



# Article Adapting Nonprofit Resources to New Social Demands: The Food Banks in Spain

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Abstract: Food banks make up an increasing phenomenon of nonprofit organizations answering to new social needs related to the global socioeconomic crisis. In order to explore if they are suitably adapting to their environments in Spain, one of the countries most seriously affected by the crisis in South Europe, this work assumes a hybrid qualitative–quantitative structure composed of an exploratory case study based on semi-structured interviews followed by a survey addressed to all the Spanish food banks. Much of the academic literature has concerned the appropriateness of food banks as a delivery mechanism in the context of welfare state withdrawal. This paper takes this in a different direction by examining Spanish food banks from an organizational management point of view. Wary of concerns about the institutionalization of food charity, on the one hand, and recognizing the escalating daily reliance on food banks, on the other, this paper seeks to address potential technical supply problems and challenges food banks face and open debate about the organizational networks of food banks more generally. The results show nonprofit entities based on a voluntary workforce who run supply chains in order to join both social and business targets. Their situation, performance, resources, mutual relationships and the links with other entities are described, paying special attention to the changes induced by the latest contextual changes. In short, food banks are efficiently organized and well established in their territories as a coherent social movement, although they should improve in their strategic view, coordination, resources and sources of these, to satisfy more adequately their increasingly complex demands.

Keywords: socioeconomic crisis; food banks; management; nonprofit sector; social movements; Spain

## 1. Introduction

Nearly 800 million people in the world are at risk of malnutrition, hunger or starvation [1], and the population by 2050 (estimated at around 9000 million inhabitants, from the present 7400) would require an increase of 70% in the delivery of food [2].

In contrast, nearly one-third of the food which is produced every year for human consumption is lost or wasted. Food waste is made up of a great variety of food products in all their states: raw, cooked, precooked, etc., including the food wasted before, during and after the meal preparation at home, as well as the food thrown away in the manufacturing, distribution, services and retail sale processes [3]. The food waste problem is greater in the industrialized countries, where, in most cases, it is caused by both the retailers and consumers, who throw perfectly edible food away [4]. In Europe, up to 50% of nutritious food is transformed into waste along the supply chain [2].

Food banks conform to nearly a half-century-old worldwide phenomenon of nonprofit organizations whose target is to deal with part of this problem by recovering surplus food and reallocating it to people in need [5]. Their major field of operation is in developed societies and their activities are structured in several areas. On the one hand, they have programs in place to search

for and obtain food from surplus and donations, to be distributed later among needy organizations and charitable or social assistance entities. On the other hand, food banks strive for awareness and sensitization against waste and social inequality through volunteer recruitment and food collection.

In many countries, food banks are not in charge of the direct food delivery to the people in need, but hand it out to different institutions that are directly connected to these people. In other cases, such as in the United Kingdom, food banks are responsible for the distribution of food parcels. The following paragraphs introduce the rest of the paper's focus, based on the Spanish model (indirect delivery as well as in most European countries [6]) being the reality most empirically studied by the authors.

As Figure 1 shows, food banks can be seen as part of a supply chain which generates the final product; i.e., the nutritional satisfaction of several groups of disadvantaged people. Each food bank acts as a wholesaler that depends on the availability of donated "supplies" by donor agencies, which determine which part of their "clients" demands can be satisfied—precisely the opposite of traditional supply chains, which are driven by the needs shown by their customers. Upstream to this supply chain, among the donors there are food manufacturing industries, distributors, malls, hypermarket and supermarkets, wholesalers, warehouses, traders, transport industries, construction industries, financial institutions, advertising and communication companies (newspapers, radio, TV and electronic media), public institutions, and various national and international organizations. Downstream are the recipient entities, corresponding to the retailers in traditional supply chains, which can belong to two different types: distribution centers (food pantries and other organizations where batches of food are redistributed among the people and beneficiary groups) and consumption centers (soup kitchens, shelters and so on, whose users are provided with cooked and prepared food to be consumed on the premises) [7]. A part of the flow is balanced internally through the transfer of products from one food bank to another.

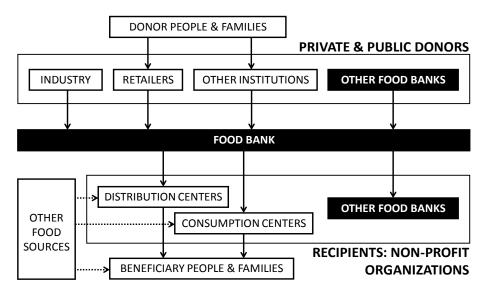


Figure 1. Spanish food banks in the supply chain of food recovery.

The European Federation of Food Banks (FEBA, from its French name), with its headquarters in Paris, was created in 1986. Today, it has a total of 265 food banks spread across 23 European countries. More than 500,000 tons of food per year are distributed by all of them, with a value of more than €1000 million, and over an area where it is received by around 5.7 million people through more than 33,200 organizations [8]. In 1996, after a food bank was founded in each of the Spanish provinces, all together these constituted the Spanish Federation of Food Banks (FESBAL, from its Spanish name), currently made up of 55 food banks. FESBAL coordinates its activities and facilitates relationships with the public, central and international administration agencies, as well as with other nonprofit

organizations and with companies which provide surplus food or give other support (aid) in their fields of competence [9].

In the economic crisis that started in 2007–2008, it is clear that the problems of hunger and malnutrition have been accentuated by the reduction in income of many family units. In the specific case of Spain, the crisis, combined with an especially virulent austerity policy, has given rise to a huge increase in unemployment percentage that has reached 2.5 times higher than that of the average of the European Union [10]. Therefore, four out of ten Spanish people lived in 2013 with less than €8000 a year, and nearly 30,000 families with children suffered from hunger [9]. Together with the traditional poor collectives, a huge number of former middle class families have succumbed to different levels of social exclusion. Therefore, poverty has been both increasing and changing in composition, what gives place to more and new social demands that different organizations must deal with.

This, coupled with the high numbers of existing food waste, further highlights the role of the food banks in today's society. In such a situation, these and other nonprofit organizations must be able to develop strategies to meet the two challenges that they face: on the one hand, dealing with the impact of the crisis in the operation of their organizations and, on the other hand, responding to social needs that grow and change [11]. Thus, in the context of this economic crisis, the role of food banks has great importance [12], as a growing number of families and single people go to food banks or to entities related to them.

Yet, are food banks responding to the challenge by adequately adapting their management to the surrounding problems? To answer this research question, this paper aims firstly to explore the present reality in relation to the crisis context through a case study of one of the Spanish food banks and, secondly, to draw a nationwide overview by means of a massive survey.

#### 2. Theoretical Framework

The resolution of social problems in local environments, such as the ones mentioned in the previous paragraphs, offers opportunities for different kinds of entities to take part. Among them, nonprofit organizations have advantages due to their participative logic, social ties, and experience through historic dedication to this kind of task. Studies carried out within the European Union (EU) [13] and in the United States [14] show that these entities are important sources of employment and economic engines. In fact, the sector has been growing while consolidating itself as a complementary alternative to the public and private sector, giving goods and services to the entire social stratum [15,16].

But many nonprofit organizations have found difficulty in using these cited advantages, and in growing and modernizing with the aim of fulfilling their functions properly. Moreover, during the recent global crisis there has been a clear reduction in their mostly public financial support, which requires that they decrease their activity or look for private sources [17], exercising new ways of interaction among them and with the rest of the sectors [18]. In short, united we stand: making the most use of nonprofit natural advantages calls for taking part in networks and, at the very best, these networks should become social movements.

Figure 2 shows how the characteristics of the nonprofit sector make it easy to configure social movements whose success will be conditioned by the coherence among ideological approaches (target system), organizational model, and real operation.

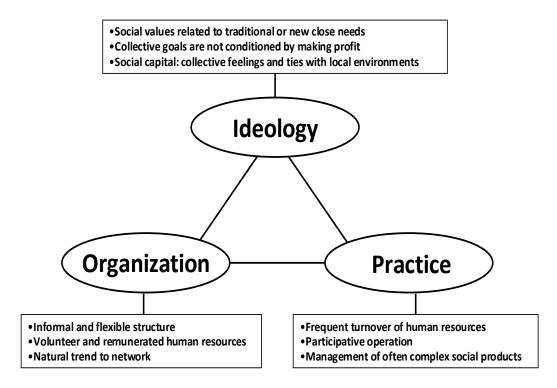


Figure 2. The nonprofit entities understood as parts of coherent social movements. Source: Authors, based on [19].

Beginning with the upper vertex of the diagram (Figure 2), it is necessary to point out that this kind of entity usually appears in the presence of public and semi-public goods, which are materialized in the social needs unsatisfied by other agents in the more immediate environment; the business sector usually lacks incentives to provide these goods and the public sector has difficulties in fulfilling heterogeneous demand. The homogeneity of approaches in each organization (social values shared with their promoters) generates collective links inside itself and its nonprofit character facilitates the organization in establishing links with the immediate environment [20].

The lower left vertex of Figure 2 shows the most suitable type of organization to fulfill these targets. The satisfaction of the different and changing social needs requires flexible organizations. Such flexibility is provided by the presence of volunteer staff (donors of time from the local environment) [21] who show altruistic behaviors. The altruistic operation and the links with the social environment make the creation of networks between organizations possible, which reinforces each one of them [22]. Reciprocally, when these networks based on mutual trust become long-lasting and responsible, they originate social capital phenomena which are an excellent encouragement for altruistic behaviors [23]. Then, developing strong accountability links to stakeholders is essential for supporting this type of organization [24].

Finally, the lower right vertex of Figure 2 indicates the appropriate operation for the ideological approaches and described organizational models. Nonprofit, collective sentiments, altruistic agents and social purposes generate participatory management systems. The pre-eminence of volunteering means a great part of the human resources will often rotate, requiring specific training, coordination and incentives measures [25]. The management of social products is further complicated in the altruistic entities because they have to face dual markets. This means they have two kinds of client: the beneficiaries (they receive the social service but do not pay for it) and the financial backers (they pay for the social service but they do not receive it), which requires paying special attention to market orientation—especially markets not governed by profit, but markets definitively [26].

The research on Spanish food banks, which is shown below, is based on the theoretical framework expounded up to this point. Food banks fit in this framework because they constitute a good example

of the nonprofit organization which operates in the social markets thanks to the initiative of altruistic entrepreneurs [27]. The ideological bases of the food bank movement (upper vertex in Figure 2) clearly respond to social values related to collective needs and to links with the local environment [28]. Organizational models (lower left vertex) based not only on volunteering but also on networks are observed. These networks function on a local level—forming stable relationships among each of the food banks and both its suppliers and beneficiary entities [29], in which it plays the role of a link agent [30]—on a national level (Spanish Federation of Food Banks), or on a global level (international food bank movement). Finally, the daily food bank operation (lower right vertex) is (or should be) participative (facilitated by most of its members being volunteers), requires a high degree of management professionalization in the logistic activities [31,32], operates in situations of great uncertainty and lack of money [33,34], and must care for the management of volunteers, with specific characteristics because they are mostly older people [35].

The rest of the paper includes the key features of the methodology applied, a combination of the qualitative and quantitative results following the three vertexes of Figure 2, and the main conclusions that have been obtained.

## 3. Methodology

The combined research which is summarized in this article assumes a hybrid qualitative–quantitative approach [36]. The first phase, a case study with an exploratory character and tentatively supported by the above theoretical model, was complemented with a survey addressed to all the Spanish food banks aimed at confirming, broadening and generalizing both the model and the results from the case.

In reference to the case study, the qualitative approach is the most suitable in this step, where the research questions are more related to the why and how of the processes of longitudinal change [37]. The data collected were contrasted with several sequentially applied instruments that guarantee the external validity, internal validity, and construct validity of the research [38]:

- 1. Saturation of information. Six in-depth interviews with three different kinds of informers, who are very different from each other and, therefore, mutually complementary: two members of paid staff (the coordinator/manager and one of her collaborators), two members of the board (the board of trustees president, with extensive experience in this position, and a member of the board of trustees, with little experience) and two base volunteers (again, one with experience and another who had recently joined the entity). All the interviews were performed personally and following a semi-structured questionnaire based on the literature review and the results from the previous quantitative study. The interviews, which lasted between 40 and 120 min, were recorded between the months of March and April 2012 and later transcribed.
- 2. Codification. Two ways of encoding were used [39]: open codes (a first reading of the interviews to mark words or pieces of text that caught the authors' attention) were followed by an axial coding (categories and subcategories were generated to make a cognitive map in a second reading).
- 3. Discussion by the research team to reach consensual views about the codification which was incorporated in a preliminary report.
- 4. Contrast and complementarity of the comments made in the interviews through documentary sources [40]: budgets, reports, food entry and exit sheets, etc.
- 5. Review with the coordinator/manager of the Food Bank of Asturias about certain aspects that were not clear either in the interviews or in the documentation provided (14 June 2013).

With respect to the quantitative research, it was designed to be developed in three different stages beginning with the questionnaire (May–June 2012), based on the previous literature review and on the opinion of both external experts and those parts of the previous qualitative research, which contributed to its improvement and quality. The questionnaire was subjected to a phone pretest (June–July 2012) carried out with four food banks chosen due to the diversity of their organizational profiles.

In the second stage—the fieldwork—the 55 food banks were contacted to ask for their participation. The sampling procedure was based on the availability for participation of the surveyed entities, which ensured the representativeness of the sample. The first contact was by email and another later by telephone. This process was repeated in two more, different moments of time, in order to increase the response rate obtained (Table 1). Then, we elaborated the descriptive analysis based on the data picked up.

Target Population	All the Spanish food banks			
Sample Unit	Every food bank			
Population Census	55 Spanish food banks			
Method for Collecting Data	Structured questionnaire sent via email			
Fieldwork	First contact: 11–18 July 2012 Second contact: 1–30 September 2012 Third contact: 18 October–10 December 2012			
Response Rate	78.18% (43 food banks)			
Confidence Level	95% for Z = 1.96 and p = q = $0.5$			
Sampling Error	7.05%			

Table 1. Spanish food banks study data sheet.

## 4. Results

# 4.1. Ideology of Spanish Food Banks

The essential empirical information has been organized according to Figure 2, to discuss the degree of management strength of both the Food Bank of Asturias and the total number of Spanish food banks as part of a social movement of nonprofit entities.

Beginning with the upper vertex of that figure, the ideological bases of this food bank case seem to be clear and solid. However, the food bank's mission has been enriched over time and its knowledge is more or less complete according to the interviewed people. All of them share an essence which maintains the values of a volunteer collective linked to the Catholic Church which, 15 years ago, led to the social initiative which is the Food Bank of Asturias today. In many countries, food banks are associated with faith-based organizations that, in the worst scenario, could be containing and maintaining the problems they deal with instead of solving them [41,42]; sometimes, certain currents of opinion from inside religious sectors condemn such kinds of contradiction [43].

Nevertheless these values are related firstly to the altruistic target of satisfying the food needs of disadvantaged people and groups, which had increased in volume and heterogeneity during the first years of the crisis; secondly, the conservation of the environment through the use of resources which otherwise would have been destroyed; and thirdly, the awareness of society in general about the problems linked to the two previous points.

"You speak with any volunteer in the warehouse and they see that the volunteers dedicated to awareness are not doing anything  $(\ldots)$  They feel the bank as what it is: entries and exits of goods and their target is that, to have more and more kilograms  $(\ldots)$  The ones who are in the area of awareness understand that there is a need to work more on awareness." (manager).

*"It was created* ( ... ) *to use leftover things* ( ... ) *This is like a big supermarket."* (administrative assistant).

*"The reasons are clear and obvious, the great and increasing need that exists and is growing* ( . . . )*."* (administration volunteer).

"The positive part of the food bank is the instantaneous distribution." (warehouse volunteer).

"Fighting against the waste of food (...) and making it available to people who (...) don't have access to them (...) On the other hand, building awareness in people of the idea that there is food to feed everybody in the world (...) Promote volunteering and, in companies, work on the social corporate responsibility, that is to say, the companies also have responsibilities, like entities, in this problem." (board of trustees' president).

These results are congruent with those of the survey: in general, the objectives of the Spanish food banks are, in order of importance, to feed people through social organizations, avoid wasting food, raise awareness in the population and the companies about the rest of the objectives, and finally, contribute to the preservation of the environment by making the most of useful resources.

With respect to the target of feeding people through social organizations, Spanish food banks provide for slightly more than one million beneficiaries. This means that, on average, 88.35 kg of food per person are received yearly by its end users. Over the whole country, 1,180,608 people benefited from this aid in 2011, which is equal to an average of 22,704 people and 129 beneficiary organizations per food bank. In other words, Spanish food banks feed 2.5% of the current Spanish population, which means approximately 12% of the population in risk of poverty, as the current rate of Spanish people in this situation is 21.1% [44]. These figures are lower than those of the Food Bank of Asturias, which is a little bigger than the country's average food bank, but much smaller than those located in big cities such as Madrid or Barcelona. In general, such percentages seem very successful when the shortage of resources that they have is taken into account. Only 55 entities in all of Spain perform this nonprofit humanitarian task.

In 2011, more than 100,000 tons of food that would have gone to landfill sites or other similar destinations were used. Given that the food banks valorized the food at 2.54  $\notin$ /kg, more than  $\notin$ 2.5 million per year and per food bank was recovered when that food was donated as basic necessities to people with low incomes. Moreover, if these food items had been discarded they would have been waste equivalent to more than 200,000 tons of CO<sub>2</sub> released annually into the atmosphere. From all of this we can conclude their contribution to the economy has both a social purpose and environmental protection. Moreover, 63% of the surveyed people affirm that the activity of each food bank is known in the context of its province, and 60% believe that they receive the social recognition that they deserve. All of this suggests that society has become sensitized to the needs of the environment and collaborates increasingly with this kind of entity. Therefore, the food banks are fulfilling the awareness objective in a satisfactory way.

Sharing the same values with the rest of the food banks compensates for difficulties caused by the large differences between them, cooperating daily at a national level and, indirectly and sporadically, internationally. This cooperation comes through sharing ideas and good practices, and is very positively valued by the food banks.

An important part of the territory where the Food Bank of Asturias is located appreciates such ideology and supports the activities within which it is materialized: the public administration (especially local ones, i.e., those closest to the population and civil society associations) gives grants in order to finance the current expenses and some investments, while companies and private donors (which are increasing faster than other sources of food, despite their greater instability and inefficiency) contribute with material resources at the point where the supply chain of the food bank starts. The crisis has been the main cause for deepening these roots in the environment, above political and ideological factors, by strengthening the image of an organization that, reciprocally, is taking measures to improve its roots and image; essentially, public relationships with different entities and events in popular public places (streets, shopping centers, learning centers, etc.). The relationship with the rest of the Spanish food banks is also a help, which facilitates their appearance in the national media. Most of these food banks were founded in the 1990s, mainly as the private initiative of a group of people (70% of the cases), being therefore relatively young entities, which had experienced a great expansion and a good acceptance by society.

Basing its operation on volunteering reinforces the public image of the nonprofit social interest entity, although these characteristics make most of the altruistic organizations sharing the disadvantages derived from depending on annual grants for their operation (the situation in this case is worsened due to the rule of refusing money donations from private citizens): the Food Bank of Asturias has difficulties with long-term planning, which maybe explains the lack of a strategic plan (or vice versa). Also, this blocks sharing (and renovating) the organizational vision internally and externally.

## 4.2. Organization of Spanish Food Banks

Moving to the lower left vertex of Figure 2, a relatively informal and flexible organization based on many volunteers (the group exceeds two hundred in the Food Bank of Asturias) is observed, where a core of people with special dedication stands out, providing strength and stability to the structure: one part is the volunteers (who donate many determined hours per week), and the other is the paid staff (who are involved far beyond their contractual obligations). The base volunteers represent 83% of the staff in the average Spanish food bank. A third category comprises the board of trustees (for legal forms of foundations) or the executive board (for associations), who were specifically studied due to the particular and differentiated character of the activity that they perform with respect to that carried out by the rest of the volunteers.

One additional reason for the stability is the high average age of the volunteers, made up in the Food Bank of Asturias mostly of retired or early retired males, as in the rest of the Spanish food banks. The high average age of volunteers is remarkable in the Spanish food banks as a whole; they are around 58 years old, mostly men (77%) and retired (61%). This result is consistent with the fact that volunteering in Spanish nonprofit entities directed to a third party increases with age [21], but it contrasts with the predominance of women in that volunteer category [45]. The reason for this difference could be found in those other organizations being dedicated to activities conventionally linked to female roles (direct care of other people), while the logistics management of a food bank would be similar to the traditionally male, business sector management. On the other hand, the inherent limitations of advanced age would be compensated by a greater willingness and possibilities of dedication, than from younger volunteers, as [35] points out, and in some cases, the important professional knowledge of their wide, previous work experience. A similar outlook was found in the case study. Although the paid staff show other profiles, elderly volunteers predominate clearly (for instance, the Food Bank of Asturias' workforce under contract is made up of younger women but numbers only three people; and many small Spanish food banks are run entirely by non-paid staff).

The important decisions are made by the board of trustees, which facilitates preserving the entity's mission. The participation feature (a basic feature of nonprofit entities) is reinforced by the fact that, in contrast to most of the foundations [46], the board of trustees of the Food Bank of Asturias is formed and elected by its own volunteers.

"Yes, trustees are who manage it." (warehouse volunteer).

"The management of the food bank is performed by the board of trustees (...). They are people of the food bank, that is to say, they are voluntary people (...) It is neither hierarchical nor structured (...) You are doing the things when they need to be done because it is like this, and the creation of positions has all come gradually (...) The volunteers can make several decisions (...) They always need my approval (...) The day to day work we do among (...) two, three volunteers and me (...) People move about without any problems." (manager).

"Here the decision making is made by the food bank manager  $(\ldots)$  with the president and the trustees  $(\ldots)$ ." (administrative volunteer).

"Democratic, the topics are taken to the board of trustees' meetings ( ... )." (board of trustees' president, answering some questions about decision making).

The organizational chart is structured according to a specialization criterion, most of the volunteers occupying positions more or less permanently related to their past work experience.

"There is a warehouse manager, there is a manager of the entries and there is a manager of the exits. There is another man who is in charge  $(\ldots)$  of the daily cash flow  $(\ldots)$ ." (administration volunteer).

In a similar way, the activity developed by the rest of the food banks can be divided into administrative management, logistics management (excluding kilo operations), kilo operations (food collection from people in learning centers, superstores, and other entities), and population awareness. Logistics management requires more dedication (55% of the workday), being developed almost totally by volunteers. Moreover, it has increased considerably over the last four years (around 32%) because the needs to be satisfied have increased as well, which partially explains the increase of volunteers (approximately 17%).

This model entails evident advantages: by decreasing the need for training and supervision, each person feels comfortable with his/her position and growth is sustainable. Nevertheless, there are also some risks: organizational rigidity and dependence on certain people in any contextual changes (demand peaks or changes in the composition of the model), which are aggravated by the aforementioned strategic shortages evident in a relatively improvised operation, the lack of a formal complete organizational chart with an analysis of the positions held, the recent fast growth, the advanced age of most volunteers, and certain difficulties of internal communication and coordination due to excess of informality.

"The communication lines are difficult in a company that has a verticalized organization, but even more difficult in an organization as horizontal as the food bank (...) From time to time meetings are had with all the volunteers to inform of specific things, for improving the debate (...)." (board of trustees' president).

As in many other nonprofit organizations, the number of paid staff is minimal: as expressed above, only three people in the Food Bank of Asturias, two of them with part-time contracts and linked to specific grants which are decreasing due to the crisis. There is a need for more people on the team and more stability of their positions with the aim of ensuring that the organization operates where volunteers are currently not able to reach. In any case, the good working atmosphere that exists must be cited, consistent with the collaborative environment prevailing in the rest of this food bank.

"Many positive details, it is very pleasant, very pleasant, because I have never worked for a foundation or anything like that, and it is very heartwarming seeing how people respond. And I can't see any negative aspects (...)." (administrative assistant, answering a question about positive and negative aspects about her job).

From the point of view of provisioning, a considerable number of companies and other entities donate food with certain regularity (and, in a lesser amount, diverse support services). In spite of tax and other kinds of advantages for the companies [47], the crisis has been making this source partially replaced by private donors [48]. However, the Food Bank of Asturias has created social capital upstream: permanent links through the construction of trust based on the mutual knowledge created by collaboration, which introduces altruistic behaviors that are more typical of a nonprofit sector, into certain companies. These data are coherent with a case study of U.S. foundations [34] and another in the Japanese health insurance sector [49], qualified by a Canadian study [27], besides a survey among charitable organizations from California [50].

"As they get to know the food bank, and its operation, the dedication of the company is greater (...) We collect some of what before was going to be destroyed, but much of what we are collecting are donations, things that would have been otherwise sold." (board of trustees' president).

The main reason for companies to collaborate with every Spanish food bank is to avoid managing commodities that they want to dispose of. On the one hand, the producers concentrate on contributing damaged products suitable for consumption; on the other hand, sellers donate products about to expire. In particular, supermarkets and hypermarkets contain a huge potential for donations because of the gap between commercial and real use-by dates of many products. Indeed, food banks are expanding their activities and linkages in these sectors while some companies develop ambitious programs of collaboration (see, for example, the support of Spanish food banks by Carrefour involving not just food delivery [51]). Incentives for such ways of acting include materialization of corporate social responsibility (CSR) strategies and "cause-related marketing" [52].

These reasons differ from that of private people: solidarity. In the years studied, these motives had been accentuated because of the economic crisis. Companies, the donors and sellers, have greater quantities of food in stock which they are not able to sell due to errors in sales and production forecasts, or promotions that have finished without the initially estimated success because of a decrease in expected demand. This, connected with social awareness, means contributions to food banks have grown significantly in a problematic social and economic environment. Therefore, the increase in quantities of food distributed by the food banks can compensate, in part, for the increase in social needs to be satisfied by them, although a gap between services needed and what can be distributed remains. The same considerations were expressed by several people interviewed for the case study.

Downstream, despite also finding nonprofit organizations, the relationships are no less complex in a crisis context which saturates and diversifies the demand and, hence, the heterogeneity not only of the beneficiary entities (many of them specialized in certain collectives), but also the people served by each of them. This is forcing the Food Bank of Asturias to increase its knowledge about these entities in order to improve coordination with them.

"We have two types of beneficiary centers, the ones that are for consumption, with these there are no problems, what arrives is to be consumed, soup kitchens, shelters, etc. and others who give the food to other people, and these are more difficult to evaluate whether all the food really reaches the end user  $(\ldots)$  or we are duplicating services  $(\ldots)$ . We would like to review all of this  $(\ldots)$ . There are different implication levels of the entities  $(\ldots)$ . We want these entities to be a part of the bank in some way." (board of trustees' president).

Both upstream and downstream are the rest of the Spanish food banks, with which the Food Bank of Asturias regulates temporary food surpluses and shortages. The flat federal structure, differently from the hierarchical model of other nonprofit organizations (that usually have their headquarters in Madrid or Barcelona and delegations in provinces), facilitates sharing resources and ideas, the decentralized management and the local roots of each food bank (which is coherent with the fact that the tendency to donate is inversely proportional to the receiver size, according to [33]).

## 4.3. Practice of Spanish Food Banks

Finally, with respect to the lower right vertex of Figure 2, it is evident that the daily practice of the Food Bank of Asturias responds to a participative operation that would be expected in an organization with its characteristics, which reinforces the ideological and organizational features mentioned with relation to the other two vertexes of the figure. Staff recruited in different ways voluntarily enter to donate an important part of their time and they are given a position in accordance with their professional profile where they will have a certain amount of management and daily cordial relationships. Training needs, not very demanding and scheduled through participation, are fulfilled in an informal way in the job position. Quitting is not common, which leads to an additional advantage: the rotation of human resources is less than in other organizations with similar characteristics. The board of trustees is cleared out democratically, probably with less frequency than would be advisable due to a lack of candidates, a very common disadvantage of the nonprofit sector, particularly one concerned with social intervention [53].

From the nationwide survey, and speaking to volunteers, their average period of rotation is around six years, and the number has grown due to the situation of economic crisis and greater social awareness, with reasons pointed out by [54]. However, the volunteers have a much reduced relevance in making decisions, with the management mainly being paid staff (81.4%). Tarasuk and Eakin (2005) have already pointed that the coordination tasks of a food bank are carried out by the paid staff [55]. This differs partially from the more participatory management style we found in the North of Spain case study, a collective way to run that food bank by means of a small team composed of a few board/trustees members—all of them volunteers—in a close and quotidian relation with the paid manager.

Rather than due to human resources, the daily activities became complicated in the case studied due to the lack of materials that the nonprofit nature imposes: dispersed locations in three different warehouses which are not sufficiently equipped and coordinated, and the obsolescence of the software and devices. In the rest of the Spanish food banks, a high percentage of the installations analyzed (approximately 58% of the offices and 48% of the warehouses) were donated or given by third parties, which indicates a dependency of the companies and donor entities of not only the food they deliver. All of that worsens the repeated problem of scarce strategic vision: if the data are not known and processed properly, it is very difficult to innovate proactively.

The optimal delivery of the social product required also has difficulties in the increasing complexity of the actions to be managed. The Food Bank of Asturias does not adequately know its users due to not working directly with them. As in the rest of Spanish food banks, its users are increasing and changing because of the incorporation of collectives that were not socially excluded before.

"My relationship is with the organizations (...) I think that it has changed (...) You only have to see the figures given by the soup kitchen (...) From the one hundred fifty users they had in to eat every day, they now have two hundred or two hundred fifty users." (manager, answering to a final users profile question).

"(...) Now the demand begins to be structured families that cannot make ends meet (...) They don't know the ways to ask for help (...) We were searching for (...) an alternative way to reach these families (...)." (board of trustees' president).

Nevertheless, the annual distributed kilograms by the Spanish food banks grew continuously (32.1% annually), as well as the number of all kinds of donors (15.4%) in the four years studied, despite the economic crisis, or precisely because of it.

The food distributed varies depending on the geographic area where a food bank is located. Despite this dispersal, a ranking of the most significant food products was carried out. The dairy products, fresh fruit, fresh fish and meat, drinks, and fresh vegetables are predominant, data which contrast with previous studies whose results indicate that dairy products are the least distributed products by this kind of organization [5]. This can be explained by the differences between Spain and the U.S. in eating habits. These basic products all have very short expiration dates, which is not worrying because they are usually given out continuously without letting them expire. Proximity methodologies can be applied for the successful organization of donations [56].

Donations coming from the surplus of the European Union (EU), which were 47.6% of the total food distributed annually, have a very important role, as they have grown considerably during the crisis (around 27.8% annually). In total, 91% of the Spanish food banks took part in these programs, which supplied food to more than 500,000 people a year. However, 66% of the Spanish food banks saw disadvantages in the management of these donations: insufficient economic endowment, lack of suitable installations for the logistics management, and the complexity of paperwork. The case study showed similar previous considerations.

Donations other than from the EU programs come mainly from private companies belonging to the food sector, as demonstrated in other studies [5,57]. This fact gives relevance to the very important

task of awareness and the need to intensify this way of acting. However, as can be seen in Table 2, kilo operations constitute the source of donations which have grown the most over the first four years of the economic crisis, partly compensating the fact that many companies have been gradually adjusting production to demand and, therefore, lowering their surpluses.

	Average Data in 2011	Typical Deviation	Maximum	% Annual Growth in the Previous 4 Years
<b>Public entities</b>	3.6	5.3	29.0	4.5
Private companies (food sector)	44.0	62.1	310.0	16.2
Learning centers collaborating with kilo operations	19.6	28.9	150.0	19.8
Shopping centers collaborating with kilo operations	8.1	18.4	120.0	11.9
TOTAL	18.1	183.3	794.0	15.4

Table 2. Data of donors in 2011 and evolution over the previous four years.

## 5. Conclusions

Under a social movement approach, Spanish food banks are, without any doubt, nonprofit entities, properly organized and rooted in their respective socioeconomic contexts, and oriented to very specific needs which, despite their shortcomings and difficulties, they satisfy with great efficiency thanks to very participative human resources and a solid network of external relationships. Regarding the internal management, small teams composed of both a few specially engaged volunteers and some paid staff seem to be advisable, i.e., closely related to the nature of these organizations. Their external links, ones with nonprofit organizations, others with companies and the public sector, are being adapted to changing contexts, increasing some kind of resource sources when others decline; in particular, the flat federal structure of Spanish food banks facilitates the territory surrounding each food bank to appreciate and support them. Then, their role, clear in the past, becomes clearer, while at the same time it has been complicated by the last socioeconomic crisis.

From the non-profit management point of view, one lesson to learn is provided by a set of successful organizations based on a profile of atypical volunteers, mostly retired men with less turnover than other charity entities and who benefit from their previous labor experience by taking positions according to their respective experience. Such specialization approach gives place to functional organizations, a typical strength of food banks in former stable contexts where they had been operating for decades. The subsequent organizational rigidity might bring about a weakness in the present changing context related to the global crisis and, therefore, to an increase of quantity and complexity of food banks' demand. This weakness should be dealt with by means of a more commercial approach, both previously (in the form of market research to deepen their demand and donors' knowledge) and afterwards (by stepping up communications campaigns and other operational marketing tools especially addressed to donors in order to increase and improve inputs).

Food banks' main disadvantage derives largely from the fact of not being able to predict accurately the quantities and types of food that every one of them must and can manage; the "must" refers to the dramatic quantitative and qualitative changes in demand that they are experiencing; the "can" to the fact that their supply chains are not driven by demand but by the offers of food. For those reasons it is difficult to establish in advance both the human and material resources that are required for food banks' activity at any one time. Moreover, the gap between logic and incentives that lead, on one hand, non-profit organizations and, on the other hand, for-profit companies should be tackled and reduced to establish more "natural" ways of cooperation (win–win).

To deal with the new challenges, it would be advisable to introduce some improvements through strategic vision, strengthening internal coordination, diversifying the sources of resources, updating

some tools and decreasing the volunteer age through the incorporation of younger people while maintaining the older ones.

Yet, in spite of all of that, Spanish food banks are adapting to the inherent demands of the economic crisis to deal with a part of the social problems that this crisis has generated by increasing their activity and extending the solidarity that occurs upstream of their value chain, in the same way as the networks with American food banks studied before the crisis by [29]. Then, in a nutshell, the research question could be answered with a qualified yes; thanks both to their internal and participatory external framework that has become a social movement, Spanish food banks are acceptably responding to the challenge by adapting their management to the surrounding problems as far as the contextual shortage of resources allows them; nevertheless, there is clearly room for improvement. The lesson to learn is based on understanding the challenges that food banks face in their supply network and on mapping out the possible responses to those challenges.

The literature review has shown that most of this reality is essentially similar to that of food banks worldwide—especially in developed countries. Nevertheless, in order to find more specific tips that could benefit nonprofit managers in different contexts, replicating studies such as this in other countries would be an interesting topic for further research, especially in the countries hardest hit by the crisis, such as Greece, Italy, Portugal and Ireland. This would gradually expand the vision on how food banks are behaving in the current difficult conditions, so as to establish comparisons within the European Union, or its reality versus similar situations in other continents. Other future extensions of this research work will seek to focus on the beneficiaries or on the donor organizations.

Finally, this paper has only tangentially dealt with a crucial controversial issue that leaves open a wider, challenging, stimulating research line: in the long term, would not food banks be inducting the "chronification" in the situation of many vulnerable social sectors, allowing governments to get rid of the obligation to ensure access to food of their populations [58]? This point takes part of the wider field of the government–nonprofit relationships in the Welfare State [59] and, speaking specifically about food banks, requires expanding the point of view up to both the social protection system and the rest of the supply food system [60]. Strategies systematically linking poverty and food insecurity are needed, instead of solving individual and urgent difficulties [61,62] that are nothing but "symptoms" of those structural problems [63]. There is little doubt that Spanish food banks would be making just such kinds of mistakes if their Catholic origin and present links to major retailing companies are taken into account. They are located at opposite ends of radical points of view—i.e., searching for the roots—that suggest taking food sovereignty beyond just food security [64,65].

However, the aim of the present work, and the empirical evidence collected here, has been limited to studying food banks technically from an organizational management approach in order to improve their short- and medium-term performance, understanding them, despite their historic longevity, not as a permanent resource but an emergency reality required to disappear or to change radically in goals and methods. At the moment, it is clear that too many people rely on them in order to eat every day.

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#### References

- Food and Agriculture Organization of the United Nations. *The State of Food Insecurity in the World* 2015; Food and Agriculture Organization of the United Nations: Rome, Italy, 2015.
- 2. Food and Agriculture Organization of the United Nations. *Food Loss Reduction Strategy;* Food and Agriculture Organization of the United Nations: Rome, Italy, 2011.

- 3. Adenso-Díaz, B.; Mena, C. Food industry waste management. In *Sustainable Food Processing*; Norton, R., Tiwari, B., Holden, N., Eds.; John Wiley & Sons Ltd.: Chichester, UK, 2013.
- 4. Kantor, L.S.; Lipton, K.; Manchester, A.; Oliveira, V. Estimating and addressing America's food losses. *Food Rev.* **1997**, *20*, 2–12.
- Cotugna, N.; Vickeyr, C.E.; Glick, M. An outcome evaluation of a food bank program. J. Am. Diet. Assoc. 1994, 94, 888–890. [CrossRef]
- 6. González Torre, P.L.; Lozano, S.; Adenso-Díaz, B. Efficiency Analysis of European Food Banks: Some Managerial Results. *Int. J. Volunt. Nonprofit Organ.* 2017, *28*, 822–838.
- 7. Berner, M.; O'Brien, K. The shifting pattern of food security support: Food stamp and food bank usage in North California. *Nonprofit Volunt. Sect. Q.* **2004**, *33*, 655–672. [CrossRef]
- 8. FEBA (Fédération Européenne des Banques Alimentaires–European Federation of Food Banks). Available online: www.eurofoodbank.org (accessed on 1 March 2017).
- 9. FESBAL (Federación Española de Bancos de Alimentos–Spanish Federation of Food Banks). Available online: www.fesbal.org (accessed on 8 October 2016).
- 10. Pérez de Armiño, k. Erosion of Rights, Uncritical Solidarity and Food Banks in Spain. In *First World Hunger Revisited: Food Charity or the Right to Food?* Riches, G., Silvasti, T., Eds.; Palgrave Macmillan: New York, NY, USA, 2012; pp. 31–145.
- 11. Vidal, P. *La Crisis y el Tercer Sector: Una Oportunidad Para la Transformación Social;* Una visión a partir del Consejo Asesor de Investigación del OTS; Observatorio del Tercer Sector: Barcelona, Spain, 2008; Volume 9.
- 12. Handforth, B.; Henkick, M.; Schwartz, M.B. A qualitative study of nutrition-based initiatives at selected food banks in the Feeding America Network. *J. Acad. Nutr. Diet.* **2013**, *113*, 411–415. [CrossRef] [PubMed]
- 13. Chaves, R.; Demoustier, D.; Monzón, J.L.; Pezzini, E.; Spear, R.; Thiry, B. *Les Entreprises et Organisations du Troisième Système: Un Enjeu Stratégique Pour L'emploi*; CIRIEC-International: Bruxelles, Belgium, 2000.
- Salamon, L.M. Putting the civil society sector on the economic map of the world. *Ann. Public Coop. Econ.* 2010, *81*, 167–210. [CrossRef]
- 15. Balabanis, G.; Stables, R.E.; Phillips, H.C. Market orientation in the top 200 British charity organizations and its impact on their performance. *Eur. J. Mark.* **1997**, *31*, 583–603. [CrossRef]
- 16. Naskrent, J.; Siebelt, P. The influence of commitment, trust, satisfaction and involvement on donor retention. *Volunt. Int. J. Volunt. Nonprofit Organ.* **2011**, *22*, 757–778. [CrossRef]
- 17. Andreoni, J.; Payne, A.A. Is crowding out due entirely to fundraising? Evidence from a panel of charities. *J. Public Econ.* **2011**, *95*, 334–343. [CrossRef]
- 18. Chaves, R.; Monzón, J.L. Beyond the crisis: The social economy, prop of a new model of sustainable economic development. *Serv. Bus.* **2012**, *6*, 5–26. [CrossRef]
- 19. Develtere, P. Cooperative movements in the developing countries: Old and new orientations. *Ann. Public Coop. Econ.* **1993**, *64*, 179–207. [CrossRef]
- 20. Anheier, H.K. Para una revisión de las teorías económicas del sector no lucrative. *CIRIEC-España* **1995**, *21*, 23–33.
- 21. García-Mainar, I.; Marcuello, C. Members, volunteers, and donors in nonprofit organizations in Spain. *Nonprofit Volunt. Sect. Q.* **2007**, *36*, 100–120. [CrossRef]
- 22. Alter, C.; Hage, J. Organizations Working Together; SAGE Publications: Newbury Park, CA, USA, 1993.
- 23. Brown, E.; Ferris, J.M. Social capital and philanthropy: An analysis of the impact of social capital on individual giving and volunteering. *Nonprofit Volunt. Sect. Q.* **2007**, *36*, 85–99. [CrossRef]
- 24. Cordery, C.J.; Baskerville, R.F. Charity transgressions, trust and accountability. *Volunt. Int. J. Volunt. Nonprofit Organ.* 2011, 22, 197–213. [CrossRef]
- 25. Yanay, G.V.; Yanay, N. The decline of motivation? From commitment to dropping out of volunteering. *Nonprofit Manag. Leadersh.* **2008**, *19*, 65–78. [CrossRef]
- 26. Álvarez, L.I.; Santos, M.L.; Vázquez, R. The market orientation concept in the private nonprofit organisation domain. *J. Nonprofit Volunt. Sect. Mark.* **2002**, *7*, 55–67.
- 27. Foster, M.K.; Meinhard, A.G.; Berger, I.E.; Krpan, P. Corporate philanthropy in the Canadian context: From damage control to improving society. *Nonprofit Volunt. Sect. Q.* **2009**, *38*, 441–466. [CrossRef]
- 28. Varda, D.M. A network perspective on state-society synergy to increase community-level social capital. *Nonprofit Volunt. Sect. Q.* 2010, 40, 896–923. [CrossRef]

- 29. Daponte, B.O.; Bade, S. How the private food assistance network evolved: Interactions between public and private responses to hunger. *Nonprofit Volunt. Sect. Q.* **2006**, *35*, 668–690. [CrossRef]
- 30. Jiménez Escobar, J.; Morales Gutiérrez, A.C. Social economy and the fourth sector, base and protagonista of social innovation. *CIRIEC-España* **2011**, *73*, 33–60.
- 31. Evans, S.H.; Clarke, P. Training volunteers to run information technologies a case study of effectiveness at community food pantries. *Nonprofit Volunt. Sect. Q.* **2010**, *39*, 524–535. [CrossRef]
- 32. Iverson, J.; Burkart, P. Managing electronic documents and work flows enterprise content management at work in nonprofit organizations. *Nonprofit Manag. Leadersh.* **2007**, *17*, 403–419. [CrossRef]
- 33. Andreoni, J. Giving gifts to groups: How altruism depends on the number of recipients. *J. Public Econ.* 2007, *91*, 1731–1749. [CrossRef]
- 34. Fairfield, K.D.; Wing, K.T. Collaboration in foundation grantor-grantee relationships. *Nonprofit Manag. Leadersh.* **2008**, *19*, 27–44. [CrossRef]
- 35. Morrow-Howell, N. Volunteering in later life: Research frontiers. J. Gerontol. Soc. Sci. 2010, 65, 461–469. [CrossRef] [PubMed]
- Aguinis, H.; Werner, S.; Abbott, J.; Angert, C.; Park, J.; Kohlhausen, D. Customer-centric science: Reporting significant results with rigor, relevance, and practical impact in mind. *Organ. Res. Methods* 2010, *13*, 515–539. [CrossRef]
- 37. Yin, R.K. Case Study Research: Design and Methods; SAGE Publications: Newbury Park, CA, USA, 2009.
- 38. Gibbert, M.; Ruigrok, W.; Wicki, B. What passes as a rigorous case study? *Strateg. Manag. J.* **2008**, *29*, 1465–1474. [CrossRef]
- 39. Strauss, A.; Corbin, J. *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory;* SAGE Publications: Newbury Park, CA, USA, 1998.
- 40. Banco de Alimentos de Asturias. Available online: www.bancaliasturias.org (accessed on 25 October 2016).
- 41. Cloke, P.; May, J.; Williams, A. The geographies of food banks in the meantime. *Prog. Hum. Geogr.* **2016**. [CrossRef]
- 42. Williams, A.; Cloke, P.; May, J.; Goodwin, M. Contested space: The contradictory political dynamics of food banking in the UK. *Environ. Plan. A* **2016**, *48*, 2291–2316. [CrossRef]
- 43. Cooper, N.; Dumpleton, S. *Walking the Breadline: The Scandal of Food Poverty in 21st Century Britain*; Church Action on Poverty and Oxfam GB: Manchester/Oxford, UK, 2013.
- 44. Instituto Nacional de Estadística. *Encuesta de Condiciones de Vida;* Instituto Nacional de Estadística: Madrid, Spain, 2012.
- 45. Franco Rebollar, P.; Guilló Girard, C. Situación y tendencias actuales del voluntariado de acción social de España. *Doc. Soc.* **2011**, *160*, 15–41.
- 46. Rey García, M.; Álvarez González, L.I. Foundations and social economy: Conceptual approaches and socio-economic relevance. *CIRIEC-España* **2011**, *73*, 61–80.
- 47. Liston-Heyes, C.; Liu, G. Cause-related marketing in the retail and finance sectors: An exploratory study of the determinants of cause selection and nonprofit alliances. *Nonprofit Volunt. Sect. Q.* **2010**, *39*, 77–101. [CrossRef]
- 48. Winterich, K.P.; Barone, M. Warm glow or cold, hard cash? Social identity effects on consumer choice for donation versus discount promotions. *J. Mark. Res.* **2011**, *48*, 855–868. [CrossRef]
- 49. Suda, Y.; Guo, B. Dynamics between nonprofit and for-profit providers operating under the long-term care insurance system in Japan. *Nonprofit Volunt. Sect. Q.* **2009**, *40*, 79–106. [CrossRef]
- 50. Suárez, D.F.; Hwang, H. Resource Constraints or Cultural Conformity? Nonprofit Relationships with Businesses. *Volunt. Int. J. Volunt. Nonprofit Organ.* **2013**, *24*, 581–605. [CrossRef]
- 51. Fondation Carrefour. Available online: http://www.fondation-carrefour.org/content/spanish-federation-food-banks (accessed on 28 February 2017).
- 52. Coque, J.; González-Torre, P.; Fernández, J. CSR by means relationships among cooperatives, capitalist firms and non-profit organizations: Experiences recovering food. In Proceedings of the International Co-Operative Alliance International Research Conference (New Strategies for Co-operatives: Understanding and Managing Co-Operative CReation, Transition and Transformation), Almería, Spain, 24–27 May 2016.
- 53. Plataforma de ONG de Acción Social. *El Tercer Sector de Acción Social en 2015: Impacto de la Crisis;* Plataforma de ONG de Acción Social: Madrid, Spain, 2015.

- 54. Agostinho, D.; Do Finisterra, P.; Arminda, M. Does the kind of bond matter? The case of food bank volunteer. *Int. Rev. Public Nonprofit Mark.* **2012**, *9*, 105–118.
- 55. Tarasuk, V.; Eakin, J.M. Food assistance through "surplus" food: Insights from an ethnographic study of food bank work. *Agric. Hum. Values* **2005**, *22*, 177–186. [CrossRef]
- 56. Falasconi, L.; Vitturari, M.; Politano, A.; Segré, A. Food waste in school catering: An Italian case study. *Sustainability* **2015**, *7*, 14745–14760. [CrossRef]
- 57. Mena, C.; Adenso-Díaz, B.; Yurt, O. The causes of food waste in the supplier–retailer interface: Evidences from the UK and Spain. *Resour. Conserv. Recycl.* **2011**, *55*, 648–658. [CrossRef]
- 58. Riches, G.; Silvasti, T. (Eds.) *First World Hunger Revisited. Food Charity or the Right to Food?* Palgrave Macmillan: New York, NY, USA, 2014.
- Salamon, L.M. Introduction: The Nonprofitization of the Welfare State. *Volunt. Int. J. Volunt. Nonprofit Organ.* 2015, 26, 2147–2154. [CrossRef]
- 60. Escajedo, L.; De Renobales, M. (Eds.) *Envisioning a Future without Food Waste and Food Poverty: Societal Changes;* Wageningen Academic: Wageningen, The Netherlands, 2015.
- 61. Dowler, E.A.; O'Connor, D. Rights-based approaches to addressing food poverty and food insecurity in Ireland and UK. *Soc. Sci. Med.* **2011**, *74*, 44–51. [CrossRef] [PubMed]
- 62. Riches, G. Advancing the human right to food in Canada: Social policy and the politics of hunger, welfare, and food security. *Agric. Hum. Values* **1999**, *16*, 203–211. [CrossRef]
- 63. Lambie-Mumford, H. 'Every Town Should Have One': Emergency Food Banking in the UK. *J. Soc. Policy* **2013**, *42*, 73–89. [CrossRef]
- 64. Alkon, A.H.; Mares, T.M. Food sovereignty in US food movements: Radical visions and neoliberal constraints. *Agric. Hum. Values* **2012**, *29*, 347–359. [CrossRef]
- 65. Holt-Giménez, E.; Shattuck, A. Food crises, food regimes and food movements: Rumblings of reform or tides of transformation? *J. Peasant Stud.* **2011**, *38*, 109–144. [CrossRef] [PubMed]



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