Annexes

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Annex 1.
Multiple crises matrix methodology

Rationale for the selection of indicators and thresholds

The multiple crises matrix presented in this report draws inspiration from Pathfinders' work in "An Age of Crises", by which countries are categorized according to the number of shocks they have experienced in recent years. This is combined with the Economic and Social Commission for Western Asia (ESCWA) Food Security Monitoring Framework to classify shocks affecting food security as economic, political or environmental. The indicators presented in each category have been selected on the basis of their relevance to the region and time period and considering data availability. While this matrix only presents an overview of the crises experienced, the discussion in chapter 3 of the present report sheds some light on how multiple crises reinforce each other.

For this exercise, shocks that affected the Arab region during the years 2020, 2021 and 2022 have been focused on. Some long-term processes, such as climate change effects or decades-long conflicts, continue to affect countries' development in general and food security in particular. Some of these processes and their relationship to food security inequality are discussed in chapter 2. The multiple crises matrix, however, aims to identify short-term shocks that help to explain the deteriorating food security situation in the region over the last three years, for which data are limited.

Economic indicators. Considering the Arab region's unique challenges as well as the changes in the global economy brought on by the COVID-19 pandemic and the war in Ukraine, four variables have been chosen by ESCWA to assess countries' economic situation during the 2020–2022 period.

- **Inflation.** Price increases, captured by the inflation rate in the 2020–2022 period, are a particularly serious challenge for developing countries and poorer households and contribute to increasing inequalities in access to food. Developing countries absorb global price changes faster due to their shorter supply chains. Poorer households then spend a larger percentage of their income and have a lower ability to buffer the rising cost of living through savings or borrowing. The thresholds for inflation alerts have been set to 33 per cent for an amber alert and 50 per cent for a red alert. A 33 per cent inflation rate in the 2020–2022 period would be equivalent to average inflation of 11 per cent per year. Inflation rates beyond 11 per cent are considered moderately high even for developing economies.[228]
- **Foreign currency reserves.** Given that most countries in the Arab region depend on imports to ensure sufficient food availability, maintaining sufficient foreign currency reserves is key. Amber alert is categorized as having the ability to sustain less than six months of imports, while having reserves for less than three months is considered a red alert.
- **External debt.** Some countries are experiencing debt stress. As discussed in the chapter 1, debt in the Arab region has been growing steadily over the last decade and recent global events have exacerbated the situation. Debt, however, is key for development finance and increased debt does not necessarily represent a problem if managed efficiently. Debt over 60 per cent of gross domestic product (GDP) is categorized as an amber alert; the European Commission Stability and Growth Pact requires public debt must not exceed 60 per cent of GDP. Debt over 90 per cent of GDP is categorized as a red alert. Debt-to-GDP ratios above 90 per cent are associated with one per cent lower growth rates than otherwise.[229] In addition, low-income countries (LICs), which received an overall risk of debt distress rank of "High" or "In distress" in the latest International Monetary Fund (IMF) Debt Sustainability Analysis, were rated as "High stress",

regardless of their level of debt-to-GDP. This indicator remains subjective and should be taken as a stress measure instead of a crisis and should always be analysed together with other macroeconomic components.

- **Energy.** This indicator ranks countries' ability to provide universal access to affordable and sufficient energy for domestic and commercial use. It is part of the World Energy Trilemma Index, which includes an Equitable Energy Ranking that sorts countries from 1 (best) to 112 (worst). Positions above 66 are considered to be amber alert and positions above 81 to be red alert.

Political and crisis indicators. Monitoring changes in violent conflict and political unrest in the Arab region remains key to ensuring food security. Three key indicators have been selected to present different aspects of political crises: social unrest, violent conflict and the number of refugees and internally displaced persons (IDPs).

- **Protests.** A high number of protest events in the 2020–2022 period can be considered a useful indicator of increased social unrest. Over 1,000 protest events are considered to be an amber alert and over 4,000 a red alert. The number of protests, however, should be analysed carefully. A very low number is not necessarily desirable as it could be an indication of a lack of rights to assembly and peaceful protest.
- **Violent events.** There were a number of violent events during 2020–2022, including riots, battles, explosions/remote violence and violence against civilians. Over 1,000 events are considered to be an amber alert and over 10,000 to be a red alert.
- **Refugees and IDPs.** In some countries, there was an increase in the number of refugees and IDPs from 2019 to 2022. Large movements of people can be an indicator of crisis in the country or neighbouring countries during the period and can also generate its own challenges in the short term. Over 100,000 additional refugees and IDPs is considered to be an amber alert and over 500,000 a red alert.

Environmental indicators. Many countries in the region are experiencing food insecurity and displacement as a result of extreme weather events. Poorer populations are more vulnerable to extreme weather events and suffer disproportionately when they happen, leading to greater inequalities in the absence of a prompt and coordinated response. Three indicators are considered based on available satellite geolocated data – extreme temperatures, extreme precipitation and consecutive dry days – and one indicator based on the number of people estimated to have been affected by these events.

- **Extreme heat.** This indicator relates to the number of days in the 2020–2022 period that exceeded the 95th percentile threshold of daily maximum average temperature in the 1981–2010 period. The number of extreme heat days is calculated at the pixel level (10 km x 10 km) and averaged across the country. Thresholds for alert have been set at over 25 per cent of days for amber and over 30 per cent for red.

Extreme precipitation levels. This indicator records the change in the number of very heavy precipitation days (over 20 mm) in the 2020–2022 period compared to a 30-year historical average (1981–2010). The number of precipitation days is calculated at the pixel level (10 km x 10 km) and averaged across the country. Thresholds for alert have been set at an over five per cent increase from the historical average for amber and an over 15 per cent increase for red.

- **Dry days.** This indicator shows the change in consecutive dry days (CDD) in the 2020–2022 period compared to a 30-year historical average (1981–2010). The number of CDD is calculated at the pixel level (10 km x 10 km) and averaged across the country. The combination of increased CDD with extreme precipitation levels leads to an increased flooding probability. Thresholds for alert have been set at an over five per cent increase from the historical average for amber and an over 15 per cent increase for red.
- **People affected by natural disasters.** This indicator is the number of people reported to have been impacted by natural disasters (including floods, earthquakes, droughts, extreme temperatures, storms and wildfires). It comprises the number of people requiring immediate assistance, those injured and those left homeless. This indicator only includes natural disasters that fulfil one or more of the following criteria: (a) 10 or more deaths reported; (b) 100 or more affected people reported; and (c) declaration by the country of a state of emergency and/or an appeal for international assistance. Over 100,000 people affected constitutes an amber alert and over a million people affected constitutes a red alert.

Finally, other critical crises that are not captured by the indicators presented, such as the port explosion in Lebanon or the locust crises in Somalia and Yemen, are discussed in chapter 3.

Indicator description

	Indicator	Description	Time period	Data availability	Source
Economic	Inflation	Inflation based on Consumer Price Index	October 2019 to October 2022	15/22	https://data.unescwa.org/portal/CPI
	Foreign currency reserves	Total reserves in months of imports	2021	14/22	World Bank and Climate Extremes Index data
	Debt	External debt as percentage of GDP	2022	19/22	IMF World Economic Outlook Database, October 2022
	Energy	Energy security ranking	2021	14/22	https://trilemma.worldenergy.org/
Political	Protests	Number of protests	2020–2022	22/22	https://acleddata.com/about-acled/
	Violence	Number of violent events (riots, battles, explosions/ remote violence, violence against civilians)	2020–2022	22/22	https://acleddata.com/about-acled/
	Refugees and IDPs	Increase in the number of refugees and IDPs from 2019 to 2022	2022	22/22	https://www.unhcr.org/refugee-statistics/
Environmental	Extreme heat	Percentage of days in which temperatures exceed the 95th percentile threshold of daily maximum temperature averaged over the historical period 1981–2010	2020–2022	21/22	ESCWA calculations based on ERA5 dataset
	Extreme precipitation levels	Change in the number of very heavy precipitation days (>20 mm) in the last 3 years (2020–2022) compared to the 30-year average (1981–2010)	2020–2022	21/22	ESCWA calculations based on ERA5 dataset
	Consecutive dry days	Change in CDD in 2020–2022 compared to the 30-year average (1981–2010)	2020–2022	21/22	ESCWA calculations based on ERA5 dataset
	People affected by natural disasters	Number of people affected by natural disasters (floods, earthquakes, drought, extreme temperature, storm, wildfire)	2020–2022	22/22	https://www.emdat.be/

Threshold for amber and red alerts

	Indicator	Threshold for amber alert	Threshold for red alert
Economic	Inflation	Between 33 and 50 per cent	Above 50 per cent
	Foreign currency reserves	Between 3 and 6 months	Lower than 3 months
	Debt	Between 60 and 90 per cent	Higher than 90 per cent or receiving an overall risk of debt distress rank of "High" or "In distress" in the latest IMF Debt Sustainability Analysis
	Energy	Ranking between 66 and 81	Ranking above 81
Political	Protests	Between 1,000 and 4,000 protest events	More than 4,000 protest events
	Violence	Between 1,000 and 10,000 violent events	More than 10,000 violent events
	Refugees and IDPs	Between 100,000 and 500,000 additional refugees and IDPs	More than 500,000 additional refugees and IDPs
Environmental	Extreme heat	Over 25 per cent of days in the year	Over 30 per cent of days in the year
	Extreme precipitation levels	Over 5 per cent increase from the historical average	Over 15 per cent increase from the historical average
	Consecutive dry days	Over 5 per cent increase from the historical average	Over 15 per cent increase from the historical average
	People affected by natural disasters	More than 100,000 people affected	More than 1 million people affected

Number of countries in crisis per indicator

	Indicator	Data availability	Countries in amber alert	Countries in red alert
Economic	Inflation	15/22	0	3
	Foreign currency reserves	14/22	4	2
	Debt	16/22	5	7
	Energy	14/22	3	3
Political	Protests	22/22	6	4
	Violence	22/22	4	4
	Refugees and IDPs	22/22	3	2
Environmental	Extreme heat	21/22	2	1
	Extreme precipitation levels	21/22	1	3
	Consecutive dry days	21/22	7	1
	People affected by natural disasters	14/22	2	5

Summary of crises per country

Country	ESCWA classification	Economic shocks	Political shocks and conflict	Environmental shocks
Algeria	Middle-income country			
Bahrain	Gulf Cooperation Council country			
Comoros	Least developed country			
Djibouti	Least developed country			
Egypt	Middle-income country			
Iraq	Country in conflict			
Jordan	Middle-income country			
Kuwait	Gulf Cooperation Council country			
Lebanon	Middle-income country			
Libya	Country in conflict			
Mauritania	Least developed country			
Morocco	Middle-income country			
Oman	Gulf Cooperation Council country			
State of Palestine	Country in conflict			
Qatar	Gulf Cooperation Council country			
Saudi Arabia	Gulf Cooperation Council country			
Somalia	Least developed country			
Sudan	Least developed country			
Syrian Arab Republic	Country in conflict			
Tunisia	Middle-income country			
United Arab Emirates	Gulf Cooperation Council country			
Yemen	Country in conflict			

Annex 2.
Food security indicators and trends

Dimension	Indicator	SDG	Year	World	Arab	Gulf Cooperation Council countries	Least developed countries	Middle-income countries	Countries in conflict
Availability	Primary wheat yield as a percentage of potential achievable yield (%)	2.3.1	2016	n.a.	81.2	124.0	n.a.	94.2	56.0
	Agriculture orientation index for government expenditure	2.a.1		n.a.	4.0	0.3	0.1	0.2	n.a.
	Food loss (% of total food available)			n.a.	6.3	2.1	9.9	7.6	4.7
	Average dietary energy supply adequacy (%)			n.a.	129.2	130.8	107.4	142.8	n.a.
	Cereal import dependency ratio (%)			n.a.	61.4	94.3	n.a.	57.2	67.8
	Share of water resources used in agriculture, out of total renewable water resources (%)	6.4.2		n.a.	80.7	71.4	94.7	75.0	88.7
Accessibility	Poverty headcount ratio (% of population)	1.1.1/1.2.1/1.2.2		26.2	33.9	9.8	40.7	17.7	36.5
	Share of food consumption expenditure in total household consumption expenditure (%)		2021	n.a.	31.3	19.0	n.a.	33.1	36.2
	Unemployment rate (%)	8.5.2		6.2	10.7	4.3	18.5	9.7	14.0
	Logistics performance index		2020	2.9	2.6	3.2	2.4	2.7	2.2
	Inflation (%)		2018	1.9	17.3	2.0	275.9	14.2	n.a.

Utilization	Percentage of population using at least basic drinking water services (%)	1.4.1/6.1.1	2020	90.0	88.8	98.5	60.7	96.4	86.0
	Percentage of population using at least basic sanitation services (%)	1.4.1/6.2.1	2020	78.0	83.4	99.0	38.8	93.4	82.9
	Percentage of children under 5 years of age who are stunted (%)	2.2.1	2020	22.2	19.4	4.9	31.4	16.3	24.9
	Percentage of children under 5 years of age affected by wasting (%)	2.2.2	2016	7.5	7.7	n.a.	15.9	6.1	8.5
	Prevalence of anaemia among women of reproductive age (15–49 years) (%)		2017	29.9	33.2	27.1	38.5	30.3	39.5
Stability	Climate change – temperature change (degree Celsius)		2019	1.7	1.9	2.0	1.5	2.1	2.0
	Food price anomalies (moderate or severe)	2.c.1	2020	n.a.	n.a.	n.a.	n.a.	n.a.	-0.1
	Political stability and absence of violence			n.a.	16.0	40.4	5.8	19.7	1.5
	Per capita food production variability ($1,000/capita) (in constant 2004–2006 $)			n.a.	15.2	8.0	17.4	14.7	18.9
	Per capita food supply variability (kcal/capita/day)			n.a.	31.1	32.3	20.9	28.1	43.0
Core indicators	Prevalence of undernourishment (%)	2.1.1	n.a.	9.3	11.9	4.5	22.6	5.3	n.a.
	Prevalence of moderate or severe food insecurity measured using FIES (%)	2.1.2	2020	27.6	33.3	n.a.	57.2	27.2	n.a.
	Prevalence of obesity in the adult population (18 years and older) (%)		2019	13.1	28.4	34.2	n.a.	30.0	25.8

Middle-income countries

Indicator		2010	Latest		Trend
Code	Description	Value	Value	Year	
Availability indicators					
AV1	Wheat yields - %	82.7	94.2	2020	🟢
AV2	Agriculture expenditure - index	0.2	0.2	2018	🟢
AV3	Food loss (R) - %	6.7	7.6	2020	🔴
AV4	Dietary energy supply - %	141.2	142.8	2020	🟡
AV5	Wheat import dependency (R) - %	51.2	57.2	2018	🔴
AV6	Agriculture water (R) - %	77.7	75.0	2020	🟡
Access indicators					
AC1	Poverty (R) - %	30.6	17.7	2022	🟢
AC2	Food consumption (R) - %	42.1	33.1	2018	🟢
AC3	Unemployment (R) - %	9.4	9.7	2023	🟡
AC4	Logistics - index	2.6	2.7	2018	🟡
AC5	Inflation (R) - %	7.0	14.2	2022	🔴
Utilization indicators					
UT1	Drinking water access - %	92.8	96.4	2020	🟡
UT2	Sanitation access - %	89.3	93.4	2020	🟡
UT3	Child stunting (R) - %	18.9	16.3	2020	🟢
UT4	Child wasting (R) - %	n.a.	6.1	2016	
UT5	Women's anaemia (R) - %	31.5	30.3	2019	🟡
Stability indicators					
ST1	Climate change (R) - OC	2.2	2.1	2021	🟢
ST2	Price anomalies (R) - index	n.a.	n.a.		
ST3	Political stability - ranking	22.0	19.7	2021	🔴
ST4	Production variability (R) - 1,000$/capita	16.3	14.7	2019	🟢
ST5	Supply variability (R) - kcal/capita/day	28.6	28.1	2020	🟡
Core indicators					
CO1	Undernourishment (R) - %	4.6	5.3	2020	🔴
CO2	Food insecurity (R) - %	26.1	27.2	2020	🟡
CO3	Obesity (R) - %	25.9	30.0	2016	🔴

R = Reversed

n.a. = Not available

- Red: negative trend
- Yellow: neutral trend
- Green: positive trend

Gulf Cooperation Council countries

Indicator		2010	Latest		Trend
Code	Description	Value	Value	Year	
Availability indicators					
AV1	Wheat yields - %	117.9	124.0	2020	🟢
AV2	Agriculture expenditure - index	0.4	0.3	2019	🔴
AV3	Food loss (R) - %	2.5	2.1	2020	🟢
AV4	Dietary energy supply - %	125.7	130.8	2020	🟡
AV5	Wheat import dependency (R) - %	88.2	94.3	2018	🔴
AV6	Agriculture water (R) - %	76.6	71.4	2020	🟢
Access indicators					
AC1	Poverty (R) - %	13.6	9.8	2022	🟢
AC2	Food consumption (R) - %	22.6	19.0	2018	🟢
AC3	Unemployment (R) - %	4.4	4.3	2023	🟡
AC4	Logistics - index	3.3	3.2	2018	🟡
AC5	Inflation (R) - %	4.0	2.0	2021	🟢
Utilization indicators					
UT1	Drinking water access - %	98.1	98.5	2020	🟡
UT2	Sanitation access - %	98.6	99.0	2020	🟡
UT3	Child stunting (R) - %	6.5	4.9	2020	🟢
UT4	Child wasting (R) - %	n.a.	n.a.		
UT5	Women's anaemia (R) - %	26.1	27.1	2019	🟡
Stability indicators					
ST1	Climate change (R) - OC	2.0	2.2	2021	🔴
ST2	Price anomalies (R) - index	n.a.	n.a.		
ST3	Political stability - ranking	49.0	40.4	2021	🔴
ST4	Production variability (R) - 1,000$/capita	5.4	8.0	2019	🔴
ST5	Supply variability (R) - kcal/capita/day	69.3	32.3	2020	🟢
Core indicators					
CO1	Undernourishment (R) - %	6.3	4.5	2020	🟢
CO2	Food insecurity (R) - %	n.a.	n.a.		
CO3	Obesity (R) - %	30.3	34.2	2016	🔴

R = Reversed

n.a. = Not available

- Red: negative trend
- Yellow: neutral trend
- Green: positive trend

Countries in conflict

Indicator			2010	Latest		Trend
	Code	Description	Value	Value	Year	
Availability indicators						
	AV1	Wheat yields - %	46.6	56.0	2020	🟢
	AV2	Agriculture expenditure - index	n.a.	n.a.		
	AV3	Food loss (R) - %	4.7	4.7	2020	🟡
	AV4	Dietary energy supply - %	n.a.	n.a.		
	AV5	Wheat import dependency (R) - %	n.a.	67.8	2018	
	AV6	Agriculture water (R) - %	86.6	88.7	2020	🟡
Access indicators						
	AC1	Poverty (R) - %	23.3	36.5	2022	🔴
	AC2	Food consumption (R) - %	n.a.	36.2	2017	
	AC3	Unemployment (R) - %	11.0	14.0	2023	🔴
	AC4	Logistics - index	2.4	2.2	2018	🔴
	AC5	Inflation (R) - %	5.6	n.a.		
Utilization indicators						
	UT1	Drinking water access - %	80.1	86.0	2020	🟢
	UT2	Sanitation access - %	77.0	82.9	2020	🟢
	UT3	Child stunting (R) - %	30.8	24.9	2020	🟢
	UT4	Child wasting (R) - %	n.a.	8.5	2016	
	UT5	Women's anaemia (R) - %	39.9	39.5	2019	🟡
Stability indicators						
	ST1	Climate change (R) - OC	2.1	2.0	2021	🟢
	ST2	Price anomalies (R) - index	n.a.	-0.1	2020	
	ST3	Political stability - ranking	10.6	1.5	2021	🔴
	ST4	Production variability (R) - 1,000$/capita	14.3	18.9	2019	🔴
	ST5	Supply variability (R) - kcal/capita/day	33.8	43.0	2020	🔴
Core indicators						
	CO1	Undernourishment (R) - %	n.a.	n.a.		
	CO2	Food insecurity (R) - %	n.a.	n.a.		
	CO3	Obesity (R) - %	22.3	25.8	2016	🔴

R = Reversed

n.a. = Not available

- Red: negative trend
- Yellow: neutral trend
- Green: positive trend

Least developed countries

Indicator		2010	Latest		Trend
Code	Description	Value	Value	Year	
Availability indicators					
AV1	Wheat yields - %	n.a.	n.a.		
AV2	Agriculture expenditure - index	n.a.	0.1	2019	
AV3	Food loss (R) - %	2.7	9.9	2020	●
AV4	Dietary energy supply - %	112.1	107.4	2020	●
AV5	Wheat import dependency (R) - %	n.a.	n.a.		
AV6	Agriculture water (R) - %	94.5	94.7	2020	●
Access indicators					
AC1	Poverty (R) - %	n.a.	40.7	2022	
AC2	Food consumption (R) - %	n.a.	n.a.		
AC3	Unemployment (R) - %	15.8	18.5	2023	●
AC4	Logistics - index	2.0	2.4	2018	●
AC5	Inflation (R) - %	12.2	275.9	2021	●
Utilization indicators					
UT1	Drinking water access - %	50.4	60.7	2020	●
UT2	Sanitation access - %	29.1	38.8	2020	●
UT3	Child stunting (R) - %	34.8	31.4	2020	●
UT4	Child wasting (R) - %	n.a.	15.9	2014	
UT5	Women's anaemia (R) - %	39.5	38.5	2019	●
Stability indicators					
ST1	Climate change (R) - OC	1.5	1.5	2021	●
ST2	Price anomalies (R) - index	n.a.	n.a.		
ST3	Political stability - ranking	2.9	5.8	2021	●
ST4	Production variability (R) - 1,000$/capita	n.a.	17.4	2019	
ST5	Supply variability (R) - kcal/capita/day	18.2	20.9	2020	●
Core indicators					
CO1	Undernourishment (R) - %	28.9	22.6	2020	●
CO2	Food insecurity (R) - %	n.a.	57.2	2020	
CO3	Obesity (R) - %	n.a.	n.a.		

R = Reversed

n.a. = Not available

- Red: negative trend
- Yellow: neutral trend
- Green: positive trend