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Research Report - UNSDG 12

**A comparative study of actions against food waste in Germany and the U.S. on the retail
and consumer level with suggestions toward enhancing the success
of the current measures**

RFLA 300 Global Sustainable Development

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1 Introduction

“Cutting food waste is a delicious way of saving money, helping to feed the world, and protect the planet” (Organic UK, 2021). This quote by the British author and activist Tristram Stuart perfectly demonstrates the connection between food waste and its consequences on the people, economy, and planet.

The Food and Agriculture Organization of the United Nations (FAO) (2021) defines food waste as the “decrease in the quantity or quality of food resulting from decisions and actions by retailers, food service providers, and consumers.” The issue of food waste has been an ever-growing issue with the FAO (2021) estimating that global food waste currently amounts to 1,3 billion tonnes annually, which is one-third of all food produced worldwide. Food waste and loss can occur at all stages of a food product’s lifecycle including the production, processing, supply chain, retail, and consumer level (De los Mozos, 2020). The major causes of food waste differ by level with the so-called “downstream” levels (processing, retail, and consumer level) contributing to more than 70% of all food waste produced due to improper storage and processing, cosmetic standards, overbuying, or carelessness (De los Mozos, 2020). The issue of food waste is not to be taken lightly as it has enormous adverse effects on world hunger, greenhouse gas emissions, and contributes to major economic losses while undermining the sustainability of food systems (Närvänen et al., 2019). If every food item produced would be consumed, there would be no world hunger, worldwide greenhouse gas emissions could be reduced by 11 percent, and economic damage amounting to \$2,6 trillion annually as well as environmental damage of \$800 billion per year could be prevented (UN, 2021c; WWF, 2021). Hereby, one must also acknowledge the ethical and moral dilemma that goes hand in hand with wasting food.

The issue of food waste is also addressed in the United National Sustainable Development Goals (UNSDG) as part of the 2030 Agenda for Sustainable Development (UN, 2021b). The latter was passed in 2015 as a successor of the Millennium Development Goals (2000) as “a shared blueprint to achieve peace and prosperity for people and the planet” and foster sustainable development (UN, 2021b). Goal 12 of the 17 UNSDGs is dedicated to ensuring sustainable consumption and production patterns. Target 12.3 addresses food waste and aims at “halv[ing] per capita global food waste at the retail and consumer level and reduc[ing] food losses along production and supply chains including post-harvest losses by 2030” (UN, 2021a).

Acknowledging to importance and urgency to act upon the issue of food waste, this research report aims to make a contribution by analyzing current actions taken against food waste and

making proposals to scale the latter in an attempt to reduce the amount of food waste and strive toward achieving Target 12.3. Due to the broadness of the topic, this paper will focus on two of the biggest economies worldwide, Germany and the U.S., with both countries having different approaches to fight food waste and presenting two of only 17 countries worldwide providing high confidence data on food waste on the retail and consumer level (UNEP, 2021). In this paper, the consumer level addresses all households and end consumers. The retail level includes grocery stores, retailers, restaurants, and other food-selling businesses. Last year, Germany produced over 12 million tonnes of food waste and the U.S. 60 million tonnes contributing to an overall 6% of all global food waste on the consumer and retail level (BMEL, 2021; EPA, 2021; WWF, 2021).

The purpose of this report is to conduct a comparative study between the U.S. and Germany on the topic of food waste. Thereby, the current prominent actions of both countries will be thoroughly described, analyzed, compared, and subsequently evaluated for their scalability, transferability, and cost-effectiveness. The different levels on which actions will be analyzed include the retail and consumer level, therefore having the same scope as the first part of Target 12.3. Moreover, the research report is dedicated to making proposals to enhance the success of the best-ranked measures by suggesting improvements in the evaluation categories, which would increase the likelihood of these actions being implementable on a larger scale.

2 Overall food waste strategies of Germany and the U.S.

In February 2019, the German Federal Ministry of Food and Agriculture (BMEL) together with the Federal Cabinet under agricultural minister Julia Klöckner implemented an elaborate action plan called the “National Strategy for Food Waste Reduction” (BMEL, 2021). This was the country’s first far-reaching and holistic legislative action plan taken against food waste in accordance with the international sustainability goals followed by the EU and Target 12.3 of the UNSDG 12 to halve food waste by 2030. Currently, 25% of all food produced in Germany is wasted and the thereby caused economic damage is estimated to be in the billions of dollars annually. The “National Strategy for Food Waste Reduction” entails a series of initiatives and new regulatory standards to achieve its objectives, for which large-scale dialogue forums for industries, businesses, and consumers as well as stricter reporting standards on food waste have been implemented. The strategy aims to provide tailored education to all age groups, foster dialogue and collaboration for idea generation and exchange, and introduce stricter regulations for enhanced data availability and precision, especially for food producers and retailers. The

progress and success of this national strategy are evaluated through new and more detailed reporting guidelines using various key performance indicators such as food waste per capita in kilograms on all food waste levels and percentage of food diverted from landfills to conduct precise comparisons and measure progress on a yearly basis. Since 2019, a variety of new laws to further reduce food waste and create more efficient food processes have been proposed, especially by the German Green Party, but have not been passed yet. (BMEL, 2021)

Focusing on the U.S. actions, the Department of Agriculture (USDA) and Environmental Protection Agency (EPA) introduced, almost contemporaneously with the adoption of the UNSDGs, the “U.S. 2030 Food Loss and Waste Reduction” plan in September of 2015 as the first-ever nationwide effort to fight national food waste - four years earlier than Germany’s first large-scale action plan. Currently, over 35% of all food produced in the U.S. goes to waste accounting for an economic damage of \$218 billion annually, which amounts to 1.3% of the country’s GDP. The action plan’s overall goal is to reduce food waste and conserve resources by fostering sustainable food management. The plan entails increased recycling, education, and supply chain improvement efforts to tackle this issue bringing about positive effects for the environment, society, and economy. In September 2021, the “U.S. 2030 Food Loss and Waste Reduction” strategy was aligned with Target 12.3 of the UNSDG 12 to halve food waste on the retail and consumer level by 2030 with performance and progress being measured using EPA metrics, mainly pounds of food waste per capita in each of the tracked levels as well as pounds of food diverted from landfills. (EPA, 2021)

Table 1: Food waste in kilograms per capita for selected countries and regions

	Germany	Europe (average)	United States	North America (average)	Global (average)
Household level	75	72.5	59	69	Insufficient data
Retail level (including food services)	27	24 (medium data confidence)	80	Insufficient data	Insufficient data

Table created with data from the UNEP Food Waste Index Report 2021 (UNEP, 2021)

Table 1 shows the number of food waste on the consumer and retail level in kilograms per capita in Germany, Europe, the United States, North America, and on a global level. One can conclude that Germany produces 22.03% more household waste per capita than the U.S. but 62.5% less food waste per capita on the retail level, which represents a significant discrepancy between the two countries. On the household level, Germany’s high number stands out as it

exceeds all comparison numbers in the table, but the country performs well on the retail level. Vice versa, the U.S. has the lowest food waste per capita on the consumer level, but the highest number of food waste on the retail level. However, both the U.S. and Germany perform, with exception of the consumer level in the U.S., worse than their associated continent. According to the UNEP Food Waste Index Report 2021, “global food waste data availability is currently low, and measurement approaches have been highly variable” with the report only identifying 17 countries worldwide offering high confidence data, mostly in Europe and North America. The FAO (2021) estimates that only 4.4 percent of food waste data published worldwide has a high confidence level. This status quo impedes the current research and design of successful action plans against food waste as those rely on high-quality data framing the problem more closely and giving insight into different issues related to the topic that must be addressed.

3 Initiatives against food waste in Germany and the U.S.

Due to the limited scope of this research report, this paper will focus only on the most prominent and influential actions taken against food waste by both countries. For Germany, the government action “Zu gut für die Tonne“ as well as the Certified B-Corporation “Too Good To Go,” and the nationwide food bank “Tafel Deutschland” will be closely examined. The “The Food Waste Reduction Alliance” (FWRA) as well as the nonprofit organization “Feeding America” with its “MealConnect” program will be analyzed for the U.S. actions to reduce food waste. These initiatives were selected based on their size, influence, data availability, and success measurable by qualitative and quantitative variables.

The first prominent initiative this report explores is the German government initiative “Zu gut für die Tonne,” which translates to “Too good for the garbage can.” The informational campaign, first launched in 2013, has become one of the main action components of Germany’s “National Strategy for Food Waste Reduction” on the consumer level (BMEL, 2021). The initiative’s main platform is online with an elaborate government-led website surrounding the issue of food waste and prevention of such. The basis assumption the platform is operating upon is that education and innovation are the main drivers toward reducing food waste on the consumer level. The website carries out educational work in the form of presenting facts, numbers, and definitions in an interactive way as well as explaining the current food waste strategy, connections to hunger and ethical implications, advice for households and consumers to better manage their food, and food recipes for all audiences and budgets (BMEL, 2021). The website’s content is very inclusive with information being

available in “easy” language for children, sign language, and German and English with different posts and articles targeting different age groups (BMEL, 2021). The initiative also focuses on fostering innovation by carrying out an annual competition called “Bundespreis” that addresses the issue with large funding opportunities (over \$17,000) (BMEL, 2021). Start-ups with sustainable business models that target food waste are eligible to participate in the competition (BMEL, 2021). The initiative’s website publishes new informational posts about these sustainable start-ups and educates consumers on how they can interact with these companies in their everyday life (BMEL, 2021). Overall, the educational campaign has achieved over 40 million visits on its German website since its founding with the German population being 83,24 million in December 2021 and is regularly used as a resource in German elementary, middle, and high schools, therefore educating a variety of consumers about food waste and offering a platform to advance innovation and sustainable development (BMEL, 2021; World Bank, 2021).

The next valuable approach this paper focuses on is the Certified B-Corporation “Too Good To Go.” The mobile app was first developed in 2015 in Copenhagen, Denmark by Brian Christensen, Thomas Bjørn Momsen, Stian Olesen, Klaus Bagge Pedersen, and Adam Sigbrand and quickly spread to other European countries including Germany and overseas (Condamine, 2020). The free mobile app connects consumers to restaurants and other food retail businesses that have leftover food that would usually go to waste due to expiration, unsold surpluses, or food with cosmetic damage (Too Good To Go, 2021). After a store publishes a post, customers can locate these stores through the app, which sell the food at around one-third of the original price (Too Good To Go, 2021).

This innovative business model linking retailers to consumers helps to significantly decrease food waste on the retail level (Condamine, 2020). The initiative presents a win-win-win situation for retailers, consumers, and the environment (Huidobro Giménez, 2019). Retailers do not have to throw away perfectly good food that would ultimately go to a landfill emitting greenhouse gas emissions. Furthermore, both the participating retail store as well as the consumer profit from a monetary perspective as customers get quality food at a cheaper price and therefore save money while retailers still earn a portion of the original price on their food that would otherwise be disposed of without any monetary compensation (Condamine, 2020). The company records major growth in Germany, also due to government subsidies amounting to \$7 million in funding in 2019 (BMEL, 2021). As of December 2021, 6,2 million Germans are actively using the app with over 10,000 participating restaurants and other food businesses

(Too Good To Go, 2021). Since its introduction to the German market in 2016, estimates show that the company has helped to save over 9,6 million portions of food from going to waste (Too Good To Go, 2021). In 2017, the company was awarded the prestigious German innovation price (“Bundespreis”) and is constantly expanding its partnerships with the recently added goal to add major German grocery stores as its partners as well as change the concept of the expiration date to a recommended date of use due to the negative connotation and false beliefs that are connected to the expiration date (Condamine, 2020; Too Good To Go, 2021).

The last German initiative presented in this research paper reports on the “Tafel Deutschland,” (2021a) a nationwide food bank founded by Sabine Werth in Berlin in 1993 with the slogan “Save Food. Help People.” The aid organization’s mission (2021b) is to provide food and cooked meals to low-income and homeless individuals and families through partnerships with German grocery chains and other food businesses to save food from being wasted and allocate and redistribute the food donations to those in need. Participating stores donate food that would otherwise be disposed of due to expiration or cosmetic damage to the “Tafel Deutschland,” where 60,000 volunteers prepare, repackage, and distribute food to the needy, either for free or at a very low cost (2021b). The organization (2021b) has over 950 fixed and 2,300 mobile locations throughout Germany helping around 1,6 million people daily with one-third of them being children under the age of 18.

“Tafel Deutschland” (2021b) is currently saving over 264,000 tonnes of food each year adding up to around 5 million tonnes of food being saved since its foundation. To successfully operate the food banks, other support on top of food donations is necessary, which comes from private and business monetary donations, volunteer work, as well as the possibility to donate one’s bottle recycling money voucher at most German grocery stores to go directly to the “Tafel Deutschland.” Moreover, the organization is highly engaged in promoting more sustainable food systems and consumption (Orgut et al., 2016). On the website, one can find in-depth educational information on the concept of the expiration date and practical tips for the consumer to minimize food waste (Tafel Deutschland, 2021a). Therefore, one can state that although the initiative mainly targets food waste on the retail level with its business model, it also puts a focus on the consumer and household level as the organization acknowledges that reducing food waste can only be achieved through a more holistic approach that taps multiple food waste levels.

After having presented the most prominent actions of Germany to reduce food waste, this next section will focus on initiatives taken from the U.S. side, which include the “Food Waste Reduction Alliance” (FWRA) and “Feeding America” with its “MealConnect” program.

The industry-led FWRA, founded in 2011, is comprised of the Consumer Brands Association, the Food Industry Association, and the National Restaurant Association in a collaborative effort to reduce food waste occurring on the retail level (FWRA, 2021). The alliance’s mission statement is “to reduce the volume of food waste sent to landfills by addressing the root causes of waste and securing pathways to donate or recycle unavoidable food waste” (FWRA, 2021). The FWRA (2021) focuses on emerging solutions and examines best practices when it comes to minimizing food waste as well as attempting to change public policy and enhance communication efforts with businesses for them to incorporate the best practices into their business model and workflows. The FWRA (2021) publishes annual reports with its findings concerning the newest trends, developments, and measures taken in regard to food waste.

Especially notable is last year’s report “Messy but Worth It: Lessons Learned from Fighting Food Waste,” which highlights experience-driven advice of the FWRA from the previous years about retailers saving and repurposing food instead of letting it go to waste (FWRA, 2020).

While the report acknowledges that there is no “one size fits all” approach for food businesses to eliminate food waste due to differences in size, goals, operations, current awareness level, willingness to change, etc., they encourage businesses to engage in thorough research and develop an individually tailored internal food waste prevention culture to recover and redistribute food and be a force for good (FWRA, 2020). The FWRA works in close cooperation with EPA’s “Too good to waste” program, a toolkit to help both businesses on the retail level as well as consumers to reduce food waste (EPA, 2020). The guide and toolkit offer a comprehensive way of laying out the issue, supported by numbers, facts, and examples, and suggest how long-lasting and far-reaching improvements can be achieved (EPA, 2020). A large number of so-called “smart-“ documents downloadable on the EPA website provide information about changing one’s buying habits, proper food storage, preparation of food, and aims to demystify the current stereotypes surrounding food waste (EPA, 2020).

The nonprofit organization “Feeding America” is one of the best-known and biggest food banks in the United States (Feeding America, 2021b). Founded in 1969 by John van Hengel in Phoenix, Arizona, “Feeding America” presently has over 200 locations spread across the U.S. to support people facing food insecurity and hunger (Feeding America, 2021a). As stated on Feeding America’s website (2021b), the organization tries to actively fight the status quo with

38 million people in the U.S. facing hunger and food insecurity (1 in 9 Americans) while at the same time, 35 percent of the food produced in the U.S. is wasted (EPA, 2021). “Feeding America” has taken on this challenge and positions itself as the connection to save food from going to waste and redistributing it to those in need. The organization is the largest food rescue organization in the country, defined as “the practice of collecting high-quality food that would otherwise go to waste and distributing it to people facing hunger” addressing the current ethically questionable practice of wasting food that is still perfectly good to eat while others suffer from hunger and food insecurity (Feeding America, 2021b). “Feeding America” is in close partnership with major retailers and grocery stores nationwide that donate food to the food banks, which is then used to distribute either for free or at a low cost to people in need (Feeding America, 2021b).

One valuable feature that has been integrated into the organization’s business model in 2014, and majorly updated for accessibility and scalability purposes in 2020, is called “MealConnect” (2021). The online application allows local grocery stores, restaurants, hotels, and other food businesses that have unwanted food surpluses to upload a picture of their donation to the app (MealConnect, 2021). A nearby food bank or pantry will be notified and a volunteer will then pick up the donation from the donor (MealConnect, 2021). “MealConnect” is among other actions, for example, “Too Good To Go” an exemplary instance of how technology can be used as a force for good to create more efficient anti-food waste processes (Langen et al., 2015). The major update of “MealConnect” in June 2020 brought about increased user-friendliness and convenience by simplification of the donation process as well as a decreased effort for the donors, which helped the platform to almost double its donations in a year-to-date comparison (MealConnect, 2021). “MealConnect” has saved around 3 billion pounds of food since 2014 and strives toward continuous improvement to increase accessibility and convenience for donors (MealConnect, 2021). Although “MealConnect” currently only focuses on the retail level, “Feeding America” also aims to reduce food waste at the consumer and household level. Besides large-scale educational campaigns on the issue of food waste and practical tips to minimize the latter, the website offers, for example, quizzes to test if one’s food is still edible (Feeding America, 2021b). With its educational approach, “Feeding America” delivers both a retail and consumer level approach to fight the issue of food waste in an attempt to halve the latter by 2030 (Feeding America, 2021b).

4 Evaluation of the explored initiatives and actions

Having thoroughly described the most prominent actions that both Germany and the U.S. have implemented in an effort to tackle the issue of food waste on the retail and consumer level, this chapter focuses on an in-depth evaluation of these actions in the three categories of scalability, transferability, and cost-effectiveness. Scalability thereby means the feasibility of expanding an initiative nationally, while transferability refers to moving current actions to different countries and the feasibility of implementing them on a more global level. Cost-effectiveness measures the relation between an action's effectiveness relative to its cost. This evaluation uses a Likert scale in order to rank the categories on a scale from one to five assuming that the strength and intensity of an attitude are linear (one = very low, five = very high).

1	2	3	4	5
very low	low	moderate	high	very high

The evaluation takes place in the same order that the different actions were presented in the previous chapter. The government initiative “Zu gut für die Tonne” receives the following rating and an overall score of 13:

Scalability				5
Transferability			4	
Cost-effectiveness			4	

The initiative presents a web-based educational approach to tackling the issue of food waste on the consumer level. The concept of publishing content on a website is easily scalable and expandable as food waste is a continuous issue and so is the need to educate people on this topic. In the case of “Zu gut für die Tonne,“ one must acknowledge that in order to offer a more holistic educational approach to the issue, the platform should work on expanding its online presence to social media to be able to create more awareness and enlarge its reach as it is currently missing this important media channel to target especially younger people, which impedes a faster scaling. Many other countries have their own educational online campaigns against food waste, and the process of creating and publishing informational and educational content around the issue appears rather unproblematic (Van den Berge et al., 2021). “Zu gut für die Tonne“ is the only German initiative offering a component to encourage the public to foster innovation and rewards such efforts (BMEL, 2021). While the initiative's concept to tackle

food waste on the consumer level is easily scalable with comparatively few resources needed by, for example, implementing new media channels, working to be featured on national news media, and perhaps hosting online and offline events on the issue, the level of transferability needs to be examined depending on the country it is aimed to be transferred to (Langen et al., 2015; Van den Berge et al., 2021). Due to cultural differences and divergent levels of awareness of consumers on food waste, the content may need to be adjusted in terms of people’s current state of knowledge, language, level of Internet access, financial resources, and cultural customs (Langen et al., 2015). One might have to consider a shift to an offline presence and modify content and depictions in countries with higher poverty rates and decreased literacy rates and Internet access. Cost-effectiveness is given a high rating because the financial resources that have to be put into this initiative are comparatively low in comparison to its effectiveness and reach. Although knowledgeable authors are needed to create articles and posts and some maintenance and marketing costs as well as strategic planning is necessary, once the content is uploaded, it is available to a broad audience and has a high reach generating a large number of impressions with relatively little input necessary (Edelman, 2015).

The nonprofit organization “Too Good To Go,” which connects retailers and customers on an app to sell food surpluses achieves the ranking “very high” in almost all evaluation categories with a total score of 14 due to its well-developed business model and growth potential.

Scalability					5
Transferability				4	
Cost-effectiveness					5

The company’s business model becomes increasingly successful as it is scaled meaning the more people are actively using the free app and the more retailers are interested in selling their surpluses over the app, the greater the success of “To Good To Go.” The app closes the missing link between retailers interested in selling food surpluses and customers wanting to save money. The Zero Waste Europe program (2021) has defined “To Good To Go” as a hyper-growth company, having grown exponentially with three-digit growth percentages in a year-to-year comparison. What makes the company and business model so attractive is the win-win-win situation described in the previous chapter, in which both parties involved are either able to save money (consumers) or make money (retailers) while protecting the environment by conserving resources (Huidobro Giménez, 2019; Van den Berge et al., 2021).

Such a scenario lays a solid foundation for strong growth, both nationally and internationally. Transferability is ranked high as the existing problem and business model of “Too Good To Go” (2021) are both to a large extent universally applicable, with the only limitations being that Internet access and a mobile device must be available to the users and retailers. The company profits from excellent user and independent agency ratings with “Too Good To Go” winning many awards for its sustainability efforts as well as achieving a large word-of-mouth reach inter alia by interactive social media postings (BMEL, 2021; Igesund, 2020). The only negative comments concern the practices of retailers and deal with food pick-up times often being very limited and many retailers offering a “surprise package” without the consumer knowing what is inside before purchase (Igesund, 2020; Van den Berge et al., 2021). However, both these critical points can be easily addressed and improved on the side of the retailer.

Over the last six years, the company has expanded to 17 countries with a total of 48,7 million users and 105 million meals saved from going to waste. The company follows an aggressive expansion strategy also having entered the U.S. market in September 2020 with the services now being available in several major cities along the East and West coast with currently 650,000 users (Rosenberg, 2021; Too Good To Go, 2021). This rapid expansion highlights the fact that the business model is easily transferable, especially to other developed countries as the necessary infrastructure is already laid out. The high user numbers suggest that people appear willing to use the app, be it for financial or sustainability reasons (Rosenberg, 2021; Too Good To Go, 2021). Cost-effectiveness is ranked very high because there are currently no significant limitations to growth or the maximum number of users as the cost of scaling is not proportionally increasing with every unit (user) more. The setup of the app theoretically allows an unlimited number of transactions between retailers and customers as it only provides the framework necessary to bring a transaction to fruition (Van den Berge et al., 2021). Relatively few resources have to be put in for the maintenance and possible updates of the app, marketing is currently mostly social media-driven, which is connected to low advertisement costs, and the costs per unit are decreasing with an increasing number of users meaning that there is a high degree to which the company is effective in relation to its financial input (Edelman, 2015).

An overarching issue is, however, that while “Too Good To Go” reduces food waste on the retail level, there is still a chance that the consumer will not eat and end up wasting the food they purchased from the retailer. In this case, a transaction only shifts food waste from the retail onto the consumer level, which defeats the purpose of holistically reducing food waste.

The last initiative that is evaluated from the described food waste actions taken in Germany is the nationwide food bank “Tafel Deutschland” receiving an overall score of 9.

Scalability			3		
Transferability			3		
Cost-effectiveness			3		

Although this nonprofit organization’s primary goal is to reduce hunger and food insecurity addressing UNSDG 2 (“Zero hunger”), it is actively engaged in reducing food waste and incorporating this principle into its everyday business practices by redistributing good food and therefore saving it from being wasted (Tafel Deutschland, 2021). While the organization’s business model is theoretically scalable, it is very resource-intensive with a need for volunteers, indoor rooms for inventory and soup kitchens with the necessary appliances, and mobile food trucks to operate. Therefore, short-time scalability is only feasible if significant financial and human resources are available to ensure successful operations (Orgut et al., 2016). Furthermore, donors currently have to bring their food surpluses to any of the food bank locations, which is rather inconvenient and time-intensive likely resulting in many retailers throwing away food instead of donating it due to time or convenience issues (Tafel Deutschland, 2021). The concept of donating almost expired or cosmetically damaged food instead of wasting it and repurposing food to help those in need is universally practiced, although not to the extent desired and needed due to resource limitations (Lovrenčić et al., 2017; Orgut et al., 2016). Therefore, transferability of the business model is moderate because one must acknowledge the fact that in many nations around the world, poverty levels are high meaning that people have less to give and are more dependent on the services of food banks themselves, which impedes successful operation on the side of the food bank.

Food banks are highly dependent on the kindness of people and retailers to volunteer and donate food and money in order to successfully operate as there is no legal obligation to do so (Lovrenčić et al., 2017). One must further acknowledge that in times of global hardship like the COVID-19 pandemic, people are less able to give donations and might even become dependent on the food banks themselves, which could bring the food banks into a tough position and endanger their everyday business (Lovrenčić et al., 2017). Because of the resource intensity, cost-effectiveness is moderate meaning that, although foods are donated to the food bank at no cost, other required financial and human resources are significantly higher as there are additional steps taken between the donation and consumption of food such as repackaging,

preparation, distribution, and the revenue from selling some foods and meals at a very low-cost does not cover the necessary expenses. This hampers the processes' efficiency and therefore cost-effectiveness.

Having evaluated the German actions against food waste, the second half of this chapter is dedicated to evaluating the actions taken by the U.S. following the same scheme as above. Starting with the FWRA, a collaborative effort of various U.S. associations to address food waste, one can view the following scores in the three ranking categories below with a total score of 10.

Scalability			4	
Transferability		3		
Cost-effectiveness		3		

The work of the FWRA is scalable to a high extent in terms of the number of collaborators as well as the frequency, preciseness, and length of the published reports. Moreover, the quality of the reports is likely positively correlated with scaling in terms of the number of contributors. The more organizations and associations collect and make data available, the more valuable and data-driven best practice conclusions are (Sprunger, 2017). The idea of transferability in an international context is ranked moderate due to the fact that the FWRA works country-specific in terms of data sourcing and sphere of influence, and all participating organizations are only active in the U.S. (FWRA, 2021). However, one could argue that by simply taking the basic concept of the idea, which is increased collaboration to tackle the issue of food waste by publishing high-quality research, the transferability could be ranked higher based on the premise that financial resources, willingness to collaborate, and the possibility of collecting accurate data in the respective country are given (Sprunger, 2017). The latter could pose an issue as the UNEP's (2021) findings suggest that only 17 countries worldwide provide high confidence data on food waste.

However, collaboration could be a first step to setting the stage to increase the number of countries with high confidence data. The collaboration effort enables the participating members to produce high-quality primary and secondary research due to being able to share and allocate resources and knowledge (Sprunger, 2017). While the moderate rating of cost-effectiveness takes into account that generating primary research is a very costly process, one must furthermore acknowledge that simply publishing reports in itself does not have a direct

influence on the reduction of food waste (Sprunger, 2017). The FWRA needs to market its reports to the intended target group and the reader must actively acknowledge what changes could be made in their organization and commence the process of implementing those changes, which is related to more costs. Therefore, the reports only form the first step with the execution of the described secondary step being inevitable for the reports to ultimately have a positive influence on the amount of food waste in the U.S. and current business practices.

Lastly, this report evaluates the nonprofit organization “Feeding America” and its implemented “MealConnect” program achieving a total score of 9.

Scalability			3		
Transferability			3		
Cost-effectiveness			3		

In terms of scalability, the organization and its “MealConnect” program are facing similar scalability issues as the “Tafel Deutschland,” namely resource-intensiveness with significant financial and human capital needed, which impedes fast scaling and growth (Orgut et al., 2016). Therefore, the ranking for the scalability category is moderate. The “MealConnect” program’s concept of connecting retailers with food surpluses to food banks who then pick up the food at the designated donor’s location is feasible and convenient for the donor, but one must acknowledge that this concept can be a direct, and perhaps inferior, competitor to “Too Good to Go” (MealConnect, 2021). If retailers have the choice between selling their surpluses to consumers at a reduced price or donating it to a food bank without monetary compensation, many will choose the first option because most businesses focus on wealth maximization. Moreover, another scalability constraint is that volunteers pick up the donation from the donor, which requires a significant number of volunteers who need to be available and mobile (MealConnect, 2021).

In terms of transferability, the idea of “MealConnect” would likely work well in developed countries but since it is resource-intensive with volunteers, vehicles, and Internet access needed, developing countries might struggle to implement such a concept (Lovrenčić et al., 2017). Transferability is therefore only feasible in countries fulfilling the criteria to allocate the necessary resources. Moreover, for “MealConnect” to be successful and help reduce food waste and hunger, retailers need to have an ethical consciousness and put “the right thing to do” over potential profits, which depends on cultural characteristics, values, and the

businesses' objectives (Lovrenčić et al., 2017). The cost-effectiveness of "Feeding America" and its "MealConnect" program is moderate. As previously mentioned, the organization, as "Tafel Deutschland," requires a lot of financial support and is to a large extent dependent on the kindness of others in terms of volunteering and monetary and food donations to keep operations running. However, one needs to keep in mind that reducing food waste is rather a secondary goal for food banks around the globe as their main aim is to redistribute food to help people suffering from hunger and food insecurity (Feeding America, 2021b; Tafel Deutschland, 2021a). From this perspective, it becomes clear that perhaps the measure of cost-effectiveness in contrast to the other actions proposed should not be taken as seriously as reducing hunger toward achieving UNSDG 2 and supporting people in need should not primarily be measured and ranked by cost-effectiveness. Much of the organization income stems from donations rather than revenue with the organization in itself not being self-sufficient without outside help.

5 Comparison between countries and actions

Having researched, described, and evaluated the most prominent actions against food waste from Germany and the U.S. on the retail and consumer level, one must acknowledge that the research process to obtain valid and reliable information about food waste programs in the U.S. was connected to a higher difficulty level than the same research for German actions as there is fewer data available and accessible. Because the U.S. is about 3.5 times the size of Germany population-wise, one would have expected more measures to be taken and data to be more easily accessible. Oftentimes, one would encounter insufficient or hidden information and outdated actions that are no longer in place and maintained (Närvänen et al., 2019). The author's research and findings suggest that the information availability, marketing, and awareness efforts of the German actions are greater than for the U.S.

Another conclusion that can be drawn is that while Germany's actions against food waste occur on a national scale, the author found that many U.S. food waste initiatives are rather small scale and local, likely due to the size of the country and connected planning and complexity challenges. Another reason that ties into this is that the United States can be viewed as a conglomerate of "independent" states that significantly vary from a cultural perspective while this issue is not as pronounced in Germany. All presented initiatives have in common that the more they are scaled in terms of location and reach, the higher the amount of food saved, the lower the impact on the environment, and the higher the cost-effectiveness (Langen et al.,

2015). To address the urgency and act upon the issue of food waste and make a far-reaching change, all created actions against food waste must be designed to be easily scalable, transferable, and cost-effective to be able to exhibit a high growth potential while being implementable and expandable within a relatively short time frame (De los Mozos, 2020; UN, 2021a).

Against the common belief that the U.S. creates more per capita food waste on the household level due to its consumption orientation and Germany having lower numbers on this level due to it being more successful with its sustainability efforts, the data could not support this statement (UNEP, 2021). The U.S. experiences a lower number of food waste per capita on the consumer level than Germany although measures to fight food waste on the consumer level in the U.S. are comparatively slim, which appears to be a paradox (UNEP, 2021). Although a majority of U.S. actions target the retail level, numbers are still high questioning the success of the current implemented measures and suggesting possible inefficiencies (UNEP, 2021). In comparison, Germany performs significantly better at the retail level, which might suggest that the food waste actions taken on the retail level are perhaps more fruitful than the U.S. equivalent (UNEP, 2021).

However, looking at this situation from a different perspective, one could also argue that with the low numbers at the retail level, Germany is perhaps focusing disproportionately much on this food waste level and should perhaps shift its focus more to other levels, such as the consumer level, where the numbers are extremely high (UNEP, 2021). However, one must acknowledge that the difference in the amount of food waste per level and country stems from a variety of sources, which are broader than just the initiatives taken and are also influenced by per capita income and general prosperity as there is a positive correlation between income and food waste, consumption behavior by country, level of education, awareness as well as sincere care about the issue and wanting to make a positive change (Barrera, 2021; De los Mozos, 2020). A higher income level and willingness to spend such on food is often tied to buying more fresh produce which perishes more quickly than packaged goods and therefore leads to higher levels of food waste as the time frame to consume fresh produce is reduced (Barrera, 2021). As Germans have a cultural preference to buy mainly fresh and unpackaged produce locally, this factor plays a significant role in the country's high level of consumer food waste (BMEL, 2021).

Providing resources and information is only the first step, but retailers and consumers need to be willing to implement changes into their everyday practices, which requires actions to be

designed practical, convenient, and easily scalable to incentivize the retailers and consumers to act upon them. Other observations on a comparison level show that some of the current measures taken could be in competition with each other, especially “Too Good to Go” and “MealConnect” as discussed in the last chapter due to the nature of receiving money versus donating food with no financial compensation keeping in mind that most businesses are for-profit (Lovrenčić et al., 2017; Orgut et al., 2016). Such potential competition between actions needs to be taken into account and mitigated if possible. The closing statement of this chapter comments on the extent and influence of current food waste actions. Although food waste is such an enormous issue in today’s world with immense adverse effects on the people, economy, and environment, it is highly worrying that, in comparison to the amount of food wasted every day, comparatively little action is taken with no action accomplishing a truly holistic approach on all levels food waste occurs on (De los Mozos et al., 2020; Närvänen et al., 2019; UN, 2021a). While the current actions do have an impact on reducing food waste, there is an incredible amount of change that still needs to happen within a short period. With the current efforts taken, one must see the likelihood of accomplishing Target 12.3 by 2030 critically.

6 Suggestions to enhance the effectiveness of actions on a global level

Having conducted a thorough evaluation and comparison of the most prominent food waste actions of both countries, this chapter is aimed at making suggestions on how two of these actions can be scaled more successfully in terms of location, the number of users, marketing, convenience, and cost-effectiveness to expand their impact on reducing food waste toward realizing UNSDG 12. The two actions selected are “Too Good To go” due to having achieved the highest score in the ranking as well as the “MealConnect” program as part of “Feeding America” because of its potential to be highly successful with some changes made to the program.

The following proposed suggestions focus on the initiative “Too Good To Go.” The underlying assumptions of this business model include that people have access to the app via a mobile device, food waste and surpluses will persist and will be offered through retailers, and people are willing to purchase nearly-expired or imperfect food for a reduced price. The business concept is solely relying on an app connecting two parties and with the issue of food waste being universal, it is easily scalable and convenient in use, which is why there are no major improvement suggestions in terms of current business operations. The company’s success at

reducing food waste is positively correlated with the number of active users (Langen et al., 2015). Therefore, “Too Good To Go” might profit from increasing its marketing efforts to gain even more exposure to reach potentially interested people. A low-cost suggestion would be to foster cooperation with the United Nations and national governments for them to publish information on the company as they have an enormous platform, reputation, and reach.

When critically examining “Too Good To Go’s” business model, a possible economic threat identified is that consumers could theoretically do their grocery shopping fully via the app and save a significant amount of money. However, if many people solely rely on the app and only buy nearly-expired or imperfect food items and speculating on listings appearing toward the end of a retailer’s business hours, a food retailer’s business model could be distorted as the business sells less of its regular food offered at a full price, which is necessary to cover expenses and make a profit. Therefore, the app should be marketed rather as an addition than a complete substitution and the consumer should be made aware of the possible dilemma retailers could face. In this scenario, one must acknowledge that it is hard to find the right balance in terms of promoting to reduce food waste while also caring about the retailer’s financial well-being.

In terms of scaling and tapping new markets, “Too Good To Go” could focus on targeting another level with only minor modifications to its current business model - the consumer level. While the underlying concept stays the same, food could then also be offered by consumers who redistribute food surpluses to other people in the community. As food waste on the household level accounts for an average of 30% of all food wasted worldwide, tapping this market would allow “Too Good To Go” to scale in terms of user numbers and be more successful at its mission to reduce food waste (UNEP, 2021). This would, to a large extent, eliminate the earlier expressed worries about the organization just shifting food waste onto the consumer level instead of reducing it. In contrast to the retail level, however, the exchange of food between consumers would have to be non-monetary as it is then considered a donation, and the donor is therefore protected through the Bill Emerson Good Samaritan Act offering both criminal and civil liability protection in case a food donation has adverse effects on a consumer’s health (Cornell Law School, 2021).

Moreover, an external suggestion would be government action in order to require or at least incentivize all retailers to offer and redistribute their food surpluses. In the case of “Too Good To Go,” this would immensely boost the company’s reach and ultimately success. The company’s mission and business model perfectly align with both Germany’s as well as the

U.S. strategy to reduce food waste by 2030 meaning that an incorporation of the company into their strategy would be highly beneficial for both the government in terms of having a strong partner and the company by gaining more reach (Too Good To Go, 2021). Incentives from the government could include subsidies or tax cuts for retailers that are demonstrably active on the “Too Good To Go” app.

An initiative from the U.S. side that offers potential to be greater in its impact of reducing food waste by incorporating some changes is the “MealConnect” program of “Feeding America.” Having analyzed the business model and core processes, one must acknowledge that while the program offers a lot of opportunities, there are some inefficiencies stalling fast expansion and growth. One ambivalent circumstance is that volunteers of a local food bank currently pick up the donations through the “MealConnect” program, which is very resource-intensive needing a volunteer, a vehicle, and the donor needs to be home and available during pick-up time (MealConnect, 2021). Moreover, simply sending a photo of the donation as part of the donation process does not mean that the quality of the food can be ensured and, therefore, some donations may be identified as not useable after pickup leading to various wasted resources (MealConnect, 2021). However, a pick-up also offers the most convenient option of donating food as no effort but a simple photo and providing the donation is required. It is likely that if there was no pick-up service, donations would be decreased as the challenges to package and transport the food to the food bank requires time and effort (Lovrenčić et al., 2017).

Therefore, it is suggested that “MealConnect,” while keeping its personal pick-up service for large donations from, for example, hotels and restaurants, focuses on implementing collection points in locations that are in very close proximity to or, at best, at popular and well-visited grocery stores and also in a convenient distance to the next local food bank. These collection points would have appropriate cooling and video surveillance to check if a donation has been made on any given day. This would also allow to include the consumer level into this program. While a pick-up service on the consumer level would be highly cost-inefficient in a resource-benefit comparison as the amount of food donated would be rather small, collection points would tackle this issue as many consumers donating small amounts of food would ultimately result in an amount that is worth picking up. The collection points, if marketed and signposted properly, would combine both the consumer’s and a respective grocery store’s donations and therefore enhance efficiency and likely lead to greater volumes of food donations.

While one must acknowledge that this solution slightly decreases the convenience on the side of the donors, it enables the food bank to tap another big market (consumer level) that would

otherwise likely stay untapped. Incentives on the consumer level to make up for the lost convenience could include, for example, coupons from and for the respective grocery store if the latter is willing to implement this kind of corporate social responsibility into its business operations, which, if marketed properly, could boost its reputation and sales showing that the store cares about the issue and has its part in contributing to a better tomorrow.

7 Final evaluation and conclusion

This research report focuses on a comparative study of actions against food waste from Germany and the U.S. on the retail and consumer level consisting of a thorough description, evaluation, and comparison of the actions as well as making suggestions to enhance and scale the success of the most promising measures. This report was written in relation to the UNSDG 12 to ensure sustainable consumption and production patterns and more specifically Target 12.3 with the goal to halve per capita global food waste and loss by 2030. The data shows that while Germany has an outstandingly large amount of food waste on the consumer level, the U.S. has a similar issue on the retail level. It was found that the research for actions against food waste and relevant data and information was harder to locate and obtain for the U.S. than for Germany.

Actions that were analyzed from the German side include the government initiative “Zu gut für die Tonne,” the mobile app “Too Good To Go” as well as the food bank “Tafel Deutschland.” U.S. actions examined are the “Food Waste Reduction Alliance” collaboration and the food bank “Feeding America” with its “MealConnect” initiative. The evaluation was performed using a Likert scale in the categories of scalability, transferability, and cost-effectiveness with total scores of evaluated actions ranging from 9 to 14 (with 15 being the highest possible score). The food waste action with the best rating is “Too Good To Go” having an enormous potential to be a force for good due to its universally applicable business model and rapid expansion and growth. Another action that stands out is the “MealConnect” program due to its potential to be scaled and more successful by implementing some changes into its business operations. Suggestions to enhance success are made for both “Too Good To Go” and “MealConnect” and target mostly the topic of implementing ways to include the consumer level into each business model in order to minimize food waste on a larger scale and offering a more holistic approach to the issue by tapping an additional level food waste occurs on.

However, one must acknowledge that without rapid scaling of anti-food waste actions together with increased awareness and understanding of the issue as well as more holistic approaches to tackle the issue, achieving Target 12.3 by 2030 must be viewed rather critically. The dimension between the food waste issue and corresponding counter-initiatives is disproportional, and more attention must be directed toward this issue. Research suggestions that lay beyond the scope of this paper but would be valuable to dedicate more research to include data unavailability of food waste numbers, the large discrepancies between countries and different food waste levels as well as developing a prototype of what a holistic approach to tackling food waste could look like.

Lastly, one must highlight the urgency to act upon the food waste issue along with the other UNSDGs and related targets from an environmental, social, economic, and ethical viewpoint. Only with increased and holistic efforts by governments, businesses, organizations, initiatives, and people around the globe is deep-rooted change for good possible. Let us start today.

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