

COUNTRY BRIEF

The global food and economic crisis' impact on food system resilience: Bangladesh



November, 2023

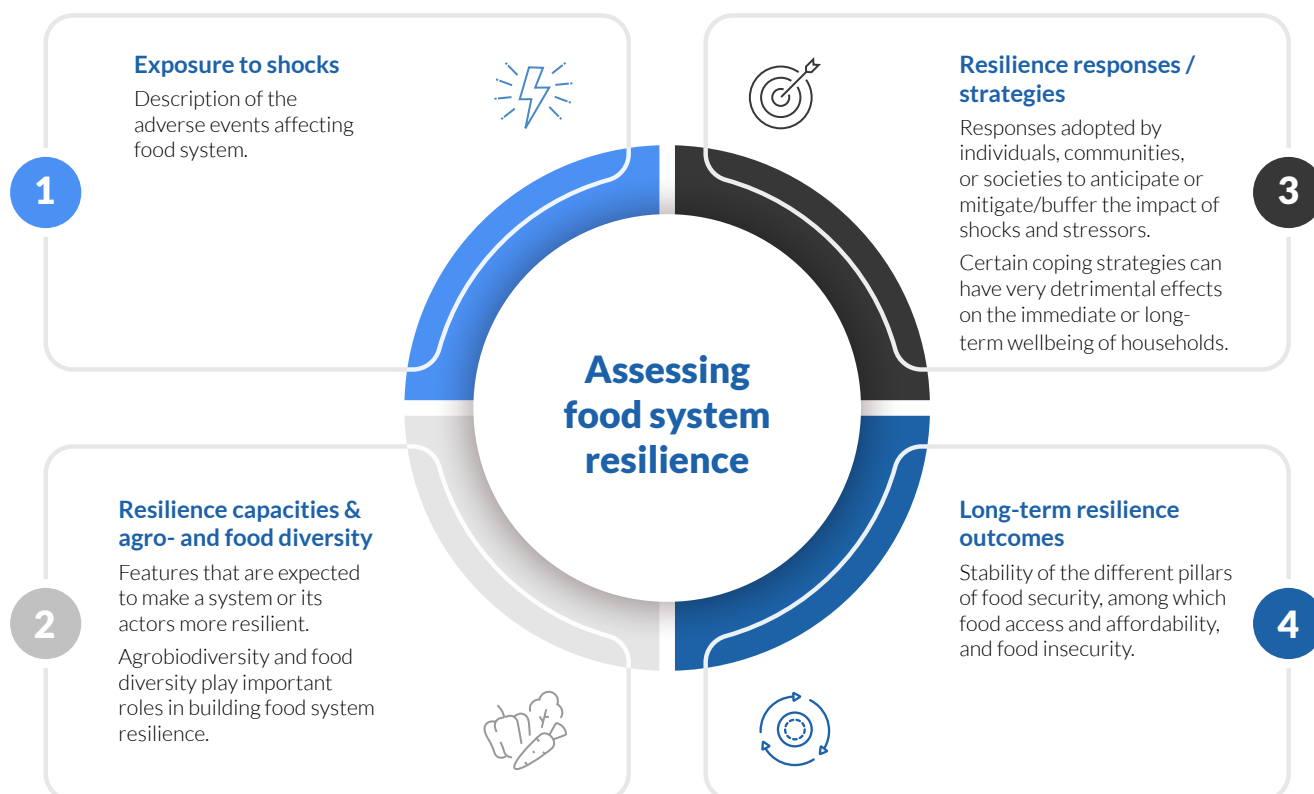
Background

The war in Ukraine has major implications for food security and diets across the world, given both countries' key roles in global food markets and Russia's prominence in global energy trade. The resulting global food and economic crisis risks heightening inequalities and vulnerabilities in a world still confronting the effects of the COVID-19 pandemic. In this context, food system resilience is crucial to maintain or adapt its functions in the face of shocks, and ultimately for system sustainability. Through a series of key indicators, this brief describes how the food system has been affected by this ongoing crisis and provides an overview of its resilience and potential opportunities for building resilience further.

Assessing food system resilience

Food system resilience is defined as “the ability of different individual and institutional food system actors to maintain, protect, or quickly recover the key functions of that system despite the impacts of disturbances”¹. Drawing from the conceptual framework established by the Food Systems Countdown Initiative², food system

resilience was measured through 4 main indicator domains. Findings presented in this section were derived from national level data, and would therefore not enable the detection of likely food system subnational variabilities.



¹ Fanzo J, Haddad L, Schneider KR, Béné C, Covic NM, Guarin A, et al. Viewpoint: Rigorous monitoring is necessary to guide food system transformation in the countdown to the 2030 global goals. *Food Policy*. 2021;104

² <https://www.foodcountdown.org/about>

HOW HAS BANGLADESH BEEN EXPOSED TO SHOCKS SINCE 2020?

In the last 3 years, Bangladesh has faced shocks that have affected the food system and its resilience in various ways. Like the rest of the world, the country was hit by the COVID-19 pandemic in March 2020. To minimize COVID-19 spread, the government rapidly implemented strict containment strategies such as school closure, restrictions of movements (e.g., countrywide lockdowns, curfews, travel restrictions) and public gatherings among others, which can impact various domains of the food system (e.g., supply chain, consumer environment, consumer behaviors). After this initial phase, those stringent measures were adapted based on transmission rates but remained at a high level until mid-2021. After this point, the measures were then progressively lifted. Following the same timeline, the government also adopted supportive economic policies and social protection programs, which included measures such as emergency cash transfer to informal workers and vulnerable households (Figure 1).

Overall, the Bangladesh currency (Bangladeshi Taka, BDT) exchange rate – relative to the US dollar (USD) – has been relatively stable pre-crisis, ranging between 78 and 84 BDT per USD from 2012 to 2019. During the crisis period, this stability persisted in 2020 and 2021. However, a change in trend was observed in 2022, with an 8% depreciation of the BDT (from 85 to 92 BDT per USD).

Due to a combination of political, geographic, and social factors, Bangladesh is recognized as highly vulnerable to climate change impacts and is ranked 163rd out of 185 countries in the 2021 ND-GAIN Index³. Besides shocks related to the COVID-19 pandemic and the war in Ukraine (which are also captured in WFP Bangladesh Market Monitor reports), Bangladesh is also prone to numerous natural hazards, such as floods, cyclones, earthquakes, and droughts. Cyclones and floods particularly cause massive damages, such as the ones experienced in 2017, 2019, 2020, and 2022 (Figure 3). In addition to these climatic events, a 2022 report also cited increased temperatures and salinity intrusion as significantly exacerbating vulnerabilities and impacting people's food security by lowering agricultural productivity and threatening rural livelihoods⁴.



³ The ND-GAIN Country Index summarizes a country's vulnerability to climate change and other global challenges in combination with its readiness to improve resilience. <https://gain.nd.edu/>

⁴ Chowdhury, Rahman, Al Amran et al. (2022). Climate change impacts on food system security and sustainability in Bangladesh. 10.21203/rs.3.rs-1673139/v1

Figure 1: COVID-19 - government response 2020-2022

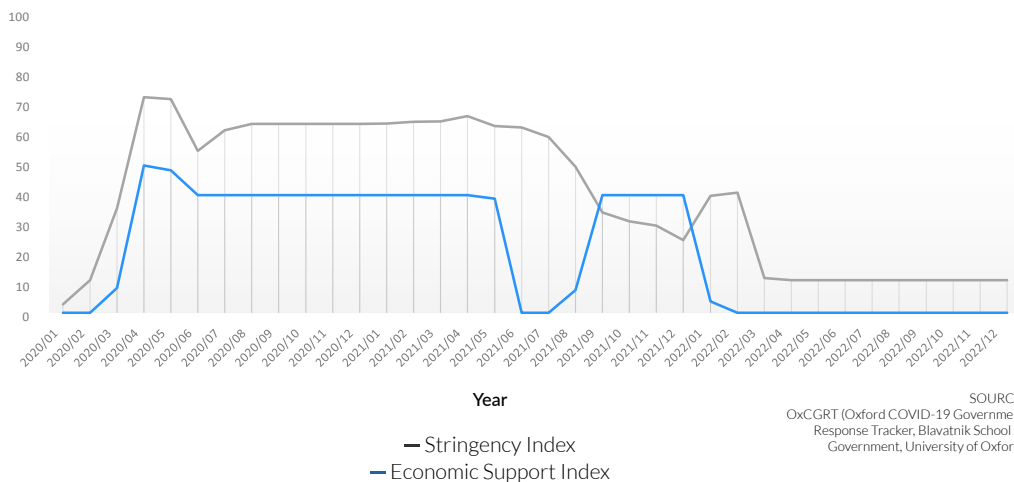


Figure 2: Exchange rate 2010-2021

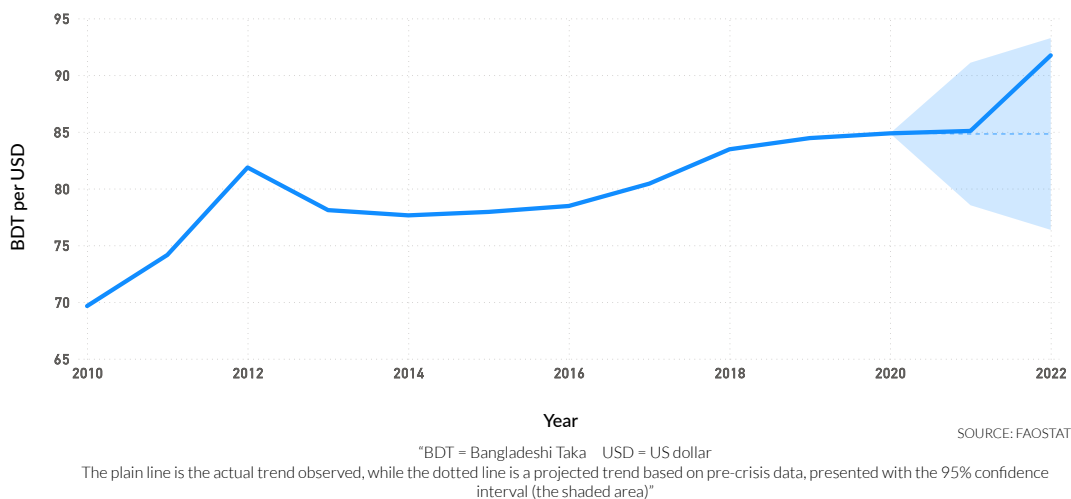
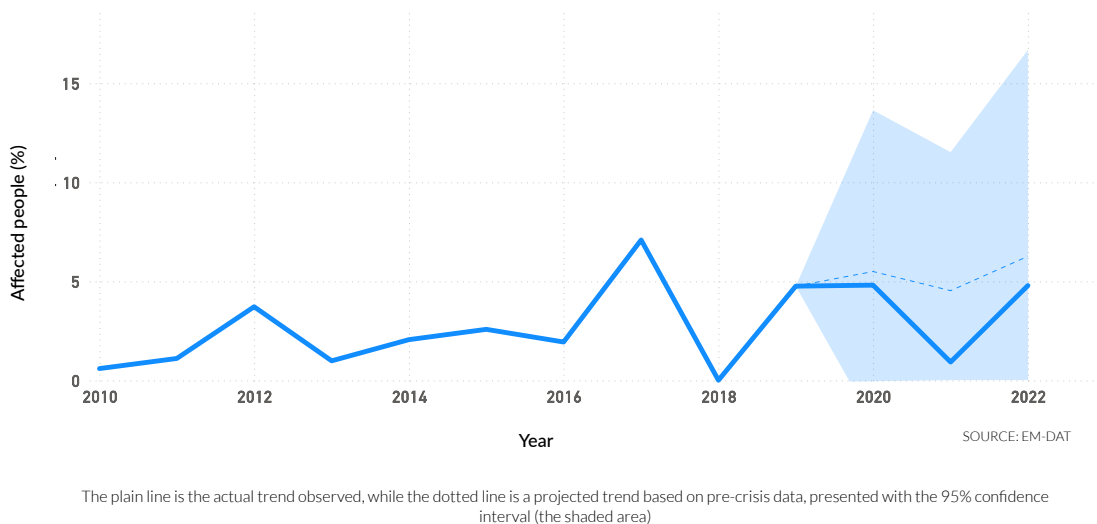


Figure 3: Ratio of affected people (from natural disasters) to the total population 2010-2022



HOW HAVE RESILIENCE CAPACITIES AND AGRO- AND FOOD-DIVERSITY BEEN AFFECTED?

According to country-level statistics, food system resilience capacities seem to have stood up reasonably well to the successive shocks, although lack of data did not enable us to assess changes in food imports (Table 1).

With respect to domestic production, results show a steady increasing trend in crop production from 2010 to 2016, and a marked growth in 2017 (8%) followed by a period of stability in 2018-19. During the crisis period, crop production slightly increased in 2020 and rose more markedly in 2021 (index=117, 2014-2016=base 100). Similarly, livestock production increased at a constant rate from 2010 to 2021, except for a noticeable decline in 2019 (Figure 4). In addition, the consumption of fertilizer sustained a constant growth from 213 to 319 kilograms per hectare of arable land between 2010 and 2018, and then stabilised with marginal fluctuations in 2019 and 2020.

The lack of data after 2020 prevents us to see the impact of the war in Ukraine on the fertilizer market. However, the ActionAid 2023 report⁵ states that fertilizer prices have risen by 105% in Bangladesh since the onset of the war. This increase is attributed to the disruption in global production and supply chains, leading some farmers to reduce fertilizer application. Consequently, this has led to lower yields, reduced agricultural output, particularly in rice production, and contributed to increased food prices and food insecurity⁶. Additionally, the increased prices of corn and soybeans have affected Bangladesh's feed sector, consequently impacting livestock production⁷.

Changes in volumes of food imports could not be assessed due to lack of data from global sources. However, data from the Food Planning and Monitoring Unit of the Ministry of Food, revealed that in the 2020-21 fiscal year, both public and private sectors imported over 1.3 million tons (MMT) of rice and 5.2 MMT of wheat. The total import of food grains (public and private) for the fiscal year 2021-22 was 5.00 MMT, with 0.99 MMT of rice and 4.01 MMT of wheat and during the fiscal year 2022-23, the import of grains was estimated at 4.9 MMT.

Reports indicate that global supply chain disruptions have constrained food commodity imports, particularly wheat and vegetable oils, leading to significant hikes in inflation and domestic food prices. Notably, disruptions in wheat imports from Russia and Ukraine have pushed Bangladesh to substantially reduce its budget for grain imports in the 2022-23 fiscal year⁸.

Additionally, trade restrictions by major vegetable oil exporters have kept vegetable oil prices at record levels, escalated import costs, and deepened Bangladesh's food system vulnerabilities⁹.

Mobile cellular subscriptions – a proxy of country's infrastructure level and therefore an important indicator for resilience – were continuously increasing from 2010 to 2021, but sustained a 4 point decline in 2022 (Figure 5). However, these national data do not allow us to observe the differences between urban and rural areas, gender disparities or other subnational variation. A 2023 publication highlighted the gender gap in cell phone usage in rural Bangladesh, pointing out limited digital connectivity among rural women, impacting their job opportunities, financial access, and access to knowledge of best practices, consequently affecting agricultural outcomes.

Social capital index – which reflects the strength of personal and social relationships, institutional trust, social norms, and civic participation in a country – was fairly stable from 2010 to 2018 (index around 47 on average) and rose by 6 points in 2019 (index=53). During the crisis period, the index sustained moderate variations, falling back to 50 in 2021, but rising again to reach 54 in 2022, and declining by 3 points in 2023 (Figure 6).

⁶ Diao X.; Dorosh P.; Smart J.; Thurlow J. 2022. Country Brief 3 - Bangladesh: Impacts of the Ukraine and Global Crises on Poverty and Food Security. Global Crisis, Country Series. IFPRI.

⁷ Mamun A.; Glauber J W.; and Laborde Debucquet D. 2023. How the war in Ukraine threatens Bangladesh's food security. In *The Russia-Ukraine Conflict and Global Food Security*, eds. Joseph Glauber and David Laborde. Section Four: Country Impacts and Responses: Asia, Chapter 34, Pp. 175-180. https://doi.org/10.2499/9780896294394_34

⁸ WFP. *Bangladesh Market Monitor*. May-July 2023

⁹ Sufian, Farha D.; Nico, Gianluigi; and Azzarri, Carlo. 2023. *Examining the gender digital divide: A case study from rural Bangladesh*. GCAN Policy Note 15. Washington, DC: International Food Policy Research Institute (IFPRI). <https://doi.org/10.2499/p15738coll2.136919>.

Table 1: Evolution of indicators of 'resilience capacities and agro- and food-diversity' domain from pre-crisis to crisis period, Bangladesh

Resilience sub-domain	Indicator	Unit	Data period covered	Desirable direction	Actual direction during crisis*	Trend analysis
Food produced domestically	Crop production index (2014-2016=100)	Index	2010-2021	↑	↑	Overall upward trend pre-crisis, which continued in 2020-21
	Livestock production index (2014-2016=100)	Index	2010-2021	↑	↑	Overall upward trend pre-crisis until 2018. Moderate drop in 2019. Upward trend resumed during crisis period (2020-21)
	Fertilizer consumption	Kg /ha of arable land	2010-2020	→ or ↑	→	Overall upward trend pre-crisis until 2018. Stabilization in 2019-2020
Imported food	Food import - healthy NCD-protect	Kg /capita		↑		No data available
	Food import - unhealthy NCD-risk	Kg /capita		↓		No data available
Infrastructure	Mobile cellular subscription	Number / 100 people	2010-2022	↑	→	Steady increasing trend pre-crisis, continued in 2020-21 but slight decline in 2022
Social capital	Social capital index	Index	2010-2023	↑	→	No marked variation from 2010 to 2018, moderate increase in 2019. No substantial change during crisis period.

* Trend appraisal and comparison between average crisis period and pre-crisis average (2018-2019 depending on data availability)

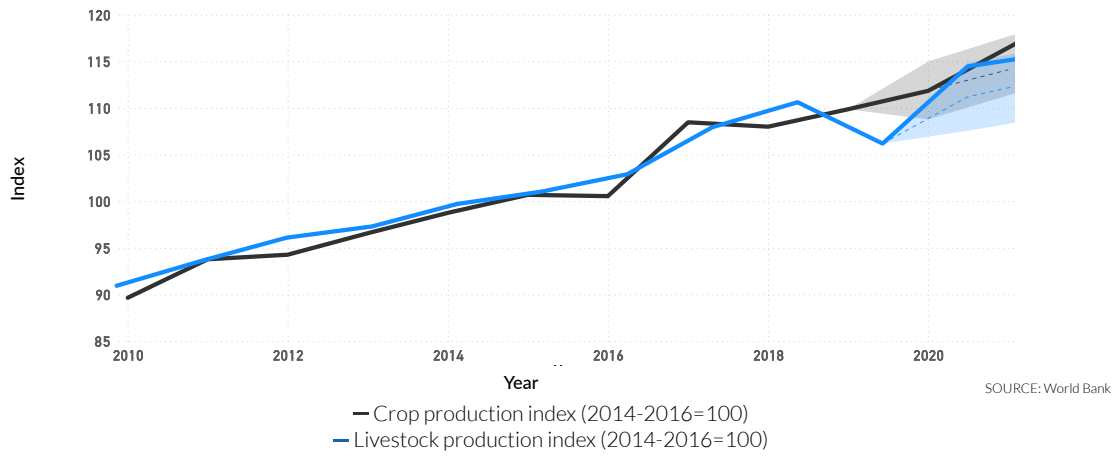
Desirable direction: ↑ denotes a higher value is more desirable, ↓ denotes a lower value is more desirable.

Actual direction : a blue arrow denotes no substantial changes and stable value, a green arrow (up/down) denotes a direction similar to the desirable one, a light green arrow (diagonal up/down) denotes a direction similar to the desirable one but less pronounced, a red arrow (up/down) denotes an opposite direction to the desirable one, an orange arrow (diagonal up/down) denotes an opposite direction to the desirable one but less pronounced

Kg= kilograms; ha= hectare

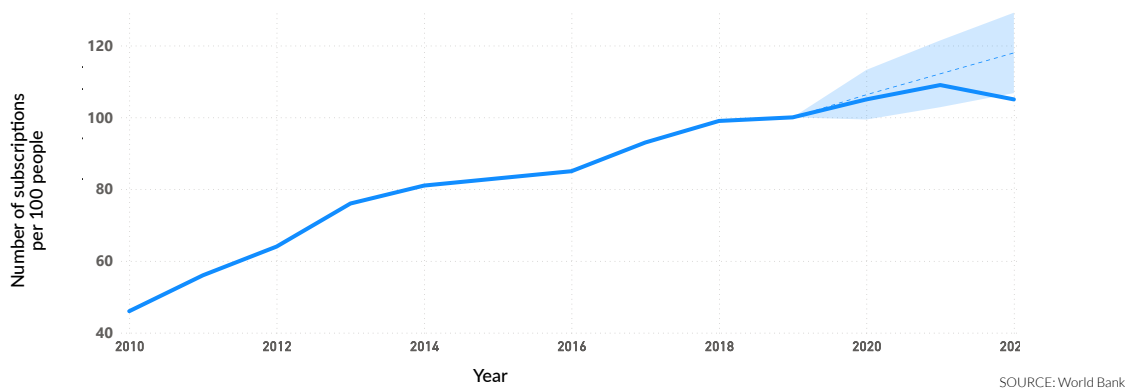
NCD= non-communicable diseases

Figure 4: Domestic production indices 2010-2021 (2014-2016=100)



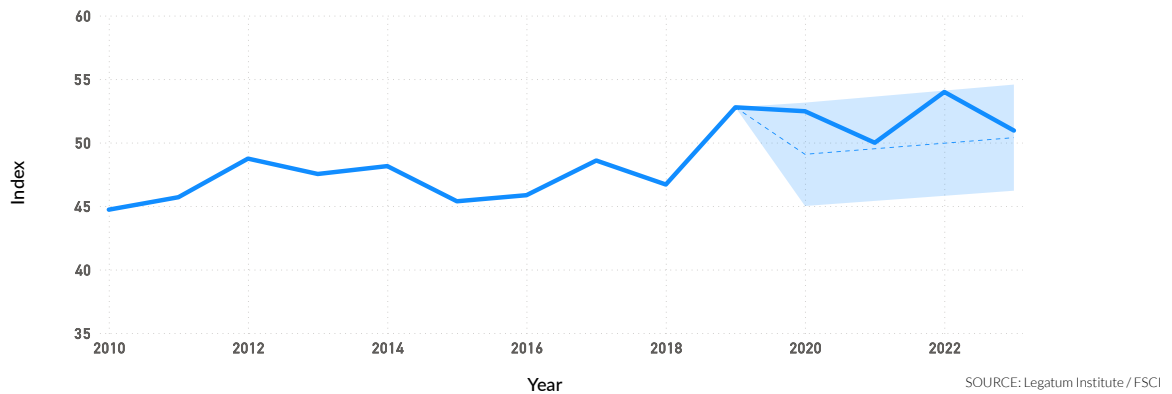
The plain line is the actual trend observed, while the dotted line is a projected trend based on pre-crisis data, presented with the 95% confidence interval (the shaded area)

Figure 5: Mobile cellular subscriptions 2010-2022, country level



The plain line is the actual trend observed, while the dotted line is a projected trend based on pre-crisis data, presented with the 95% confidence interval (the shaded area)

Figure 6: Social capital index 2010-2023



The plain line is the actual trend observed, while the dotted line is a projected trend based on pre-crisis data, presented with the 95% confidence interval (the shaded area)

RESILIENCE RESPONSES / STRATEGIES AND LONGER-TERM RESILIENCE OUTCOMES

Based on the analysis of national level data, while changes in the use of coping strategies could not be assessed due to lack of pre-crisis data, indicators measuring food system resilience outcomes, and more particularly those related to food prices and food supply variability, show a deterioration since the start of the crisis (Table 2). A WFP Bangladesh market monitor report¹⁰ indicates that this deterioration has translated into an exacerbation of households' food insecurity and an increased rate of malnutrition with disparities among population groups – especially the most vulnerable – and/or geographical areas.

After a peak at 7.9% in 2013-14, annual food price inflation in Bangladesh fell by 3.4 points the next two years, rose and reached 7.2% in 2017, and sustained a slight decline in 2018-2019. During the crisis period, food price inflation levelled off between 5% and 6% in 2020-21 and increased moderately in 2022 to reach 7.7% (Figure 7). According to the Bangladesh Bureau of Statistics¹¹, food price inflation continued to rise throughout the year 2023, reaching almost 13% in October 2023. Surprisingly, results show a divergent trend for food price anomalies (IFPA) for rice and wheat. Price growth for rice was considered to be abnormally high in 2020 (IFPA=1) before returning to normal in 2021 and 2022. It might be that world price changes in 2022 had not transmitted to local markets. IFPA for wheat, on the other hand, indicate an alarming situation – after three years of normal price growth (from 2018 to 2020), wheat price was abnormally high in 2021 (IFPA=1) and soared in 2022, as shown by the IFPA at 2.7 (Figure 8).

Pre-crisis, food supply variability was stable from 2016 to 2018 but increased moderately (by 7 points) in 2019. National food supply variability does not seem to have been strongly impacted

by the current crisis, as it maintained at 38 kcal/capita/day in 2020 and slightly decreased in 2021 to reach 34 kcal/capita/day (Figure 9). To some extent, this indicates the ability of the food system to sustain a low variability in the food supply in the face of shocks.

The steady declining trend in the share of the population unable to afford a healthy diet persisted in 2020-21 – although it is important to notice that it remained overall at a high level (Figure 10) – while prevalence of moderate or severe food insecurity has been stable during the reporting period (2017-2021). However, it is important to acknowledge that lack of data for 2022 and 2023 does not enable us to assess further the effect of the on-going crisis as part of this analysis, and national averages conceal disparities within the country or among specific vulnerable population groups. Diet quality has worsened for many households with rising food prices. It is estimated that more than 32 billion people became deprived of at least one additional food group for a healthy diet and led to an increase in inequalities¹². Country-level data¹³ emphasizes how the food and economic crisis has negatively impacted food security among the population over the last two years. As a result of reduced household income alongside elevated food prices, households are purchasing cheaper food and in smaller quantities. Although food insecurity affects the entire country, significant differences exist across regions, where certain households suffer more than the average due to increased susceptibility to natural disasters (e.g., Sylhet and Khulna divisions). Variances are also evident among income groups, particularly impacting lower-income households and populations living in slums.



¹⁰ WFP. Bangladesh: Food Security Monitoring May - August 2023 - Remote Household Food Security Survey Brief.

¹¹ Bangladesh Bureau of Statistics. Consumer Price Index (CPI) and Inflation Rate (IR) Year-2023. <https://bbs.gov.bd/site/page/29b379ff-7bac-41d9-b321-e41929bab4a1/>

¹² Diao X.; Dorosh P.; Smart J.; Thurlow J. 2022. Country Brief 3 - Bangladesh: Impacts of the Ukraine and Global Crises on Poverty and Food Security. Global Crisis, Country Series. IFPRI.

¹³ WFP. Bangladesh: Food Security Monitoring May - August 2023 - Remote Household Food Security Survey Brief.

Table 2: Evolution of indicators of 'resilience responses / strategies' and 'longer-term resilience outcomes' domains from pre-crisis to crisis period, Bangladesh

Resilience sub-domain	Indicator	Unit	Data period covered	Desirable direction	Actual direction during crisis*	Trend analysis
Coping strategies	Livelihood coping strategy (LCS): None (N) Stress (S) Crisis (C) Emergency (E)	% population	2010-2021	↑ N ↓ S, C, E		Insufficient pre-crisis data available (only 2020-23)
	Reduced Coping Strategy Index (rCSI)	Index	2010-2021	↑ L ↓ M,H		No data available
Food price volatility	Food price annual inflation	%	2010-2020	↓	↗	Overall declining trend from 2014 to 2019 (except 2017). Stabilization in 2020-21, and slight increase in 2022.
	Food Price Anomalies (IFPA), wheat	Index	2015-2022	↓	↑ →	Rice: High variations. Normal price growth in 2018 and lower than expected in 2019. In 2020, abnormally high price growth and back to normal in 2021-22. Wheat: normal price growth from 2018 to 2020. Abnormally high price growth in 2021, even more in 2022.
Food supply variability	Food supply variability	Kcal / capita / day	2010-2021	↓	→	Stable trend from 2016 to 2018. Moderate increase in 2019, which stabilized in 2020. Slight decrease in 2021.
Food security	% population experiencing moderate or severe food insecurity	% population	2015-2021	↓	↓	No substantial variations during pre-crisis and crisis period.
	% population who cannot afford a healthy diet	% population	2017-2021			Steady downward trend from 2017 to 2019, which continued in 2020 and 2021.

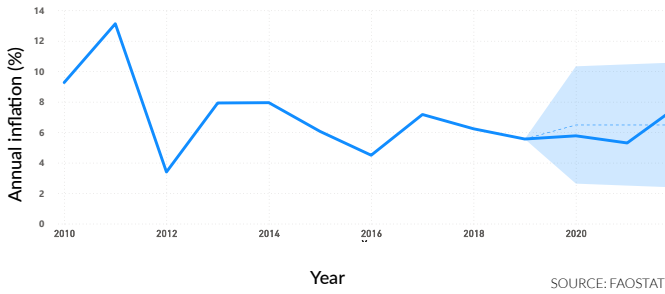
* Trend appraisal and comparison between average crisis period and pre-crisis average (2018-2019 depending on data availability)

Desirable direction: ↑ denotes a higher value is more desirable, ↓ denotes a lower value is more desirable.

Actual direction : a blue arrow denotes no substantial changes and stable value, a green arrow (up/down) denotes a direction similar to the desirable one, a light green arrow (diagonal up/down) denotes a direction similar to the desirable one but less pronounced, a red arrow (up/down) denotes an opposite direction to the desirable one, an orange arrow (diagonal up/down) denotes an opposite direction to the desirable one but less pronounced

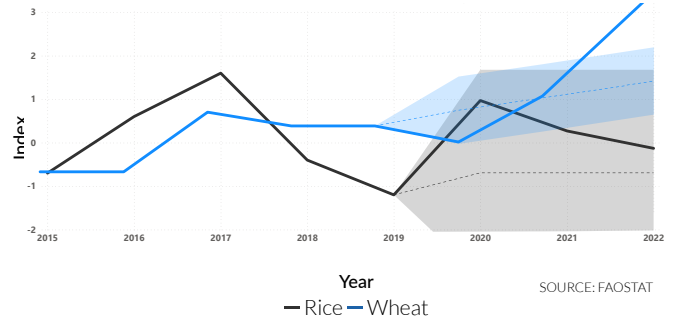
IFPA = indicator of food price anomalies; Kcal= kilocalories

Figure 7: National food price inflation 2010-2022



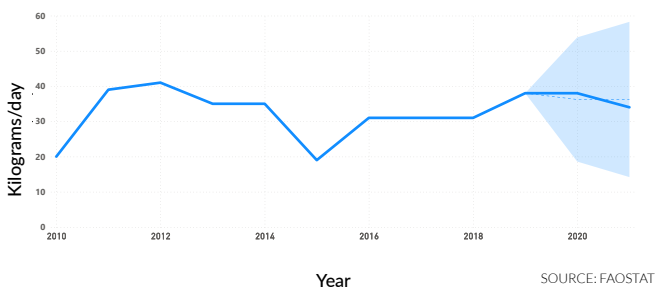
The plain line is the actual trend observed, while the dotted line is a projected trend based on pre-crisis data, presented with the 95% confidence interval (the shaded area)

Figure 8: Food Price Anomalies (IFPA) 2015-2022
Rice and Wheat, country level



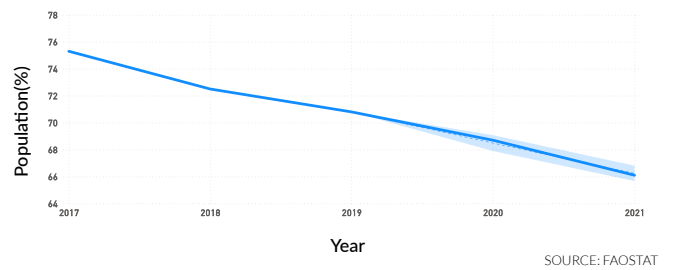
The plain line is the actual trend observed, while the dotted line is a projected trend based on pre-crisis data, presented with the 95% confidence interval (the shaded area)

Figure 9: Per capita food supply variability 2010-2021, country level



The plain line is the actual trend observed, while the dotted line is a projected trend based on pre-crisis data, presented with the 95% confidence interval (the shaded area)

Figure 10: National share of the population unable to afford healthy diet 2017-2021



The plain line is the actual trend observed, while the dotted line is a projected trend based on pre-crisis data, presented with the 95% confidence interval (the shaded area)



CONTEXTUAL SPECIFICITIES AND VULNERABILITIES

GEOGRAPHIC VULNERABILITY AND CLIMATE CHANGE:

Bangladesh's geographical location places it in the path of frequent natural disasters such as cyclones, floods, and storm surges. These recurring events disrupt both food production and distribution systems, causing extensive damage to crops and infrastructure, thereby posing a formidable challenge to the resilience of the food system. In specific areas, recurrent natural disasters like flash floods, heatwaves, and cyclones have significantly heightened the risks faced by households, especially those already more vulnerable. These events result in the loss of vital seeds and crops, hinder access to markets, and reduce income opportunities. Consequently, a growing number of households are compelled to adopt negative coping strategies to secure access to food. As one of the world's most climate-vulnerable nations, Bangladesh confronts rising sea levels, soaring temperatures, and unpredictable weather patterns that further compound its vulnerabilities. Climate change translates into reduced agricultural productivity, crop losses, and an increased salinity threat in coastal regions, all of which collectively undermine food security.

RURAL-URBAN DISPARITIES:

There are considerable disparities between urban and rural areas in terms of food security and access to resources. Rural communities often face challenges related to limited infrastructure, healthcare, and education, impacting their resilience during crises. At the same time, Bangladesh is experiencing rapid urbanization, resulting in the growth of slum populations. These marginalized communities often rely on low-wage, informal labor and face challenges accessing adequate nutrition and healthcare.

OVERPOPULATION AND LIMITED ARABLE LAND:

With a high population density, Bangladesh faces the challenge of feeding a large number of people within its limited land resources. Bangladesh has a constrained amount of arable land relative to its population. This limitation intensifies the pressure on the agricultural sector to meet the food demand, making it susceptible to fluctuations in production and food prices.

DEPENDENCY ON RICE PRODUCTION AND WHEAT IMPORT:

Rice and wheat are staple foods in Bangladesh, and the country heavily depends on rice production and wheat imports. Any disruption in rice production and failure of the global chains, whether due to climate-related events, pests, or market fluctuations, can have a significant impact on food security.

GENDER DISPARITIES:

Gender disparities in Bangladesh have implications for food system resilience. Women often have limited access to resources, including land, credit, and decision-making power, which can hinder their ability to cope with food system shocks. Poor maternal nutrition outcomes and early marriage further exacerbate these disparities, affecting women's health and their children's nutrition.

Impact of food system: further results

In addition to food price inflation, further analyses on a few food commodities show that prices have risen in a steep curve since the start of the crisis in 2020. In 2023, the aggregated mean food prices at national level was around 75% higher than the 2017-18 baseline (Figure 11). The trend is similar across divisions but varies across food items: compared to the baseline, price of wheat flour and palm oil more than doubled (although price of palm oil initiated a decline in 2023) while price of rice rose to a lesser extent (a bit more than 20% - Figure 12). Surprisingly, the impact on the overall cost of nutritious diet appears negligible, with no substantial changes compared to pre-crisis and the lowest variation among the 5 assessed countries in the region (Figure 13). The cost of diet which meets energy requirement however increased by around 25%, which suggests that energy-dense foods such as rice, wheat and other cereals, sugars and oils increased in price to a greater extent than nutrient-dense foods (such as animal sourced foods, fruits and vegetables, among others).

In contrast with the other countries in the region, cost of living pre-crisis was stagnating (2018) and even slightly increased (2019). Surprisingly, the observed rise in food prices does not seem to have had an impact, as cost of living levelled off the two first years of the crisis (2020-21) and started to reduce in 2022 (Figure 15). Similarly, the share of food expenditure remained stable and slightly above 50% throughout the reporting period (Figure 14). With respect to income, the pre-crisis upward trend of both urban and rural households' disposable income persisted during the crisis, although a slight downturn can be noticed in 2020 (Figure 16).

Volumes of NCD¹⁴-risk food sales has not varied substantially during the reporting period, despite a marginal decline in 2020. In contrast, volumes of NCD-protect food sales steadily increased pre-crisis (from 117 in 2010 to 164 Kg per capita in 2019). This upward trend was sustained during the crisis period, with even a slightly steeper slope

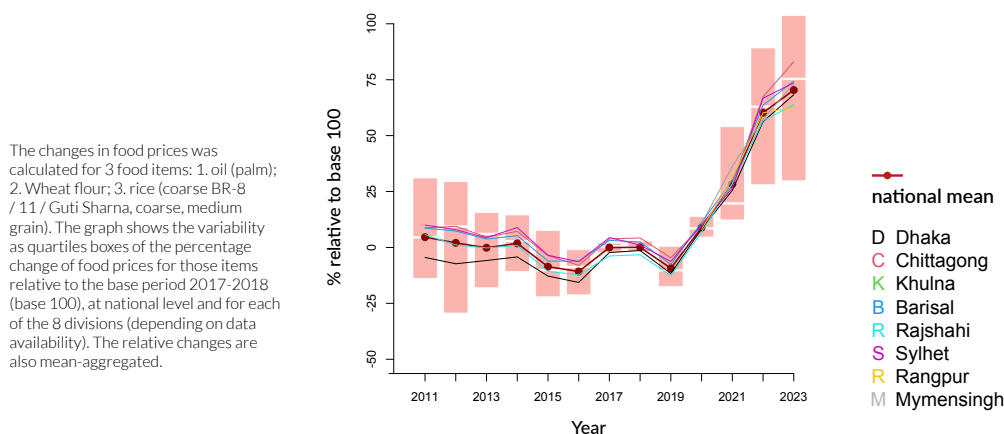
than projected. In 2022, volumes reached 196 Kg per capita (Figure 17). This seems to be primarily due to sales of "other vegetables" and "other fruits", which constitutes the majority of the NCD-protect food sales (Figure 18).

Because of insufficient data at the national level, changes in households' food security during the crisis period compared to pre-crisis could not be assessed. However, partially available data for food consumption score (FCS) in 2020 and 2022 show a marked increase in the proportion of households with acceptable FCS. This trend persisted until October 2022 but fell by 19 points in November to attain 54% while those with borderline FCS increased as much and reached 42%. The proportion of households with poor FCS remained relatively stable and at a low level (4% on average) from August 2022 onwards (Figure 19).

A Dikoda survey in Bangladesh focused on the challenges faced by urban food vendors during the crisis in Dhaka and Chittagong¹⁵. Urban food vendors play a critical role in urban food systems, bridging the gap between producers and consumers. They provide essential insights into the impact of the crisis on diets, consumption, and the resilience of vulnerable populations. The crisis disrupted food systems in urban areas, affecting access to diverse and fresh foods. In Bangladesh, respondents reported significant disruptions in market access and supply chains. Most businesses experienced reduced income, with limited operational cost reductions. Vendors adapted to the crisis by diversifying products, introducing new items, sharing workforces, and adopting new distribution methods. The variations in impacts underline the resilience of urban food vendors in Bangladesh.

FOOD PRICES AND COST OF DIET

Figure 11: Changes in prices 2011-2023 (2017-2018 = 100), 3 food commodities, country level and 8 divisions



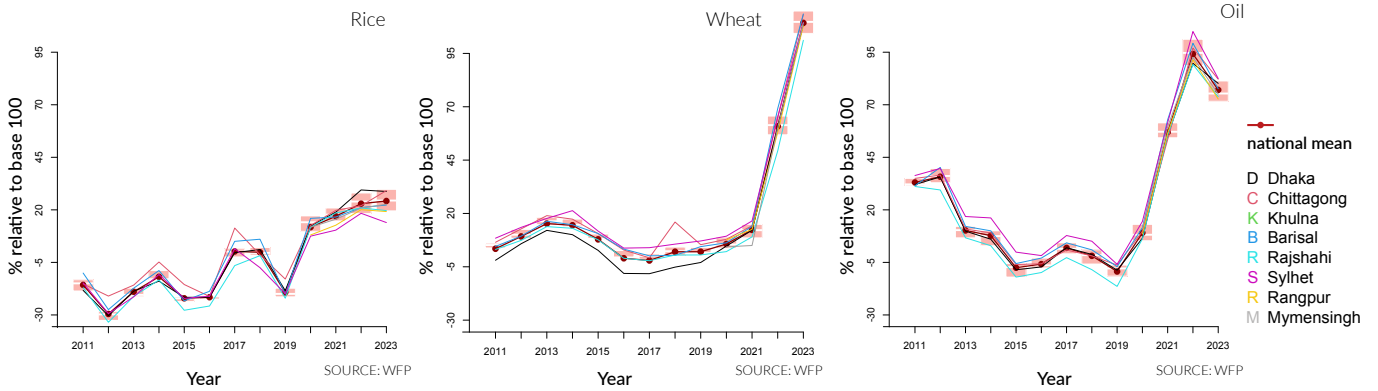
SOURCE: WFP

¹⁴ NCD= non-communicable diseases

¹⁵ Chittagong n=50, Dhaka n=28,

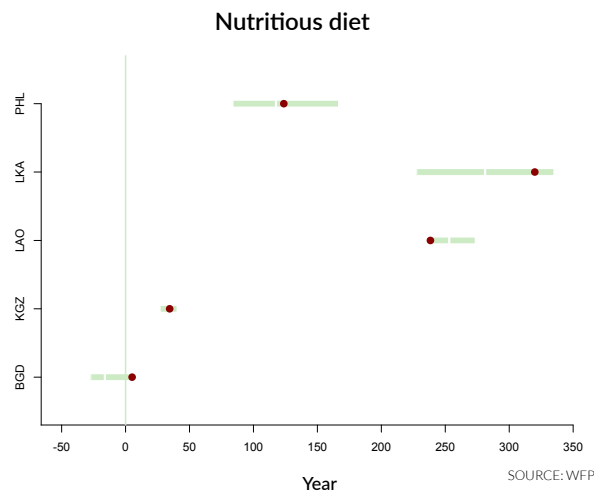
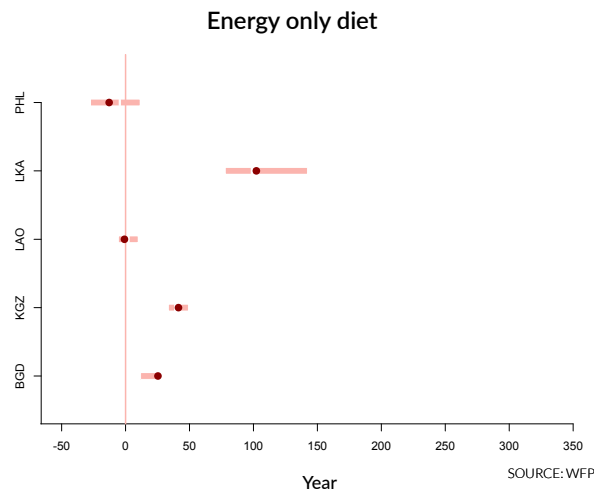
¹⁶ **Profile of Food Businesses:** These businesses ranged in size from small ventures with two employees to large corporations with up to 4000 individuals. It is important to note that this survey does not represent an even distribution among countries. Responses were more abundant in Myanmar and Sri Lanka, with fewer contributions from Pakistan and the Philippines. Food vendors represented a broad spectrum of categories, including agriculture/food production, food manufacturing/processing, food storage/supply, food retail/catering, and others. While most business types were evenly distributed across countries, Myanmar and Sri Lanka had a higher proportion of food retail/catering businesses. Unprocessed foods such as fresh meat, fish, fruits, vegetables, nuts, seeds, and legumes were staples across all countries. However, many vendors also sold processed or manufactured foods, sugary or fatty drinks, deep-fried items, and even infant formula and packaged foods for children under two years. Most vendors reported catering to consumers of all ages and genders. In some countries, a significant portion sold primarily to adults over 20. A smaller percentage served adolescent boys and girls or young children.

Figure 12: Changes in food prices 2011-2023 (2017-2018 = 100), rice, wheat flour and palm oil, country level and 8 divisions



The graph shows the variability as quartiles boxes of the percentage change of food prices for those items relative to the base period 2017-2018 (base 100), at national level and for each of the 8 divisions. The relative changes are also mean-aggregated.

Figure 13: Change in daily cost of diet (energy only and nutritious) pre-crisis and crisis period, 5 countries



This figure shows the change in CoD crisis period relative to pre-crisis for 5 countries in the region at national level (red dot) as well as the variability across provinces (box plots showing the 25%, median and 75% illustrating the spread of the values).

Pre-crisis and crisis periods:

- Bangladesh: September 2016; August 2022
- Kyrgyz Republic, November 2017; October 2022
- Laos: March 2017; October 2022
- Sri Lanka: June 2016; June 2022
- Philippines: September 2015; October 2022

FOOD EXPENDITURE, INCOME, AND FOOD SALES

Figure 14: Household food expenditure share, 2017-2022, 5 countries

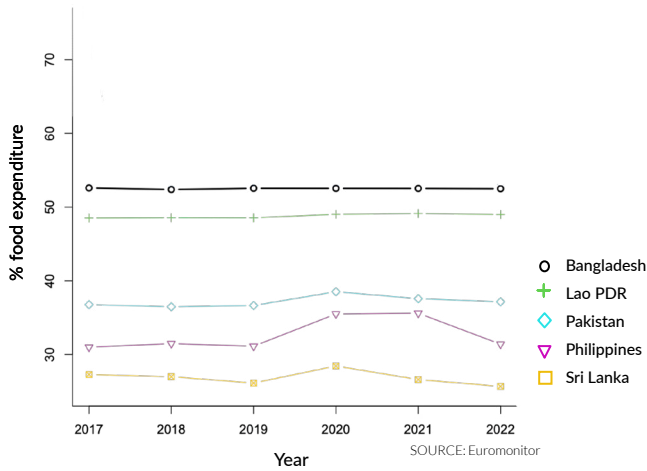


Figure 15: Cost of living (internationally comparable) 2017-2022, 5 countries

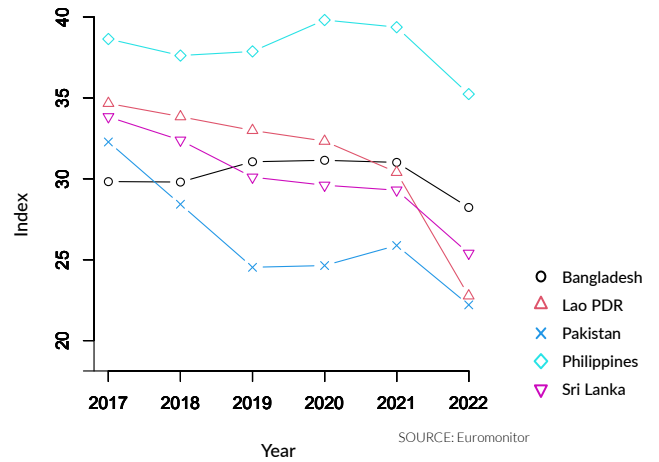


Figure 16: Urban and rural disposable income 2015-2022, 6 countries

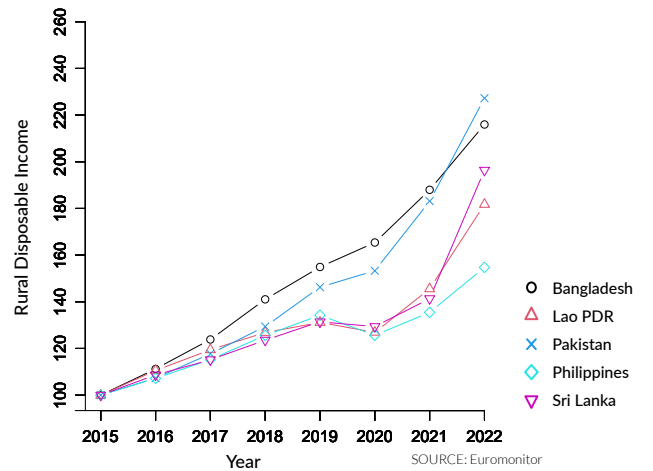
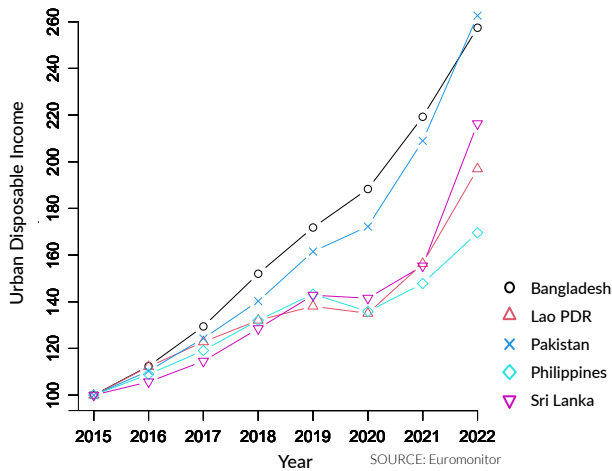
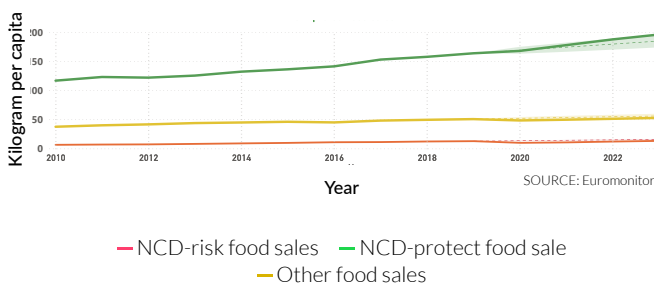
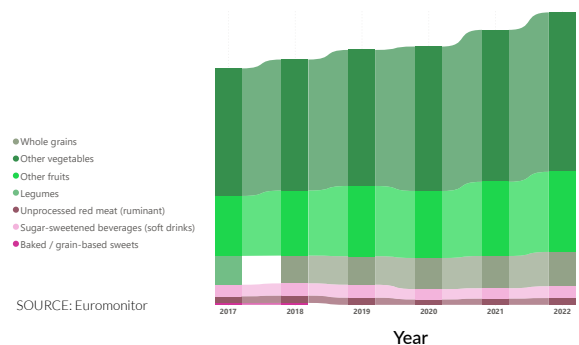


Figure 17: Food sales 2010-2023, country level



NCD: non-communicable diseases.
The plain line is the actual trend observed, while the dotted line is a projected trend based on pre-crisis data, presented with the 95% confidence interval (the shaded area).

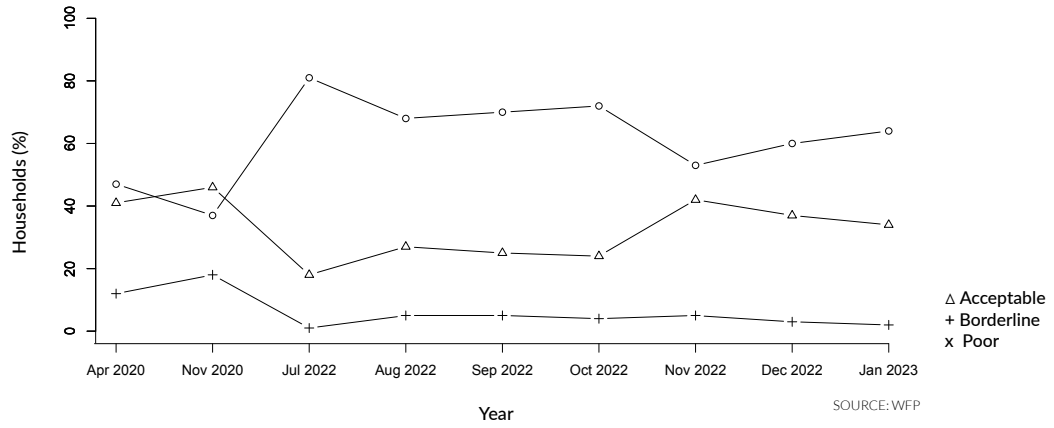
Figure 18: Country-level food sales 2017-2022 (volume per capita), top 3 NCD-protect and NCD-risk food groups



*NCD: non-communicable diseases.
This indicators shows the total volume of sales (kilograms or liters, depending on type of food) by year for the top 3 NCD-protect and NCD-risk food groups (DQQ, see figure 18). The top 3 food groups are defined as the food groups with the highest volumes sold for a given year. The NCD-protect food groups are displayed with a range of green color and the NCD-risk food groups with a range of red colors."

FOOD SECURITY AND DIETS

Figure 19: Households' food consumption scores Apr 2020-Jan 2023, country level



OPPORTUNITIES FOR BUILDING FOOD SYSTEM RESILIENCE

CROP DIVERSIFICATION AND INSURANCE FOR RESILIENCE:

Bangladesh's heavy reliance on rice calls for crop diversification to bolster resilience. Encouraging the cultivation of alternative crops helps mitigate the risks tied to rice production fluctuations caused by climate change, pests, and market shifts. Collaborative efforts between the World Food Programme (WFP) and the government, including the promotion of crops like lentils, enhance food system resilience by reducing dependence on a single crop. Additionally, the introduction of a crop insurance program, jointly supported by WFP and the government, provides farmers with a safety net, enabling recovery from seed and crop losses during natural disasters and fostering agricultural sustainability.

GENDER EQUALITY INITIATIVES FOR IMPROVED FOOD SECURITY AND NUTRITION:

Efforts to eliminate gender disparities play a pivotal role in fortifying food security and nutrition in Bangladesh. By bolstering the standing of women and facilitating their improved access to resources, education, and healthcare, the overall resilience of households and communities can be substantially enhanced. Initiatives designed to address issues related to maternal nutrition and early marriage hold the potential to effect positive change, elevating the health and nutrition status of both women and children.

SUPPORT FOR INFORMAL WORKERS:

Recognizing the vulnerabilities of informal workers, especially women, providing support through economic policies and social protection programs can enhance the resilience of households and the food system during crises. Emergency cash transfers to vulnerable households can act as a safety net.

URBAN FOOD SYSTEMS:

Recognizing the vital role of urban food vendors in bridging the gap between producers and consumers, support and enhance urban food systems to build resilience. These vendors can adapt to disruptions and ensure the availability of diverse and fresh foods in urban areas.

FERTILIZER MARKET STABILITY:

Ensuring the stability of the fertilizer market is vital for agricultural productivity. Measures to address disruptions in the global supply chain, such as increasing domestic fertilizer production, can reduce dependency on imports and mitigate price fluctuations.

DIGITAL CONNECTIVITY:

Addressing digital disparities and improving access to mobile phones, especially in rural areas, can enable better access to information, job opportunities, and financial services. Bridging the digital gender gap is crucial for empowering women in agriculture.

SUPPLY CHAIN MANAGEMENT AND MARKET LINKAGE:

Improving policies and establishing strong institutional support are essential for fostering connections between smallholders and markets. Providing services like training, education and assistance in food safety, food processing, post-harvest handling, and logistics arrangements for small-scale farmers will empower them to enhance farming practices and make informed investment decisions. Additionally, investing in rural infrastructure, securing land tenure and property rights, and implementing regulations on pesticide use, food standards, and seed quality will also contribute farmers to successfully navigate evolving market conditions.

STRENGTHEN FOOD PRICE MONITORING AND REGULATION:

Enhancing food price monitoring and regulation mechanisms can mitigate inflation. Continuous tracking of food prices and market availability is essential, especially for essential food items. Authorities should consider policies that stabilize food prices and ensure affordability for consumers.

URBAN INFRASTRUCTURE MANAGEMENT:

Investing in infrastructure to connect cities with surrounding rural areas is crucial for promoting market access for rural farmers and generating employment within the food system. Engaging with local communities and stakeholders through workshops, participatory mapping, and focus groups is essential to developing new urban plans and projects that align with the needs and preferences of citizens, particularly vulnerable groups. Strengthening urban governance and building capacity to implement coherent and comprehensive urban strategies and plans are necessary. This includes coordinating and collaborating across sectors and levels of government, efficiently and equitably mobilizing and allocating resources, and monitoring and evaluating urban performance and outcomes.

Notes on methodology

DATA SOURCES AND METHODOLOGY

For assessing the impact of food and economic crises on diets among vulnerable groups across urban and rural areas in selected countries, we employed a multi-faceted methodology. **Primary Data Collection:** We conducted food vendor surveys in various cities to understand how the COVID-19 pandemic and the war in Ukraine affected businesses in the food sector. **Secondary Data Analysis:** We analyzed data from diverse sources, including food trade data, the Euromonitor International market sales database, and Cost of Diet data from the Fill the Nutrient Gap (FNG) initiative by WFP RBB. This analysis helped us examine changes in food imports, assess sales of both healthy and unhealthy food items, and study the affordability of diets, particularly for vulnerable groups. **Modeling:** We utilized economic shocks models to explore how change in food imports and sales affect food security and diets. We used techniques like Principal Component Analysis, Canonical Correlation Analysis, t-SNE, and Multivariate Random Forest to understand how changes in the food environment, income, and inflation influence food security.

To evaluate food system resilience, we selected specific indicator domains, curating data from various sources to understand changes over time and trends. We assessed food system resilience through various indicators, covering economic stability, natural disaster impact, COVID-19 stringency, domestic food production, imported food percentages, infrastructure, social capital, coping strategies, food price volatility, food supply stability, and food security. These indicators provided a comprehensive perspective on resilience across economic, environmental, and social dimensions. We also conducted semi-structured interviews with experts from WFP country offices to gather qualitative insights and identify opportunities to enhance resilience. Ethical standards were upheld throughout the study, with participants providing consent, data privacy and confidentiality being respected. Our research adhered to the TRUST code, a global code of conduct for equitable research partnerships.

The research was conducted between January 2023 and November 2023.

LIMITATIONS

For some indicators, there was limited data available, which restrained the ability to conduct further analyses on specific food system areas or to assess the impact of the current crisis. For example, there was no data for food imports, and insufficient data available to assess changes in livelihood or food-based coping strategies, and in food consumption. Moreover, several indicators for food system resilience only had data available up to 2020 or 2021 (e.g., domestic production, fertilizer consumption, food supply variability), therefore the potential effect of the war in Ukraine - which started in February 2022 - could not be captured.

Furthermore, for the indicator "food consumption score", sampling and/or data collection methods may have varied across time periods. This may affect comparability and therefore interpretability of the results presented.

With respect to most indicators, the analysis was conducted at the level of the country, potentially masking subnational variabilities (e.g., across different regions, or across urban/rural areas) and/or disparities among specific groups (e.g., most vulnerable groups). Further research would be warranted to shed light on these variations.

DEFINITIONS OF KEY TERMS

Crisis period: the on-going food and economic crisis results from a combination of two main shocks: the COVID-19 pandemic (from March 2020) and the Ukraine and Russia war (from February 2022).

Food system: "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).

INDICATOR DEFINITIONS

Indicator domain	Indicator	Definition	Data source
Exposure to shocks	Exchange rate	Annual exchange rates. Local currency units per US dollar.	FAOSTAT
	Ratio of affected people to the total population	Natural disasters include biological (animal accident, epidemic, insect infestation), climatological (drought, glacial lake outburst, wildfire), geophysical (earthquake, mass movement - dry, volcanic activity), hydrological (flood, landslide, wave action), and meteorological disasters (storm, extreme temperature, fog). Total people affected include the total of injured (including hospitalization), affected (number of houses damaged multiplied by the family size), and homeless people (number of houses destroyed multiplied by the family size). Note: proportion of the total population may be an overestimation, as people may have been counted more than once for a given year, if they have been affected by different natural disasters throughout that year.	EM-DAT
	COVID-19 Stringency Index	Composite indicator calculated by using nine scaled indicators, including eight containment and closure policy indicators (school closing, workplace closing, cancel public events, restrictions on gatherings, close public transport, stay at home requirements, restrictions on internal movement, and international travel controls) and one indicators of public information campaigns, rescaled to a value from 0 to 100 (100 = strictest).	OxCGRT
	COVID-19 Economic Support Index	Composite measure based on four indicators: direct transfers to people not working due to the pandemic; debt relief for households; fiscal spending to stimulate the economy; and international support, rescaled to a value from 0 to 100 (100 = highest).	OxCGRT
Resilience capacities and agro-food diversity	Crop production index (2014-2016 = 100)	Agricultural production for each year relative to the base period 2014-2016. It includes all crops except fodder crops. Regional and income group aggregates for the FAO's production indexes are calculated from the underlying values in international dollars, normalized to the base period 2014-2016.	World Bank
	Fertilizer consumption	Quantity of plant nutrients used per unit of arable land. Fertilizer products cover nitrogenous, potash, and phosphate fertilizers (including ground rock phosphate). Traditional nutrients--animal and plant manures--are not included.	World Bank
	Livestock production index (2014-2016 = 100)	Includes meat and milk from all sources, dairy products such as cheese, and eggs, honey, raw silk, wool, and hides and skins. It shows the relative level of the aggregate volume of agricultural production for each year in comparison with the base period 2014-2016.	World Bank
	Food import NCD-protect, NCD-risk food groups	This indicator was created using the data available in the United Nation's Comtrade database. Annual food import data was downloaded with the Harmonized System (HS) Codes 6-digits that is a standardized numerical method of classifying traded products. These commodity groups were re-categorized into standard Diet Quality Questionnaire (DQQ) food groups. Classification as NCD-risk and NCD-protect food groups was done based on the Global Dietary Recommendations (GRD) guideline. NCD-Protect: foods protective against noncommunicable diseases (whole grains; legumes/pulses; vitamin A-rich orange vegetables; dark green leafy vegetables; other vegetables; vitamin A-rich fruits; citrus; other fruits; nuts and seeds). NCD-Risk: foods related to noncommunicable diseases (baked/grain-based sweets; other sweets; processed meat; unprocessed red meat - ruminant; unprocessed red -non ruminant; packaged ultra-processed salty snacks; instant noodles; sugar-sweetened beverages).	UN Comtrade
Resilience responses and strategies	Mobile cellular subscription	Mobile cellular telephone subscriptions are subscriptions to a public mobile telephone service that provide access to the PSTN using cellular technology. The indicator includes (and is split into) the number of postpaid subscriptions, and the number of active prepaid accounts (i.e. that have been used during the last three months). The indicator applies to all mobile cellular subscriptions that offer voice communications. It excludes subscriptions via data cards or USB modems, subscriptions to public mobile data services, private trunked mobile radio, telepoint, radio paging and telemetry services.	World Bank
	Social capital index	A composite index based on a subset of indicators from the Social Capital pillar of the Legatum Prosperity Index, which assesses social cohesion and engagement, community and family networks, and political participation and institutional trust. The index is scaled to a value that ranges from 0 (low) to 100 (high).	Legatum Institute/ FSCI
	Reduced Coping Strategy Index (rCSI)	Measure of the frequency and severity of household behaviors when faced with shortages of food or financial resources to buy food. It is calculated using five standard food consumption-based strategies and severity weighting, a higher score indicates more frequent and/or extreme negative coping strategies.	WFP ^b
	Livelihood coping strategy - Food security	Indicator used to understand households' medium and longer-term coping capacity in response to lack of food or lack of money to buy food and their ability to overcome challenges in the future. The indicator is derived from a series of questions regarding the households' experiences with livelihood stress and asset depletion to cope with food shortages.	WFP ^b

Indicator domain	Indicator	Definition	Data source
Longer-term resilience outcomes	Food price inflation ^a	Inflation is measured in terms of the annual growth rate and in index, 2015 base year.	FAOSTAT
	Food Price Anomalies (IFPA), by type of product (Rice)	Identifies market prices that are abnormally high. The IFPA relies on a weighted compound growth rate that accounts for both within year and across year price growth. The indicator directly evaluates growth in prices over a particular month over many years, taking into account seasonality in agricultural markets and inflation, allowing to answer the question of whether or not a change in price is abnormal for any particular period.	FAOSTAT
	Food Price Anomalies (IFPA), by type of product (Wheat)		
	Food supply variability ^a	This indicator uses the data on dietary energy supply from the Food Balance Sheet to measure annual fluctuations in the per capita food supply (kcal), represented as the standard deviation over the previous five years per capita food supply. Food supply variability results from a combination of instability and responses in production, trade, consumption, and storage, in addition to changes in government policies such as trade restrictions, taxes and subsidies, stockholding, and public distribution.	FAOSTAT
	% population experiencing moderate or severe food insecurity	The prevalence of moderate or severe food insecurity is an estimate of the percentage of people in the population who live in households classified as moderately or severely food insecure. The assessment is conducted using data collected with the Food Insecurity Experience Scale (FIES) or a compatible experience-based food security measurement questionnaire. A household is classified as moderately or severely food insecure when at least one adult in the household has reported to have been exposed, at times during the year, to low quality diets and might have been forced to also reduce the quantity of food they would normally eat because of a lack of money or other resources.	FAOSTAT
	% population who cannot afford a healthy diet ^a	Proportion of the population whose food budget is below the cost of a healthy diet. The food budget is defined as 52% of household income, based on the average share of income that households in low-income countries spend on food. Income data are provided by the World Bank's Poverty and Inequality Platform. A value of zero indicates a null or a small number rounded down at the current precision level.	FAOSTAT
Food prices and cost of diet	Changes in food prices	The changes in food prices was calculated for 3 food items 1. oil (palm); 2. Wheat flour; 3. rice (coarse BR-8 / 11 / Guti Sharna, coarse, medium grain).	Economic: Prices-Dataviz WFP - VAM ^b
Food prices and cost of diet	Changes in daily cost of diet (energy only and nutritious)	The Cost of Diet (CoD) is a method to model the cost of a theoretical, simulated diet (food basket) which satisfies recommended energy requirements of a household of specific composition of interest (e.g. breastfed child, lactating mother, and other members) at the minimal possible cost, based on the availability, price, and nutrient content of local foods.	WFP FSOM ^b
Food expenditure, income and food sales	Per capita food expenditure share	Indicator used to measure households' economic vulnerability. It determines the economic vulnerability without the need of having a reference to a poverty line or minimum expenditure basket. The higher the share of households' consumption expenditures on food - out of the total consumption expenditure - the more vulnerable the households are to food insecurity.	Euromonitor
Food expenditure, income and food sales	Cost of living	Cost of Living Index by Income (internationally comparable) is a price index that measures relative cost of living over time in a chosen income decile. Cost of Living Index is a weighted average of Index of Consumer Prices by category and consumer expenditure by income deciles, adjusted to Price Level Index.	WFP ^b
Food expenditure, income and food sales	Income	Disposable income is gross income less social security contributions and income taxes.	WFP ^b
Food expenditure, income and food sales	Food sale (volume per capita)	This indicator was created using the data in Euromonitor International database https://www.euromonitor.com/ . Market research data on food sales was downloaded and food groups were categorized into standard Diet Quality Questionnaire (DQQ) food groups. Classification as NCD-risk and NCD-protect food groups was done based on the Global Dietary Recommendations (GRD) guideline. NCD-Protect: foods protective against noncommunicable diseases (whole grains; legumes/pulses; vitamin A-rich orange vegetables; dark green leafy vegetables; other vegetables; vitamin A-rich fruits; citrus; other fruits; nuts and seeds). NCD-Risk: foods related to noncommunicable diseases (baked/grain-based sweets; other sweets; processed meat; unprocessed red meat - ruminant; unprocessed red -non ruminant; packaged ultra-processed salty snacks; instant noodles; sugar-sweetened beverages).	WFP ^b
Food security and diets	Food consumption score	This indicator is associated with household food access, and is therefore a proxy for household food security. The FCS is used to classify households into three groups: poor, borderline or acceptable food consumption. These food consumption groups aggregate households with similar dietary patterns - in terms of frequency of consumption and diversity - and access to food.	WFP ^b

^a Estimated data^b Country level data



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