) and [presentations](#) are available on the forum’s website.

²⁰ The following text section was provided by Annika Thies and Josef Efken (Thünen Institute/Germany).

²¹ Andrea’s and Camila’s research was supported by São Paulo Research Foundation (FAPESP), Grant #2017/00763 5; Coordination for Improvement of Personnel and Higher Education (CAPES), Financing Code 001; National Council for Scientific and Technological Development (CNPq), code 305819/2016 0.

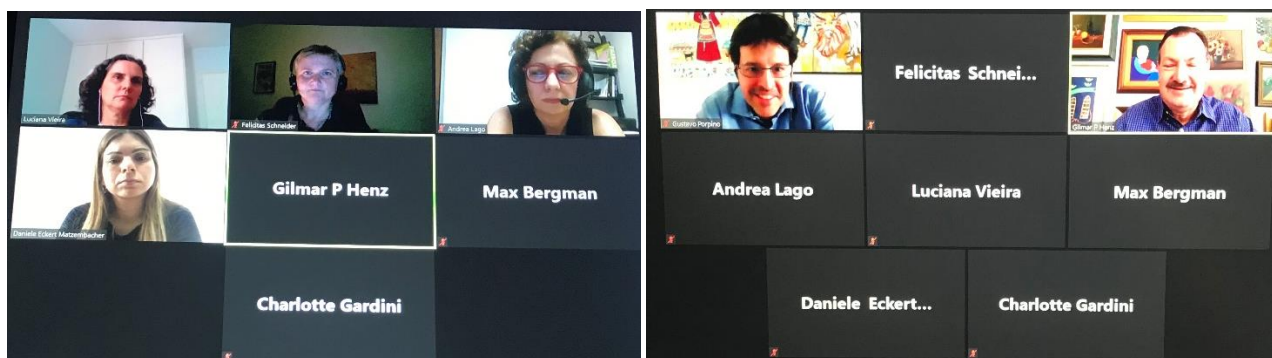


Figure 10 The Brazilian-German team for Brazilian FLW session at 8th World Sustainability Forum (credit: Felicitas Schneider).

Cooperation with Sino-German Agricultural Centre (DCZ)

In the course of the [6th Sino-German Agricultural Week](#) which took place from end of November to beginning of December 2020, Thünen Institute was invited to contribute to the Forum on “Food Security and Nutrition in a Changing World”. The conference is the flagship event of the Sino-German Agricultural Centre ([DCZ](#)), a joint project of the German Federal Ministry for Food and Agriculture (BMEL) and the Chinese Ministry for Agriculture and Rural Affairs (MARA).



Figure 11 The Forum on “Food Security and Nutrition in a Changing World” was organised as a hybrid event (credit: DCZ).

Due to the current travel restrictions, the Forum on Food Security and Nutrition was organised on December 3rd, 2020 as a half-day hybrid of onsite and online presentations in Beijing, China (Figure 11). Our Initiative’s coordinator, Felicitas, reported on the “The Role of Food Loss and Waste in Food Supply Chain and Impact on Sustainability” including updated FLW activities in China and Germany. In total, 140 participants joined this interesting event including persons from China, Germany and international students.

Cooperation with “Bread Recycling Project” started in Palestine

The "Bread Recycling Project" initiative project aiming to recycle bread waste and turn it into healthy feed for livestock including sheep. The first period of the initiative was supported by Jerusalem Center for Women in cooperation with the Jerusalem Farmer association and the Joint Services Council for Solid Waste Management to contribute to reducing FW in Palestine. Data on generated bread waste were collected using a questionnaire for companies and households in early 2020. In addition, interest from a local feed producer was raised to act as cooperation partner for final product. In autumn 2020, a grinding machine was purchased for starting the process. In addition to the environmental issue, this initiative aims to involve women in all

phases of project implementation, with the goal of empowering women and their participation in the process of positive change. This approach is expected to have benefit on valuing women's work and their role in society, contribute to education of children and youth and to preserve the Palestinian environment and its natural resources. The aim is to increase awareness on the problem of FW in general and bread waste in particular and thus to contribute also to a decrease of bread waste at different levels of the food supply chain.

Thünen Institute provide support related to scientific information on bread waste. We are looking forward to further cooperation in order to foster the implementation of an interesting bread waste prevention action! There is still need for experts with expertise on efficient drying process for the collected bread!

Cooperation with University Centre of the Westfjords (Iceland)

The University Centre of the Westfjords located in Iceland offers a master's program in "Coastal Communities and Regional Development". In order to complement the study programme, our coordinator Felicitas will make use of her long-term waste management teaching experience and conduct the course "Sustainable Waste Management in Coastal Communities" in June 2021. Beside the basics of general waste management focused on coastal regions, the international students will hear a lot about FW generation and prevention embedded in global framework.

Topic 3: Stimulating research cooperation

Cooperation with TempAg

We already reported about the joint project idea between TempAg and our Initiative aiming to identify further need for interdisciplinary research and policy on FLW at global level in order to facilitate appropriate national and international funding programmes and government support. Unfortunately, due to time and budget restrictions the initial consortium of six research organisations dispersed in the course of the project. As there is already a preliminary report available, Thünen Institute decided to finish the report as soon as possible and publish it online.

Project cooperation with Canada²² - an update

The project entitled "Implementation of a technology platform to develop sustainable strategies in order to reduce Food Loss and Waste across the continuum of food distribution in Canada"²³ has been slowed down due to COVID-19. Few on-field experiments have been achieved in 2020. Most activities have been postponed to 2021 and beyond. Nevertheless, the work plan and the rationale of the approach have been presented during the 6th IIR International Conference on Sustainability and the Cold Chain (ICCC 2020) held at the Cité des Congrès in Nantes, France, from August 26 to 28, 2020. The paper is available in the online [Proceedings](#). Briefly, the approach is described for each phase of the project: Pilot scaling (scale-down) of real conditions (Figure 12); Development and formulation of eco-efficiency indicators; Development and formulation of safety indicators; Simulation and Strategies. Impact and significance of the project for Canada is discussed.

²² The following section was written by Sébastien Villeneuve from Saint-Hyacinthe Research and Development Centre in Quebec, Canada.

²³ For initial introduction of the project, please see our [2019](#) annual report.

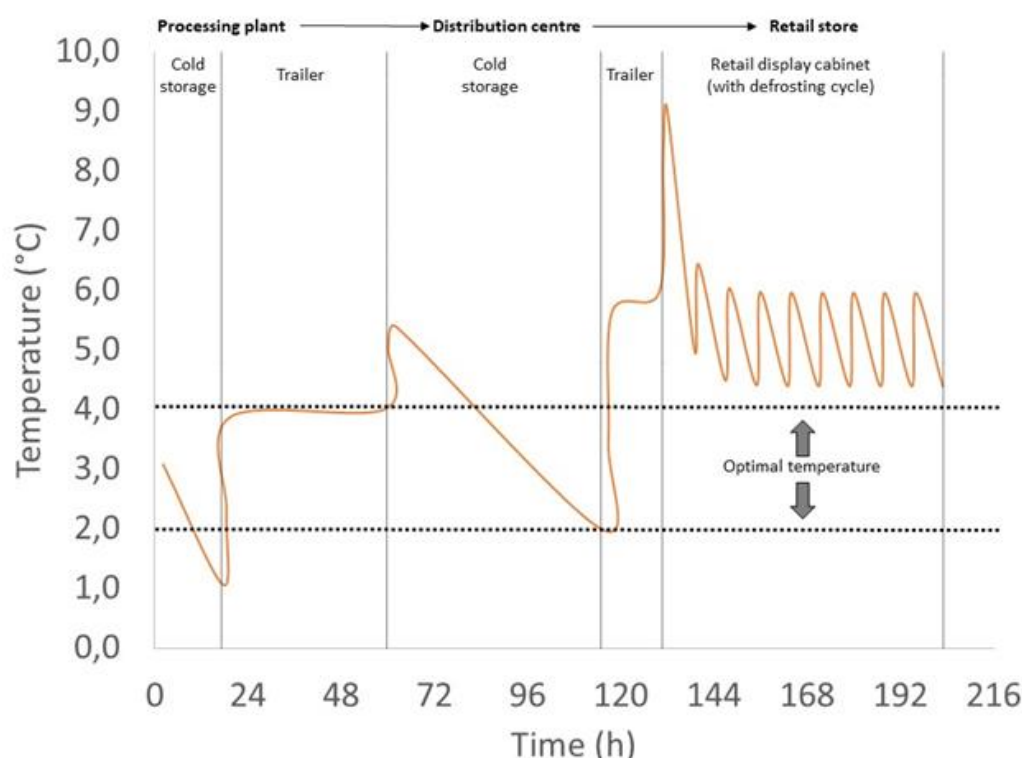


Figure 12 Scale-down of a broken cold chain simulation (Villeneuve et al. 2020²⁴). Real condition data used for this simulation come from the database used in conjunction with the CanGRASP simulation tool (LeBlanc et al. 2015²⁵).

Thünen Institute acts as facilitator for this project in order to share the findings that could also be useful for other countries within the Initiative's network.

Research cooperation with Spain on FLW quantification²⁶

The inspiring cooperation between Héctor Barco Cobalea and Felicitas Schneider dates back to 2013 when Héctor was a volunteer of the Food Bank of Seville in order to have deeper insight about the FW issue in the reality. Although the desired PhD could not be realised due to budget reasons – despite the prizes won to finance the PhD – in the first place, he finally found an option to conduct his research within the European project [Waste4Think](#), related to the Circular Economy paradigm. The PhD is related to the facilitation of FLW quantification and donation using ICT tools. The most promising aspect is the FW quantification in different territorial scales in order to facilitate the comparability of results between studies and creating synergies between them. This aspect is further discussed in a recent [publication](#). Furthermore, the methodology aims to improve the [current gaps and deficiencies](#) detected thanks to Héctor's collaboration with the Joint Research Centre (JRC). The PhD is very close to deposit with the Initiative's coordinator Felicitas involved in final discussions.

²⁴ • Villeneuve, S., Mondor, M., Guévremont, E., Arcand, Y. & Gariépy, S. 2020. Implementation of a technology platform to develop sustainable strategies in order to reduce Food Loss and Waste across the continuum of food distribution in Canada. Proceedings of the 6th IIR International Conference on Sustainability and the Cold Chain (ICCC 2020). Cité des Congrès in Nantes, France from August 26 to 28, 2020. Manuscript ID: 269782. P 83-89. ISSN: 0151-1637; ISBN: 978-2-36215-036-4.

²⁵ • LeBlanc, D.I., Villeneuve, S., Hashemi Beni, L., Otten, A., Fazil, A.M., McKellar, R., & Delaquis, P.J. 2015. A national produce supply chain database for food safety risk analysis, *Journal of Food Engineering*, 147, p. 24-38.

²⁶ The chapter was provided by Héctor Barco Cobalea from the University of Deusto.

Research cooperation on primary production losses in Spain²⁷

Among the least developed aspects in the scientific literature on FLW is the quantification of losses in the initial stage of the agri-food chain (pre-, harvest and post-harvest phases). Until now, there are very limited quantification studies using direct and on-site methods. Thus, this lack of information is precluding the magnitude of the problem and therefore an incentive of carrying out new initiatives for improvement of the current data. Even less research initiatives have been focused on fruit trees. Within this context a collaboration has emerged between the Valencian Institute of Agricultural Research ([IVIA](#)), located in Valencia (Spain), and Thünen Institute. At IVIA, Dr. Maria-Angeles Fernandez-Zamudio started a series of works on FL of Mediterranean fruit trees two years ago. During this period of time, she has taken information in pomegranate and persimmon. Furthermore, she has deepened in the situation how persimmon farmers are living nowadays.

The knowledge about FL of persimmon is of great interest for the Valencia region. This territory has a very relevant agricultural component. In fact, this region is the main supplier of persimmon for European markets. But in addition, designing good methodologies for the analysis of food loss in woody trees, can be very useful for other very important fruit trees in this region, such as the case of citrus fruits, pomegranate, peaches, apricots, plums or loquats.

Ms. Fernandez-Zamudio is an expert in agricultural economics, with cultivation costs and the analysis of farm profitability being one of her main lines of work. For a year now, she also has been responsible for coordinating the Plan against Food Losses and Waste in the Comunitat Valenciana (Plan BonProfit), which is the roadmap drawn up by the regional government to promote the prevention and reduction of FW in this region.

Regarding FL in fruit trees, Ms. Fernandez-Zamudio is counting on the great help of the PhD student Héctor Barco, a specialist in FLW quantification methodologies who is finishing his doctoral thesis at the University of Deusto²⁸ (Basque Country/Spain). At the beginning of 2020, Maria-Angeles and Hector contacted Felicitas from Thünen Institute to ask for her advice and help in promoting this line of work. As a result of this collaboration, after analysing the first information gathered in the fields between September and December 2019, a [paper](#) entitled "Direct Measurement of Mass and Economic Harvest and Post-Harvest Losses in Spanish Persimmon Primary Production" has been published in Agriculture Journal.



Figure 13 Photos taken during the on-site measurements at persimmon yards in Valencia (credit: Maria-Angeles Fernandez-Zamudio).

²⁷ The text was contributed by Maria-Angeles Fernandez-Zamudio from Valencian Institute of Agricultural Research (IVIA).

²⁸ See also the previous section.

In this paper, the food loss of 12 persimmon parcels was measured on-site (Figure 13), and the different classes of damage to the fruits were characterised in order to understand the possible reasons for the food loss in the harvest phase. It was also possible to analyse the fraction of unpaid fruit in the warehouses, and the reasons for discarding the fruit in the post-harvest phase. As a contribution, the historical series with 10 years of data collected by one of the three most important persimmon cooperatives in Spain was highlighted. It shows the evolution of the damage catalogued in the warehouse, and how commercial practices are pressing for more and more fruit to remain on the plots, in many cases due to mere aesthetic criteria.

At present, Fernandez-Zamudio, Barco and Schneider continue to collaborate and have decided to carry out an in-depth study for the near future. New data are being collected from the plots in order to validate which measurement method can be the most effective for quantification of FL in fruit trees. They expect to obtain new results in spring 2021. Above all, they hope that this work could generate a deep reflection in different stakeholders and decision-makers along the entire agri-food chain, which may lead a substantial change in the food chain mechanisms. Thus, as a result of it, producers could obtain a better appreciation of the effort made and their importance of their role along the food chain.

Participation in German-Israeli agriculture research cooperation workshop

In the framework of the existing Israeli-German agreement concerning “scientific-technical cooperation in the area of research on agriculture and nutrition” which was signed in 2012, a virtual workshop took place in October 2020. The workshop was opened by the Agricultural Ministers Julia Klöckner (Germany) and Alon Schuster (Israel). The organisers, Helmholtz Association of German Research Centres and Volcani Center - Agricultural Research Organization (ARO), kindly invited participants from Julius Kühn Institute as well as from Thünen Institute to participate and join the discussion on present research interests and future cooperation options. Based on German Minister’s preceding mention of relevance of FLW issues during conversations with Israeli Minister as well with Israeli ambassador in Germany and first respective contacts between ARO and Thünen Institute in 2019, Stefan Lange from Thünen Institute briefly [presented](#)²⁹ potential bilateral cooperation ideas in terms of FLW prevention. These ideas were further discussed between colleagues from ARO and Thünen Institute in separated meetings and we are looking forward to a fruitful collaboration.

Topic 4: Matching ideas & funding

German Chancellor Fellowship for Prospective Leaders

The Alexander von Humboldt Foundation launches the “German Chancellor Fellowship for Prospective Leaders” for applicants from Brazil, China, India, Russia, the US and - which is new - also from South Africa! Each year, up to ten winners from each country are selected to carry out their individual projects in Germany for one year. The subjects of the projects are not restricted to a special topic but they should have societal relevance with respect to politics, economy, media, society, culture or administration. The fellows act as link between Germany and their home country. The Alexander von Humboldt Foundation pays a monthly grant, helps with administrative issues during their stay and offers additional excursions and courses for the selected “prospective leaders” of the program. The German host organisation receives a monthly financial support for its expenses.

²⁹ See the FLW presentation from time line 2:29:06 to 2:33:48.

The next round of application starts on March 15th, 2021. More information on the program is provided [online](#). If you have any ideas related to FLW, please do not hesitate to contact us!

Government of Canada launches Food Waste Reduction Challenge

Beside the cooperation between Thünen Institute and Agriculture and Agri-Food Canada³⁰, more activities are going on in Canada which should be shared among our network³¹:

In Canada and around the world, FW continues to increase, resulting in an overuse of natural resources such as water, soil and land, while contributing excess greenhouse gas emissions to the atmosphere. Meanwhile, a growing number of Canadians are facing food insecurity. In response, Agriculture and Agri-Food Canada (AAFC), under the Food Policy for Canada, has launched the \$20M Food Waste Reduction Challenge to accelerate the development and deployment of innovative solutions that can tackle food waste at any point from farm-to-plate.

The Food Waste Reduction Challenge will include four complementary innovation streams. Challenge Streams A and B are now open, with applications being accepted until January 18, 2021. These streams will support solutions that are ready for commercialisation and that provide an innovative way of doing business (i.e., a new business model) to prevent or divert FW across any or multiple segments of the food supply chain. These streams target solutions in their early commercialisation phase to accelerate their growth and expansion in the Canadian market. Successful solutions will have a high impact in reducing the volume of food waste in absolute (total volume of food saved) or relative terms (percentage of food saved).

Challenge Streams C and D will be launched in Spring 2021, and will focus on investments in technologies at the prototyping and testing phases to improve their effectiveness and make them ready for the Canadian market within the next two years.

Innovators of all types and sizes are invited to apply. International applicants with a Canadian partner or an ability to register to do business in Canada are encouraged to apply. Ideas and concepts can originate from anywhere globally, but to receive funding under the Challenge, the solutions presented in the submissions must be developed, tested, piloted, demonstrated, and deployed in Canada. The most promising solutions will be selected by an external committee of subject-matter experts. Innovators will receive grant funding as well as other benefits to help them succeed.

More information about the Food Waste Reduction Challenge and how to apply is available at the challenge [website](#).

³⁰ See Topic 3 of the present report.

³¹ Information for this section was kindly provided by Sébastien Villeneuve from Saint-Hyacinthe Research and Development Centre/ Agriculture and Agri-Food Canada in Quebec, Canada.

Topic 5: Fostering cooperation at implementation level

EIP-AGRI focus group „Reducing food loss on the farm“

As already reported previously, Felicitas as coordinator of our Initiative, was selected as one of twenty experts for the agricultural European Innovation Partnership (EIP-AGRI) Focus Group „Reducing food loss on the farm“. More information on the topics and aims can be found [online](#). A final [report](#) on the findings of the focus group was published in April 2020.

Cooperation with United Nations Economic Commission for Europe (UNECE)

Among other topics, UNECE is responsible for developing Agricultural Quality Standards which are used internationally by stakeholders along the food supply chain. Those standards cover a wide spectrum of agricultural products such as fresh fruit and vegetables (FFV), dry and dried produce (DDP), seed potatoes, meat, cut flowers, eggs and egg products. The standards are supplemented by further documents to promote and improve interpretation and implementation in practice (e.g. [method for simple measuring food loss and waste](#)).

Since July 2020, the Working Group on Code of Good Practice (WGCoGP) is active in the framework of United Nations Economic Commission for Europe. Aim is to revise the [Code of Good Practise](#) for Reducing Food loss in handling fruit and vegetables which was published in 2019 according to present demand and challenges. The working group is led by Ms. Kristina Mattsson from Swedish Board of Agriculture. Thünen Institute is presented by the Initiative's coordinator Felicitas. The adapted report is expected to be published in spring 2021.

In addition to the previous work, on November 16th, 2020 UNECE presented the new online application FeedUP@UN virtually. Aim of this tool is to support alternative, flexible and fast reacting food supply chains for former invisible food which cannot be marketed and is lost or wasted along the entire food supply chain at present. The application allows systemic traceability of the food based on blockchain technology and connects food suppliers and users in order to save food. At present, various case studies are implemented in different countries. Full implementation and hand over to countries of use is planned by January 2021.

Cooperation with United Nations Environment Program (UNEP)

In line with our ongoing cooperation with UNEP related to our annual regional FLW workshops since 2019, Thünen Institute also supports the elaboration of the Food Waste Index quantification methodology. In order to track progress towards the quantitative goal of SDG 12.3, to halve per capita food waste at retail and consumer levels, UNEP is custodian of SDG indicator 12.3.1b, the Food Waste Index.

Preliminary information on the general approach can be found at the UNEP [website](#). Our coordinator Felicitas was part of a reviewer team providing feedback on draft report. The finalised Food Waste Index methodology is expected for publication in early 2021.

Recent literature from Initiative participants

In this section, we introduce new literature related to FLW which was published by members of our network. If you would like to see your publication listed here, too, please give us a hint!

- Adler C., Ncube E. (2020) Options for improving stored product protection in Southern Africa. In: Sikora R.A., Terry E.R., Vlek P.L.G., Chitja J. [Ed.] *Transforming Agriculture in Southern Africa - Constraints, Technologies, Policies and Processes*. Routledge, 1st Edition, p. 114-123, ISBN: 978-1-138-39353-0 (print), ISBN: 978-0-429-40170-1 (open access [ebook](#)).
- Brenes-Peralta L., Jimenez-Morales M.F., Freire M.J., Belik W., Basso N., Polenta G., Giraldo C., Granados S. (2020) Challenges and initiatives in reducing food losses and waste: Latin America and the Caribbean. In: Yahia E.M. [Ed.] *Preventing food losses and waste to achieve food security and sustainability*. Burleigh Dodds Series in Agricultural Science, Burleigh Dodds Science Publishing, Cambridge, UK, 2020, ISBN: 978 1 78676 300 6, <http://dx.doi.org/10.19103/AS.2019.0053.14>.
- Chu W., Williams H., Verghese K., Wever R., Glad W. (2020) Tensions and Opportunities: An Activity Theory Perspective on Date and Storage Label Design through a Literature Review and Co-Creation Sessions. *Sustainability* 2020, 12, 1162; [doi:10.3390/su12031162](https://doi.org/10.3390/su12031162).
- Dyen M., Sirieix L., Costa S. (2021) Bien manger et ne pas gaspiller la nourriture, une question d'organisation? (Eating well and not wasting food, a question of organisation?) *Décisions Marketing*, Association Française du Marketing, 2021, [pp. 1-24](#) (French and English).
- Dyen M., Sirieix L., Costa S., Depezay L., Castagna E. (2018). Exploring the dynamics of food routines: a practice-based study to understand households' daily life. *European Journal of Marketing*, [doi:10.1108/ejm-10-2017-0775](https://doi.org/10.1108/ejm-10-2017-0775).
- Fernandez-Zamudio M.-A., Barco H., Schneider F. (2020) Direct Measurement of Mass and Economic Harvest and Post-Harvest Losses in Spanish Persimmon Primary Production. *Agriculture* 2020, 10, 581; <https://doi.org/10.3390/agriculture10120581>.
- Goossens Y., Schmidt T.G., Kuntscher M. (2020) Evaluation of food waste prevention measures in the food service sector: can portioned salmon cut food waste, save costs and reduce environmental impacts? In: Eberle U., Smetana S., Bos U. (eds) *Proceedings 12th International conference on Life Cycle Assessment of Food (LCAFood2020)*, 13-16 October 2020, Berlin Virtually, Germany. Quakenbrück: DIL, pp 103-108.
- Goossens Y., Schmidt T.G., Kuntscher M. (2020) Evaluation of Food Waste Prevention Measures - The Use of Fish Products in the Food Service Sector. *Sustainability* 2020, 12, 6613; [doi:10.3390/su12166613](https://doi.org/10.3390/su12166613).
- Herzberg R., Schmidt T., Schneider F. (2020) Characteristics and Determinants of Domestic Food Waste: A Representative Diary Study across Germany. *Sustainability* 2020, 12, 4702; [doi:10.3390/su12114702](https://doi.org/10.3390/su12114702), Supplement material available [here](#).
- Kuntscher M., Schmidt T., Goossens Y. (2020) Lebensmittelabfälle in der Außer-Haus-Verpflegung - Ursachen, Hemmnisse und Perspektiven (Food Waste in Out-of-Home consumption – causes, barriers and perspectives). Braunschweig: Johann Heinrich von Thünen-Institut, 72 p, Thünen Working Paper 161, [doi:10.3220/WP1607500978000](https://doi.org/10.3220/WP1607500978000) (with english abstract).
- Le Borgne G., Sirieix L., Costa S. (2018) Perceived probability of food waste: Influence on consumer attitudes towards and choice of sales promotions. *Journal of Retailing and Consumer Services* 42: 11-21. [DOI: 10.1016/j.jretconser.2018.01.004](https://doi.org/10.1016/j.jretconser.2018.01.004).
- Leverenz D., Hafner G., Moussawel S., Kranert M., Goossens Y., Schmidt T. (2020) Reducing food waste in hotel kitchens based on self-reported data. *Industrial Marketing Management* xxx (xxxx) xxx-xxx, doi.org/10.1016/j.indmarman.2020.08.008 (in press).
- Masson M., Delarue J., Blumenthal D. (2016) An observational study of refrigerator food storage by consumers in controlled conditions, *Food Quality and Preference* (2016), [doi: http://dx.doi.org/10.1016/j.foodqual.2016.06.010](http://dx.doi.org/10.1016/j.foodqual.2016.06.010).

- Matar C., Guillard V., Gauche K., Costa S., Gontard N., Guilbert S., Gaucel S. (2020) Consumer behaviour in the prediction of postharvest losses reduction for fresh strawberries packed in modified atmosphere packaging. *Postharvest Biology and Technology* 163 (2020) 111119, <https://doi.org/10.1016/j.postharvbio.2020.111119>.
- Matzembacher D., Vieira L.M., de Barcellos M.D. (2020) An analysis of multi-stakeholder initiatives to reduce food loss and waste in an emerging country – Brazil. Article in press, *Industrial Marketing Management* xxx (xxxx) xxx–xxx, doi.org/10.1016/j.indmarman.2020.08.016.
- Masson, M., & Gojard, S. (2019). Le gaspillage alimentaire dans les foyers français (Food waste in French households). *Cahiers de Nutrition et de Diététique*, 54(4), 240–246. <https://doi.org/10.1016/j.cnd.2019.04.002> (in French).
- Orr L., Schmidt T.G. (2020) Monitoring der Lebensmittelverluste im Lebensmittelhandel. Braunschweig: Johann Heinrich von Thünen-Institut, 68 p, Thünen Working Paper 154, [doi:10.3220/WP1598947100000](https://doi.org/10.3220/WP1598947100000) (with english abstract).
- Porat R., Lichter A., Terry L.A., Harker R., Buzby J. (2018) Postharvest losses of fruit and vegetables during retail and in consumers' homes: quantifications, causes, and means of prevention. *Postharvest Biol. Technol.* 139: 135-149.
- Redlingshöfer B., Barles S., Weisz H. (2020) Are waste hierarchies effective in reducing environmental impacts from food waste? A systematic review for OECD countries. *Resources, Conservation & Recycling* 156 (2020) 104723, <https://doi.org/10.1016/j.resconrec.2020.104723>.
- Santacoloma P., Brenes L., Granados S., Jimenez-Morales M.F., Saez L. (2020) Investment needs and role of the private sector in reducing food loss and waste. In: Yahia E.M. [Ed.] *Preventing food losses and waste to achieve food security and sustainability*. Burleigh Dodds Series in Agricultural Science, Burleigh Dodds Science Publishing, Cambridge, UK, 2020, ISBN: 978 1 78676 300 6, <http://dx.doi.org/10.19103/AS.2019.0053.14>.
- Schneider F. (2020) Lebensmittel und Abfall in Valentin Thurns TASTE THE WASTE (Food and Waste in Valentin Thurns TASTE THE WASTE). In: Kaul S., Lange S. [Ed.] *Politische Ziele und ästhetische Strategien von Umweltdokumentarfilmen - Eine interdisziplinäre Annäherung (Political Goals and Aesthetic Strategies of Environmental Documentaries - An Interdisciplinary Approach)*. Thünen Report 70, 224 Seiten, Braunschweig, 2020, S. 63-71, [doi:10.3220/REP1585820523000](https://doi.org/10.3220/REP1585820523000) (with english abstract).
- Sebbane M., Costa S. (2018). Food leftovers in workplace cafeterias: An exploratory analysis of stated behavior and actual behavior. *Resources, Conservation and Recycling* 136: 88-94. [DOI: 10.1016/j.resconrec.2018.04.015](https://doi.org/10.1016/j.resconrec.2018.04.015).
- Shinde R., Rodov V., Krishnakumar S., Jayasankar S. (2018) Active and intelligent packaging for reducing post-harvest losses of fruits and vegetables. In: *Postharvest biology and nanotechnology*. (G. Paliyath et al., ed.), pp. 171-189. John Wiley & Sons, Inc. (Wiley - Blackwell), Hoboken NJ, USA.
- Silvennoinen K. (2020) Food Waste Amount, Type and Origin in Finland – Focus on Households and Food Services. *LUKE Natural resources and bioeconomy studies* 53/2020, [doctoral thesis](https://doi.org/10.1016/j.resconrec.2020.104723), Helsinki, 2020, 72 pages.
- Teigiserova D.A., Hamelin L., Thomsen M. (2020) Towards transparent valorization of food surplus, waste and loss: Clarifying definitions, food waste hierarchy, and role in the circular economy. *Science of the Total Environment* 706 (2020) 136033, <https://doi.org/10.1016/j.scitotenv.2019.136033>.
- Villeneuve S., Mondor M., Guévremont E., Arcand Y., Gariépy S. (2020) Implementation of a technology platform to develop sustainable strategies in order to reduce Food Loss and Waste across the continuum of food distribution in Canada. [Proceedings](https://doi.org/10.1016/j.scitotenv.2019.136033) of the 6th IIR International Conference

on Sustainability and the Cold Chain (ICCC 2020). Cité des Congrès in Nantes, France from August 26 to 28, 2020. Manuscript ID: 269782. P 83-89. ISSN: 0151-1637; ISBN: 978-2-36215-036-4.

- Wegner A., Goossens Y., Schmidt T.G. (2020) Nachhaltigkeitsbewertung von Maßnahmen zur Vermeidung von Lebensmittelabfällen (Sustainability assessment of Food Waste Prevention Measures). Braunschweig: Johann Heinrich von Thünen-Institut, 73 p, Thünen Working Paper 158, [doi:10.3220/WP1603713219000](https://doi.org/10.3220/WP1603713219000) (with english abstract).

International news

Due to the pandemic, a lot of webinars were newly elaborated for e-learning purposes and scheduled meetings were changed to online style and recordings are made available. It is not possible to list all interesting events and publications available but here you can find a selection of some:

The meetings of the EU Platform on Food Losses and Food Waste on June 15th and December 10th, 2020 were [recorded](#) and are available together with all presentations given. Among others, the topics cover national experiences with FW measurement in different levels of the food supply chain, information on new EU Farm to Fork strategy, impact of COVID-19 pandemic on food supply system, methodology of Food Waste Index and Assessment of progress made in implementing the Council conclusions adopted on 28 June 2016.

In addition, also the meetings of the EU FLW Platform Subgroup [measurement](#) held on June 26th and November 25th, 2020 are available online.

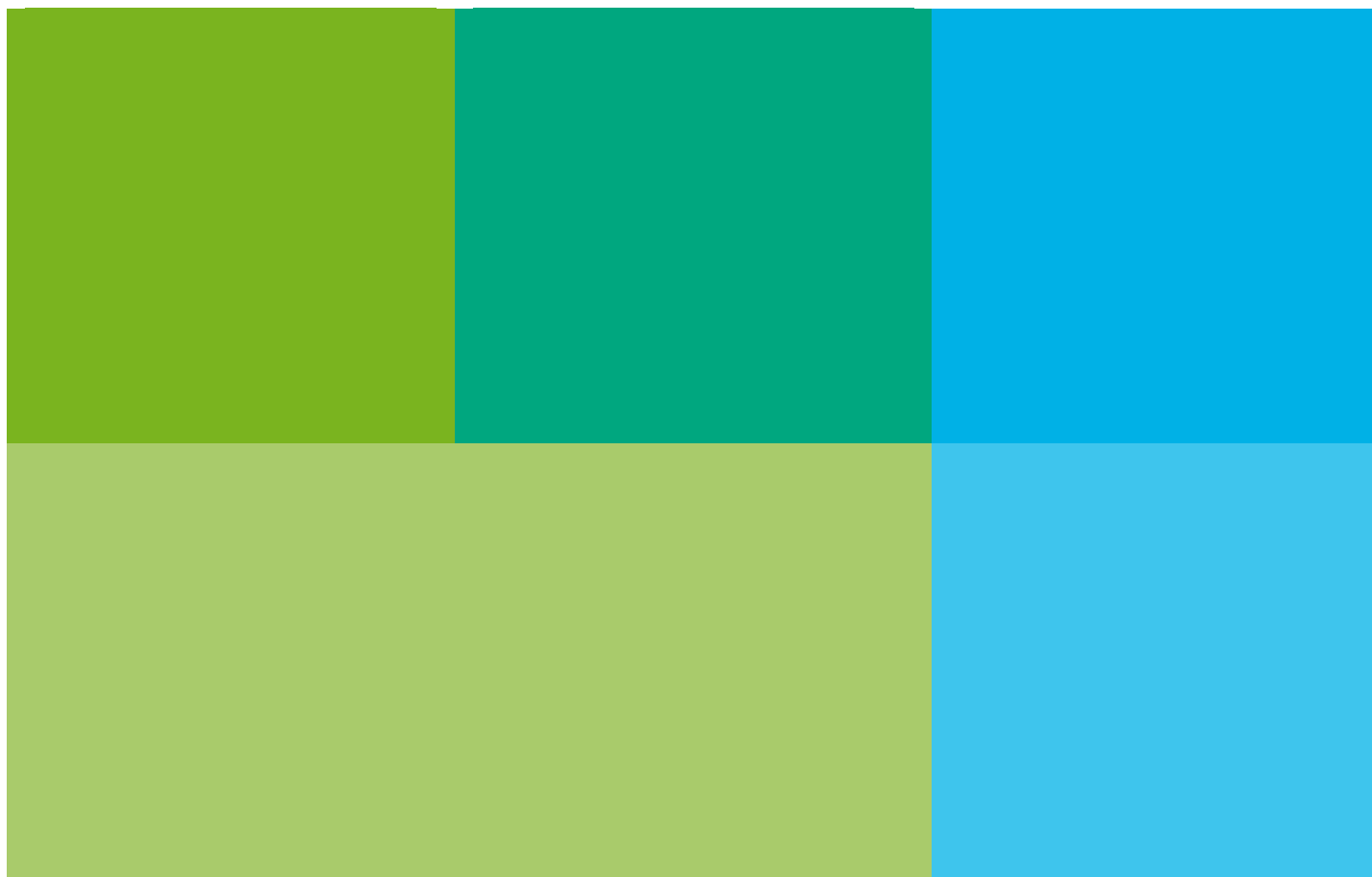
There were a huge number of publications on impact of COVID-19 pandemic on different stakeholders and interfaces of food supply chain published in 2020, among those FAO [brief](#), WRAP [report](#), FEBA [report](#), The Global Food Donation Policy Atlas [report](#) or Food Banks Norway [report](#).

In September 2020, Champions 12.3 published a [call](#) to global action on food loss and waste addressing all governments and companies to dramatically accelerate efforts to halve their food loss and waste by 2030.

On March 25th, 2020, FAO presented the “[First Technical Webinar - Sustainable food systems and nutrition: Food Post-Harvest Losses](#)”.

The Consortium for Innovation in Postharvest loss and food waste reduction offers a [series](#) of webinars related to the reduction of FLW.

UNEP, IEA (2020) [Cooling Emissions and Policy Synthesis Report: Benefits of cooling efficiency and the Kigali Amendment](#). United Nations Environment Programme, Nairobi and International Energy Agency, Paris, 50 pages.



Dr. Felicitas Schneider

Johann Heinrich von Thünen Institute

Bundesallee 63

D-38116 Braunschweig

Germany

www.thuenen.de