Tracking Food Security in the Arab Region

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E/ESCWA/SDPD/2019/4

Economic and Social Commission for Western Asia

Tracking Food security in the Arab region

UNITED NATIONS
Beirut

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United Nations publication issued by ESCWA, United Nations House, Riad El Solh Square, P.O. Box: 11-8575, Beirut, Lebanon.

Website: www.unescwa.org.

19-01343

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Acknowledgements

This report benefited from generous support from the Swedish International Development Cooperation Agency (Sida) and the combined technical efforts of the Economic and Social Commission for Western Asia (ESCWA), the Arab Organization for Agricultural Development (AOAD) and the Food and Agriculture Organization of the United Nations (FAO). Experts from the latter three organizations in collaboration with country and independent experts contributed background information or provided advices during the extended consultative process that led to the development of the Arab Food Security Monitoring Framework, which underpins this report.

The report was prepared by the Food and Environment Policies Section (FEPS) under the overall guidance of Roula Majdalani, Director, Sustainable Development Policies Division (SDPD) at ESCWA and under the direct supervision of Reem Nejdawi, Executive Director of the ESCWA Technology Centre (ETC).

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The report benefited from background information and contributions by and/or technical expertise from Julie Abou Arab, Layale Gedeon, Minerva Sadek and Lina Fleyfel from FEPS as well as Kamil Hamati former FEPS staff member and Firas Yassin (FAO).

Additional reviews and commentaries were received by staff from AOAD, including Ibrahim El Dukheri, Director General, as well as Elhag Attia Elmansour, Head of the Technical Programmes Department; Ali Mussa Eissa, Agricultural Economics Expert; and Tarek Abdellatif Draz, Agricultural Statistics Expert; and from FAO-RNE, Mohamed Al-Hamdi, Senior Land and Water Officer (former First Economic Affairs Officer at ESCWA), Tamara Nanitashvili, Nutrition and Food Systems Officer, in addition to Juraj Riecan, Director, Statistics Division, Khalid Abu-Ismael (EDID/ESCWA) and Elias Ghadban, Lara Geadah and Nour El Jundi (intern) (FEPS).

Special thanks go to members of the Publication Committee and other staff from ESCWA who provided comments and feedback as well as to the external peer reviewers: Carlo Cafiero (FAO), Waleed Zubari (Arabian Gulf University) and Rachel Bahn (AUB) as well as attendees of the various Expert Group Meetings who reviewed the framework underlying the report and/or earlier versions of the report.

Technical support for the organization of the consultative meetings and preparation of reports was provided by Mona Fattah, Moneem Murrah, Rita Wehbe, Nadeen Hedjazi (Senior Graphic Designer), Abdul Halim Maarouf, Nour Charafeddine (SDPD) in addition to Nael Al Mulki and Ban Pahlawan (ETC).

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Acronyms and Abbreviations

ADER	Average dietary energy requirement
ADESA	Average dietary energy supply adequacy
AGU	Arabian Gulf University
AOAD	Arab Organization for Agricultural Development
AOI	Agriculture Orientation Index
AQUASTAT	Food and Agriculture Organization's global information system on water resources and agricultural water management
AUB	American University of Beirut
BMI	Body mass index
DES	Dietary energy supply
ECA	Economic Commission for Africa
ESCWA	Economic and Social Commission for Western Asia
ETC	ESCWA Technology Centre
FAO	Food and Agriculture Organization of the United Nations
FAO-RNE	FAO Regional Office for the Near East and North Africa
FAOSTAT	Food and Agriculture Organization Corporate Statistical Database website
FEPS	Food and Environment Policies Section
FIES	Food Insecurity Experience Scale
FSN	Food security and nutrition
GCC	Gulf Cooperation Council
GCCStat	GCC Statistics
GDP	Gross domestic product
IFPRI	International Food Policy Research Institute
ILO	International Labour Organization
IMF	International Monetary Fund
LAS	League of Arab States
LDCs	Least Developed Countries
OECD	Organisation for Economic Co-operation and Development
RCP	Representative concentration pathway
RICCAR	Regional Initiative for the Assessment of Climate Change Impacts on Water Resources and Socio-Economic Vulnerability in the Arab Region
SDGs	Sustainable Development Goals
SDPD	Sustainable Development Policies Division
Sida	Swedish International Development Cooperation Agency
UNCCD	United Nations Convention to Combat Desertification
UNICEF	United Nations Children's Fund
UNSTAT	United Nations Statistics Division
USD	United States Dollars
WDI	World Development Indicators
WHO	World Health Organization

Executive Summary

Executive Summary

BACKGROUND

The Arab region is facing rising economic, sociopolitical and environmental challenges which are impacting the food security situation of its growing population. The region is witnessing an increase in the prevalence of undernutrition, overnutrition and nutrient deficiency, giving rise to the triple burden of malnutrition. Undernourishment is increasing in conflict-plagued and low-income countries, while obesity is a growing concern in high- and middle-income countries, and nutrient deficiency is spreading in all countries, leading to conditions such as anaemia to become especially rife among women.

Ensuring food security and good nutrition remains a top priority on the agenda of Arab countries, whether rich or poor, in conflict or stability. However, the go-to food security strategies in the region to increase food production have relied on trade to cover the production gap and the provision of market subsidies to support consumption. While these strategies improve food availability in the short run, they sometimes contribute to worsening the situation by, among others, increasing natural resource degradation or encouraging overconsumption. Thus, understanding the status and determinants of food security in addition to factors affecting it has become a necessity for Arab countries to design evidence-based food security strategies and policies and to tackle all food security dimensions by going beyond food availability to address additional pillars of food security which are access, utilization and stability.[1]

Food security can be evaluated at individual, household, national, regional or global levels; it can be seasonal, transitory or chronic. As such, it is multifaceted and multidimensional with an interactive nature and requires a comprehensive approach for monitoring. Food security is a core element of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals (SDGs), which reflect the commitment of governments to tackle food insecurity in all its different dimensions. Achieving food security is the aim of Goal 2 of the SDGs and elements of food security are reflected in many other SDGs including those on poverty (SDG 1), health (SDG 3), gender equality (SDG 5), water and sanitation (SDG 6), energy (SDG 7), economic growth (SDG 8), and the environment and sustainability (SDG12,13,14,15), to name a few. It is for this reason that there is a need to broaden the regional perspective on food security beyond the sole dimension of availability.

ESCWA in partnership with the Arab Organization for Agricultural Development (AOAD), the Food and Agriculture Organization of the United Nations (FAO), academia and other experts and with support from the Swedish International Development Cooperation Agency (Sida), collaborated with member States to develop an Arab food security monitoring framework that builds on global knowledge and practices while accounting for regional specificities including nutritional needs and preferences, natural resource limitations and prevailing economic and sociopolitical realities.

DEVELOPING THE FOOD SECURITY MONITORING FRAMEWORK

The development of the Arab Food Security Monitoring Framework involved extensive consultations and a comprehensive review of the literature on existing knowledge and assessment frameworks at global, regional and national levels. A wide variety of country-level and region-wide strategies and plans were also closely examined to identify potentially relevant food security determinants.

The underlying hypothesis was that food security and nutrition can be expressed as a function of a multitude of determinants or causal factors, though a few have a more influential role than others within each of the food security dimensions. The criteria to select the chosen determinants or indicators of food security included being measurable; relating closely to the SDGs or the FAO Suite of Food Security Indicators; reflecting the Arab context; and having data available for at least 50 per cent of the countries and 50 per cent of the regional population. Thus, twenty-four indicators were selected, consisting of three ex post or outcome indicators and twenty-one ex ante or causal indicators. These indicators were split and placed in either a core pillar consisting of the three outcome indicators (undernourishment, food insecurity experience and obesity) or in the four food security dimensions (availability, access, utilization and stability) for the 21 causal indicators.[2] The groupings can be described as follows:

- Core indicators: These indicators allow the assessment of the prevailing food security situation as they show the presence or risk of malnutrition.
- Availability: These indicators allow the exploration of the supply side of food as they are concerned with physical inflows, including food production, food trade or food distribution, to name a few.
- Access: These indictors reflect the ability to access food as they are concerned with financial and socioeconomic factors, including revenues, food prices or infrastructure.
- Utilization: These indicators allow the examination of the nutritional status of the population or factors affecting it, such as access to basic infrastructure essential for food utilization (water and sanitation) as well as the impact of the nutritional value of food measured through health parameters such as stunting, wasting or anaemia.
- Stability: These indicators look at factors that affect the year-round availability, accessibility and utilization of food as they deal with issues related to production and supply variability, price shocks, sociopolitical factors (violence and conflict) or vulnerability to weather events.

The publication provides for each selected indicator a short description together with a justification for inclusion, suggested action areas, linkages to regional and global plans, possible data sources and the process for normalizing the raw data.

VISUALIZING FOOD SECURITY THROUGH A DASHBOARD

The results of the framework are presented as a dashboard made up of a chart and a table containing the data and trends. The chart consists of two doughnut charts with the inner part showing the three core indicators and the outer part the 21 causal indicators split along the four food security dimensions. Both the inner and outer doughnuts are made of 10 rings, to show the range of performance from poor to good. The table provides the un-normalized data as well as the years over which the monitoring is conducted and the trend in three colours (red for negative, yellow for neutral and green for positive).

As presented, the Arab Food Security Monitoring framework is mechanistic as (i) all indicators are set and distributed across the core pillar and the food security dimensions and (ii) the interpretation of results follows a set approach starting with an assessment of the outcome indicators (inner chart) then moving to the causal factors (outer chart).

TRACKING FOOD SECURITY IN THE ARAB REGION

The framework was applied at the Arab regional level using data collected from international databases, such as the United Nations Statistics Division, the World Bank and FAO, noting that these institutions originate their data from country sources.

A. Trends and data

The core pillar show a high prevalence of undernourishment, food insecurity experience and obesity. Undernourishment affects about 12 per cent (about 50 million people) while obesity affects 28 per cent (115 million people) of the population in 2016. In addition, 50 million people (12 per cent of the Arab population) reported experiencing moderate to severe food insecurity. Both the prevalence of undernourishment and food insecurity are higher than global averages (11 and 9 per cent respectively).

The availability dimension shows a favourable trend for wheat yields and food loss. The access dimension highlights high prevalence of poverty, unemployment and inflation with unfavourable trends for the last two.

The utilization dimension shows a high prevalence for stunting, wasting and anaemia but a higher rate of access to water and sanitation than the world average. The stability dimension shows unfavourable trend for political stability but a favourable one for food supply variability. A few indicators lacked data.

B. Dashboard

The region is underperforming for all three core indicators – undernourishment, food insecurity experience and obesity – and needs to urgently adopt programmes and strategies to remedy the situation. Given the poor performance in the core indicators, the region needs to identify and address hotspot areas in the four food security dimensions. These include the yield gap, the high import dependency, poverty and unemployment levels, children's and women's nutrition as well political stability, among others. Data needs to be collected for several indicators, notably expenditure in agriculture, water use in agriculture, household expenditure on food and price anomalies.

C. Key areas for action

Key areas of action include addressing all the indicators displaying poor performance, of which undernourishment, food insecurity perception and obesity as well poverty, unemployment, child stunting, child wasting, anaemia among women and political stability are among the most important ones. Data gaps exist as well at the regional level, notably for expenditures in agriculture, water use, expenditure on food consumption and price anomalies. However, no definitive recommendations can be drawn at the regional level given the large disparities that exist among Arab countries in terms of human, financial, technical and natural resource endowments. More focused policies would be drawn following a run of the framework at national level. To this end, ESCWA and AOAD are currently working with countries to implement the framework at the national level.

The proposed Arab Food Security Monitoring Framework captures well the complex, multidimensional and interactive nature of food security. It shows that the Arab region is affected by both undernourishment and obesity and that both are increasing. Obesity is affecting close to a third of the population and addressing it should be high on the agenda of policymakers in the region given its potential cost on health and loss in productivity. Undernourishment and the perception of increased food insecurity seem to go hand in hand with increasing poverty, unemployment and political stability and might further deteriorate in the future based on prevailing trends. The framework highlights the main stumbling blocks to enhanced food security, which need immediate action in those countries where the problems have been highlighted as urgent.

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Introduction

Introduction

Food security is defined as existing "…when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. The four pillars of food security are availability, access, utilization and stability" (FAO, 2009). As defined, it is applicable at multiple levels, meaning individual, household, national, regional or global. The concept of food security[3] allows a better understanding of the nutritional status of individuals at household level, as related to both undernutrition and overnutrition (FAO, 2003). As such, food security requires a multidimensional approach to capture its multifaceted and interactive aspect.

Food security is also central to the achievement of the 2030 Agenda for Sustainable Development with its 17 Sustainable Development Goals (SDGs) and 169 targets that the world has agreed to meet by 2030. Specifically, SDG 2 aims to end hunger, achieve food security, improve nutrition and promote sustainable agriculture. Achieving food security will require going beyond the reduction of poverty and hunger to also promote good health, gender equity and economic growth as well as to protect the environment and to ensure sustainability. Thus, food security is multifaceted nature and can be linked to all SDGs.

Given the wide-ranging nature of food security, relevant indicators and reliable data are needed to assess and monitor progress towards its achievement. Since the adoption of the SDGs,[4] a momentum for monitoring and evaluation has intensified and this has opened the way to explore as well how best to assess, monitor, evaluate and follow up on the achievement and the implementation of a whole range of issues including environmental stewardship, climate change, oceans' health and food security (Allen and others, 2018; Allen and others, 2017; Diaz-Sarachaga and others, 2018; Rickels and others, 2016).

Box 1. Food Security: a critical reading

Food security is a valuable concept if used with a clear understanding on its meaning, its limitations and how it interacts with behavioural and non-food factors.

The following notes can help to frame the concept of food security as used in this document:

- The World Food Summit (1996) definition essentially implies a process applied at the macroscale but the outcomes of which are measured at a microscale, as it identifies "people" as the core concern of food security.
- Food security is not an end by itself, but a fundamental component of human well-being.
- The concept of food security is dynamic. Food security can be chronic or transitory. It can be measured ex post (actual results) or ex ante (projected outcomes).
- The framing of the FAO definition is passive and lacks actors with agency that might be responsible for providing food security (Shepherd, 2012).
- Food security is defined as being primarily an economic problem: one of supply (of sufficient, nutritious food), demand (to meet the dietary needs of all people at all times) and making supply meet demand (by physical, social and economic means of access). It is based on availability of food and is essentially about the challenge of procuring, and distributing, scarce resources among the world's population. (Shepherd, 2012).
- The extent to which individual food security results in good nutrition depends on a set of non-food factors such as sanitary conditions, water quality, infectious diseases and access to primary health care. Thus, food security does not assure nutritional security (Pinstrup-Andersen, 2009).
- Food security is a means to achieve good health and nutrition. Policy interventions should be guided towards nutritional security and the monitoring of food security should be complemented by anthropometric measurements (Pinstrup-Andersen, 2009).

An increasing number of Arab countries import more than 50 per cent of their food needs, notably cereals, which makes them highly vulnerable to the volatility of global markets. Population growth is high while food production and agricultural productivity remain low (World Bank and others, 2009). Some countries are witnessing growing natural and environmental challenges, as well as economic, political and security ones, which are proving fertile grounds for protracted crises. Food security is a high priority for the Arab region, which puts its measurement and monitoring at the forefront of national and regional development agendas.

While there is no consensus on how to measure food security, there are numerous metrics that prioritize selected aspects of food security, at different scales and for various purposes. The multiplicity of metrics is essentially due to the profoundly multidisciplinary and multisectoral nature of food security. Food security is essentially best suited to be described using a wide range of quantitative and qualitative variables. For example, the Global Food Security Index, as will be shown below, and the Food and Agricultural Organization of the United Nations (FAO) Suite of Food Security Indicators available through FAOSTAT, FAO's Corporate Statistical Database website, rely on variables such as gross domestic product (GDP), levels of food production, import dependency, prevalence of undernourishment or price anomalies and variability to name a few (Fraanje and Gammage, 2018).

In the Arab region, the emphasis of the food security agenda had been previously placed on the food availability dimension with the focus aimed at increasing agricultural production and achieving self-sufficiency. Until recently, the main report on food security in the Arab region produced annually by the Arab Organization for Agricultural Development (AOAD), put emphasis on the assessment of food production levels, including livestock and fisheries, while overlooking other aspects influencing food security, such as poverty, nutrition or food supply variability. It is only recently that AOAD annual report has started to look at other dimensions of food security (AOAD, 2017). Similarly, the AOAD Strategy for Sustainable Arab Agricultural Development for the Next Two Decades (2005-2025) focuses on the availability of safe food and stability to Arab rural communities. The focus on food availability is similarly evident in other major initiatives such as the "Riyadh Declaration to Enhance Arab Cooperation to Face World Food Crisis" (AOAD, 2008 or the Emergency Arab Food Security Programme, 2009).

Addressing the measurement and monitoring of other dimensions of food security—such as those linked to food quality and safety, the stability of the Arab region food supply or the ability of the poor and vulnerable segments of the population to access food—requires broadening the regional perspective on food security. An essential step in this direction is developing a regional food security monitoring system to support integrated food security policymaking.

In this context, through an initiative on "Promoting Food and Water Security through Cooperation and Capacity Development in the Arab Region" funded by the Swedish International Development Cooperation Agency (Sida), the Economic and Social Commission for Western Asia (ESCWA), AOAD and others developed and recommended a regional food security monitoring framework to support this integrated policymaking. In developing the framework, an extensive and comprehensive review of existing policies and programmes was conducted, at the end of which a policy-gap map was developed (Annex 2). The primary purpose of the mapping was to assess the degree to which an integrated perspective on food security can be developed from existing policies and strategies and then established and mainstreamed within development policymaking in the Arab region.

ESCWA conducted this food security mapping for nine countries (Yemen, the Sudan, Egypt, the State of Palestine, Jordan, Iraq, Lebanon, Morocco and Tunisia). The mapping showed that the bulk of policies influencing food security are still directed primarily towards agricultural production and specifically national production. It also revealed that policies were strongly linked to trade and markets and related subsidies. Thus, Arab countries relate food security to either the "availability" or the "access" dimensions or both. The "utilization" dimension was the least reported upon in terms of policies and programmes, although related issues could be reported in the realm of other departments outside of agriculture per se, such as health. The "stability" dimension is usually inferred based on information from the other three dimensions. However, monitoring of food security appears to be nearly non-existent and when it does, is not performed in an integrated manner, a situation that limits synergistic policymaking.

This policy-gap mapping laid the foundation for the proposed food security monitoring system while identifying potential areas of synergy between national-level and regional- and global-level food security monitoring, such as Arab regional initiatives like the Riyadh Declaration or the global 2030 Sustainable Development Agenda with its 17 SDGs.

Figure 1. Timeline of recent publications on food security by ESCWA

2015 — Arab Sustainable Development Report

Progress on securing human dignity and well-being in the Arab countries and what is needed to achieve sustainable development in this region in turmoil.

2015 — Promoting the Science-Policy Interface in the Arab Region

To encompass relations between scientists and other actors in the policy process, and which allow for exchanges, co-evolution, and joint construction of knowledge with the aim of enriching decisionmaking.

2016 — Land Degradation Neutrality in the Arab Region: Preparing for SDG Implementation

This Factsheet explains the concept of Land Degradation Neutrality (LDN) and provides data and case studies on land degradation in the Arab Region.

2017 — Arab Horizon 2030: Prospects for Enhancing Food Security in the Arab Region

An overview of food security in the Arab region, offered detailed analysis of key issues, and simulated several alternative future scenarios for the region.

2017 — Methodology for Measuring Sustainable Development and Indicators related to Food Security

The following review revisits the concept of food security starting from its origins to highlight its complexity and the difficulty encountered in measuring or describing it, particularly through the use of a single index or limited number of indicators.

2017 — Reducing Food Loss and Waste Through the Implementation of the SDGs and the Adoption of Good Agricultural Practices in the Arab Region

This technical paper discusses food loss and waste in the Arab region and assesses opportunities to address the issue through the implementation of the Sustainable Development Goals (SDGs) and the adoption of Good Agricultural Practices (GAPs) to enhance food safety and quality.

2019 — Country fact sheets on food security in the Arab region

The Country Fact sheets contain key statistical information affecting Food Security, providing a comprehensive preview of the prevailing food and agriculture situation in the Arab Region.

2019 — Policy Briefs on Food Security Issues in the Arab Region

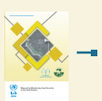
The policy briefs provide key policy recommendations to enhance food security in the Arab region, with a focus on issues pertaining to agriculture productivity, engagement with world food markets and food loss and waste.

2019 — Adopting Good Agriculture Practices (GAPs) for Enhanced Food Safety in the Arab Region

Applying Good Agriculture Practices (GAP) contribute towards sustainable agriculture and rural development and to meeting the Sustainable Development Goals (SDGs) of the 2030 Agenda on Sustainable development that were adopted by the United Nations General Assembly in 2015.

2019 — Assessing the impacts of changing water availability on agricultural production in selected Arab countries

Assess agricultural production in the Arab region, as a result of changing water availability through the use of reliable climate forecasts and hydrological parameters at the regional and national levels.



2019 — Manual for Monitoring Food Security in the Arab Region

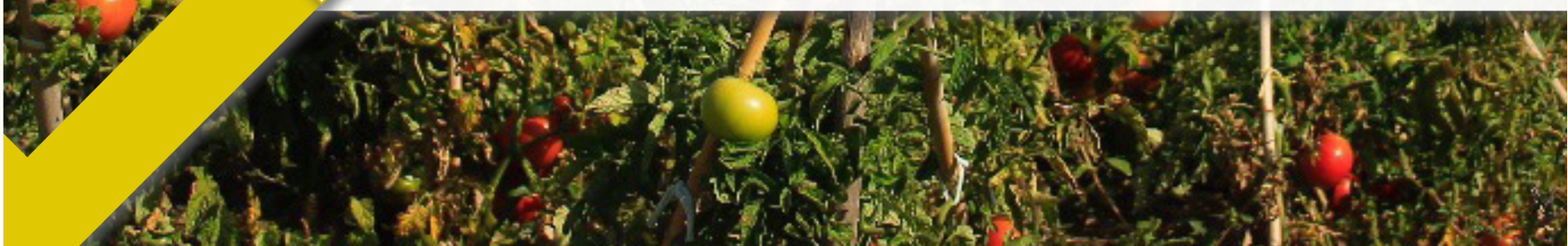
Highlight national strength, weakness and priorities for interventions under the 4 pillars defining Food Security (access, availability, utilization, and sustainability).

This food security monitoring initiative seeks to support efforts by Arab countries to monitor the implementation of the SDGs. The limitations faced by the region in ensuring food security were taken into consideration when designing the monitoring framework and these included, among others, the nutritional status of the population including the rising triple burden of malnutrition (consumption of few calories, consumption of few nutrients and consumption of excess calories), the degradation and depletion of natural resources, protracted sociopolitical crises and global warming, to name a few.

This publication follows and complements other publications on the issue of food security recently produced by ESCWA as shown below (figure 1). The objective of this publication is to present the Arab Food Security Monitoring Framework with the rationale and process for selecting its 24 indicators, including the computation and charting involved. In addition, the publication documents the consultative process of development of the framework. The report is organized into four sections as follows: Section 1 provides the background on the proposed monitoring framework and discusses the rationale and the methodology followed for the selection of indicators that were ultimately included. It also describes the framework including data collection, computation and charting. Section 2 presents the 24 indicators that were selected, including their definitions and justifications; the policy areas that could affect them and their linkage to other development plans; and practical considerations including their respective sources of data and normalization process. Section 3 consists of an application of the framework to track food security at the Arab regional level, which includes background information, food security assessments based on the framework indicators as well as key areas for action. Section 4 provides concluding remarks and a way forward.

Chapter 1

Food Security Monitoring: Building the Framework



Food Security Monitoring: Building the Framework

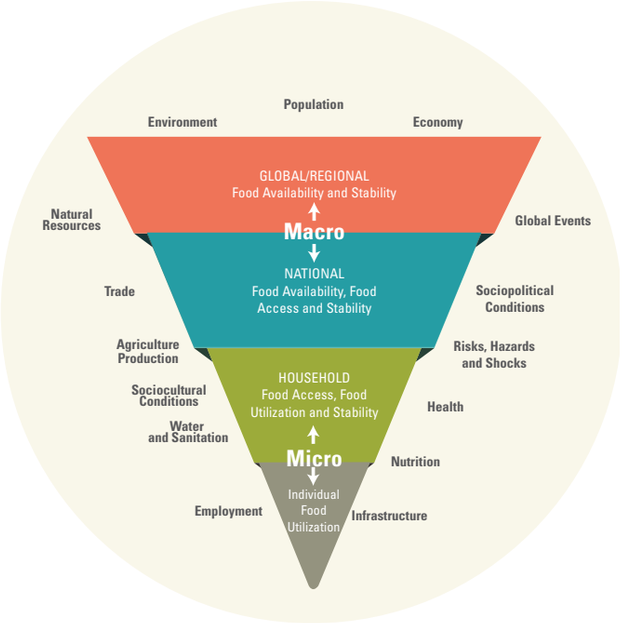
CONCEPTUAL APPROACH AND ASSUMPTIONS

Food security can be evaluated at the macro level, meaning the global, regional or national levels, or at the micro level, meaning the household and individual levels (figure 2). At the micro level nutrition issues come into play as emphasis is put on the utilization dimension in addition to physical availability, economic access and supply stability. At the macro level greater focus is put on the three dimensions of availability, access and stability, as the capacity of countries or regions to acquire supplies that could meet the nutritional needs of the population come into play. At each level, food security is influenced by a wide range of factors, including general issues such as population size, the economy or the environment, to more specific ones such as employment, access to water and sanitation services, health services availability and status, impact of local and global events, shocks and hazards or quality of logistics/ infrastructure to name a few (Cecilia, 2016).

As noted by Fraange and Lee-Gammage (2018), food security might exist at one level, such as the national or regional level, and be lacking at another, such as in specific communities or at the individual level. Conversely, food security can be achieved at individual or household levels but not necessarily at the national or regional levels. This is frequently the case when the duration and frequency of food insecurity are taken under consideration. Accordingly, food insecurity could be seasonal or cyclical, such as between harvests; or it could be transitory or temporary due to the impact of a condition such as drought or a shock as in a price hike; alternatively, it could be chronic such as during conflicts or other long-term conditions such as desertification or a major cataclysm.

For these reasons, the comprehensive monitoring of food security is and should be an essential component of policy and programme formulation. However, due to the multifaceted nature of food security, monitoring is usually a complex task which requires a multidimensional approach. While the definition of food security is widely accepted, there is no consensus on the means and methods of measuring food security in its complexity. Currently, there is a lack of a single internationally agreed upon system for monitoring food security across countries but, as will be seen below, many competing ones, some more widely known and used than others. The resulting evidence gap hinders policy and programme accountability.

Figure 2. Levels of food security



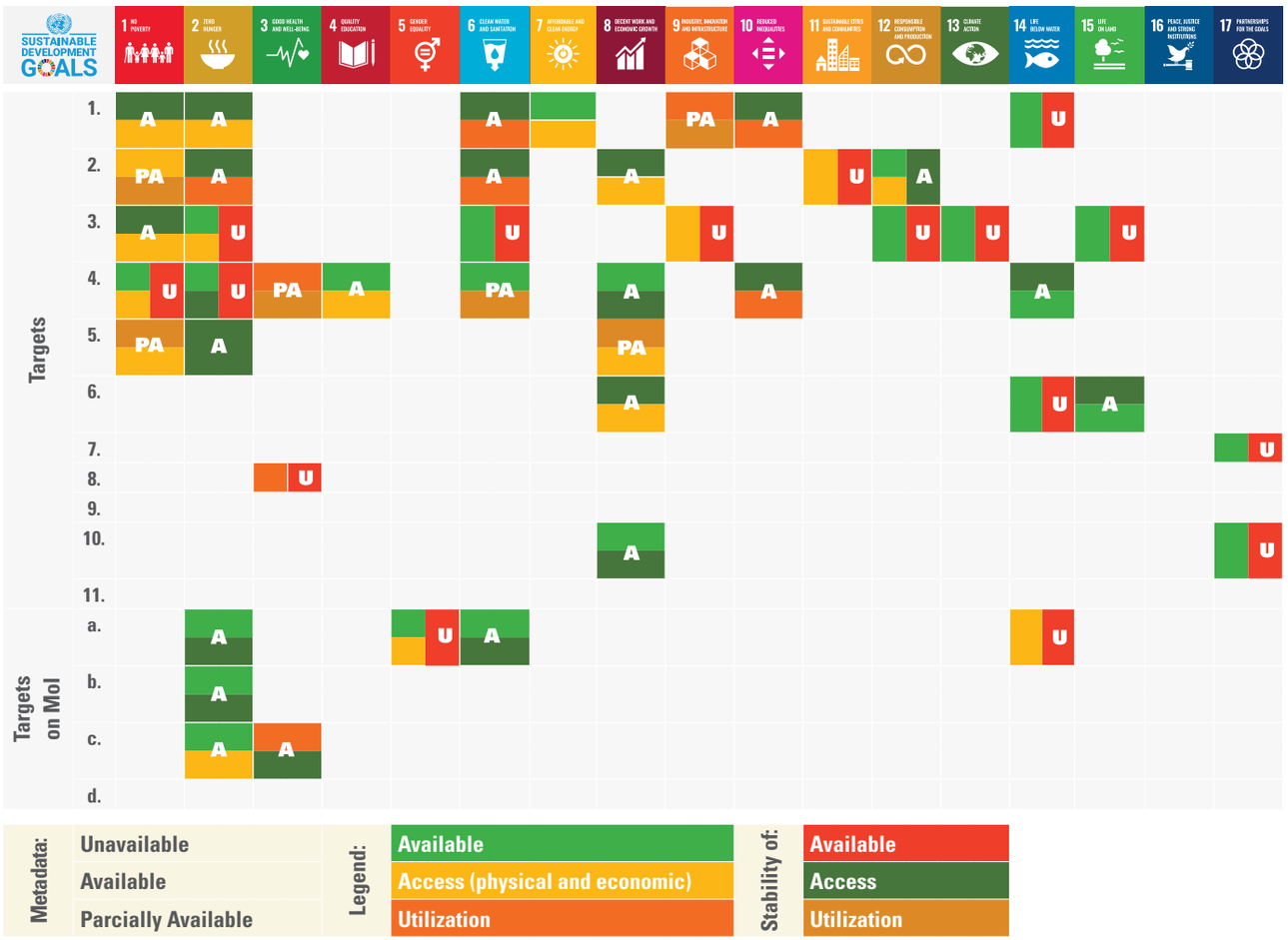
Source: Adapted from Fraange and Lee-Gammage (2018).

The existence of many approaches, metrics and methods results in different types of assessments with each a reflection of the priorities set by the measurers and the purpose of the monitoring. And while food security is intrinsic to the SDGs, and directly related to SDG 2 for which a set of indicators has been identified, a closer look will show that food security impinges on a large number of SDGs, thereby adding complexity to an already complicated process. In a recent mapping conducted by ESCWA (2017a), 45 of 169 targets were found to be related to food security across 16 of the 17 SDGs (figure 3).

Confusion is further added when the indicators used consist of a mix of "input" and "outcome" indicators of food security – also often referred to as "means" (the methods used) and "ends" (goals or results) – in the process of measurement. In addition, monitoring could be carried out ex ante, that is, assessing causal indicators, or ex post, assessing outcome indicators, while also accounting for the type of food insecurity faced, either chronic, as a result of structural conditions, or temporary, as a result of short-term crises.

The above confusion leads to the production of a "shopping list" of indicators that end up measuring the performance of policy levers and programme achievements without really providing a holistic picture of the food security status. Such a confused state is understandable: food security is an outcome of complex interactions of interdependent dimensions. Food security is not an end by itself but rather a fundamental component of human well-being.

Figure 3. Mapping of food security dimensions across the Sustainable Development Goals



Source: ESCWA, 2017a.

Box 2. Food security in the Sustainable Development Goals

Goal 2 of the Sustainable Development Goals (SDGs), usually referred to as the "zero hunger" goal, covers all the dimensions of food security: availability (targets 2.3, 2.4, 2.a, 2.b and 2.c), access (targets 2.1 and 2.3), utilization (target 2.1 and 2.2) and stability (targets 2.4, 2.5, and 2.c). However, food security is cross-cutting and, as such, aspects of it are found in numerous other goals and targets. For example, the rising scarcity of water in the Arab region is a major factor in food production and thus target 4 of SDG 6 (sustainable freshwater withdrawals) relates to the "availability" dimension through domestic agricultural production. Similarly, other targets such as target 4 of SDG 8 (Decent Work and Economic Growth), target 2 of SDG 12 (Responsible Consumption and Production) or target 3 of SDG 15 (Life on Land) impacts resource efficiency and sustainability and therefore food availability.

The "access" dimension of food security is important at the household and individual levels. Elements of physical and economic access to food can be found in targets 1, 2 and 4 of SDG 1 (End Poverty), target 1 of SDG 7 (Affordable and Clean Energy), target 1 of SDG 9 (Industry, Innovation and Infrastructure), targets 1 and 4 of SDG 10 (Reduced Inequalities) or target (b) of SDG 14 (Life Below Water).

The "utilization" dimension is related to dietary habits and the resulting health status of people, particularly children, in the form of stunting, wasting or obesity. Issues related to this dimension can be found in target 4 of SDG 3 (Good Health and Well-being) and targets 1 and 2 of SDG 6 (Clean Water and Sanitation).

The "stability" dimension is reflected throughout the other three dimensions, as well, and is accounted for through numerous targets including 1.3, 1.5, 3.8, 3.c, 4.4, 5.a, 8.2, 8.4, 8.5, 8.6, 8.10, 9.3, 11.2, 12.2, 13.3, 14.1, 14.4, 14.6, 15.6, 17.7 and 17.10 among others. A comprehensive mapping of the four food security dimensions within the SDGs framework is available in Arab Horizon 2030: Prospects for Enhancing Food Security in the Arab Region (ESCWA, 2017a) from which this section was adapted.

SELECTED FOOD SECURITY MONITORING PRACTICES: SUMMARY REVIEW

There are several food security measurement tools used by various entities for the purpose of monitoring status and progress in food and nutrition security (see Jones, and others, 2013; ESCWA, 2017b; and the bibliography section for a full review). These tools can be used to:

1. Provide national level assessment of food security;
2. Inform global monitoring and early warning systems;
3. Assess household-level (and within household-level) food security; and/or
4. Measure food consumption and utilization through individual anthropometric studies.

A. Food security indicators and indices

Prevalence of undernourishment (PoU)

This measure is widely adopted and has been developed by FAO, which uses it in the annual "State of the Food Security and Nutrition in the World" report. It uses at its basis the food balance sheets developed by FAO which draw on nationally generated data of food supply and utilization and, when available, data from household surveys that provide information on the inequality in access to food. It is also a first-tier indicator of SDG 2. It estimates the likelihood that a random person in the studied population is not consuming enough dietary energy to lead an active and healthy life (Cecilia, 2016). The information provided is important and is relied upon by governmental and non-governmental agencies. It is a composite outcome indicator and, as such, does not provide information on the drivers of undernourishment and food insecurity.

FAO Suite of Food Security Indicators

The prevalence of undernourishment is part of the FAO suite of food security indictors, which used to be the mainstay of the annual State of Food Insecurity reports. They are now available through FAOSTAT and consist of a set of 27 food security indicators representing drivers associated with each of the four pillars of food security. Data is available across countries and over time, which facilitates comparisons and aims to become a single worldwide food security information system. The suite of food security indicators serves as a good source of data across drivers of food security but its usefulness as policymaking tool is relatively limited since it fails to provide a comprehensive view of the food security situation in easily digestible format.

Global Hunger Index

This index is a composite indicator, which has been developed by the International Food Policy Research Institute (IFPRI) to measure hunger. It is based on four indicators: the prevalence of undernourishment, child wasting (proportion of children under 5 years with low weight for their height), child stunting (proportion of children under 5 years with inadequate height for their age) and child mortality (rate of mortality among children under 5 years). It is a tool for tracking progress, or lack thereof, in combating hunger across countries. Each country receives a score between 0 and 100, with high figures indicating extremely alarming hunger situations. It constitutes a step forward compared to the PoU as it accounts also for child stunting, wasting and mortality but like the PoU, it is limited as it is a composite indicator, which does not permit to identify its drivers.

Global Food Security Index

This index is produced by the Economist Intelligence Unit. It is widely used for cross-country comparisons. It is a composite indicator and it does not build on the four dimensions of food security (availability, access, utilization and stability). Rather, it organizes 30 indicators (both outcome and input indicators) in three dimensions: affordability, availability and quality and safety. Some indicators are quantitative while others are qualitative and rely heavily on expert opinions or on weights. Hence, it can be characterized as a subjective tool. It is "complex" and of limited usability for policymaking due to the inability to dissect the relationship between the 30 indicators used in the computation of the index (Pangaribowo, and others, 2013). Though it does not cover all Arab countries, given its simplicity for characterizing food security through a single number, it is increasingly relied upon by the media to characterize food security in the region.

B. Assessment through surveys

These global and household-level surveys attempt to capture the "access" indicator of food security and serve as an early warning system.

Vulnerability analysis and mapping methodology

This methodology is used in crisis-prone, food-insecure countries to assess food security status and examine underlying causes of vulnerability. These analyses rely on data collected from households. Surveys make use of available data but focus on 13 core modules: food consumption patterns, expenditures, household assets, sources of water, access to sanitation, household composition and education, housing materials, access to credit, livelihoods/sources of income, agriculture, livestock, external assistance, and shocks and coping strategies (Jones and others, 2013).

Household consumption and expenditure surveys

These rely on the measurement of poverty, the consumer price index and household socioeconomic status. These are analysed along with the patterns of food consumption within households. A limitation is that it assumes that household food acquisition equals household food consumption. Household surveys do not account for gifts or for differences in individual consumption within households as well as food wasted or consumed away from the household (Jones and others, 2013).

The Food Insecurity Experience Scale

The Food Insecurity Experience Scale (FIES) tries to directly assess families' behaviours and lived experiences of household food insecurity using a questionnaire. The FIES allows the determination of the prevalence of moderate or severe food insecurity at an individual or household level. The prevalence of severe food insecurity is a first-tier indicator falling under SDG 2. FIES focuses on access to food, and not on nutritional outcomes. The FIES survey comprises eight questions that aim to assess people's access to food over a 12-month period. The severity of the condition is treated as a "latent" trait, meaning that it can be reliably inferred using advanced statistical techniques, but not directly observed (See Annex 1 for an elaborate explanation).

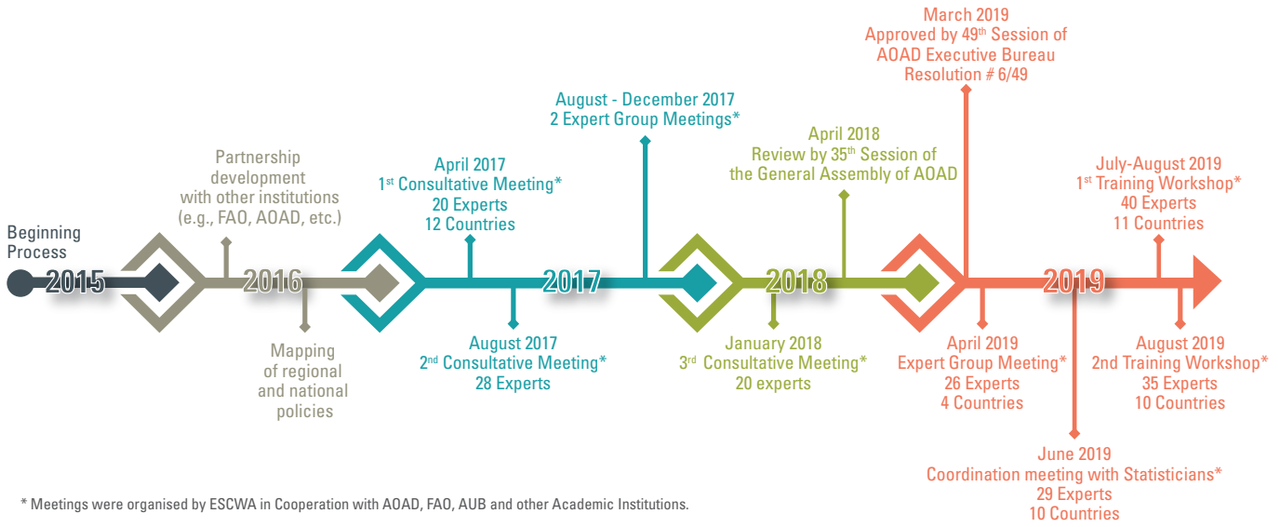
C. Food utilization: anthropometry

Anthropometric measurements, meaning the measurements of body dimensions, are mostly used to indicate nutritional status. The measurements often collected in the Arab region include height, weight, waist and hip circumferences and body mass index (BMI). In addition to nutritional status, anthropometric measurements are also linked to mortality and morbidity, cognitive development and chronic disease. They also serve as health and socioeconomic well-being indicators. However nutritional status does not only depend on food intake but also on individual health status, influenced by one's hygiene and sanitation and access to caregiving and health services.

D. Summary

Monitoring practices based on indicators and indices allow for the estimation of food security usually in the form of a single figure or score, which allow, among other benefits, cross-country comparisons. However, most of these measures focus on a few selected dimensions while providing little information on the remaining dimensions. The survey-based monitoring practices provide an overall description at household or individual level as they cover many issues related to patterns of food consumption, food expenditure or food access but without providing a summarized view on the overall food security status. Most survey-based monitoring practices tend to measure the "access" dimension with the other dimensions largely overlooked. Finally, the anthropometric practice is based on individual measurements to assess the impact of food consumption as well as health outcomes. It is mostly concerned with the "utilization" dimension.

Figure 4. Timeline in the development of the food security monitoring framework



* Meetings were organised by ESCWA in Cooperation with AOAD, FAO, AUB and other Academic Institutions.

As such, there is a lack of a system that brings together the four dimensions of food security in a simple and easy to use or interpret format for a quick assessment of food security while also pulling together a meaningful number of descriptive indicators under each of the four dimensions. The monitoring framework being proposed for the Arab region will attempt to fill this gap by bringing together a meaningful number of indicators based on regional needs and situation, on a mapping and assessment performed by ESCWA and on SDGs monitoring. These indicators would then be assembled and presented to policymakers and development planners in a way they could easily visualize, understand and interpret the information being conveyed for focused food security-related policies and strategies.

SELECTION OF INDICATORS

The above review makes clear that food security is not a simple case of food supply and stocks but is more elaborate and thus needs a commensurate monitoring system that captures its complex nature. Since the endorsement of SDGs at the global level and the inclusion of food security as one of the tools to assess success, a logical next step is to build on SDG monitoring while monitoring food security through the use of approaches and indicators that are compatible with both endeavours. The challenge is to develop such a framework based on a set of indicators applicable across countries and cultures, in both developed and developing nations, including those that have limited data collection and statistical analysis capacities. A further challenge is to develop a framework and use indicators that are simple yet multidimensional to capture the complexity of food security. If indicators are to be used to tailor policies to needs, they will also need to be disaggregated as required to reflect age, gender, disability status, social class or community vulnerability. These are some of the challenges that were faced during the process of developing the monitoring framework.

A. Process and rationale

The architecture of the monitoring framework, the selection of indicators and their allocation to specific determinants of food security were the outcome of an extended consultative process involving frequent interactions with experts versed on issues of agriculture, food security and nutrition as well as related development areas. The experts were from national institutions, regional and international organizations, and academia. The whole process spanned from 2015 to 2019 as highlighted in figure 4.

The outcome of the process was as follows:

- ESCWA developed close partnerships with, among others, the AOAD and FAO, both the Regional Office in Cairo and headquarters in Rome, which were instrumental in the development and dissemination of the framework;
- Mapping of regional and national policies and strategies to identify relevant indicators and their relation to the four food security dimensions;
- First consultative meeting (April 2017): The process was initiated with experts responding to a wide-ranging questionnaire. The results were used to guide the design of the framework. It was agreed that the monitoring system would reflect the four dimensions of food security and would rely on the FAO Suite of Food Security Indicators with priority given to those indicators overlapping the SDGs.
- Second consultative meeting (August 2017): An early draft of the monitoring framework was discussed. The proposed monitoring framework revolved around the four food security dimensions with each containing 4-6 indicators closely related to the SDGs as well as two "core" indicators (prevalence of undernourishment and the Food Insecurity Experience Scale), both of which are "outcome" indicators that are used to monitor progress under SDG 2.
- Expert meetings (September – December 2017): Two expert meetings were held to agree on the final list of food security monitoring indicators. Priority was given to those for which data is already available or regularly collected. The first draft of the monitoring framework (known hereafter as the Arab Food Security Monitoring Framework, shortened to the "monitoring framework") was also produced and discussed;
- Third consultative meeting (January 2018): The final format of the monitoring framework was reviewed and discussed, including the list of chosen indicators. During this process, a new outcome indicator was added to the core pillar (prevalence of obesity among adults), as attending experts felt it is an issue of high concern within the Arab region;
- Meeting of the General Assembly of AOAD (April 2018): The Thirty-fifth Session of the General Assembly of AOAD considered the methodological framework and called on Arab countries to review and provide comments and suggestions to pave its adoption later that year or early 2019;
- Meeting of the Executive Council of AOAD (March 2019): Taking into account the comments from and recommendations by Arab countries, the Executive Council approved and adopted the monitoring framework;
- Meeting of experts (April 2019): Selected experts reviewed a draft publication that laid out the framework and the first food security tracking effort using the proposed monitoring framework in the Arab region;
- Coordination meeting with statisticians (June 2019): Experts from statistic offices at the national and regional levels were presented the framework and agreed on a timetable to organize training workshops on its use. The training workshops would also include experts from national and regional agriculture-focused agencies;
- Training workshops (July and August 2019): Two training workshops were organized in Tunis, Tunisia, and Beirut, Lebanon, which were attended by experts from national and regional agricultural departments and statistics offices. Experts were taught how to use the framework to assess food security and provide recommendations to policymakers.

Before and between the above consultative meetings, a comprehensive review of the literature and background research were conducted to ensure that the selection of indicators, the building of the framework and the interpretation of results were in line with the most commonly used practices found in the literature or used by other institutions around the world. This ensured that the framework was not developed in a vacuum but rather took advantage of the available knowledge and expertise while integrating it in a meaningful way to obtain an innovative approach for analysing food security. The framework design and indicator selection followed the rationale outlined below.

First, food security as defined by the World Food Summit was assumed to be the outcome of complex interaction between many determinants. These determinants can be arranged in four groups, also known as dimensions, though there are overlaps and interactions that exist between dimensions and between the indicators within and across those groups. For instance, wheat yield is a determinant of food availability while logistics performance is a determinant of food access and food production variability is a determinant of the food stability dimension. Poor performance in logistics affects the delivery of both inputs and outputs, which affects the yields achieved and consequently lead to a certain degree of variability in food production.

Second, the number of determinants that can influence food security is extremely large with some (sub)determinants nested within primary determinants. It is a challenge to identify and account for all determinants of food security but through appropriate research and consultations it was possible to identify those determinants that can explain most of the food security outcome while accounting for national and regional specificities. For example, water use in agriculture or food import dependency might not be major issues for countries well-endowed in natural resources or those that have a substantial agricultural sector. However, the two issues are of great concern in the Arab region due to the rising scarcity of water resources and the length at which most countries go in their attempt to produce the food they consume.

Third, based on the above stipulations, food security and nutrition (FSN) can be expressed as a function of determinants across its four dimensions as follows:

FSN = f[(AV1,…,AV6,…,AVn);(AC1,…,AC5,… ,ACn);(UT1,…,UT5,…,UTn);(ST1,…,ST5,…,STn)]

Where AV refers to determinants of the availability dimension, AC refers to determinants of the access dimension, UT refers to determinants of the utilization dimension and ST to determinants of the stability dimension. The dimension determinants would be the ex ante or causal indicators as their interactions would lead to the level of food security being observed. FSN of food security outcome would be reflected through ex post or core indicators. Numbered determinants under each dimension are those that are widely recognized to explain most of the variations in the selected dimension. However, each dimension comprises many other determinants though the cost-effectiveness of including them is not justified by the additional explanatory power they may provide. Moreover, the information and data about these other determinants may not be available, may have limited impact or may have little importance in the specific regional or national context.

Fourth, the determinants are quantitatively represented by indicators that are measurable and relevant. For instance, in the Arab region, wheat remains the basic staple and the main source of calories. Wheat production is therefore an important determinant of food availability. Vos (2015) citing Alexandratos and Bruinsma (2012) indicates that in the Middle East and North Africa, yield increases will account for 80 per cent of the increase in crop production, 20 per cent increase in cropping density and 0 per cent in arable land expansion. The indicator for wheat production increase must therefore represent yield increase. The indicator selected to proxy wheat production is the yield gap [(actual yield / potential yield) * 100]. It should be emphasized that qualitative measures or expert opinions have been explicitly excluded from the framework.

Fifth, throughout the development of the framework both during the consultative and the review and research processes, the following key principles were adhered to:

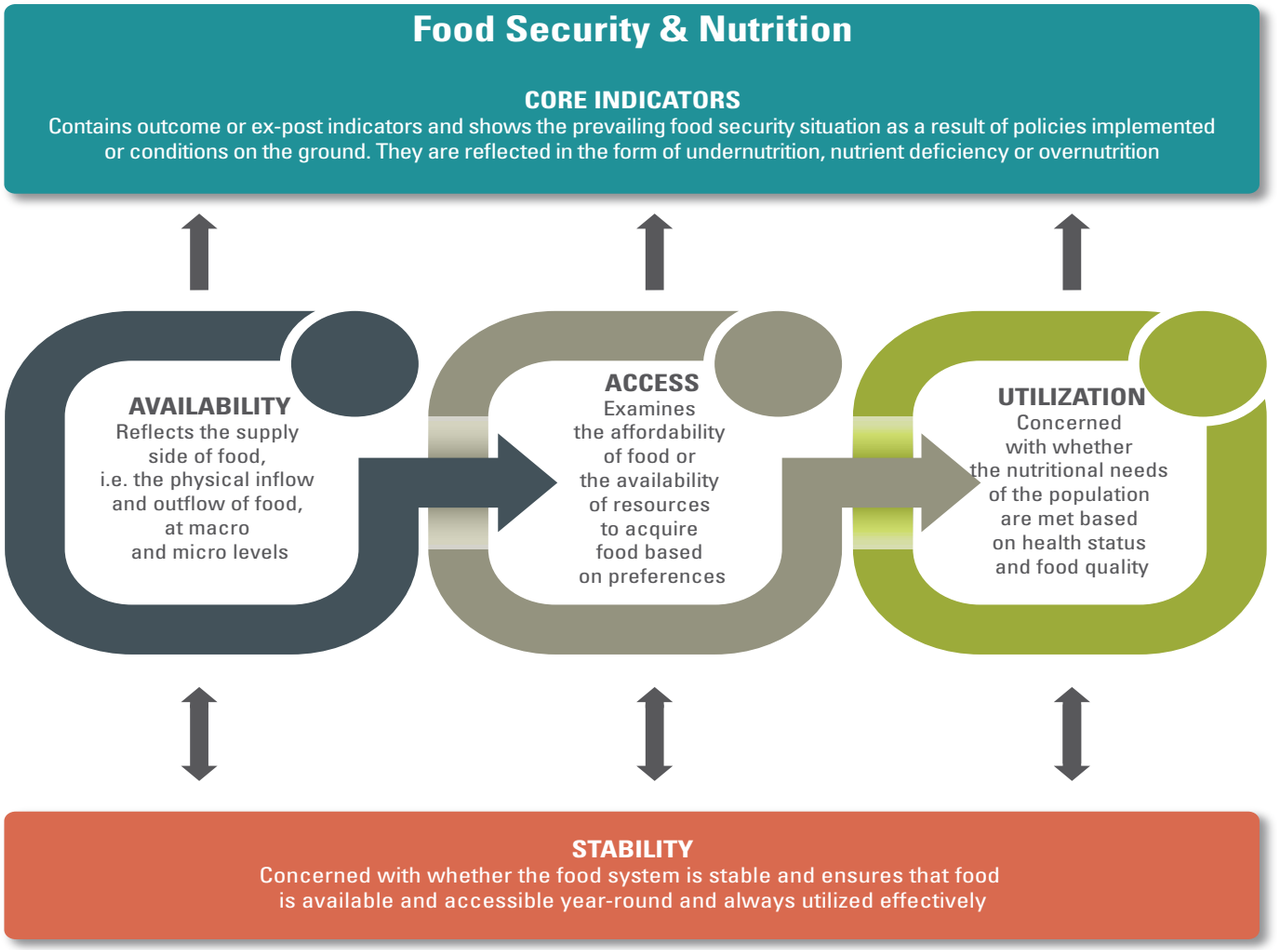
- The indicator had to account for seasonal, temporary and chronic food (in)security;
- It should cover the four dimensions of food security (availability, access, utilization, stability);
- It had to integrate household and individual food security (utilization dimension);
- It should include ex post (outcome) as well as ex ante (causal) information;
- It should be harmonized with the SDGs to facilitate reporting on these;
- It should be aligned with regional policy priorities in food security; and
- It should allow a degree of regional specificity.

B. Configuration and format

The four dimensions of food security are to be monitored using between 5 and 6 proxy indicators for each dimension. These indicators are selected to satisfy the conceptual aim of the framework as listed above and would be ex ante (causal) indicators, or dimension indicators. The four dimensions could act as vertical support to enhance the level of food security and nutrition with three of the dimensions, meaning availability, access and utilization, at the same level as their influence might be equally important while indicators of the stability dimension might act on each of the other three dimensions. However, for food security to exist all four dimensions must be sufficiently present (Lele and others, 2016; Fraanje and Lee-Gammage, 2018). At the top of these four dimensions would be the core pillar containing ex post or outcome indicators (figure 5). In this publication, “dimension” will be used to refer to the usual four pillars of food security (availability, access, utilization and stability) while “pillar” will be used for the newly introduced “core” composed of ex post indicators.

As noted by Lele and others (2016), the pillar and dimension indicators support each other to determine food security and nutrition. The three middle dimensions in figure 5 influence each other moving left to right though the reverse causality might also exist notably through the stability dimension.

Figure 5. Interrelations among food security dimensions



Source: Adapted from Fraanje and Lee-Gammage (2018) and Lele, and others (2016).

This architecture has the advantage of providing guidance for policymaking in sectors associated with each of the pillar and dimensions of food security. Any change in policy in the precursor sectors should, given the appropriate amount of time, be reflected in the outcome indicators. This format allows a diachronic monitoring of food security. One limitation is that this is a black box system and there is no exploration of the actual mechanism linking one sectoral indicator to the dimension to which it is allocated and to the resulting outcome. In a sense, it is like looking at gauges and instrument on a car dashboard (speedometer, tachometer, temperature gauge) and making driving decisions on these without understanding the functioning of a car engine. This is indeed the situation of a vast majority of car drivers. The other limitation lies in the difficulty of selecting indicators and allocating them to one dimension rather than to another while there exist overlaps between categories. This is the subject of the next section.

The results of the framework are presented through a single doughnut chart, which has the advantage of providing a rapid visual, comparative and quantitative assessment of a multivariable system (see figure 6 below).

C. Selected indicators

The selection of indicators was conducted according to the objective and target audience. The latter determines the scale at which information is collected. There is therefore no “best indicator” as the usefulness of an indicator depends on the purpose for which it is used

(Habicht and Pelletier, 1990). In this case, the chosen principal target audience is policymakers and the scale is both national and regional. Composite indicators will usually include dimensions correlated to food and nutrition, such as poverty levels. Trade-offs are often required in order to limit the number of indicators and avoid the "shopping list" phenomenon. For this purpose, indicators are examined in matrixes that allow the detection of overlaps and similarities while also being used to examine data availability and make decisions about keeping or eliminating an indicator (Jones and others, 2013; Pangaribowo and others, 2013).

The following conditions were laid out for the selection of indicators in each food security dimension and the pillar:

- Compatibility with regional food security strategies in order to ensure relevance to current Arab policies;
- Alignment or overlap with SDG indicators and goals; and
- Availability of metadata for a majority of Arab countries and for the bulk of the Arab population.

Eleven regional strategies covering cross-sectoral thematic issues impinging on food security, such as water, climate change, infrastructure, agriculture, and disaster risk reduction, were reviewed.[5] Twenty-eight indicators were extracted and compared with the list of SDG targets and indicators. Those indicators that intersected were included in a first selection list. Data was then collected from reliable sources for each of the identified indicators, such as FAO Suite of Food Security Indicators, the SDGs, the World Bank or the Sustainable Development Solutions Network's SDG Index.

As a result, two issues emerged:

- Unavailability of metadata for several SDG indicators (such as tier 3 indicators).[6]
- A substantial gap in data for countries of the Arab region for the majority of the selected indicators.

Consequently, alternative indicators had to be identified and filtered according to the following set criteria as related to the metadata:

- Act as substitutes to tier 3 SDG indicators, based on their scope;
- Be relevant to the Arab region's context (meaning derived from regional strategies and/or priorities);
- Be available from verified sources (listed above);
- Be available for at least 50 per cent of the countries of the Arab region (11 out of 22 Arab countries);
- Be available for at least 50 per cent of the population of the Arab region.

For example, 11 out of 22 Arab countries, representing 50 per cent of the region's countries, are only representative of the region if their collective population equals 50 per cent or more of that of the entire Arab region while 10 out of 22 countries are not representative of the region even if they do have a collective population of over 50 per cent of the region's population.

The result of this exercise was a relatively large number of indicators, covering the four dimensions and the pillar of food security. They were organized into a colour-coded matrix, as recommended by Jones and others (2013) and Pangaribowo and others (2013). They were then cross-checked for overlap, validity and data availability on country basis for identification of data gaps. Related matrices are included as annexes.

At the end of the process, 24 indicators were selected which are closely related to the SDGs, the FAO Suite of Food Security Indicators and selected other global and regional plans of actions (see also Annex 2). The indicators are distributed as follows (for the full list and descriptive on the indicators see Section 2 below):

- Three indicators in the core pillar[7] (undernourishment, food insecurity experience, obesity) of which two are directly linked to the SDGs indicators;
- Six indicators in the availability dimension (yields, agriculture orientation expenditure, food losses, average dietary energy supply, food import dependency, water use in agriculture) of which four are directly linked to the SDGs indicators;
- Five indicators in the access dimension (poverty, share of expenditure on food, unemployment, logistics, inflation) of which two are directly linked to the SDGs indicators;
- Five indicators in the utilization dimension (access to drinking water, access to sanitation services, child stunting, child wasting, anaemia among women) of which four are directly linked to the SDGs indicators; and
- Five indicators in the stability dimension (climate change impact, food price anomalies, political stability, food production variability, food supply variability) of which one is directly linked to the SDGs indicators.

PUTTING TOGETHER THE DASHBOARD

A. Construction of the dashboard

The dashboard is composed of a doughnut chart and a table containing the raw or computed data and their trends. The doughnut was constructed by superposing two individual doughnut charts. The resulting chart comprises an outer doughnut containing the indicators of the four dimensions (availability, access, utilization and stability) and the inner doughnut containing the three core pillar indicators.

Figure 6. Food security dashboard: Doughnut chart

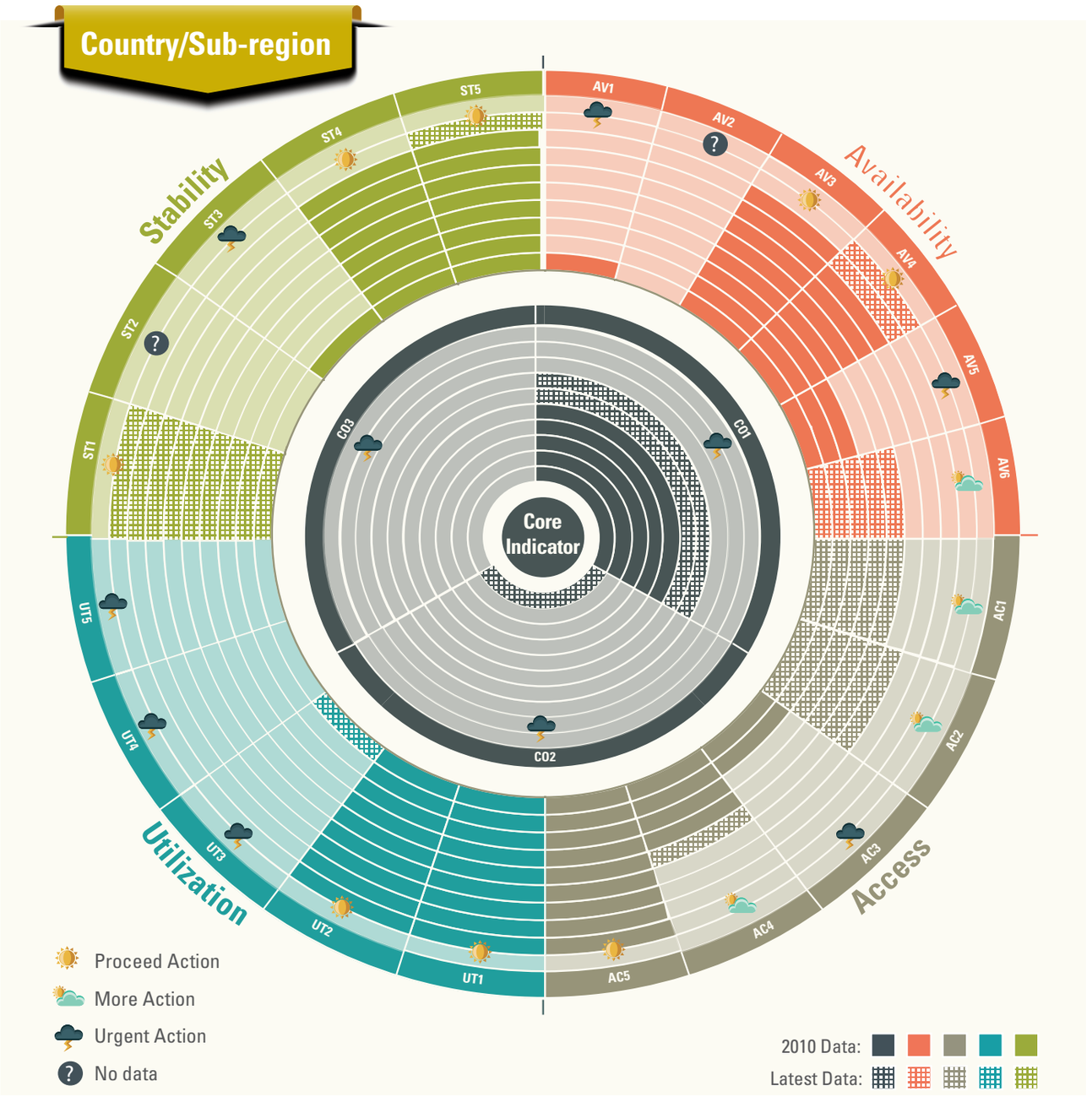


Table 1. Food security dashboard: Data and trend table

Indicators		Arab		Country/Sub-region			
		Latest		2010	Latest		Trend
Code	Description	Value	Year	Value	Value	Year	
CORE INDICATORS							
CO1	Undernourishment (R) -%	12.1	2016	6.3	4.7	2016	●
CO2	Food insecurity (R) - %	12.2	2016	n.a.	8.3	2016	
CO3	Obesity (R) - %	28.4	2016	23.3	27.4	2016	●
AVAILABILITY INDICATORS							
AV1	Wheat yield - %	82.2	2017	44.5	35.6	2017	●
AV2	Agriculture expenditure - index	n.a.		n.a.	n.a.		
AV3	Food loss (R) - %	6.8	2013	7.1	6.8	2013	●
AV4	Dietary energy supply - %	131	2017	135	146	2017	●
AV5	Wheat import dependency (R) - %	65.0	2012	70.6	72.2	2012	●
AV6	Agriculture water (R) - %	n.a.		n.a.	54.8	2017	
ACCESS INDICATORS							
AC1	Poverty (R) - %	16.6	mult.	n.a.	3.9	2011	
AC2	Food consumption (R) - %	n.a.		n.a.	43.0	2016	
AC3	Unemployment (R) - %	10.4	mult.	10.0	12.2	2018	●
AC4	Logistics - index	2.7	2016	2.4	2.8	2016	●
AC5	Inflation (R) - %	12.8	mult.	3.9	4.3	2018	●
UTILIZATION INDICATORS							
UT1	Drinking water access - %	86.9	2015	92.4	93.5	2015	●
UT2	Sanitation access - %	80.8	2015	86.6	87.5	2015	●
UT3	Child stunting (R) - %	23.0	mult.	n.a.	11.7	2012	
UT4	Child wasting (R) - %	8.7	mult.	n.a.	4.1	2012	
UT5	Women anaemia (R) - %	35.5	2016	33.3	35.7	2016	●
STABILITY INDICATORS							
ST1	Climate change (R) - index	0.09	2019	n.a.	0.05	2019	
ST2	Price anomalies (R) - index	n.a.		n.a.	n.a.		
ST3	Political stability - ranking	14	2017	12	15	2017	●
ST4	Production variability (R) - 1000$/capita	10.1	2016	14.2	20.3	2016	●
ST5	Supply variability (R) - kcal/cap/day	29.8	2013	26.0	14.0	2013	●

(R) : Reversed n.a.= Not Available mult.= Multipleas years

● Red: Negative Trend ● Yellow: Neutral Trend ● Green: Positive Trend.

Table 2. Normalization formula

Normal: when a high value is best (for example, yields):	$\frac{X - min}{max - min} * 10$
Reversed: when a low value is best (for example, obesity):	$\frac{X - max}{min - max} * 10$
With X being the value to be normalized Reversed indicators will be highlighted with an "R" next to concerned indicator	

The chart highlights the hierarchy between the core indicators or outcome or ex post variables and the remaining indicators of the other four dimensions or causal or ex ante variables (figure 6 above). It also allows a visual tracking of performance.

The dashboard helps visualize progress made towards reaching the optimum level for a selected indicator. As an ensemble, it shows the overall food security status, with good performance achieved when the successive full colour or shared rings of all or most indicators pull towards the outer part of the two doughnuts. When they contract towards the inner parts of the doughnuts it shows underperformance. Policymakers and interested stakeholders can immediately identify bright spots (pushing towards the outskirts or high scores) and hotspots (contracting inwards or low scores). Within the doughnuts, the full and usually darker colours show the performance for the base year (2010) while the shaded and usually lighter colours show the performance in the latest year for which data is available. Improving performance is indicated by a shaded and lighter colour appearing above a full and darker one and getting closer to the outer rings while a lack of improvement would be indicated by the base year colours (full and darker) being on top.

The accompanying table provides background raw or computed data depending on the indicator (table 2 above). It provides the evolving trend as well between the base year (2010)[8] and the latest year for which data was available. The trend, for those indicators for which data is available for the base and latest year, would be indicated using traffic light-type symbols: green for progression, red for regression and yellow for no or insignificant change, that is where the rate of change is within a margin of error of 5 per cent. Indicators for which a high value indicates poor performance, such as undernourishment, will be inverted during the normalization process and highlighted with a letter R.

B. Data normalization

In order to use a similar scale on the charts and for ease of visual assessment, all indicators were normalized from 0–10 whereby 0 denotes the worst performance and 10 the best performance. The normalization was performed using the following equations (table 2):

The minimum (min) and maximum (max) are world lowest and highest values whenever the figures could be obtained. Sometimes regional minimum and maximum values were used when no world values could be obtained, such as for wheat yield gaps as no world average for yield potential could be found. A few other exceptions were introduced as related to the outcome indicators in the core pillar — undernourishment (CO1), food insecurity experience (CO2), obesity (CO3) — and nutrition related indicators in the utilization dimension, namely child stunting (UT3), child wasting (UT4) and anaemia among women (UT5), to reinforce the call to achieve "Zero Hunger" as per the SDGs. Thus, undernourishment and food insecurity experience are normalized using world averages as maximum values and capping the minimum value at 2.5 per cent given that no computations are made below. Obesity (CO3), child stunting (UT3), child wasting (UT4) and anaemia among women are normalized using as maximum values the global 2030 Agenda targets provided by FAO (FAO and others 2019, p. 29).

Using world minimums and maximums allows for wider ranges between the two values while also avoiding a regional ranking as it becomes less likely that the minimum and maximum values are both from Arab countries, though there is a possibility this might happen. The framework also becomes less subject to conditions that might affect the entire or most of the region. In addition, the use of world minimums and maximums rather than the extremes of 0 per cent and 100 per cent allows for a more realistic scale as in real life the extreme values are seldom reached regardless of the indicator or the country.

For example, no country would be expected to have 0 per cent or 100 per cent obesity, poverty or unemployment. Thus, using those values would imply comparing countries to best- or worst-case scenarios, which would embellish or worsen scores.

To illustrate the framework, the baseline year chosen in this document is 2010, a year for which data was relatively available for many indicators. However, users might opt for alternate base years if enough data is available for a proper monitoring. Regardless of the base year, performance would be evaluated against data from the latest available years for each indicator.

C. Data: sources, quality, coverage and absence

For this edition, the privileged source of data was official international databases and these were complemented with non-official data from published sources such as journals or other articles. Official sources from global datasets are from international organizations such as the United Nations Statistics (UNSTAT), the World Bank (World Development Indicators – WDI) or FAO (FAOSTAT and AQUASTAT, FAO's global information system on water resources and agricultural water management) to name a few. The above institutions originate their data from countries and proceed to apply filters and to cross-check them to improve reliability. A few data sources are non-official, and these include actors such as universities and research institutions or peer-reviewed papers or non-governmental organizations. No special effort was made to account for missing data. Those indicators were left blank which translated into a blank (light colour) on the dashboard, serving as well as a policy recommendation on the need to collect related data.

GUIDEBOOK

A. Preamble: things to remember when using the framework

- The objective of the framework is to allow countries to monitor food security and nutrition (FSN) through time;
- One purpose of the framework is to aid in the evaluation of FSN policy and programme impacts;
- Another purpose is to guide the targeting and prioritization of policies and programmes that lead to improved FSN;
- The definition of food security used here is that of the World Food Summit, which has four dimensions: availability, access, utilization and stability. Since it includes a nutrition dimension, it will also be referred to as food security and nutrition (FSN);
- In general, availability is expressed at national level, access at national and household levels and utilization at household and individual levels while stability cuts across all levels;
- The outcomes of food security can also be quantified by measuring specific indicators;
- Each dimension is constructed from many determinants;
- Determinants can be quantified by measuring specific indicators;
- It is futile to attempt to use all possible determinants of food security. It is more effective to identify and measure those determinants that are relevant to the specific food security dimension, and that can account for most of the variation in that dimension or in FSN;
- These determinants were identified using expert opinions and a review of the literature;
- The indicators of the core pillar of FSN are direct or indirect SDG indicators. They can be used to chart the performance of the country towards meeting specific SDGs and to assess FSN achievement;
- The scores computed for each indicator represent the normalized real value;
- The purpose of the normalization is to fit all indicators into a single graphical representation, the doughnut chart;
- The indicators within the doughnut chart are like the dials on a car's dashboard where one can check the car's motion and critical indicators of good operation: the speedometer, the tachometer, the oil pressure meter, the temperature gauge, the brake lights;
- The four dimensions' indicators show what is happening "under the hood". Monitoring these indicators is similar to using a scanner in a car in order to identify where there may be a malfunction;
- Data for core pillar indicators are usually published on annual basis through the State of Food Security and Nutrition in the World report by the FAO and its partners (FAO and others, 2019);

- Data may not be always available for all indicators or in some cases may not be relevant across the board, such as wheat yield gap in Gulf Cooperation Council (GCC) countries. In those cases, countries might have high scores that would reflect an already optimal situation given the prevailing conditions, which would not warrant additional resources. These types of indicators were minimized but a few were nonetheless selected due to their relevance and data availability for more than 50 per cent of the Arab countries and for more than 50 per cent of the Arab population.

B. How to use the Framework?

- **Step 1: Gather core pillar indicators data (links for each indicator are provided in the reference section);**
- **Step 2: Gather data of each of the four food security dimension indicators (links for each indicator are also provided in the reference section);**
- **Step 3: Compute as relevant and conduct a normalization of the data and whenever applicable invert the minimum and maximum (using the methodology under the data normalization section);**
- **Step 4: Generate the doughnut chart using the accompanying Excel file which contains the necessary formulas and linkages;**
- **Step 5: Interpret the food security at a glance chart starting with the core indicators analysis;**
- **Step 6: Interpret the four dimensions indicator analysis**.

The above steps should include cross-checking with other sources of data and information and, as appropriate, disaggregation of data according to gender, youth and disability at the national level and a disaggregation along country subdivisions (cities, provinces, states or governorates as applicable) or marginalized communities (refugees and others).

C. Assessing performance in the doughnut chart and trend table

- All scores are normalized on a scale of 0-10, with 10 indicating that the country is, within a margin of error, close to the best performing country in the world in 2010 (baseline country). A score of 0, on the other hand, would indicate that it is closer to the poorest performers;
- A score of 0 can also indicate the absence of data. This would be cross-checked through the accompanying chart's table where missing data would not be listed;
- On the chart, progress on achievement for a determinant is indicated by an incremental change in the normalized value of the relevant indicator between the two time periods (base and latest year) while in the table it would be highlighted through the trend icon;
- As a convention, doughnut chart scores are classified as follows:
  - Scores 8 and above mean good performance suggesting that countries should continue implementing current policies, strategies and programmes shown in the doughnut chart as a sunny day (☀);
  - Scores below 8 to 5 mean moderate performance suggesting that countries should step up efforts in the design and implementation of policies, strategies and programmes shown in the doughnut chart as a cloudy day (⛅);
  - Score below 5 indicate poor performance suggesting that countries should invest drastically to rump up performance unless the country has no competitive advantage, such as lack of adequate resources to produce food, shown in the doughnut chart as a stormy day (⛈)
  - Where data is missing it is indicated with a question mark (❓).
- In the table, the trend from one year to other is read as follows:
  - Positive trend: when the difference between the values is positive and exceeds 5 per cent meaning that the trend is improving compared to the base year, a green light is shown (🟢);
  - Neutral trend: when the difference between the values is not significantly different by more than 5 per cent meaning that the trend is improving compared to the base year, a yellow light is shown (🟡);
  - Negative trend: when the difference between the values is negative and exceeds 5 per cent meaning that the trend is worsening compared to the base year, a red light is shown (🔴).

Example of scores evaluation: core indicators

Using as example data and information for a hypothetical example (figure 6 and table 1 above):

- Core indicator 1 (CO1) – Undernourishment: The score was 5 in 2010 and 7 for 2016. In the considered example, the country is performing better than the world average though it needs additional efforts to reach the minimum of 2.5 per cent undernourishment levels, below which values are not reported. Given that the score is below 8 but above 5, the country has a cloudy sky meaning that it needs to exert additional efforts to eliminate undernourishment. The table shows that the country decreased its undernourishment levels from 6.3 per cent in 2010 to 4.7 per cent in 2016, which is a positive trend and thus a green light is shown in the trend column;
- Core indicator 3 (CO3) – Obesity in the adult population: The score for both years is 0 and a dark thunderstorm is shown in the chart (figure 6 above). The table shows that obesity increased from 23.3 per cent in 2010 to 27.4 per cent in 2016 which is emphasized by the red light in the trend column. The country experienced a decline in performance, which translated into an increased prevalence of obesity among the adult population. The country needs to step up efforts to address the rising obesity among its adult population.

Example of scores evaluation dimensions indicators: Availability

- Availability indicator 2 (AV2) – Agriculture orientation in government expenditure: The score is 0 in both 2010 and the latest year as no data is available. The indicator is represented in the chart with a dark question mark that indicates the data is missing and efforts should be made to ensure that it is collected;
- Availability indicator 4 (AV4) – Average dietary energy supply adequacy (ADESA): The score increased from 7 in 2010 to 9 in 2016, which resulted in a sunny day in the chart as it indicates an improvement in performance and an increase in the availability of food.

D. Building the charts in Excel

- Data and scores are computed based on the indicator's formula, when applicable, and the normalization equations provided above;
- Two doughnut charts of 10 rings (to account for the 0–10 scores) were created, one for the core pillars and the other for the four food security dimensions;
- The core pillar in the doughnut chart was split into three slices while the dimension indicators doughnut chart was split into 21 slices (availability – 6, access – 5, utilization – 5 and stability – 5);
- The doughnut chart for the core pillar was then overlaid on top of the doughnut chart for the four food security dimensions making it appear as an inner core for the three pillar indicators and an outer mantle for the food security dimensions indicators;
- Each indicator slice is coloured in three different colours, namely (i) solid and darker colours for 2010 data, (ii) shaded and lighter colours for latest year data and (iii) very light colours for scores of 0 or no data;[9]
- If more than one country or subdivision (province, governorate, state) is available, then an Excel slicer is used to toggle between these entries allowing all countries or national subdivisions to be alternatively displayed on the same doughnut chart and data table;
- A Users' Manual provides additional details on the description of the indicators, process for normalization and using the Excel files which accompanies this framework. The manual is available at: https://www.unescwa.org/publications/manual-monitoring-food-security-arab-region.

Chapter 2

Food Security Monitoring Framework: Selected Indicators

Food Security Monitoring Framework: Selected Indicators

The selected indicators are distributed between a core pillar and the four dimensions of food security: availability, access, utilization and stability. Below is a description of all indicators in which an overview of the indicator is provided (definition and background information) as well as a justification of its selection, policy areas that can influence the indicator, its link to the SDGs and the FAO Suite of Food Security Indicators, possible data sources at global and national levels and the normalization process. For all indicators, links to appropriate data sources and other useful information are provided below indicator by indicator.

CORE INDICATORS

These are outcome or ex post indicators, which provide the prevailing food security situation as a result of the policies implemented and prevailing conditions on the ground. In other words, the core indicators show the presence or lack of food security and are depicted through malnutrition or risk of malnutrition. Food insecurity usually translates into undernutrition (situation of insufficient food energy and nutrient consumption) or overnutrition (situation of excess food energy consumption).

Table 3. List of selected core indicators

	Code	Indicator Description	Short Name	SDG Linkage
Core Indicators (CO)	CO1	Prevalence of undernourishment (R) %	Undernourishment	2.1.1
	CO2	Prevalence of moderate or severe food insecurity measured using FIES (R) %	Food insecurity	2.1.2
	CO3	Prevalence of obesity in the adult population (18 years and older) (R) %	Obesity	

CO1: Undernourishment (%)

Name/description: Prevalence of undernourishment (%).

Overview: The prevalence of undernourishment (CO1) estimates the proportion of the population whose food consumption is not enough to provide the adequate dietary energy to lead a normal, active and healthy life. Food deprivation or prevalence of undernourishment is assessed by comparing the dietary energy (kcal) consumption to prevailing energy requirement norms. Those consuming below the energy requirement norms are said to be undernourished.

Justification: In this framework, undernourishment is part of the core pillar as an outcome indicator. Undernourishment is closely linked to food availability and access and thus, to overall food security. It is linked to various illnesses, mortality and childhood metabolic imprinting leading to long-term developmental challenges. Monitoring undernourishment is crucial for tracking food security performance globally and more specifically in the Arab region in the light of recent and ongoing conflicts and protracted crises.

Action areas: Potential policies to address shortcomings under this indicator could include enhancing social safety nets, enhancing prevention and control, promoting good nutrition, mobilizing necessary resources (financial and human), enhancing food production and yields, making food available for direct consumption, reducing food loss and waste, establishing food banks, facilitating trade and enhancing markets and supply chains.

Link to action plans: This indicator is related to SDG 2, target 2.1 (indicator 2.1.1). It is also part of the FAO Suite of Food Security Indicators in the "access" dimension.

Data source: At the international level, data for this indicator can be obtained from FAO, the World Bank or UNSTAT. At the national level, data could be obtained through the health or statistics departments.

Normalization: The lower the percentage of undernourished the better it is and, as such, the normalization process to compute the 0 –10 score is reversed: min – max. The minimum and maximum values are capped at 2.5 per cent (best scenario) and world average of 10.8 per cent in this example (worst scenario).

CO2: Food Insecurity Experience Scale (%)

Name/description: Prevalence of moderate or severe food insecurity measured using Food Insecurity Experience Scale (FIES) (%).

Overview: The prevalence of moderate or severe food insecurity (CO2) estimates the percentage of individuals in the population who experience moderate or severe food insecurity as measured through the FIES. Moderate and severe levels of food insecurity are associated with either an inability to regularly access food or to reduce food intake both of which could lead to micronutrient deficiency and undernutrition including hunger for the most severe cases. The FAO provides data for "moderate or severe" food insecurity. It provides also data for "severe" food insecurity separately and the latter could be used if data for "moderate or severe" food insecurity is not available with an appropriate explanatory note. The FIES is an FAO-developed indicator and consists of a survey with eight questions to investigate people's experience with access to adequate food.

Justification: In this framework, FIES is part of the core pillar as an outcome indicator. An inability to access food results in a series of determined experiences and conditions. They range from being concerned about the ability to obtain enough food, the need to compromise on the quality or the diversity of the food consumed to opting to reduce food intake or to skip meals, up to the extreme condition of not being able to access food on a regular basis. In the Arab region, it helps monitor the food security situation in light of recent and ongoing conflicts and protracted crises.

Action areas: Potential policies to address shortcomings under this indicator could include enhancing food production and yields, enhancing food access, reducing food loss and waste, establishing food banks, facilitating food import, enhancing markets and supply chains and providing adequate social safety nets.

Link to action plans: This indicator is related to SDG 2, target 2.1 (indicator 2.1.2). It is also part of the FAO Suite of Food Security Indicators in the "access" dimension.

Data source: At the international level, data for this indicator can be obtained from FAO and UNSTAT. At the national level, data could be obtained through surveys.

Normalization: The lower the FIES the better it is and, as such, the normalization process to compute the 0 –10 score is reversed: min – max. The minimum and maximum values are capped at 2.5 per cent (best scenario) and world average of 9.2 per cent in this example (worst scenario).

CO3: Obesity (%)

Name/description: Prevalence of obesity in the adult population (18 years and older) (%).

Overview: Obesity (CO3) consists of an excess of fat accumulation that could affect health. The Body Mass Index (BMI), which compares weight to height, allows the classification of adults in terms of overweight and obesity status. As such, a person is said to be obese if his BMI is equal or greater than 30. This indicator estimates the percentage of individuals in the population with a BMI higher than 30.

Justification: In this framework, obesity is part of the core pillar as an outcome indicator. Obesity is usually due to an overconsumption of calories associated with low physical activity. It is associated with many illnesses and non-communicable diseases and impedes economic participation and growth. Low income groups may suffer from obesity due to the overconsumption of cheap, unhealthy foods, especially in the absence of healthy food alternatives. This indicator was specifically selected in this framework because obesity rates are escalating at alarming rates in the Arab region. The region has among the highest prevalence in the world with nearly a quarter of the population estimated as obese (ESCWA, 2017a). This calls for urgent action particularly as food consumption patterns are still transitioning towards westernized and less healthy food consumption habits.

Action areas: Potential policies to address shortcomings under this indicator could include enhancing prevention and control, promoting good nutrition including reducing the consumption of refined wheat, added sugar and selected oils, re-evaluating food subsidy programmes, supporting programmes for increasing physical activities, mobilizing necessary resources (financial and human) for advocacy programmes, strengthening health programmes and institutions.

Link to action plans: This indicator is not part of the SDGs but could be related to SDG 2 and SDG 3. This indicator is also part of the FAO Suite of Food Security Indicators in the "utilization" dimension.

Data source: At the international level, data for this indicator can be obtained from World Health Organization (WHO) or FAOSTAT. At the national level, data could be sought from the health statistics departments.

Normalization: The lower the obesity rates the better it is and, as such, the normalization process to compute the 0 – 10 score is reversed: min – max. The minimum and maximum values are capped at 2.5 per cent (best scenario) and the global 2030 target 11.7 per cent (worst scenario) based on FAO (FAO and others 2009, p. 29).

FOOD AVAILABILITY INDICATORS

Availability is one of the four dimensions of food security and it is concerned with the supply side of food or the physical inflows and outflows of food into a country, usually at the macro level. Food availability could also be assessed at micro level within households and communities. Providing enough food is a necessary but not sufficient condition to achieving food security and nutrition. Food availability is determined by local food production, food trade and distribution efficiency, among other factors.

Table 4. List of selected food availability indicators

	Code	Indicator Description	Short Name	SDG Linkage
Food Availability Indicators (AV):	AV1	Primary wheat yield as a percentage of potential achievable yield - %	Wheat yield	2.3.1
	AV2	Agriculture Orientation index for government expenditures - Index	Agriculture expenditure	2.a.1
	AV3	Food losses (% total food available) R - %	Food loss	12.3
	AV4	Average dietary energy supply adequacy - %	Dietary energy supply	
	AV5	Wheat import dependency ratio R - %	Wheat import dependency	
	AV6	Share of water resources used in agriculture out of total renewable water resources R - %	Agriculture water	6.4.2

AV1: Wheat yield (%)

Name/description: Primary wheat yield as a percentage of potentially achievable yield (%).

Overview: The wheat yield indicator (AV1) accounts for the yield gap as a limiting factor of local food production and thus food availability from local sources. It was put forward specifically for this framework in consultation with national and international experts. It does not have associated metadata information, but it is computed using various data sources as listed above. It is the recorded primary wheat yield as a percentage of the potentially achievable yield for the selected country. The following formula is used:

$$\frac{\text{Achieved yield}}{\text{Potentially achievable yield}} * 100$$

Justification: This indicator is part of the availability dimension. Closing the wheat yield gap would contribute to a higher availability of local food, which would also reduce food import dependency. This indicator is relevant to the Arab region as wheat is produced in many countries and is a major staple food, accounting for some 37 per cent of total food supply (Solh, 2013). The region is also one of the largest cereal importers in the world with wheat being a major component of all cereal imports. It should be noted, however, that this indicator will provide little food security information for non-agricultural countries.

Action areas: Potential policies to address shortcomings under this indicator could include enhancing on-farm production (crop and pest management, crop varieties, on-farm intensification, incentives, reducing post-harvest losses), enhancing irrigation and water-use efficiency, enhancing natural resources management and enacting supporting policies (investments, financing, markets, education and training, etc.).

Link to action plans: At the international level, this indicator is related to SDG 2, target 2.3 (indicator 2.3.1).

Data source: At the international level, data for this indicator can be obtained from FAOSTAT or the literature notably for the potential yields (Mueller and others, 2012). At the national level, data could be sought from the agriculture or statistics departments.

Normalization: The higher the wheat yields the better it is and, as such, the normalization process to compute the 0 – 10 score is straightforward: max – min.

AV2: Agriculture Orientation Index

Name/description: Agriculture Orientation Index (AOI) for government expenditures (index).

Overview: The AOI for Government Expenditures (AV2) is ratio of the share of agriculture in government expenditure to the share of agriculture in the GDP. An AOI greater than 1 denotes government expenditures towards agriculture exceed agriculture's share in GDP and vice versa for an AOI less than 1. An AOI of 1 reflects neutrality as expenditures are commensurate to its overall share in GDP.

Justification: This indicator is part of the availability dimension. Besides production intensification, investments in agriculture can also be geared towards soil improvement, erosion control, water management, animal and livestock health, extension, training and capacity building, management, forestry projects or agricultural infrastructure, to name a few. It includes support provided to farmers.

Action areas: Potential policies to address shortcomings under this indicator could include promoting and facilitating investments, developing rural infrastructure, enhancing trade policy, developing the financial sector, building capacity and research and development and protecting the environment (Organisation for Economic Co-operation and Development, 2013).

Link to action plans: This indicator corresponds to SDG 2 target 2.a (indicator 2.a.1).

Data source: At the international level, data for this indicator can be obtained from FAOSTAT. At the national level, data could be sought from the agriculture, economic or statistics departments.

Normalization: The normalization process to compute the 0 – 10 score is straightforward: max – min.

AV3: Food loss (%)

Name/description: Food loss as a percentage of total food available (%).

Overview: Food loss (AV3) refers to the amount of a commodity lost during the year at all stages of the food supply chain between the level at which production is recorded (farm gate) but before the level of consumption (retail), namely storage, transportation, handling and processing, while also excluding losses occurring before and during harvest. Food losses computed in percentages as per the formula below:

$$\frac{\text{Losses}}{\text{(Imports + Production - Exports)}} * 100$$

Justification: This indicator is part of the availability dimension. Food losses impact food availability, access and utilization. Preventing food loss could lead to the availability of more food that would have been discarded. It is a concern for the Arab region where food loss is due to inadequate practices and infrastructure in production and logistics (ESCWA, 2017a).

Action areas: Potential policies to address shortcomings under this indicator could include building partnership between the public, private and civil society, promoting sustainable food systems, building an integrated food supply chain and addressing food loss and waste to decrease its occurrence (FAO, 2015).

Link to action plans: This indicator is related to SDG 12, target 12.3.

Data source: At the international level, data for this indicator can be obtained from FAOSTAT. At the national level, data could be sought from the health, agriculture or statistics departments.

Normalization: The lower the food losses the better it is and, as such, the normalization process to compute the 0 – 10 score is reversed: min – max.

AV4: Average Dietary Energy Supply Adequacy (%)

Name/description: Average Dietary Energy Supply Adequacy (ADESA) (%).

Overview: ADESA (AV4) expresses the Dietary Energy Supply (DES) as a percentage of the Average Dietary Energy Requirement (ADER). The average supply of calories for food consumption is normalized using the average dietary energy requirement estimated for the concerned population to obtain an index of adequacy of the food supply in terms of calories.

Justification: This indicator is part of the availability dimension. ADESA reflects the adequacy of the supplied dietary energy at the national level and therefore, food availability in terms of quantity. The quantity of food provided should fulfill the energy needs of the population to allow a healthy life.

Action areas: Potential policies to address shortcomings under this indicator could include facilitating trade, enhancing food access and utilization, encouraging dietary transition, enhancing social safety net programmes.

Link to action plans: This indicator is associated to SDG 2, target 2.1 and 2.2. It is also part of the FAO Suite of Food Security Indicators in the availability dimension.

Data source: At the international level, data for this indicator can be obtained from FAOSTAT. At the national level, data could be sought from the health, agriculture or statistics departments.

Normalization: The higher the ADESA the better it is and, as such, the normalization process to compute the 0 – 10 score is straightforward: max – min.

AV5: Import dependency (%)

Name/description: Wheat import dependency ratio (%).

Overview: The wheat import dependency ratio (AV5) highlights the degree to which the domestic food supply of wheat is dependent on imports. The indicator is calculated in three-year averages, from 1990-92 to 2009-11, to smooth out the impact of abnormal years in estimated production or trade, due to difficulties in properly accounting for weather impacts or stock variations. It is computed as:

$$\frac{\text{(Import - Exports)}}{\text{(Production + Import - Exports)}} * 100$$

Negative values would indicate that the country is a net exporter of wheat.

Justification: This indicator is part of the availability dimension. Cereals are the main source of dietary energy globally and particularly so in the Arab region. This indicator is a measure of the dependence of the country or region on food imports. The greater the indicator, the higher the dependence on imports and hence the higher the vulnerability to the vagaries of global markets.

Action areas: Potential policies to address shortcomings under this indicator could include enhancing merchandise exports, developing non-food and non-agricultural sectors to generate alternative sources of revenues, increasing local production through intensification provided natural resources are available, supporting the private sector to enhance exports and engaging and supporting small producers.

Link to action plans: This indicator could be related to SDG 2, target 2.3. It is also part of the FAO Suite of Food Security Indicators in the stability dimension.

Data source: At the international level, data for this indicator can be obtained from FAOSTAT. At the national level, data could be sought from the agriculture, economic or statistics departments.

Normalization: The lower the wheat imports dependency the better it is and, as such, the normalization process to compute the 0 – 10 score is reversed: min – max. The minimum is capped at 0 per cent.

AV6: Agricultural water (%)

Name/description: Share of water resources used in agriculture out of total renewable water resources (%).

Overview: The share of water withdrawal for agriculture (AV6) corresponds to the ratio of water withdrawn for agriculture purposes to total renewable water resources. It provides information on the sustainability of water use for food production. Agricultural water withdrawal is the annual quantity of water withdrawn for irrigation, livestock and aquaculture purposes while total renewable water resources is the maximum theoretical yearly amount of water available for a country at a given moment and is the sum of both internal and external renewable water resources. The indicator is calculated as follows:

$$\frac{\text{Agricultural water withdrawal}}{\text{Total renewable water resources}} * 100$$

Justification: This indicator is part of the availability dimension. Water is crucial for food production. The region suffers from a scarcity of renewable water resources and unsustainable agricultural practices with increased demand for food production leading to an overexploitation of renewable water resources.

Action areas: Potential policies to address shortcomings under this indicator could include enforcing water regulations and making them more stringent, providing incentives to reduce agricultural water consumption, improving use efficiency and water management, discontinuing policies that encourage excesses including consumption and degradation and promoting technologies to enhance efficiency and productivity.

Link to action plans: This indicator relates to SDG 6, target 6.4 (indicator 6.4.2).

Data source: At the international level, data for this indicator can be obtained from AQUASTAT. At the national level, data could be sought from the agriculture, water or environment departments.

Normalization: The lower the agricultural water withdrawal the better it is and, as such, the normalization process to compute the 0 – 10 score is reversed: min – max. The maximum is capped at 100 per cent.

FOOD ACCESS INDICATORS

This food security dimension is concerned with whether the population gets enough food to lead a healthy life. As such, it examines the availability of resources (physical, social and/or financial) to grow food or to acquire it. It is affected by the affordability of the food available in local markets and at macro level on global markets and the allocation of resources as well the preference of the population based on social and cultural aspects as people may demand a certain type of food and not the other. Issues such as disposable income, food prices, social support, and infrastructure are major determinants of food access.

Table 5. List of selected food access indicators

	Code	Indicator Description	Short Name	SDG Linkage
Food Access Indicators (AC):	AC1	Poverty headcount ratio (R) - %	Poverty	1.1.1/1.2.1/1.2.2
	AC2	Share of food consumption expenditure in total household consumption expenditure (R) - %	Food consumption	
	AC3	Unemployment rate (R) - %	Unemployment	8.5.2
	AC4	Logistics performance - index	Logistics	
	AC5	Inflation, consumer prices (R) - %	Inflation	

AC1: Poverty (%)

Name/description: Poverty headcount ratio (%).

Overview: The poverty headcount ratio (AC1) corresponds to the percentage of population living under the national poverty line. Poverty could be defined as a lack of adequate material possessions or income to cover needs. The monitoring framework relies on a US$3.20 poverty line, which reflects the typical national poverty line for countries classified as Lower Middle Income, which encompasses most Arab countries. The $1.90 a day poverty line is usually used for Low Income Countries.

Justification: This indicator is part of the accessibility dimension. Poverty is a main determinant of economic access to food as it reflects a lack of means. The poverty headcount ratio is a good indicator to evaluate food security levels in Arab countries as it determines accessibility to resources to acquire the food needed.

Action areas: Potential policies to address shortcomings under this indicator could include promoting economic growth, investing in rural and agriculture development, promoting trade, creating jobs, providing basic social services and social protection, promoting equitable access to resources and supporting training and education.

Link to action plans: This indicator relates to SDG 1, target 1.1 (indicator 1.1.1) and 1.2 (indicators 1.2.1 and 1.2.2).

Data source: At the international level, data for this indicator can be obtained from World Bank. At the national level, data could be sought from the central bank or the economic or statistics departments.

Normalization: The lower the poverty rates the better it is and, as such, the normalization process to compute the 0 – 10 score is reversed: min – max. SDG target 1.2 calls for halving poverty in all its dimensions by 2030 and, as such, the maximum for this indicator will be 8.3 per cent, which is half the current average poverty for the Arab region (16.6 per cent).

AC2: Food consumption (%)

Name/description: Share of food consumption expenditure in total household consumption expenditure (%).

Overview: The food consumption expenditure (AC2) refers to the monetary value of the acquired food, purchased and non-purchased, including non-alcoholic and alcoholic beverages, as well as food expenses away from home consumed in bars, restaurants, food courts, work canteens, street vendors, etc. The data is collected through household consumption and expenditure surveys. The share of household spending on food is computed as:

$$\frac{\text{Expenditure on food}}{\text{Total expenditure}} * 100$$

The monetary value of non-purchased items, comprising consumption from own production and in-kind payments and transfers, must be calculated from available price information.

Justification: This indicator is part of the accessibility dimension. The share of food consumption expenditure in total household consumption expenditure allows the estimation of how affordable it is for people to access food and therefore how food secure they are. Spending money on food is a fundamental requirement for survival. The more vulnerable a household is, the larger is the share of household income spent on food.

Action areas: Potential policies to address shortcomings under this indicator could include general policies to reduce poverty including inclusive economic growth, job creation, lower taxes for the poor, training and education as well providing adequate social safety nets and targeted subsidies to benefit poor and vulnerable communities.

Link to action plans: This indicator relates to SDG 1, target 1.1 and 1.2 and SDG 10, target 10.1.

Data source: At the international level, data for this indicator can be obtained from the FAO or World Bank. At the national level, data could be sought from the central bank or the economic or statistics departments.

Normalization: The lower the share of food consumption expenditure in total household consumption expenditure the better it is and, as such, the normalization process to compute the 0–10 score is reversed: min – max.

AC3: Unemployment (%)

Name/description: Unemployment rate (%).

Overview: The unemployment rate (AC3) corresponds to the percentage of able-bodied individuals looking for a job who are unable to find one. It can be disaggregated by age and sex and disability status.

Justification: This indicator is part of the accessibility dimension. The unemployment rate is rising in the Arab region, according to the International Labour Organization (ILO), with youth being disproportionately affected. The Arab States have among the highest unemployment rates in the world, with consequent gender and age gaps. The unemployment rate is a critical indicator as it provides the percentage of the Arab population without a steady source of income and therefore who are likely to face difficulty acquiring food.

Action areas: Potential policies to address shortcomings under this indicator could include a mix of fiscal and monetary policies, including reducing taxes and interest rates to promote investments, increasing government spending for employment creation as well as others supply-side initiatives such as spending on education and training, providing employment subsidies to businesses, enhancing labour market flexibility or geographic mobility to name a few.

Link to action plans: This indicator corresponds to SDG 8, target 8.5 (indicator 8.5.2) and it could be disaggregated by sex.

Data source: At the international level, data for this indicator can be obtained from the ILO. At the national level, data could be sought from the central bank or the economic or statistics departments.

Normalization: The lower the unemployment rate the better it is, and therefore the normalization process to compute the 0 – 10 score is reversed: min – max. Since SDG target 8.5 does not set a limit that could be used as maximum, the Arab natural rate of unemployment or long-term weighted average was computed for the period 1990-2017 and is used as the maximum. The natural rate of unemployment was estimated at 11.25 per cent. The minimum is set at 5 per cent, which is often considered as the full employment rate (Acemoglu, Laibson and List, 2016).

AC4: Logistics (index)

Name/description: Logistics performance index.

Overview: The Logistics Performance Index (AC4) provides an indication of the quality of trade and transport related infrastructure. It measures a country's logistics by scoring such things as efficiency of customs clearance process, quality of trade- and transport-related infrastructure, ease of arranging competitively priced shipments, quality of logistics services, ability to track and trace shipments and speed at which deliveries reach the consignee. Data is from the World Bank, which is collected through surveys.

Justification: This indicator is part of the accessibility dimension. The Logistics Performance Index could assist countries to identify challenges and opportunities they face in terms of logistics and supply chains performance, which are necessary for the food markets to function properly. It could help countries adopt strategies to improve logistic performance. This indicator is related to food security as it looks at the quality of trade and transport related infrastructure, which determines access to food through port logistics, red tape and roads infrastructure among others.

Action areas: Potential policies to address shortcomings under this indicator include improving infrastructure, facilitating trade and services, improving supply chains and reducing red tape at port of entries and market functioning (Arvis and others, 2018).

Link to action plans: This indicator supports SDG 9, target 9.1.

Data source: At the international level, data for this indicator can be obtained from the World Bank. At the national level, data could be sought from the central bank or the economic or statistics departments.

Normalization: The higher the Logistics Performance Index the better it is and, as such, the normalization process to compute the 0 – 10 score is straightforward: max – min.

AC5: Inflation (%)

Name/description: Inflation, consumer prices (%).

Overview: Inflation (AC5) which builds on consumer prices, is concerned with the movement or changes in the level of prices of consumer goods and services over a given time. It is measured through the consumer price index as a percentage change in the prices of a basket of consumer goods and services commonly purchased by households on a monthly, quarterly or yearly basis. Consumer price indices are obtained through surveys, collected on a regular basis, on the cost of a defined but representative basket of consumer goods and services. Since inflation can be negative (deflation), which is also harmful to the economy, the absolute value is used for normalizing this indicator.

Justification: This indicator is part of the accessibility dimension. Inflation measures changes in the average prices of goods and services, which should be distinguished from changes in the relative prices of individual goods and services. It is important as substantial price variations may lead to shortages of goods, which might affect the ability of people to acquire food, among other items. This is especially true for individuals or households that spend a high share of their income on food. High and rapidly rising food prices may negatively affect poor households and individuals as they might forgo eating despite feeling hungry or opting for less nutritious, cheaper foods.

Action areas: Potential policies to address shortcomings under this indicator could include acting on economic policies to combat inflation, notably interest rates and other monetary policies.

Link to action plans: This indicator is related to SDG 2, target 2.c.

Data source: At the international level, data for this indicator can be obtained from the World Bank. At the national level, data could be sought from the central bank or the economic or statistics departments.

Normalization: Using absolute values, the lower the inflation the better it is and, as such, the normalization to the 0–10 score requires an inversion of the minimum and maximum, noting that optimal values for inflation are below 2 per cent but higher than 0 per cent. Given that the global inflation rate has never gone beyond 17 per cent since 1974, the maximum value of inflation is capped at 20 per cent (Ha and others, 2019).

FOOD UTILIZATION INDICATORS

The third pillar of food security is the utilization dimension, which is concerned with whether the nutritional needs of the population are met through the available and accessible food. A good score indicates that the population is eating properly to lead a healthy life, which presupposes good nutrition, good health and good metabolism among others. It is affected by the health status of the individual, the nutritional value of the food and whether it is safe and the way the food is prepared and consumed. It is thus concerned with anthropometric aspects especially among children as well as food safety and quality, health and hygiene conditions.

Table 6. List of selected food utilization indicators

	Code	Indicator Description	Short Name	SDG Linkage
Food Utilization Indicators (UT):	UT1	Percentage of the population using at least basic drinking water services - %	Drinking water access	1.4.1/6.1.1
	UT2	Percentage of the population using at least basic sanitation services - %	Sanitation access	1.4.1/6.2.1
	UT3	Percentage of children under 5 years of age affected by stunting (R) - %	Child stunting	2.2.1
	UT4	Percentage of children under 5 years of age affected by wasting (R) - %	Child wasting	2.2.2
	UT5	Percentage of anaemia among women of reproductive age (15-49 years) (R) - %	Women anaemia	

UT1: Drinking water access (%)

Name/description: Proportion of population using at least basic drinking water services (%).

Overview: The proportion of the population using at least basic drinking water services (UT1) includes people using both basic and safely managed water services. Basic drinking water service is defined as water of drinking quality from an improved source. Improved water sources include piped water, boreholes or tube wells, protected dug wells, protected springs and packaged or delivered water. It is also found in the FAO Suite of Food Security Indicators in the "utilization" dimension (FAOSTAT).

Justification: This indicator is part of the utilization dimension. Access to clean and safely managed drinking water is a determinant of safe food production and consumption practices. As such, it plays a major role in food security as clean water prevents nutrition-related diseases and infections and therefore reduces the incidence of illnesses that can hinder the absorption of nutrients which might debilitate the workforce, particularly in rural areas.

Action areas: Potential policies to address shortcomings under this indicator could include investing in water infrastructure, reducing leakages and the contamination of water resources and improving water quality, managing water supply and demand, mitigating water resources degradation.

Link to action plans: This indicator is related to SDG 1, target 1.4 (indicator 1.4.1) and SDG 6, target 6.1 (indicator 6.1.1).

Data source: At the international level, data for this indicator can be obtained from FAO or the World Bank. At the national level, data could be sought from health or statistics departments.

Normalization: The higher the proportion of the population using at least basic drinking water services the better it is and, as such, the normalization process to compute the 0–10 score is straightforward: max – min.

UT2: Sanitation access (%)

Name/description: Proportion of population using at least basic sanitation services (%).

Overview: The percentage of people using at least basic sanitation services (UT2) estimates the proportion of people using improved sanitation facilities that are not shared with other households. It includes both people using basic sanitation services as well as those using safely managed sanitation services. Improved sanitation facilities include flush/pour flush to piped sewer systems, septic tanks or pit latrines; ventilated improved pit latrines, composting toilets or pit latrines with slabs. The indicator is part of the FAO Suite of Food Security Indicators in the "utilization" dimension (FAOSTAT).

Justification: This indicator is part of the utilization dimension. Access to sanitation facilities prevents the spread of disease and the contamination of water resources. It is part of food security as it promotes healthier lifestyles and improves the assimilation of nutrients allowing for a productive life and reduced health costs among others, which support economic development.

Action areas: Potential policies to address shortcomings under this indicator could include increasing funding for hygiene programmes and sanitation infrastructure, including hygiene issues into policies and strategies, promoting good practices such as hand washing and promoting good hygiene in school curricula.

Link to action plans: This indicator is related to SDG1, target 1.4 (indicator 1.4.1) and SDG 6, target 6.2 (indicator 6.2.1).

Data source: At the international level, data for this indicator can be obtained from FAO, the World Bank, UNSTAT, WHO or UNICEF. At the national level, data could be sought from health or statistics departments.

Normalization: The higher the percentage of people using at least basic sanitation services the better it is and, as such, the normalization process to compute the 0–10 score is straightforward: max – min.

UT3: Child stunting (%)

Name/description: Percentage of children under 5 years of age affected by stunting (%).

Overview: The indicator percentage of children under 5 affected by stunting (UT3) accounts for children who are too short for their age which usually results from chronic or recurrent malnutrition. It is the proportion of stunted children below two standard deviations from the median of the World Health Organization (WHO) Child Growth Standards among children under 5 years of age. It is also found in the FAO Suite of Food Security Indicators in the "Utilization" dimension (FAOSTAT).

Justification: This indicator is part of the utilization dimension. Child stunting is a major health issue as it is due to poor diet. Affected children tend to face recurrent infections and possibly death. Low height-for-age in children is a result of the cumulative effects of undernutrition and infections from birth or even before. It is also a measure of poor environmental conditions and/or long-term restriction of a child`s growth potential. This indicator is relevant to the Arab region due to the protracted crises (ESCWA, 2017a).

Action areas: Potential policies to address shortcomings under this indicator could include promoting breastfeeding, strengthening nutrition programmes including healthy eating and diet diversification, improving micronutrients intake through food fortification, improving food safety (WHO, 2014a).

Link to action plans: This indicator is related to SDG 2, target 2.2 (indicator 2.2.1).

Data source: At the international level, data for this indicator can be obtained from FAO, the World Bank, UNSTAT or WHO. At the national level, data could be sought from health or statistics departments. The data sources might include nutrition surveys and national surveillance systems.

Normalization: The lower the percentage of children under 5 affected by stunting the better it is and, as such, the normalization process to compute the 0–10 score is reversed: min – max. The minimum and maximum values are capped at 2.5 per cent (best scenario) and the global 2030 target 12.2 per cent (worst scenario) based on FAO (FAO and others 2009, p. 29).

UT4: Child wasting (%)

Name/description: Percentage of children under 5 years of age affected by wasting (%).

Overview: The indicator percentage of children under 5 affected by wasting (UT4) accounts for children with low weight for height, which indicates cases of acute food shortage or disease. The indicator measures the proportion of children under five whose weight for height is less than two standard deviations below the median weight for height. It is also found in the FAO Suite of Food Security Indicators in the "Utilization" dimension (FAOSTAT).

Justification: This indicator is part of the utilization dimension. Child wasting is a major health issue due to the risk of morbidity. Affected children are more subject to diseases that could devolve into death. The frequency of illnesses further affects their nutritional status, which locks them into a vicious cycle (UNICEF, 2013). This indicator is of relevance to the Arab region in light of the protracted crises.

Action areas: Potential policies to address shortcomings under this indicator could include strengthening public health system, addressing child wasting as a serious health issue, improving health system supply management, ensuring the proper identification of wasting cases and improving nutrition programmes and awareness (WHO, 2014b).

Link to action plans: This indicator is related to SDG 2, target 2.2 (indicator 2.2.2).

Data source: At the international level, data for this indicator can be obtained from FAO, the World Bank, UNSTAT, UNICEF or WHO. At the national level, data could be sought from health or statistics departments. The data sources might include nutrition surveys and national surveillance systems.

Normalization: The lower the percentage of children under 5 affected by wasting the better it is and, as such, the normalization process to compute the 0–10 score is reversed: min – max. The minimum and maximum values are capped at 2.5 per cent (best scenario) and the global 2030 target 3 per cent (worst scenario), based on FAO (FAO and others 2009, p. 29).

UT5: Women anaemia (%)

Name/description: Prevalence of anaemia among women of reproductive age (15-49 years) (%).

Overview: The indicator prevalence of anaemia among women of reproductive age (UT5) shows the level at which women are affected by low blood hemoglobin concentrations. It accounts for both non-pregnant (haemoglobin levels below 12 g/dL) and pregnant women (hemoglobin levels below 11 g/dL). Anaemia among women is mainly caused by heavy blood loss during menstruation periods as well as during pregnancies in addition, among others, to poor diets which fail to bring in enough iron.

Justification: This indicator is part of the utilization dimension. Women anaemia is a serious public health issue, given its impact on psychological and physical development, behaviour and work performance. It is the most common nutritional disorder in the world (Verster and van der Pols, 1995). This is a gender-specific indicator as it reflects women's health and access to nutritious food and is crucial to their reproductive capacities. Since increased prevalence of anaemia among women of reproductive age indicates inadequate intake of micronutrients, anaemia is indicative of the food security situation.

Action areas: Potential policies to address shortcomings under this indicator could include implementing programmes to overcome and prevent anaemia including encouraging better nutrition and diet diversification, supporting food fortification, distributing vitamins and minerals supplements, strengthening public health and disease control and supporting reproductive health programmes (Thompson, no date).

Link to action plans: This indicator is not part of the SDGs but could benefit from achievements under SDG 2, SDG 3 and SDG 5. It is also found in the FAO Suite of Food Security Indicators in the "Utilization" dimension (FAOSTAT).

Data source: At the international level, data for this indicator can be obtained from FAO, WHO or the World Bank. At the national level, data could be sought from health departments.

Normalization: The lower the prevalence of anaemia the better it is and, as such, the normalization process to compute the 0–10 score is reversed: min – max. The minimum and maximum values are capped at 5 per cent (best scenario) and the global 2030 target 15.2 per cent (worst scenario) based on FAO (FAO and others 2009, p. 29).

STABILITY INDICATORS

The last dimension of food security is concerned with stability in the food system or ensuring that food is available and accessible year-round as well as always utilized effectively. With stability, cyclical, seasonal and temporary food availability, accessibility and utilization are smoothed out, which reduces chances of experiencing or enduring malnutrition even for short time periods. Stability deals with issues related to variability in food production and supplies due to price swings, the prevailing sociopolitical environment and extreme weather events.

Table 7. List of selected stability indicators

	Code	Indicator Description	Short Name	SDG Linkage
Stability Indicators (ST):	ST1	Climate change vulnerability index R	Climate change	
	ST2	Food price anomalies standard deviation R	Price anomalies	2.c.1
	ST3	Political stability and absence of violence - ranking	Political stability	
	ST4	Per capita food production variability - 1000$/capita R	Production variability	
	ST5	Per capita food supply variability - kcal/capita/day R	Supply variability	

ST1: Climate change (index)

Name/description: Climate change vulnerability index.

Overview: The indicator Climate Change Vulnerability (ST1) is an index that assesses the vulnerability of countries against three major impacts of climate change: weather-related disasters, sea level rise and loss of agriculture productivity.

Justification: This indicator is in the stability dimension. It was selected as climate change can have major impact on food security, by affecting agriculture production and productivity and thus influencing food availability as well as the food supply system within and between countries. The above variables of this indicator are not the only impacts of climate change on human systems though they might account for the largest economic losses resulting from climate change.

Action areas: Potential policies to address shortcomings under this indicator could include tackling the impact of climate change, which might necessitate actions on mitigation and adaptation. Mitigating the impact of climate change will involve promoting a greater use efficiency of resources, promoting the use of renewable resources or imposing a carbon tax while adapting to climate change might involve protecting infrastructure, restoring natural resources, reforesting, diversifying agriculture and adopting climate-smart technologies and other preventive measures.

Link to action plans: This indicator is not part of the SDGs but could be related to SDG 1, target 1.5 and SDG 13, target 13.1, among others.

Data source: At the international level, data for this indicator can be obtained from The Hague Centre for Strategic Studies (HCSS). At the national level, data could be sought from the meteorology department.

Normalization: The lower the climate change vulnerability index scores the better it is and, as such, the normalization process to compute the 0–10 score is reversed: min – max.

ST2: Price anomalies (index)

Name/description: Food price anomalies.

Overview: The indicator of food price anomalies (ST2) identifies situations in which food market prices are abnormally high for a given time period. It evaluates growth in prices over a month or several years, measured as the difference in the growth rate of prices from their historical mean for the selected period. Less than half a standard deviation is normal, between half and one it is moderately high while beyond one it is abnormally high. The indicator is estimated by FAO.

Justification: This indicator is part of the stability dimension. Food price anomalies allows the evaluation of changes in prices over a determined period, month or year, while accounting for the seasonality in food markets and inflation, to detect abnormal price changes over the selected period. As such, it aims at characterizing the functioning of the food market, as well as at facilitating access to information on markets, including food reserves as they could help limit extreme food price volatility that could otherwise lead to a heightened state of food insecurity.

Action areas: Potential policies to address shortcomings under this indicator could include improving market information system, enhancing coordination and early warning systems for price change to increase confidence, facilitating trade and mitigating measures to reduce risks and exposure, maintaining emergency reserves and stocks, and taking advantage of innovative financial instruments including price and commodity hedges, insurance and guarantees or counter-cyclical lending or improving regulations affecting food markets to minimize speculations among others (Torero, 2016).

Link to action plans: This indicator corresponds to SDG 2, target 2.c (indicator 2.c.1).

Data source: At the international level, data for this indicator can be obtained from UNSTAT and FAO. At the national level, data could be sought from the central bank or the economy, statistics or planning departments.

Normalization: The lower the food price anomalies the better it is and, as such, the normalization process to compute the 0–10 score is reversed: min – max.

ST3: Political stability (ranking)

Name/description: Political stability and absence of violence (ranking).

Overview: The indicator political stability and absence of violence (ST3) provides a perception on the overall stability of the country in relation to politically-motivated acts of violence including terrorism. Political stability and the absence of violence is important as it leads to lower economic development and deteriorating conditions including potentially food insecurity. It is computed by the World Bank but is also available through the FAO Suite of Food Security Indicators under the "Stability" dimension (FAOSTAT).

Justification: This indicator is part of the stability dimension. A high level of political instability and violence points to the likelihood of further unrest and a lack of a conducive environment for economic growth and development. In countries affected, there is usually increased food insecurity and in the Arab region countries experiencing famine and severe food insecurity are also affected by war and conflicts.

Action areas: Potential policies to address shortcomings under this indicator could include adopting a collective decision-making process aiming at preventing conflicts while finding solutions, involving citizens and civil society into political and governance processes through dialogue and promoting stability and social cohesion (Agenda for Humanity, 2016).

Link to action plans: This indicator could be related to SDG 16, target 16.1.

Data source: At the international level, data for this indicator can be obtained from the World Bank. At national and regional level, data could be obtained from the department of interior though an index would have to be developed.

Normalization: The higher the political stability the better it is and, as such, the normalization process to compute the 0–10 score is normal: max – min.

ST4: Production variability (1000$/capita)

Name/description: Per capita food production variability (1000$/capita).

Overview: The indicator of food production variability (ST4) measures the volatility occurring in the food production system over time. It is found in the FAO Suite of Food Security Indicators in the "Stability" dimension and, within FAOSTAT, it is expressed in monetary terms (constant 2004-2006 international dollars) as net per capita. It is estimated as the standard deviation over the previous five years of the difference between actual production values and their fitted ordinary least squares.

Justification: The indicator is in the stability dimension as it helps assess the vagaries prevailing in food markets. As such, it is an important aspect of food security as with high levels of food production and productivity there is a higher likelihood that the population will have access to affordable food sourced locally.

Action areas: Food production variability is subject to natural resource availability and is affected by prevailing local conditions including climatic conditions, sociopolitical stability and so on. Policies affecting food production and productivity, natural resource management, irrigation and agricultural-based rural development will positively affect food production variability (FAO, 2002).

Link to action plans: This indicator is not part of the SDGs but is closely related to SDG 2, target 2.3.

Data source: At the international level, data for this indicator can be obtained from FAOSTAT or the Land Portal (landportal.org). At national level, data could be obtained from the department of agriculture, economy, planning or statistics.

Normalization: The lower the food production variability the better it is and, as such, its normalization during the computation of the 0–10 score is reversed: min – max.

ST5: Supply variability (kcal/capita/day)

Name/description: Per capita food supply variability (kcal/capita/day).

Overview: The indicator of food supply variability (ST5) assesses fluctuations within the dietary energy supply. It is expressed as the annual per capita daily dietary energy supply in caloric terms (kcal) and consists of its standard deviation over the previous five years. It is part of the FAO Suite of Food Security Indicators in the "Stability" dimension and is available in the Food Balance Sheets in FAOSTAT.

Justification: This indicator is part of the stability dimension as it assesses the prevailing variability in the food supply system, which affects the ability of people, particularly the most vulnerable, to access enough food. Assessing food supply variability allows a better understanding of the cycles prevailing in the food system, which usually correlates with price volatility, to allow policymakers to adopt measures to enhance resilience notably against price shocks. This indicator will be a measure of how stable and reliable the food supply is within the country including its evolution overtime.

Action areas: Food supply variability is affected by instability along the food supply chain including instability in production, storage, marketing and trade as well as consumption. Policies affecting it include those impacting trade such as taxes, exchange rates, rationing or subsidies. They all greatly affect food supply variability.

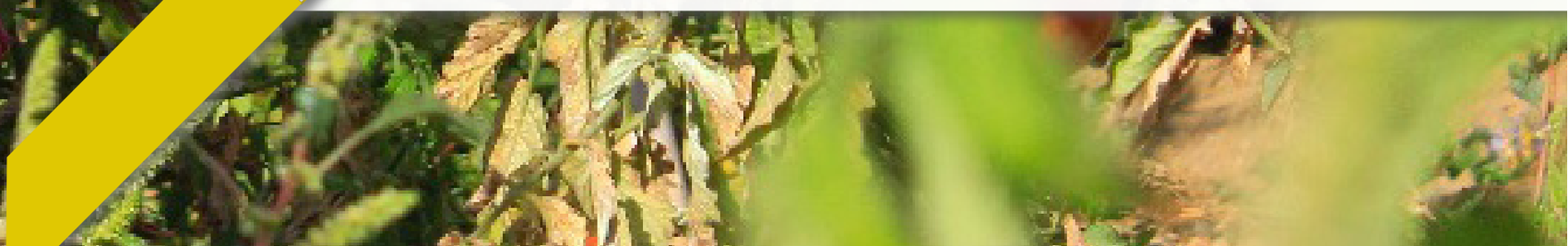
Link to action plans: This indicator is not part of the SDGs but is closely related to several targets of SDG 2, including targets 2.1, 2.4, 2.b and 2.c.

Data source: At the international level, data for this indicator can be obtained from FAOSTAT and the INDDEX Project. At national level, data could be obtained from the department of agriculture, economy, planning or statistics.

Normalization: The lower the food supply variability the better it is and therefore its normalization during the computation of the 0–10 score is reversed: min – max.

Chapter 3

Applying the Framework to Track Food Security in the Arab Region



Applying the Framework to Track Food Security in the Arab Region

OVERVIEW

For this publication, the framework is applied at the regional level, despite the sizable disparities existing among countries of the region. This approach was chosen to demonstrate how the framework should be used. In Annex 3 below, trend tables and doughnut charts for selected country groupings are provided as well for illustrative purposes. ESCWA and AOAD will soon publish the country-level applications of the framework to better capture food security status at country level and provide more substantive and country-focused policy options and ways forward.

The framework, as applied at the Arab regional level, relies on data originating from international sources such as from the United Nations Statistics, the World Bank or FAO. These institutions collect most of their data from countries and proceed to apply filters and compare data for increased accuracy. The climate change vulnerability index (the first indicator under stability) was originated from a third party institution (The Hague Centre for Strategic Studies) as it relies on a proprietary methodology. It is worth noting that the index does not clearly capture the vulnerability of the Arab region to climate change. The index is built around the number of climate change-related casualties caused by disasters, the decrease in agriculture productivity and the impact of seawater intrusion. Climate change impact might not be limited only to the above three issues and data for each component comprising the indicator might not be available or accurate for all countries. Hence, the Arab region might appear to not be affected by climate change although simulations show that the region will be negatively affected. All regional and subregional averages provided below were calculated and averaged by the authors.[10]

As noted above, undernourishment (CO1) and food insecurity experience (CO2) are normalized using world averages as maximum values while the minimum is capped at 2.5 per cent. Obesity (CO1), child stunting (UT3), child wasting (UT4) and anaemia among women are normalized using maximum values from the global 2030 target as provided by FAO (FAO and others 2019, p. 29).

A. Economic highlights

The Arab region witnesses variations and extremes in terms of its natural resources, population growth, socioeconomic contexts and level of development or infrastructure. There is a great diversity in developmental levels across countries, notably between the high-income countries of the Arab Gulf and the Arab Least Developed Countries (LDCs), particularly those in protracted conflicts such as Somalia or Yemen. The economic landscape is also diverse where some countries rely heavily on oil exports while others rely on a wider range of primary or light industrial products for their sources of revenues. Estimates show that the total GDP of the Arab region is close to $3 trillion representing about 3.5 per cent of the world GDP at nominal values (IMF, 2018).

In terms of governance, numerous countries are more economically centralized while others have slightly freer market economies. Recent trends indicate that most countries are endeavouring to diversify their economies, which they are achieving with various level of success (Popov, 2017; ESCWA, 2018). These wide disparities constitute a challenge to develop region-wide comprehensive development programmes that could be applicable to all Arab countries.

Box 3. Impact of climate change

Climate change is a growing challenge. Based on Regional Initiative for the Assessment of Climate Change Impacts on Water Resources and Socio-Economic Vulnerability in the Arab Region (RICCAR) projections, the region is expected to witness a decrease in precipitation of about 8-10 mm/month and an increase of temperatures of up to 2.3°C. These will lead to substantial fluctuations in agriculture production and productivity as rainfed production is the dominant system apart from Egypt, which relies on irrigated agriculture. Moreover, arable land will also contract due to the expansion of aridity and desert areas (ESCWA, 2019).

Simulations point to decreasing potential in crop productivity with, for example, in Morocco, winter cereals expected to decrease by 10 per cent in normal years and by as much as 50 per cent in drought years. With the increasing frequency of drought years overall agriculture production could decrease by up to 30 per cent in Morocco (Rousset and Arrus, 2006).

In the Comoros, a tropical cyclone hit in April 2019 causing flooding in coastal areas that resulted in loss of life and injuries with about 45,000 people affected and 20,000 displaced and in need of food assistance and clean water (https://reliefweb.int/report/comoros/comoros-humanitarian-situation-report-no-3-cyclone-kenneth-29-april-2019).

In Djibouti, a chronic drought is affecting a third of the population, which is 40 per cent higher than in 2016. The drought is induced by climate change and has lasted for over two decades decimating the already limited food production of the country. Close to 60 per cent of the rural population is food insecure with 42 per cent living in absolute poverty and 35 per cent with no access to water (https://reliefweb.int/report/djibouti/unicef-djibouti-humanitarian-situation-report-mid-year-2019).

At subregional level, the GCC countries rely on oil income as the main source of government revenues, which has allowed them to experience massive developmental change as they evolved into high-income countries with a large inflow of migrant workers, multinational companies and foreign investments (World Population Review; GCCStat; Santosh and Samuel, 2019). The Maghreb countries are middle-income countries though they differ in their economic structure: Algeria and Libya rely heavily on oil and gas export while Morocco and Tunisia export more agricultural commodities and limited industrial products. With the exception of Iraq, the Mashreq countries have little oil and, as such, rely on other economic sectors to generate revenues. Overall GDP growth was above 3 per cent in 2015 after a few years of stagnation caused by the sociopolitical upheavals of 2011 (Zou'bi and others, 2015). The Arab LDCs are relatively underprivileged and in need of special international and urgent support. The countries have a low per capita income as well as low level of human capital development and they are highly susceptible to economic and environmental shocks (OECD/FAO, 2018).

B. Geographic and environmental highlights

The Arab region is characterized by aridity, as the entire region lies within the so-called dust belt extending from West and North Africa, extending through West Asia and South Asia (Iran, Pakistan and Afghanistan) going all the way to East Asia in the Gobi Desert of China (Hofer and others, 2017). The region receives little rain with most parts getting under 200 mm of rain per year. As a result, large tracts of the region are unsuitable for crop production while other parts are classified as pastureland. Rainfall is limited and shows great variability year-to-year with a high occurrence of droughts (see also box 3).

There are major disparities between subregions as, for example, Iraq has up to 2,467 m3/capita/year of renewable water resources while a few countries from the GCC fall below 100 m3/capita/year and countries like Lebanon, Syria or Egypt have a water scarcity threshold of around 1000 m3/capita/year (FAO, 2019b; El Hajj, and others, 2017). Agricultural systems and capacities differ except for the dedication of large areas to growing cereals, which is a common thread in the region (World Bank and others, 2009). Inclement natural conditions and/or lack of resources have made domestic food production an ongoing challenge that is addressed through more and more food import exposing countries are more to the vagaries of global food markets (Efron and others, 2018).

C. Social highlights

The population of the Arab region is about 5 per cent of the world's total or about 415 million and growing at a rate of about 2 per cent per annum (UN Population, 2017). The most populous country is Egypt, accounting for about 24 per cent of the Arab population, while the least populated are Comoros and Djibouti with less than a million inhabitants each. Total population is projected to be above 600 million by 2050 (UN Population, 2017), which will put pressure on the resources of the region, and more so, in the face of the constant challenge resulting from the flow of refugees and displaced people due to the protracted conflicts of the region (box 4).

Box 4. Food security and conflict

The conflicts in Iraq and the Syrian Arab Republic have decimated agricultural production and trade of the Mashreq region, which affected the food security of millions of people, notably the refugees and internally displaced people as well hosting communities in neighboring countries. Syria and Iraq seat in the middle of a trade corridor linking Mashreq countries among them and with Gulf countries as well as Turkey and Iran. It is estimated that food and agriculture trade between Jordan and the Syrian Arab Republic decreased to less than $100 million in 2016 from a high of more than $300 million in 2010 while Lebanon had to forgo the low-cost land route through the Syrian Arab Republic to reach the Gulf countries and Iraq to use the more expensive air transport or longer maritime shipping which increased overall costs by 60 per cent (Fathallah, 2019).

In Somalia, up to 6.3 million people are food insecure and more than 2 million face severe hunger as a result of conflicts and droughts. More than 2.6 million people are internally displaced across the country (https://www.unocha.org/somalia).

In Yemen, after four years of conflict, 60 per cent of the population is experiencing chronic food insecurity tending towards famine. About 14.3 million people are in acute need including 3.2 million affected by acute malnutrition of which 2 million children below five years. Close to 18 million people live without access to safe water and sanitation. Inflation is on the rise while about 40 per cent of households have no major source of income. Poverty is estimated to affect up to 78 per cent of the population, a majority of which are women (https://www.worldbank.org/en/country/yemen).

In 2017, four of the top ten countries with the highest internally displaced people due to conflict were in the Arab region and accounted for the largest number of refugees in the world. The internally displaced population in Iraq, Sudan, Syria and Yemen reach up to 13.5 million people with Iraq, Syria and Yemen accounting for the most new displacements at about 4.5 million people (IDMC, 2018).

The region is expected to undergo further social changes including rising levels of affluence, which will further accelerate the already rapidly changing lifestyles including nutrition and diets. In particular, the changing diets combined with low physical activity levels due to the widespread availability of motorized transport and the prevailing pockets of poor people are leading a rise in obesity levels and therefore the triple burden of malnutrition – undernutrition, overnutrition and nutrient deficiency. This is resulting in the occurrence of chronic non-communicable diseases such as diabetes or cardio-vascular diseases while undernourishment, child stunting and wasting and anaemia among women are also high (Klautzer, and others, 2014).

The Arab region is also characterized by a high prevalence of blanket subsidies, especially for energy and food. The subsidies were introduced in the 1940s with the stated objective to stabilize prices but have since evolved into outright social supports that tend to distort markets and lead to unintended consequences such as the triple burden of malnutrition. The subsidies are perceived as a protection mechanism or welfare tool but inadequately target those most in need. In many countries, the subsidies have become so entrenched that they are considered a natural right making it difficult to remove or reform them. However, in the face of the recent financial crises, limited reforms have started to take hold, such as in Egypt which is phasing out regressive food subsidies while cushioning the impact on the most vulnerable through cash transfer programmes such as Takaful ("Solidarity") and Karama ("Dignity"), respectively for the poor families with children and for the elderly poor and those living with disabilities (Ecker, and others, 2016; El-Katri and Fattouh, 2017; Breisinger, and others, 2018).

D. Agriculture and food security

Most agriculture production in the Arab region is rainfed though the highest productivity is achieved in irrigated farming systems such as in the Nile valley and a few other irrigated systems along rivers or relying on groundwater resources (McDonnell, and Safwat, 2012, Saab, 2015; Hofer, and others, 2017).

In the GCC, arable land and water resources are extremely limited. Some countries use up to 500 per cent of their freshwater resources by tapping on non-renewable aquifers; with the proportion of water used in agriculture being close to the global average of 70 percent. Agriculture production is limited with a share in total GDP of only 0.8 per cent on average. Environmental constraints towards agricultural production combined with rapid economic growth imply that GCC countries are highly reliant on global food markets to meet their demand (Kotilaine, 2010; Al-Rashed, 2000; AQUASTAT, 2019; Karasik and Yang, 2019; Al-Saidi and Saliba, 2019).

In the Maghreb, about 20 per cent of the area is considered cultivable notably the northern coastal strip with a Mediterranean-type temperate climate while the remaining is mostly part of the arid Sahara Desert. Groundwater has been intensively exploited for domestic and irrigation purposes leading to a rapid fall in groundwater tables.

Maghreb countries are increasingly importing a large part of their food supplies with the main imported products being cereals and dairy products as a result of a shift in diet (Jacobs and van't Klooster, 2012; Aloui and Benabderazzik, 2008).

In the Mashreq, the "Fertile Crescent" encompassing the Nile River valley and the other fertile plains and valleys in Lebanon, Jordan, Syria and Iraq has a striving agricultural system. However, agricultural production does not meet demand due to the allocation of the scarce arable land and renewable water resources towards low-productivity but essential staple crops (Zou'bi, and others, 2015; ESCWA, 2017a).

The Arab LDCs have generally a lowly productive agriculture system as crop yields remain low and stagnant. The LDCs rely mostly on rainfed farming system, which is the dominant agricultural system covering more than two thirds of the cultivated land. The agriculture sector is exceptionally vulnerable to the impact of climate change with frequent and intense droughts. Some countries are in the midst of protracted crises, which further hampers economic activities and local food production contributing to a higher numbers of food insecure people (ESCWA, 2017a).

DATA AND TRENDS

As previously noted, the data and trends below are for the Arab region while the four subregions' data and trends are provided in Annex 3.

A. Core indicators

CO1: Undernourishment in the Arab region has been above the world average (10.8 per cent) and increased between 2010 and 2016 from 11.5 per cent to 12.1 per cent respectively, affecting close to 50 million people. Undernourishment in the Arab region is largely driven by conflicts, natural disasters and poverty. Disparities among the subregions exist – GCC and Maghreb subregions have favourable trends with rates below 5 per cent whereas undernourishment affected almost a third of the population in the LDCs.

CO2: Food insecurity, as measured by the FIES, was 12.2 per cent for the Arab region in 2016, higher than the world average of 9.2 per cent. This is a cause of concern as about 50 million people reported they were food insecure. Disparities exist among subregions: GCC and Maghreb record levels are much lower than the Arab average while the Mashreq was slightly higher than the Arab region average. There was no data for the LDCs as a whole though in selected countries it is double the Arab region average.

CO3: Obesity affected more than 110 million people in the Arab region in 2016 as rates increased from 24.6 per cent in 2010 to 28.4 per cent though it was well above the world average of 13.2 per cent in 2016. The rising obesity could be attributed to a shift towards unhealthy lifestyles and dietary habits away from more traditional ones. Obesity almost affected a third of the population of GCC, Maghreb and Mashreq while the LDCs recorded much lower levels of around 14 per cent (Hanouf and Reilly, 2019).

Availability indicators

AV1: On average, wheat yields as a percentage of potential achievable yield for Arab countries shows an increasing trend reaching 82 per cent in 2017. Selected Arab LDC countries had yields of about 30 per cent due to a combination of low productivity, low rainfall and reduced food production resulting from both natural and human-caused disruptions. Maghreb wheat yields are less than half their potential as most production is rainfed and hence subject to the high variability of the rainfall. Mashreq countries have among the highest yields though most could be attributed to the irrigated farming system of the Nile valley.

AV2: The agriculture orientation index has limited data throughout the region. Data is available for a few countries in the Maghreb and Mashreq subregions while data is lacking for most of GCC and LDCs countries. However, the limited available data show that a few countries have extremely low agriculture expenditure (well below an index of 1) indicating that the agricultural sector gets inadequate support in overall governments expenditure despite its share in total GDP for a number of countries and its centrality to rural livelihoods.

AV3: Food loss as a percentage of available food decreased from 7.3 per cent in 2010 to 6.8 per cent in 2015. However, food loss appears low as a result of a lack of data while food waste, which occurs at the consumer level, is not considered though it could be consequential in the region.

AV4: The average dietary energy supply adequacy (ADESA) was stable at about 131 per cent during 2010 and 2017 for the Arab region. However, the Arab LDCs have an ADESA fluctuating around 100 per cent indicating that not all segments of the population are getting enough dietary energy supply. The three other Arab subregions have ADESA well in excess of 100 per cent. A high ADESA is usually recommended (ESCWA, 2017a).

AV5: The Arab region is heavily dependent on food imports, with 62.5 per cent dependency on wheat imports in 2010 rising to 65 per cent in 2012. This reflects a high susceptibility to price and supply volatilities and potential disruptions in global food markets. Understandably, GCC countries have higher dependency rates extending beyond 90 per cent, while Maghreb and Mashreq have dependency rates around 60 per cent. The Arab LDCs have lower dependency rates around 50 per cent (except Djibouti, which has limited food production capabilities).

AV6: Though no data is available for the Arab region, it is well known that it is one of the most water scarce regions in the world and a substantial part of its renewable water resources are being used for agricultural purposes despite the low productivity of the sector. The GCC has withdrawal rates well in excess of 100 per cent, while for most other subregions the rate is in usually 40-60 per cent. Most Arab countries are below the generally accepted water scarcity threshold of 1000 m3 per capita per year for renewable water resources.

B. Access indicators

AC1: The latest average poverty rate was 16.6 per cent at the regional level. However, most countries in the GCC and Arab LDCs had no data. It could be presumed the rate is low in the GCC, as most countries have good social support systems for their population, while it is relatively high in the few Arab LDCs with data as most have low economic opportunities and lack social support programmes. The poverty rates in the Maghreb are low at around 5 per cent of the population while they are relatively high in the Mashreq region (above 15 per cent) as a result of the large number of refugees and internally displaced people. However, there are pockets of poverty and high level of precarity among selected groups notably the youth in the Maghreb and Mashreq subregions (World Bank, 2016).

AC2: Data on household expenditure on food is lacking at regional and subregional levels. Data is available for only two countries in the Maghreb subregion in which the population spends almost half their income on food.

AC3: The unemployment rate was high at 10.4 per cent in 2016 increasing from 9.6 per cent in 2010, which is much higher than the global unemployment rate of 5 per cent in 2016. This high unemployment rate has major implications on income and poverty and hence food security. Unemployment rates in the GCC countries are generally low, below 5 per cent, while for all other subregions they are above 10 per cent. Unemployment rates among the youth and recent graduates are said to be high in the Maghreb and Mashreq subregions while in the Arab LDCs there is a high prevalence of underemployment notably in rural areas.

AC4: On average, the logistics performance index is around 2.7 on a scale 1–5, just below the world average of 2.8. It has a favourable trend as it increased from 2.6 in 2010. For most Arab countries physical hindrances exist to access food specifically in remote and conflict-affected areas. The GCC's logistical performance is above 3 while it is below that number for the remaining subregions. Food availability and accessibility in remote areas might be a cause of concern and this could be exasperated by prevailing red tape, notably in the countries' ports of entry (World Bank and FAO, 2012).

AC5: Inflation more than doubled from an average of 6 per cent per annum in 2010 to 12.8 per cent in the latest year[11] compared to a world average of 2.5 per cent in 2018. However, large disparities exist among subregions where inflation rates range from below 3 per cent in the GCC and Maghreb and above 10 per cent in the Arab LDCs and the Mashreq. The sharpest increase in the inflation over the last few years was in the Mashreq, mostly due to the prevailing insecurities which have disrupted the economic life and food trade.

C. Utilization indicators

UT1: More people in the Arab region have access to basic drinking water services in 2015 which were reaching 87 per cent of the population compared to 84 per cent in 2010. The region needs to invest more in increasing access to water to ensure that all its population are accessing basic water services. Currently, 13 per cent of the population, about 53 million people, lack access to safe drinking water. There is a substantial discrepancy at the subregional level with the GCC countries reaching close to 100 per cent, the Mashreq at the mid-90 per cent level and the Maghreb close to 90 per cent while the Arab LDCs achieve only about 60 per cent. This indicator does not show consistency nor quality of the water accessible.

UT2: On average, about 80 per cent of the Arab population had access to sanitation facilities in both 2010 and 2015, which compares favourably to the global averages of 65 per cent and 68 per cent respectively. Efforts should be exerted towards enhancing access to sanitation facilities in the region. In the GCC, the whole population has access to sanitation services while about 40 per cent in the Arab LDCs have such access.

UT3: Child stunting is relatively high at about 23 per cent and slightly higher than the world average of 22.2 per cent. It is a critical concern for the Arab region especially given the contexts of protracted crises affecting a number of countries. Though the GCC countries have no data, stunting is assumed to be relatively low. In the Maghreb, child stunting was well above 10 per cent and in the Mashreq and Arab LDCs it is above 20 per cent. This an is an indication of the existence of pockets of food insecurity in the region, notably in poor and conflict-afflicted countries.

UT4: The rate of child wasting at 8.7 per cent is higher at the Arab regional level than the world average of 7.5 per cent. Poor countries and those in conflict might experience increased levels of child wasting. Child wasting in both the Maghreb and Mashreq was below the regional average while in the LDCs it was above 10 per cent, an indication of the pervasiveness of food insecurity.

UT5: Anaemia among women of reproductive age is high in the region with about 34 per cent in 2010 and 35.5 per cent in 2016 affected, higher than the world average of about 33 per cent in 2016. All subregions have rates close or higher than 30 per cent or more, meaning one out of every three women, with the Arab LDCs reaching mid-40 per cent, or close to every other woman affected.

D. Stability indicators

ST1: The average climate change vulnerability index for the Arab region is 0.09 (on a scale from 0 to 1). The region does not seem to be particularly susceptible to the chosen proxy for climate change impact, which looks at shorter-term impacts related to an increase in weather-related disasters, sea level rise and loss in agricultural productivity. However, projections from the RICCAR initiative show, for example, that the region will endure a rise in temperatures and a reduction in rainfall, which will affect negatively the production of food in the longer-term (United Nations and LAS, 2015).

ST2: Data for food price anomalies are lacking at the regional and subregional levels. However, data is available for some countries.

ST3: The political stability and absence of violence indicator demonstrates the worsening perception of stability in the region as it dropped to 14 in 2017 from 20 in 2010 (100 being the highest political stability). The ranking of the GCC subregion was around 40 while it was below 10 for the Arab LDCs. Political stability and absence of violence is a cause of concern in the region and might have a major impact on the overall food security of the region.

ST4: Food production variability has a low value constant at about $10.1 thousand$/capita, indicating that food production is relatively stable. The Maghreb is the only subregion with a food production variability above the Arab average. Thus, while food production remains stable, it does not contribute sizably to improving the food security status as the region increasingly depends on food import.

ST5: Food supply variability had a high value, around 30kcal/cap/day in 2013, with an improving trend compared to 2010. A high variability has the potential to negatively affect food security particularly following a shock such as sociopolitical unrest or weather-related disasters. The largest food supply variability is recorded in the GCC countries probably due to the subregion's high dependence on global food markets while the lowest food supply variability is found in the Maghreb. The largest improvement (close to half) is within the Arab LDCs most probably as they relied more on food assistance with the intensifying conflicts.

FOOD SECURITY SNAPSHOT

Reviewing the doughnut chart (figure 7) identifies the hotspots that need critical and urgent action from the region demonstrated through the dark cloud (⛈). If data is not available the (❓) will be used noting that lack of data is considered a major challenge.

The inner doughnut shows that the region is not doing well on all core indicators: undernourishment (CO1) and obesity (CO3) are serious challenges that needs to be addressed while the perceived food insecurity (CO2) is alarming. As the core indicator scores are critically low, the region needs to assess and address the hotspots appearing in the outer doughnut as they are among the underlying causes of the deteriorating situation.

These hotspots include:

- Availability dimension: high food import dependency (AV5) while expenditure for agriculture (AV2) and freshwater use in agriculture (AV6) have no data;
- Access dimension: alarming poverty (AC1) and unemployment (AC3) rates and no data for food consumption expenditure (AC2);
- Utilization dimension: child stunting (UT3), child wasting (UT4) and anaemia among women are very high; and
- Stability dimension: low political stability (ST3) with no data for food price anomalies (ST2).

Figure 7. Dashboard for the Arab region

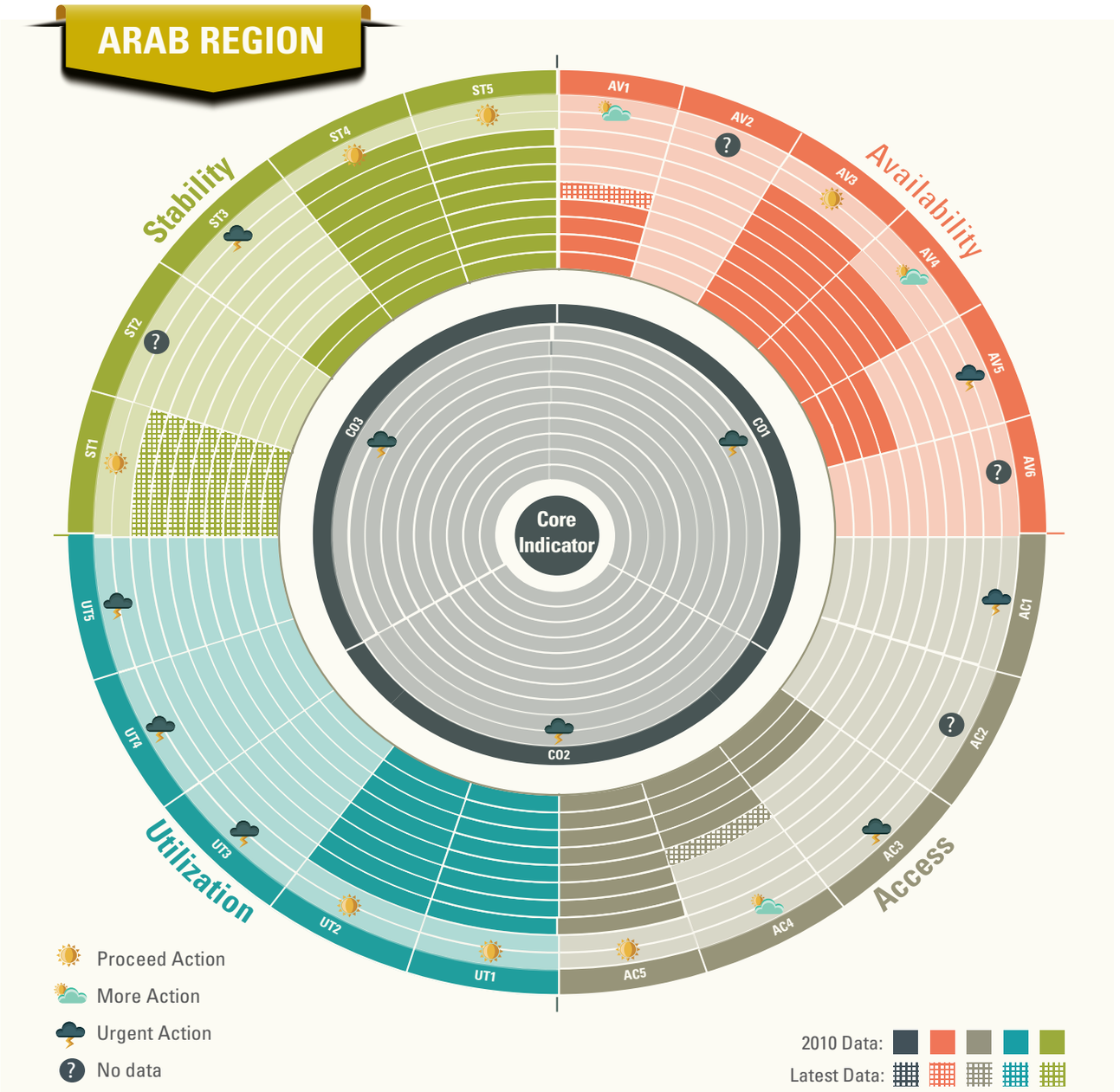


Table 8. Indicators for the Arab region

Code	Description	World		Arab			
		Latest		2010	Latest		Trend
		Value	Year	Value	Value	Year	
CORE INDICATORS							
CO1	Undernourishment (R) -%	10.8	2016	11.5	12.1	2016	🟢
CO2	Food insecurity (R) - %	9.2	2018	n.a.	12.2	2016	
CO3	Obesity (R) - %	13.0	2016	24.6	28.4	2016	🔴
AVAILABILITY INDICATORS							
AV1	Wheat yield - %	n.a.		76.5	82.2	2017	🔴
AV2	Agriculture expenditure - index	n.a.		n.a.	n.a.		
AV3	Food loss (R) - %	n.a.		7.3	6.8	2013	🟡
AV4	Dietary energy supply - %	n.a.		131	131	2017	🟢
AV5	Wheat import dependency (R) - %	n.a.		62.5	65.0	2012	🟡
AV6	Agriculture water (R) - %	n.a.		n.a.	n.a.		
ACCESS INDICATORS							
AC1	Poverty (R) - %	26.2	2015	n.a.	16.6	mult.	
AC2	Food consumption (R) - %	n.a.		n.a.	n.a.		
AC3	Unemployment (R) - %	5.0	2018	9.6	10.4	mult.	🔴
AC4	Logistics - index	2.8	2016	2.6	2.7	2016	🟢
AC5	Inflation (R) - %	2.5	2018.	5.7	12.8	mult.	🔴
UTILIZATION INDICATORS							
UT1	Drinking water access - %	88.5	2015	84.3	86.9	2015	🟡
UT2	Sanitation access - %	68.0	2015	78.9	80.8	2015	🟡
UT3	Child stunting (R) - %	22.2	2017	n.a.	23.0	mult.	
UT4	Child wasting (R) - %	7.5	2017	n.a.	8.7	mult.	
UT5	Women anaemia (R) - %	32.8	2016	34.2	35.5	2016	🔴
STABILITY INDICATORS							
ST1	Climate change (R) - index	n.a.		n.a.	0.09	2019	
ST2	Price anomalies (R) - index	n.a.		n.a.	n.a.		
ST3	Political stability - ranking	n.a.		20	14	2017	🟢
ST4	Production variability (R) - 1000$/capita	n.a.		10.3	10.1	2016	🔴
ST5	Supply variability (R) - kcal/cap/day	n.a.		32.8	29.8	2013	🟢

(R) : Reversed n.a.= Not Available mult.= Multipleas years

🔴 Red: Negative Trend 🟡 Yellow: Neutral Trend 🟢 Green: Positive Trend.

Attention should be geared towards addressing the hotspot areas with particular focus on issues related to poverty and unemployment as these might exacerbate a volatile political situation since they directly affect food availability, access and utilization. Urgent corrective measures need to be taken to reverse these unfavourable trends.

Key action areas:

It is challenging to draw definitive policy recommendations given the existing significant disparities among countries of the Arab region and the prevalence of missing, old and/or inaccurate data. As such, tackling the issue of data and information collection and availability to properly monitor food security in its multidimensionality and complexity across the Arab region is urgently needed. To this end, regional cooperation and experience-sharing could greatly enhance the technical potential of countries without the allocation of excessive resources, both human and financial.

In addition, food security is unlikely to be achieved at the regional level without addressing the multiple conflicts and sociopolitical unrest across the region. Resolving these crises should be a priority. Efforts need to be targeted towards improving stability, conflict resolution and prevention, and devising programmes to support those affected through dedicated recovery programmes that make food security an integral part of peacebuilding initiatives.

Below are other key recommended action areas/ programmes to consider to the shared regional priorities that can simultaneously address multiple hotspots:

- Reforming subsidies to better reach the targeted vulnerable segments of the population while discouraging overconsumption (for example, subsidies on wheat, sugar and cooking oils). The reforms would be coupled with efficient and fair social protection programmes;
- Raising regional awareness on healthy eating, reducing the consumption of sugar and carbohydrates and increasing activity level (sport) needs to be enhanced taking advantage of the Arabic common language and culture of the region;
- Expanding programmes to reduce unemployment and poverty, notably in rural areas through the creation of labour-intensive small-scale food processing units, economic diversification, capacity-building and training and the provision of small loans for small businesses and job creation;
- Supporting regional food trading companies that could compete successfully on the global stage in food production, food trade and food storage, both within and outside the region, to ensure that the terms of trade are favourable to the Arab region;
- Enhancing yields, notably those for staple foods in countries with adequate natural resources, as the disparity between wheat yield achieved and the potential achievable is still substantial for many countries of the region;
- Initiating appropriate sustainable intensification programmes in areas with great potential such as along river valleys and fertile plains where availability of land and renewable water resources allows such intensification;
- Ensuring the resilience of the regional agricultural sector in the face of the rising impact of climate change. This will require a multipronged approach involving public efforts for the provision of necessary infrastructure including for irrigation and availability of inputs and farmers and private sector efforts to adapt practices and adopt new technologies. To this end, countries could rely on the AQUACROP modeling to enhance supplementary irrigation (See the various national assessments done in the ESCWA Food Security project available at https://www.unescwa.org/publications/national-assessment-reports);
- Encouraging private and public investments and expenditure in technology for the agriculture sector in geographical areas with the greatest environmental potential to avoid exacerbating the degradation and depletion of the region's non-renewable resources due to climate change;
- Promoting and facilitating investments in rural areas including strengthening rural infrastructure, enhancing the functioning of rural markets and improving the logistics, developing the rural financial sector and building capacity and research and development as well as protecting the environment. These efforts are needed in post-conflict situations as they support and enhance the welfare of the population while also improving harmony within the society and political stability;

- Exploring alternatives to decrease the food import bill including the derivative markets through financial instruments like futures and options contracts (both of which are agreements to buy or sell at a future date and at an agreed-upon price a set quantity of a commodity). These instruments facilitate hedging against both prices and physical commodity risks as prices are set well ahead of time acting as "virtual" storage since the commodity is not delivered until it is needed;
- Looking further into foreign land investments and deals which are fair to the receiving countries;
- Adopting an integrated strategy for water allocation, including the efficient use of water in agriculture within the impact of climate change. The projection scenarios developed by ESCWA programme partners and RICCAR which show a worsening impact requiring urgent interventions including:
  - Encouraging irrigation with emphasis on the use of water-saving technologies;
  - Building retention dams to capture runoff water;
  - Treating and reusing agriculture wastewater;
  - Adopting integrated water resource management techniques, improving efficiency in water use and delivery;
  - Considering the use of water tariffs;
  - Re-adapting the agriculture calendar based on changing weather patterns;
  - Adopting efficient irrigation techniques;
  - Supporting investments and financing in rural and the agricultural sector; and
  - Building the capacity of the sector's stakeholders, notably among farmers and technical staff.
- Promoting water allocation and transboundary water-sharing agreements, notably with upstream countries, to ensure continued water availability as climate change impact worsens;
- Initiating focused nutrition programmes to address the challenges of malnutrition, anaemia among women and child stunting, better nutrition and diet diversification, enhancing food fortification, distributing vitamins and supplements, strengthening public health and disease control and supporting reproductive health programmes.

Conclusion and Way Forward

Conclusion and Way Forward

CONCLUSION

Food security is a major concern in the Arab region. As a group, Arab countries are the biggest food importers in the world. Economic disparity between countries is remarkable and income inequality within countries is rife. Endowment of natural resources is limited and vulnerable to the vagaries of the climate. The region appears also to be locked in a vortex of economic and security crises. Unfortunately, and probably due to the above challenges and the massive food import bills, Arab governments tend to conflate food security with food self-sufficiency. As a result, policies principally address the "availability" dimension of food security, while the remaining dimensions (access, utilization and stability) are commonly overlooked. However, since the food price crisis of 2007-2008, countries of the region have started to progressively address other dimensions as well.

The Sustainable Development Goals (SDGs) include food security in Goal 2. However, other drivers of food security are disseminated among the 17 goals, a clear indication of the multidimensional and complex nature of food security. The Arab countries have endorsed the SDGs and are committed to tracking, reporting and monitoring progress towards their achievement. It is in this context that this initiative to monitor food security was launched with the goal to support Arab countries in producing data and information for evidence-based policies. The initiative resulted in the development of a regionally adapted food security monitoring framework to support integrated food security policymaking. The framework was developed, tested and validated in an extended participatory process that involved experts as well as national decision-makers in policies and programme gap analysis and indicator development. It is purposely designed to address salient issues of relevance to Arab food security as indicated in the dozens of strategy reports that were consulted during the development process.

The main objective of the Arab Food Security Monitoring Framework is to provide countries with a rapid assessment of how they are performing in the outcomes of food security (through the core indicators related to SDG 2) and in the indicators of the four dimensions of food security. The purpose is to guide synchronized action and national policies in areas that need focus or improvement. The framework allows a diachronic assessment and therefore facilitates the tracking of progress in food security and the links to policies and programmes. It needs data, most of which is already compiled in international databases or can be collected by national statistical offices. The data is normalized to describe the food security situation at the national level by showing where each country is performing well (score close to 10) or poorly (score close to 0). It offers a quick food security status snapshot through the three core or outcome indicators which reflect the complex interplay between the four dimensions (availability, access, utilization and stability). The effective measurement of food security requires an examination not only of its proximate basis, but also of its underlying causal factors. Those underlying factors are represented by the other 21 indicators of the four food security dimensions, the disruption of which would likely impair the core indicators.

The presentation of results through a doughnut chart accompanied by tabulated data, scores and trend indicators allow policymakers to see which food security issues need to be addressed and where to direct attention, efforts and resources into national actionable policies. In addition to catalysing coherent action by reflecting the multidimensional aspects of food security, this tool will inform policymakers of data gaps that need to be filled to allow a more accurate monitoring.

The main obstacle faced during the framework development process was access to data, which is often scant for the Arab region. This restricted the nature of the indicators that could be used. Eventually, and as the choice of an indicator for which data would be available for the same period of time for all Arab countries was proving to be a daunting task, it was recommended by the successive panels of experts to select those indicators for which there is data for at least 50 per cent of the Arab countries and which concurrently covers 50 per cent of the Arab population. The limitation this issue poses is fully acknowledged, but it can only be resolved by a national commitment to collect, treat and publish data in a professional and timely manner.

Another area requiring consideration is the relevance of all indicators to all Arab countries. Considering the ecological, political, economic, cultural and social diversity of the countries of the Arab region, it is improbable that one set of specific indicators would be completely applicable to all nations. For instance, the yield gap in wheat has little relevance to the countries of the GCC but could be very pertinent for the Syrian Arab Republic, Egypt and Iraq. The same applies to the use of water as a per cent of the renewable water, which means much more in Qatar, which has little renewable water, than in Lebanon or Iraq. The framework's presentation as an Excel dashboard offers the possibility of changing indicators and of adapting the tool to the very specific prevailing conditions in the country concerned. Nevertheless, it is strongly recommended to minimize those changes, in order to continue to have a common food security language among user countries.

The framework could also be adapted to be used for sub-national contexts, whereby it could help visualize the status of food security in the different governorates, kadda, or other subnational divisions in a given country. This would assist decision-makers at local and national levels to better pinpoint and address the pertinent issues at hand by localizing them geographically and identifying gaps in policies to propose more targeted policy responses and other action plans if needed. However, data collection at national and subnational levels need to be addressed.

It must also be noted that the quality of the monitoring is fully dependent on the reliability of the data, and that the truth of the adage "garbage in, garbage out" applies to the framework. This brings us again to the issue of data availability and validity, which becomes more pressing than ever.

The initial purpose of the monitoring framework was to achieve the dual goal of tracking progress in SDGs and progress in food security. The aim was to rely on as many SDGs indicators as possible in order to achieve this goal. However, considerations listed above required us to adapt some of the SDG indicators to local conditions. An example is the poverty indicator, which in the SDGs uses the threshold of $1.25/day while this framework uses a threshold of $3.2/day, upon the recommendation of national representatives who participated in the validation of the tool. Experts also recommended to account for the rising burden of overnutrition as a determinant factor of food security in the Arab region, which is an issue of concern notably for Arab youth as they are increasingly moving towards westernized diets and away from traditional ones, despite the fact that they are healthier. This is giving rise to the challenging issue of obesity, which has health impacts in the rise of non-communicable diseases such as cardiovascular diseases or diabetes, both of which are on the increase. Another issue that emphasized is the rising scarcity of water in the Arab region as food security is inextricably linked to water security. This was reflected through the assessment of the share of total renewable water resources allocated to the agriculture sector, a sector whose output, in many countries, is not commensurate to its consumption of resources, natural, physical or financial.

The monitoring framework shows that the Arab region is afflicted by both undernourishment and obesity that sometimes affects up to a third of the population. Addressing these challenges should be high on the agenda of countries of the region given their potential costly impact on the economy, the health-care systems and the loss in productivity. The high levels of undernourishment and food insecurity experience might worsen in the face of the protracted sociopolitical crises affecting many countries, high poverty and unemployment rates and the likely impact of climate change. Obesity is also expected to continue rising as countries become even more affluent and the move away from traditional and healthier diets continues. There are many hotspot areas that need immediate action: tackling poverty and unemployment, closing the yield gap, addressing and mitigating the food import dependency, responding to the nutrition-related issues (child stunting and wasting and anaemia among women) and resolving the protracted political crises. Concerted regional efforts will be needed to reverse the negative trends and put the region on a path of growth and food security.

The framework also highlights the need to step up efforts to collect and disseminate or share relevant data so that more focused analyses on food insecurity and its drivers can be conducted. Disaggregating the data along known divides, such as gender, youths, disabilities, refugees/displaced people or rural/urban, would help target vulnerable populations and, as such, should be supported at national and regional levels. Arab countries are encouraged to adopt and utilize this framework widely given its ease of use.

THE WAY FORWARD

The framework has been developed, tested and validated. It was endorsed by the Executive Council of the AOAD. It is now essential to promote its adoption by all countries of the Arab Region. ESCWA and AOAD have initiated training workshops to provide clear instructions on the purpose of the framework as a policy guidance tool. AOAD in cooperation with ESCWA can also support implementation measures and follow-up discussions with national parties. It is expected that this monitoring framework will be used in different programmes and ministries and at different stages and periods of time. These national institutions must be involved in further adaptation of the tool to meet specific local conditions. Finally, it is recommended to hold regular interregional meetings on Arab food security monitoring in which outcomes of the framework usage can be compared and evaluated, and appropriate policies and strategies adopted to address potential emerging issues.

This publication as well as the accompanying training manual and country analysis have been designed for use by stakeholders who have food security-related involvements and responsibilities. This makes it possible for stakeholders to focus on the areas that are relevant to their needs. It is further recommended that a single national institution compile the data, feed it into the framework and put together an annual or biannual report. This report would provide the information on the different aspects of food security and would link them to policies and programmes, thereby identifying policy gaps and providing guidance for new policies. The multidimensionality of the framework is bound to improve collaboration between the different institutions, ministries and State agencies. The importance of data collection and availability must be stressed again at this point to allow for proper performance tracking. Attention must be paid to achieving this monitoring framework's objectives through a realistic and effective implementation process that moves responsibly towards achieving food security.

Endnotes

1. According to the Committee on World Food Security, food security exists "when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. The four pillars of food security are availability, access, utilization and stability." (FAO, 2009, p. 3).
2. In this publication, "dimension" will be used to refer to what are usually known as the four "pillars" of food security, namely availability, access, utilization and stability, while "pillar" will be used for the newly introduced "core" composed of ex post indicators.
3. In this publication, the term "food security" is synonymous to "food and nutrition security," as nutritional security is an integral part of food security.
4. The SDGs cover the complex issues of poverty, hunger, growth, inequality, education, health, life on land and in the water as well as the issues of peace, climate change, the environment and the need for strong institutions and partnerships, among others, which are covered through 17 goals and 169 targets and means of implementation.
5. Arab Strategy for Disaster Risk Reduction; Arab Transportation Agreements (http://www.lasportal.org/ar/councils/ministerialcouncil/Pages/MCouncilDocuments.aspx?RID=3); Pan-Arab Renewable Energy Strategy; Arab Health and Environment Strategy; Arab Regional Strategy for Sustainable Consumption and Production; Strategy for Sustainable Arab Agricultural Development for the Upcoming two Decades (2005-2025); Arab Strategy for Water Security in the Arab Region; Emergency Programme for Arab Food Security (http://www.aoad.org/Arab-Food-Emergency-Program.asp); Arab Fisheries Strategy (http://www.aoad.org/FishStratgy.asp); United Nations Convention to Combat Desertification 2018-2030 Strategic Framework; Arab Framework Action Plan on Climate Change Issues (AFAPCC) (خطة العمل العربية للتعامل مع قضايا تغير المناخ).
6. Tier 3 indicators are indicators selected for SDG monitoring for which there is no methodology or databank available yet.
7. As a convention in this publication, "pillar" will be used to denote the group of three core indicators at the center of the framework while "dimension" will be referring the four usual dimensions of food security, namely availability, access, utilization and stability.
8. 2010 was chosen as the base year for this report as it had the most data for a majority of indicators.
9. Each indicator slice consists of an overlay of three slices representing respectively the year 2010, the latest year and scores of 0 or no data. The overlay is achieved using the "VLookup" function in Excel. When 2010 data is available it is on top (solid and dark colours) and if not available then latest year data would appear (shaded and light colour) while if both are not available or the score is 0, the slice would have a light grey colour.
10. Subregional averages are provided in annex 3.
11. The world figure is for 2018 and the Arab region is an average over multiple years for countries.
12. Note: Red shaded cells show indicators for which data is not available. AC2 (expenditure on food consumption) and ST2 (food price anomalies) lack data for most countries. Despite of the stated aim of including indicators with data for 50 per cent of countries and covering 50 per cent of the Arab population, they had to be included given their importance to food security, for example AC2 would help account for periods like the 2007-2008 food price crises.

Annexes

ANNEX 1: MEASURING FOOD INSECURITY FROM PEOPLE'S EXPERIENCES: THE FOOD INSECURITY EXPERIENCE SCALE (FIES)

By Firas Yassin (FAO)

In the late 1980s, researchers at Cornell University sought a new approach for measuring hunger, one which would be appropriate for use in a wealthy country such as the United States where rates of child stunting and wasting are very low, and many food insecure people are overweight. Aiming to develop a new measure, they interviewed women who said they had experienced hunger. Based on these conversations, the researchers identified various dimensions and components of the experience of hunger. The Cornell researchers identified a sequence of experiences that characterized hunger and food insecurity as described by the women – a sequence that reveals increasing severity of food insecurity. Years later, a review of studies in many countries around the world concluded that these dimensions of the experience of hunger appear to be common across cultures.

The consequences of food insecurity become more severe as the situation worsens, negatively affecting physical, mental and social well-being. The Cornell measure, together with the FIES and similar experience-based food security scales, are all composed of a series of questions that refer directly to people's ability to access food. The series of questions is part of a scale that covers a range of experiences of food insecurity at increasing levels of severity.

The FIES survey module is composed of eight questions with simple dichotomous responses ("yes" or "no") which are posed to a respondent during a survey. Respondents are asked whether at any time during a certain reference period they have had any of the experiences described in the questions, due to lack of money or other resources to obtain food. These experiences range from worrying about their ability to get enough food to whether they have been forced to compromise the quality or quantity of the food they ate. It is important to note that each question focuses on lack of money or resources to obtain food, and not on other reasons such as religion or health factors, which might lead to someone reducing the quantity or quality of the food that he or she eats, or to altering their diet.

The FIES can be used to measure food security for the following purposes:

1. **To assess the population's prevalence of food insecurity** (for both SDG monitoring and national use) - Where "prevalence" refers to the percentage of people in the total population who are affected by food insecurity at different levels of severity, it is possible to use the same set of questions across cultures to estimate food insecurity at different levels of severity and to compare the results in a way that is meaningful and statistically valid.
2. **To identify vulnerable populations most affected by food insecurity** - The FIES can be used to identify subpopulations vulnerable to food insecurity, to understand who they are and where they live. The full potential of the FIES to generate actionable information for policy is realized when the tool is applied in large national population surveys that allow more detailed analyses of the food insecurity situation in relation to income, gender, age, race, ethnicity, migratory status, disability, geographic location or other policy relevant characteristics.

3. To guide and monitor the effects of national food security policies and programmes - FIES can be used to monitor changes in the prevalence of food insecurity over time and to identify trends which is a powerful way of assessing the effects of national policies and development programmes aimed at reducing food insecurity nationally and among vulnerable populations.
4. To identify risk factors and consequences of food insecurity - Other purposes of the FIES include research and surveillance to identify determinants and consequences of food insecurity on health and well-being. This involves exploring food insecurity in relation to other variables. These may be measured on the same individual (or household) in the same survey or analysed using ecological studies. By studying associations between food insecurity and characteristics or conditions such as livelihood strategies, access to public services, basic sanitation, food habits, health and nutritional status, we will have a better understanding of the complex phenomenon of food insecurity.

Successful applications of FIES in the Arab region

More than 50 countries around the world have been using FIES in their various national household surveys since 2014. In the Arab region, countries have recently started including FIES in their national surveys. Some example includes applications of FIES module in Bahrain, the Sudan, the State of Palestine, Lebanon and Jordan. Other countries, like Morocco and Egypt, have concrete plans to implement FIES in their national surveys in 2019. One of the successful applications was carried out in Jordan by the Department of Statistics that implemented FIES questionnaire in its "Household Income and Expenditure Survey 2017". The survey was representative at the subnational (regions) level and therefore, different prevalence rates of food insecurity were estimated for different regions and for the country as a whole. Another successful example was implemented in Bahrain where jointly the Ministry of Health and the Information and eGovernment Authority attached FIES module to the "World Health Survey 2018, Individual Questionnaire". By collecting data on FIES, this survey developed a considerable potential to study the nexus between food insecurity situation and its outcomes measured by the anthropometric and health indicators.

ANNEX 2: MAPPING OF SELECTED ARAB REGIONAL POLICIES AND PROGRAMMES: AN OVERVIEW

A review was conducted to assess how selected Arab regional policies and programmes integrate various food security dimensions. Below is the result for some of the main action plans:

A. The Arab Strategy for Agricultural Development (2005-2025) (ASAD)

Formulated by the AOAD, the strategy builds on the Tunis Declaration (2004) and on Algiers Declaration (2005) issued at the sixteenth and seventeenth Arab Summits. Its five key long-term objectives for the Arab region include the (1) adoption of an integrated approach to the utilization of agricultural resources; (2) achievement of a joint agricultural policy; (3) enhancement of the capacity for providing safe food; (4) achievement of sustainability of agricultural resources; and (5) enhancement of stability in rural communities. The strategy revolves around seven main programmes ranging from agricultural technologies to agricultural investments and industries, competitiveness of agricultural products, agricultural legislation and policies, capacity-building, rural development and integrated environmental and agricultural resource management. The strategy calls on Arab countries to shoulder a large part of the implementation responsibilities through dedicated programmes and projects while also collaborating with partners at the regional and international levels.

The ASAD supports the "availability" dimension as it aims to improve domestic production and imports; the "access" dimension through various entitlements including livelihood policies, price control and subsidies; the "utilization" dimension through nutrition improvement, food safety and policies targeting water and sanitation. The "stability" dimension is not reflected as such although the proposed food security monitoring programme and infrastructure development might enhance stability in the food system. The ASAD also targets institutional development through capacity-building but does not address emergencies and crises.

B. The Arab Strategy for Disaster Risk Reduction 2020

This strategy has proved hard to implement as a result of the prevailing political and economic challenges facing most Arab countries. However, it is a long-term strategy that targets both national and local levels.

The Arab Strategy for Disaster Risk Reduction aims to enhance institutional support to better respond to emergencies and crises and, as such, supports more the "stability" dimension of food security.

C. The Arab Strategy for Water Security in the Arab Region (2010-2030)

This strategy is a long-term programme and practical mechanism for overcoming known future challenges in water resources development and management in the Arab Region. The implementation and financing of the strategy and its programmes fall under the auspices of the Arab Ministerial Water Council and its technical secretariat, namely the General Directorate for Economic Affairs of the Arab League, the Arab Center for the Studies of Arid Zones and Dry Land (ACSAD), national institutions and regional/ international civil society organizations involved in the water sector and related fields.

This strategy supports the "utilization" dimension as it aims to enhance food safety through enhanced water quality and sanitation. It also targets the food "stability" dimension by addressing emergency and crises and institutional development.

D. The Riyadh Declaration to Enhance Arab Cooperation to Face World Food Crises

The declaration aims to consolidate Arab cooperation to address crises in the food sector following the 2007-2008 food price shock. It promotes the adoption and implementation of concerted actions and mechanisms that include, for example, launching an initiative to enhance Arab food security emergency programme, encouraging the public and private sectors and Arab businesses to invest in joint agricultural projects in Arab countries within the context of the emergency programme or urging governments to expedite the preparation of legislations and laws supporting Arab agricultural integration and reinforcing the Greater Arab Free Trade Area to enhance inter-Arab agricultural trade.

As such, it targets the "availability" and "access" dimension as it aims to enhance investments in food production as well as ensuring that food is accessible in critical times but also the "stability" dimension by addressing responses to emergencies and long-term development.

E. The Emergency Arab food security programme (2011-2031)

The programme aims to increase and stabilize food production in the Arab world notably by targeting such commodities as cereals, oilseeds and sugar over a 20-year development programme. The total number of projects that are to be executed number around 1,881 projects for a total cost of $32 billion, though funding is still a challenge.

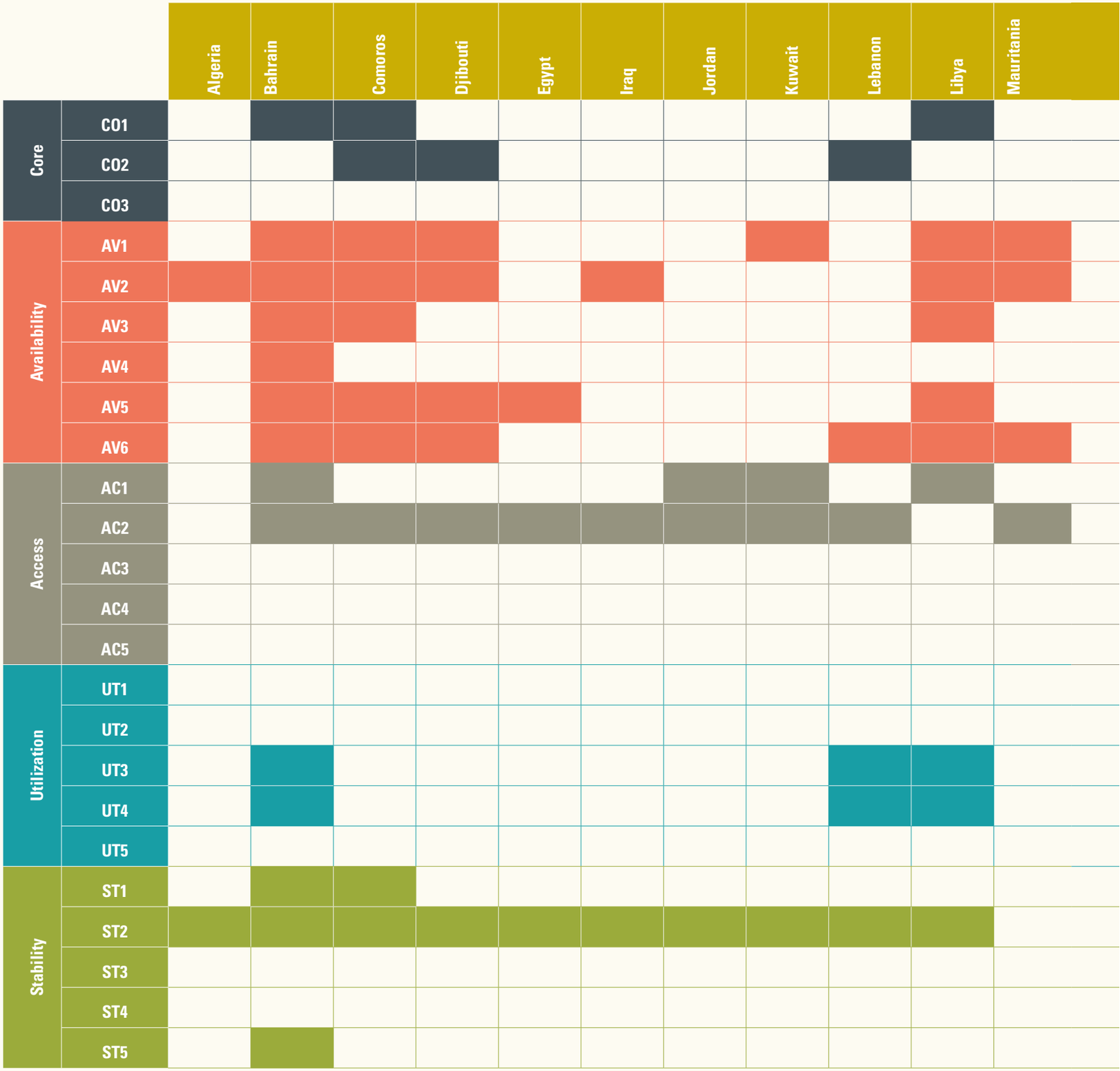
The emergency programme addresses most parameters of food security including, food "availability" through agricultural development activities, and investment programmes; "access" through safety net initiatives, price control and infrastructural developments; and "stability" through capacity-building and strategic reserves. It does not explicitly address "utilization" though it has a major component related to early warning systems, food security monitoring programme and international cooperation and trade.

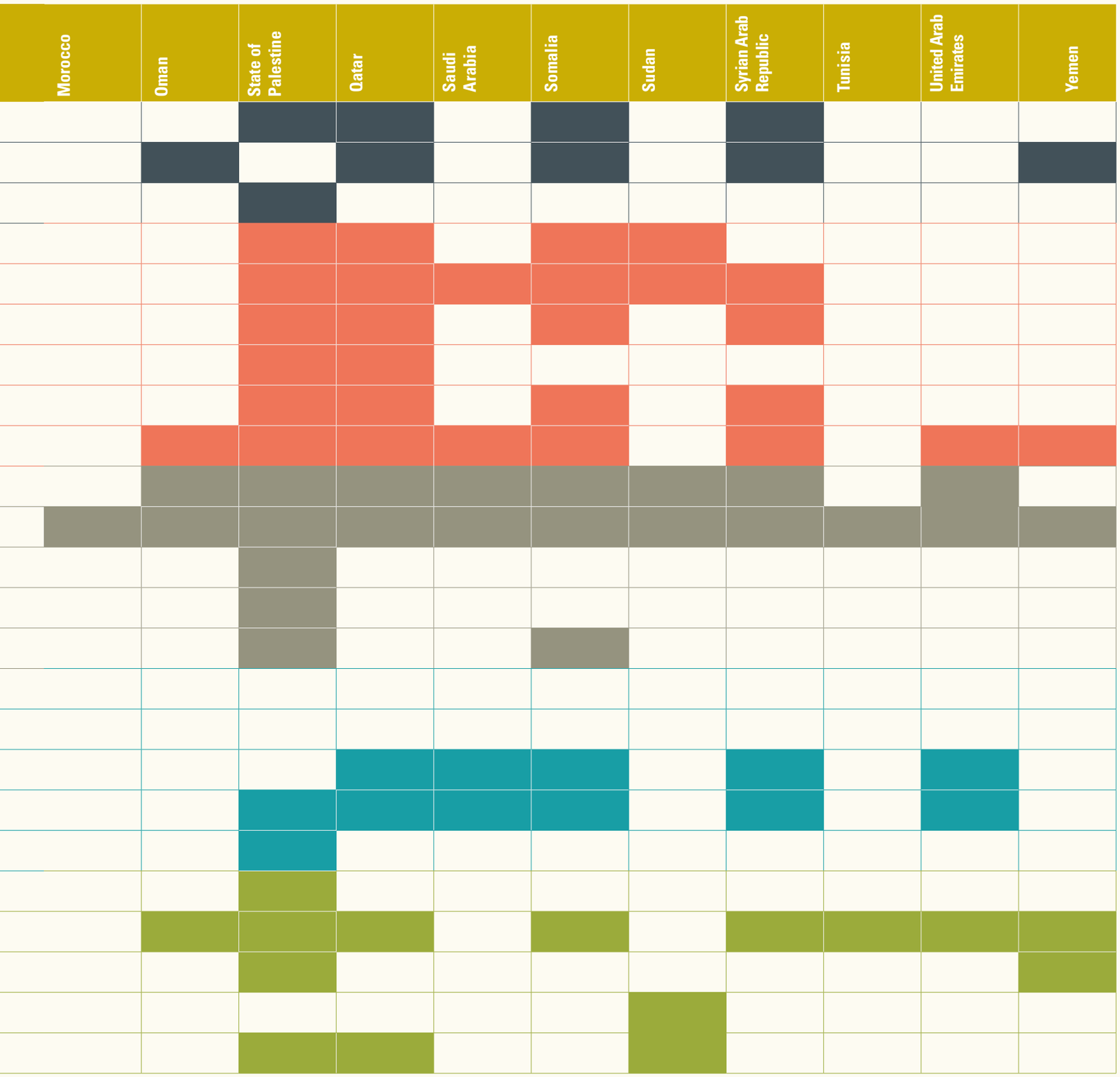
Existing linkages between the framework indicators and selected global and regional plans and frameworks

			Sustainable Development Goals (SDGs)	FAO Food Security Indicators	UNCCD 2018-2030 Stratigic Framework (UNCCD)	Arab Strategy for Agricultural Development (ASAD)	Arab Regional Strategy for Sustainable Consumption an Production (ASCP)	Arab disaste Risk Reduction (ADRR)	Arab Strategy for Water Security in the Arab Region (ASWS)	Arab Food Emergency Programme (AFEP)	Arab Fisheries Strategy (AFS)	Arab Health and Environment Strategy (AHES)	Arab Worldplan to deal with Climate Change (AWCCI)	Pan-Arab Renewable Energy Strategy (ARES)
Core	CO1	Prevalence of undernourishment- R %												
	CO2	Prevalence of moderate or severe food insecurity measured using FIES- R %												
	CO3	Prevalence of obesity in the adult population (18 years and older)- R %												
Availability	AV1	Primary wheat yield as a percentage of potential achievable yield - %												
	AV2	Agriculture Orientation index for government expenditures - Index												
	AV3	Food losses (% total food available) R - %												
	AV4	Average dietary energy supply adequacy - %												
	AV5	Wheat import dependency ratio R - %												
	AV6	Share of water resources used in agriculture out of total renewable water resources R - %												
Access	AC1	Poverty headcount ratio R - %												
	AC2	Share of food consumption expenditure in total household consumption expenditure R - %												
	AC3	Unemployment rate R - %												
	AC4	Logistics performance - index												
	AC5	Inflation, consumer prices R - %												

			Sustainable Development Goals (SDGs)	FAO Food Security Indicators	UNCCD 2018-2030 Stratigic Framework (UNCCD)	Arab Strategy for Agricultural Development (ASAD)	Arab Regional Strategy for Sustainable Consumption an Production (ASCP)	Arab disaste Risk Reduction (ADRR)	Arab Strategy for Water Security in the Arab Region (ASWS)	Arab Food Emergency Programme (AFEP)	Arab Fisheries Strategy (AFS)	Arab Health and Environment Strategy (AHES)	Arab Worldplan to deal with Climate Change (AWCCI)	Pan-Arab Renewable Energy Strategy (ARES)
Utilization	UT1	Percentage of the population using at least basic drinking water services - %	■	■	■	■	■	■	■			■		
	UT2	Percentage of the population using at least basic sanitation services - %	■	■	■	■	■	■	■			■		
	UT3	Percentage of children under 5 years of age affected by stunting (R) - %	■	■		■	■							
	UT4	Percentage of children under 5 years of age affected by wasting (R) - %	■	■		■	■							
	UT5	Percentage of anaemia among women of reproductive age (15-49 years) (R) - %	■	■		■	■							
Stability	ST1	Climate change vulnerability index (R)	■		■	■	■	■	■	■	■	■	■	■
	ST2	Food price anomalies standard deviation (R)	■			■		■						
	ST3	Political stability and absence of violence - ranking	■	■		■	■	■						
	ST4	Per capita food production variability - 1000$/capita (R)	■	■	■	■	■		■	■	■			
	ST5	Per capita food supply variability - kcal/capita/day (R)	■	■	■	■	■		■	■	■			

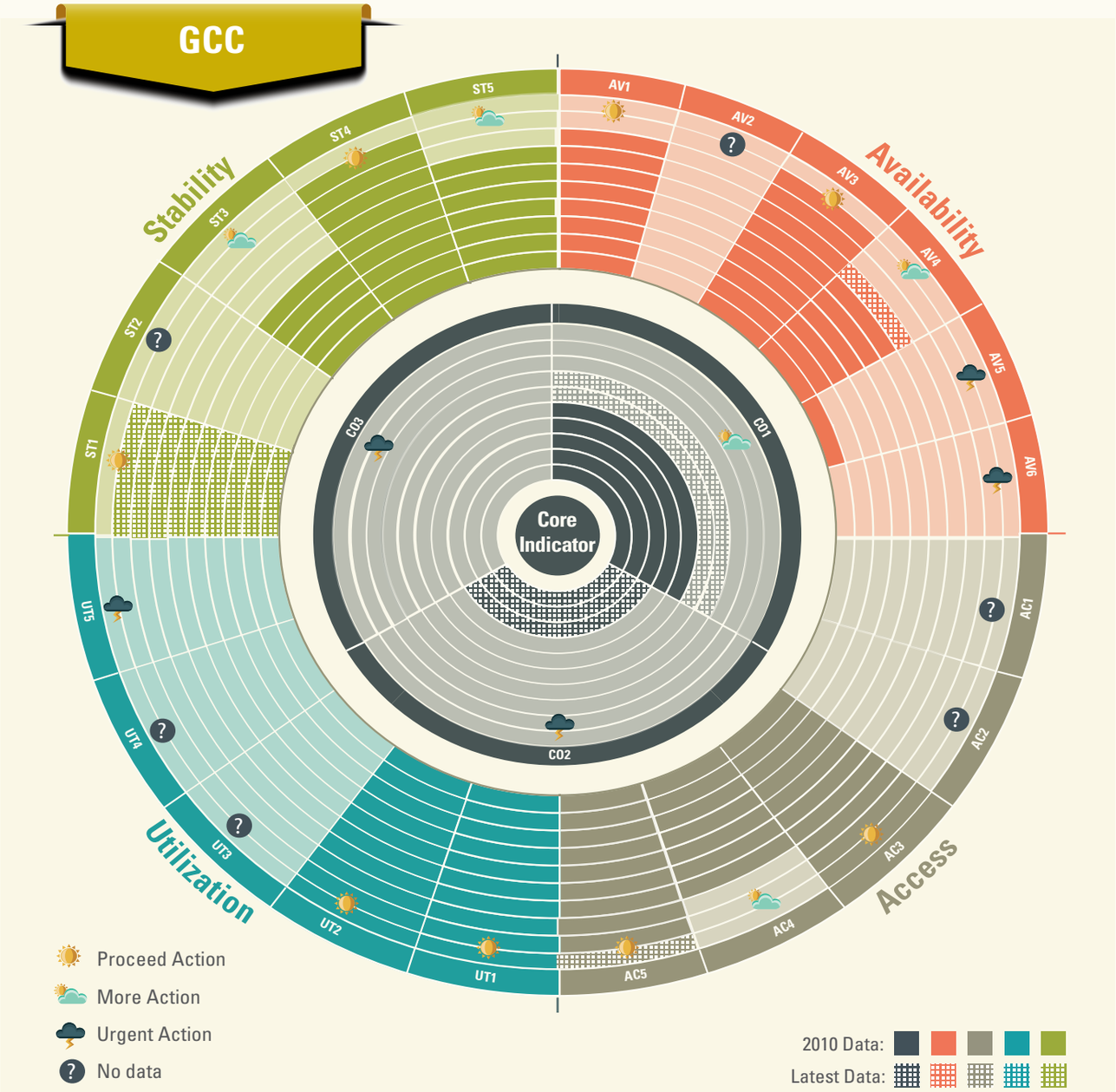
Data availability by indicator and by country based on latest year (range 2012 – 2019)[12]




Morocco
Oman
State of Palestine
Qatar
Saudi Arabia
Somalia
Sudan
Syrian Arab Republic
Tunisia
United Arab Emirates
Yemen

ANNEX 3: INDICATORS AND DASHBOARDS FOR SELECTED ARAB SUBREGIONAL GROUPINGS

Food Security performance in GCC* Countries



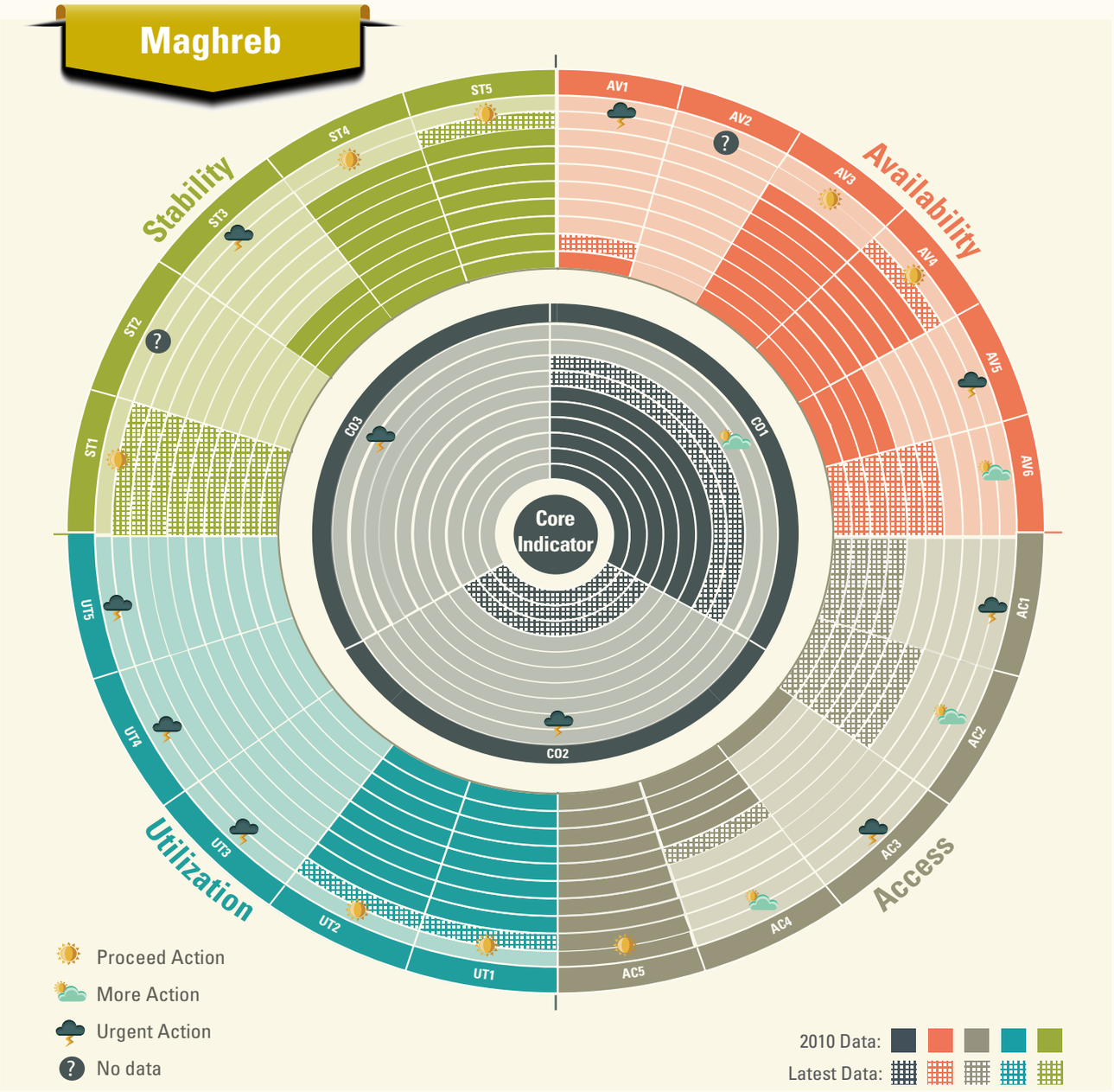
*** Indicators and dashboard for the Arab Gulf subregion:** Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates

Code	Description	Arab Latest Value	Arab Latest Year	GCC 2010 Value	GCC Latest Value	GCC Latest Year	Trend
CORE INDICATORS							
CO1	Undernourishment (R) -%	12.1	2016	6.4	4.7	2016	●
CO2	Food insecurity (R) - %	12.2	2016	n.a.	7.3	2016	
CO3	Obesity (R) - %	28.4	2016	30.3	34.1	2016	●
AVAILABILITY INDICATORS							
AV1	Wheat yield - %	82.2	2017	114.3	111.8	2017	●
AV2	Agriculture expenditure - index	n.a.		n.a.	n.a.		
AV3	Food loss (R) - %	6.8	2013	5.1	4.1	2013	●
AV4	Dietary energy supply - %	131	2017	128	133	2017	●
AV5	Wheat import dependency (R) - %	65.0	2012	90.8	96.6	2012	●
AV6	Agriculture water (R) - %	n.a.	n.a.	n.a.	472.4	2017	
ACCESS INDICATORS							
AC1	Poverty (R) - %	16.6	0	n.a.	n.a.		
AC2	Food consumption (R) - %	n.a.		n.a.	n.a.		
AC3	Unemployment (R) - %	10.4	mult.	4.4	4.4	2016	●
AC4	Logistics - index	2.7	2016	3.3	3.3	2016	●
AC5	Inflation (R) - %	12.8	mult.	3.9	2.3	mult.	●
UTILIZATION INDICATORS							
UT1	Drinking water access - %	86.9	2015	98.5	99.2	2015	●
UT2	Sanitation access - %	80.8	2015	99.7	99.9	2015	●
UT3	Child stunting (R) - %	22.9	mult.	n.a.	n.a.		
UT4	Child wasting (R) - %	8.7	mult.	n.a.	n.a.		
UT5	Women anaemia (R) - %	35.5	2016	36.2	37.7	2016	●
STABILITY INDICATORS							
ST1	Climate change (R) - index	0.1	2019	n.a.	0.03	2019	
ST2	Price anomalies (R) - index	n.a.		n.a.	n.a.		
ST3	Political stability - ranking	14	2017	50	39	2017	●
ST4	Production variability (R) - 1000$/capita	10.1	2016	5.4	7.9	2016	●
ST5	Supply variability (R) - kcal/cap/day	29.8	2013	34.6	69.5	2013	●

(R) : Reversed n.a.= Not Available mult.= Multipleas years

● Red: Negative Trend ● Yellow: Neutral Trend ● Green: Positive Trend.

Food Security performance in Maghreb* Countries



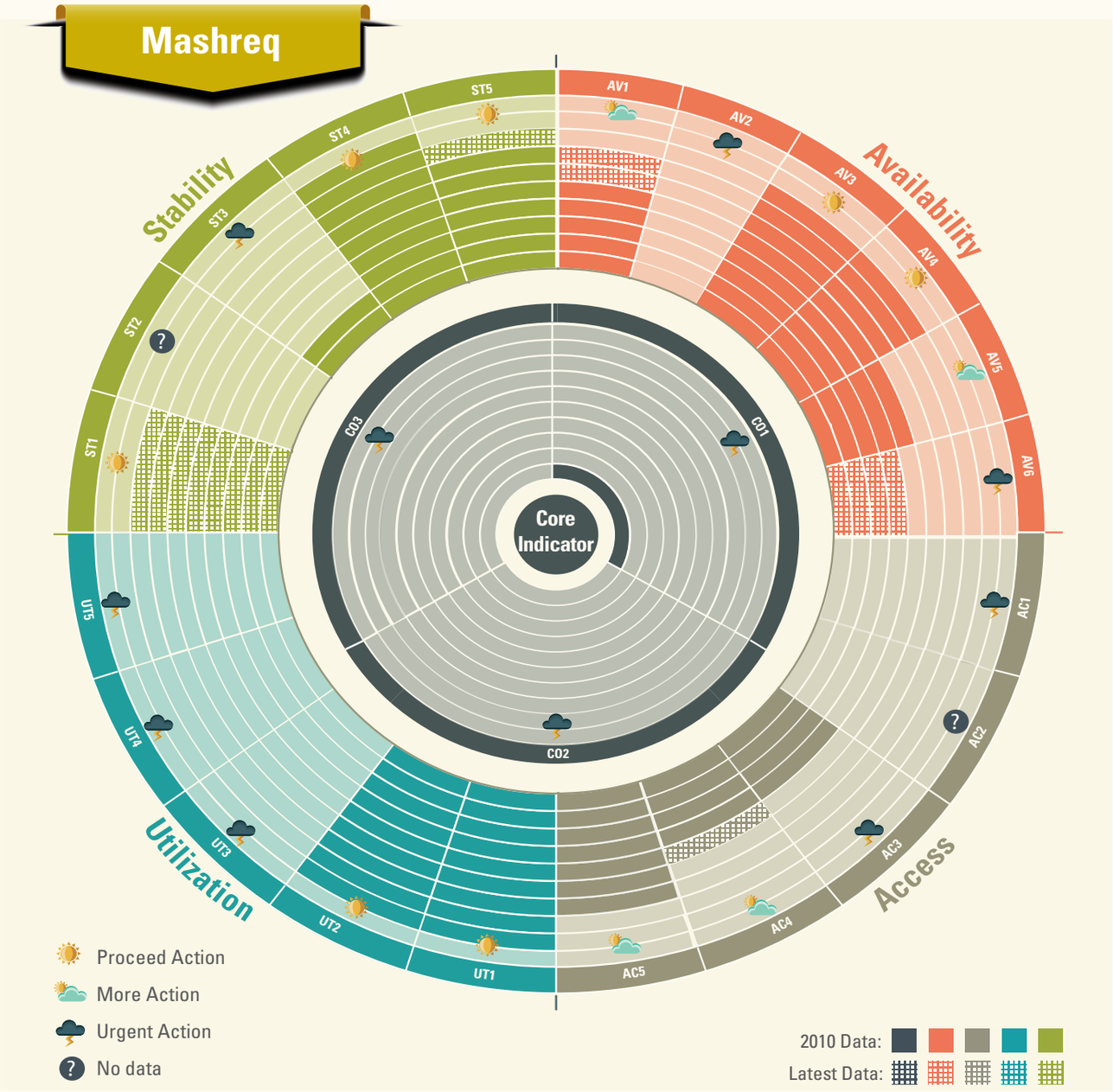
*** Indicators and dashboard for the Maghreb subregion:** Algeria, Libya, Morocco, Tunisia.

Code	Description	Arab Latest Value	Arab Latest Year	Maghreb 2010 Value	Maghreb Latest Value	Maghreb Latest Year	Trend
CORE INDICATORS							
CO1	Undernourishment (R) -%	12.1	2016	5.7	4.7	2016	🟢
CO2	Food insecurity (R) - %	12.2	2016	n.a.	7.3	2016	
CO3	Obesity (R) - %	28.4	2016	23.3	27.2	2016	🔴
AVAILABILITY INDICATORS							
AV1	Wheat yield - %	82.2	2017	44.6	45.2	2017	🟡
AV2	Agriculture expenditure - index	n.a.		0.20	n.a.		
AV3	Food loss (R) - %	6.8	2013	7.1	7.0	2013	🟡
AV4	Dietary energy supply - %	131	2017	138	145	2017	🟢
AV5	Wheat import dependency (R) - %	65.0	2012	56.0	58.4	2012	🟡
AV6	Agriculture water (R) - %	n.a.	n.a.	n.a.	42.0	2017	
ACCESS INDICATORS							
AC1	Poverty (R) - %	16.6	0	n.a.	5.3	mult.	
AC2	Food consumption (R) - %	n.a.		n.a.	43.9	2016	
AC3	Unemployment (R) - %	10.4	mult.	10.6	11.7	mult.	🔴
AC4	Logistics - index	2.7	2016	2.5	2.7	2016	🟢
AC5	Inflation (R) - %	12.8	mult.	-1.6	3.6	mult.	🔴
UTILIZATION INDICATORS							
UT1	Drinking water access - %	86.9	2015	86.9	89.9	2015	🟡
UT2	Sanitation access - %	80.8	2015	85.0	87.5	2015	🟡
UT3	Child stunting (R) - %	22.9	mult.	n.a.	12.8	mult.	
UT4	Child wasting (R) - %	8.7	mult.	n.a.	3.2	mult.	
UT5	Women anaemia (R) - %	35.5	2016	32.5	35.4	2016	🔴
STABILITY INDICATORS							
ST1	Climate change (R) - index	0.1	2019	n.a.	0.07	2019	
ST2	Price anomalies (R) - index	n.a.		n.a.	n.a.		
ST3	Political stability - ranking	14	2017	26	20	2017	🔴
ST4	Production variability (R) - 1000$/capita	10.1	2016	15.3	16.5	2016	🔴
ST5	Supply variability (R) - kcal/cap/day	29.8	2013	23.0	13.0	2013	🟢

(R) : Reversed n.a.= Not Available mult.= Multipleas years

🔴 Red: Negative Trend 🟡 Yellow: Neutral Trend 🟢 Green: Positive Trend.

Food Security performance in Mashreq* Countries



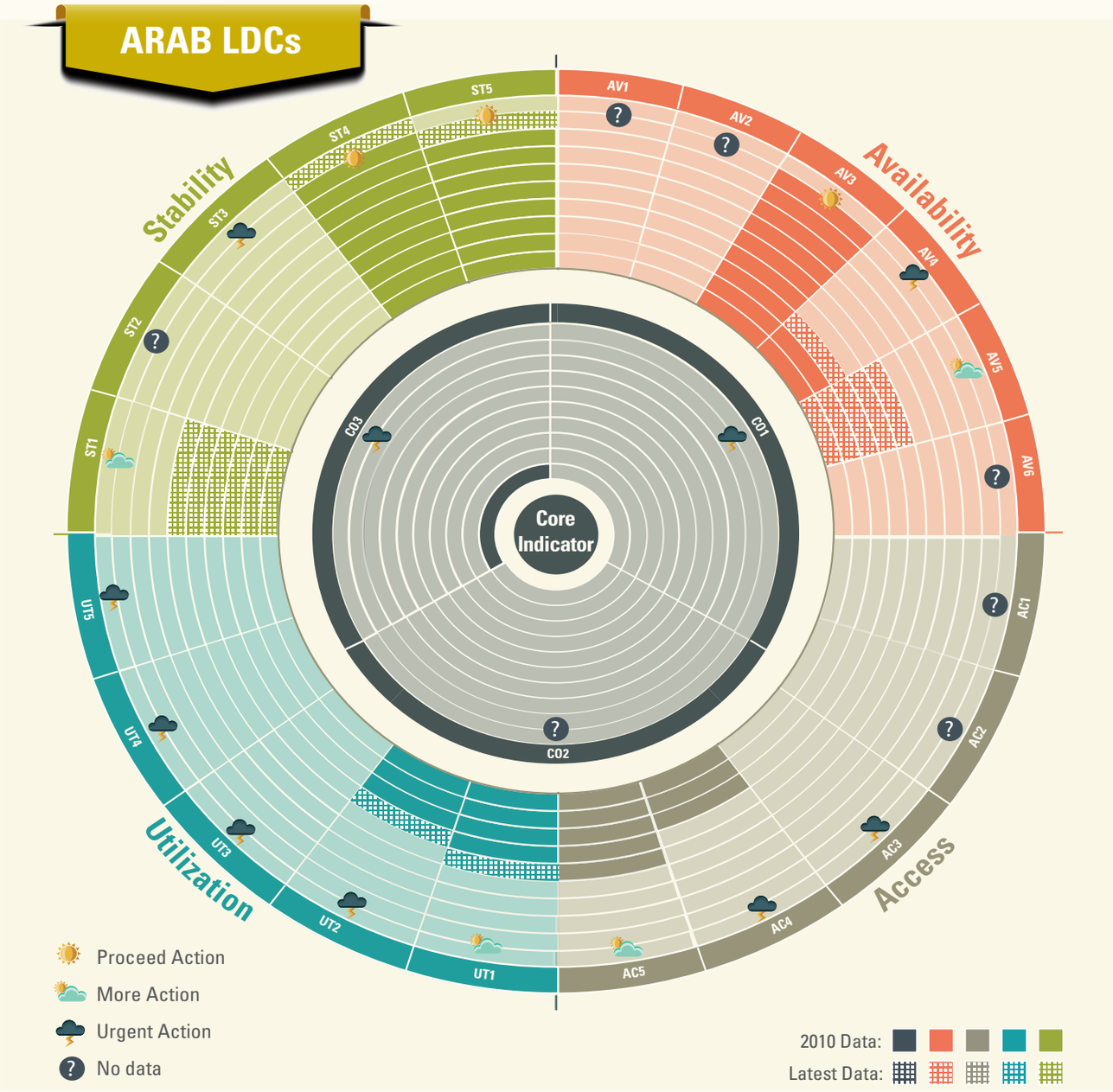
*** Indicators and dashboard for the Mashreq subregion:** Egypt, Iraq, Jordan, Lebanon, State of Palestine and Syrian Arab Republic.

Code	Description	Arab Latest Value	Arab Latest Year	Mahsreq 2010 Value	Mahsreq Latest Value	Mahsreq Latest Year	Trend
CORE INDICATORS							
CO1	Undernourishment (R) -%	12.1	2016	10.3	11.3	2016	🔴
CO2	Food insecurity (R) - %	12.2	2016	n.a.	13.5	2016	
CO3	Obesity (R) - %	28.4	2016	27.4	31.4	2016	🔴
AVAILABILITY INDICATORS							
AV1	Wheat yield - %	82.2	2017	88.2	105.3	2017	🟢
AV2	Agriculture expenditure - index	n.a.		n.a.	0.12	mult	
AV3	Food loss (R) - %	6.8	2013	8.9	8.7	2013	🟡
AV4	Dietary energy supply - %	131	2017	137	137	2017	🟡
AV5	Wheat import dependency (R) - %	65.0	2012	51.7	n.a.		
AV6	Agriculture water (R) - %	n.a.	n.a.	n.a.	57.7	2017	
ACCESS INDICATORS							
AC1	Poverty (R) - %	16.6	0	19.2	16.0	mult.	🟢
AC2	Food consumption (R) - %	n.a.		n.a.	n.a.		
AC3	Unemployment (R) - %	10.4	mult.	8.8	10.4	2016	🔴
AC4	Logistics - index	2.7	2016	2.6	2.8	2016	🟢
AC5	Inflation (R) - %	12.8	mult.	7.9	21.5	mult.	🔴
UTILIZATION INDICATORS							
UT1	Drinking water access - %	86.9	2015	94.3	95.1	2015	🟡
UT2	Sanitation access - %	80.8	2015	91.1	91.9	2015	🟡
UT3	Child stunting (R) - %	22.9	mult.	n.a.	21.0	mult.	
UT4	Child wasting (R) - %	8.7	mult.	n.a.	8.5	mult.	
UT5	Women anaemia (R) - %	35.5	2016	30.3	29.7	2016	🟡
STABILITY INDICATORS							
ST1	Climate change (R) - index	0.1	2019	n.a.	0.08	2019	
ST2	Price anomalies (R) - index	n.a.		n.a.	n.a.		
ST3	Political stability - ranking	14	2017	17	8	2017	🔴
ST4	Production variability (R) - 1000$/capita	10.1	2016	10.4	9.2	2016	🟢
ST5	Supply variability (R) - kcal/cap/day	29.8	2013	38.5	30.8	2013	🟢

(R) : Reversed n.a.= Not Available mult.= Multipleas years

🔴 Red: Negative Trend 🟡 Yellow: Neutral Trend 🟢 Green: Positive Trend.

Food Security performance in Arab LDCs*



*** Indicators and dashboard for the Arab LDCs:** Comoros, Djibouti, Mauritania, Somalia, Sudan and Yemen.

Code	Description	Arab Latest Value	Arab Latest Year	LDCs 2010 Value	LDCs Latest Value	LDCs Latest Year	Trend
CORE INDICATORS							
CO1	Undernourishment (R) -%	12.1	2016	24.8	27.8	2016	🔴
CO2	Food insecurity (R) - %	12.2	2016	n.a.	n.a.		
CO3	Obesity (R) - %	28.4	2016	11.0	13.9	2016	🔴
AVAILABILITY INDICATORS							
AV1	Wheat yield - %	82.2	2017	n.a.	n.a.		
AV2	Agriculture expenditure - index	n.a.		n.a.	n.a.		
AV3	Food loss (R) - %	6.8	2013	4.2	2.1	2013	🟢
AV4	Dietary energy supply - %	131	2017	98	100	2017	🟡
AV5	Wheat import dependency (R) - %	65.0	2012	n.a.	52.2	2012	
AV6	Agriculture water (R) - %	n.a.	n.a.	n.a.	n.a.		
ACCESS INDICATORS							
AC1	Poverty (R) - %	16.6	0	n.a.	n.a.		
AC2	Food consumption (R) - %	n.a.		n.a.	n.a.		
AC3	Unemployment (R) - %	10.4	mult.	13.2	12.9	2016	🟡
AC4	Logistics - index	2.7	2016	2.2	2.3	2016	🟡
AC5	Inflation (R) - %	12.8	mult.	11.8	12.3	mult.	🟡
UTILIZATION INDICATORS							
UT1	Drinking water access - %	86.9	2015	52.8	60.4	2015	🟢
UT2	Sanitation access - %	80.8	2015	35.2	40.2	2015	🟢
UT3	Child stunting (R) - %	22.9	mult.	n.a.	40.6	mult.	
UT4	Child wasting (R) - %	8.7	mult.	n.a.	16.2	mult.	
UT5	Women anaemia (R) - %	35.5	2016	43.0	45.5	2016	🔴
STABILITY INDICATORS							
ST1	Climate change (R) - index	0.1	2019	n.a.	0.18	2019	
ST2	Price anomalies (R) - index	n.a.		n.a.	n.a.		
ST3	Political stability - ranking	14	2017	3	4	2017	🟢
ST4	Production variability (R) - 1000$/capita	10.1	2016	4.6	3.2	2016	🟢
ST5	Supply variability (R) - kcal/cap/day	29.8	2013	31.2	18.1	2013	🟢

(R) : Reversed n.a.= Not Available mult.= Multipleas years

🔴 Red: Negative Trend 🟡 Yellow: Neutral Trend 🟢 Green: Positive Trend.

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- https://reliefweb.int/report/djibouti/unicef-djibouti-humanitarian-situation-report-mid-year-2019.
- https://reliefweb.int/report/mauritania/wfp-mauritania-country-brief-july-2019.
- https://www.unocha.org/somalia.
- https://www.unocha.org/sudan.
- https://www.worldbank.org/en/country/yemen.

Indicators

CO1 – Undernourishment:

- https://unstats.un.org/sdgs/metadata/files/Metadata-02-01-01.pdf.
- http://www.fao.org/3/Y4249E/y4249e06.htm.
- http://www.fao.org/3/a-i4046e.pdf.
- http://www.fao.org/publications/sofi/en/.
- https://unstats.un.org/sdgs/metadata/files/Metadata-02-01-01.pdf.
- https://data.worldbank.org/indicator/sn.itk.defc.zs.

CO2 – FIES:

- https://unstats.un.org/sdgs/metadata/files/Metadata-02-01-02.pdf.
- http://www.fao.org/faostat/en/#data/FS.

CO3 – Obesity:

- https://www.who.int/en/news-room/fact-sheets/detail/obesity-and-overweight.
- http://www.fao.org/faostat/en/#data/FS.

AV1 – Wheat yield:

- http://www.fao.org/faostat/en/#data/QC.
- https://www.nature.com/articles/nature11420?platform=oscar&draft=journal.

AV2 – Agriculture Orientation Index (AOI):

- https://unstats.un.org/sdgs/metadata/files/Metadata-02-0A-01.pdf.
- http://www.fao.org/faostat/en/#data/IG.

AV3 – Food losses:

- http://www.fao.org/faostat/en/#data/FBS.

AV4 – ADESA:

- http://www.fao.org/faostat/en/#data/FS.

AV5 – Wheat imports dependency:

- http://www.fao.org/faostat/en/#data/FS.

AV6 – Agricultural water withdrawal:

- http://www.fao.org/nr/water/aquastat/data/popups/itemDefn.html?id=4250).
- http://www.fao.org/nr/water/aquastat/data/popups/itemDefn.html?id=4188.
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- Year=2017&varGrpIdsYear=2017&varGrpIds=4250%2C4251%2C4252%2C4253%2 C4257&cntIds=&regIds=9805%2C9806%2C 9807%2C9808%2C9809&edit=0&save=0&query_type=WUpage&lowBandwidth=1&newestOnly=true&_newestOnly=on&showValueYears=true&_showValueYears=on&categoryIds=-1&_categoryIds=1&XAxis=VARIABLE&showSymbols=true&_showSymbols=on&_hideEmptyRowsColoumns=on&lang=en.

AC1 – Poverty rate:

- https://datacatalog.worldbank.org/poverty-headcount-ratio-national-poverty-lines-population-4.
- https://data.worldbank.org/indicator/SI.POV.LMIC?end=2013&locations=1W&start=1981&view=chart.
- https://data.worldbank.org/indicator/SI.POV.LMIC?end=2017&name_desc=false&start=2000.

AC2 – Share food consumption expenditure:

- https://inddex.nutrition.tufts.edu/data4diets/indicator/household-food-expenditure-share.

AC3 – Unemployment rate:

- http://www.ilo.org/ilostat/faces/oracle/webcenter/portalapp/pagehierarchy/Page3.jspx?MBI_ID=2&_afrLoop=2077030756898988&_afrWindowMode=0&afrWindowId=1ckqux3qin_1#!%40%40%3FafrWindowId%3D1ckqux3qin_1%26_afrLoop%3D2077030756898988%26MBI_ID%3D2%26afrWindowMode%3D0%26_adf.ctrl-state%3D1ckqux3qin_45.

AC4 – Logistics Performance Index:

- https://data.worldbank.org/indicator/LP.LPI.OVRL.XQ?end=2010&name_desc=false&start=2007.
- https://datacatalog.worldbank.org/logistics-performance-index-ability-track-and-trace-consignments-1low-5high.
- https://www.indexmundi.com/facts/indicators/LP.LPI.OVRL.XQ.

AC5 – Inflation:

- https://data.worldbank.org/indicator/FP.CPI.TOTL.ZG\.
- https://data.worldbank.org/indicator/FP.CPI.TOTL.

UT1 – Drinking water services:

- https://data.worldbank.org/indicator/SH.H2O.SMDW.ZS.
- http://data.worldbank.org/indicator/SH.H2O.BASW.ZS.
- http://www.fao.org/faostat/en/#data/FS.

UT2 –Sanitation:

- https://data.worldbank.org/indicator/SH.STA.BASS.ZS.
- https://www.unicef.org/wash/index_43107.html.
- http://www.fao.org/faostat/en/#data/FS.

UT3 – Children Stunting:

- https://unstats.un.org/sdgs/metadata/files/Metadata-02-02-01.pdf.
- https://data.worldbank.org/indicator/SH.STA.STNT.ZS.
- https://www.who.int/nutrition/databases/en/.
- http://www.fao.org/faostat/en/#data/FS.

UT4 – Child Wasting:

- https://unstats.un.org/sdgs/metadata/files/Metadata-02-02-02b.pdf.
- https://data.worldbank.org/indicator/SH.ANM.ALLW.ZS.
- https://data.worldbank.org/indicator/SH.STA.WAST.ZS.
- https://data.unicef.org/.
- https://www.who.int/nutrition/databases/en/.
- http://www.fao.org/faostat/en/#data/FS.

UT5 – Prevalence of Anaemia:

- https://databank.worldbank.org/reportsaspx?source=2&type=metadata&series=SH.ANM.ALLW.ZS.
- https://databank.worldbank.org/indicator/SH.ANM.ALLW.ZS.
- http://www.fao.org/faostat/en/#data/FS.

ST1 – Climate Change Vulnerability:

- http://www.hcss.nl/.
- http://projects.hcss.nl/monitor/70/.

ST2 – Food Price Anomalies:

- https://unstats.un.org/sdgs/metadata/files/Metadata-02-0C-01.pdf.
- http://www.fao.org/sustainable-development-goals/indicators/2c1/en/.
- https://unstats.un.org/sdgs/indicators/database/?indicator=2.c.1.

ST3 – Political Stability:

- https://datacatalog.worldbank.org/political-stability-and-absence-violenceterrorism-estimate.
- https://databank.worldbank.org/data/reports.aspx?source=1181&series=PV.PER.RNK.
- https://info.worldbank.org/governance/wgi/#home.
- http://www.fao.org/faostat/en/#data/FS.

ST4 – Food Production Variability:

- https://landportal.org/book/indicator/fao-21030-6127.
- http://www.fao.org/faostat/en/#data/FS.

ST5 – Food Supply Variability:

- https://inddex.nutrition.tufts.edu/data4diets/indicator/capita-food-supply-variability.
- http://www.fao.org/faostat/en/#data/FS.

The publication presents and applies the Arab Regional Food Security Monitoring Framework developed by the Economic and Social Commission of Western Asia (ESCWA). The Framework aims to help countries effectively assess their food security situation. It was developed in collaboration and partnership with Arab countries, the Arab Organization for Agricultural Development (AOAD) and the Food and Agriculture Organization of the United Nations (FAO) and experts with support from the Swedish International Development Cooperation Agency (Sida). It accounts for the complexity and multidimensionality of food security along its multi-pronged definition and allows the monitoring of selected targets of the Sustainable Development Goals. The framework tracks food security through three outcome indicators grouped under a core pillar and 21 causal indicators distributed along the four food security dimensions of availability, access, utilization and stability. The publication outlines the Framework's development process and rationale for selecting the indicators and introduces an innovative way to show results in the form of a dashboard composed of a double doughnut chart visualizing performance and a table summarizing key statistics and trends. It also presents the key results of tracking food security at the Arab regional level and the trend over the considered years. It shows that the region records poor performance for all three of the outcome indicators of undernourishment, food insecurity experience and obesity while also presenting the performance and trends for the remaining 21 other indicators. It identifies yields, food import dependency, logistics, food price volatility and low political stability as hotspots needing urgent action, among others. It also reveals declining trends in the prevalence of undernourishment and obesity as well as dietary energy supply, use of water in agriculture and unemployment, to name a few. The publication includes an indicator-by-indicator analysis and outlines selected recommendations.

19-01343