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European food banks and COVID-19: Resilience and innovation in times of crisis

Paula Capodistrias [a], Julia Szulecka [b], Matteo Corciolani [c], Nhat Strøm-Andersen [b,*]

[a] Food Banks Norway, Ole Deviks vei 20, 0666, Oslo, Norway
[b] TIK Centre for Technology, Innovation and Culture, University of Oslo, P.O. Box 1108, Blindern, NO-0317, Oslo, Norway
[c] Department of Economics and Management, University of Pisa, Via Ridolfi 10, 56124, Pisa, Italy

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ABSTRACT

This paper examines the impact of the COVID-19 crisis on the functioning of European food banks and how resilient European food banks were in coping with the pandemic in 2020. We apply a multiple case study to assess how the first year of the pandemic affected European food banks' operations and the amount of redistributed food. We further investigate innovation practices that have been developed to cope with the new situation, hoping to draw lessons for imminent future waves of the pandemic and other social crises. Our study finds that, compared to 2019, in 2020 food banks were able to redistribute a significantly higher amount of food despite numerous social restrictions and other challenges associated with the pandemic. To explain this, we delve into the organizational innovations implemented by the studied food banks and find that the introduction of new strategies and new internal structures, as well as the establishment of new types of external network relations with other firms and/or public organizations, proved to be particularly important, enabling food banks to respond quickly and effectively to the new emergency. The study thus highlights the role of food banks in food redistribution and food waste reduction in times of crisis.

1. Introduction

Food banks are non-profit organizations that collect and redistribute food among hunger-relief charities. They are a tool of redistribution, connecting upstream producers and wholesalers with consumers, in parallel to the regular market. They act as food storage and distribution depots for smaller frontline organizations[1] and usually do not themselves give out food directly to people struggling with hunger but to hunger-relief organizations helping people in need instead [1]. Their work directly corresponds to several Sustainable Development Goals, particularly SDG 1 to "end poverty in all its forms everywhere", SDG 2 to "end hunger, achieve food security and improved nutrition and promote sustainable agriculture", SDG 12 to "ensure sustainable consumption and production patterns" and its concrete target of SDG 12.3 to "by 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses" [2].

Importantly, food banks rely on the inflow of food stocks from the food industry, such as producers, wholesalers, and retailers, in addition to food from a European Union mechanism linked to the Common Agricultural Policy and national withdrawn produce scheme, called the Fund for European Aid to the Most Deprived (FEAD). Food banks take care of stockpiling and redistributing the food down the supply chain to frontline organizations, which provide the food to their beneficiaries in various forms (e.g., food parcels, soup kitchens, meals served in social restaurants/cafés, etc.). Since these flows can easily be disrupted during an emergency, this makes food banks a 'bottleneck' actor of sorts, and the COVID-19 crisis put their functioning to a tough test [3]. Indeed, the COVID-19 crisis has already demonstrated many choke points in food chains, which are problematic from the perspective of systemic resilience [4–7]. One is related to food security and efficient food redistribution, a practice that can potentially combine food waste reduction with providing food for people in need. In this sense, food banks are key actors working at the interface of preventing edible food being thrown

* Corresponding author.
E-mail addresses: paula@matsentralen.no (P. Capodistrias), julia.szulecka@tik.uio.no (J. Szulecka), matteo.corciolani@unipi.it (M. Corciolani), nhat.strom-andersen@tik.uio.no (N. Strøm-Andersen).

[1] There are different terms to indicate organizations who receive food from food banks such as hunger-relief charities, charity organizations, social organizations, recipient organizations, partner organizations, or frontline organizations/agencies. In this paper, we mainly use the term frontline organizations.

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away and redistributing food to those in need.

Several studies have been conducted highlighting food banks' assistance to vulnerable groups of people in crisis [8–11]. However, very few investigate *how* food banks have been able to do so despite the many constraints caused by the COVID-19 pandemic. This is particularly relevant since there is little systematic empirical evidence and comparative research focusing on the interrelationship among food waste, food redistribution, and COVID-19. A few articles do exist, but they generally offer single country case studies and focus on consumer food waste e.g., [12,13,14]. Therefore, we pose an overarching research question: *What was the impact of the COVID-19 crisis on the functioning of European food banks?*

Accordingly, we provide the first systematic analysis of the impact of the pandemic on food redistribution through food banks and present a much-needed comparative perspective on which more general policy advice and recommendations can be built to better support food redistribution, with particular reference to times of crisis. To answer our general research question, we formulate our first empirical question: *How resilient were European food banks to the COVID-19 shock?* In 2020, we have witnessed spikes of COVID-19 cases as well as the introduction of public health protection measures, such as a near total lockdown in most EU countries. We are thus interested in better understanding how food banks have been coping with this new, unpredictable situation. Following this initial question, we further ask: *What types of innovation practices were developed by food banks to cope with food redistribution during the crisis?*

To answer these questions, we employ a multiple case study design, studying ten national food banks that represent different regions in Europe, i.e., Albania, Bulgaria, France, Greece, Ireland, Lithuania, Norway, Poland, Romania, and the United Kingdom (UK). We combine a descriptive quantitative analysis of the food banks' performance in terms of food redistribution, contrasting this data with the amount of food redistributed during the year before the pandemic. Further, we move to a qualitative analysis and scrutinize observable innovation practices implemented by the studied food banks based on surveys, communications, and interviews with their representatives.

Our analysis indicates that, despite the social restrictions and other challenges of the pandemic, food banks were able to redistribute a significantly higher amount of food, owing to the introduction of various types of organizational innovations, especially new strategies, new internal structures, and new types of external network relations with other firms and/or public organizations. Those organizational innovations were important for food banks' ability to adapt and respond to an emergency situation, such as the COVID-19 pandemic, and thus for their resilience. The study thus notes the role of food banks in food redistribution and food waste reduction, as well as the importance of innovation in times of crisis.

We begin by reviewing the recent and constantly growing literature providing early analyses on the impact of the COVID-19 pandemic on food system resilience, highlighting the question of food waste and food redistribution, which gains prominence in a situation of a combined health and economic crisis. We also engage with the innovation studies (IS) literature to link food system resilience with innovation practices. This is followed by an outline of the methodological approach, introduction of case studies, and overview of the data gathered. We then move on to our analysis, beginning with a quantitative assessment of food banks' performance in food redistribution of the ten countries and then focusing on a qualitative analysis of innovation practices. Finally, we discuss our findings and conclude our paper.

2. Food systems in a crisis: resilience and innovation

2.1. The impact of COVID-19 on global food systems and the role of food banks

There are many possible dimensions of concern related to the COVID-19 pandemic and the way it has affected agri-food systems. Many of them have already attracted the attention of scholars. We are interested in the capacity of food systems to sustain sudden negative shocks (crises), i.e., their resilience. Food system resilience is defined as the "capacity over time of a food system and its units at multiple levels, to provide sufficient, appropriate and accessible food to all, in the face of various and even unforeseen disturbances" [15]. Key aspects of resilience are flexibility, adaptability, and the capacity to absorb shocks and maintain a functioning supply chain [7]. The COVID-19 crisis has evidently impacted three core elements of the food system [compared to 16]: safety, security, and sustainability. The last is defined particularly in terms of the food waste rate, which we interpret as an organizational and distributional failure within the system.

The more worrying impact of the COVID-19 pandemic, however, is related to food security [17]. This is particularly alarming in the Global South, as the Global Report on Food Crises estimates that the number of people facing hunger rose by 130 million in 2020 because of the pandemic. The World Food Programme has already appealed for more funding but there are expectations of a foreign aid decrease in 2020 and after, due to the economic crisis sparked by COVID-19.

However, food security is also a significant problem for the Global North. In the United States, before the COVID-19, 11.1% of the population lacked regular access to adequate food for an active, healthy life. Decimated incomes, panic buying and food hoarding, disrupted supply chains, and a sharply reduced workforce as a result of the crisis may now place more than 38% of Americans at risk of food insecurity [18]. One of every five US households was food insecure in April 2020 [The Brooking Institute 2020 in 19]. Soon after the outbreak of the pandemic, the rise of food insecurity has translated to a 98% increase in the demand for food assistance from local food banks [20,21]. Similarly, evidence from the UK points to growing food insecurity, the fragility of the UK charity system and worsening diet-related health inequalities exposed by the COVID-19 pandemic [22]. The UK imports 48% of its food, including 84% of fruits [Office National Statistics in 22]. Thus, its food supply was severely affected and fragile upon the COVID-19 crisis [23]. Clearly, food security associated with the COVID-19 pandemic is a global problem [24].

Regarding food sustainability and food waste, some research has already been conducted on the impact of COVID-19 on an important category of actors operating on the interface of food security and waste reduction—food banks. In the US, many food banks that support food safety nets needed to close during lockdown, as so did school feeding programs. In the UK too, food banks saw a sharp increase in demand for food (because of unemployment, reduced wages, inadequate welfare payments, etc.) [22]. Before the pandemic, 75% of independent food banks relied on volunteers, many of whom are elderly and belong to the risk group. There is evidence that certain food banks needed to close because of that. Furthermore, panic buying and stockpiling lead to a decrease in donations to food banks and an increased concern for vulnerable groups that could not afford to stockpile [25]. In Norway, food banks also experienced an increase of up to 40% in demand for food assistance from frontline organizations [26].

The mobilization of food banks, non-governmental organizations (NGOs), community-based organizations (CBOs), and charitable organizations to deliver food proved very important in the lockdown. These institutions have relevant knowledge and networks and delivery roots [16]. Although food banks alone will not solve the problem of food security, they are important actors in addressing the sustainability of the food system and reducing food waste. Estimations from Spain state that 2% of that country's food could be saved from being thrown away by donating to food banks, shelters, and kitchens [13].

Yet, existing research on food banks during the COVID-19 pandemic is limited; consequently, in this study, we ask how these institutions were impacted, focusing on European food banks during the first year of the outbreak of the disease and its corresponding lockdown measures. On the one hand, it might be expected that due to the COVID-19

restrictions, food banks would not be able to cope with food redistribution, might be either unprepared to receive new food streams, unable to get food from traditional suppliers or unable to redistribute due to their own or their partners limited capacities. Older volunteers might not be able to work in the pandemic and, therefore, the lockdown would decrease food banks activities. On the other hand, it could be expected that new food supply chains might emerge due to the pandemic, that there would be more solidarity, more people in need, more resources that can be mobilized, including new volunteer groups, etc. This latter possibility requires asking about organizations' capacity to adapt and innovate in the face of a crisis.

2.2. Innovation in crisis

Many scholars have noted that innovation plays a pivotal role in promoting food sustainability and food system resilience after a crisis [27–29]. Crises like droughts and pandemics trigger innovation, technological and institutional changes and should be considered important lessons not only for the COVID-19 crisis but also for climate policy and sustainability [19]. Galanakis, for instance, has called for using the current crisis as a way of avoiding 'business as usual' and for introducing more innovations to make food systems more secure, safe, and sustainable [16].

The literature on innovation in crisis has been developed further from the debates on how firms and organizations react and respond to unexpected disruptive changes and threats from the external environment, which require them to have an ability to adapt in order to survive [30,31]. Recent literature on innovation in crisis has mainly discussed aspects of innovation in relation to financial crises and economic downturns e.g., [32, 33–36]. For instance, Corsman [33] studied the 2008 financial crisis and the relationship between innovation and firm performance. He found that innovative firms performed better than non-innovative firms after the financial crisis. Gonzalez [34] explored how a crisis influences innovation by looking into the 2014–2017 downturn in the oil and gas industry in Norway. Her findings indicated that the industry downturn made existing modes of working with innovation for firms difficult to sustain. The studied firms had to adapt to the new situation, search for new ways of sustaining the existing model, and change how they work with innovation.

Several studies have explored types of innovation in times of crisis, such as service innovation [37], social innovation [38–40], innovation management [41], or innovation activities in general. A crisis could lead to a concentration of innovative activities within both small fast-growing new firms and firms that were already highly innovative before the crisis [35]. Companies in pursuit of more explorative strategies toward new product and market developments can cope better with the crisis. Lodigiani and Pesenti [40], among others, investigated the effect of an economic crisis on different forms of welfare and the role of radical subsidiarity for *social innovations*. The authors argued that the problems arising from an economic understanding of welfare pluralization could be addressed by a cultural change, which sees the need for social innovations in aggregating social demand, reinforcing social ties, creating shared value, and re-socializing social risks.

However, these studies have mainly focused on firms, innovation, and economic crises and paid less attention to public organizations and social and health crises like COVID-19. Unlike economic crises, COVID-19 has much more extensive and enormous impacts on the entire human population in every aspect: health, economic, environmental, and social [25,42]. Apart from health and food related consequences, it has strongly affected education, employment, the economy, transport, tourism, entertainment and sport, and religion. Hence, there is a room for investigating how innovations are developed in response to such social crises.

Rowan and Galanakis [28] saw COVID-19 as a possibility for the agri-food sector to transform itself and to develop more green innovations and disruptive technologies. These innovations may aim to enhance the quality of food, improve diets, shorten supply-chains, and its system resilience [29]. Similarly, Giudice et al. [43] showed that the food system might become more resilient and sustainable with localized food systems that reduce waste and favor nutrients. Fei et al. [44] called for more public private partnerships and stakeholder dialogue. They stress the role of Information and Communication technologies (ICTs)—big data information, platforms, apps for shopping, communities group buying, live streaming of local products, and digitalization of supply chains—as a way of dealing with food shocks. There is a growing need for innovations addressing labor shortages, food waste, delivery, and shelf life but that also increases resilience with tailored solutions and shorter supply chains.

With respect to food security, well-being, and COVID-19, Kinsey et al. [45] observed that the crisis has spurred social innovations. The authors studied school nutrition services in the US during school closures due to COVID-19. They found that states and school districts in the US have responded quickly to the current crisis and found innovative solutions for addressing rapidly changing demands. To replace the missed meals normally provided during school time, many districts implemented a few social innovations to ensure meal replacements, including new distribution sites, mobile distribution using school buses, home delivery in rural areas, shared meal preparation resources among non-public and private schools and districts, and coordination with community partners. Even though not all missed school meals were replaced by the initiatives, school nutrition programs proved to play a vital role in responding to student and family needs during the crisis.

To explore how food banks have coped with the social crisis of COVID-19 and to effectively compare their innovative practices, we draw on the concept of organizational innovation as it helps us to examine "what external and internal conditions induce innovation, how organizations manage innovation processes, and in what ways innovation changes organizational conduct and outcome" [46]. Organizational innovation is a prominent concept that refers to the studies of innovation in both business and public organizations [46–49].

We employ the typology of organizational innovation proposed by Tavassoli and Karlsson [50], who distinguish six dimensions of organizational innovation: (i) introduction and implementation of new strategies, (ii) introduction of knowledge management systems that improve the skills in searching, adopting, sharing, coding, storing, and diffusing knowledge among employees, (iii) introduction of new administrative and control systems and processes, (iv) introduction of new internal structures with their associated incentive structures including decentralized decision-making and team work, (v) introduction of new types of external network relations with other firms and/or public organizations including, vertical cooperation with suppliers and/or customers, alliances, partnerships, sub-contracting, out-sourcing and off-shoring, and (vi) hiring of new personnel for key positions in the organization.

Briefly, to study the role of food banks in a social crisis like the COVID-19 pandemic, we first need to discuss the impact of COVID-19 crisis on food systems' resilience and the pressures it places on food banks and their food redistribution. Next, by drawing on the literature of innovation in crisis and organizational innovation, we aim to address the question of how European food banks have been able to handle that situation and cope with the increased demand for food from people in difficulties, through their food redistributions. Our analytical framework is illustrated in Fig. 1.

3. Methodological approach, case studies, and data

Our paper seeks to answer two exploratory research questions. Firstly: how resilient were European food banks to the COVID-19 shock? And secondly: what types of innovation practices were developed by food banks to cope with food redistribution during the crisis? To answer the two research questions, we rely on a multiple case study design, combining a descriptive, quantitative analysis with a qualitative analysis of ten national food bank federations in Europe.

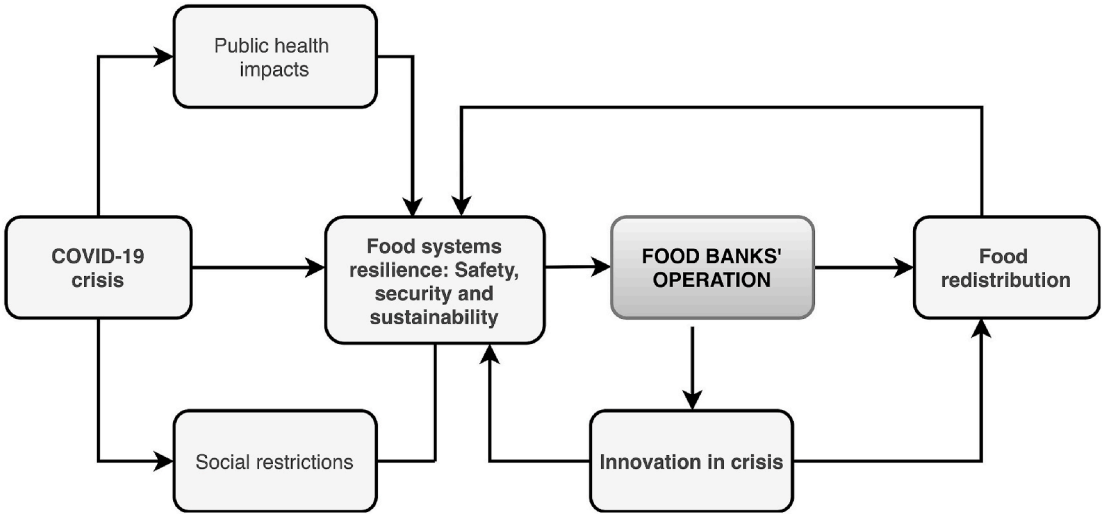

Fig. 1. An analytical framework of the role of food banks under the COVID-19 crisis.

Resilience is conceptualized as the capacity of food systems to sustain sudden negative shocks without compromising their core activities and creating deeper insecurities [15]. In our research on food banks, we operationalize resilience in terms of the amount of redistributed food in the first pandemic year 2020 as compared to the food redistributed in the preceding year, before the COVID-19 outbreak. The less interruption in food redistribution (or if the redistribution is increased rather than decreased) the more resilient a food bank can be said to be.

Since we are interested in how the COVID-19 pandemic has affected European food banks' work, we collected data from country members of the European Food Banks Federation (FEBA). FEBA was created in 1986, two years after that the first European food bank was opened in Paris [51] (the first food bank at a global level was founded in Phoenix, Arizona, in 1967). Today, more than 335 European food banks located in 24 full member countries and 5 associate country members redistribute food equivalent to 860,000 tons of food through 48,126 charities, assisting 12.8 million deprived people every day [52]. FEBA works on raising awareness about the problems of food waste and poverty, lifting obstacles to food donation for social purposes, and promoting the circular economy. Traditionally, European food banks received food from corporate donations and public food collection, in addition to food from a European Union mechanism linked to the Common Agricultural Policy and national withdrawn scheme, called the Fund for European Aid to the Most Deprived (FEAD). In the last few years, however, they have also started receiving surplus food from actors in the food industry looking to reduce food waste. This way, the food banks' goal is committed to prevent food waste and reduce food insecurity [52].

Our aim was to gather as much data as possible from the FEBA members to have an overall understanding of the situation. We eventually received data from 15 members, of which ten had a comparable reporting format (national food redistribution data in kilograms reported monthly). Those ten countries are Albania, Bulgaria, France, Greece, Ireland, Lithuania, Norway, Poland, Romania, and the UK. Like many other countries in Europe, these countries have been affected by the COVID-19 pandemic differently and introduced various policy measures. Notably, while our cases are not a representative sample of European countries, these countries represent all the key regions across the European continent: Norway in the North, Ireland and the UK in the North-West, France in the South, Lithuania and Poland in the East, and Albania, Bulgaria, Greece, and Romania in the South-East.

The European food banks, as independent organizations, vary in the way they operate, their size and access to resources. Their situation in the studied countries is very context specific, with a significant difference in the total number of food banks, amount and type of volunteers, and frontline organizations. Table 1 presents relevant food bank data in the studied countries.

We followed the four steps of data collection method suggested by Yin [53]—using multiple sources of evidence, creating a case study database, maintaining a chain of evidence, and exercising care when using data from electronic sources—in order to make the research process as explicit as possible. Our primary data were gathered through expert interviews,[2] emails, and phone communications with the FEBA's country representatives between November 2020 and August 2021 (see Table A1 in the Appendix). The respondents have roles such as Community Development Manager, Director, Institutional Relations Officer, Chairman, Chief Executive, Project Manager, or Impact & Evaluation Manager. Firstly, we collected the information about food redistribution—monthly volumes of food that food banks redistribute to downstream partners, i.e., frontline organizations and, in some cases, end beneficiaries in 2019 and 2020. We used the standard measure of kilograms of 'food redistribution'. More specifically, we evaluated the

Table 1
Analyzed countries in comparison.[a]

Country	Population (2020)	Poverty rate (2018)[b]	Number of food banks	Number of frontline organizations
Albania	2,837,743	14.3%	4	100
Bulgaria	6,927,288	23.8%	1	48
France	67,391,582	13.6%	79	5400
Greece	10,715,549	17.9%	4	263
Ireland	4,994,724	13.1%	3	235
Lithuania	2,794,700	20.6%	5	600
Norway	5,379,475	12.7%	7	400
Poland	37,950,802	15.4%	31	3300
Romania	19,286,123	23.8%	5	400
UK	67,215,293	18.6%	27	10,962

[a] Information on the population and the poverty rate in this table was obtained from the World Bank's data open sources: https://data.worldbank.org/indicator/SI.POV.NAHC?locations=LT-FR-IE-NO-PL-GB-AL-GR-DK-RO-BG and https://data.worldbank.org/indicator/SP.POP.TOTL?locations=LT-FR-IE-NO-PL-GB-AL-DK-GR-RO-BG.

[b] Poverty rate is 2018 data, except for Albania (2012), Bulgaria (2019), and the UK (2017).

[2] These interviews were not only conducted with food banks' representatives of the ten studied countries but also with other food bank experts from the Czech Republic, Germany, Spain, and Sweden.

food redistribution data in 2020 against the food redistributed in 2019, the year before the pandemic. We also decided not to use the data on amount of food collected/received by the food banks for several reasons: (i) significant fluctuations (as a result of seasonal, geographical, and logistical factors), (ii) different monitoring systems (in some food banks, food collection and food redistribution is considered equivalent), and (iii) difficulties in tracing how long the food stays in the food bank due to diverse storage capacities and food characteristics (variations in food types, storage in fridges or freezers, expiration date variances, etc.). Next, to investigate innovative practices, we asked the respondents about what kind of innovative strategies and solutions were implemented during the outbreak to respond to the emergency.

We started the qualitative analysis by classifying and labeling our data materials based on the six categories of organizational innovations suggested by Tavassoli and Karlsson [50] and coding them into categories [54]. To strengthen our analysis, we relied on a desktop study and a rich literature review of food waste, food system resilience, innovation in crises, and COVID-19. We also screened through the country food banks' websites and documents as well as general data on the functioning of food banks in Europe from three reports published by FEBA in 2020. The reports, published in April, July, and September, highlight challenges, urgent needs, and concrete responses to prevent food waste and support frontline organizations helping people in need. The reports present aggregated data from the members.

It is important to highlight that we have chosen multiple cases aiming to better understand a common phenomenon—how European food banks responded to the COVID-19 crisis—while our primary objective is not searching for differences between those countries. Future studies might hopefully have larger and more reliable samples to overcome our study's limitations.

4. Findings

4.1. Food banks and COVID-19: A multiple case study

Three FEBA surveys and reports (FEBA 2020a, b, c, d, e, g) show that food banks remained active during the pandemic (see Table 2). Some early lockdown measures led to the closure of 3.57% of European food banks but, in the period between April and August 2020, all European food banks remained open. The surveys also show that most European food banks (over 80%) experienced an increase in food demand. This was especially the case between April and May and might be related to new groups of people needing food assistance such as low-income families, people on furlough and the unemployed [26].

FEBA reports provide a direction to think about the role of food banks in the COVID-19 crisis. However, more detailed country-level data are needed to get a fuller picture of the way COVID-19 impacted food banks' operations over time. We provide a comparative assessment of the quantitative data from national food banks in the ten selected countries, exploring whether the pandemic has altered the rates of food. To do this, we contrast 2020 food redistribution volumes with 2019 food redistribution volumes in Table 3.

As shown in Table 3, food redistribution in 2020 seems to increase in all country cases in our sample, except for France. The variation between 2019 and 2020 is calculated as: [(Food redistribution$_{2020}$ – Food redistribution$_{2019}$)/Food redistribution$_{2019}$] * 100. Among the various countries, Albania, the UK, Romania, and Greece's food redistribution escalates in 2020 compared to 2019 by 150.29%, 132.56%, 108.88%, and 103.15% respectively. Next group is Ireland, Bulgaria, Poland, and Norway. These countries show a substantial increase by 76.88%, 38.92%, 32.34%, and 30.77% respectively. Lithuania has a more modest growth with 4.69%. Only France does not follow the trend, showing a small drop in their food redistribution by 1.23%. However, on average, food banks in the ten studied European countries redistributed 68% more food in 2020 than in 2019.

Table 2
COVID-19 impact on European food banks.

Survey from April 2020	Survey from May 2020	Survey from August 2020
96.43% food banks open 81.48% answer that they are experiencing an increase in demand for food aid	100% food banks open 95.65% answer that they are experiencing an increase in demand for food aid	100% food banks open 84.62% answer that they are experiencing an increase in demand for food aid

We notice that most of the countries had a sharp increase in food redistribution around April, May, and June 2020, when various countries began applying social restrictions (at the beginning of the pandemic in March) as in the case of Albania, Ireland, Lithuania, Norway, Poland, Romania, and the UK. Notably, Albania had a skyrocketing rise by 1182.75% in June 2020 compared to June 2019, while Bulgaria had a similarly high increase (by 501.45%) in March 2020 compared to March 2019. We also observe that, in April 2020, the Greek Food Bank redistributed 253,046 kg of food, recording a 327% increase in the quantities of the redistributed food, compared to the same month in 2019. These findings clearly support the results of the FEBA surveys regarding the increase in food demand in those periods, which suggest that the levels of food redistribution we observed during the COVID-19 periods in 2020 were quite different from those of the previous year. Therefore, it is more likely that the data we noticed in 2020 were not common and potentially related to the pandemic.

While we observe a clear trend of an increased redistribution of food in 2020 compared to 2019, we also see interesting patterns that repeat in both 2019 and 2020, with redistribution peaks and lows coinciding in both years. These fluctuations are related to public holidays, summer breaks, and other circumstances that affect the increase or decrease in amount of food redistributed throughout the year as shown in the ten illustrations in Fig. 2.

To better understand how the food banks responded to the first year of the pandemic and how most of the studied countries were able to redistribute higher amounts of food, we now turn our attention to the innovations they implemented.

4.2. Innovating in a crisis: Toward an understanding of food bank resilience

4.2.1. Food banks' challenges during COVID-19

The crisis has proved that many countries were unprepared, not alone food banks. Food banks were not exempt from the impact of the COVID-19 crisis and had to cope with several unprecedented situations with the arrival of the pandemic. Because of various social restrictions adopted in the countries, many food banks and their frontline organizations faced a common challenge—a lack of human resources. They struggled with the loss of employees and volunteer help, which is vital to food banks' daily operations and their frontline organizations. For example, many of the frontline organizations usually collecting food from the Polish food bank had to close temporarily due to strict restriction measures and lack of volunteers. This situation led to the Polish food bank redistributing less food in the spring 2020, which was not caused by the lack of food in the food bank, but rather linked to the frontline organization's capacity—the lack of personnel—to redistribute food.

Furthermore, during the pandemic outbreak, many frontline organizations noted an increase in new groups of people who needed food assistance, including low-income families, people on furlough and the unemployed:

> *Lots of immigrants and asylum seekers are looking for food assistance during the Corona period. But also many ethnic Norwegians who have been laid off or lost their jobs.* (Norway)

Consequently, food banks had to deal with a sudden spike in the

Table 3
Ood redistribution 2019 vs. 2020 by food banks of the ten countries (measured in kilograms).

	Albania			**Denmark**			**France**			**Greece**			**Ireland**		
	2019	2020	Var	2019	2020	Var	2019	2020	Var	2019	2020	Var	2019	2020	Var
Jan	17,525	45,760	161.11	112,567	124,789	10.86	10,084,463	10,275,672	1.90	55,607	67,243	20.93	66,000	84,000	27.27
Feb	14,088.50	29,880	112.09	98,002	102,453	4.54	9,283,968	8,624,376	−7.10	75,296	41,024	−45.52	70,000	83,000	18.57
Mar	15,331.90	28,737	87.43	114,460	97,678	−14.66	9,374,119	7,482,215	−20.18	75,558	79,827	5.65	84,000	113,000	34.52
Apr	4237.80	35,664	741.57	118,859	93,913	−20.99	9,735,250	8,821,853	−9.38	59,263	253,046	326.99	60,000	128,000	113.33
May	10,606.50	58,079	447.58	116,959	110,974	−5.12	9,774,175	8,889,378	−9.05	84,961	137,145	61.42	72,000	181,000	151.39
Jun	5071.30	65,052	1182.75	106,118	116,279	9.58	8,816,590	9,936,076	12.70	41,025	102,244	149.22	85,000	213,000	150.59
Jul	12,275.60	38,993	217.65	116,945	96,687	−17.32	9,131,449	8,910,881	−2.42	64,572	252,709	291.36	77,000	157,000	103.90
ug	6335.30	20,525	223.98	106,025	110,267	4.00	5,712,816	5,794,346	1.43	38,882	111,584	186.98	73,000	151,000	106.85
Sep	5798.50	20,897	260.39	121,551	128,532	5.74	8,420,145	8,970,531	6.54	55,795	94,948	70.17	108,000	151,000	39.81
Oct	21,059.30	16,633	−21.02	126,618	120,307	−4.98	9,737,182	8,917,332	−8.42	70,577	177,207	151.08	97,000	155,000	59.79
Nov	21,983.90	36,893	67.82	119,279	134,815	13.02	8,416,914	9,837,856	16.88	98,979	135,553	36.95	87,000	141,000	62.07
Dec	38,107.10	34,436	−9.63	93,073	120,315	29.27	10,452,063	11,139,798	6.58	84,925	183,726	116.34	103,000	180,000	74.76
Tot	172,421	431,549	150.29	1,350,456	1,357,009	0.49	108,939,134	107,600,314	−1.23	805,440	1,636,256	103.15	982,000	1,737,000	76.88
	Lithuania			**Norway**			**Poland**			**Romania**			**UK**		
	2019	2020	Var	2019	2020	Var	2019	2020	Var	2019	2020	Var	2019	2020	Var
Jan	438,374	374,489	−14.57	241,000	275,000	14.11	6,118,066	6,152,014	0.55	66,186	74,557	12.65	1,137,110	1,443,906	26.98
Feb	380,358	364,880	−4.07	231,300	254,000	9.81	6,552,536	7,313,291	11.61	44,223	65,100	47.21	1,008,620	1,219,160	20.87
Mar	418,764	418,757	0.00	234,400	315,500	34.60	6,878,342	7,358,224	6.98	38,408	116,759	204.00	1,122,920	1,610,110	43.39
Apr	456,839	470,157	2.92	209,600	360,000	71.76	6,779,045	6,854,205	1.11	35,488	144,607	307.48	1,191,010	3,219,880	170.35
May	394,846	456,694	15.66	251,400	323,100	28.52	6,370,339	7,508,431	17.87	98,535	96,363	−2.20	1,223,370	393,680	−67.82
Jun	413,506	522,225	26.29	227,600	304,900	33.96	2,816,625	7,101,147	152.12	64,071	181,428	183.17	1,161,470	4,815,010	314.56
Jul	451,833	428,723	−5.11	150,300	200,700	33.53	1,914,648	5,998,745	213.31	140,983	270,023	91.53	1,310,750	4,697,780	258.40
Aug	450,853	448,646	−0.49	195,500	255,500	30.69	1,533,683	5,608,081	265.66	69,897	316,439	352.72	1,260,130	3,627,320	187.85
Sep	412,477	453,598	9.97	217,400	283,100	30.22	2,124,979	3,458,897	62.77	50,997	111,387	118.42	1,237,220	3,288,810	165.82
Oct	423,530	427,429	0.92	232,400	281,900	21.30	2,430,692	2,010,002	−17.31	64,332	88,296	37.25	1,391,140	2,967,170	113.29
Nov	377,797	412,918	9.30	219,700	276,100	25.67	1,702,229	2,212,119	29.95	66,691	86,210	29.27	1,360,350	3,398,030	149.79
Dec	423,773	500,716	18.16	210400	297,800	41.54	3,230,335	2,544,107	−21.24	83,372	168,316	101.89	1,207,150	3,299,570	173.34
Tot	5,042,949	5,279,232	4.69	2,621,000	3,427,600	30.77	48,451,518	64,119,262	32.34	823,183	1,719,485	108.88	14,611,240	33,980,426	132.56

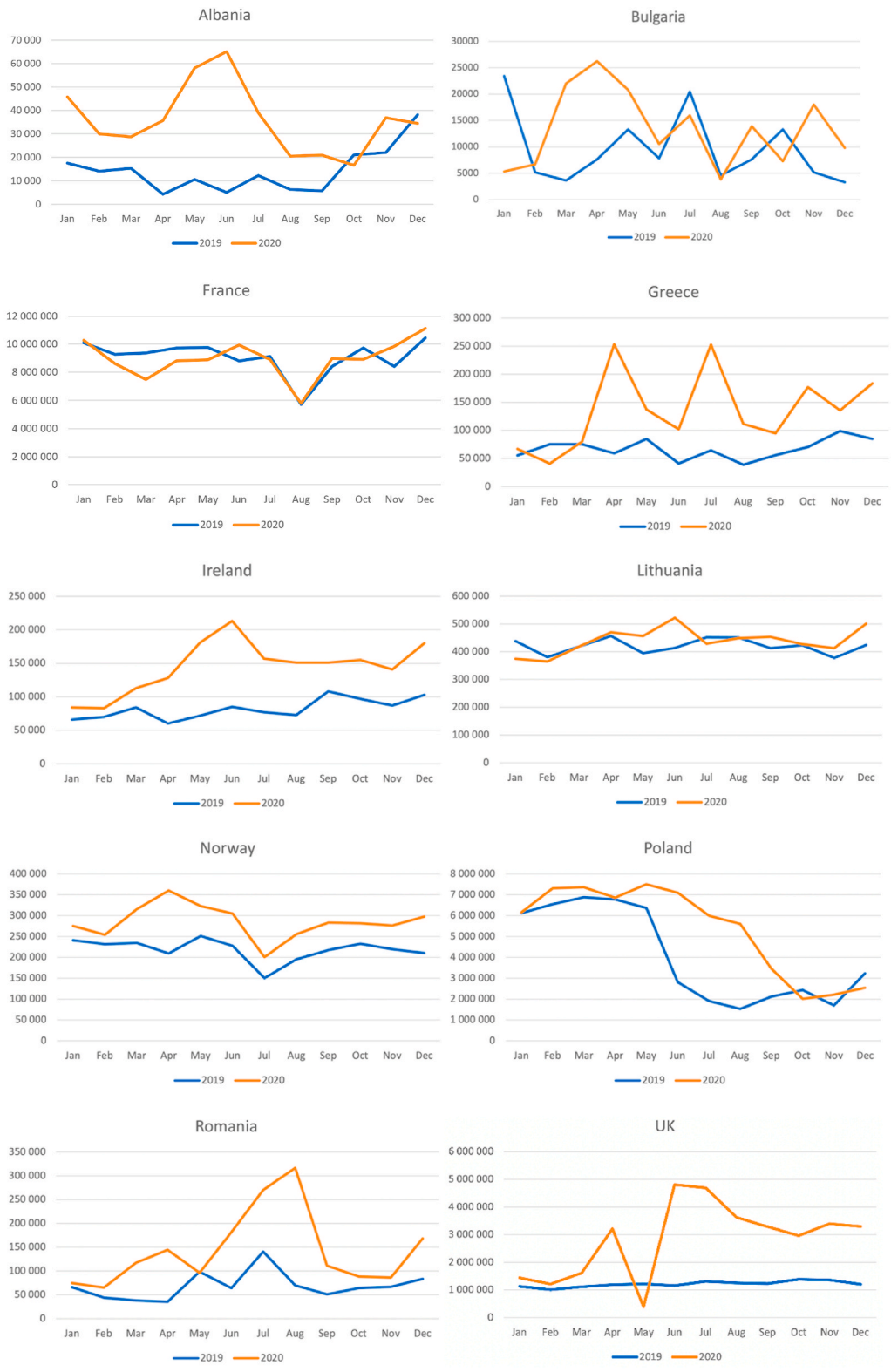

Fig. 2. Illustrations of food redistribution 2019 vs. 2020 by food banks of the ten case countries.

demand for food, as shown in the three FEBA surveys. As the representatives from Albania and Ireland stated:

> *The requests for food doubled, and often tripled from our partnering NGOs.* (Albania)

> *Our biggest challenge then and now has been to sustain the volume of good nutritious food over the months as demand continues to grow.* (Ireland)

In addition, they also needed to handle larger volumes of surplus food donated from producers, supermarkets, and distributors because of the closure of commercial kitchens and unsold food. For example, in Greece, the lockdown in the first phase of the spread of COVID-19, as

well as a reduction of tourists in the country, created significant problems in the food market. Products in professional packaging and specific brands addressed exclusively to hotels, restaurants, and canteens, remained largely unmarketable. At the same time, consumer habits changed significantly. Panic buying, home office, and e-shopping in the retail sector played an important role in this change, intensifying the divergence of supply and demand in many products and the availability of surplus food.

How could the studied food banks tackle this situation in which the surplus food and food demand suddenly increased while there was a lack of personnel? In the next section, we will discuss how new protocols, initiatives, and strategies helped the food banks maintain a safe supply of food and respond to the rise in food demand.

4.2.2. Food banks' innovative responses under crisis

Based on our expert interviews, we can observe many organizational innovations that the European food banks adopted after the pandemic outbreak. Drawing on the typology of six categories by Tavassoli and Karlsson [50], our analysis clearly shows that the food banks in the studied countries developed new strategies variously, in order to be able to continue with regular operations and to rescue more food and help more people in need in most cases.

New strategies include new, creative ways to reach out to people in need, recruiting new volunteers, and fundraising to raise money to buy needed food. Because of the restrictions of the pandemic, many frontline organizations were not able to maintain their normal activities. For example, they could no longer serve prepared meals. In Norway and France, the food banks reacted quickly to this situation by partnering with other organizations and businesses to produce ready meals themselves and, thus, help these frontline organizations:

> *Half of the organizations that served a meal had to stop doing this because of the pandemic's restrictions. Having access to ready meals offered by the food bank allowed these organizations to continue offering food aid to the disadvantaged during such difficult times.* (Norway)

In France, volunteers at the food bank used the surplus food not collected by the frontline organizations to produce meals for health care workers. The same happened in Poland. Food banks tried to recruit new volunteers to help in with the urgent situation. Lithuania recruited around 670 new volunteers for the pandemic actions. The food bank was very active on both the social media and traditional media to draw attention of people on its work. Some recruitments took place among volunteers that usually assist traffic police. Due to low traffic during the pandemic, these volunteers joined the food bank and drove food to people's homes instead. In addition, the food bank recruited students that were looking for something meaningful to contribute to during the crisis when their universities were closed:

> *Many people have found out for the first time in life the fun to volunteer, because it is not so much in our culture. Many of the people who came through pandemic learned about the work of the food bank and also the significance and size of the fight against the food waste.* (Lithuania)

Fundraising and communication were important activities during the pandemic, including campaigns to raise awareness about the emergency situation and increase financial support. Collaborating with the media, as shown in Bulgaria and the UK, was an important approach:

> *We partnered with the media and celebrities and moved our public awareness from 1 in 10 people in the country to 1 in 3. This has helped us raise more money and influence.* (UK)

The Bulgarian food bank, for example, had a 2-h event on TV during which more than 200,000 BGN (100,000 EUR) were donated to support the work of the food bank, with a total of 500,000 BGN (250,000 EUR) raised by the end of the campaign two weeks later. This sum is equivalent to operational costs for two years of activity of the food bank:

> *Covid-19 showed a solution to the most persistent issue for many years - where the funding comes from and how to engage the public and the food industry. The Bulgarian food bank operates exclusively thanks to fundraising and has never received financial support from the state or municipalities to run its activities, so being able to involve the private and public sector was new to us.* (Bulgaria)

It is clear that many food banks, which have relied on surplus food that could otherwise be wasted, also had to put in place new strategies to get a hold of more food, including buying or calling for donations of non-perishable foods to respond to the increasing demand for food assistance and assure a balanced food supply during the crisis. To several of them, such as in Ireland and the UK, calling for food donations and funding support was completely a new strategy:

> *We asked the food industry and Government to donate food or money to allow us to purchase food. Normally we deal 100% with surplus food only.* (UK)

> *[We] launched Food & Funding Appeal for donations, previously we never asked for food donations as such – only surplus food. (Ireland)*

The studied food banks also developed other types of organizational innovations. For instance, there are examples of **new knowledge management systems**, including special workshops developed under the pandemic (France) or the launch of the Community Food Link (Ireland), which was an interactive map that allowed the public to see if there was emergency food provision close by.

New administrative and control systems have been launched to comply with the pandemic restrictions, not only to overcome current barriers in food redistribution but also have a potential to catalyze long-term improvements that make food redistribution more effective. In Norway and Greece, for example, the frontline organizations that collect food from the food banks were assigned time slots for collection. In addition, the food bank in Oslo was divided into areas, to minimize contact among the volunteers of the organizations collecting food. The new system was received with enthusiasm:

> *We really liked time allocations; it made it much easier to collect food [from food banks].* (Norway)

In Ireland and the UK, the food banks cancelled the membership fee usually charged to frontline organizations that collect food from the food bank.

Furthermore, **new internal structures** were also observed. The Norwegian food banks, for example, established a system of internal transport that allowed the seven food banks in their network to send food to each other. This meant that a particular food bank could accept donations of large volumes of food (even if the volumes exceeded the local need for food) and help other food banks that were struggling to get enough food. This system also allowed a better distribution of types of food throughout the country. Ireland streamlined its operations so that the food bank could support the unprecedented rise in organizations providing food parcels - introducing all new sign ups into a collection/allocation model, meaning they could not choose what they got:

> *This helped us to share the food better.* (Ireland)

In the UK, the food bank switched to providing food for food parcels when their normal model is mainly fresh produce. In addition, instead of supplying food directly to the frontline organizations, the food bank supplied food to local government centers that would further redistribute the food to the frontline organizations. Furthermore, food banks in the UK established different kinds of cooperation to expand their warehouse space and deliver food home to people in need.

The food banks in France and Lithuania started redistributing food directly to the people in need. In France, for example, the food bank, in collaboration with student organizations, provided food boxes to students struggling because of the university's canteen closure, and the loss

of student jobs:

> *It is something that is usually never done by Food Banks [distribute food products directly to people in need].* (France)

Or in Lithuania, the food bank started a home delivery service:

> *With the pandemic, many organizations have closed, but at the same time, people were still in need for food. So, instead of bringing the food to the organizations, we brought it to people's homes. That was a completely different logistical strategy for us.* (Lithuania)

Even more vital for some food banks was to find a good location for food deliveries:

> *We better understood the importance of a good location for food deliveries.* (Albania)

The food bank in Tirana, Albania turned their office into a temporary warehouse as their warehouse was located a bit far off the city, and it was more convenient for frontline organizations and food beneficiaries to come and pick up the food there. They also supported frontline organizations and strengthened their limited capacities by equipping them with practical tools such as fridges, crates, vehicles, etc. for food handling, so that the frontline organizations could redistribute as much food as possible. Furthermore, the food banks strengthened their capacity to deliver food to more distant locations and launched operations in two new locations. In Albania, the food bank implemented a new system to redistribute the food based on requests for specific food from the organizations. By doing this, they could redistribute the food to meet beneficiaries' needs in the best possible way. In Romania, the regional food banks shared the food collected, so that they could reach more people.

Special attention also needs to be paid to **new types of external network relation**s. All countries studied showed strong evidence of new collaborations between diverse public and private bodies to rescue food from being wasted and help in food redistribution. Food banks established or expanded collaborations with local food producers as shown in France and Albania:

> *We clearly understood the importance of local strong businesses that produce locally versus those that import the food. In hard times, importing can get hard, or expensive. Local produced food was what kept us going.* (Albania)

The food banks in Albania also established new connections with high profile policymakers and leaders and acted as an intermediary between the food industry and charities to purchase food at discounted prices. This strategy benefited both the charities that could access cheaper food and the food industry that received large orders of food from the charities. Food Bank Albania had a collaboration with local producers, which proved to be a successful factor during the crisis. In France, the pandemic also strengthened the already strong ties between the food bank and local producers, by playing a pivotal role in local purchasing mechanisms to support the primary sector.

Many food banks increased collaborations with local, regional, or national authorities due to COVID-19 such as in Bulgaria, France, Ireland, and Norway. In Bulgaria, the COVID-19 pandemic created an opportunity to build strong relationships between food banks, local authorities, the food industry, and the government. Following the closure of many frontline organizations during the first confinement, the French food banks co-organized food aid in various territories, working closely with local authorities. A decentralized administration proved a smart strategy to ensure the homogeneous distribution of food aid over the country. The French food banks also received financial support from the government to buy food to make up for the decrease in food collection from supermarkets. The Irish food bank also partnered with local authorities to identify local needs and manage logistics. Fifteen new strategic partnerships in seventeen counties with community services and organizations were established during 2020 in Ireland. In Norway, the food bank in Bergen partnered with the local municipality by producing and redistributing ready meals to be redistributed through selected frontline organizations.

In addition to collaboration with local and national authorities, there were also collaboration in other sectors. In Lithuania, for example, the food bank was able to access free vehicles from a car rental company to do food deliveries. In Poland, the food banks collaborated with transport companies, such as those providing services to commercial kitchens affected by the pandemic. In Romania, the food banks supported the military in partnership with Metro, Danone, and Caroli Foods.

Despite the rapid increase in food redistribution and problems with volunteer work among the risk groups, only food banks in Ireland and Albania mentioned **new hiring** as a strategy adopted in the crisis.

Owing to various initiatives and innovations undertaken, as summarized in Table 4, many food banks were able to redistribute more food to their frontline organizations and people in need despite the social restrictions. They acted promptly and came up with timely solutions to be able to sort out the increase in both food supply and demand—the offer of surplus food available and the demand for food assistance. While the COVID-19 situation put extra pressure on the food banks, innovation and collaboration made it possible for them to tackle the situation in the best way. This highlights that the studied food banks were flexible and reacted quickly to the new circumstances with suitable strategies and actions—an evidence of their *resilience*.

5. Discussion and conclusions

This study looked at the impact of the COVID-19 crisis on the functioning of European food banks. It focused on the role of food banks as key channels for redistribution and analyzed how they responded to a social crisis. Since food flows were notably disrupted during the first pandemic wave of COVID-19, this makes food banks a 'bottleneck' actor and puts their functioning to a tough test.

To answer this, we firstly focused on the resilience of European food banks to the COVID-19 pandemic crisis. Our multiple case study shows that the levels of food redistribution in 2020 increased considerably compared to 2019 for most of the studied countries. Although stricter social restrictions cannot be seen as a direct causal factor for more food being redistributed via food banks, it appears clearly that, despite the various challenges they were exposed to under the first wave of the pandemic, the studied food banks were able to redistribute a significantly higher amount of food, responding to the sudden increase in needy recipients. About France, our expert interviews revealed that, although they had a 1.23% reduction in food redistribution, this number could have been much worse, since both the collection from supermarkets and the deliveries of ambient products (cans and non-perishable products) from the FEAD program, fell almost 20% each. The reason for the reduction of food supply from supermarkets and the FEAD program was consumer's panic shopping/hoarding for groceries, especially of ambient food in the early months of the pandemic (food redistribution for March 2020 dropped 20.18% compared to 2019). Besides, it was also difficult to have enough volunteers to collect and sort out the food from supermarkets. Regarding FEAD, producers had less ambient food available for the program since the sale of these products increased with hoarding. Furthermore, as a result of five years of the food waste law (in which French supermarkets must donate surplus food to food banks and charities) and food price inflation, the French food bank's relationship with supermarkets has weakened as supermarkets seemed to be trying different strategies to reduce their surplus levels by selling as much food as possible—selling food approaching its best before date at a reduced price, not only at the store, but also online, through apps. Thus, there are several reasons why there was a reduction in food redistribution in France.

Following this observation, we further looked at the types of innovation practices that were developed to increase the effectiveness of

Table 4
Examples of Organizational Innovations of European food banks under the COVID-19 pandemic. Our own elaborations based on the framework adapted from Tavassoli and Karlsson [50].

Types of organizational innovation	Innovation practices across the ten case studies
(i) ***New strategies***	*Bulgaria*: Media event to raise awareness of the critical situation and fundraising. *France*: Production of meals for health care workers. Redistribution of purchased food and food donations that were not surplus food. *Ireland*: Redistribution of purchased food and food donations that were not surplus food. *Lithuania*: A national campaign to recruit new volunteers among volunteers usually assisting traffic police and students. *Norway*: Production of ready meals with ingredients originally destined for commercial kitchens, in cooperation with an external community kitchen. *UK*: Public awareness campaign for food banks in partnership with the media and celebrities (recognition among the public increased from 1 in 10 people in the country to 1 in 3). Redistribution of purchased food and food donations that were not surplus food.
(ii) ***Knowledge management systems***	*France*: Transformation workshops to prepare meals. *Ireland*: Launching the Community Food Link in collaboration with the Government led Community Call initiative/CC's, which was an interactive map that allowed the public to see if there was emergency food provision close by. Developing strategic partnerships with Local Development Companies (LDC) and large organized groups to identify local needs and manage logistics; 15 new strategic partnerships in 17 counties with community services and organizations.
(iii) ***New administrative and control systems and processes***	*Greece*: Scheduling system to organize frontline organizations collecting food from the food banks to minimize social contact. *Ireland*: Suspending membership fees for frontline organizations. *Norway*: Scheduling system to organize frontline organizations collecting food from the food banks (time allocations); organizing the food bank in sectors and restricting the number of volunteers per charity who could visit the food bank (max 2 per organization) to minimize social contact. *UK:* Suspending membership fees for frontline organizations.
(iv) ***New internal structures***	*Albania:* New system to redistribute the food based on requests for specific food from the organizations. *Bulgaria*: Strengthening the capacity to deliver food to more distant locations and launching operations in two new locations. Their offices were turned into a temporary warehouse to offer food aid closer to the city. They also supported frontline organizations and strengthen their limited capacities by equipping them with practical tools such as fridges, crates, vehicles, etc. *France*: Food distribution directly to people in need, such as students. *Ireland:* Streamlining operation and introducing a new collection/allocation model. *Lithuania*: Establishing of a home delivery service. Home delivery of food for people that depended on food aid from closed frontline organizations. *Norway*: New system for internal transport between the food banks in the network. *Romania:* Sharing the increasing volume of donations (especially from the HORECA sector) among the regional food banks. *UK*: Lunch clubs turned into parcel delivery services and community centers started delivering groceries to the doorstep; Additional warehouse space in 11 regional centers. Supply of food to local government centers that would then redistribute the food to the frontline organizations.
(v) ***New types of external network relations with firms and/or public organizations***	*Albania:* Cooperate with local businesses that produce food locally; new connections with high profile policymakers and leaders. Acting as an intermediary between the food industry and charities for the purchase of food at discounted prices, which benefited both the charities, that could access cheaper food and the food industry, that received large orders of food from the charities. *Bulgaria*: COVID-19 used as a chance to "build strong relationships with the local authorities and be recognized from the food industry and the government". *France*: New collaborations with local authorities, decentralized administrations, and charities to ensure homogeneous distribution of food aid over a territory; new partnerships to support for caregivers, vulnerable students; strengthening ties and increasing donations from local producers, local purchasing mechanisms to support producers. Public financial support for the purchase and redistribution of food to people in need. *Lithuania*: Partnering with a car rental company to access free vehicles for food collection. *Norway*: New collaborations with local municipalities, volunteer centers and local restaurants to reach people in need. *Poland*: New partnerships with food donors and transport companies, e.g., with suppliers of fruit and vegetables to offices that remained closed; ad hoc 'feed the medics' campaigns. Unique Summer Food Collection; "Partner at all times" (Partner na kazdy czas) special certificates for additional industry support under COVID-19. *Romania:* Collaborating with NGOs with limited storage capacity by helping with the redistribution of some of the food. Supporting the Military in partnership with Metro, Danone, and Caroli Foods.
(vi) ***Hiring of new personnel***	*Albania:* Hiring extra people and double the staff. *Ireland*: Hiring new warehouse operatives.

food banks in mitigating food waste and redistributing food. Crises trigger innovation, technological, and institutional changes and should be considered important lessons not only for managing a pandemic but also for climate policy and sustainability. Our analysis of organizational innovations developed by food banks under COVID-19 pointed particularly to new strategies, new internal structures, and new external

partnerships, as vital innovation elements. New strategies focused mainly on finding new ways to redistribute food and launching new campaigns both to raise awareness about the emergency situation, recruit new volunteers, and increase fundraising. New internal structures involved streamlining operation, restructuring infrastructure, and introducing a new food collection/allocation model. New partnerships made all food banks expand their collaboration with local food producers, local, regional, and national authorities, and private businesses related to food and transportation. Such partnerships increased the general resilience of the food system and can be used in future crises but also in their daily work. More importantly, we observed that the food banks have applied an innovation strategy—a *combination* of different innovative practices—which proved able to help them tackle the situation efficiently and effectively—an outcome that would not have been feasible had one single innovation been used alone. This is an important lesson for food banks worldwide and future crises.

We can conclude that the studied food banks have been very effective in dealing with the first COVID-19 wave in 2020, showing admirable resilience to a social crisis. We observed a strong mobilization and commitment from both the food banks and their partners in the crisis. However, this has been a short-term effect of the pandemic on food banks' work. The long-term effect might be more difficult to sustain. With new COVID-19 waves, both the demand for food is expected to significantly grow, while the supply side might be difficult to mobilize again. In addition, the food industry is expected to be better prepared for shocks and may introduce new routines that limit larger amounts of surplus food. Thus, food banks should not only rely on the donation of surplus food, but also actively pursue new collaborations to ensure access to a diverse and stable supply of food. For that reason, this study draws the attention of public policy to food banks' role under crisis and uncertainty, which further nurtures food system resilience and sustainability. Food banks are not only 'safety nets' for the surplus food in the food system, but also a channel to reach out to those in need; thus, their role should be taken into consideration more in policy-making. Governments and local authorities should regard their work seriously and give them access to restricted places or flexible working times so they can bring food to the people who need it the most. Strengthening food banks' operation with more funding support and helping them build their networks with other organizations, public institutions, firms, and relevant stakeholders, is vital.

This study notes a couple of important research avenues and knowledge gaps related to food waste, food redistribution, and social crisis. Nevertheless, this requires further research that could explain the precise dynamics of food banks' crisis response. First, there is a strong need for unifying food waste measuring techniques. Even though we received datasets from 15 European food banks, only ten cases turned out to be directly comparable. Second, there is a need for a better diagnosis of the innovation processes and barriers during crises. Such a diagnosis could eventually be turned into an innovation model that can be useful for other food banks to learn from and/or adopt, so that they can sustain their resilience and better prepare for future shocks and unforeseen circumstances.

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Appendix

Table A1
List of interviews

	Date	Country	Informant's position	Type of interview
1	November 11, 2020	Ireland (FoodCloud)	Community Development Manager	E-mail communication
2	November 17, 2020	Czech Republic (Czech Federation of Food Banks)	Director	E-mail communication
3	November 18, 2020	Albania (Food Bank Albania)	Manager	E-mail communication
4	November 18, 2020	France (French Federation of Food Banks)	Institutional relations officer	E-mail communication
5	November 18, 2020	Greece (Greek Food Bank)	General Manager	E-mail communication
6	November 18, 2020	Romania (Bank Association for Collecting and Food Distribution)	Assistant Manager	E-mail communication
7	November 18, 2020	Norway (Food Banks Norway)	Chairman	Phone interview (45 min)
8	November 18, 2020	UK (Fareshare)	Chief Executive	E-mail communication
9	November 20, 2020	Bulgaria (Bulgarian Food Bank)	CEO	E-mail communication
10	November 20, 2020	Poland (Federation of Polish Food Banks)	Administrative and Operations Director	E-mail communication
11	November 25, 2020	Spain (Spanish Federation of Food Banks – FESBAL)	Director International Relations	E-mail communication
12	December 03, 2020	UK (Fareshare)	Impact & Evaluation Manager	E-mail communication
13	December 11, 2020	Lithuania (Lithuanian Food Bank)	Deputy Director	E-mail communication
14	February 09, 2021	Poland (Federation of Polish Food Banks)	Operational Director	E-mail communication
15	August 11, 2021	France (French Federation of Food Banks)	Institutional relations officer	Phone interview

Author statement

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Paula Capodistrias is a Project Manager at Food Banks Norway where she coordinates the network, leads projects, and supports new initiatives for redistribution of surplus food, fundraising, communication, and research. She earned her Master's degree in Agroecology and Sustainable Agriculture from the Norwegian University of Life Sciences in 2015. She is also an enthusiastic speaker on the topic of food system sustainability and food waste.

Julia Szulecka is a Senior Researcher at TIK Centre for Technology, Innovation and Culture, University of Oslo. She attained her joint Ph.D. degree from Dresden University of Technology and the University of Padova in 2015. She is an environmental social scientist, whose research interests focus on the sustainability issues in the food and forestry sectors, as well as governance and policy pathways towards a functioning bioeconomy. She is currently leading the BREAD (Building REsponsibility And Developing Innovative Strategies for Tackling Food Waste) project financed by the Research Council of Norway.

Matteo Corciolani is an Associate Professor at the Department of Economics and Management, University of Pisa. He attained a Ph.D. in Business Administration from the University of Pisa in 2010. His research interests relate to Consumer Behavior, Marketing Management, and Corporate Social Responsibility. His research projects focus on several topics, including the production and consumption of authentic items, brand crisis management, CSR communications, and food waste.

Nhat Strøm-Andersen is a Postdoctoral Fellow at TIK Centre for Technology, Innovation and Culture, University of Oslo. Nhat has a Master of Science in Innovation and Entrepreneurship from BI Norwegian Business School, 2013. She attained her doctorate on the topic of incumbent firms in sustainability transitions in the food industry from the University of Oslo in 2020. Her research interests are related to the field of innovation studies, strategic management, and sustainability transitions.