HOUSEHOLD IMPACT OF THE COVID-19 PANDEMIC FROM A DEVELOPMENT ECONOMICS PERSPECTIVE – A REVIEW

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Abstract

In terms of the socio-economic crisis, the ravages of a pandemic shock indicate that people from developing countries are likely to be more vulnerable. The same direction of impact could be expected in the case of the COVID-19 pandemic; however, both scale and speed of this pandemic differ from others in the past. Therefore, we can expect causes to be different from those of past crises. Although emerging studies are available, the existing literature offers no systematic analysis of household vulnerability in the prism of development economics. Especially the interlinkages of causes and the relative importance of effects and coping strategies are not yet summarized. Therefore, this study aims to provide a systemic assessment of household effects of COVID-19 and tries to identify casual effects of the consequences, to which it adds policy recommendations. The systematic analysis undertaken in this study is based on a cluster analysis of 150 articles and reports provided in international literature. This study shows that two distinct impacts of the COVID-19 pandemic concern food security and market imbalance, together with socio-economic consequences, which a large number of studies identify as the core of a pandemic. Similarly, risk mitigation strategies such as strengthening farm support, food system resilience, and social protection need to be particularly promoted under COVID-19 conditions. The study also identifies research gaps especially in particularities of health outcomes in different food systems and on different economic development levels.

Keywords: Food security, resilience, pandemic, income, poverty, inequality
JEL classification: Q10, Q11, Q13, Q18

Graphical Abstract:

1. Introduction

Since COVID-19 (CO-corona; VI-virus; and D-disease) was defined as a pandemic, the disease and the resulting restrictions in private and economic realms have led to enormous social and economic changes (Chakraborty and Maity 2020). Due to the epidemiological features of COVID-19, the virus has been spreading ubiquitously. Until effective medication and/or vaccination is developed, the situation is likely to continue in a similar vein for the coming years (Lin et al. 2020). The rapid worldwide spread of COVID-19 therefore required a lockdown policy to delay contagion. Lockdown measures, in the absence of effective medical treatment or vaccination, require a response to protect people in developing countries from increasing penury (Aluga 2020; Djalante et al. 2020). This results in an urgent need to strengthen and diversify such strategies to mitigate the emergence of negative economic and social effects as well as to manage the damage that has been already been experienced (Reis et al. 2020).

To explore the economic effects of COVID-19 quantitatively, a review of historical cases may be of interest. One relevant case, the Spanish flu pandemic in the early 20th century, was

estimated to have cost USD 49.6 trillion (Burns, Van der Mensbrugghe, and Timmer 2012). Another study, focusing on various scenarios for influenza pandemics, confirms that even pandemics considered as mild have had a severe impact on the global economy, and were especially strongly pronounced in developing countries (McKibbin and Sidorenko 2006). The economic impact during the shock of Severe Acute Respiratory Syndrome (SARS) in 2002-2003 was found to have most negatively influenced the demand side of consumption (Siu and Wong 2004; Chou, Kuo, and Peng 2004), and led to behavioral changes of consumers (Lee and McKibbin 2004). Forecasts for the COVID-19 pandemic indicate an approximate 5.2 percent decline in global GDP, paralyzing economic activities in many parts of the world (WB 2020). However, looking at both the global outlook and historical evidence, the consequences of any pandemic are unpredictable (Kilbourne 2004), and the actual impact may differ from predictions.

Multiple recent studies have already tried to study and predict the impact of current lockdown measures on food systems in particular (Savary et al. 2020). This paper aims to provide an overview of existing analyses of the economic and social consequences of COVID-19 across multiple academic disciplines. Due to their strong economic importance in low-income countries, a special focus is given to agricultural and food systems, which are particularly hit by negative consequences. By drawing a comprehensive picture of the current knowledge base, I try to establish a new understanding of the multidisciplinary response to this pandemic. In order to contribute to the policy reforms around COVID-19, this paper will put the current research findings in perspective and provide a discussion on potential mitigation strategies for developing countries.

2. Materials and Methodology

To fully capture the bandwidth of researchers' understanding and interpretation, which plays a significant role in explicating related ideas (Denzin and Lincoln 2008), I conducted a qualitative data analysis supported by the NVivo software tool. This software is recommended for the analysis of large and diverse data sources (Basak 2015). Qualitative studies on nutritional research recognize the reliability of this software (Auld et al. 2007), particularly for high data complexity (Göransson et al. 2007).

Overall, there are 6 steps that I covered in conducting analysis, namely collecting the literature material itself, creating nodes and codes, identifying themes, exploring themes and concepts, developing a system to illustrate nodes, and reporting the findings (Altmann, 2013). In order to conceptualize, each passage in an article was analyzed by highlighting the most relevant parts with the help of the coding option in the software. In this sense, codes are helpful to identify themes in a context (Bernard, Wutich, and Ryan 2016) with the highlighted context being stored in corresponding nodes (Bazeley and Jackson 2013). Thus, I coded similar ideas into corresponding nodes under certain names (Sotiriadou, Brouwers, and Le 2014) only after identifying main ideas from selected journal articles and reports (Jackson and Bazeley 2019). In practice, a qualitative method for policy analysis through conducting systematic content analysis was applied by coding and creating representative nodes (Hall and Steiner 2020; Arslan and Alqatan 2020). In this context, this method allows us to efficiently analyze qualitative data for conceptualization and interpretation (Tseng et al. 2019).

In order to understand the pattern of relationships between pandemic outcomes, I used cluster analysis based on grouping sources and nodes. A salient pattern of relationship was obtained by using the Pearson correlation index (Bazeley and Jackson 2013). Clustering, in research techniques, is the classification of multivariate data derived from grouping objects into classes (Macia 2015), which gives an indication of relationships (Zapata-Sepúlveda, López-Sánchez, and Sánchez-Gómez 2012). More precisely, observed objects or nodes conglomerate, implying that they are co-incidents in their meanings with certain similarities (Segev 2010). In practice, there is some evidence that a systematic literature review through the use of clustering techniques with manually created nodes is useful for building comprehensive models (Amrutha and Geetha 2020; Mayer 2019; Rossolatos 2019). I applied the complete linkage (farthest neighbor) hierarchical clustering algorithm with NVivo and showed the results in a dendrogram (QSR 2020). Pursuant to coding structure in this study, there are a total of more than 30 nodes representing COVID-19 consequences and coping strategies. The nodes are organized hierarchically in their visual illustration (Figure 3), which

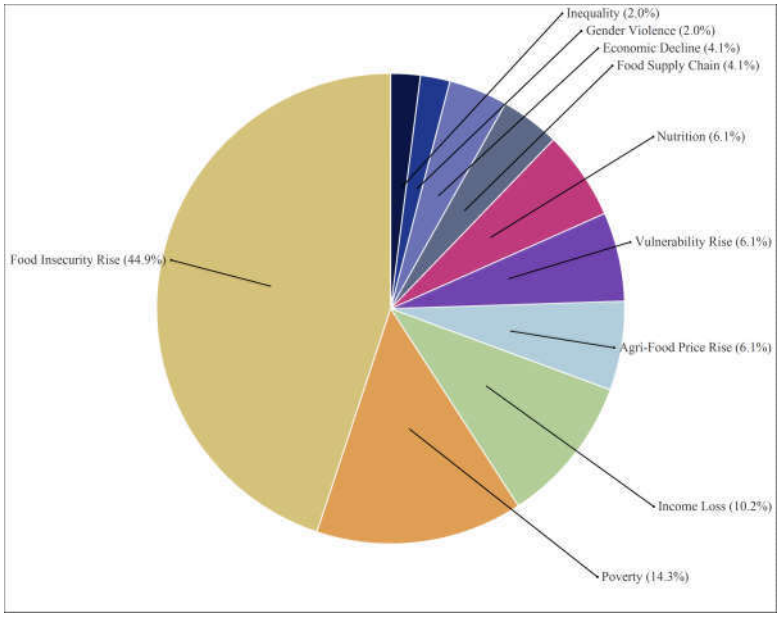
is based on depicted nested rectangles of varying sizes. In this case, the size of the rectangle indicates the amount of coding in the nodes (Bazeley and Jackson 2013). Visualizing emerging patterns of nodes is done with the help of project maps (Bazeley and Jackson 2013; QSR 2020). This visualization is helpful to understand developed nodes and their linkages with the articles included in this study.

In detail, findings draw on a database of 150 articles and reports mainly from Springer, Elsevier, Wiley, International Food Policy Research Institute (IFPRI), Food and Agriculture Organization of the United Nations (FAO), and International Labour Organization of the United Nations (ILO) sources. A selection of articles is a collection from between the emergence of COVID-19, more precisely when the Coronavirus was confirmed as a pandemic by the World Health Organization on March 11, 2020 (Cucinotta and Vanelli 2020), and August 10, 2020. For further analysis, 10 main attributes are created to show the proportion of the main messages from the majority of articles included in the study (Figure 1).

3. Analysis and Discussion

By classifying articles and reports based on a general message with corresponding attributes (QSR 2020), this study identified food insecurity, poverty, income loss, and others as main impact areas of COVID-19 (Figure 1).

Figure 1: COVID-19 Consequence Attributes



Source: Author's own estimates

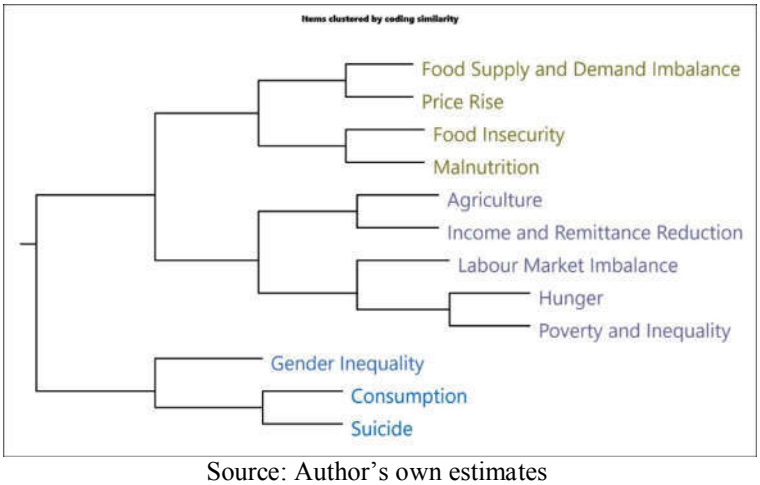
Accordingly, more than two fifths of papers in the database indicate that the rise of food insecurity is a large problem in developing countries. This high rate of food security discussions is of course due to the expected twofold increase of 265 million people suffering from acute food insecurity in low-income and middle-income countries (The Lancet Planetary 2020). Meanwhile, COVID-19 poses another challenge to people, which is related to a rising level of poverty. At the moment, we are in a stage of a vicious circle linking the pandemic with rising poverty (Anser et al. 2020) by affecting household resilience (Gillespie 2020). In developing countries, poverty is shown as a large issue that about 14.3 percent of papers from the dataset focus on. In addition to this, a rising market imbalance in the agricultural sector is directly decreasing both production and income sources; therefore, income loss is another one of the most frequently studied issues, with more than one in ten articles in the database citing it. Looking at the economic consequences of the lockdown, this pandemic has driven people to the brink of an income crisis (Buonsenso et al. 2020). Meanwhile, there is growing evidence to suggest that nutritional imbalance, vulnerability, and price rise in agricultural production are becoming other challenges caused by the pandemic. Each of these consequences represents more than 6 percent in this study. Not only has the lockdown policy paralyzed the food system, but this system collapse has also become more gender-sensitive in

many developing countries, putting women in danger (Ragasa and Lambrecht 2020). Correspondingly, the challenges related to economic decline or the food supply chain (representing 4.1 percent each) and rising inequality and gender violence (2 percent each) are also typified as negative consequences by many researchers. In the following sections, the identified consequences are grouped into different nodes, and their clusters lead to an in-depth review of the cascading effects of the socio-economic consequences of COVID-19.

3.1. Food security and market imbalance

By exploring the ramifications of the COVID-19 pandemic, it is becoming more apparent that the ongoing crisis wreaks havoc on structural changes of production and supply chains (Richards and Rickard 2020), leading to growing concerns about food insecurity (Pérez-Escamilla, Cunningham, and Moran 2020). As Figure 2 highlights, food supply and demand imbalance, together with a rise in prices, joining in the first branching diagram, send a strong message about the relationship with food market deterioration. This cluster analysis is based on 48 articles and reports with an emphasis on food system resilience, food security, and malnutrition (Figure 4). In the second clade, one can observe another close connection between food insecurity and malnutrition on one side and food market dysfunction on the other, implying related problems with supply. Generally, these compounding relationships, which are based on 51 article and report sources (Figure 5), infer a market imbalance emphasizing hunger, poverty, or inequality.

Figure 2: Cluster Analysis of Nodes (Pearson's Correlation)



Source: Author's own estimates

From the perspective of the demand side, many countries are struggling with the consequences of the COVID-19 pandemic, because agriculture and food supply chains come under pressure to react to the widespread adoption of physical distancing by the consumers (Gray 2020). Further problems arise from the fact that rising food insecurity is traced to agro-food system failure at the time of the pandemic regime (Gaupp 2020; Mukiibi 2020; Galanakis 2020), indicating an overall vulnerability of food system resilience (Ahmed et al. 2020; Farrell et al. 2020; Chen and Mao 2020). Although there is an uneven influence of the pandemic on supply chains (Reardon, Bellemare, and Zilberman 2020), food supply and demand imbalance impair food system resilience (Béné 2020). Delayed farm operations, labor shortages, and declining farm productivity are considered the main pathways affecting the food production system (Amjath-Babu et al. 2020). This situation has been further exacerbated by the disruption of transportation, through which farmers are suffering from labor shortages (Heck et al. 2020).

The problem discussed above is likely to be more pronounced in global food markets with rising food prices (Heigermoser and Glauben 2020), where it is exacerbating hunger and income imbalances (Laborde, Mamun, and Parent 2020; Gaupp 2020). From this point, a detrimental impact of food supply and demand imbalance on food security problems can be observed in price volatility (Hernandez et al. 2020). Consequently, the outbreak model as a valid instrument in developing countries accounts for very challenging consequences in food security. Meanwhile, the expansion of the COVID-19 crisis sets off some chain reactions

reflected in the nutritional status (Harris et al. 2020; Bhavani and Gopinath 2020). Malnutrition is likely imminent as a result of COVID-19 in countries in which there are limited capacities to deal with ongoing difficulties (Kabir et al. 2020; Zimmerer and de Haan 2020). The case of impairment is also strongly reflected not only in the health status but also in a high prevalence of malnutrition in areas with high poverty (Díaz de León-Martínez et al. 2020). Therefore, many developing countries might be on the brink of cataclysmic malnutrition in the future.

Looking at different channels of the potential economic impact of COVID-19, there are some common problems between short-run and long-run effects. Generally, long-run effects are explained by loss of human capital and infrastructure deterioration, while short-run effects are reflected in wage and income decline and a rise in poverty (Evans and Over 2020). Looking at the second branch of the dendrogram in Figure 2, one can observe a relationship between agriculture and income reduction. However, labor market imbalance does not coincide with this, it has instead its own relationship with another cluster connecting the subject of hunger with poverty and inequality. To sum up, these compound correlations, which are collected from 51 sources (Figure 5), convey a message about supply-side effects. In Figure 5, we can detect a vicious circle which links both the physical and economic access to food. This implies that the ravages of labor market imbalance are reflected in income reduction, leading to more hunger, poverty, and inequality (Savary et al. 2020; Heck et al. 2020). As COVID-19 has been devastatingly affecting economies, many developing countries are grappling with income reduction on both the demand and supply side. If we continue looking at supply-side shocks, there is a high risk explained by labor shortages hampering labor-intensive farms or companies (Hobbs 2020). In turn, the pandemic has been progressively affecting the global workforce (Barrett 2020; Bonet-Morón et al. 2020), aggravating both economic and physical access to food security (Jribi et al. 2020). Under these distortions in production and the supply chain of agriculture, farmers may suffer from difficulties stemming from price changes in production. For the relationship between income-remittance reduction in connection with agriculture and labor market imbalance in Figure 2, we can draw the conclusion that a market imbalance on the supply side in agricultural sectors has a direct impact on earnings. Findings from Myanmar, for example, confirm that people are experiencing an income shock during the pandemic, and that it has eventually affected agricultural input purchases negatively (Goeb, Boughton, and Maredia 2020). At the same time, market imbalance is strongly associated with migrant workers (Diao et al. 2020), which makes the situation more severe by weakening the resilience of migrated people (Abella 2020; Papademetriou and Hooper 2020). Developing countries have witnessed the proliferation of migration, thereby affecting the labor balance (Mukhra, Krishan, and Kanchan 2020). As a general factor from the supply-side, an ongoing shock has a negative impact on employment, thereby decreasing household income (Arndt et al. 2020), which is likely to exacerbate food insecurity (The Lancet Global 2020; Devereux, Béné, and Hoddinott 2020) and hunger (Vaughan 2020). If farmers are confronted with large increases in agricultural input and production prices, their abilities to produce food become limited. Consequently, it may raise a strong backlash as a reaction to the current model of COVID-19 response.

3.2. Socio-economic consequences

Rural areas in developing countries, characterized by higher exposures to COVID-19 due to limited access to health facilities and adequate sanitation, may experience a relatively higher extent of socio-economic difficulties. Therefore, vulnerable people from developing countries are likely to be less resilient to not only COVID-19, but also its projected socio-economic difficulties, which in turn increases inequality or poverty (Figure 2). In addition to inequality and poverty, the main message behind the consequences of COVID-19 in the lower branch of dendrogram is related to socio-economic problems such as inequality, suicide, or changes in consumption patterns (Figure 2). These findings are based on 19 articles and reports mainly related to the social consequences of COVID-19 (Figure 6). Showing a close relationship with socio-economic consequences, it is suggested that COVID-19 is characterized by an increasing suicide rate connected to consumption. Findings indicate that there are confirmed suicide cases from developing countries because of economic difficulties

but not due to COVID-19 itself (Mamun and Ullah 2020; Thakur and Jain 2020; Goyal et al. 2020). Findings showing the relationship between shocks and the level of consumption are nontrivial because some shocks such as climate change or health have long lasting effects on consumption (Dercon, Hoddinott, and Woldehanna 2005; Browning and Crossley 2009; Yilma et al. 2014). The situation in developing countries, where there is a low income and treatment costs are high, might be relatively more severe. For example, estimations indicate that COVID-19 interrupts the level of household consumption in Egypt, showing a household income decrease between 9.0 and 10.6 percent (Breisinger et al. 2020). The imminence of household vulnerability and poverty becomes very high as a consequence of health shocks (Gloede, Menkhoff, and Waibel 2015; Agénor 2004; Dabla-Norris and Bal Gündüz 2014), exacerbating the situation especially in countries without formal health insurance mechanisms (Atake 2018; Gertler and Gruber 2002). Therefore, one can expect household members who are uninsured to be more vulnerable to socio-economic problems, creating extra challenges in designing COVID-19 mitigation strategies.

Although gender inequality is not correlated strongly by a close relationship with other nodes, the situation is more critical in developing countries, indicating a gender-differentiated impact on different dimensions of food security (FAO 2020c; Ragasa and Lambrecht 2020). The eventual consequence might be more detrimental for women, as they are expected to face multiple conflicting roles such as managing their own careers and increased domestic responsibilities (Kantamneni 2020). This has already weakened women's roles in their economic positioning (Kristal and Yaish 2020). Consequently, we can observe a long-lasting impact on discrimination reflected in employment and income inequality of women (Kristal and Yaish 2020; Leung et al. 2020). Rural women, who are considered a key factor in food production and trading in developing countries, are faced with more inequality, disrupting their engagement in the agri-food value chains (FAO 2020c). There is also cause for concern in the fact that gender-based violence is likely to increase during the COVID-19 pandemic (Bellizzi et al. 2020; Gulati and Kelly 2020).

3.3. Future coping strategies

Multi-sector pandemic response is found to be a holistic policy which stems from moving towards an integrated state approach (Fanzo et al. 2020) with a strong focus on the farm-system-for-nutrition approach (Bhavani and Gopinath 2020). We should be aware of the fact that policy approaches for COVID-19 should be fully grounded in strong equality (Hargreaves et al. 2020), as history has already confirmed socio-economic equality to be one of the most important criteria to implement prevention measures successfully (Ribeiro et al. 2018; Hunter 2007). Meanwhile, coping strategies should be based on strengthening resilience specifically of the most vulnerable people (Djalante et al. 2020; Ishiwatari et al. 2020), for which an inclusive approach is the most important (Shammi et al. 2020; Mehtar et al. 2020). To some extent, the evidence from different countries is diverse; however, the main focus should be on the protection of marginalized and vulnerable people. Otherwise, the response might lead to controversy in low and middle-income countries (Kelley et al. 2020; Buheji et al. 2020). Taking this into account, the following coping strategies are suggested for the future, clearly giving alternative solutions to deal with the pandemic and its resulting negative consequences.

3.3.1. Farm support and food system resilience

Overall, the mitigating strategies for both farmer and food system resilience are derived from 25 journal articles and reports (Figure 7). Concurrent household vulnerabilities should be dealt with by programs for strengthening farmers. As the shock becomes relatively more ubiquitous and shows a high risk for farmers, agricultural credits for risk management practices can help farmers to react to market changes (Akhtar et al. 2019). Generally, stimulus packages with agricultural credits cushion negative consequences on production and income.

One of the main policy strategies is to sustain domestic production and farmer's incomes, which should be applied in countries during the COVID-19 crises in order to underpin the agri-food chain and food security (FAO 2020a). Under these circumstances, agricultural credit, being one of several alternative mitigation strategies for farmers initiated by the government, is crucially important in pandemic and post-pandemic times. As the projected

situation of small farmers is explained by the reduction of production in post-COVID-19 times, their ability to invest into farm production is hampered. In this case, giving microcredits to households who suffer from the augmentation of shocks plays a particular role in the mitigation of the adverse effects on production and income (Harris et al. 2020).

In addition to this, a cash transfer to farmers is another means of market-let support which could counteract the decrease in purchasing power of farmers in the food chain (Sperling 2020). As a practical example, Myanmar's policy of providing cash transfers, improving the availability of agricultural inputs and increasing the flexibility of agricultural loans, can be applied to other country contexts (Boughton et al. 2020). In addition, policy actions implemented by insurance services for farm entities in China, price support through procurement in Egypt, Sri Lanka, and Mali, soft loans to farmers in Kazakhstan or Kyrgyzstan, and different relief packages in Pakistan are other examples of strategies increasing the resilience of farmers during a pandemic (IFPRI 2020).

Although this requires changing the form of trading to some extent, with related security measures in place, keeping a stable food supply chain thus becomes more realistic. One of the most judicious approaches in dealing with the current pandemic is to maintain a resilient food system, which translates into possibilities of preparedness for a shock or possibilities to make the shock less severe (Kahiluoto 2020). Looking at the Central Asian context, except from Turkmenistan, a total of 218 COVID-19 response policies have been implemented, in which increasing food resilience is actively included to deal with increasingly difficult situations in food security (IFPRI 2020).

Another important issue for maintaining production levels is paying attention to the importance of horizontal and vertical relationship between farmers and other participants in the food system (Martins, Trienekens, and Omta 2019). In this regard, maintaining farmer roles in the food supply chain is one of the most frequently mentioned policies against chain disruptions. In addition to investing into food security overall (Heigermoser and Glauben 2020), a strong commitment to support farmers makes the food system more resilient (Rashid, Theobald, and Ozano 2020; Petetin 2020). In this context, one alternative way to support the supply chain is boosting the participation of farmers in channels similar to indoor farmer markets (Preiss 2020; Wegerif 2020). The state should support the operation of the food supply chain with critical infrastructure, by ensuring farmers' participation. Taking into account that farm productivity in the food market may stall due to the pandemic, the enhancement of e-commerce for farmers in the food chain is another form of support (FAO 2020b; Amjath-Babu et al. 2020). In pursuance of farm support, an increasingly common form of help is the creation of farm-to-market linkages during and after the pandemic (Kumar, Padhee, and Kumar 2020). The launch of Kisan Rath mobile apps in India during the pandemic or that of a digital platform for tea auctions in Sri Lanka are both examples of direct farm policies implemented against COVID-19 disruptions. All these logistic innovations, as part of the promotion of rurally focused e-commerce (Waibel et al. 2020) in the food system, avert a chain collapse by strengthening food system resilience (Zimmerer and de Haan 2020).

At the same time, the mobilization of resource movements also becomes difficult. As farm production has been influenced by bottlenecks in inputs, the distributions in both input and output movements should be relaxed to such an extent that disabled channels for food production are recovered. Maintaining the food value chain is achieved by minimizing logistics disruptions (FAO 2020b), thereby influencing the basic channels of food transmission (Schmidhuber, Pound, and Qiao 2020). In this case, the role of emergency systems is crucially important, because coordination at different levels of food production and distribution synergies between actors ensure the resilience of the food chain. As for the improvement of food channels, evidence from China has shown that the national emergency food supply system (NEFSS) led to effective responses in warehousing, transporting, and distributing by emergency centers or enterprises (Pu and Zhong 2020).

3.3.2. Social protection

The subject of social protection, together with food security and nutritional program nodes, is highlighted by 42 sources in the dataset, accentuating its importance in dealing with the consequences of the pandemic (Figure 8). Generally, there are three frequent social protection measures used merely as mitigation strategies, namely social assistance scheme; social

insurance measures; and labor market measures (FAO 2020d; Gentilini, Almenfi, Orton, et al. 2020). As of 10th July, 2020, USD 589 billion in the world had already been spent on such social protection measures, with 75 countries spending on social assistance, 21 counties spending on social insurance, and 17 countries spending on labor market measures (Gentilini, Almenfi, Dale, Lopez, and Zafar 2020).

Social assistance transfers have become one of the most used strategies during the COVID-19 pandemic, accounting for 60% of the global response in social protection measures (Gentilini, Almenfi, and Dale 2020). A cash transfer-based social protection response is the most used type of social assistance scheme implemented in more than 130 countries (Gentilini, Almenfi, Dale, Lopez, Canas, et al. 2020). Social protection policies linked with pro-poor cash transfers are important to prevent the worst effects of a pandemic (Okoi and Bwawa 2020). Cash transfer programs targeted at the most vulnerable ultimately help them cope with extra difficulties experienced in their livelihoods. For example, the Government of Malawi's Social Cash Transfer Programme (SCTP) provides about MK 7,000 monthly (UNICEF 2020a), the Kartu Sembako Programme in Indonesia gives monthly cash assistance of about Rp 200,000, and the Targetted Social Assitance (TSA) in Georgia supplies the amount of TSA 21,000 for 6 months (UNICEF 2020b), in programs targeted at vulnerable families affected by the COVID-19 pandemic. Within the context of social assistance, there are special targeted programs aimed at finding alternative provisions for vulnerable children who are missing daily school meals. However, the situation has already shown that the state is required to pledge relief packages for providing nutritious food for children (Alvi and Gupta 2020). On the whole, 71 countries have already implemented alternative provisions for school meals, 49 countries are offering take-home rations, and 11 countries are issuing social security cash transfers to families with school children (WFP 2020a). Implementing adequate social protection measures through cash transfer programs or special targeted food programs plays a significant role in the protection of vulnerable people (Rutayisire et al. 2020; Mishra and Rampal 2020), and healthy diets (Abbas and Kamel 2020) and nutritional programs (Panthi et al. 2020) are central points of such programs. COVID-19 response programs like Integrated Child Development Service in India or a special package identification that includes potatoes, pulses, oil, onions and salt in Bangladesh have become some of the most influential nutritional programs, providing minimum required rations to marginalized people (Jribi et al. 2020). Additionally, some countries have adjusted already existing programs instead of putting new target-based ones in place. An example is the adjustment of India's Targeted Public Distribution System (TPDS), which is the world's largest food program, serving more than 813 million beneficiaries each month (WFP 2020b). Moreover, there is a special COVID-19 response program designed for the social protection of women in Latin America and the Caribbean, transferring special bonds (FAO and ECLAC 2020), or eight special programs for supporting nutritional programs in Latin America and Asia (Roy et al. 2020). In this case, a gender-sensitive social protection program that encourages the productive capacity of women is one alternative way of designing policy intervention (FAO 2020c; Lawson-Lartego and Cohen 2020), putting women at less risk of later impairment in the post-pandemic period (Roy et al. 2020).

Looking at supply side measures, there are two main comprehensive schemes known as social insurance and labor market measures, providing incentives and support for health and income protection, respectively (Gentilini, Almenfi, and Dale 2020). These programs have a particular significance in these historically unprecedented times. The scenario currently unfolding has shown the significance of financial support to those who are unofficially unemployed, although it is still insufficient. As of July, 2020, 136,7 million people from informal sectors were entitled to cash transfers in response to COVID-19 (Gentilini, Almenfi, Dale, Lopez, and Zafar 2020). For example, the government of India has already implemented a massive relief effort to allocate Rs 500 per month to the bank accounts of 200 million unemployed women (Swinnen and McDermott 2020); however, such stimulus packages still only have a limited capacity to deal with the ravages of the outbreak (Sharma, Talan, and Jain 2020). Another similar situation can be observed in Kazakhstan, where the government has implemented a special package of unemployment benefits of KZT 42,500 (IFPRI 2020). Ensuring income security can be realized with the help of sickness benefits and unemployment protection. For example, infected people in Vietnam are entitled to receive

VND 60,000 as a daily food allowance, the government of the Philippines has made PHP 1.billion available in unemployment benefits, and the government of Indonesia has mobilized IDR 500,000 for 2 million people as one of its supply side measures (ILO 2020). Generally, the effectiveness of immediate response measures through labor market or social insurance measures in the Greater Mekon Subregion (GMS) countries has already strengthened the resilience of rural households (Waibel et al. 2020).

4. Conclusion

This study explored the impact of COVID-19 on households in developing countries. A revision of 150 publications from the international literature reveals effects of food insecurity and market imbalance in connection with socio-economic consequences. As developing countries are witnessing aggravations on an unprecedented scale, this study found main mitigation strategies linked to farm support, food resilience, and social protection. Generally, we can say that the outcome of COVID-19 is a vicious circle whereby distributions of food supply chains, economic access to food, and nutritional balance are characteristics of global socio-economic changes, which is in line with the literature on impacts of the pandemic (Savary et al. 2020). In the case of mitigation strategies, the majority of them are aimed at increasing the resilience of rural households, farmers, and the food system.

The majority of publications agrees on veering away from traditional schemes to protect small farmers towards more inclusive safety net programs enhancing farm productivity. Studies recommend target-based policy actions protecting farm activities by providing supporting packages, which offer credit opportunities to challenge the distortion on the production caused by COVID-19. As microcredits play a particular role in the mitigation of adverse effects on income and consumption, short-term stimulus packages which sustain the proper functioning of food chains should be considered, promoting access to rural finance. Particularly the enhancement of access to agricultural services and inputs, in order to encourage productivity during and after the shock and thus to protect farmers, seems to be an important policy in this regard. As smallholder producers play a particularly significant role in developing countries, creating access to agricultural services reduces value chain disruptions.

Keeping the food supply chain active is an important task of many governments, and therefore sustaining food logistics by encouraging small farmers' roles in food production is an important measure to encourage efficient operations. Moreover, lessons learned from the COVID-19 pandemic so far underline the importance of e-commerce. The use of digital technologies has seen a dramatic increase in almost all sectors because of COVID-19, promising another era of digitalization. Because they promote an appropriate enhancement of food supply chains, innovation technologies which strengthen e-commerce regulations create another safe corridor within food chains.

Farm-system-for-nutrition approach (FSN) is another important approach to maintaining food security. Related to that, home gardening and urban agriculture encourage further strengthening of the food supply. In order to sustain the resilience of a food system during a pandemic, food and nutrition security is attributed to home gardening or urban agriculture, which also leads to a balanced diet within households.

Prioritizing national socio-economic protection policies by offering food assistance programs might help balance long-term food-supply consequences of the ongoing pandemic. In this case, implementing agencies in developing countries which can deal with flexibilities in procurement and delivery of food products may become an indemnity against the loss experienced by vulnerable people in developing countries. The reviewed studies agree that countries highly dependent on unorganized and unofficial daily wages should explicitly consider stimulus packages providing for the unofficially unemployed rural population. As COVID-19 has influenced labor migration in a staggering manner, the measures to call a halt to an increasing vulnerability among migrants are likely to reduce the risk of negative consequences.

Government social protection systems function as a means of protecting the most vulnerable, thus controlling the increasing rate of inequality during or after the COVID-19 pandemic. Any appropriate buffering policy should certainly consider supporting rural women with special social insurance measures, an approach which is linked to reducing

gender inequality in food security. Furthermore, special nutritional and diet programs counteract malnutrition consequences of COVID-19.

This review study identified several fields for further research. In particular, a policy formulation for food systems linked with health outcomes is stymied by the absence of a strong research agenda. Therefore, more attention should be given to food system research, in order to maintain a status quo in regards to COVID-19 consequences on the food system and health outcomes. Discussions should certainly consider related factors which characterize resilience during and after the pandemic. In order to explore new challenges and opportunities around the subject of food systems, future research should consider these other directions. As a first step, a critical mass to instigate a new approach towards the food system needs to be established. It is of especially urgent importance to study the resilience of farmers and food systems under the shock. Secondly, future research should put an emphasis on the adaptability of food supply chains by synthesizing low-and middle-income country strategies during and after the pandemic. In their conceptualization, food system studies should consider associated risks to food supply chains. While different countries have already implemented diverse efforts to handle major bottlenecks in the food supply chain, it is crucially important to extend the knowledge bases in this area in order to formulate policy options. Moreover, it is important to contribute to the development of a strong research agenda on COVID-19, while specifically considering gender studies in the food system. In the case at hand, gender equality, the gender gap, women's empowerment, and gender violence can be considered motives for furthering the recognition of "gendered" food systems in policy responses. Lastly, there is also a need for research on the accuracy of early warning systems to interpret food security signals, thus cementing the linkage between better food security projection and credible mitigation strategies. Inaccuracies may be associated with technical issues as well as political motivation. Therefore, research focusing on short- and long-term food security predictions should be prioritized.

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