Food and Agriculture Organization of the United Nations

Insights from a global survey conducted in June-July 2022

City region food systems: responding to shocks and stresses

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ABOUT THE SURVEY

Over the past few years, global shocks have greatly disrupted food systems all over the world. They include the COVID- 19 pandemic and the Ukraine war. They have added up to many other shocks and stresses, often local, regional or national, already weighing on food systems.

In view of this challenge, and in collaboration with City Networks (C40, ICLEI, Milan Urban Food Policy Pact, Resilience cities, UCLG), FAO has designed a survey to help identify effective responses to shocks and stresses to increase the resilience and sustainability of city region food systems (CRFS). This survey targeted all the actors of the food system, including local governments with the following four objectives:

- to better understand the most important impacts of the pandemic and other shocks and stresses on their city region food systems over the past few years. Food system actors have adopted a wide range of strategies and implemented concrete actions to respond to these shocks and stresses;
- to identify individual reactions, collective initiatives and public policies to capture the diversity of responses;
- to identify the most important characteristics of their city region food systems that enabled these actions. These characteristics include the way food systems are governed; and
- to determine whether these individual or collective interventions contributed to an increase in the resilience and sustainability of their CRFS.

The survey was opened on 1 June 2022. It has been disseminated through several channels:

- the 'Food for the city' D-Group list which gathers more than 2 600 people working in or on city region food systems;
- institutional social media accounts (Twitter, LinkedIn and Facebook) of the three research partners (FAO, RUAF and CIRAD);
- the international networks of cities (C40, ICLEI, Milan Urban Food Policy Pact, Resilience cities, UCLG) circulated it to their members; and
- reminders were regularly sent . The survey closed on 15 July 2022.

We collected 210 responses, of which 182 where included in this analysis, following a thorough process of database cleaning to remove inconsistencies.

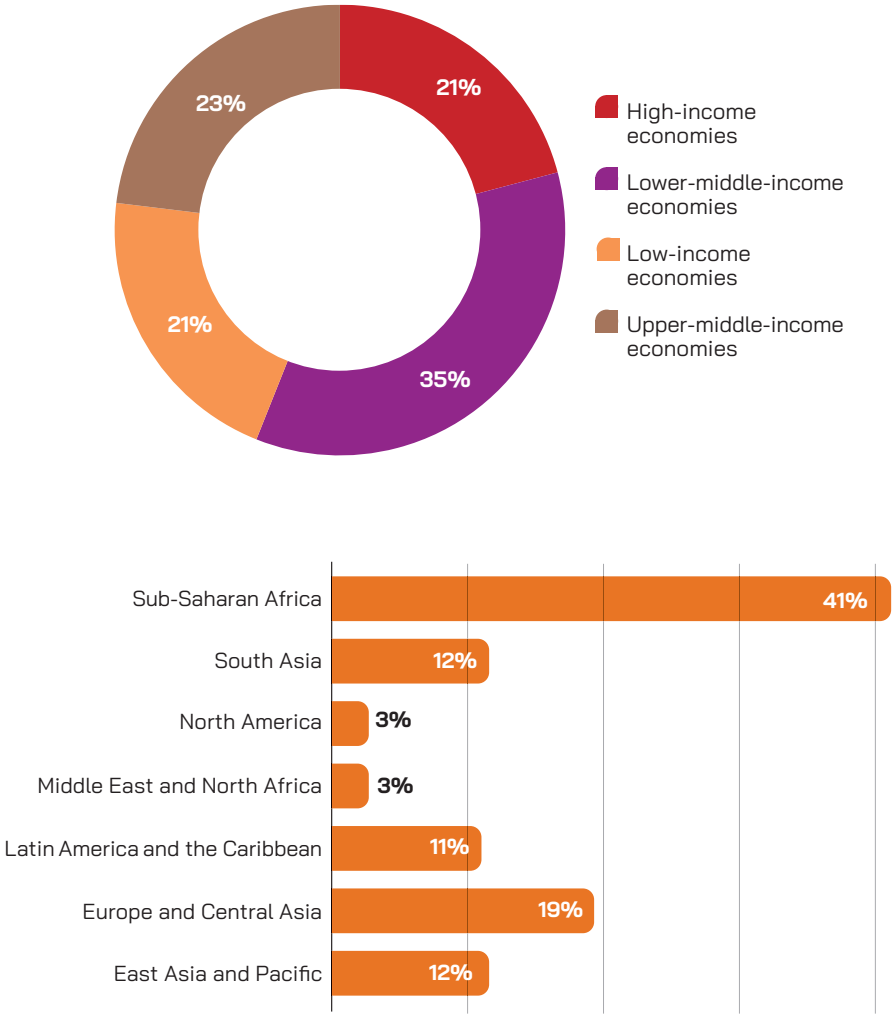
Origin of respondents _1

- The 182 responses come from 147 different cities: there were several respondents for one city.
- The respondents display an interesting diversity allowing us to cover a wide range of situations. However, the level of representation is relatively low and the conclusion we draw from this survey should be seen as further hypothesis to be tested in future work.
- Several criteria can be used to characterize the sample.

We used the World Bank classification 2022 (https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups) to determine the level of income of the country in which the city is located. The proportion of respondents range from 21 percent in high-income and low-income countries, to 35 percent in lower-middle-income countries. The sample is relatively well balanced.

We used the geographical classification of the World Bank to determine the distribution of respondents. The sample is clearly skewed towards Sub-Saharan Africa which garners 40 percent of the respondents, followed by Asia (24 percent) and Europe and central Asia (19 percent). This geographical imbalance is difficult to explain.

Figure 1

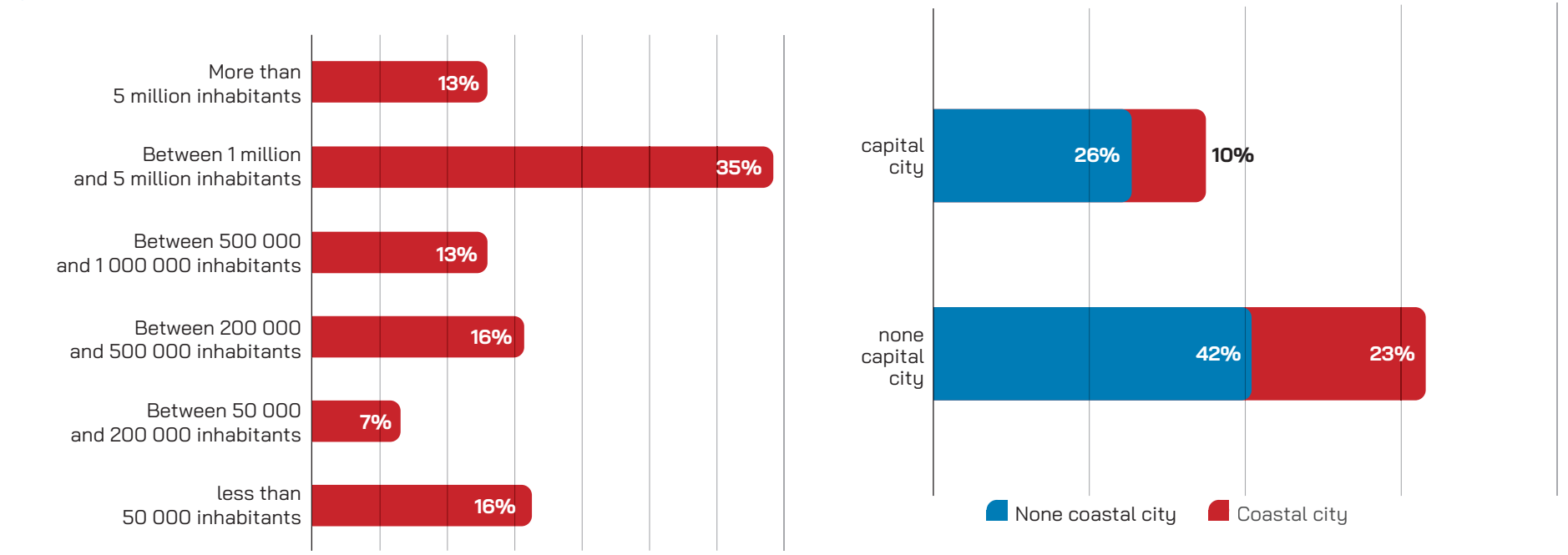


Sources: FAO

Origin of respondents _2

- The 147 cities are in 69 countries, with 34 of them being represented through multiple cities.
- The most represented countries are India and Nigeria (9 cities), Spain (7), the US and Italy (6) and China (5).
- Capital cities are overrepresented: there is at least one respondent from each of the 65 capital cities, out of our 69 countries.
- Because capital cities tend to be the most populated cities, it is not surprising to have a dominance of large cities, with respondents from cities having more than 500 000 inhabitants amounting to 61 percent in our sample (111 cities). At the other end of the spectrum, 16 percent of the respondents are from cities with less than 50 000 inhabitants (30).
- Whether cities are coastal or not is an important feature when it comes to sea-level rise and potential flooding. Thirty three percent of the cities are coastal cities, of which one third are also capital cities.

Figure 2

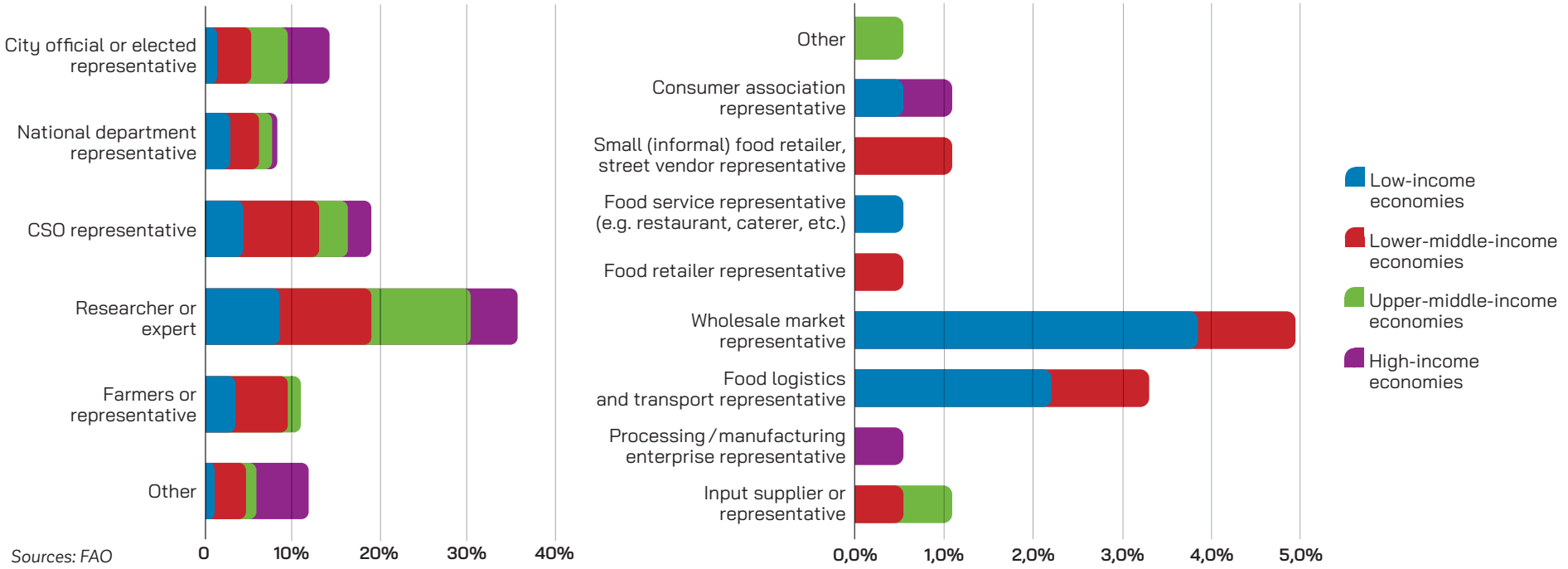


Sources: FAO

Profile of respondents

- The profile of respondents also shows a wide diversity. While the survey mentioned many categories, experts and researchers dominate among the respondent (36 percent), followed by CSO representatives (19 percent, city officials or elected representatives (14 percent).
- The geographical distribution of the respondents according to their profile is important to notice: most CSO representatives, national government representatives, and farmer representatives come from low- and lower-middle-income economies, while the distribution for the other categories is much more balanced.
- City officials from upper- middle- and high-income economies dominate.
- The number of CRFS actors belonging to other segments of the food systems than those already mentioned is limited (right-hand graph). They come mainly from high-income economies. Wholesale market representatives amounted to nearly five percent of the respondents.

Figure 3



Sources: FAO

WHAT ARE THE SHOCKS AND STRESSES AFFECTING FOOD SYSTEMS?

Methodological explanations

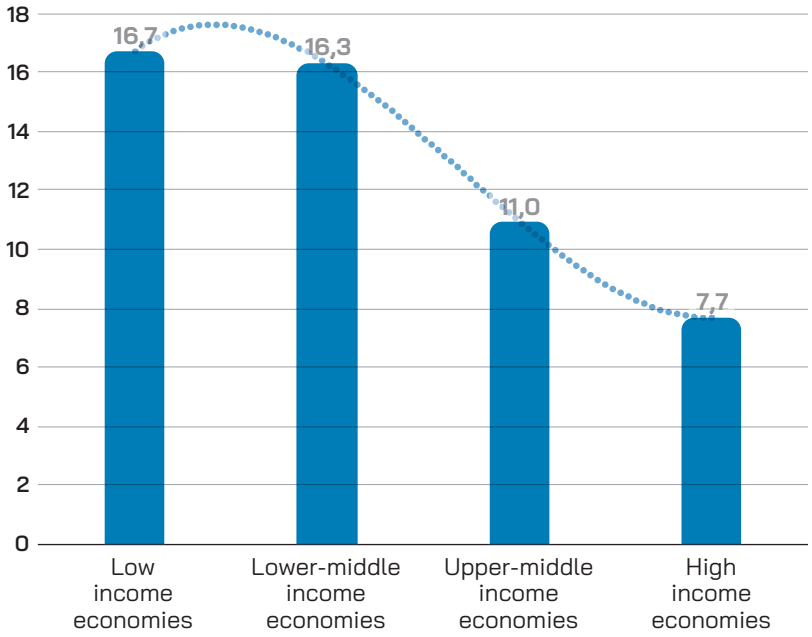
- This section deals with the perception CRFS actors have of the intensity of shocks and stresses that recently affected their food systems. The question asked was the following: "Over the past five years, have any [type of shocks or stresses] affected your city region's food system?"
- The list of shocks and stresses were adapted from (UN, 2020). Shocks and stresses were divided into seven categories: 1/ public health and biological events (e.g. COVID-19); 2/ climate and weather-related events (e.g. floods, droughts); 3/ geological events (e.g. landslides, earthquakes); 4/ ecosystem-related events (e.g. biodiversity loss, ecosystem degradation); 5/ technological and/or industrial events (e.g. pollution-driven harm, industrial accidents); 6/ economic events (e.g. food price shocks, market disruptions); 7/ political and civic events (e.g. conflict, corruption, migration).
- Respondents were offered the possibility to answer yes/no/I don't know for each category. If the answer was yes, then a series of shocks and events were suggested for this category. Respondents could rate the perceived intensity of the shock or stress on a Likert scale from 1 to 10.
- The average intensity and the weighted average intensity (average intensity × the proportion of respondents mentioning the shock) as perceived by CRFS actors are here presented.

The perceived importance of shocks and stresses of CRFS

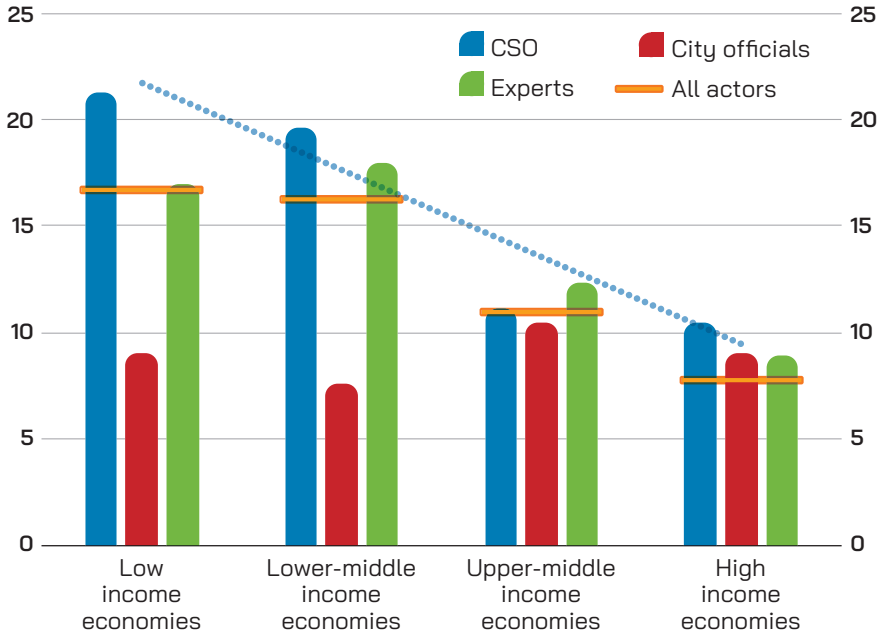
- Respondents ranked the significance of shocks and stresses on their CRFS over the past five years on a Likert scale from 1 to 10. In this analysis, significant shocks and stresses are defined by a rank of seven or above. We here consider the number of different shocks perceived, among the 54 we listed, over the last five years.
- The number of different shocks perceived as significant seems to be related to the level of income, with a plateau for the lowest income category, before plummeting from lower- to upper-middle income economies: the lower the level of income, the more significantly respondents perceived the shocks.
- This pattern seems to depend on the type of actors. CSO representatives and experts or researchers seem to drive this trend.
- There seems to be a disconnect between the perception of CSOs and researchers on the one hand, and the perception of city officials on the other, in lower-income economies. City officials in lower-income economies seem to perceive some shocks with a lower intensity than CSOs or researcher which would explain the gap in the number of different shocks. This gap seems almost inexistent in higher-income economies.

Figure 4

Average perceived occurence of significant shocks and stresses over the past 5 years



Average occurence of significant shocks and stresses as percieved by specifics respondents over the past 5 years

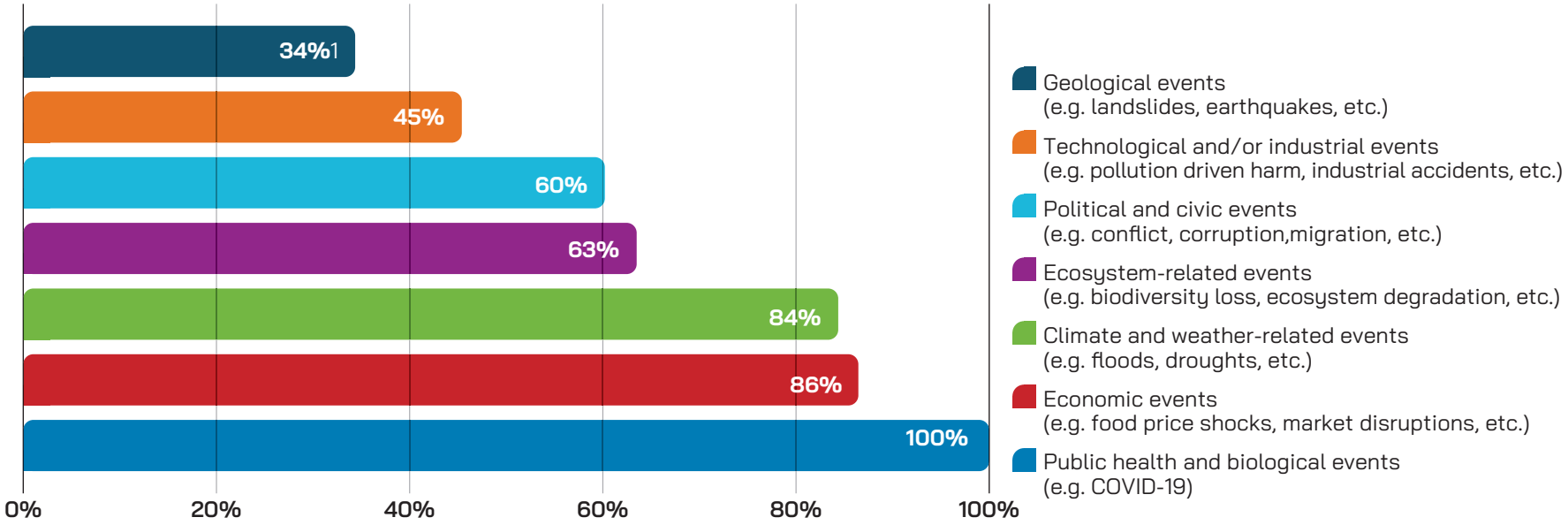


Sources: FAO

Understanding the perceived diversity of shocks and stresses on CRFS over the past 5 years

- The seven broad categories of shocks mentioned in the survey come out in the respondents' feedback, demonstrating the importance of considering them all when studying food system resilience. The ranking translates the relative importance of the different categories of shocks and stresses as they affect CRFS.
- Public health and biological shocks is a record 100 percent because of the COVID-19 pandemic, as we will see later.
- Economic shocks come second with 86 percent. This result could be due to the difficulty for the respondents in identifying primary shocks. Of course, economic shocks could be the consequence of other types of shock (e.g. shock on food prices could be due to drought, limiting production).
- Climate related events came in third, very close to economic shocks, demonstrating the tremendous influence of climate events on food systems.
- Ecosystem related events are fourth, followed by political and civic events. The importance of the state of nature for food systems to function is thereby emphasized.

Figure 5 Share of respondents reporting shocks and stresses over the past 5 years by broad category

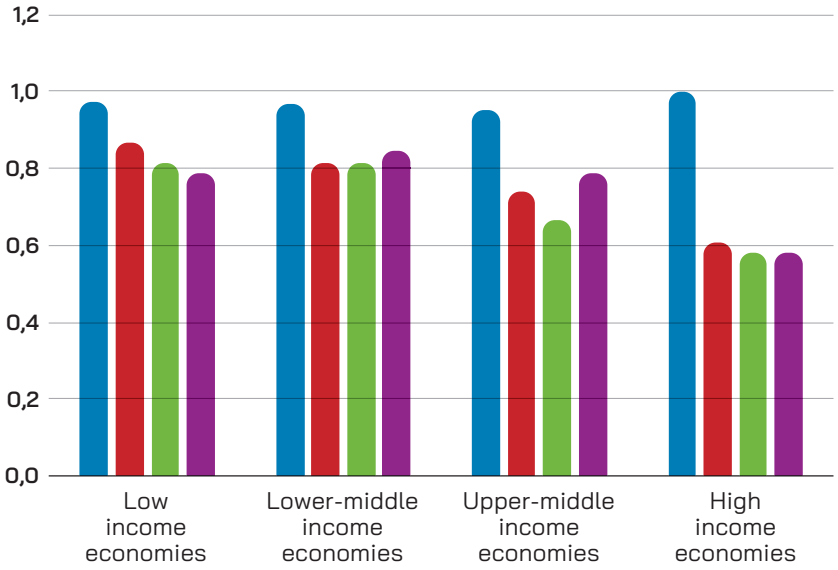


Sources: FAO

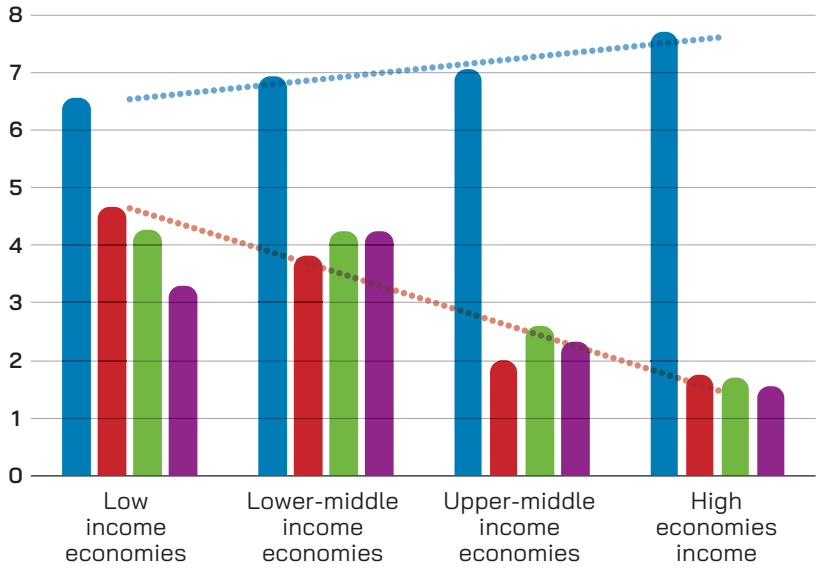
Public health and biological shocks

- The perceived intensity of the COVID-19 pandemic is far above other health and biological shocks and seems to increase with level of income.
- Conversely, the perceived intensity of the other health and biological shocks decreases with the level of income. It seems that the higher the income level, the more prepared for these shocks' economies are, and therefore the lower the perception of their intensity.
- The divergence of these two trends could come from the expected / non expected nature of the different shocks which would then influence the level of preparedness, to the point where the intensity of these later shocks is perceived as limited (below two) in high-income economies.
- The difference in perceived intensity of pest and animal diseases and food safety events between the two higher-income categories and two lower-income categories is substantial.

Figure 6 Average perceived intensity of public health and biological shocks



Weighted average perceived intensity of public health and biological shocks



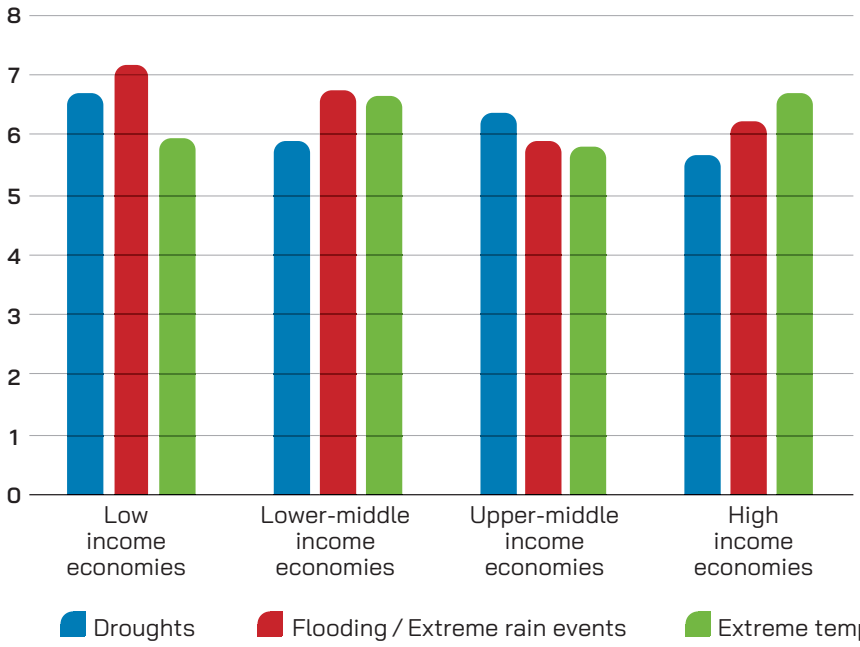
COVID-19 and other human epidemics and pandemics | Plant pests and diseases | Animal disease | Food safety events

Sources: FAO

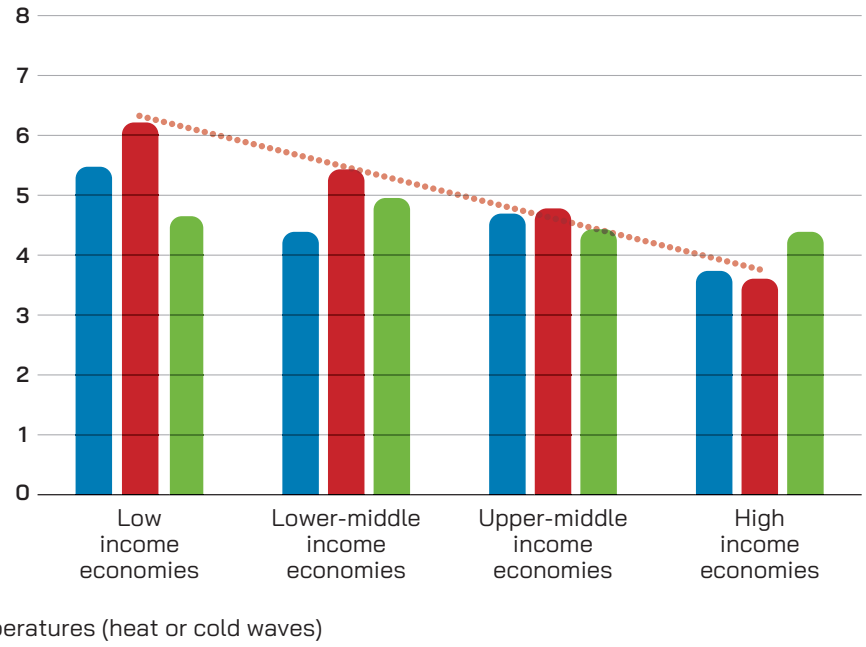
Climate and weather-related events

- Climate and weather-related events seem to be perceived as having the same intensity whatever the level of income, as no clear trends appear.
- The differences in intensity of shocks within this category are limited: all climate and weather-related shocks are perceived as being of middle to high intensity (most perceived between six and seven).
- However, these figures tend to change when the weighted average is considered. It is then perceived as higher in low-income economies.
- This difference is due to the proportion of respondents mentioning these events rather than the intensity of the event itself. In other words, more people perceive these events in lower-income economies than in high- income economies.
- However, the difference is limited. Except in high-income economies, where the intensity is between 3.6 and 4.4, the other economies record perceived intensity between 4.4 and 5.4 with floods in low-income economies sticking out at 6.2.
- The perceived intensity of floods and extreme rainfall events is clearly higher than droughts and extreme temperature events, except in high-income economies.

Figure 7 Average percieved intensity of climate and weather related events



Weighted average percieved intensity of climate and weather related events



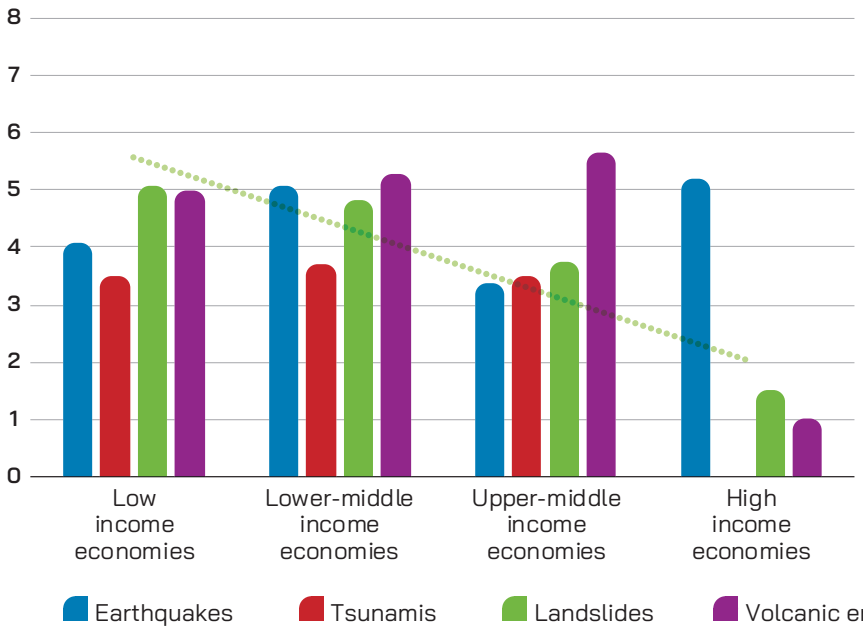
Droughts | Flooding / Extreme rain events | Extreme temperatures (heat or cold waves)

Sources: FAO

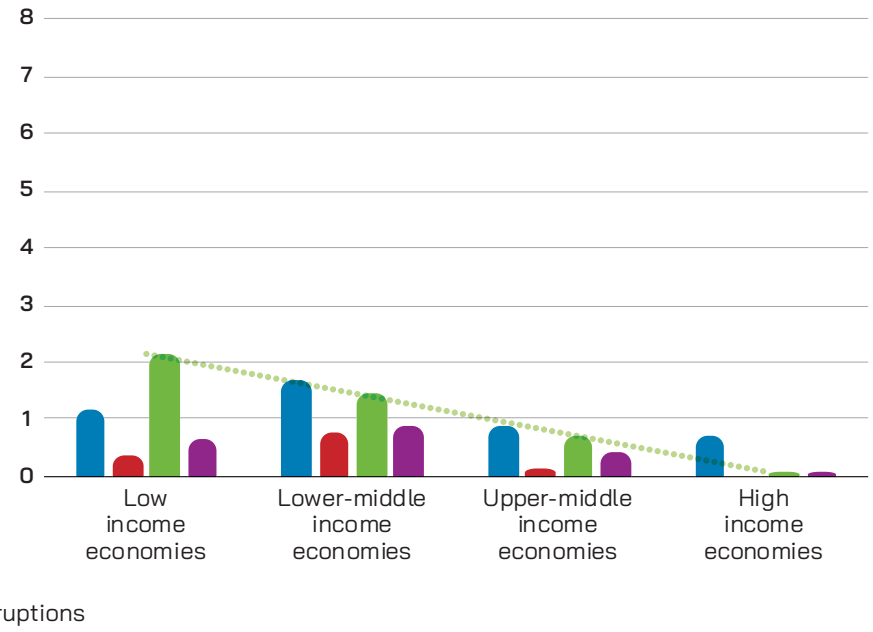
Geological events

- There does not seem to be any pattern regarding the average intensity of geological shocks (such as earthquakes, tsunamis, landslides, volcanic eruptions). These shocks are perceived to be from low to medium intensity (mostly below five).
- The reason might be because most shocks are related to geological conditions which are very context specific (location of seismic zones or volcanoes, coastal cites re. tsunamis).
- Only landslides seem to be perceived differently depending on the level of income with a downward trend of the perceived intensity as the level of income of the economy increases.
- The weighted averages confirm the predominance of landslides as the most important geological events. The importance of landslides is consistent with the flooding and extreme rainfall events previously mentioned.
- There is a significant gap between the level of the weighted and non-weighted average perceived intensities, whatever the income level, that translates the low frequency of such events.
- These weighted averages are the lowest of all the seven shock categories.

Figure 8 Average percieved intensity of geological events



Weighted average percieved intensity of geological events

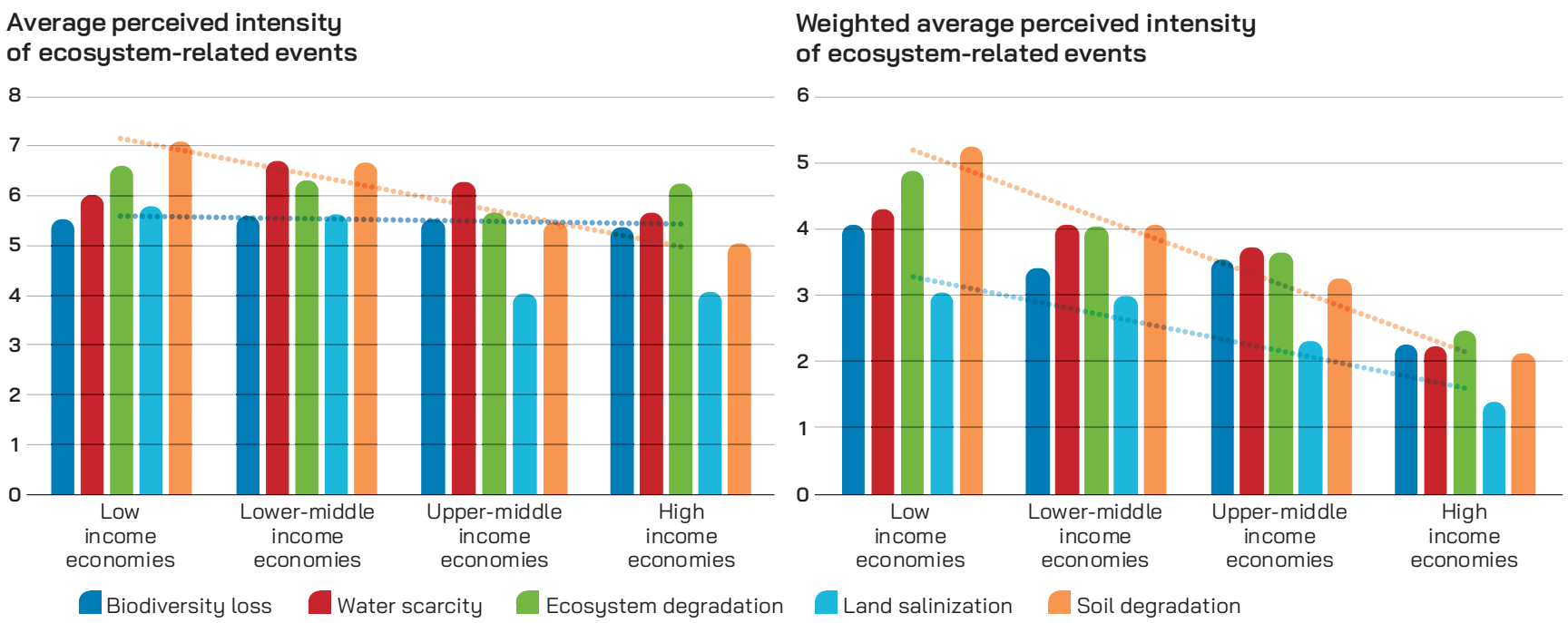


Sources: FAO

Ecosystem-related events

- This category has the particularity of including mostly stresses rather than shocks. They are closely linked to climate change events.
- Biodiversity loss, water scarcity, and ecosystem degradation display no specific trend when considering income differences.
- Conversely, land salinization and soil degradation tend to increase in intensity as the level of income decreases.
- The weighted averages display a different pattern as the five stresses seem to be conversely correlated to the level of income. This means that while their intensities are rather similar, they are more often perceived when the level of income decreases.
- Soil and ecosystem degradation clearly stand out as the most important stresses whatever the level of income, followed by water scarcity, two critical determinants of food production.

Figure 9

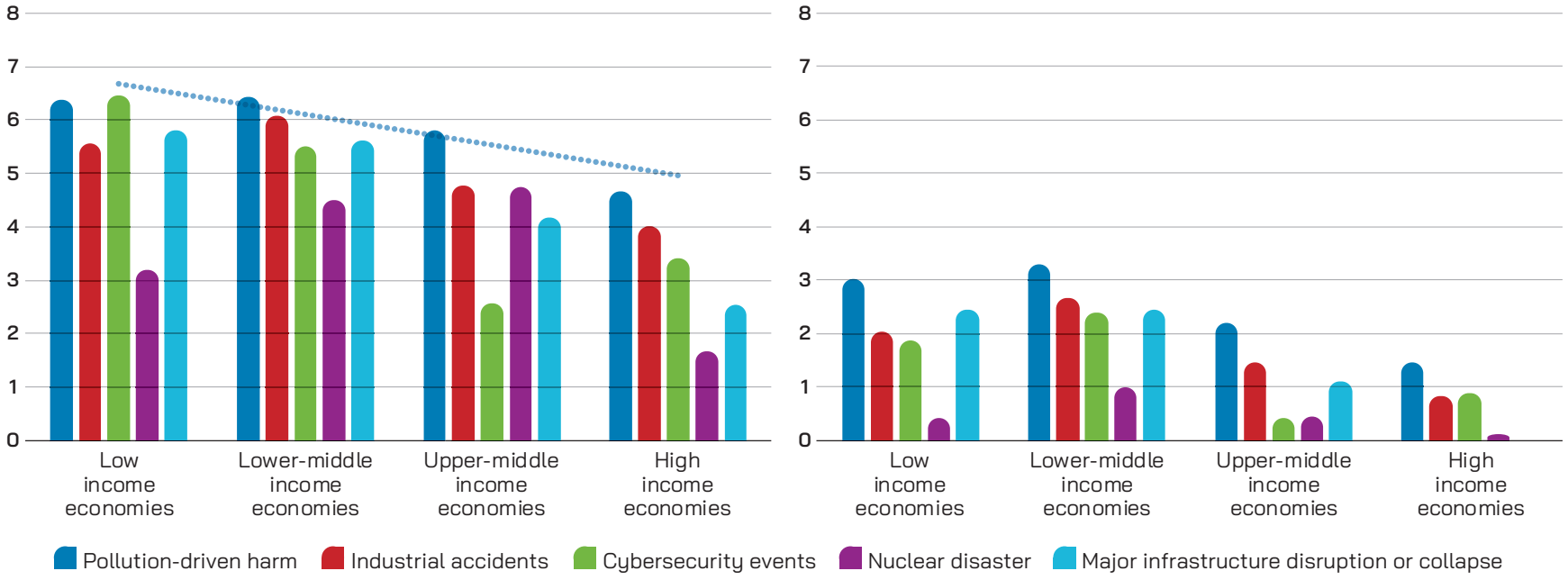


Sources: FAO

Technological and industrial events

- Technological and industrial events are perceived with lower intensities as the level of income of the economies increases.
- Pollution, industrial accidents and infrastructure disruptions seem to drive this trend. Rules and regulation, and their enforcement, which increase with the level of income, could be an explanatory factor.
- The perceived intensity of these events drops below five for the higher-income economies.
- Nuclear and cybersecurity events stand out from this pattern.
- When it comes to weighted averages of intensity, they plummet for nuclear events due to both the limited-spread of the nuclear power stations around the world and the rather drastic safety measures that surround them.
- More generally, the higher weighted average intensity is recorded in the two lower-income categories, especially regarding pollution and infrastructure disruptions.
- But the weighted averages are very low in high-income economies where rules and regulations are strong and enforced.

Figure 10 Average perceived intensty of technological events

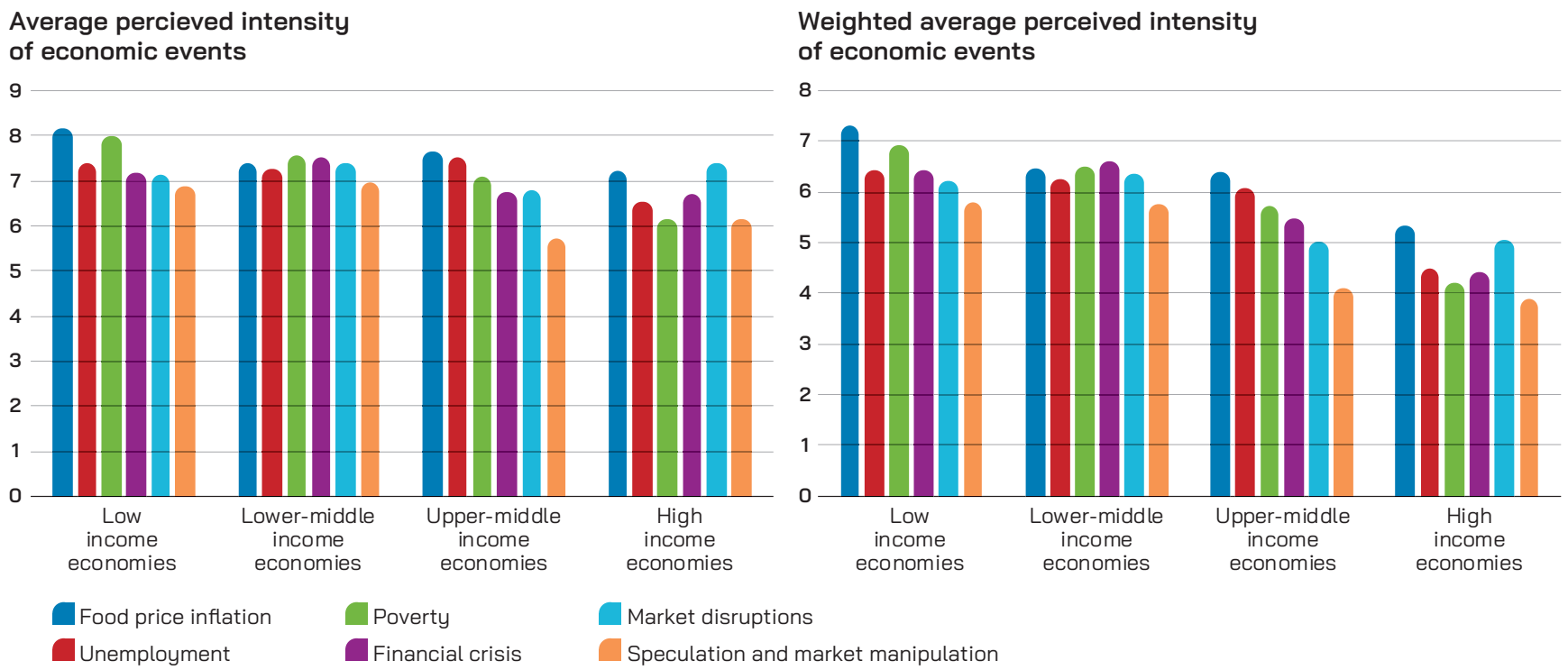


Sources: FAO

Economic events

- What is striking here is the intensity of economic events which on average are all perceived as very strong (around seven or above) whatever the level of income.
- Some of these events are long term stresses (poverty, unemployment) others are shocks with potential lasting consequences.
- As previously stated, economic shocks and stresses might either be first-hand shocks or the consequences of other shocks. It might be difficult for respondents to distinguish the two.
- It is not surprising that economic shocks are those perceived to have the highest intensity of all the seven shock categories.
- The weighted average shows a progressive decline as income level increases. However, they remain very similar in low and lower-middle-income economies.
- Food price inflation is confirmed as the most significant shock whatever the level of income of the economies.

Figure 11

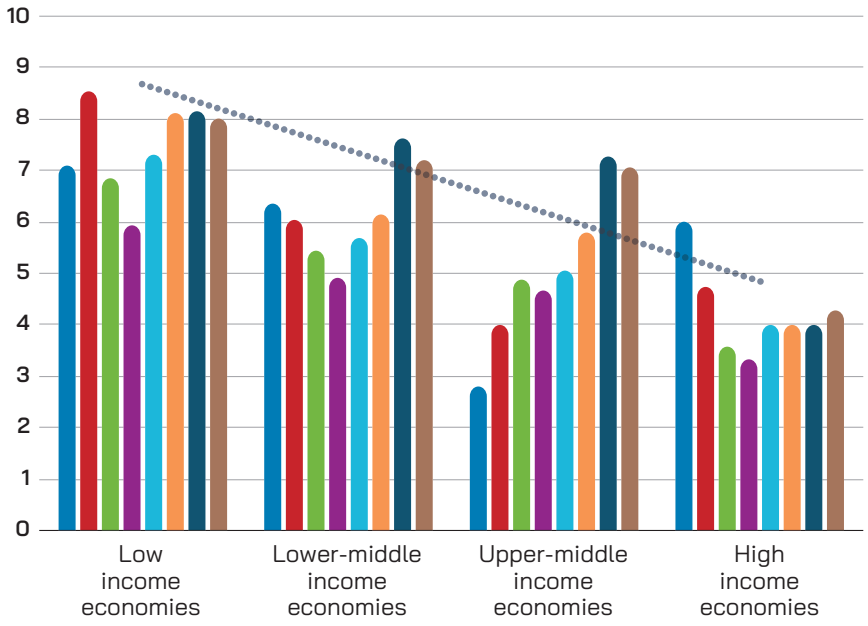


Sources: FAO

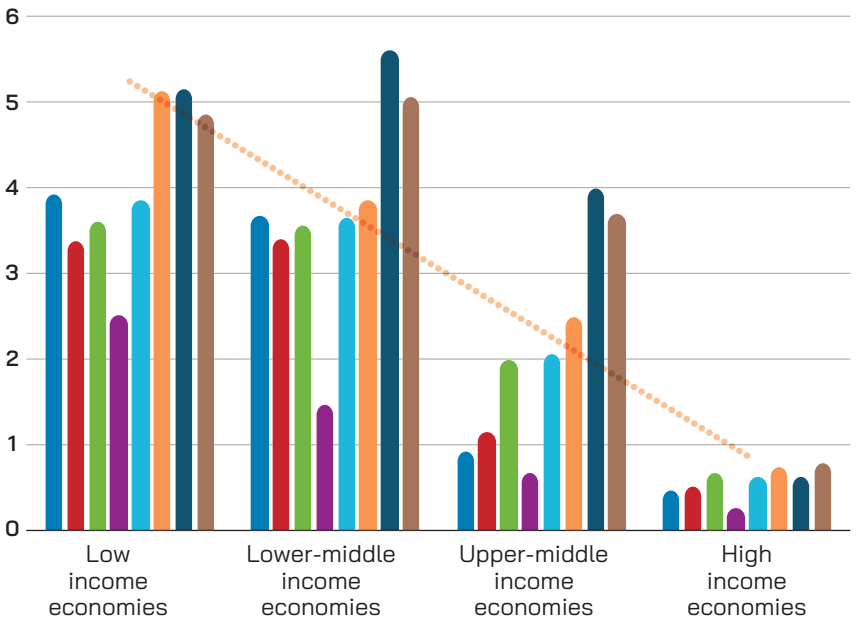
Political and civic events

- Political and civic events are perceived as having relatively strong intensity especially in low-income economies.
- Interstate conflicts are perceived as having the most significant impacts on food systems in low-income economies. Corruption and crime rates dominate in middle-income economies, and terrorism in high-income economies.
- While the average intensity of most events seems to decrease as the level of income increases, terrorism and interstate conflict do not seem to follow this pattern.
- The weighted averages show a very different pattern. Political and civic events, while perceived as having intense impacts in high-income economies are very seldom there: whatever the nature of the event, the value is below one.
- The difference between high-income economies and lower-income economies is the highest of all the shock and stress categories, meaning this is where the inequality of exposure is the greatest.
- The ranking is also different, with migration and displacement, corruption and crime rate standing out as the most important.

Figure 12 Average perceived intensity of political and civic events



Weighted average perceived intensity of political and civic events



Sources: FAO

WHAT ARE THE IMPACTS OF THOSE SHOCKS AND STRESSES ON DIFFERENT SEGMENTS OF THE CRFS?

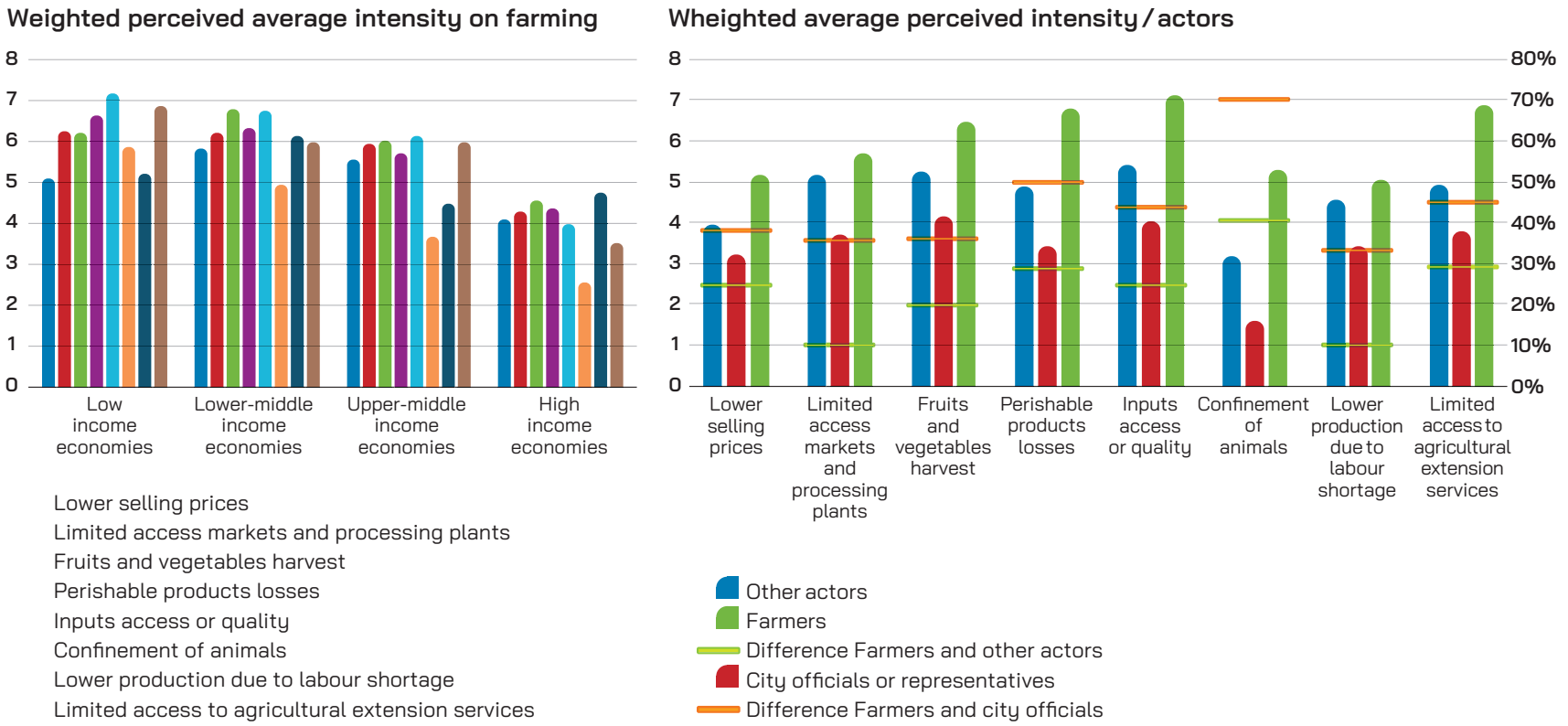
Methodological explanations

- This section deals with the perception respondents have of the intensity of the impacts of the shocks and stresses they identified as having recently affected their food systems. The question asked was the following: "What have been the impacts of these shocks and stresses on [a specific food system segment] in your city region?"
- The list of impacts were suggested following a literature review of publications on the COVID-19 pandemic(www.fao.org/in-action/food-for-cities). Food systems were divided into six segments: 1/ food production, farming and input supply; 2/ food manufacturing and processing; 3/ food distribution and retail; 4/ informal food sellers and street vendors; 5/ food transportation and logistics; and 6/ food consumption, consumers.
- Respondents were asked to rate the perceived intensity of the different impacts in each segments on a 1 to 10 Likert scale.
- The average intensity and the weighted average intensity (average intensity x the proportion of respondents mentioning the shock) of each impact as perceived by respondents are presented.

Impacts on food production, farming and input supply

- Recent shocks and stresses have far less affected high-income economies.
- The most significant impacts seem to vary between economies. Labour shortage clearly stands out as having the highest weighted average intensity in high-income economies.
- However, its intensity remains much lower than access to inputs and extension services, production loss, and access to markets and processing plants, and fresh produce harvest, in the three other economic categories.
- These five impacts come in various orders depending on the income level of the economies, without any clear pattern.
- Three impacts might be highly positively correlated: production loss; access to markets and processing plants; and fresh produce harvest.
- What is interesting here is the difference of perception of impacts on farming systems between farmers or groups of farmers, city officials or representatives, and other actors of the food system.
- The differences of perception between farmers and city officials or representatives is always above 30 percent, with 50 percent for production loss, and even 80 percent for animal confinement.
- The difference of perception between farmers and city officials is double the one between farmers and the other actors of the CRFS. The bias previously identified is clear here too.

Figure 13



Sources: FAO

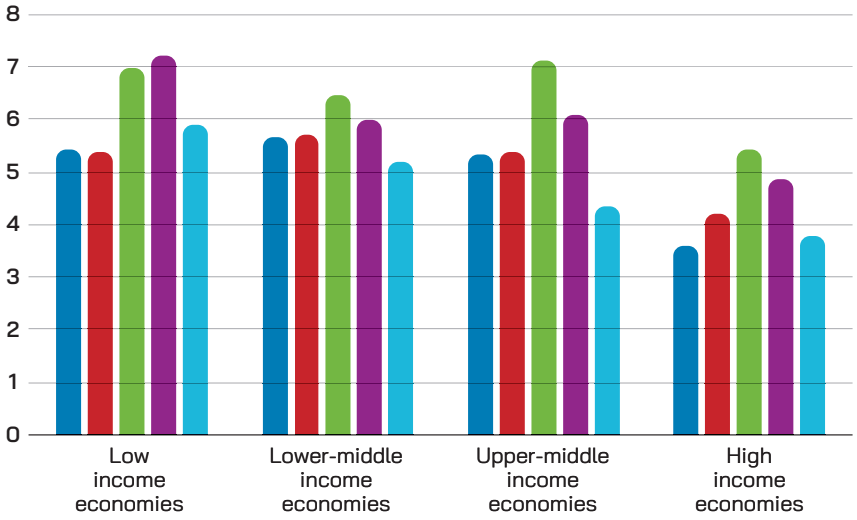
Impacts on food manufacturing and processing

- The impact with the highest perceived intensity is clearly income loss.
- Income loss is the outcome of the other impacts with the loss of human resources issue at the centre.
- These results seem to confirm a causality chain in each income level economy: Reduced activity or temporary closure ⇄ furlough or loss of human resources ⇄ income loss.

Impacts on food distribution and retail

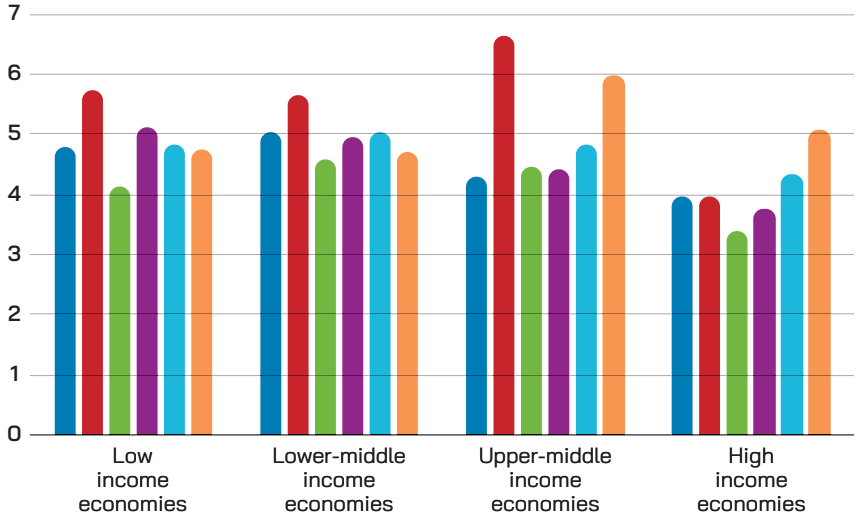
- Again, the impact with the highest perceived intensity is clearly income loss, except in high-income economies where changes in business model stands out. This might translate to a high level of adaptability to the shocks.
- The other impacts do no show much difference in perceived intensity.
- The intensity of income loss in distribution and retail is very similar to manufacturing and processing, oscillating between five and 6.5 depending on the level of income of the economies.

Figure 14 Weighted average perceived intensity of impacts on food manufacturing and processing



Temporary closure of processing plants
Lower activities due to labour shortage
Loss of income
Furlough and loss of human resources
Contamination of food manufacturing spaces

Weighted average perceived intensity of impacts on food distribution and retail



Shortages / empty shelves
Loss of income
Furlough and loss of human resources
Limited business hours
Temporary closure of retail businesses
Changes in the business model

Sources: FAO

Impacts on informal food sellers and street vendors

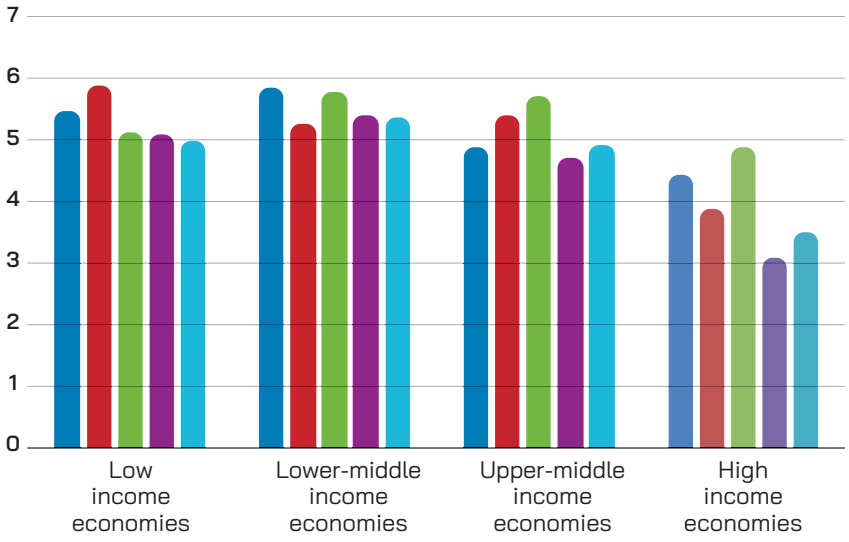
- Food sellers and street vendors are perceived as being among the most affected intermediary actors by shocks, except in high-income economies, more so than processors, wholesalers and retailers.
- However, irrespective of income, there is no factor that stands out as being worse. translating that 1/ the diversity of challenges these actors are perceived to be facing; and 2/ the cumulative nature of the impacts which, combined, could explain the importance of the decline number of food sellers. This should be confirmed by future work.

Impacts on food transportation and logistics

- The rise of transportation costs and logistics is clearly perceived as the most important impacts of recent shocks and stresses, whatever the level of income. The reduction of the level of activity comes second.
- The most important difference between income groups is the impacts of shocks on transport infrastructure which are perceived as particularly resilient in high-income economies.

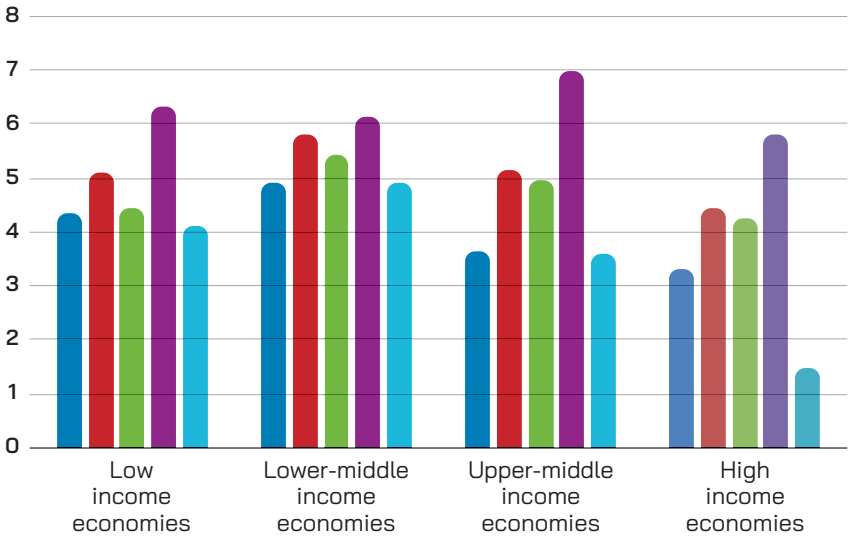
Figure 15

Weighted average perceived intensity of impacts on informal food sellers and street vendors



Sales restrictions
Limited access to suppliers / intermediaries
Limited number of customers
Evictions or lack of access to selling space
Decline in number of food sellers

Weighted average perceived intensity of impacts on food transportation and logistics



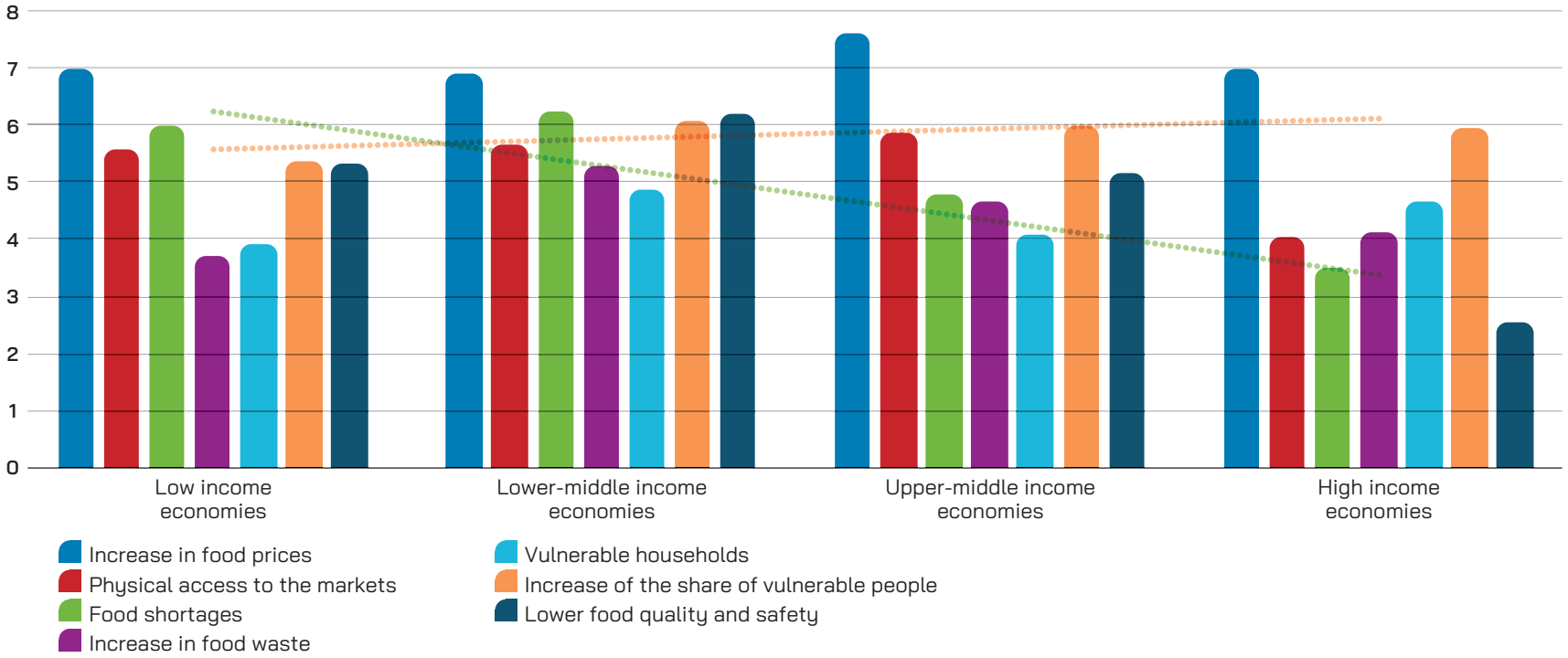
Lower activities due to shortage of drivers
Lower activities due to movement restriction measures
Temporary closure and furlough
Higher cost of transportation and logistics
Destruction of transport infrastructure

Sources: FAO

Impacts on food consumption

- Food price increase is perceived as being the most significant impact of shocks and stresses that affects consumers.
- The second most important impact varies according to the income level. In lower-income economies, food shortage comes second.
- The weighted intensity of the increase in number of vulnerable people is very similar whatever the level of income, to the point of being the second most important impact in upper-middle and high-income economies.

Figure 16 Weighted average perceived intensity of impacts on food consumption



Sources: FAO

WHAT ARE THE RESPONSES TO THESE SHOCKS AND STRESSES AND THEIR IMPACTS?

Methodological explanations

- This section deals with the perceptions CRFS actors have of the actions they undertake to cope with impacts of recent shocks and stresses. The question asked was the following: "What have been the individual responses of [food system actors] in your city region food system to the impacts of these shocks and stresses?" The responses were suggested following a literature review on the COVID-19 pandemic that allowed the identification of a series of actions. Respondents had the possibility to add further actions.
- Food system actors are divided into five categories with the objective of covering as largely as possible the CRFS without adding too much to the length of the survey: farmers; processors and manufacturers; distributors (wholesalers and retailers); informal sellers and street vendors; and consumers.
- This section only displays the weighted average intensity of the responses since the difference between the two measurements were very limited, and the comparison of the two did not provide any significant additional information.

Responses from producers and input suppliers

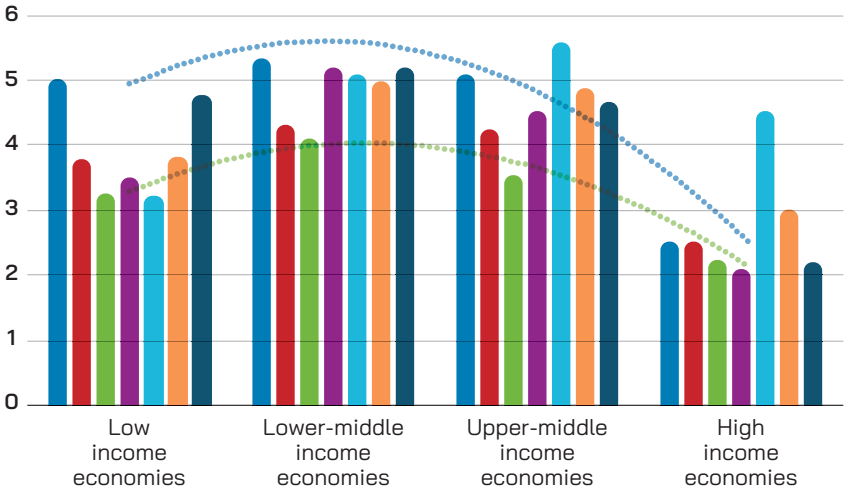
- The response from producers are clearly perceived as the most intense in lower- and upper-middle economies.
- In low-income economies, respondents perceived that farmers coping strategies were primarily based on changes in practices at best and ceasing activities at worst.
- In high-income economies, changes in marketing channels are perceived as first-order response, followed using savings and selling assets.
- In middle-income economies, farmers' responses are perceived as much more diverse, showing a mix of what dominates in low- and high-income economies.
- Investing in storage and processing capacities, while probably one of the most effective responses to deal with future shocks as found in literature, remains the answer with the lowest perceived intensity in every income category.

Responses from processors and manufacturers

- The increase in selling prices is the most important response perceived by respondents from processors and manufacturers.
- The second one is perceived to be ceasing their activities or merging, except in high-income economies where this response is perceived as the least frequent. This situation might be related to the structure of these companies and to the demand they satisfy.
- While often put forward as a necessary change for strengthening CRFS resilience, procuring local food production is perceived as an important response, except in high- income economies.
- Innovation i.e. enterprises offering new, innovative, alternative manufacturing and processing methods, is not perceived as being an important response.

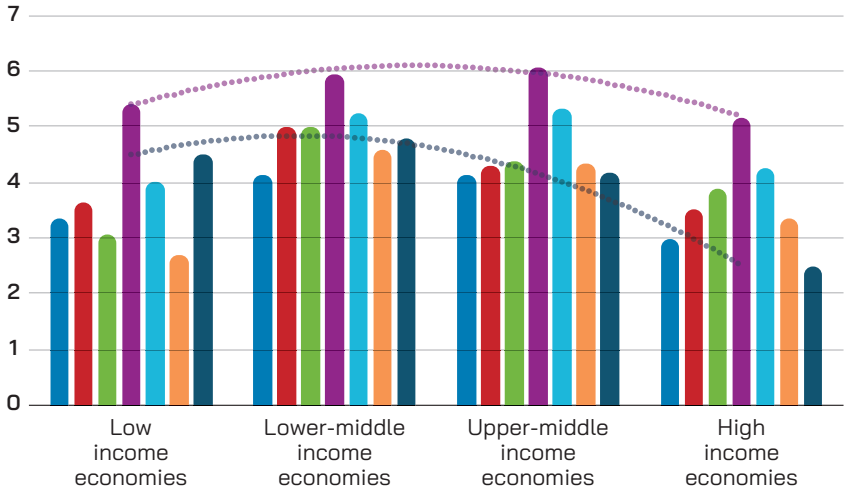
Figure 17

Weighted average percieved intensity of responses from producers and input suppliers



Changes in agriculture practices
Diversified their production
Invest in storage or processing capacities
Reduced their production targets
Diversified marketing channels
Use of savings or sold assets
Bankrupt or ceased activities

Weighted average perceived intensity of responses from processors and manufacturers



Innovative methods
Change in production patterns
Changes in food packaging
Increased selling prices
Increased level of debt
Localized procurement strategies
Bankrupt, ceased activity, or merged

Sources: FAO

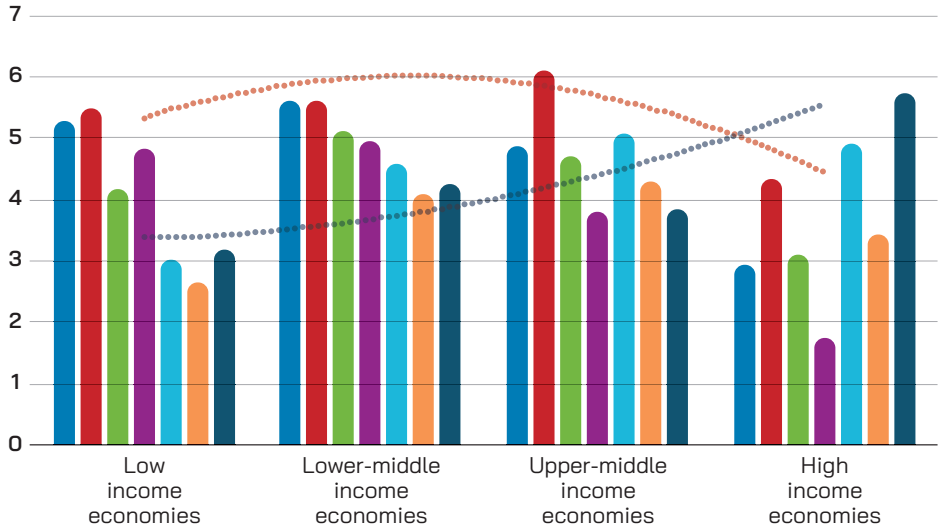
Responses from distributors (wholesale and retail)

- Just like for processors and manufacturers, price increase is perceived as the most important response from wholesalers and retailers, followed by reduction of activity levels.
- High-income economies are an exception, where home food delivery is perceived as being the most important adaptation, just before increasing prices.
- The expansion of food bank activities is perceived as particularly important in high-income economies, much higher than in other income categories. Food banks are then perceived to be the primary response to the increase of the vulnerable population previously mentioned.

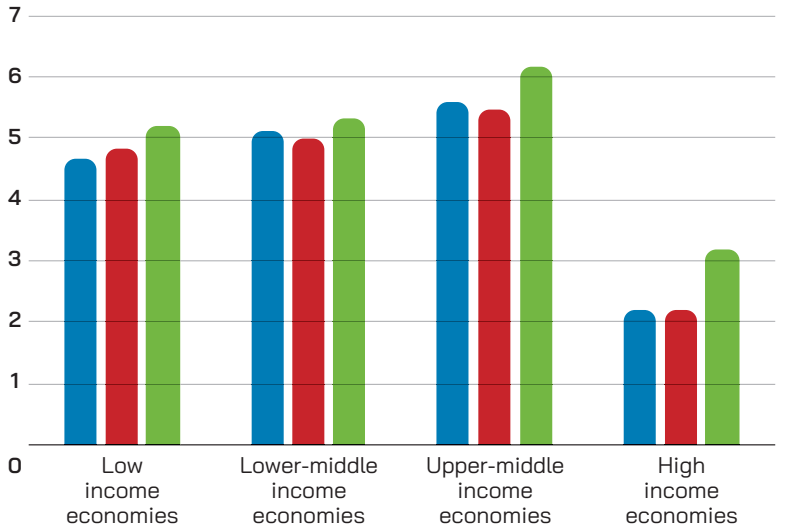
Responses of informal food sellers and street vendors

- Increase in selling prices is here too the first perceived response.
- However, the differences between the perceived responses of informal food sellers and street vendors are very limited: the three suggested adaptation strategies are perceived to have been used with similar intensity.
- There is a gap between high-income economies and the others in terms of perceived intensity due to the weighting, i.e. a lower proportion of respondents from this income group reported responses from street vendors.

Figure 18 Weighted average perceived intensity of responses from distributors (wholesale and retail)



Weighted average perceived intensity of responses from informal food sellers and street vendors

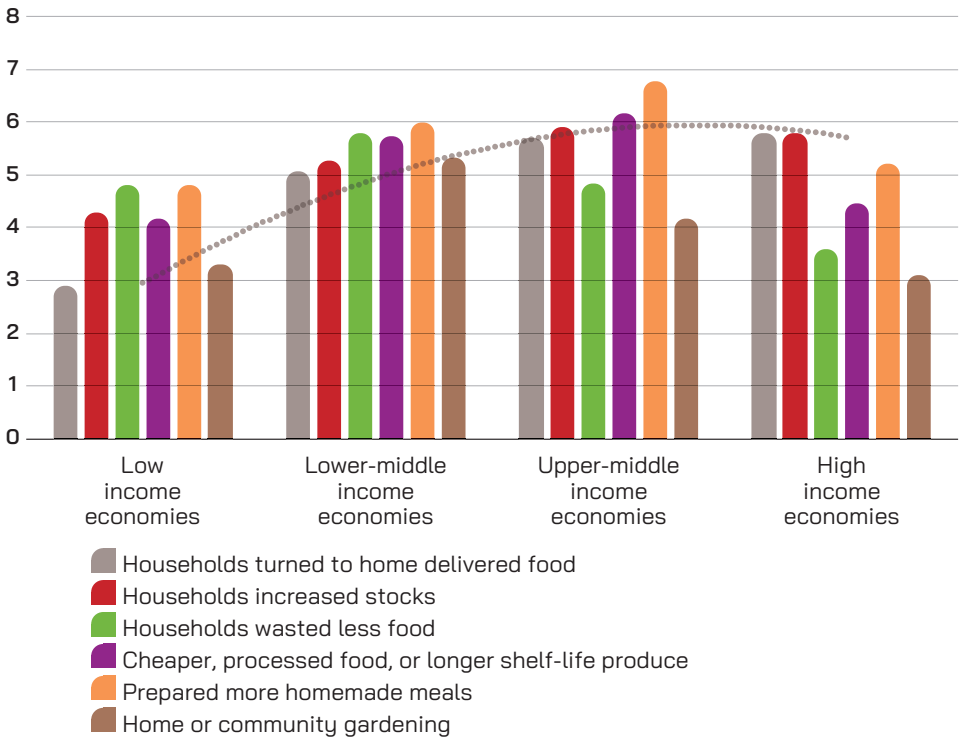


Sources: FAO

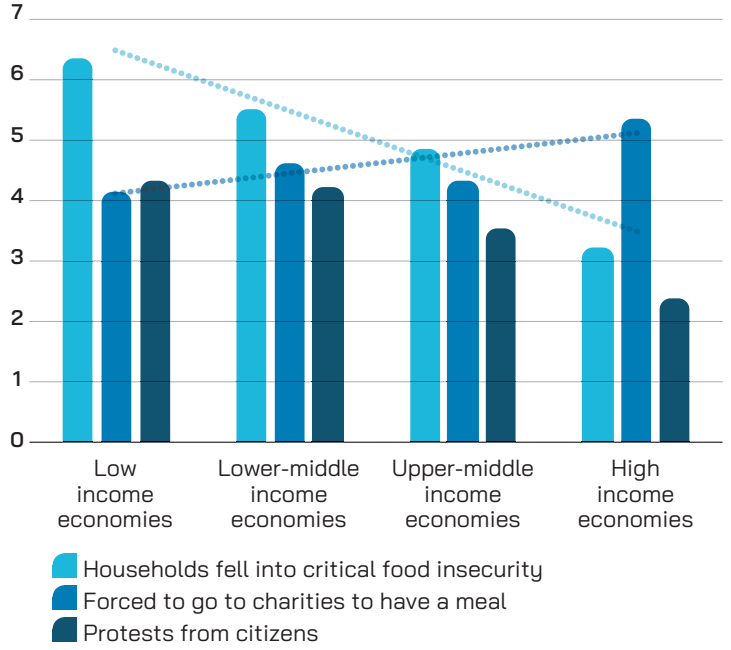
Responses from consumers

- The significance of the COVID-19 pandemic is clearly visible here with perceived responses from households clearly oriented towards home-cooked meals as the main response, as well as home delivery and stockpiling, their intensity increasing with the level of income.
- The other perceived responses do not show a clear pattern.
- Home or community gardening seems to be perceived as important mostly in lower-middle-income economies only.
- The most important fact is the perceived difficulty households have in coping with shocks on their CRFS: food insecurity is perceived as the first consequence in low-income countries, following a downward trend as income increases.
- Consistent with expansion of food banks, households have been perceived to turning to charity, along an increasing trend matching the level of income.

Figure 19 Weighted average perceived intensity of response from consumers



Weighted average perceived intensity of response from consumers



Sources: FAO

WHAT ARE THE COLLECTIVE INITIATIVES OR PUBLIC POLICIES THAT HAVE BEEN DEVELOPED, AMENDED OR IMPLEMENTED?

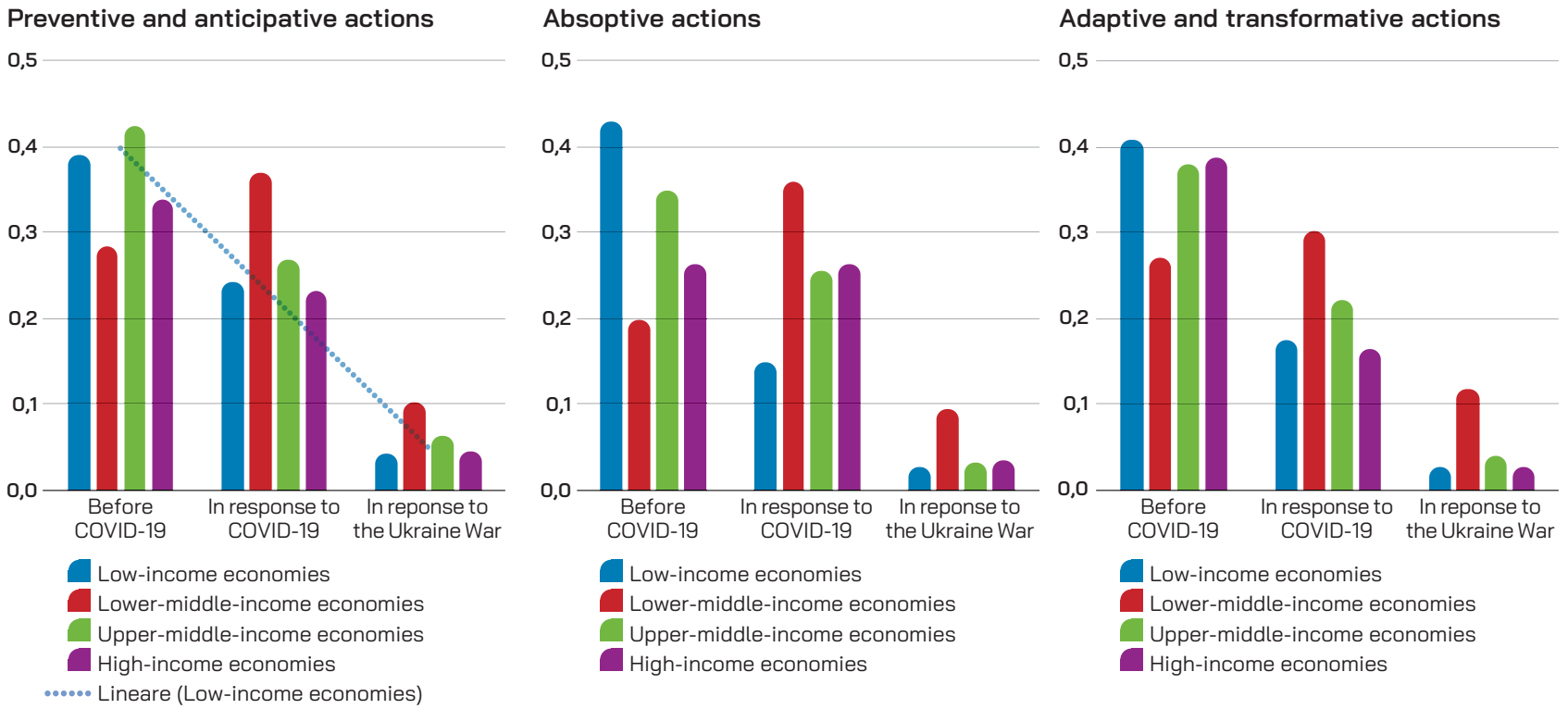
Methodological explanations

- While the previous section dealt with responses to shocks and stresses from individual actors, this section focuses on collective actions and public policy. The list of collective actions and public policies was drawn from a literature review of the COVID-19 pandemic. It included 29 types of policies clustered in seven categories.
- The question asked was the following: "what have been the collective initiatives or public policies developed, amended or implemented?" Respondents could choose between four closed answers: existed before the COVID-19 pandemic; implemented as a response to the COVID-19 pandemic; implemented as a response to the Ukraine War; and I don't know.
- The 29 collective initiatives or public policies were then sorted according to their main objective, i.e. whether they aim at preventing and anticipating shocks and their impacts (11 policies or collective actions), absorbing impacts (six), or adapting and transforming food systems (12).

Public policies and collective actions

- The following graphs show the proportion of respondents who perceived each type of action as being implemented before the COVID-19 pandemic, in response to this crisis, or in response to the Ukraine war.
- Whatever the type of collective actions of policies considered, many have been perceived as being already in place before the COVID-19 pandemic in all income categories except lower-middle-income countries.
- CRFS in low-income economies are perceived as having developed the highest level of collective actions and public policies before the COVID-19 pandemic. This is in line with the highest number of shocks and stresses actors perceived over the past five years compared to other income levels.
- In high-income economies, contrary to the others, the COVID-19 pandemic triggered mostly absorptive measures according to the perception of CRFS actors, and a lower level of adaptive and transformative initiatives.
- The Ukraine war does not seem to induce many public policies and collective actions. This might be due to the time of the survey (too early for actors to perceive changes).
- It must be noted that the question asked was about the type of initiatives and not their effectiveness, and it would be unwise to draw any conclusion in this respect.

Figure 20



Sources: FAO

WHAT ARE THE MOST IMPORTANT CHARACTERISTICS OF YOUR CRFS?

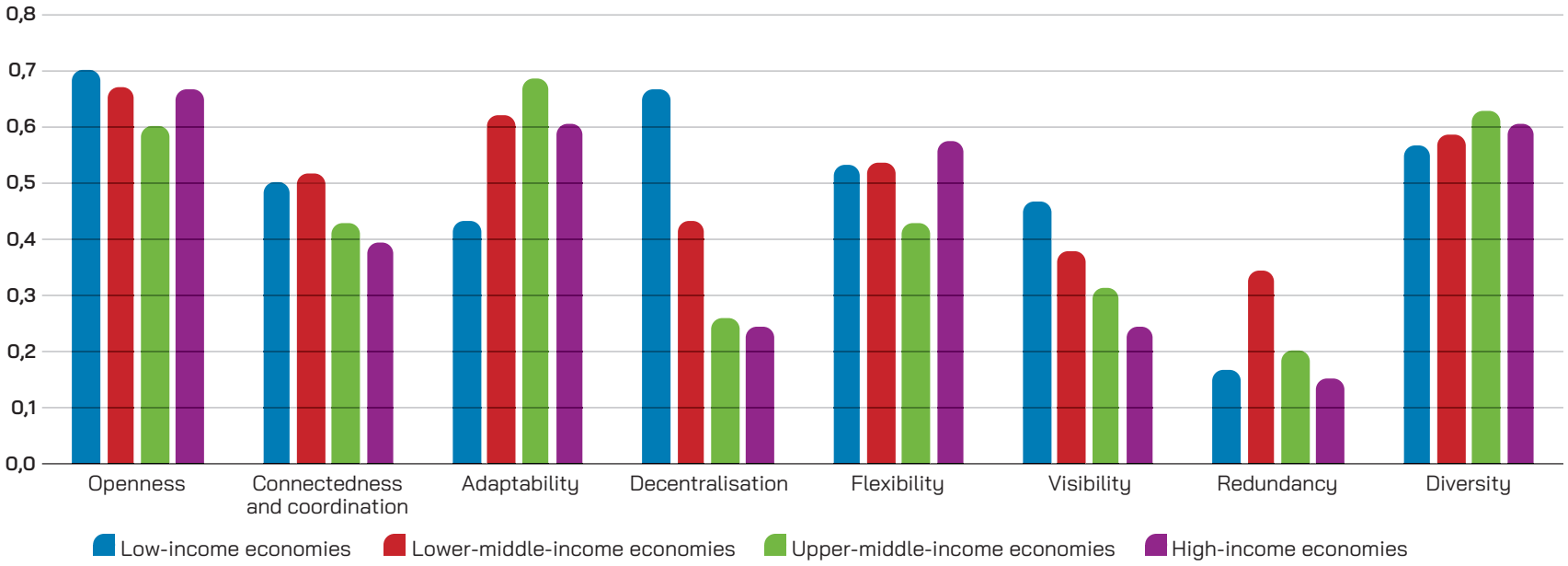
Methodological explanations

- Based on a literature review, several features of CRFS (also called attributes) have been identified as potentially critical in supporting the resilience of food systems. In this survey, we included eight characteristics with their definitions: openness; connectedness and coordination; adaptability; decentralization; flexibility; visibility; redundancy; and diversity.
- The question was: "What are the most important characteristics of your city region food system that enabled these collective actions and public policies to be put in place?" The possible answers were yes/no.
- The proportion of respondents answering yes to each feature was then used in the analysis to highlight the perceived role of the different features in supporting CRFS resilience.

Features of CRFS

- Two features stand out as being perceived as important in the respective CRFS of respondents, and so whatever the level of income: openness (sufficient spatial connection with other food systems enabling alternative food flows) and diversity (of actors in size and function, leaving space for reorganization and increasing flexibility). Diversity is also the most important feature identified in the literature. Flexibility (capacity to diversify value chains (to ensure the continuity of business)) comes as an important complement to diversity.
- Adaptability (food system actors are aware of and have the capacity to adapt and respond quickly and efficiently) is perceived as an existing feature, except in low-income economies, where individual capacities may be limited.
- More surprising at first sight, but consistent with the previous feature, is decentralization (local innovative food system actions are fostered to avoid problems caused by maladapted, top-down, centralized approaches) being important in low-income countries. CRFS actors make do with their local, limited capacities, with low expectations from other levels of government.
- Connectedness and coordination (a governance mechanism exists within your food system to identify, involve and coordinate local food system actors) are much less prominent than potentially expected, despite the importance of governing food systems in the face of crisis and unsustainability. This is especially true in higher-income economies where food systems are more integrated, regulated at the national level, and local governance appears as a new dynamic. This is consistent, with decentralization seldom being an existing feature.

Figure 21 Average perception of CRFS characteristics



Sources: FAO

WHAT GOVERNANCE PRINCIPLES HAVE UNDERPINNED RESPONSES TO THE SHOCKS AND STRESSES?

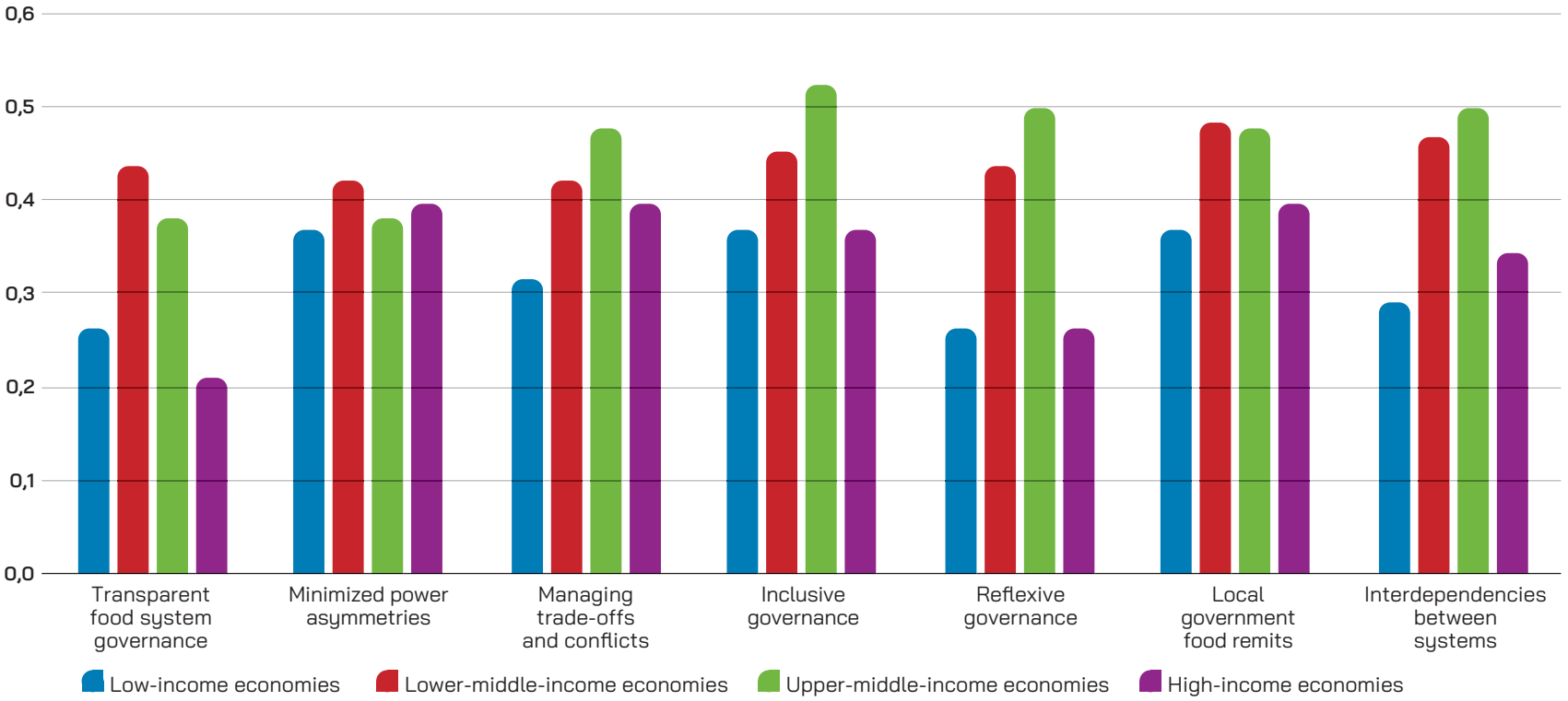
Methodological explanations

- The way a CRFS is governed, heavily conditions its ability to respond to shocks and stresses, and beyond, its transformation. To assess the perception of actors on the governance of their CRFS, a set of principles was identified. It aims to unpack how the coordination and connectedness feature identified in the previous question seems to take shape at the local level.
- Respondents expressed their perception of how each principle was considered or implemented locally with four possible answers: never considered; considered but never implemented; existed before recent shocks and stresses; or has improved following recent shocks and stresses.
- For each of these four possible responses, the proportion of respondents is presented for each principle.

Governance principles _1

- Many principles are perceived as never considered or considered but never implemented, since for many of them, the proportion of respondents is around 40 percent or above.
- A few exceptions exist, mostly in low-income and high-income economies when it comes to transparency of food system governance, reflexive governance and the acknowledgment of interdependences between systems.
- Minimizing power asymmetries within the CRFS and inclusive governance (both probably going hand-in-hand) are among the less considered or implemented principles.
- Considering food as an integral remit of local government is also perceived as challenging.

Figure 22 Never considered + considered but never implemented

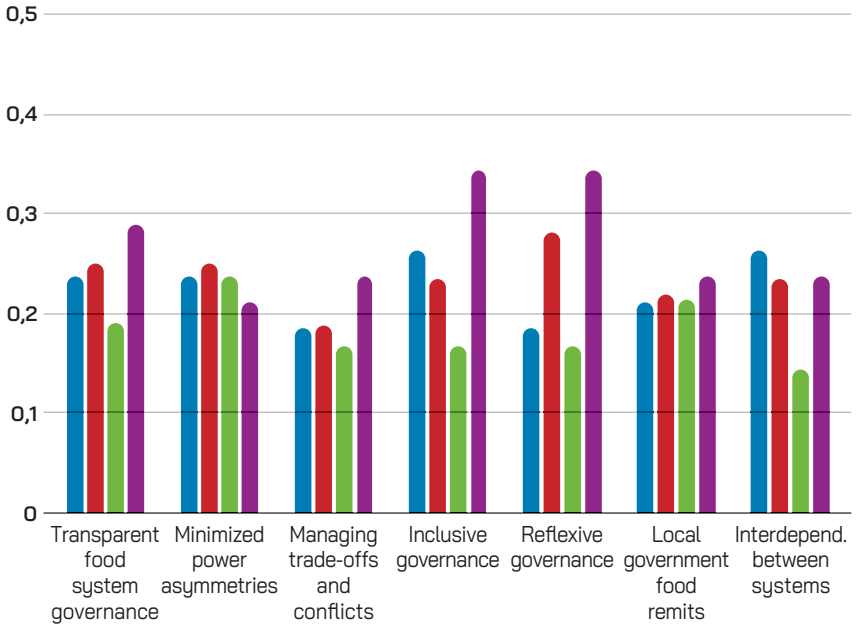


Sources: FAO

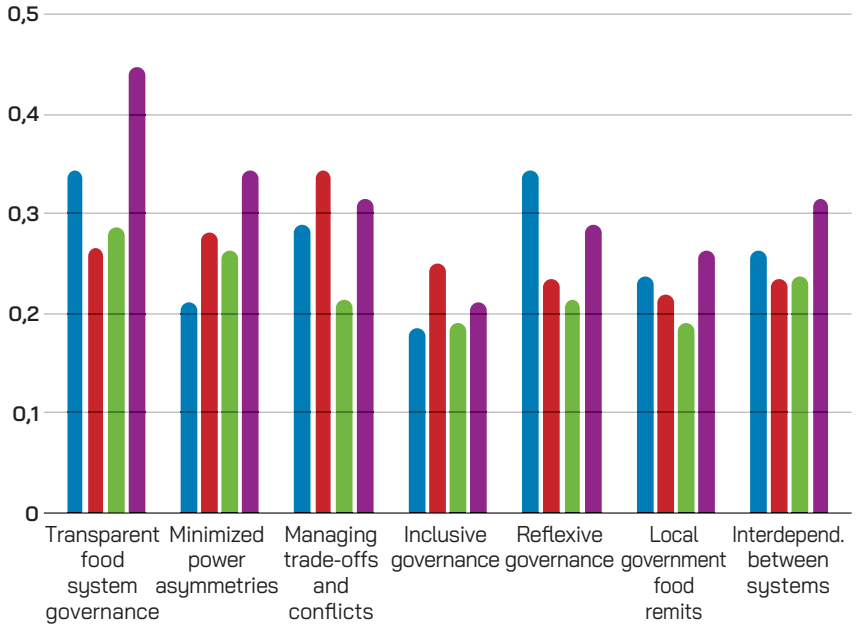
Governance principles _2

- Governance principles are perceived as being poorly implemented before recent shocks and stresses. Apart from a few exceptions, most principles were perceived as existing by only 25 percent or below of respondents.
- Upper-middle-income economies are where respondents perceived governance principles to have been least implemented.
- When they existed before recent shocks, governance principles were perceived as being prioritized differently depending on the level of income. Transparent, inclusive and reflexive governance principles clearly dominate in high-income economies according to respondents' perception. In the other income categories, the difference between principles is much more limited.
- Recent shocks are perceived as having stimulated the implementation of some governance principles, especially in high-income economies, but on a limited scale (between 20 and 30 percent on average).
- Moving towards a more transparent food system governance is perceived as one of the most improved principles in all income categories.
- No principle really stands out beyond transparency.

Figure 23 Existed before recent shocks and stresses



Has improved following recent shocks and stresses



Sources: FAO

OVERALL, WHAT HAVE BEEN THE IMPACTS OF THE COLLECTIVE ACTIONS AND PUBLIC POLICIES MENTIONED IN THE PREVIOUS QUESTION?

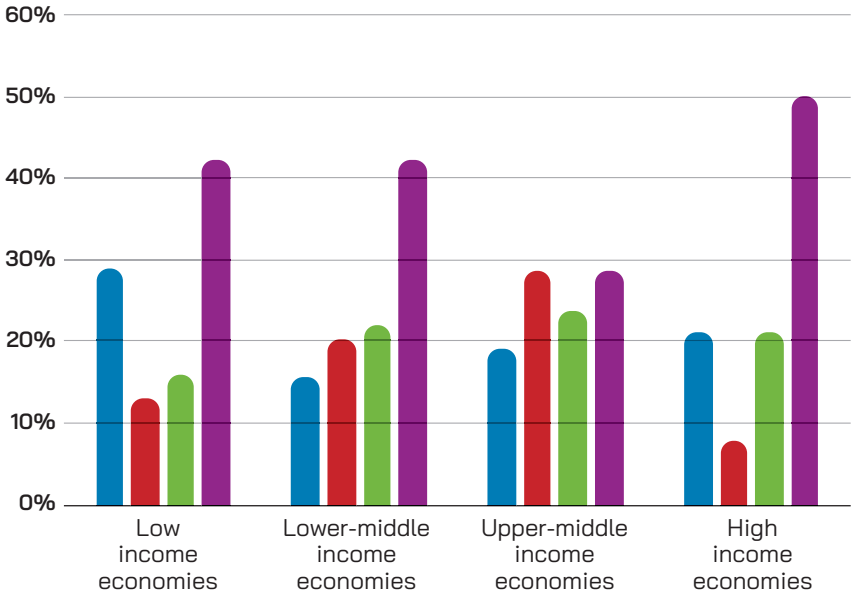
Methodological explanations

- The last question was about the overall perceived consequences of the many changes in the CRFS, i.e. whether, the CRFS has made progress towards sustainability, the ultimate objective.
- The question was: "Overall, what have been the impacts of the collective actions and public policies mentioned in the previous question?". There were four possible and non-exclusive options with a yes/no/I don't know answer: 1/ our food system has rebounded to its pre-shock or stress functioning; 2/ permanent changes of practices have taken place within the food system; 3/ the food system is more resilient to further shocks and stresses; and 4/ the food system is more economically, environmentally, and socially sustainable.
- The answers were grouped according to the following: a yes to 1/ equates back to business as usual; a yes to 2/ and/or 3/ means the CRFS encountered sustainable changes; and all other combinations refer to unsustainable changes.
- The results are then showed according to the income level of economies and the type of respondents.

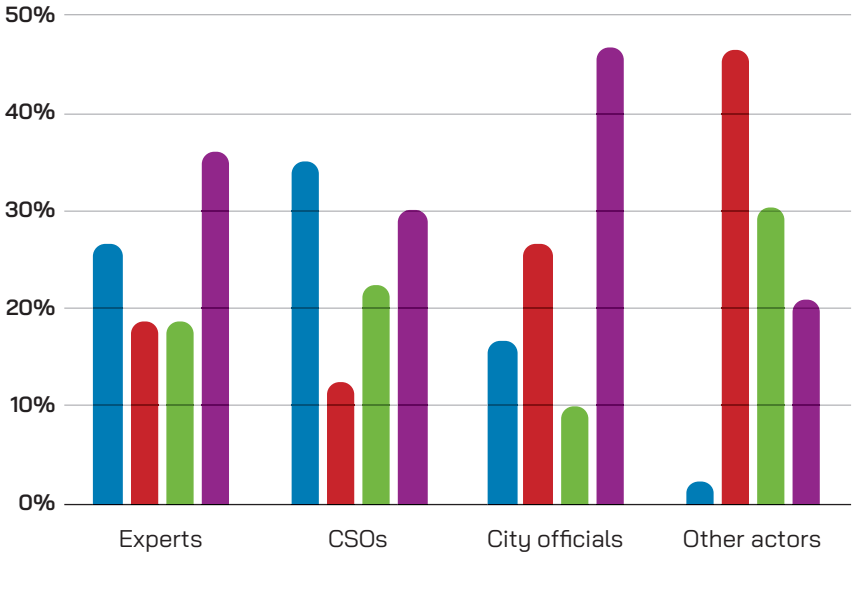
Overall consequences on CRFS

- While changes are perceived to have happened over the past few years, sometimes because of recent shocks and stresses, their overall consequences are clearly not satisfactory: less than 10 percent of respondents in high-income countries perceived their CRFS to be more sustainable, with a maximum of almost 30 percent in upper-middle- income economies.
- What is more worrying is that respondents perceived that the changes are not going in the right direction and their CRFS is less sustainable now than before: 50 percent in high-income economies, 40 percent in low- and lower-middle-income economies, and just under 30 percent in upper-middle-income economies.
- These figures come on top of respondents perceiving changes as mere adjustments to allow their CRFS to go back to business as usual.
- Experts, academics and CSO representatives seem to be more cautious about the outcome of recent changes.
- Interestingly, city officials and representatives are the ones that perceive CRFS as being less sustainable, while other actors (the ones belonging to elements of the food systems) rather believe that the changes are positive. Does it mean that their daily activities are made easier, and therefore more sustainable for them? Or that they perceive the CRFS within which they operate as actually being more sustainable? This would need further work to be clarified.

Figure 24 Sustainability of CRFS by income level



Sustainability of CRFS by actor categories



Sources: FAO

CONCLUSION AND WAY FORWARD

Conclusion and way forward _1

This survey is very rich and provides many insights on the perceptions of CRFS actors. It tackles some critical issues around shocks and their impacts, sometimes individual and sometimes collective capacities to respond to shocks and stresses, the consequences of these responses, and the perceived outcomes on CRFS. It brings to the fore many findings that should be considered rather as hypotheses to be tested in future work than clear evidence, since the number of respondents is too limited to be representative, and the balance between geographies, or type of respondents is skewed. Many respondents were from sub-Saharan Africa, implying either our good ability to reach out to the continent or high interest or urgency of action on a continent facing most striking challenges. Similarly, most respondents are either academics or food system experts, CSO representatives or city officials. It seems more difficult to reach out to the other actors of the food systems, and to get them answering such surveys. Let us then highlight a few interesting findings:

- The number of shocks perceived by CRFS actors is much higher in poor countries. This might be due to either the number of shocks itself, or to the intensity of these shocks (inability of actors to adapt individually to these shocks).
- Not surprisingly, the COVID-19 pandemic has a strong influence on the respondents, whatever the level of income, showing the same very high level of unpreparedness. However, many other shocks are perceived, especially climate related shocks with floods and heavy rainfalls dominating, except in high-income economies where heat events seem important. Economic events are also critical either as primary shocks or spill-over effects of other shocks. Food inflation is one of the most important economic events. Finally, political and civic events are particularly important in low-income economies, with interstate conflicts underscored as one of the most intense.
- The impacts of these shocks are clearly perceived as the most important at the two hands of the food systems: the farmers and the consumers. Famers are likely to suffer a very wide variety of impacts thereby highlighting the immense needs for resilience on the production side, while for consumers, food price increase is clearly seen as the most important impact. In between, for the other actors, income loss, the last impact of any shock on CRFS economic actors, dominates most of the time, whatever the income level.
- There are differences in perception of shocks and their impacts between actors. City officials in lower-income economies seem to perceive a fewer number of significant shocks than other actors. This finding needs to be further investigated since this could challenge the role of local governments in supporting resilience of their CRFS. There seems to be also the case for the impacts of shocks on farming systems that city officials perceive as being much lower than the perception of farmers, experts and CSO representatives.
- The perceived responses of food system actors to these shocks are very much consistent with their impacts: in response to income loss, processors, wholesalers, or retailers, have increased their prices according to the perception of respondents, which could explain the food price increase for consumers; farmers are seen as using their savings and selling some of their assets to cope with impacts of shocks in high-income economies while in low-income economies, changes in practices were perceived as the most important response; consumers are perceived to have mobilized a wide range of strategies along a continuum from stockpiling and home cooked meals when possible, to the point of not being able to cope: resorting to foodbanks when possible and then falling into food insecurity.

Conclusion and way forward _2

- Two striking findings should be highlighted regarding the responses of CRFS actors. First of all, investing in storage and processing capacities, while probably one of the most effective responses to dealing with future shocks as found in literature, remains the answer with the lowest perceived intensity in every income category. Secondly, innovation i.e. enterprises offering new, innovative, alternative manufacturing and processing methods, is not perceived as being an important response from processors and manufacturers.
- Public policies and collective actions were perceived as being more important, and therefore consistent with the perceived increased number of significant shocks, as the level of income decreases. Shocks clearly seem to be windows of opportunity for these type of actions with a lot already perceived as happening before recent shocks, and additional actions and policies being implemented in response to the COVID-19 pandemic.
- The most important characteristics of CRFS that allow the development of collective actions and public policies were clearly perceived as being openness (sufficient spatial connection with other food systems enabling alternative food flows), diversity (of actors in size function, leaving space for reorganization) and flexibility (capacity to diversify value chains to ensure the continuity of business). Connectedness and coordination (a governance mechanism exists within the food system to identify, involve and coordinate local food system actors) are less perceived as a critical feature by CFRS actors despite governance of food systems being at the centre of resilience and sustainability building.
- This is confirmed when asking actors about changes in governance principles. Only between 20 percent and 30 percent of respondents perceived that governance principles existed before the COVID-19 pandemic. Transparent, inclusive and reflexive governance principles clearly dominate in high-income economies according to respondents' perception. In the other income categories, the difference between principles is much more limited. The pandemic played an important part in supporting the implementation of these principles since between 20 percent and 30 percent of respondents perceived improvements in their implementation. However, what is more worrying is that many of these principles are still perceived as never having been considered or implemented, by 40 percent of respondents or above. Many more efforts are needed to support food system governance.

From this survey, it appears that shocks and stresses affecting food systems are probably more frequent than often perceived, which make the difference between a shock (with objective impacts) and a crisis (where the subjective dimension comes into play to trigger collective awareness). Some actors perceived shocks, impacts and responses differently in this respect; while numerous shocks and stresses are sometimes windows of opportunity for systemic changes as perceived by CRFS actors here. However, the overall consequences are not always feeding a sustainability transition. Indeed, less than 10 percent of respondents in high-income countries perceived their CRFS to be more sustainable, with a maximum of just under 30 percent in middle-income economies. What is more worrying is that respondents perceived that the changes are not going in the right direction and their CRFS is less sustainable now than before: 50 percent in high-income economies, 40 percent in low- and lower-middle-income economies, and slightly below 30 percent in upper-middle-income economies.

While the results of this survey should be taken with caution, they hint at the need to go into deeper analysis to really understand what is currently happening (or not) and what is actually at play. To move in this direction, this survey has been followed by the unravelling of 11 case studies which brought additional insights about the resilience of CFRS (https://www.fao.org/in-action/food-for-cities-programme/global-study/en/).