

A risk governance approach to mitigating food system risks in a crisis: Insights from the COVID-19 pandemic in five low- and middle-income countries

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ABSTRACT

Research on food system responses to COVID-19 has remained largely disconnected from the broader risk governance scholarship. We connect both literatures by adopting a risk governance lens to study how governments have dealt with COVID-19 induced food system risks across different phases of the crisis. Studying responses in five low- and middle-income countries – Bangladesh, Ethiopia, Mexico, Nigeria and Vietnam – we find that food system risks and actors related to the food system were largely absent from initial risks assessment and policy responses, leading to growing food insecurity risks for vulnerable groups. Feedback and involvement from local governments and societal actors improved the capacities to assess and mitigate food system risks. We suggest developing future arrangements that involve actors with knowledge on food system risks to allow for more adequate responses.

1. Introduction

A growing body of food systems literature sheds light on how the COVID-19 pandemic exposed and amplified existing inequalities and crises, such as structural undernutrition and limited food availability, particularly in low- and middle-income countries (LMICs) (e.g., Laborde et al., 2020; Egger et al., 2021; Béné et al., 2021a; Zurayk, 2020). Moreover, various studies have shown how measures taken to mitigate further spread of COVID-19, in particular lockdowns and other mobility restrictions, disrupted supply chains and triggered (temporary) losses in employment and economic activity, reducing household incomes and increasing food insecurity (e.g., Barrett, 2020; Devereux et al., 2020). These sudden disruptive effects caused risks for food systems, in particular with regard to food system activities, value chains, and conjunctural food insecurity. In order to mitigate these food system risks (FSRs), different responses and measures have been taken by governments - varying in timing, scope, and impact on food systems - such as economic safety nets (cash transfers), and exempting food trade and sales from mobility restrictions (Balmford et al., 2020; Birner et al., 2021).

Despite emphasizing the importance of dealing with risks in post-COVID19 food systems debates, the current body of literature has remained largely disconnected from the broader literature on the governance of crises and risks. Risk governance scholarship, for example, distinguishes between the dynamics in separate phases of crises and how institutional settings and governance arrangements for crisis management matter for the measures that governments take (Greer et al., 2020; Toshkov et al., 2021; Saunes et al., 2022; Maor and Howlett, 2020). Insights from this literature highlight, amongst others, the importance of governance capacities, which are related to country specific arrangements, such as the dispersion of authority across various levels of governance and the range of – both governmental and nongovernmental – actors involved (e.g., Greer et al., 2020; Capano et al., 2020).

Applying a risk governance perspective to FSRs and responses during the pandemic can provide a better understanding of how different countries have approached the governance of FSRs during the pandemic, and how various governance arrangements have affected the capacities and measures taken to address these risks, while containing the spread of COVID-19. Moreover, insights from the governance of FSRs

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during the pandemic can contribute to the wider literature on risk governance, which has predominantly focused on the primary risks of the pandemic, concerning health care systems and sickness from the virus (e.g., Boin et al., 2021: 8), largely overlooking the impacts of measures on adjacent and more indirect risk dimensions, such as those relating to food systems.

In this paper we explore how governance arrangements have affected capacities to identify and respond to the adjacent national food systems risks. We adopt a risk governance lens which distinguishes between five phases of risk governance: pre-assessment, risk appraisal, characterization and evaluation, and risk management, and subsequent feedback. For each phase we investigate how the capacities for risk governance were affected by broader institutional context, notably the involvement and coordination across various levels of government, departments, and other societal and private stakeholders. For this, we compare five LMICs with different food systems and institutional contexts: Bangladesh, Ethiopia, Mexico, Nigeria, and Vietnam. Based on our findings we provide insights about how governance arrangements can be strengthened to help mitigating FSRs during (future) crises.

2. The governance of food systems risks

Food systems contain “all the elements (environment, people, inputs, processes, infrastructures, institutions, etc.) and activities that relate to the production, processing, distribution, preparation and consumption of food, and the output of these activities, including socio-economic and environmental outcomes” (HLPE, 2017: 23). When we refer to food systems risks, we mean the likelihood that food system activities and outcomes of food systems – such as food security – are threatened by shocks or stresses in complex, uncertain, and/or ambiguous situations (cf. Van Asselt and Renn, 2011: 432; Laborde et al., 2020; Zurek et al., 2022). Various studies have shown that FSRs related to the COVID-19 pandemic are often the result of income loss and subsequent reduced access to food, caused by sickness, social restrictions, or disruptions in supply chains causing limited availability and food loss (e.g., Laborde et al., 2020, Béné et al., 2021a). Literature on risk governance helps to understand how and why FSRs were assessed and acted upon in various contexts.

2.1. Phases of risk governance

Risk governance captures both “the institutional structure and the policy process that guide and restrain collective activities of a group, society or international community to regulate, reduce or control risk problems” (Renn et al., 2011: 231). Key features of the institutional structure include the involvement of various levels of government, different types of actors, and different hierarchic structures, the dispersion of authority between which has an impact on how risks are governed (e.g., Ongaro et al., 2019; Schmidt, 2020). To understand the complexity of risk governance processes, scholars distinguish between different phases of risk governance. The International Risk Governance Council (IRGC), an independent research foundation, developed an influential processual model to structure risk governance in different phases: *pre-assessment*, *risk appraisal*, *characterization and evaluation*, and *risk management*, followed by subsequent feedback mechanisms (IRGC, 2017). Together, these phases can serve as a heuristic to understand and compare the governance of various risks in national COVID-19 responses, and potential pitfalls for failing to identify or address relevant risks (Collins, 2020).

The first three phases of risk governance deal with identifying and understanding the risks at hand (see IRGC, 2017: 11–21). *Pre-assessment* concerns initial recognition of risks through existing early warning systems, contingency plans and routines, and ways to address them. Possible pitfalls in this phase come from the lack of follow-up on early signals, an underestimation of consequences, and conflicting aims or interests. *Appraisal* is about identifying adverse effects and potential

stakeholders, societal responses, and controversies and constraints associated with a risk. Shortfalls in this phase can come from data limitations, biases, or incomplete recognition of relevant stakeholders. The phase of *characterization and evaluation* concerns understanding the complexity, uncertainty, and ambiguity of taking action, based on the knowledge gained in the previous phases, and evaluating the acceptability of a risk (i.e., the importance that measures are taken). Associated deficits in this phase may be caused by incomplete information from the previous phases, and lack of transparency or responsiveness.

In the *management* phase, critical decisions are made about specific measures to be taken (e.g., see Boin et al., 2013), the trade-offs between measures, how these need to be implemented, which actors ought to be involved in this process of implementation, and how vertical, horizontal, and perhaps international levers are to be coordinated. In this phase pitfalls arise when it is not clear who is responsible or can be held accountable, when short-term opportunism leads to temporary solutions, or when the benefits of measures are unequally distributed across society (IRGC, 2017: 23–26).

After going through these phases, adequate *monitoring and feedback* mechanisms are crucial, to ensure that policymakers can respond to new lessons and reassess risks (Ansell and Boin, 2019). Such learning proved essential in the COVID-19 pandemic, as recent papers on COVID-19 show that, initially, decision-makers had a high sense of urgency to respond to health risks associated with the COVID-19 pandemic, leading to preliminary measures without fully appraising and evaluating the adjacent risks, for example those related to food systems (Collins, 2020).

The degree to which governments can successfully navigate through these phases – while avoiding previously mentioned potential pitfalls and governance deficits – depends to a large extent on so-called governance capacities (e.g., Collins et al., 2020; Boin et al., 2021). These capacities concern the skills and resources required to deliver interventions to mitigate FSRs during the pandemic, which are affected by a wider institutional context.

2.2. Governance capacities

Governance capacity is a multidimensional concept (for a comprehensive overview, see Wu et al. (2015); or Lodge and Wegrich, 2014). Building upon the work of Christensen et al. (2016) and Christensen and Lægveid (2020) in this article we focus on three aspects of governance capacity which are particularly relevant for risk governance: *coordination capacity*, for bringing together various actors (i.e. different levels of government, societal groups, NGOs) for collective action; *analytical capacity*, for dealing with information, input and advice, and turning this into risk assessments; and *operational capacity*, the resources necessary for successful implementation and policy delivery. The wider institutional context of risk governance can affect these capacities, in particular regarding how responsibilities are allocated across governmental jurisdictions, or levels of government, and the actors involved in assessing and managing risks (Renn et al., 2011; Boin et al., 2021; Collins et al., 2020). Below we will discuss how these factors are linked to capacities for risk governance.

2.3. Multi-level governance arrangements

The dispersion of responsibilities and power across governmental jurisdictions, has consequences for how risk governance is shaped during a crisis. Coordination and cooperation between levels of government (vertical) and different ministries and agencies (horizontal) are important in times of crisis, because of the complexity and ambiguity of risks, especially when ministries are highly specialized (i.e. only focus on agriculture, instead of food in general), and the crisis has a broad impact (e.g. Ongaro et al., 2019; Baker et al., 2021). A lack of coordination may lead to a failure to consider all social needs and outcomes (IRGC, 2017). Moreover, governments are inclined to centralize decision-making in times of crisis, and tend to increase executive authority (Capano et al.,

2020). On the one hand, this allows implementation of stringent measures, such as enforcing hard lockdowns (Boin et al., 2021: 54–55). On the other hand, this approach may lead to insensitivity toward differences in local contexts, especially considering the limited information processing capacity of policymakers. In decentralized approaches, local actors have more authority, for which they rely largely on strategies of persuasion and consensus building amongst levels of governance (ibid.). However, allocating responsibility to decentralized governmental echelons may induce political blame-games between central and regional governments, slowing down crisis responses (Capano et al., 2020).

2.4. Policy networks

There is a strong interplay between (de)central coordination and the functioning of policy networks (e.g., Greenaway et al., 2007). Policy networks go beyond political-bureaucratic relationships of government, and involve nongovernmental actors, such as NGOs, private interest groups, charities and donor organizations, or international organizations (e.g., Atkinson and Coleman, 1992). Involvement of these actors can improve governance capacity (Peters, 2015; May et al., 2016), and contribute to policy success or failure (Bomberg and Peterson, 1998: 8). In order to understand risk governance, it is crucial to understand who are part of these networks of experts and stakeholders (IRGC, 2017: 29).

Policy networks of multi-disciplinary experts are considered a best practice for risk governance (Boin et al., 2021: 111). Especially for the identification of secondary risks and understanding the effect of risk mitigation on other risks – so called risk-to-risk trade-offs – it is important that a wide variety of actors plays a role in risk (pre-)assessment and appraisal, in order to raise awareness of specific risks and to understand societal perceptions, thus improving both the analytical and coordination capacities (IRGC, 2017). Also, in the delivery of policies and risk management – the operational capacity – it is important to have a wide network of actors that can help and provide resources to mitigate risks.

The analytical framework capturing the interaction between the different phases of risk governance, governance capacities, and the multi-level arrangements and policy networks is summarised below in Fig. 1.

3. Data and methods

To comparatively analyse food risk governance during the COVID-19 pandemic, we selected five LMICs: Bangladesh, Ethiopia, Mexico, Nigeria, and Vietnam. The choice of this set of countries was motivated by both methodological and practical considerations. First, the selection captures various levels of economic development, food security, and food system organization, level of (de)centralisation, as well as geographical range (Latin America, Africa, Asia). Through these factors we capture variation in the organization of food and governance systems, allowing for exploring and comparing food system risk responses in different contexts. Second, the selection was motivated by the availability of background literature on pandemic crisis management and its impact on domestic food systems. Moreover, the country selection was influenced by the availability and access to key stakeholders for interviews. For the identification of and access to key stakeholders we cooperated with contacts within the CGIAR network and the Dutch Agricultural Attachés. Moreover, we have approached additional informants to prevent gatekeeper bias. The selection of interviewees and the questions asked were solely decided upon by the authors.

Before conducting interviews, document analyses of FSRs and

responses during the pandemic were made for each country. For that purpose, we collected documents such as academic publications, policy documents, newspaper articles, and grey literature related to the governance of FSRs in these countries associated with the pandemic, based on Google, Google Scholar and Duckduckgo search queries on FSRs in the selected countries¹ and subsequent snowballing. The initial findings have been corroborated and supplemented through semi-structured interviews with between three and six key informants per country, including senior government officials, senior NGO staff, and scholars. An anonymised overview of the key informants interviewed, and their positions is provided in Appendix B. These interviews were each conducted online through either MS Teams or Zoom with a minimum of two authors present. Due to civil conflict in Ethiopia in the fall of 2021, it was not possible to organize interviews with key informants, and questionnaires were sent out by e-mail instead, to which responses were also insufficient. Therefore, the data used for Ethiopia comes from document analysis.

Based on the different phases, we have analysed documents and asked interviewees to identify for each phase to what extent food systems risks were addressed, why this happened, and which actors were involved. A full set of question, based on the IRGC (2017) framework used for both interviews and document analysis can be found in Appendix A. Using this scheme, we identified whether and how food related risks were part of the different crisis phases, and whether and how various levels of government and actors from policy networks were involved. The full case reports for each country can be found in the appendices (C-G). The analysis presented below consists of an overview of the most significant differences and similarities we found across cases for each phase.

4. Analysis

4.1. Food systems risks and COVID-19

Before and during the COVID-19 pandemic previously identified food systems risks were notable to various extents across the five countries, most prominently related to food insecurity (ranging from 57.7% of the population experiencing moderate or severe food insecurity in 2019 in Nigeria, to 6.5% in Vietnam) (Our World in Data, 2023; Mueller et al., 2022; Rudin-Rush et al., 2022). Next to poverty, or socioeconomic disadvantages, pre-COVID FSRs related mainly to decreased availability of food through climate and weather extremes, such as floods and droughts, or pests (e.g., Ethiopia, Nigeria, and Bangladesh) (e.g. Hassan et al., 2021: 21; Shigute et al., 2020: 4; UN, 2021). Moreover, food systems in some countries have been fragile due to prolonged violent conflict (Nigeria and Ethiopia [UN, 2021]). In countries with relatively low food insecurity, the main food related risk concerned malnutrition (Mexico and Vietnam).

Despite differences in household food (in)security across countries, economically and socially marginalized groups generally suffered from higher food insecurity prior to the pandemic and had a greater chance of becoming more food insecure during the pandemic in all countries under study. In the most food insecure countries – Bangladesh, Ethiopia, and Nigeria – citizens were even reported to be more scared of food insecurity than health risks of COVID-19 (BRAC, 2020; Kalu, 2020; Takele et al., 2022). Similar to the findings of previous studies (e.g., Devereux et al., 2020), this increased risk of food insecurity during the pandemic can mainly be attributed to movement restrictions and market closures without taking into concern the effects on food insecurity and increasing food prices (e.g., Hassan et al., 2021: 85; Wieser et al., 2020).

¹ Combinations of five groups of statements: i) Food; ii) AND risk*/insecur*/availab*/product*/consum*/transport*/retail*; iii) AND COVID* OR pandemic OR corona; iv) AND policy OR governance OR response OR management; v) Bangladesh OR Ethiopia OR Mexico OR Nigeria OR Vietnam.

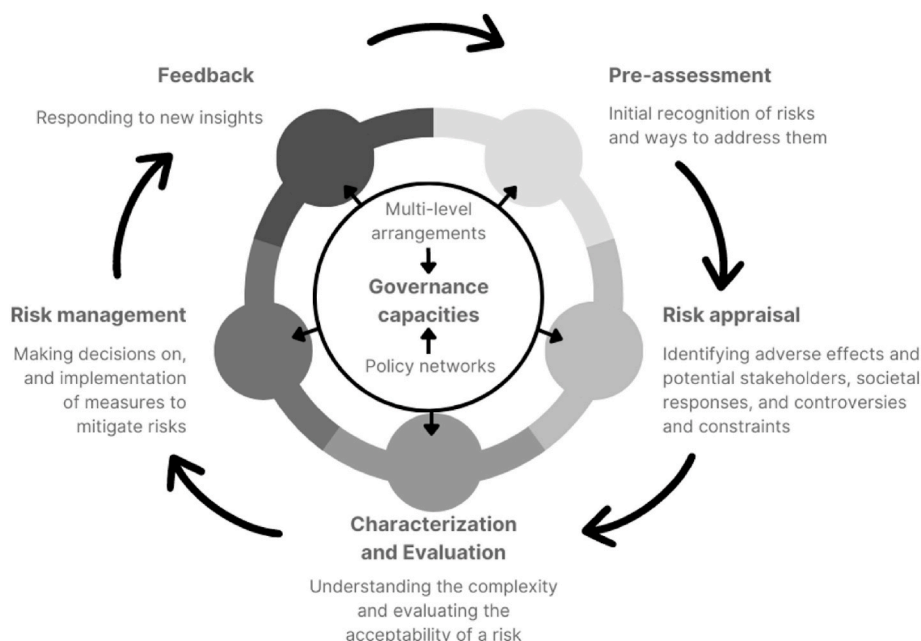


Fig. 1. Analytical framework for food risk governance, based on IRGC (2017).

Informal sectors proved most affected during the pandemic, especially as the result of measures taken to mitigate the virus outbreak, such as movement restrictions and lockdowns. As a result, income and job losses of marginalized groups working in the informal sector were perceived as the most crucial factors reducing food security. In Nigeria, Bangladesh, and Vietnam, initial movement restrictions led to disruptions of value chains and temporary food shortages and interruptions in food transportation, limiting farmers to deliver their produce to markets. These measures resulted in food losses, especially for unsold fresh and perishable products. In Nigeria, the increased food insecurity due to COVID-19 policies even triggered looting of food storage facilities (Obiezu, 2020). In contrast, the federal governments in Mexico and Ethiopia opted for more relaxed lockdowns with no strict enforcement of measures. In Ethiopia, this was based on the recognition of the importance of informal food markets. However, despite limited outbreak prevention measures, there are indications that reduced incomes of the urban poor led to reduced food access (Harris et al., 2021).

A second recurring risk triggered by the pandemic was limited food accessibility due to increased food prices. Both Nigeria and Ethiopia, faced reductions in imports, resulting in higher food prices, especially for imported staple goods (GAIN, 2020; Harris et al., 2021). Vietnam also witnessed increasing food prices, sometimes up to 20%, also as the result of value chain disruptions, as well as higher prices for agricultural inputs and transportation. In Mexico, where the effect of the pandemic on food availability was limited, the pandemic – possibly through lifestyle and diet-related behaviour changes, or income shocks – led to less diverse diets and consequent decreased nutrient intakes (e.g. Acton et al., 2022). In all cases, low-income groups were disproportionately affected by food price increases and changes in food consumption patterns due to income losses.

4.2. Pre-assessment of COVID-19 risks

In the earliest stages of the COVID-19 outbreak, Bangladesh, Ethiopia, Nigeria, and Vietnam all had pre-existing crisis management plans and structures in place, with the aim of managing either natural disasters, disease outbreaks, or both, while Mexico did not. Bangladesh had a ministry of disaster management and food transfer programs to mitigate food insecurity (Azad, 2021, p.21). However, it did not have a plan in place for FSRs during a pandemic. Nigeria had a *Pandemic*

Influenza Preparedness and Response Plan since 2013, taking into account food systems and recognizes potential risks to food security, even considering the scenario of a lockdown. The responsibility for further steps was with the National Emergency Management Agency in cooperation with the responsible federal ministries (e.g., Health, Trade, or Agriculture), to ensure continuity of food retail (Government of Nigeria, 2021). Vietnam was relatively well-prepared for a pandemic, due to the experiences with SARS, and monitoring of zoonotic disease spread (Willoughby, 2021a). However, again, mainly focusing on mitigating the virus outbreak. Ethiopia, worked together with USAID in developing a disaster management plan and had increased awareness on the economic impacts of crisis outbreaks, reflecting a different approach to crisis management than most countries, where the initial focus was on the primary health risks from the virus.

These response structures were based on earlier crisis experiences, such as droughts, floods, or specific disease outbreaks, and applied to the national (or federal) level, relying on national ministries and government agencies to take up tasks, while paving the way for swift responses regarding virus outbreak mitigation. However, the plans did not include specific monitoring mechanisms for FSRs caused by, or during, a pandemic, limiting the analytical capacities to assess adjacent FSRs in the mitigation of a virus outbreak (e.g. Interview B4; B5).

With regard to the monitoring capacities of governments, countries more prone to famine, such as Nigeria and Ethiopia, had early warning mechanisms to monitor food security (Abay et al., 2022). However, these systems were not explicitly designed for, or linked to, measuring the impact of the pandemic on the food insecurity. Additionally, support schemes existed for vulnerable groups (notably cash transfer schemes), albeit often limited in scope, contributing to operational capacities for reaching groups at risk of increased food insecurity, starting from the onset of the pandemic (ibid.).

4.3. Appraisal, characterization, and evaluation

In all countries studied, these early stages were characterized by highly centralized, top-down decision-making, with the responsibility for crisis management often falling under the direct responsibility of the president, prime-minister, or deputy. This was even the case in countries with high local administrative autonomy, such as Mexico, Bangladesh, and Nigeria, displaying the tendency to centralize decision-making and

risk management during crises. Although Bangladesh and Nigeria – despite their constitutionally decentralized foundations – are known to have relatively high degrees of centralized decision-making in practice (e.g., [Fatile and Ejalonibu 2015](#); [Panday, 2017](#)). However, the exact institutional structuring differed across countries.

In Vietnam mostly public health risks caused by viral infection were assessed, with support from health system managers ([Walden, 2020](#)). Here, the Ministry of Agriculture was not involved, and risks related to food production and value chains were not assessed. However, the involvement of the Ministry of Industry and Trade contributed to recognizing risks of continued rice exports for food security (e.g. [Hos-sain, 2020](#)). Bangladesh, in this phase, has been reported to lack the capacity on the ground to assess food related risks for vulnerable groups, in particular in urban regions, and instead mainly focused on health risks as a direct result from the virus (e.g., [Barua, 2020](#); [Hassan et al., 2021](#): 125–130; Interview B3).

Interestingly, Nigeria did consider risks related to food security and trade, however, trade-offs between mitigating health risks and food were not explicitly made. While the government took into account loss of income of vulnerable groups, wider FSRs and impact on the agricultural sector were not addressed until other measures were implemented ([Lowe et al., 2021](#); [FAO, 2021b](#)).

In Ethiopia the national government did consider potential FSRs. The COVID-19 National Emergency Response Plan drafted in March 2020 listed food assistance to vulnerable households as a measure against negative economic impacts of the pandemic ([Sanchez Martin et al., 2021](#)). Moreover, Ethiopia benefitted from strong coordination capacities between various stakeholders from the public sector, civil society, and international organizations to understand the (potential) impact of the pandemic ([Lanyero et al., 2021](#); [McCann et al., 2022](#)). As a result, the national government in Ethiopia showed a higher sense of urgency in mitigating the potential secondary impacts of the pandemic, and the prevention of general economic decline and recognition of the importance of informal markets. Prioritizing vulnerable groups and people working in informal sectors to continue with their daily economic activities.

In Mexico, the central government made similar trade-offs, however, this cannot be seen separately from the role of the president, who refused to take initial actions and publicly promoted going to parties and large rallies at the beginning of the pandemic ([Felbab-Brown, 2020](#)).

4.4. Management and implementation

In the studied countries, this phase typically followed the centralized, top-down, decision-making, from the preceding phases. Following the governance deficits regarding FSRs in the previous phases, these risks were largely overlooked in the early measures to contain the COVID outbreak. Especially Vietnam was internationally lauded for its swift centralized response with regard to containing the virus outbreak in the early stages ([Tran et al., 2020](#)), but later criticised for having a blind spot for food security (e.g. [Johnson and Nguyen, 2021](#)).

In Mexico and Ethiopia economic risks were more prominently included in the previous phases and little or no drastic measures were introduced that disrupted food systems, which limited the impact of movement restrictions on food system disruptions, although in both countries food insecurity did still rise gradually ([Gaitán-Rossi et al., 2021](#); [Tefera et al., 2022](#)). Where Ethiopia cooperated closely with international organizations, Mexico introduced measures much more in isolation of other stakeholders, donors, and international organizations, but was influenced by the aforementioned position of the president ([Felbab-Brown, 2020](#)).

As a first policy response, Bangladesh, Nigeria, and Vietnam implemented various forms of mobility restrictions and lockdowns to prevent further spread of the virus, without addressing the risks of these measures for the food system, both regarding food insecurity and supply chains. This caused aforementioned food system disruptions, mainly

affecting vulnerable households, which led to subsequent feedback from actors that were previously not included in the formal national crisis response units, in attempts to raise attention to FSRs.

In addition, in Ethiopia, Nigeria and Bangladesh existing public support schemes, providing financial assistance, were often not sufficient to reach the most affected and vulnerable households, often due to a lack of analytical and operational capacities (e.g., [Lain and Vishwanath, 2021](#); [Deshpande et al., 2021](#); [Hassan et al., 2021](#)).

4.5. Feedback on food systems risks and new risk assessment and management

Although the composition of policy networks authorities differed across countries, feedback on the decreasing food security, and existing aid schemes missing vulnerable households, was often raised by international organizations, NGOs, grassroots movements, local governments, or farmer organizations. For instance, national household telephone surveys on the impacts of COVID-19, including food security, were supported by the World Bank in both Nigeria and Ethiopia, and FAO in Bangladesh, which were used to give FSRs more urgency (e.g., Interview B3; [Wieser et al., 2020](#)). Following feedback, new types of cross-level and cross-sector cooperation emerged to mitigate the newly assessed FSRs, where expertise and staff resources from local levels could be used to improve the operational capacity to reach (vulnerable) target groups. In countries, such as Ethiopia, Nigeria and Bangladesh, existing public support schemes were updated in order to better reach the most vulnerable households' engagement with local governments and non-state actors ([FAO, 2021a](#); [Ruszczczyk et al., 2021](#); Interview B3). In addition, social capital and community-level responses were mentioned in all country studies as factors mitigating food risks for the most vulnerable groups who were not reached by government programs.

Moreover, in Bangladesh feedback from NGOs prompted central decision-making authorities to take swift actions, reflected in the subsequent lifting of disruptive restrictions, or better communication about exemptions for the food sector regarding movement restrictions (Interview B3, B4).

In Nigeria, the government cooperated with a wide range of actors regarding food systems risks that were not involved in the first rounds of sense-making. It was perceived that such new coalitions led to food security gaining priority with the central government (Interview N3). Also, the role of the Ministry of Agriculture increased with improved understanding of challenges that mobility restrictions brought to food systems. In terms of implementation, non-government actors were essential for alleviating negative effects of the measures and economic decline among the vulnerable groups (Interview N2; [Human Rights Watch, 2021](#)). Moreover, international organizations such as FAO and WHO participated in drafting a COVID-19 Response Plan on Food and Nutrition. Another example is the cooperation across regions, states, and the federal government in developing a national registry of vulnerable small-scale farmers in Nigeria to improve aid targeting.

The Vietnamese government organized ad-hoc reviews of its policy interventions, on basis of which its strategy shifted to more local measures, instead of state-wide restrictions (Interview V4). Moreover, community engagement, for example through the Women's Union and other civil society organizations was important in this phase to identify and target vulnerable groups ([Ha et al., 2021](#); [Willoughby, 2021b](#); Interview V4). Feedback about the impact and risks for small farmers was also provided by international organizations, including FAO and CGIAR, who also helped to support farmers to make more use of digital tools to be connected to markets (Interview V6).

In Mexico, in absence of strong nation-wide measures, state governments acted largely independently from the federal government and were able to decide on the scope and level of enforcement of measures within their territories. However, limited cooperation and coordination with the federal government constrained regional governments to benefit from federal resources, often resulting in a lack of operational

capacities at state level for effective implementation (Interview M4).

5. Discussion

Our analysis of Food Systems Risks (FSRs) in five low- and middle-income countries during the pandemic through a risk governance lens (see Table 1 for a summary) provides a number of valuable insights, both on our understanding of the responses to FSRs in relation to the pandemic, as on risk governance in general.

First, similar to Fan et al. (2021) we see that ministries of agriculture or food are often excluded from the initial highly centralized national response units. Our empirical analysis indicates that the limited attention to FSRs follows from these centralized approaches to crisis governance, indicating that also public health ministries that were involved often did not prioritize nutrition. Following the IRGC framework, the lack of involvement of ministries of agriculture and other relevant food system stakeholders and indicators limits the attention and analytical capacities to assess these risks at an early stage. This also helps to explain why policymakers have not always been aware of the effects of restrictive measures across food systems and households (cf. Maredia et al., 2022).

In two countries we found slightly different dynamics. In Mexico, we observed limited restrictive measures, the nature of which has been attributed to the central leadership role of the president. In Ethiopia there we observed stronger collaboration between the national government and international organizations from the pre-assessment onwards. Here, FSRs and economic risks were taken into consideration at an earlier stage, contributing to less stringent measures. Comparable trade-offs – between FSRs and economic risks on the one hand and restrictive measures to prevent virus outbreaks on the other – have been observed in other African countries, such as Benin, Ghana and Zambia (Baker et al., 2021).

Second, our findings indicate that the feedback from and involvement of local governments and societal organizations in providing feedback, assessing FSRs and implementing food aid improved analytical, operational and coordination capacities to reach vulnerable households. In countries such as Bangladesh, Nigeria, and Vietnam the involvement of local governments and societal organizations has been crucial in reaching particular vulnerable target groups with these types of schemes. These findings align with studies on COVID-19 food system responses that noticed the relevance of traditions of collective action for societal benefits in Asian countries (Fan et al., 2021), and wider-spread community participation when government responses are inadequate (O'Meara et al., 2022). Moreover, our findings ascribe to the value of having cash transfer and support schemes for vulnerable groups and market access for small farmers highlighted in earlier studies (e.g., Arndt et al., 2020; Kang et al., 2021).

Where new cooperations between local actors and governmental crisis management structures have emerged this has mostly happened on an informal, ad-hoc basis. Without further institutionalization, built-up capacities may be lost in future crises. Therefore, we recommend that networks involving actors across governmental jurisdictions and NGOs and civil society need to be established to obtain relevant information on FSRs, which requires systematic involvement of local and societal actors with knowledge on (local) food systems, specifically at the early sense-making phases of a crisis. Literature shows that it is important in this regard to find a balance between centralized coordination and local responses, in which societal actors and businesses can be involved in pandemic governance, but regulated properly to prevent turf-wars for influence (Yang, 2020; Namugumya, 2021).

Third, we found that risk governance capacities evolved over time, as the result of the involvement of new actors, feedback mechanisms, and channels as the pandemic unfolded, emphasizing the importance of learning abilities during crises to reassess risks and learn from ongoing developments (Ansell and Boin, 2019). Moreover, capacities are related to the nature of a risk. For example, Vietnam was seen as having high

Table 1
Summary of analysis.

Phase	Case	Institutional context	Food systems risks
Pre-assessment	BGD	Pre-existing crisis management plans, centrally organized with ministry of disaster management.	Not part of pre-assessment.
	ETH	Pre-existing crisis management plans, drafted in cooperation with international organizations, and centrally organized. Early warning systems to monitor food insecurity.	Part of trade-off between economic and health system risks.
	MEX	No pre-existing crisis management plans, centrally organized crisis management.	Not part of pre-assessment.
	NGA	Pre-existing crisis management plans and structures, pandemic preparedness plan, involvement of ministry of agriculture in centrally organized crisis management. Early warning systems to monitor food insecurity.	Some strategies to mitigate food systems risks in preparedness plan.
	VNM	Pre-existing crisis management plans, centrally organized with involvement of ministry of trade.	Not part of pre-assessment.
Appraisal, characterization, and evaluation	BGD	Centralized, top-down decision-making. Limited coordination between ministries and levels.	Lack of capacities to appraise food related risks for vulnerable groups.
	ETH	Centralized, top-down decision-making, however, with strong coordination between public sector stakeholders and CSOs.	Food risks were evaluated as part of income loss for vulnerable groups through restrictions, and importance of informal markets was recognized.
	MEX	Centralized, top-down decision-making, strong presence of president.	Economic consequences of restrictive measures were considered, not explicitly related to food.
	NGA	Centralized, top-down decision-making following structure set out in preparedness plan.	Food risks were evaluated as part of income loss for vulnerable groups through restrictions.
Management and implementation	VNM	Centralized, top-down decision-making. Health system managers supported central govt.	Food related risks, aside from export, were initially not recognized.
	BGD	Continuance of previous decision-making structure.	Restrictive measures caused disruptions in food systems, for vulnerable urban groups. Shortfall of existing support schemes.
	ETH	Continuance of previous decision-making structure. Continued collaboration with international	Limited impact of restrictive measures on food systems risks. Shortfall of existing support schemes.

(continued on next page)

Table 1 (continued)

Phase	Case	Institutional context	Food systems risks
Feedback	MEX	Continuance of previous decision-making structure. Strong influence of president.	Limited impact of restrictive measures on food systems risks.
	NGA	Continuance of previous decision-making structure. Existing support schemes could not	Restrictive measures caused disruptions in food systems, for vulnerable urban groups. Shortfall of existing support schemes.
	VNM	Continuance of previous decision-making structure.	Restrictive measures caused disruptions in food systems, for vulnerable urban groups.
	BGD	NGOs and international organizations help raise issue of food systems risks. New cross-level and cross-sector cooperation.	Adjustments to disruptive movement restrictions. Updating of existing public support schemes to better reach the most vulnerable groups.
	ETH	NGOs and international organizations help monitoring food systems risks.	Updating of existing public support schemes to better reach the most vulnerable groups. Involvement of non-state actors in implementation of support schemes.
	MEX	Federal state governments responded to lack of national measures with own measures. Mix of approaches across states. Overall characterized by lack of coordination and operational capacities.	Differences across federal states and continued limited effectiveness of implemented measures to mitigate food systems risks.
	NGA	NGOs and international organizations help monitoring food systems risks. Role of Ministry of Agriculture increased.	Updating of existing public support schemes to better reach the most vulnerable groups. Involvement of non-state actors in implementation of support schemes.
	VNM	Government organized reviews of interventions. Community engagement increased to identify and target groups vulnerable to food systems risks. Some involvement international organizations in technical and practical assistance.	Reviews led to more local measures. Support for farmers to use digital tools to access markets.

capacities to deal with health risks, but FSRs were assessed too late, resulting in increased hunger among a large share of the population (e.g. Johnson and Nguyen, 2021).

6. Conclusion and outlook

By taking a risk governance approach, we shed light on how governance arrangements across phases of the pandemic affect the capacities

of governments to timely and adequately identify and respond to food systems risks. Previous studies have shown how movement restrictions and lockdowns had consequences on food systems risks, such as decreased food security. Our analysis of risk governance in Bangladesh, Ethiopia, Mexico, Nigeria, and Vietnam helps to understand how the governance arrangements behind these measures allowed initial insensitivities to these risks, and how they were subsequently assessed and addressed. These insights are relevant to the broader scholarship on COVID-19 responses, which thus far has focused predominantly on the arrangements and measures to prevent further outbreak and mitigate public health risks (e.g. Boin et al., 2021; Edwards and Ott 2021; McConnell and Stark, 2021).

We have observed that in the initial risk governance cycle in response to the pandemic food systems risks were hardly acknowledged, and that relevant actors to identify these risks were often not involved, and relevant capacities to identify these risks were lacking. Following feedback after initial policy responses, and with the involvement of lower levels of government, and non-state actors with expertise on food risks, relevant governance capacities – coordination, analytical, and operational – for assessing and effectively mitigating food systems risks improved. This is an important insight on why these risks were often identified after initial movement restrictions were taken, and further highlights that governance capacities can dynamically develop throughout a crisis. Without additional input of these actors and their expertise in crisis response networks, food systems risks were likely continued to be overlooked in national crisis governance structures. Following the idea that lessons from current crisis can help future resilience (Love et al., 2021), our main policy recommendation therefore is to create national crisis response units that involve actors with knowledge on food systems risks.

With regard to the wider governance of food systems risks in LMICs, this study provides initial insights to understand how current governance arrangements for managing risks related to disease outbreaks may lack the capacities to effectively assess, evaluate, and manage food systems risks. In this regard, Future studies will have to elucidate how these insights translate to other crises causing food systems risks, such as the war on Ukraine that followed the pandemic. Moreover, future researchers and practitioners should further assess how sustainable cooperation across levels of government and with societal partners can be realized, for example through integrative leadership styles, which can bring together diverse groups and interests, while maintaining swiftness in response (e.g. Crosby and Bryson, 2010), or by looking into principles of subsidiarity, according to which decisions on food aid, or support measures, can be taken at the lowest practical level (e.g. Melo Zurita et al., 2015). Finally, we hope that this study paves the way for observational studies that can provide important insights in how to further organize the governance of these risks in ways that do justice to those most affected to these risks.

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Declaration of competing interest

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Data availability

The data that has been used is confidential.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.gfs.2023.100717>.

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