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In Preparation of the

Regional Forum on Accelerating Food Systems Transformation in the Arab Region

The Sheraton Amman Al Nabil Hotel

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30-31 October 2024

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Regional Meeting on Accelerating Food Systems Transformation in the Arab Region
Amman, Jordan
30- 31 October 2024

Background Document 1

Economic and Social Commission for Western Asia Assessing food systems in the Arab region- Draft

Economic and Social Commission for Western Asia

Assessing food systems in the Arab regions



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Draft for Discussion

Key messages

- Food security is one of the major challenges in the Arab region. Key outcome indicators, including undernourishment, food insecurity experience, obesity among adults and stunting among children, are high – in most cases above world averages – as a result of poorly functioning food systems that are not inclusive, resilient or sustainable due to shortcomings in their main components and daunting external drivers.
- The Arab Food Systems Assessment Tool is a comprehensive framework adapted for the Arab region that uses a combination of select indicators covering all dimensions of food security and the components, external drivers and outcomes of food systems to provide insights into the functioning and performance of food systems in the Arab region.
- Food systems in the Arab region can be categorized based on food system development stages, income and development levels, and conflict or fragility status to describe contextual challenges, assess their ability to promote inclusivity, resilience and sustainability, and recommend a transformation pathway.
- The assessment provides an in-depth understanding of the Arab food systems landscape, enabling policymakers to make informed decisions and implement targeted interventions to improve food security, reduce inequalities, enhance resilience and promote sustainability in the region.

Executive summary

This report outlines the Arab Food Systems Assessment Tool, which evaluates food systems based on outcomes such as food security and nutrition and the attributes of inclusivity, resilience and sustainability. It discusses the vulnerabilities of Arab food systems, the dimensions of food security and the need for a food systems assessment tool to support the desired transformation of food systems in the region. Following the Food Systems Summit in 2021, efforts have been made to understand vulnerabilities hindering food security in the Arab region, where food systems are susceptible to a matrix of shocks and stresses affecting their resilience and thus the achievement of food security and good nutrition. At the global level, a framework for analysing food systems has been put forward and consists of internal components, external drivers and overall outcomes. The framework identifies five intrinsic components: the food supply chain, the food environment, individual-level filters, consumer behaviour and diets. It highlights that these components are influenced by external drivers such as the environment, globalization, income distribution, urbanization, population growth, politics and the sociocultural context. The resulting outcomes of food systems include food security and nutrition, which are assessed through indicators such as undernourishment, the Food Insecurity Experience Scale, the prevalence of obesity and child stunting. There are also economic outcomes, as food systems contribute substantially to livelihoods, especially in rural areas; social outcomes, as food systems are related to the exacerbation of inequalities in access to food; and environmental outcomes, as food systems play a leading role in the sustainability of resources. These components, drivers and outcomes of food systems interact and are interconnected, influencing dietary patterns, production systems, livelihoods and environmental sustainability.

The framework presented analyses and categorizes Arab food systems based on their transformation stages, economic development and sociopolitical contexts. The transformation stages of three types of food systems are described: traditional food systems, which face challenges in production, supply chains and food environments; emerging food systems, which show advancements in production, supply chains and food environments; and modernizing food systems, which are relatively well developed with minimal reliance on local production and advanced supply chains. Regarding economic development, three groups of countries are identified – low-income countries, middle-income countries and high-income countries – and are complemented with the list of least developed countries. To account for sociopolitical contexts, the framework identifies conflict-affected and fragile countries, as their weak institutions might affect the functioning of food systems.

Food systems in the Arab region are further categorized according to the six dimensions of food security: availability, access, utilization, stability, agency and sustainability. The 28 indicators comprising the food system assessment tool and covering all the dimensions of food security can also be distributed throughout food systems' components, drivers and outcomes and relied upon to identify how food systems contribute to inclusivity, resilience and sustainability. This interrelatedness enabled the development of the Arab Food Systems Assessment Tool, which is applied at the regional and subregional levels. The selection of a case study country – Yemen – demonstrates how the tool can be used to analyse the performance of food systems in the Arab region. The assessment tool uses data from international sources for related analyses with the results provided in the form of a dashboard that allows comparative analysis among the indicators through their trends. As such, the tool helps to identify areas needing attention so that actions for improvement can be prioritized accordingly. The Arab region assessment highlights specific challenges including undernourishment, obesity and food insecurity. The subregional analysis shows disparities in income groups and food system performance, while the analysis for Yemen shows the impact of conflicts on the functioning of food systems. Recommendations include addressing

poverty, improving yields and responding to nutrition issues. As this report makes clear, regional efforts are needed to achieve growth and food security in the Arab region.

Draft for Discussion

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Abbreviations and acronyms

AOAD	Arab Organization for Agricultural Development
BMI	body mass index
DESA	Department of Economic and Social Affairs
ESCWA	United Nations Economic and Social Commission for Western Asia
FAO	Food and Agriculture Organization of the United Nations
FIES	Food Insecurity Experience Scale
GCC	Gulf Cooperation Council
GDP	gross domestic product
GNI	gross national income
HDR	Human Development Report
HICs	high-income countries
HLPE	High-level Panel of Experts on Food Security and Nutrition
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
IMF	International Monetary Fund
LDCs	least developed countries
MICs	middle-income countries
NGOs	non-governmental organizations
OCHA	Office for the Coordination of Humanitarian Affairs
OECD	Organisation for Economic Co-operation and Development
PoU	Prevalence of undernourishment
SDGs	Sustainable Development Goals
Sida	Swedish International Development Cooperation Agency
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFPA	United Nations Population Fund
UNHCR	Office of the United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
UNRWA	United Nations Relief and Works Agency for Palestine Refugees in the Near East
UNU	United Nations University
USDA	United States Department of Agriculture
WFP	World Food Programme
WHA	World Health Assembly
WHO	World Health Organization
WID	World Inequality Database

Introduction

Since the United Nations Food Systems Summit in 2021, efforts have been made to better understand food systems and their components, drivers and outcomes with a view to identifying the vulnerabilities that might hinder the achievement of food security. Previous reports have attempted to highlight the susceptibility of food systems in the Arab region to various shocks, both natural and human-induced, which are worsened by numerous stresses that limit their resilience capacity and ability to deliver food security and healthy diets to all.¹ In the lead up to the Food Systems Summit, the many dialogues held within the Arab region as part of a global effort further highlighted the crucial intricacies prevailing within the food systems of the region as well as worldwide.² The dialogues also provided an opportunity to emphasize the linkages between food systems and food security, particularly in the Arab region given the many challenges it faces to produce and procure sufficient food. One of the main outcomes of the dialogues was to highlight that improving food security in the Arab region requires a food systems transformation that enhances their inclusivity, resilience and sustainability. These three food system attributes are essential and need to be accounted for while monitoring food security. Elements of these attributes can be identified throughout the six dimensions of food security: availability, access, utilization, stability, agency and sustainability.

As defined, “[f]ood security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life”, and for several decades, four dimensions – availability, access, utilization and stability – formed the basis of the concept.³ The availability dimension considers the food supply and is determined by the level of food production, stock levels and net trade. The access dimension examines physical and financial access to food in terms of the ability of people to acquire food available on the market. The utilization dimension is commonly understood as being related to nutrition, including diet quality, as well as non-food related issues such as clean water and sanitation. The stability dimension encompasses factors affecting the consistency of the food supply in the short term. The newly added agency dimension embodies the right of all to determine the sourcing of their food, while the sustainability dimension examines the ability of food systems to recover from shocks, notably in the long term.

In January 2019, the United Nations Economic and Social Commission for Western Asia (ESCWA) put forward a Food Security⁴ Tracking Tool that allows for the monitoring of food security in the Arab region based on a select number of indicators within the four previously acknowledged dimensions of food security, i.e. availability, access, utilization and stability,⁵ which was adopted by the Executive Bureau of the Arab Organization for Agricultural Development (AOAD). With the recent proposed expansion of the conceptual understanding of food security through the addition of the agency and sustainability dimensions, it is necessary to revisit and recalibrate the Food Security Tracking Tool so that it can provide an understanding of how food systems function and deliver on food security, nutrition, economic, social and environmental outcomes, and the essential attributes of inclusivity, resilience and sustainability.

This report builds on previous work undertaken to analyse food security and food systems in the Arab region with a view to link the monitoring of food security to the assessment of food systems. This correlation can provide a better understanding of the performance of food systems and what they deliver in terms of food security within a country or region, among other parameters. Linking food security to the functioning of food systems facilitates the identification of policies that can support the transformation of food systems to achieve food security through increased effectiveness and efficiency aligned with the attributes of inclusivity, resilience and sustainability. Specifically, this report has three objectives:

- To outline a tool that describes food systems in the Arab region and how they determine food security outcomes.
- To develop a typology of Arab food systems that can be used for food system analysis.
- To identify, using the proposed typology, the challenges to be overcome and the opportunities to ensure Arab food systems' inclusivity, resilience and sustainability.

Draft for Discussion

1. Food systems in the Arab region

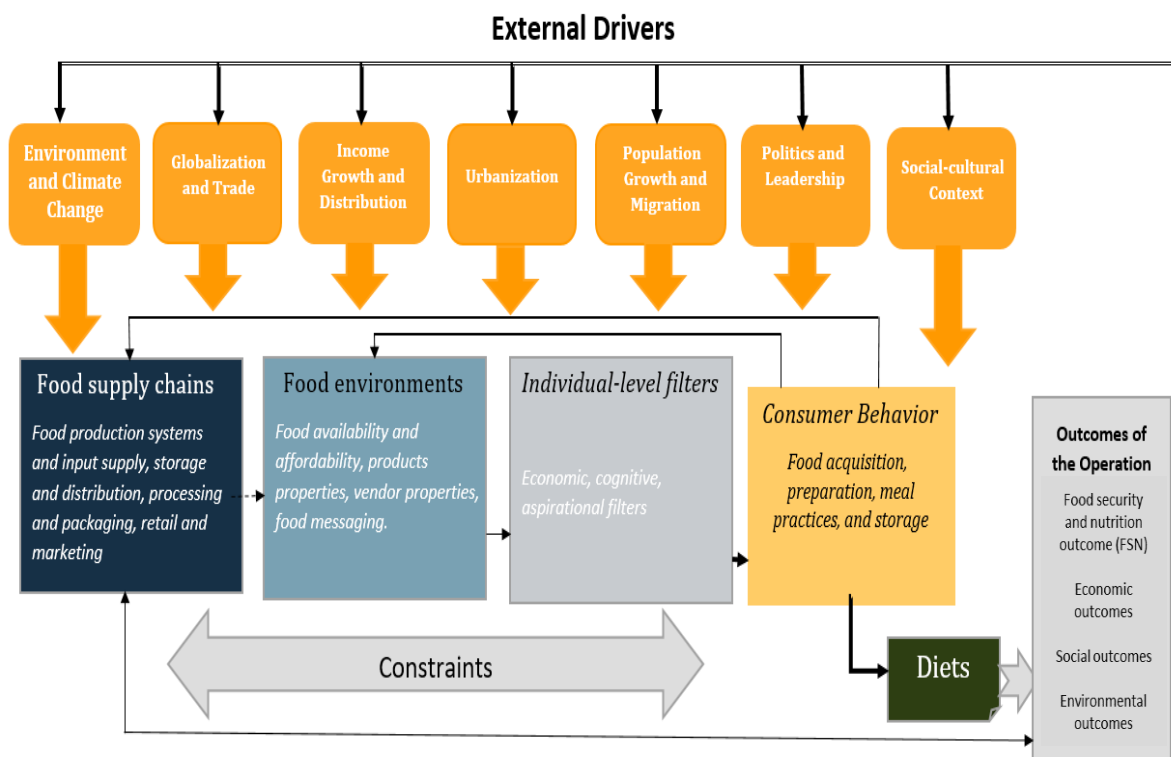
A. The food system conceptual and methodological framework

1. Introduction

As the world faces the impacts of interconnected, multisectoral and multidimensional risks, addressing food security requires a holistic approach that accounts for the functioning of the entire food system.⁶ Analysing food security from a food systems perspective includes understanding their different components – food supply chains, food environments and individual-level choices – their cross-sectoral nature, and how they interact and are impacted by external drivers to determine diet and nutrition outcomes as well as broader social, economic and environmental outcomes.

The food systems framework explored below builds on the conceptual and methodological tool put forward by Fanzo et al. (2020). Figure 1 below details the components of the food system under this framework. Interlinked biophysical and socioeconomic components – food supply chains, food environments, individual-level filters and consumer behaviour – interact and are impacted by external drivers to determine human diet and nutrition outcomes. The food supply chain component includes all the processes involved in getting food from producers to consumers, including production, processing, packaging, transportation, distribution and retail. The food environment component accounts for the physical, economic and social factors that determine food choices, including availability, affordability, messaging or product properties. The individual-level filters component includes all the personal factors behind food acquisition and consumption decisions, such as taste preferences, health concerns, and cultural and religious beliefs. The consumer behaviour component encompasses all the actual consumer actions, including food acquisition, preparation, meal practices and storage. While these factors are presented sequentially, the relationships among them are analysed as part of the food systems framework. The purchase of a specific food product (consumer behaviour) affects production decisions (food supply chains), for example. All these factors, in turn, affect the dietary outcome of the population.

Figure 1: Food systems framework



Source: Adapted from Fanzo et al. (2020).

At the same time, biophysical, political and sociocultural determinants affect the food system and alter its operation through various mechanisms. These external drivers include the environment and climate change, globalization and trade, income growth and distribution, urbanization, population growth and migration, politics and leadership, and the sociocultural context. The combination of all these interlinked components, drivers and constraints of the food system leads to specific outcomes in terms of food security and nutrition as well as overall health, in addition to economic, social and environmental outcomes.

For policy and management interventions to be effective, it is crucial to adopt a comprehensive approach that considers the food system in its entirety, including the interactions among the different components and the impact of external drivers. Usually, analysis efforts are concentrated on specific aspects of the system, such as agricultural production or food supply, while overlooking other parts, which fails to provide a holistic view of how food systems determine food security. It is thus critical to adopt a more all-encompassing framework that accounts for the entire food system – including its internal and external interactions – for more effective policy and management interventions.⁷

Moreover, a food system approach allows the identification of priority actions at global, regional, national or local levels, which better supports the achievement of policy goals and programmatic activities that could lead to improved food security and nutrition. This approach would further help accelerate progress towards the achievement of the 2030 Agenda through the Sustainable Development Goals (SDGs), as measured through different dimensions of sustainability (economic, social and environmental).

2. The food systems framework

The framework presented above (figure 1) is used to analyse food systems in the Arab region. For each component, the main characteristics are identified along with characteristics specific to the Arab region. This brief analysis provides an overview of the food system in a holistic manner by considering the multiple components, drivers and interconnections that constitute it. Additionally, this general perspective will serve as the basis for the generation of typologies of Arab food systems.

The assessment of a food system begins with a review of its core components, followed by a review of the external drivers that influence it, and ends with an overview of its main outcomes: food security and nutrition outcomes as well as economic, social and environmental ones.

(a) Components of food systems

Food systems are comprised of five core components that influence one another simultaneously. Sequentially, the food supply chain leads to the food environment that in turn leads to the individual-level filters on food choices. In the same way, those individual filters translate into general consumer behaviours that result in the observed diets and dietary patterns.

(1) Food supply chain

The food supply chain component comprises all the steps needed to get the food from the producers to the consumers and encompasses food production, processing, packaging, transportation, distribution and retail. The food supply chain in the Arab region is relatively varied, as it includes small-scale and large-scale food producers, wholesalers, retailers, agribusinesses and food service providers. In some countries, limited development and lack of infrastructure make it difficult for small-scale producers to participate in the supply chain while in others, conflicts or crises render the population heavily reliant on food aid, which further hinders local production. In Yemen, for example, the ongoing conflict has disrupted the food supply chain, making it difficult to import food and distribute it to those in need; local production, meanwhile, has been gravely affected.

(2) Food environment

The food environment component considers the physical, economic and social factors that influence food choices, availability and affordability. Food environments are still largely traditional in low-income countries where most consumers, particularly those in rural areas, obtain their food from own production or informal markets. In contrast, food environments are rapidly developing towards modern standards in most middle-income countries, where there is higher prevalence of formal food markets, including in rural areas. In countries where there is a distinct dietary transition, there are limited options and information on healthy foods at affordable prices, which leads to the dominance of fast food and convenience food stores. In Saudi Arabia, for example, Western fast-food chains are popular while traditional markets that sell fresh produce are becoming less common.

(3) Individual-level filters

The individual-level filters component comprises personal factors that influence food choices and eating behaviours, such as taste preferences, health concerns, and cultural and religious beliefs. These factors impact an individual's diet quality and overall health outcomes. The Arab region continues to be a large consumer of bread and wheat, which account for up to 35 per cent of the calories consumed. The consumption of sweetened beverages and energy-dense foods is also on the

rise, largely as a result of the subsidies on sugars, oils, cereals and bread. For example, in Morocco, the current diet includes a lot of bread and sweet pastries, which contribute to high levels of sugar and carbohydrates.

(4) Consumer behaviour

The consumer behaviour component refers to the actions and decisions of individuals and households regarding food purchases, consumption and waste. Consumer behaviours are the actual visible actions influenced by the individual-level filters. Food waste is high in many Arab countries due to a range of factors that include cultural and social aspects related to generous hospitality norms where large amounts of food are often prepared for social events. For example, in the Gulf Cooperation Council (GCC), it is common to prepare lavish feasts for celebrations such as weddings, resulting in substantial quantities of food being wasted.

(5) Diets

The diets component focuses on the types and amounts of food consumed by individuals and populations. Dietary patterns can vary widely depending on cultural and regional factors. In many Arab countries, diets generally include high amounts of carbohydrates, fats and sugars, and low amounts of fruits, vegetables and protein. This dietary pattern has been linked to high rates of chronic diseases such as obesity, diabetes and cardiovascular ailments. For example, in Bahrain, the normal meal tends to be primarily composed of meat and rice, which can contribute to high levels of saturated fat and carbohydrates in the diet. In countries bordering the Mediterranean and where a nutrition transition is underway, the traditionally diverse diet emphasizing fruits and vegetables is slowly being replaced with a more Westernized diet rich in red meat and refined and processed foods.

(b) Drivers and constraints of food systems

Several drivers and their associated constraints impact the operation of food systems and their ability to deliver positive outcomes. Seven main categories of drivers are identified in the food systems framework: the environment and climate change; globalization and trade; income growth and distribution; urbanization; population growth and migration; politics and leadership; and the sociocultural context. These drivers and constraints are briefly described in this section together with an overview of their potential impact on Arab food systems.

(1) Environment and climate change

The environment and climate change exacerbate existing constraints to food production and human development in the Arab region. These constraints include the rising scarcity of natural resources, such as land and fertile soils, and increasing water insecurity due to limited quantity and quality of water supplies. In addition, the Arab region is one of the most vulnerable to the effects of climate change due to its water scarcity, low coastal areas and arid climate. The temperature in the Arab region is increasing and is expected to continue to climb by more than 5°C until the end of the century. The soils of the region are severely degraded, affecting up to 75 per cent of the rain-fed cropland.⁸

(2) Globalization and trade

Most Arab countries are increasingly reliant on food imports to meet their food needs. The region currently imports 61.4 per cent of its wheat, the main consumed staple.⁹ This poses considerable risks when supply chain disruptions arise, such as those caused by the COVID-19 pandemic, the war in Ukraine or import restrictions imposed by major producing countries. Moreover, most of the imported calories originate from five global suppliers, which further exacerbates the unpredictability of the food supply and leads to a price volatility risk.¹⁰ Driven by globalization, the modern retail space has expanded in the Arab region from 12.9 per cent in 2003 to 32.7 per cent in 2017.¹¹ This expansion is expected to impact

consumption and access to processed foods and fast foods, which are often associated with modern retail spaces and could worsen obesity levels.¹²

(3) Income growth and distribution

The Arab region is the most unequal region in the world. The average income of the top 1 per cent is 128 times higher than that of the bottom 50 per cent.¹³ In addition, since 2010, income poverty has been increasing, reversing decades of progress in poverty reduction. The significant inequalities in the region are observed both between countries – specifically between oil-rich countries and countries with high population growth – and within countries. The rise in gross domestic product (GDP) does not seem to translate into a reduction in undernourishment, as per capita GDP has more than doubled since 2001 while undernourishment decreased by only 1 per cent. Wealth and income inequalities disproportionately affect certain vulnerable populations, such as rural dwellers, refugees, women and minority groups.¹⁴

(4) Urbanization

Currently, 60 per cent of the population in the Arab region already live in cities and it is estimated that by 2025, 70 per cent of the population will be in urban areas.¹⁵ Rapid growth in urban areas is associated with a series of challenges that include unemployment, the growth of slums and peri-urban areas, the lack of public spaces, or insufficient urban infrastructure. With diminishing opportunities in rural areas, cities are hosting a growing number of people, resulting in populations being increasingly detached from food production areas. Rapid urbanization is often linked with a dietary transition “characterized by a shift away from traditional, seasonal, and diverse diets rich in whole grains, fruits, and vegetables” towards Western diets.¹⁶ Some Arab countries appear to have moved from a diet rich in grain legumes, whole grains and fresh vegetables towards a diet based on refined cereals, fats, sugars and more animal protein consumption.

(5) Population growth and migration

In 2021, the Arab region was home to 444.94 million inhabitants,¹⁷ almost double the population in 1990 of 222.7 million.¹⁸ Overall, the region’s mortality rate has decreased faster than its fertility rate over the last decades, leading to natural population growth. Following this trend, from 2015 to 2050, the population of the Arab region is projected to double, increasing steadily over the coming decades. Population growth combined with a greater affluence will lead to a significant rise in food demand and increases in import dependence.¹⁹

In addition to increases in population numbers, changing migration patterns influence the geographies of food demand. In 2020, the Arab region hosted around 41.4 million migrants and refugees and was the origin of about 32.8 million.²⁰ GCC countries are a major labour migration hub, attracting workers from other Arab countries as well as from countries such as India, Bangladesh and Pakistan. At the same time, being a conflict-affected area, the Arab region has a large number of refugees and internally displaced persons. In 2020, there were 3.6 million refugees registered by the Office of the United Nations High Commissioner for Refugees (UNHCR), and an additional 5.7 million registered by the United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA),²¹ while the internally displaced in Iraq, the Sudan, the Syrian Arab Republic and Yemen reached up to 15.31 million people in 2021.²²

(6) Politics and leadership

Food policies and programmes, governance instruments and institutional settings affect the operation of the food system. These drivers can also include producer organizations and collectives which can alter the balance of power. Enhancing process effectiveness, having transparency in decision-making and improving coordination among key actors are all important for good governance of food systems. Key policy areas include agricultural production, strategic food reserves, enhancement of trade, management of foreign land investments, food safety measures, food aid programmes, and

nutrition and health policies. Countries in the Arab region differ in their policy choices and the effectiveness of their implementation. In general terms, however, the support for agriculture is weak, reflected by the fact that most countries have a low agriculture orientation index.

A ubiquitous policy in the region is food subsidies, as most Arab countries have historically subsidized food commodities as part of the social contract between a State and its citizens. This has long represented an important safety net for the poor and lower middle classes. Food subsidy policies have tended to bolster the consumption of energy-rich foods (e.g. bread, oil and rice) and evidence shows that such policies are correlated with a rise in the number of overweight individuals and obesity.²³ The policies might also act as barriers to healthy diets, particularly for vulnerable subpopulations. Additionally, blanket food subsidies represent a high cost for government budgets. Countries of the region have recently exerted efforts to reform their food subsidies to reduce market distortions, improve targeting and incorporate nutritional considerations. Nevertheless, further improvements might be needed.

(7) Sociocultural context

The sociocultural context is important for understanding some of the inequalities in Arab food systems. Differences between urban and rural populations, small enterprises and big corporations, men and women, are present across the entire food system. Women's land ownership, for example, is very low in most Arab countries for which data are available, and women's salaries in agriculture are generally lower than men's. Persistent inequality exists among migrant workers who face limited rights, poor housing and working conditions, as well as no access to health care or social protection.²⁴

Education and wealth inequalities tend to have a strong impact on health and nutrition outcomes. Nutritional knowledge can direct the selection of healthy dietary options, while the affordability of healthy diets is determined by income levels. High poverty levels in Arab countries, especially in rural areas, along with a lack of awareness about healthy food choices, create obstacles to equal societal access to balanced healthy diets.

Food is also associated with culture, social habits and class. These factors can play both positive and negative roles in Arab societies. In some countries, for example, traditional diets might include excessive cereals and sugar content, and celebrations might encourage excessive food waste.

(c) Outcomes of food systems

Interactions within and between all the components and drivers of food systems lead to the observed nutritional and food security outcomes as well as the economic, social and environmental results and consequences.

(1) Food security and nutritional outcomes

Arab countries are not making enough progress towards achieving Sustainable Development Goal (SDG) targets with regard to food security and nutrition.²⁵ It is estimated that in 2020, 33.3 per cent of the population faced food insecurity while 11.9 per cent suffered from undernourishment.²⁶ In 2016, 28.6 per cent of the population was obese.²⁷ Additionally, the region suffers from high levels of child stunting, wasting and anaemia among women, with 19.4 per cent, 7.7 per cent and 33.2 per cent prevalence rates, respectively.²⁸ These indicators of food insecurity are of great public health significance, and no country in the region is currently on track to meet the World Health Assembly (WHA) targets on anaemia among women of reproductive age or on adult obesity. The rising number of overweight children is also a challenge; only three Arab countries are currently on track to meet the WHA intermediate target of reversing this trend.²⁹

Micronutrient deficiencies are widespread in the region, especially among vulnerable groups such as women of childbearing age, pregnant and breastfeeding mothers, and children under the age of 2. This is due to diets that lack

essential micronutrients such as iron, iodine, zinc, calcium, folic acid, and vitamins A and D. Micronutrient deficiencies are also high in countries where people are wealthier and markets are stable, largely due to a substantial share of dietary energy coming from unfortified wheat flour and refined sugar, which have low micronutrient content. The prevalence of anaemia among women of reproductive age (15–49) has not improved over recent decades, while obesity among the adult population is increasing the occurrence of non-communicable diseases, which are some of the greatest health challenges facing the region.³⁰

(2) Economic outcomes

Ideally, food systems should generate value added for the society in the forms of wages for workers, revenues for farmers, profits for agribusinesses, and taxes for governments. The distribution of economic benefits in food systems, however, is shaped by incentives and economic interests along the food value chain. Analysing economic outcomes is key to gaining a better understanding of how different power dynamics evolve along the food system and to identifying mechanisms to catalyse positive change.

Millions of people are financially dependent on food systems, from agricultural producers to food transporters, wholesalers and processors, retailers and the hospitality industry. The agricultural sector alone accounted for 5.1 per cent of the GDP of the Arab region in 2021.³¹ In rural areas, agricultural production is deeply intertwined with rural livelihoods and often determines poverty. At the same time, poverty – which affects one third of the population in the Arab region – is one of the major determinants of malnutrition.

Globally, food markets are often visualized as an hourglass: millions of smallholder farmers grow food for millions of consumers, followed, in the narrowing part of the hourglass, by the intermediaries between the farm and the fork, which are a mix of small- and mid-sized distributors, suppliers, retailers, and processing and packaging firms. The concentration of capital and market share is in the narrow neck of the hourglass, which comprises primarily large-sized firms, leading to unequal power dynamics. For example, the global seed market is dominated by three main companies while the grain trade is dominated by five major companies. Policymakers, regulators and food speculators also play a role in distributing economic profit from food markets. Analysing how profit is made and the role of the different players involved is crucial for understanding global and local changes in food markets, and how economic inequalities might be perpetuated in food systems.

(3) Social outcomes

The food system affects social outcomes in multiple ways. The living conditions of people producing food, the connection of communities with their land and the food they consume, the quality and safety of the food and the inequities in access to food are a few examples of how social inequalities, traditions or preferences shape and are shaped by the food system. Ideally, food systems should aim for equality across multiple dimensions such as gender, age, origin or social and economic status and help advance social goals in terms of health and nutrition, fair working conditions and general human welfare.

Food production is particularly relevant for social outcomes in rural communities. In 2021, the agricultural sector in the Arab region provided 18 per cent of total employment.³² Rural areas and traditional ways of life are shaped by food production and are simultaneously impacted by global trends regarding food preferences and lifestyles. For example, several pastoralist communities have prevailed in the region for centuries and been integral to Arab societies and culture. Now, however, the difficulties associated with a nomadic lifestyle and the lack of institutional support and social recognition, together with global trends, are prompting many of these communities to replace livestock rearing with other economic activities, forcing them to adopt different lifestyles.

A key social outcome of the food system is inequality in access to sufficient and nutritious food among different population groups. Economic and educational inequalities, institutional frameworks and traditions shape both their ability to access food and their preferences in relation to specific diets. At the same time, body beauty standards, the role of food in social settings, and perceptions surrounding nutrition-related health problems are different in different communities and may exacerbate existing inequities. All these factors translate into lower nutrition and health outcomes among vulnerable groups such as refugees, women or persons with disabilities. In many parts of the Arab region, for example, obesity rates are higher among women than men. Similarly, food insecurity is considerably more prevalent among refugee communities than host populations.

(4) Environmental outcomes

Food systems are dependent on the environment and also influence it. Ideally, food systems should promote the sustainability of resources and environmental conservation. They should consider water resources, soil and land, biodiversity, the carbon footprint and contributions to climate change, the generation of pollution, and food waste and loss.

Food systems and the environment are strongly interlinked. The discussions above have highlighted how environmental factors and climate change reduce agricultural production in the Arab region due to water scarcity, decreasing rainfall, soil salinity and land degradation, among other factors. At the same time, the way food is consumed and produced may have negative effects on the environment and contribute to climate change. Globally, food systems are responsible for roughly one third of total greenhouse gas emissions and 60 per cent of biodiversity loss.³³ In the Arab region, 80 per cent of renewable water resources are allocated to agriculture.³⁴ Bad agricultural practices are one of the main drivers of degradation of the already scarce arable land in the Arab region. In addition, about 6 per cent of the food produced is lost along the supply chain,³⁵ and between 76 and 132 kg/cap/year are wasted at the household level.³⁶ Promoting environmental protection within food supply chains, adopting climate change adaptation and mitigation strategies, promoting greener food consumption, and reducing food waste and loss are key to ensuring the sustainability of food systems.

(d) Interactions in food systems

The food systems framework proposes a holistic approach, moving from demand–supply linear relationships towards multiple interconnections that are observed among different parts of the system. In that sense, the food system is the sum of all the activities that extend from production to consumption, and the drivers that influence them. This results in specific outcomes due to the existing interactions and feedback between and within the physical and human environments of food systems.

These interactions can happen at multiple levels and among components, drivers or outcomes. An example of interconnectedness within food systems' components is a change in dietary preferences that influences food production, imports and processing. Similarly, an example of interconnectedness among drivers and components is the increasing soil degradation, which shifts agricultural production from one area to another based on competitive advantages.

B. Categories of food systems

A wide lens is used to describe, analyse and assess food systems in the Arab region. Using the food systems framework above as a guide and based on an extensive analysis of the components, drivers, constraints and outcomes of food systems, several categories of food systems are identified and described. This macro-level assessment is used to develop and describe food systems of the Arab region based on their characteristics, economic development and sociopolitical

situation, which allows for the identification of food system transformation stages. Pathways towards food systems' transformation will differ based on each country's resource endowment, financial capacity, market access, sociocultural traditions, and human, economic, technological and infrastructure development, among other factors.

1. Food system typologies

While acknowledging the complexity and singularity of each individual food system, typologies are helpful in showing broad patterns across countries. Typologies facilitate the identification of food systems that share common drivers of dietary, economic and environmental change, and that are responsive to similar policy actions or technological and institutional innovations. It is important to acknowledge that multiple food system types can coexist within a single country, such as between urban and rural areas, with certain areas and food items blending traditional and contemporary features.

Developing typologies to analyse food systems is an important step in understanding the diversity and complexity of food systems. By grouping food systems using common characteristics, decision makers can better understand, compare and analyse more systematically the components and drivers of their food systems from food production to processing, distribution and consumption as well as waste. This analysis can then inform the development of policies to address specific challenges and capitalize on opportunities to enhance the likelihood of achieving food security and nutrition for the entire population through increased food system inclusivity, resilience and sustainability. Additionally, the creation of a common language and understanding of food systems through typologies help enhance collaboration and cooperation among different stakeholders, from regional to national levels, including governments, farmers, public and private sector companies, civil society organizations, and academic and research institutions.

Two typologies were considered to accurately categorize Arab food systems and they are presented below. The first typology is based on the identification and description of specific components of the food system while the second typology considers the state of development and the prevailing sociopolitical situation.

(a) Typology 1: Food system transformation stages

This first typology builds on the Food Systems Dashboard³⁷ framework from the Global Alliance for Improved Nutrition and Johns Hopkins University. It distinguishes five groups of food system transformation stages:

- **Rural and traditional:** This food system stage prevails in contexts of low urbanization rates, low agricultural productivity or production, low use of modern inputs, high consumption of starchy staples and high food budget share. It comprises the Comoros, Djibouti, Mauritania, Somalia, the Sudan and Yemen.
- **Informal and expanding:** This food system stage is characterized by low to moderate urbanization rates and low to moderate agricultural productivity or production, more use of modern inputs, elevated consumption of starchy staples and moderate to high food budget share. It includes Egypt, Iraq, Libya, Morocco, the Syrian Arab Republic and the State of Palestine.
- **Emerging and diversifying:** This food system stage is characterized by moderate urbanization and agricultural productivity or production, more use of modern inputs, elevated consumption of starchy staples and moderate to high food budget share. It includes Algeria and Tunisia.
- **Modernizing and formalizing:** This food system stage is characterized by higher urbanization rates, higher agricultural productivity or production, more use of modern inputs, lower consumption of starchy staples and low to moderate food budget share. It includes Jordan, Lebanon, Kuwait, Oman, Qatar, Saudi Arabia, Bahrain and the United Arab Emirates.

- **Industrialized and consolidated:** This food system stage is characterized by high urbanization rates, a broad range of agricultural productivity, a high use of modern inputs, low consumption of starchy staples and low food budget share. There are no Arab countries that currently meet the criteria for this group.

The Food Systems Dashboard suggests classifying countries in these transformation stages based on four indicators: (i) agriculture value added per worker; (ii) share of dietary energy from cereals, roots and tubers; (iii) number of supermarkets per 100,000 population; and (iv) percentage of the urban population to the total population. However, this typology was simplified to recognize three food system transformation stages which best describe the food systems in the Arab region. These three transformation stages are:

- Traditional.
- emerging (which combines the “informal and expanding” and “emerging and diversifying” stages).
- modernizing.

The three food system transformation stages identified as relevant to the Arab region and their respective key thresholds are reviewed in table 1 below.³⁸ As highlighted above, the Food Systems Dashboard³⁹ suggests four types of characteristics to classify food systems transformation stages, which are adjusted through both addition and replacement.⁴⁰ The modified characteristics include:

- Levels of malnourishment, which show overall food security and nutrition outcome and are proxied through undernourishment, food insecurity experience or prevalence of stunting.
- The agricultural sector share in GDP, an addition, which proxies policies to strengthen the food system.
- Agricultural value added per unit of resources, which proxies resource use efficiency.
- Urbanization rate (share of the urban population in the total population), which proxies the length and/or performance of the food supply chain.
- Industrialization rate in lieu of the number of supermarkets per 100,000 population, which proxies the complexity and sophistication of the food system.
- Share of dietary energy from cereals, roots and tubers, which proxies the food environment, consumer behaviour and diets.

For each of the above proxy indicators, thresholds were set to identify food systems’ transitions from one stage to another (table 1).

Table 1. Food systems transformation stages: classification criteria

	Traditional	Emerging	Modernizing
Food systems outcomes (Proxied by the average of undernourishment, food insecurity experience, stunting)	High (off-track) (above 12.5%)	Moderate (stagnating) (5% to 12.5%)	Low (on-track) (below 5%)
Food systems policies (Proxied by the agriculture sector share in GDP)	High (off-track) (above 20%)	Moderate (stagnating) (10% to 20%)	Low (on-track) (below 10%)
Sustainability and efficiency of resource use (Proxied by agricultural productivity per worker)	Low (off-track) (below US\$5,000/ worker)	Moderate (stagnating) (US\$5,000– \$10,000/worker)	High (on-track) (above US\$10,000/ worker)

Length of food supply chain (Proxied by the urbanization rate)	Low or short (off-track) (below 55%)	Moderate or growing (stagnating) (55% to 75%)	High or complex (on-track) (above 75%)
Food supply chain complexity (Proxied by the industrialization rate, i.e. includes food processing)	Low or limited (off-track) (below 30%)	Moderate or expanding (stagnating) (30% to 60%)	High or significant (on-track) (above 60%)
Dietary energy supply (Proxied by dietary calories derived from starchy foods)	High (off-track) (above 65%)	Moderate (stagnating) (50% to 65%)	Low (on-track) (below 50%)

(b) Typology 2: Classification of countries

The second typology builds on three different methodologies to categorize countries based on their income level, development challenges and sociopolitical situation. This report adopts the World Bank categorization of countries by income group,⁴¹ which proxies the level of development of a country. It is based on the gross national income (GNI) per capita which is an indicator of economic capacity. In the context of the Arab region, three income groups are utilized: low-income countries (GNI below US\$1,135); middle-income countries (GNI between US\$1,136 and \$13,845); and high-income countries (GNI above US\$13,846).

Countries are also differentiated as being in conflict or facing institutional and social fragility as per the World Bank,⁴² as these particular situations influence the functioning of national food systems. Countries in conflict or facing institutional and social fragility, which are found in both low- and middle-income countries, tend to face critical development challenges that in some cases thwart their efforts to reduce or end poverty and other development outcomes.⁴³

The report also builds on the list of countries identified by the United Nations as being least developed countries (LDCs).⁴⁴ These countries tend to fall short in providing minimum standards of nutrition, health, transport, communication, social infrastructure and other necessities including drinking water and sanitation in both rural and urban areas, which also impacts food systems.⁴⁵

Thus, the second typology identifies five categories of countries noting that there could be overlaps between the first three groups and the last two groups:

- **Low-income countries (LICs):** These countries face severe structural impediments to sustainable development and are vulnerable to economic and environmental shocks. This group includes Somalia, the Sudan, the Syrian Arab Republic and Yemen.
- **Middle-income countries (MICs):** Countries in this group are characterized by population growth that still outpaces economic development, inadequacy of investment capital, shortage of skilled workers, and poor governance and instability. This group could be further split into lower MICs (Algeria, the Comoros, Djibouti, Egypt, Jordan, Lebanon, Mauritania, Morocco and Tunisia) and upper MICs (Iraq, Libya and the State of Palestine).
- **High-income countries (HICs):** Currently, this group is only comprised of GCC countries on the Arabian Peninsula; they are oil producers and exporters with high social and economic achievement and technology access. This group includes Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates.
- **Conflict-afflicted or fragile countries:** Countries in this group are challenged by conflict or institutional and social fragility and are characterized by reduced institutional capacity and limited public service delivery, and could extend to

forced displacement and, in some cases, active conflict. Conflict countries include Iraq, Somalia, the State of Palestine, the Sudan, the Syrian Arab Republic and Yemen while fragile countries include the Comoros, Lebanon and Libya.

- **Least developed countries (LDCs):** This group includes countries that are entitled to preferential market access, aid, special technical assistance and capacity-building on technology, among other concessions. It includes the Comoros, Djibouti, Mauritania, Somalia, the Sudan and Yemen.

This second typology, which is based on countries' income levels, conflict or fragility status, and least developed country (LDC) classification leads to the following classification (table 2).

Table 2. Socioeconomic-based country typologies

Low-income	Middle-income	High-income	Conflict or Fragile	Least Developed
Per capita income (GNI) below US\$1,135	Per capita income (GNI) between US\$1,136 and \$13,845	Per capita income above US\$13,846	Fragile and conflict States (World Bank, 2024)	United Nations List
Somalia, Sudan, Syrian Arab Republic, Yemen	Algeria, Comoros, Djibouti, Egypt, Iraq, Jordan, Lebanon, Libya, Mauritania, Morocco, State of Palestine, Tunisia	Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates	Conflict: Iraq, Somalia, State of Palestine, Sudan, Syrian Arab Republic, Yemen Fragile: Comoros, Lebanon, Libya	Comoros, Djibouti, Mauritania, Somalia, Sudan, Yemen

(c) Typology 3: Food systems transformation and level of economic development and stability

By combining level 1 and level 2 typologies, the 22 Arab countries are classified into a third and final typology that captures the key characteristics of food systems in the region. This level 3 typology allows the identification of the following six food systems groups (table 3).

- **Traditional food systems in low-income countries:** Somalia, the Sudan and Yemen, noting that all three countries are also listed as LDCs and in conflict or considered fragile.
- **Traditional food systems in middle-income countries:** the Comoros, Djibouti and Mauritania, noting that all three countries are also listed as LDCs, while the Comoros is classified as a fragile country.
- **Emerging food systems in low-income countries:** the Syrian Arab Republic, which is also listed as a conflict-affected country.
- **Emerging food systems in middle-income countries:** Algeria, Egypt, Iraq, Libya, Morocco, the State of Palestine and Tunisia, noting that Iraq, Libya and the State of Palestine are also listed as conflict-affected or fragile countries.
- **Modernizing food systems in middle-income countries:** Jordan and Lebanon, noting that Lebanon is listed as a fragile country.
- **Modernizing food systems in high-income countries:** Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates.

Table 3. Country-level food system transformation stages and level of economic development

	Traditional	Emerging/Transitioning	Modernizing
Low-income countries (LICs)	<i>Somalia, Sudan, Yemen</i>	Syrian Arab Republic	--

Middle-income countries (MICs)	<i>Comoros, Djibouti, Mauritania</i>	Algeria, Egypt, Iraq, Libya , Morocco, State of Palestine , Tunisia	Jordan, Lebanon
High-income countries (HICs)	--	--	Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates

Bold: Countries in conflict or institutional and social fragility based on World Bank classification.

Italic: Countries listed as least developed countries (LDCs) by the United Nations.

2. Detailed characteristics of the identified food systems groups

(a) Traditional food systems in low-income countries (Somalia, the Sudan and Yemen)

These three low-income countries – Somalia, the Sudan and Yemen – are affected by conflict and/or fragility and are listed as least developed countries (LDCs). They face significant development challenges, including poverty, hunger and limited access to basic services, such as education and health care, and the agriculture sector amounts to over 20 per cent of GDP. Somalia, the Sudan and Yemen are among the poorest countries in the world and are afflicted by wars or fragility. Low-grade infrastructure, water shortages, inequitable distribution of resources, including land, and slow growth are just some of the problems that are endemic to these countries.

- **Food production:** Farming is mainly done by smallholders, and yields are typically low. Food production is focused on staple crops for subsistence and a small number of cash crops. Food imports are usually limited and do not account for all domestic consumption. Food aid is one of the principal ways in which food is imported into these countries.
- **Food supply chains:** They are short due to smaller urban populations and, consequently, are more local and fragmented. Cold storage and storage facilities are commonly lacking, which causes more food loss for some crops. Livelihood diversification to non-farm employment concerns mostly men while women play a more prominent role in farming. Migration to urban poverty belts is also present.
- **Food environments:** They are represented by informal market outlets including small, independently owned shops and street vendors. Supermarkets are small, rare and limited to urban areas. Food is acquired from small, independently owned shops and street vendors.
- **Food quality standards:** Countries have not adopted mandatory or voluntary fortification guidelines for staple foods to combat micronutrient deficiencies. Food quality standards are usually lacking or not enforced due to conflict situations, which further adds to the malnutrition and food insecurity burden of conflicts.

(b) Traditional food systems in middle-income countries (the Comoros, Djibouti and Mauritania)

These three middle-income countries – the Comoros, Djibouti and Mauritania – are also listed as least developed countries (LDCs), while the Comoros is additionally affected by fragility. These countries face significant development challenges, including poverty, hunger and full access to basic services like water and sanitation, education and health care. With the exception of Djibouti, which lacks adequate natural resources, agriculture represents over 20 per cent of their GDP.

- **Food production:** Farming is mainly done by smallholders, and yields are typically low. Food production is focused on staple crops for subsistence and a limited number of cash crops. Food imports are usually limited and do not cover all domestic consumption.
- **Food supply chains:** They are short due to smaller urban populations; consequently, more local, fragmented and small markets are found. Cold storage and storage facilities are commonly lacking and causing food loss for some crops. Livelihood diversification to non-farm employment opportunities is present as is migration to urban poverty belts.

- **Food environments:** They are represented by informal market outlets including small, independently owned shops and street vendors. Supermarkets are small and rare.
- **Food quality standards:** A greater proportion of countries in this food system type have adopted mandatory or voluntary fortification guidelines for staple foods to combat micronutrient deficiencies. Mauritania is the only country that has adopted fortification guidelines for staple foods.

(c) Emerging food systems in a low-income country in conflict (the Syrian Arab Republic)

The Syrian Arab Republic used to be a middle-income country but is experiencing a severe internal conflict which has heavily impacted its economic and social development. According to the Office for the Coordination of Humanitarian Affairs (OCHA), the country faces significant humanitarian needs and requires support to address the impacts of conflict and to achieve sustainable peace and development. The agricultural share of GDP exceeds 30 per cent. The food system is facing severe disturbances and may sometimes be disrupted and weaponized.

- **Food production:** Agricultural productivity is strongly affected by the conflict. In areas that are away from clashes, productivity can be high when inputs are available, where farming can be capitalized and where the size of farms can be large. Migration of labour from combat zones can decrease production significantly.
- **Food supply chains:** They are managed by a combination of small- and large-scale processors along with international relief organizations that offer food aid in regions affected by conflict and crisis. This specifically affects grains and other dry foods that can be readily stored and distributed through centralized distribution centres. Traditional supply chains continue to dominate fresh foods due to the fragility of already weak cold chains and inadequate market infrastructure.
- **Food environments:** Processed and packaged foods are available in both urban and rural areas from a combination of opportunist imports and food aid. Food processing may be curtailed by sieges, sanctions and clashes. Demand for convenience foods increases as the formal labour force grows and includes more women. Urbanization and income growth also play a role. Supermarkets and fast food are expanding and accessible to middle-class consumers. However, consumers continue to obtain most of their food from informal market outlets, especially for animal-sourced foods, fruits and vegetables.
- **Food quality standards:** Few such standards are in place and advertising is not regulated. Fortification guidelines for staple foods – when they exist – are rarely implemented.

(d) Emerging food systems in middle-income countries (Algeria, Egypt, Iraq, Libya, Morocco, the State of Palestine and Tunisia)

This group contains seven middle-income countries – Algeria, Egypt, Iraq, Libya, Morocco, the State of Palestine and Tunisia – three of which are in a state of conflict, occupation or fragility: Iraq, Libya and the State of Palestine. They have made significant progress in terms of economic development but still face challenges related to poverty, inequality and unemployment as well as conflict and fragility for some. The agricultural share of GDP is around 10 per cent but can be lower for less agriculturally oriented economies, reaching as low as 2 per cent for Libya. Among these countries, Egypt and Morocco distinguish themselves by having a significant rural population whose livelihood remains anchored in the food system.

- **Food production:** Agricultural productivity is increasing, especially in regions where conflict and crises do not preclude its development, where farming can be capitalized and the size of farm can be large particularly in the intensive export-led farms. The use of modern inputs is a mark of these food systems, but access may be curtailed by infrastructural and financial issues. Many medium- and large-scale commercial farms coexist alongside small-scale farms. These small-scale farms are linked to both formal and informal markets. Urban financial capital is penetrating the rural world in the form of large investment farms.

- **Food supply chains:** They are commonly efficient for grains and other dry foods, with large-scale processors (along with many small) and centralized storage and distribution centres. Modern chains are also emerging for fresh foods, including fruits, vegetables and animal-source foods, though traditional supply chains continue to dominate due to weak cold chains and inadequate market infrastructure. Urban areas source both dry and fresh foods through longer supply chains and rely significantly on food imports.
- **Food environments:** Processed and packaged foods are available in both urban and rural areas. Food processing includes a combination of locally sourced and imported ingredients. Demand for convenience foods increases as the formal labour force grows and includes more women. Urbanization and income growth also play a role. Supermarkets and fast food are rapidly expanding, accessible to middle-class consumers and increasingly available in smaller cities and towns. Processed foods, including ultra-processed foods, are common in urban areas and found in many rural areas. However, the majority of consumers continue to obtain most of their food from informal market outlets, especially for animal-source foods, fruits and vegetables.
- **Food quality standards** They are often in place but are enforced mainly within formal markets due to limited government monitoring capacity. Food advertising is not strictly regulated. Many countries have fortification guidelines for staple foods.
- Being countries in conflict, occupation or fragile, Iraq, Libya and the State of Palestine share similar attributes as the Syrian Arab Republic in the previous category.

(e) Modernizing food systems in middle-income countries (Jordan and Lebanon)

This group comprises only two countries – Jordan and Lebanon – with Lebanon being in a situation of socioeconomic fragility. The countries have made significant progress in terms of economic development but still face some developmental challenges related to poverty, inequality and unemployment. The agricultural share of GDP is usually below 5 per cent.

- **Food production:** Agricultural productivity is generally high due to the availability and use of technology and modern inputs. Larger farms rely more on mechanization and input-intensive practices. Food supply chain infrastructure is more developed, which results in lower food losses on the farm and beyond the farm gate. On the other hand, food waste is rising rapidly, and spoilage at the end of the supply chain remains a challenge. Food and beverage manufacturing is increasing and modernizing and can constitute a significant share of exports (Lebanon). The dietary energy is derived from diverse food sources.
- **National distribution chains:** They are effective and enhance the role of food imports in enabling more year-round availability of diverse foods.
- **Food environments:** There are multiple supermarket chains within cities and larger-sized towns, but their growth can be faster. These supermarkets and other modern retail outlets hold a large share of processed and dry goods sales, have captured a larger market share of fresh foods, and low-income consumers are much more likely to shop in them.
- **Food quality standards:** Government regulation and monitoring of food safety and quality standards are more common. Most recently, aggressive food labelling is emerging for ultra-processed foods.

(f) Modernizing food systems in high-income countries (Kuwait, Oman, Saudi Arabia, Bahrain, Qatar and the United Arab Emirates)

High-income countries are all GCC countries and are characterized by high levels of economic development, political stability and rapid modernization. These countries have high levels of GDP per capita, a strong reliance on oil and gas exports as a source of revenue, and an agricultural share in GDP of less than 3 per cent.

- **Food production:** Local food production represents a small fraction of the food that is consumed. The sector is clearly divided between very modern livestock and fresh produce production with high technological inputs, and low-

technology traditional agriculture, which is more of a relic of the past than a contribution to the food system. The food supply chain infrastructure is more developed, which results in fewer food losses on the farm and beyond the farm gate. On the other hand, food waste is rising rapidly, and spoilage at the end of the supply chain remains a challenge. Food and beverage manufacturing represent a smaller percentage of overall manufacturing because countries in this category have more manufacturing in non-food sectors. Dietary energy is derived from diverse food sources.

- **Excellent national distribution chains:** They are primarily for imported food and enable year-round availability of diverse foods.
- **Food environments:** Multiple supermarket chains exist within megacities and large towns and are growing quickly. The supermarkets and other modern retail outlets hold the major share of fresh foods as well as processed and dry fruits and are the primary source of food for low-income consumers such as migrant labourers.
- **Food quality standards:** Government regulation and monitoring of food safety and quality standards are the norm. Most recently, aggressive food labelling is emerging for ultra-processed foods. Consumers are increasingly becoming aware of healthy diets and adopting them where income allows.

C. Food systems' inclusivity, resilience and sustainability

The above overview of food systems in the Arab region enables additional analyses to enhance the understanding of the state of food systems in the region. Constraints such as inadequate policies, weak institutions and infrastructure, insufficient human capacity, and low stakeholder and private sector involvement and investments limit the ability of food systems to enhance livelihoods and well-being. Inefficiencies in food supply chains namely lead to food loss and waste, which reduce the availability of and access to nutritious food. Climate-related events and other short- and medium-term shocks result in disruptions in the food supply chain with potentially far-reaching consequences in terms of undernutrition and food poverty. Unsustainable consumption and production patterns, such as an overconsumption of red and processed meats, harm human health while also giving rise to intensive livestock industries, which harm the environment by increasing the environmental footprint and jeopardizing future needs.

Well-functioning food systems should embody three essential attributes: inclusivity, resilience and sustainability. The attribute of inclusivity is concerned with agency, which refers to the capacity of actors in the food system to make their own decisions about food; it is also concerned with equity in access to healthy diets, resources and decision-making related to food systems. The attribute of resilience is important as demonstrated by the recent global events that put at risk the stability of food systems both in the Arab region and globally; it involves the ability of food systems to bounce back to their initial status following sudden and intense shocks, such as conflicts, pandemics, floods or drought. Finally, the attribute of sustainability reflects the long-term ability of food systems to deliver on key outcomes while ensuring that the resource base is not compromised for the survival of future generations.

The three attributes are further examined below to better understand how they shape food systems in the Arab region.

1. Food systems' inclusivity

This attribute of the food system is concerned with the level of equity and food justice. Inclusivity emphasizes the need to ensure equity in access to healthy diets, resources and decision-making. Inclusive food systems must reach, benefit and empower all stakeholders, notably the most socially and economically disadvantaged, as the transformation of the food system cannot happen without lifting poor producers and consumers, who are often at a detriment due to prevailing social and environmental factors.⁴⁶

The Arab region is one of the most unequal regions in the world. For example, while in Western Europe the richest 10 per cent made 1.87 times more than the bottom 50 per cent in 2021, in the Arab region the difference was as high as 6.23

times in Yemen, 6.13 times in Oman or 5.68 times in Qatar. In addition to income inequalities, large disparities also exist in food consumption, particularly in countries in conflict such as Libya, the Syrian Arab Republic and Yemen. Participation in food systems with a plurality of actors is generally lacking, with decision-making and governance largely centralized and limited support provided to smallholder farmers and other small-scale food system contributors. Countries of the Arab region generally perform very poorly in the voice and accountability index compared to other regions of the world.

2. Food systems' resilience

This attribute shows the ability of a food system to bounce back to its initial status following a shock, such as conflict, pandemic or drought. Food systems' transformation has to ensure that they are able to withstand and recover from short-term disruptions. They must be able to continuously adapt to provide sufficient, appropriate and affordable food to all as various types of disturbances arise.⁴⁷

Most Arab countries are import-dependent, especially for key staples such as cereals. The wheat import dependency in many countries, including Jordan, Kuwait or the United Arab Emirates, is above 90 per cent. This is a cause of high concern, as the limited number of global food suppliers and the occurrence of climatic, health, economic and security crises regularly threaten the stability of food availability. Most recently, the COVID-19 pandemic and the war in Ukraine have shown how such crises can disrupt food supply chains, resulting in higher volatility and increased food prices. For example, these external shocks in combination with existing internal crises led Lebanon and the Sudan to experience food inflation levels of over 200 per cent in 2021. It is possible to state, however, that a majority of Arab countries were able to avert a major debacle thanks to timely policy initiatives, which cushioned the impact of those shocks. Thus, while Arab food systems may lack resilience in certain aspects, it appears that the lessons of the 2007–2008 food crisis have been learned and countries were able to take appropriate and timely measures to counteract the shocks. To achieve greater resilience, however, political stability and conflict avoidance need to be reinforced, as countries affected by ongoing conflict or high political instability saw substantial increases in the number of food insecure persons.

3. Food systems' sustainability

This attribute relates primarily to the state and sustainability of resources resulting from the practices used within food systems. It underscores the need to ensure the long-term ability of food systems to provide the needs of current generations without compromising the resource base to meet the needs of future generations. The transformation of the food system must ensure it is sustainable so that it can continue to provide services and livelihoods in the future.⁴⁸

While its contributions to global emissions are low by international comparison, the Arab region is among the most exposed to the negative impacts of climate change. At the same time, the region has limited water and land resources, which are prone to rapid depletion and degradation, making it particularly important to manage the resources more carefully. Prevailing production and consumption practices could jeopardize resource availability for future generations, as the ecological footprint of the Arab region is around 2 (i.e. the region requires two Earths to meet its current consumption). Adopting sustainable practices throughout the food system is essential to reduce environmental impacts and enhance ecosystem services. Adopting measures to reduce waste, pollution and degradation in all food system components, including during production, distribution, storage, processing and consumption, is essential to achieve sustainability, as these are a reflection of existing inefficiencies in the food system in terms of overproduction, inadequate technology and wasteful consumption practices.

Food systems exert significant pressure on natural resources and compromise sustainability. In most countries of the region, agrobiodiversity scores are lower than the global average (56.0), with the lowest scores recorded in Yemen (31.5) and Djibouti (35.2). Water is the most limiting factor for food production in the region, and most countries use more than their annual renewable water supply. Agriculture, which produces less than half of the total calories consumed, is the

largest water user, reaching more than 75 per cent of total water used in several countries. However, the region also lacks sufficient arable lands, and its soil is severely degraded, affecting up to 75 per cent of the rain-fed cropland. Most countries have increased the amount of climate altering land cover with respect to 2015, with the State of Palestine and Djibouti presenting increases of over 25 per cent. Food loss and waste represent a significant problem for food systems' sustainability, and it is estimated that in the Arab region, 6 per cent of the food available is lost along the supply chain and between 76 and 132 kg/cap/year are wasted at the household level.⁴⁹

Draft for Discussion

2. Arab food systems assessment

A. Background on monitoring food security

1. Overview

Achieving food security is a complex endeavour which requires the consideration of multiple foundations, including natural resources, institutions, infrastructure, health and the economy. Accounting for this complexity, the United Nations 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) jointly developed, with the support of the Swedish International Development Cooperation Agency (Sida), a food security monitoring framework.⁵⁰ The monitoring framework built on available global knowledge and practices as well as on regional specificities to offer a tool for tracking national food security over time and serving as a basis for informed policymaking and decision-making. The framework provided a comprehensive, harmonized and standardized approach to food security monitoring in Arab countries.

The framework was composed of 24 indicators, which described food security based on the then identified four dimensions: availability, access, utilization and stability.⁵¹ The 24 indicators were chosen based on their relevance to the Arab region, data availability for at least half of the Arab countries or half of the Arab population, and their linkages to the Sustainable Development Goals (SDGs), the FAO Food Security Suite of Indicators, or other important international or regional plans of action.

Of the 24 indicators, three are considered ex post indicators and are grouped in a core pillar, as they show the food security outcome. Two of these indicators are also SDG indicators. The remaining 21 indicators are ex ante or causal indicators and are distributed along the four food security dimensions (table 4).

The indicators were distributed as follows:

- The core pillar included three outcome indicators reflecting the state of food security and nutrition: undernourishment, Food Insecurity Experience Scale and obesity.
- The availability dimension comprised six indicators proxying the inflow of food; the indicators consisted of the yield gap, public investments in agriculture, food loss, dietary energy supply, food import dependency and water use in agriculture.
- The access dimension comprised five indicators highlighting the economic and/or socioeconomic capability of the population to access food and included indicators on poverty, expenditure on food, unemployment, logistics and inflation.
- The utilization dimension used five indicators that looked at the impact of nutrition or factors that influence it and included indicators on water and sanitation and nutrition-related parameters focusing on women and children.
- The stability dimension included five indicators that examined fluctuations in food production: climate change impact, price anomalies, political stability, food production and supply stability.

Table 4. The Arab Food Security Monitoring Framework

DIMENSION	ABBR	FULL NAME	SDG
	CO1	Prevalence of undernourishment (%)	2.1.1

Core indicators	CO2	Prevalence of moderate or severe food insecurity measured using FIES (%)	2.1.2
	CO3	Prevalence of obesity in the adult population (18 years and older) (%)	
Availability	AV1	Primary wheat yield as a percentage of potential achievable yield (%)	2.3.1
	AV2	Agriculture orientation index for government expenditures	2.a.1
	AV3	Food loss (% of total food available)	
	AV4	Average dietary energy supply adequacy (%)	
	AV5	Cereal import dependency ratio (%)	
	AV6	Share of water resources used in agriculture, out of total renewable water resources (%)	6.4.2
Accessibility	AC1	Poverty headcount ratio (% of population)	1.1.1/1.2.1/1.2.2
	AC2	Share of food consumption expenditure in total household consumption expenditure (%)	
	AC3	Unemployment rate (%)	8.5.2
	AC4	Logistics performance index	
	AC5	Inflation (%)	
Utilization	UT1	Percentage of population using at least basic drinking water services (%)	1.4.1/6.1.1
	UT2	Percentage of population using at least basic sanitation services (%)	1.4.1/6.2.1
	UT3	Percentage of children under 5 years of age who are stunted (%)	2.2.1
	UT4	Percentage of children under 5 years of age affected by wasting (%)	2.2.2
	UT5	Prevalence of anaemia among women of reproductive age (15-49 years) (%)	
Stability	ST1	Climate change - temperature change (°C)	
	ST2	Food price anomalies (moderate or severe)	2.c.1
	ST3	Political stability and absence of violence	
	ST4	Per capita food production variability (US\$1,000/capita) (in constant 2004-2006 international US\$)	
	ST5	Per capita food supply variability (kcal/capita/day)	

Source: ESCWA (2019).

2. Selection of indicators relevant to the Arab region

The selection of indicators built on the principle that there is no “best indicator”, as their usefulness depends on the purpose for which they are to be used,⁵² the objective to achieve and the targeted audience. Given that the principal target audience was to be policymakers, the scale at which food security information was gathered was national and regional. To avoid the examination of an exhaustive list of indicators, predetermined indicators were selected and evaluated to avoid overlaps and similarities while ensuring the availability of data.⁵³

The following conditions were also established for the selection of indicators:

- Compatibility with the regional food systems assessment to ensure relevance to current issues.
- Alignment or overlap with SDG indicators and targets.
- Availability of metadata for at least 50 per cent of Arab countries and for at least 50 per cent of the Arab population.

B. From food security monitoring to food systems assessment

It has been argued that food security should also be approached from a “human development” perspective to emphasize the significance of giving people the choice to shape their own relationships with food. Adopting such a perspective would help account for the power imbalance seen through the increasing inequality and persistent hunger and undernourishment among the most disadvantaged. This is also related to the notion of food sovereignty, which advocates for the right of people to determine their own food and agricultural systems.⁵⁴ Additionally, there is a growing body of research that proposes to approach food security and food systems through their interconnectedness with other ecological systems.⁵⁵ The sustainability–food security linkage is increasingly being looked into and there is broad agreement that sustainability should be integral to the concept of food security and, more importantly, to food systems since it is also part of policy initiatives such as the Sustainable Development Goals (SDGs).⁵⁶ However, formal food policy frameworks at the international level had yet to recognize these elements explicitly and consistently. The expansion of the conceptual understanding of food security through the addition of agency and sustainability as the fifth and sixth food security dimensions was recently proposed by the High-level Panel of Experts on Food Security and Nutrition (HLPE) and is part of the trend to ensure that both the right to food and the need to preserve the natural resource base become integral to food security and, by extension, to food systems.⁵⁷

1. The agency dimension

Agency relates to “what a person is free to do and achieve in pursuit of whatever goals or values he or she regards as important”.⁵⁸ Thompson (2015) highlighted the growing significance of agency in relation to food security, which aligns with the principles emphasized by social movements advocating for food sovereignty and the right to food. Agency can be understood as “the ability to not only exercise voice and make decisions, but also to act upon them in order to improve one’s own and their community’s well-being”.⁵⁹ In the context of food systems and food security, the High-level Panel of Experts on Food Security and Nutrition defines agency as “the capacity of individuals or groups to make their own decisions about what foods they eat, what foods they produce, how that food is produced, processed and distributed within food systems, and their ability to engage in processes that shape food system policies and governance”.⁶⁰ It should also be noted that Action Track 4 of the 2021 United Nations Food Systems Summit featured “agency” as a key component for advancing equitable livelihoods in sustainable food systems.

Agency accounts for a complex interaction of elements to determine an individual’s or a community’s ability to make decisions and act upon them. These include:

- Education and access to information, which empowers them to make informed decisions.
- Availability of resources – financial, land and technology – which help them to act on their decisions.
- Adequate social and political systems supporting a participatory process for more empowerment.
- Gender equality or low social, economic and political marginalization for greater participation.
- Psychological well-being, self-esteem and resilience, which also support agency.
- Cultural norms and values, as they support people to act on their decisions.

These factors often interact and influence each other, and the capacity for agency can vary substantially depending on the specific context and individual. Agency is critical when addressing food security and can be expressed at both individual and community levels. For instance, when agency is increased through greater access to education and land ownership, especially among women who experience gender-based injustices, diet quality and outcomes related to childhood nutrition improve.⁶¹ Better food security and nutritional outcomes are also achieved at the community level when collective agency is strengthened through increased voice and involvement in determining food and farm development initiatives and food system governance.⁶²

2. The sustainability dimension

Sustainability refers to “food system practices that contribute to long-term regeneration of natural, social, and economic systems, ensuring the food needs of the present generations are met without compromising those of future generations”.⁶³ Sustainability as a dimension of food security complements the stability dimension. The latter accounts for shorter-term disruptions that could jeopardize food security in the near or medium term, such as those brought on by market volatility, armed conflict and natural catastrophes.⁶⁴ Sustainability underscores the interdependence of ecosystems, livelihoods, society and political economy to sustain food systems and promote food security for the long term and is central to broader policy initiatives such as the Sustainable Development Goals (SDGs). In its demand to “end hunger, achieve food security and enhanced nutrition, and promote sustainable agriculture”, Sustainable Development Goal 2 specifically links sustainability to food security.

Due to emerging trends like climate change, it is crucial to account for sustainability in the concepts of food security and nutrition. The ability of ecological systems to support diversified and healthy food production, and livelihoods, is compromised by changes and the degradation of natural resources. Therefore, it is necessary to ensure that ecological, social and economic systems interact in a way that is regenerative. Sustainability emphasizes the connections between ecosystems, livelihoods, society and political economy to maintain food systems and support food security well into the future.

Sustainability is also recognized as a crucial component in protecting the right to food. The Right to Food Guidelines urged nations to “consider specific national policies, legal instruments, and supporting mechanisms to protect ecological sustainability and the carrying capacity of ecosystems to ensure the possibility of increased, sustainable food production for present and future generations”.⁶⁵ The degree to which the systems that produce food and nutrition outcomes connect dynamically with ecological, health, economic, political and sociocultural systems determines the achievement of food security. As a result, the long-term health and functioning of those other systems, as well as their interactions with one another, determine and are dependent on the long-term working of food systems. While economic, sociocultural and political systems impinge on sustainability, ecological systems merit special consideration because they provide the structural underpinnings of food production and dietary diversity. It is increasingly clear that food systems, of which food security is the principal outcome, can only be sustained within the limits of ecosystems and must contribute to their restoration. Environmental and ecological determinants are represented by some examples such as climate change, land degradation, water shortages, biodiversity loss, and the availability and usage of natural resources, such as land, water and forests.

3. Conclusion

The addition of these two dimensions of food security – agency and sustainability – enables a broader analysis of the causes and underlying factors determining food availability, access, utilization and stability over the long term. They allow for an evaluation of the activities and interlinkages existing within and among food systems’ components while also exposing the simultaneous impact of the various drivers. They also provide an in-depth look at how food system outcomes – not only nutrition and diets but also the resulting economic, social and environmental outcomes – are achieved. In effect, this more holistic approach leads to the identification of measures needed to achieve the required changes such as social justice and equity, multi-stakeholder involvement, policies and strategies to enhance resilience, and the management of the resource base.

As with the previous four food security dimensions – availability, access, utilization and stability – efforts have been made to describe the agency and sustainability dimensions through a determined number of indicators. This report thus also identifies a select number of indicators for the agency and sustainability dimensions based on the same principles as outlined above for the other food security dimensions. The related indicators were collected and assessed for their

relevance to Arab food systems in a process similar to that used for the development of the initial version of the Arab Food Security Monitoring Framework. This process involved first identifying the determinants of each of the two additional dimensions and then selecting adequate indicators that can be obtained from the existing literature and for which an appropriate data set is available.

The selection of the final indicators for the agency and sustainability dimensions resulted from consultations with experts who reviewed the proposed indicators and their distributions within the original framework to avoid redundancies. After considering the availability and reliability of the indicators and the possible overlap with the early indicators, changes were introduced with the final list of indicators provided below.

C. Key indicators and their distribution into the food system

1. The selected indicators by food security dimension

(a) Core pillar indicators

The core pillar contains outcome or ex post indicators and provides a snapshot of the prevailing food security and nutrition situation resulting from the functioning of the food system. It shows the presence or lack of food security and nutrition, which in most cases implies malnutrition – either undernutrition (insufficient food energy and nutrient consumption), overnutrition (excess food energy consumption) or nutrient deficiency (low consumption of one or more nutrients).

	code	Short name	full name
Core (CO)	CO1	Undernourishment	Prevalence of undernourishment (%)
	CO2	Food insecurity	Prevalence of moderate or severe food insecurity (%)
	CO3	Adult obesity	Prevalence of obesity in the adult population (%)
	CO4	Child stunting	Percentage of children under 5 years of age affected by stunting (%)

(b) Availability dimension indicators

The availability dimension provides a glimpse into the supply side of food or the net physical inflows of food, usually at the macro level though it could also be assessed at the micro level within households and communities. Food availability is determined by local food production, food trade and distribution efficacy, among other factors.

	code	Short name	full name
Availability (AV)	AV1	Yield gap	Yield (wheat) as a percentage of potential achievable yield (%)
	AV2	Agriculture expenditure	Agriculture orientation index for government expenditures
	AV3	Dietary energy	Average dietary energy supply adequacy (%)
	AV4	Import dependency	Wheat import dependency ratio (%)

(c) Access dimension indicators

The access dimension is concerned with whether the population can afford the food needed to lead a healthy life. It is affected by the affordability of food in markets, locally and globally, the allocation of resources and the general preference of the population based on social and cultural norms. Issues such as disposable income, food prices, social support and infrastructure are determinants of food access.

	code	Short name	full name
Access (AC)	AC1	Poverty	Poverty headcount ratio (%)
	AC2	Food expenditure	Share of food consumption expenditure in total household consumption expenditure (%)
	AC3	Logistics	Logistics performance (index)
	AC4	Inflation	Inflation, consumer prices (%)

(d) Utilization dimension indicators

The utilization dimension is concerned with whether the nutritional needs of the population are met through the available and accessible food to allow them to lead a healthy and active life. It is determined by the health status of the individual, the nutritional value of the food and whether it is safe, and the way food is prepared and consumed.

	code	Short name	full name
Utilization (UT)	UT1	Water and sanitation	Proportion of the population using at least basic drinking water and sanitation services (%)
	UT2	Starchy foods	Share of dietary energy supply derived from cereals, roots and tubers (kcal/cap/day)
	UT3	Healthy diet	Percentage of the population unable to access a healthy diet (%)
	UT4	Women's anaemia	Percentage of anaemia among women of reproductive age (15–49 years) (%)

(e) Stability dimension indicators

The stability dimension is concerned with the ability of the food system to ensure that food is available, accessible and utilized year-round. It assesses whether the cyclical, seasonal and temporary food availability, accessibility and utilization are not resulting in enduring malnutrition, even for short time periods. Stability involves issues related to variability in food production and supplies, and the prevailing sociopolitical environment.

	code	Short name	full name
Stability (ST)	ST1	Food stocks	Food stock changes (%)
	ST2	Political stability	Political stability and absence of violence (rank)
	ST3	Production variability	Per capita food production variability (US\$1,000/capita)
	ST4	Supply variability	Per capita food supply variability (kcal/capita/day)

(f) Agency dimension indicators

The agency dimension includes indicators related to income inequality, gender inequality, inequality in education, and voice and accountability. These indicators aim to assess social and political factors that influence food security outcomes. The agency dimension assesses the capacity of people to make decisions on issues related to food availability, access and utilization, and to engage in shaping food system policies and governance. Agency is concerned with issues related to inequalities based on income, education and gender, as well as voice and accountability.

	code	Short name	full name
Agency (AG)	AG1	Income inequality	Income inequality top 10% to bottom 50% income gap
	AG2	Gender inequality	Gender inequality (index): marginalization of women and lack of access to resources
	AG3	Education inequality	Inequality in education (%)
	AG4	Voice and accountability	Voice and accountability (rank)

(g) Sustainability dimension indicators

The sustainability dimension includes indicators that reflect the salient agroenvironmental issues in the Arab region. These are: agricultural water as a percentage of renewable water resources, land cover changes impacting the climate, the ecological footprint resulting from food production and consumption, and the food waste index. These indicators focus on the environmental impact of food systems and aim to promote sustainable practices in agriculture and reduce food waste.

	code	Short name	full name
Sustainability (SU)	SU1	Agriculture water	Agricultural water withdrawal as a percentage of total renewable water resources (%)
	SU2	Land cover	Climate Altering Land Cover Index
	SU3	Agroecological footprint	Total ecological footprint of production and consumption (gha/cap)
	SU4	Food waste	Food waste index

The complete list of the selected indicators is provided below (table 5 and annexes).

Table 5. Food security monitoring indicators

DIMENSION	ABBR		SDG
Core indicators	CO1	Undernourishment (R) - (%)	2.1.1
	CO2	Food insecurity (R) - (%)	2.1.2
	CO3	Obesity (R) - (%)	
	CO4	Child stunting (R) - (%)	2.2.1
Availability	AV1	Yield gap (%)	2.3.1

DIMENSION	ABBR		SDG
	AV2	Agriculture expenditure (index)	2.a.1
	AV3	Dietary energy supply (%)	
	AV4	Import dependency (R) - (%)	
Accessibility	AC1	Poverty (R) - (%)	1.1.1/1.2.1/1.2.2
	AC2	Food expenditure (R) - (%)	
	AC3	Logistics (index)	
	AC4	Inflation (R) - (%)	
Utilization	UT1	Water and/or sanitation access (%)	1.4.1/6.1.1
	UT2	Starchy food (R) - (%)	2.2.1
	UT3	Healthy diet (R) - (%)	2.2.2
	UT4	Women's anaemia (R) - (%)	
Stability	ST2	Food stock (1,000 t)	2.c.1
	ST3	Political stability (rank)	
	ST4	Production variability (R) - (1,000 international \$/capita)	
	ST5	Supply variability (R) - (kcal/capita/day)	
Agency	AG1	Income inequality (R) – (ratio)	
	AG2	Gender inequality (R) – (index)	
	AG3	Education inequality in (R) - (%)	
	AG4	Voice and accountability – (rank)	
Sustainability	SU1	Agriculture water (R) (%)	
	SU2	Land cover – (index)	15.4
	SU3	Ecological footprint (R) - (gha/cap)	
	SU4	Food waste (R) - (kg/capita/year)	12.3

(R) - shows that the values will be reversed while computing the score so that indicators for which a low score is good could have a higher score.

Distribution of indicators into the food systems framework

The 28 indicators that were selected provide a more comprehensive and holistic approach to evaluating food security in the Arab region, as they cover all six dimensions and address key issues that influence access to nutritious food, individual rights and the overall sustainability of resources used for food systems.

(a) Selected indicators within the food system

The selected indicators were distributed across the food system components and external drivers. Such a redistribution allows for a better understanding of how a food system functions and performs. Building on the food systems diagram presented earlier (figure 1), the food security indicators can be distributed throughout the food systems components, drivers and outcomes. It should be noted that there is a possibility for overlap, as some indicators could fit into more than one of these areas (table 6).

Table 6. Potential distribution of indicators within food systems

Drivers of food systems						
Environment and climate change	Globalization and trade	Income growth and distribution	Urbanization	Population growth and migration	Politics and leadership	Socio-cultural context
Agriculture water, land cover, ecological footprint	Import dependency	Income inequality, inflation	Logistics, water and sanitation	Poverty	Political stability, voice and accountability	Gender, education
Components of food systems						
Food supply chain		Food environments	Individual filters and consumer behaviour		Diets	
Yield gap, agriculture expenditure, food stocks, production variability, supply variability		Dietary energy, food expenditure	Healthy diet, starchy foods, food waste		Women's anaemia	
Outcomes of food systems						
Undernourishment, food insecurity, adult obesity, child stunting						

The food system components – the food supply chain, food environment, individual filters and consumer behaviour, and diets – point to the complexity of the food system and the difficulty of identifying all determining factors. This calls for the selection of a few widely recognized indicators which could help provide a comprehensive view of the inner workings of the food system. The food supply chain has to be stable, reliable and efficient, which could be assessed through such factors as overall productivity or production levels, investments made, the availability of sufficient stocks and the variability in food production and supply. The food environment is influenced by various factors such as the dietary energy supply and the expenditure on food, which determine what foods are accessible, affordable and culturally acceptable to meet the eating preferences of the population. Food systems' individual filters and consumer behaviours are influenced by dietary choices, including the source of energy supply, which produce specific health outcomes and the extent of wastefulness throughout the food system. Nutrient deficiencies result from existing dietary patterns and nutritional behaviours as proxied through the prevalence of anaemia among women. The different drivers affecting food systems are influenced by a multitude of indicators that collectively help determine food systems' operations, efficiency, inclusivity, resilience and sustainability. These indicators interact in complex ways to shape the functioning and outcomes of food systems at the global, regional, national, local and individual levels. The selected indicators used to characterize these drivers will help stakeholders make informed decisions to optimize the performance of food systems so they are better positioned to help achieve the overarching goal of ensuring food security and nutrition while also helping to meet environmental and socioeconomic targets.

(b) Food security indicators and food systems' key attributes

Each of the 28 identified indicators for monitoring food security can further be assessed for their contribution to food systems' essential attributes of inclusivity, resilience and sustainability. The core pillar indicators are assumed to show the overall performance or outcome of a food system and thus are not matched with the three attributes, although it would be possible to connect them to the attribute of inclusivity. For the remaining six dimensions of food security, the indicators were matched with at least one attribute to which they closely contribute, noting that some indicators could contribute to more than one attribute (table 7).

Table 7. Matching the food system to the indicators and attributes

Pillar/Dimension	code	Short name	Food system part	Attribute
Core (CO)	CO1	Undernourishment	Outcome	Outcome
	CO2	Food insecurity	Outcome	Outcome
	CO3	Adult obesity	Outcome	Outcome
	CO4	Child stunting	Outcome	Outcome
Availability (AV)	AV1	Yield gap	Component: Food supply chain	Sustainability
	AV2	Agriculture expenditure	Component: Food supply chain	Resilience and Sustainability
	AV3	Dietary energy	Component: Food environments	Inclusivity
	AV4	Import dependency	Driver: Globalization	Resilience
Access (AC)	AC1	Poverty	Driver: Population	Inclusivity
	AC2	Food expenditure	Component: Food environments	Inclusivity
	AC3	Logistics	Driver: Urbanization	Resilience
	AC4	Inflation	Driver: Income distribution	Resilience
Utilization (UT)	UT1	Water and sanitation	Driver: Urbanization	Inclusivity
	UT2	Starchy foods	Component: Individual-level filters and consumer behaviour	Inclusivity
	UT3	Healthy diet	Component: Individual-level filters and consumer behaviour	Inclusivity
	UT4	Women's anaemia	Component: Diets	Inclusivity
Stability (ST)	ST1	Food stocks	Component: Food supply chain	Resilience
	ST2	Political stability	Driver: Politics	Resilience and Inclusivity
	ST3	Production variability	Component: Food supply chain	Resilience
	ST4	Supply variability	Component: Food supply chain	Resilience
Agency (AG)	AG1	Income inequality	Driver: Income distribution	Inclusivity
	AG2	Gender inequality	Driver: Sociocultural	Inclusivity
	AG3	Education inequality	Driver: Sociocultural	Inclusivity

Pillar/Dimension	code	Short name	Food system part	Attribute
	AG4	Voice and accountability	Driver: Politics	Inclusivity
Sustainability (SU)	SU1	Agriculture water	Driver: Environment and climate change	Sustainability and Inclusivity
	SU2	Land cover	Driver: Environment and climate change	Sustainability
	SU3	Agroecological footprint	Driver: Environment and climate change	Sustainability
	SU4	Food waste	Component: Individual-level filters and consumer behaviour	Sustainability

This matching exercise makes it possible to assess the functioning of the food system and its outcomes in terms of food security and nutrition status, and the performance of the food system according to the attributes of inclusivity, resiliency and sustainability. This assessment allows the identification of weaknesses, strengths and opportunities, which could lead to more effective policies aimed at transforming national food systems.

3. Using the Arab Food Systems Assessment Tool

A. Guidebook

The Arab Food Systems Assessment Tool outlined in this report allows countries to assess how their food systems are delivering on the outcomes and attributes identified above (section II.1.2): food security and nutrition; economic, social and environmental outcomes; and the three key attributes of inclusivity, resilience and sustainability. The tool is designed to aid in evaluating the impact of food system policies and programmes and help guide the targeting and prioritization of actions that could improve the functioning of regional and national food systems. It should also help countries and stakeholders to adopt a food systems approach in their development work by prompting them to consider the wide range of issues, challenges and options facing food systems, from core components to external drivers, while fostering a more comprehensive understanding of how these forces impact the key outcomes and attributes of food systems. Such an improved understanding of the functioning of food systems would help them identify, design, adopt and implement innovative policies, strategies and programmes based on the dynamics of a particular context.

To put the Arab Food Systems Assessment Tool into practice, appropriate detailed data must be collected for each indicator. In this report, data from various international sources are used, including the United Nations Statistics Division, the World Bank, or the Food and Agriculture Organization of the United Nations (FAO). These international databases are chosen because they are easily accessible, the data sets tend to be more complete and with a smaller time lag, and they facilitate cross-country aggregations and comparisons since the methodological approach is similar across countries. This is especially true when the indicators are part of, or are closely related to, the Sustainable Development Goals (SDGs) or

other internationally agreed-upon action plans. Limited data originates from other sources such as non-governmental organizations (NGOs), academia or research institutions.

The output of the Arab Food Systems Assessment Tool is provided in the form of a dashboard comprising two sets of tables containing an array of information.

The first table (table 8) provides four types of information:

- The actual data for each indicator, with two or three time periods for trend analyses (2010, 2015 and the latest year for which data is available).
- A comparison of the latest-year data for a country or the Arab region to the regional average in case of a country, or to the world average in case of the Arab region.
- A trend between 2015 and the latest year for which data is available, which uses a traffic light-like system with a red dot indicating an “off-track” trend, a yellow dot indicating a “stagnating” trend and a green dot indicating an “on-track” trend.
- A score for the latest-year data is provided together with a horizontal bar to contextualize the result with both the score and the horizontal bar showing how far the country is progressing towards achieving the concerned goal through a comparison to the performance of other countries using worldwide thresholds. To assess the contribution of each indicator towards meeting at least a significant key attribute of food systems, i.e. inclusivity, resilience or sustainability, associated with that particular indicator, the scores were further renormalized to a scale of 1 to 3, building on the methodology outlined by LaFortune et al. (2018). This rescaling allows the identification of three goal trends: scores between 0 and 1 indicate an “off-track” trend, between 1 and 2 indicate a “stagnating” trend, and between 2 and 3 indicate an “on-track” trend.⁶⁶

Table 8. Assessment results: indicator progress

Indicator		Arab	Country Name			Trend	Score	Food System Attribute
Code	Description	Latest	2010	2015	Latest year	Latest vs 2015	Latest	Latest
ORE INDICATORS								
CO1	Undernourishment (R) - %	13.5	7.0	6.8	9.3 2022	●	1.0	Outcome: stagnating
CO2	Food insecurity (R) - %	36.8	n.a.	26.3	61.2 2022	●	0.0	Outcome: off-track
CO3	Obesity (R) - %	31.7	10.3	12.3	22.7 2022	●	0.0	Outcome: off-track
CO4	Child stunting (R) - %	19.0	27.3	25.1	22.1 2022	●	0.0	Outcome: off-track
AVAILABILITY INDICATORS								
AV1	Yield gap - %	63.7	52.3	50.6	53.4 2021	●	0.2	Sustainability: off-track
AV2	Agriculture expenditure - index	0.2	0.3	0.2	0.3 2021	●	0.8	Resilience and Sustainability: off-track
AV3	Dietary energy supply - %	125.8	130	133	132 2022	●	3.0	Inclusivity: on-track
AV4	Import dependency (R) - %	65.4	79	58	57 2021	●	1.3	Resilience: stagnating
ACCESS INDICATORS								
AC1	Poverty (R) - %	33.9	38.3	33.9	33.6 2022	●	0.0	Inclusivity: off-track
AC2	Food expenditure (R) - %	31.5	n.a.	n.a.	n.a.		n.a.	n.a.
AC3	Logistics - index	2.7	n.a.	n.a.	2.3 2022	●	1.1	Resilience: stagnating
AC4	Inflation (R) - %	17.3	6.3	3.3	9.5 2022	●	1.7	Resilience: stagnating
UTILIZATION INDICATORS								
UT1	Water and/or sanitation access - %	64.2	n.a.	n.a.	n.a.		n.a.	n.a.
UT2	Starchy food (R) - %	56.7	54.0	55.0	56.0 2019	●	1.2	Inclusivity: stagnating
UT3	Healthy diet (R) - %	38.1	n.a.	n.a.	62.4 2021	●	0.0	Inclusivity: off-track
UT4	Women's anaemia (R) - %	33.2	45.9	44.2	43.3 2019	●	0.0	Inclusivity: off-track
STABILITY INDICATORS								
ST1	Food stock - 1,000 t	-1850.2	13.0	257.0	194.0 2021	●	3.0	Resilience: on-track
ST2	Political stability - ranking	15.8	14.2	23.3	22.6 2021	●	0.7	Resilience & Inclusivity: off-track
ST3	Production variability (R) - 1,000 international \$/capit	13.2	8.4	4.9	4.3 2020	●	2.9	Resilience: on-track
ST4	Supply variability (R) - kcal/cap/day	33.5	60.0	27.0	11.0 2023	●	2.9	Resilience: on-track
AGENCY INDICATORS								
AG1	Income inequality (R) - ratio	3.7	2.6	2.4	2.4 2021	●	2.6	Inclusivity: on-track
AG2	Gender inequality (R) - index	0.5	0.7	0.6	0.6 2021	●	0.0	Inclusivity: off-track
AG3	Education inequality (R) - %	33.3	42.1	40.8	44.0 2021	●	0.0	Inclusivity: off-track
AG4	Voice and accountability - ranking	14.6	22.8	23.7	28.5 2021	●	0.9	Inclusivity: off-track
ENVIRONMENTAL SUSTAINABILITY INDICATORS								
SU1	Agriculture water (%) (R)	217.3	10.7	10.7	10.7 2020	●	3.0	Sustainability & Inclusivity: off-track
SU2	Land cover - index	101.2	101.7	100.0	101.5 2020	●	3.0	Sustainability: on-track
SU3	Agroecological footprint (R) - bio ha	2.2	2.5	2.5	2.3 2022	●	1.7	Sustainability: stagnating
SU4	Food waste (R) - kg/cap/year	141.2	n.a.	n.a.	142.9 2021	●	0.0	Sustainability: off-track

(R) = Reversed n.a. = Not Available

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

The second table (table 9) of the dashboard builds on the food system typologies outlined above to categorize the food system based on key criteria that determine the food system transformation stage. These criteria include income level, overall sociopolitical and economic conditions, food system outcome, impact of food policies, resources sustainability, length and complexity of the food supply chain, and sources of dietary energy supply.

The cells within the table show the actual value for each criterion concerned while the cell is also highlighted to show progress in three colours: red for “off-track”, orange for “stagnating” or green for “on-track” progress. The first row aggregates the data of the criteria to show the resulting food system transformation stage for the country, which is either “traditional”, “emerging” or “modernizing”, as previously discussed. To compute this aggregate, each criterion is given a score: 1 for an “off-track” trend, 2 for a “stagnating” trend, and 3 for an “on-track” trend. Additionally, 2 scores are deducted when the country is in conflict or fragility; the same applies when the country is listed as a least developed country (LDC). An aggregate score below 10 means a traditional food system stage, between 10 and 15 an emerging stage, and above 15 a modernizing stage.

The second part of the table provides the average aggregated characteristics at the world, regional and subregional levels for comparative purposes.

Table 9. Assessment results: food systems transformation stage

Country name					
Food systems		Off-track	Stagnating	On-track	
Food Systems Transformation Stage					
Level of income (LICs/MICs/HICs)			MICs		2
Conflict or fragile (World Bank FY24) - Y/N					
LDCs (UN) -Y/N					Y
Food system outcome (PoU, FIES, stunting) - % of population	31				
Food policies (share agriculture in GDP) - % of GDP	20				
Sustainability resource use (productivity) - U\$/worker		5168			
Length supply chain (urbanization) - % of population		62			
Supply chain complexity (industrialization) - % of GDP	26				
Source dietary energy (starchy foods) - kcal/cap/day		56			
					9

Food systems averages	World	Arab	HIC	MIC	LIC
Food Systems Transformation Stage	Emerging	Emerging	Modernizing	Emerging	Traditional
Level of income (LICs/MICs/HICs)	MIC	MIC	HIC	MIC	LIC
Conflict or Fragile (World Bank FY24) - Y/N					Y
LDCs (UN) -Y/N					Y
Food system outcome (PoU, FIES, stunting) - % of population	20	23	5	18	28
Food policies (share agriculture in GDP) - % of GDP	4	5	2	10	17
Sustainability resource use (productivity) - U\$/worker	4042	8473	40034	12511	4784
Length supply chain (urbanization) - % of population	55	60	86	62	37
Supply chain complexity (industrialization) - % of GDP	27	42	47	35	13
Source dietary energy (starchy foods) - kcal/cap/day	51	57	46	59	47

The above dashboard (table 9) facilitates the identification of areas requiring immediate attention. This would allow the country to prioritize actions according to areas of high underperformance, shown in red, or with a low score (below 1), as indicating that the country is off-track or not moving in the right direction. The orange colour denoting a score between 1 and 2 indicates that there is relative stagnation, which requires corrective measures to support progress. The green colour denoting a score between 2 and 3 indicates an on-track trend, meaning that the country is moving in the right direction and should maintain course. Thus, the dashboard highlights which area of the food system needs particular attention so it can be prioritized to improve the overall food system outcomes and key attributes. It should be noted, however, that relying on a select number of indicators or criteria could hide other potential areas of concern if they are not explicitly covered through the chosen indicators. In this exercise, the major policy areas are well covered, as the indicators were chosen through numerous consultations with concerned experts and agreed upon by countries in the Arab region as relevant and representative.

B. Application of the food systems assessment tool

1. Regional assessment

The dashboard of the Arab region is provided below. It should be noted, however, that this assessment tool is more accurate when applied at the country level or focusing on subgroups of countries with closely similar characteristics, such as the high-income countries of the Gulf Cooperation Council (GCC) subregion. The Arab region assessment is provided for illustrative purposes (table 10).

The Arab region is made up of countries with vastly different characteristics, challenges and opportunities in terms of natural resources, population size and growth, and socioeconomic and development achievements. Some countries are endowed with sufficient natural resources, mostly land and water, to have an economically viable agricultural system. Other countries have sufficient financial means to provide for their populations, while others face daunting economic conditions. Others still are enmeshed in conflicts and sociopolitical crises or are in a state of fragility, hampering development activities. These existing disparities weaken attempts at conducting region-wide assessments and therefore the suggestion of focused policy recommendations render one-size-fits-all advice unworkable in most cases. For simplicity, regional assessments are carried out to provide general information and overall trends to allow for a situational analysis but most importantly to show how the assessment tool works. For more focused assessments, emphasis would be put on subregional groupings and particularly on individual country analyses.

Table 10. Arab Food Systems Dashboard

Indicator	World	Arab				Trend	Score	Food system attribute
		latest	2010	2015	Latest year			
Code	Description	latest	2010	2015	Latest year	Latest vs 2015	Latest	Latest
Core indicators								
CO1	Undernourishment (R) - %	9.2	10.4	n.a.	13.5	2022	0.0	Outcome: off-track
CO2	Food insecurity (R) - %	29.6	n.a.	n.a.	36.8	2022	0.0	Outcome: off-track
CO3	Obesity (R) - %	13.1	24.6	24.9	31.7	2022	0.0	Outcome: off-track
CO4	Child stunting (R) - %	22.3	23.6	20.5	19.0	2022	0.0	Outcome: off-track
Availability indicators								
AV1	Yield gap - %	n.a.	59.5	52.7	63.7	2021	0.8	Sustainability: off-track
AV2	Agriculture expenditure - index	0.5	0.2	0.2	0.2	2021	0.7	Resilience and sustainability: off-track
AV3	Dietary energy supply - %	124.0	126	128	126	2022	3.0	Inclusivity: on-track
AV4	Import dependency (R) - %	-1.7	61	55	65	2021	1.0	Resilience: stagnating
Access indicators								
AC1	Poverty (R) - %	26.2	33.0	29.8	33.9	2022	0.0	Inclusivity: off-track
AC2	Food expenditure (R) - %	n.a.	37.1	n.a.	31.5	2021	2.1	Inclusivity: on-track
AC3	Logistics - index	3.0	2.6	n.a.	2.7	2022	1.5	Resilience: stagnating
AC4	Inflation (R) - %	8.3	6.8	5.1	17.3	2022	0.5	Resilience: off-track
Utilization indicators								
UT1	Water and/or sanitation access - %	84.0	n.a.	n.a.	64.2	2022	1.9	Inclusivity: stagnating
UT2	Starchy food (R) - %	51.0	47.7	56.8	56.7	2019	1.3	Inclusivity: stagnating
UT3	Healthy diet (R) - %	42.2	n.a.	n.a.	38.1	2021	0.0	Inclusivity: off-track
UT4	Women's anaemia (R) - %	29.9	34.0	33.0	33.3	2019	0.0	Inclusivity: off-track
Stability indicators								
ST1	Food stock - (1000 t)	50016.0	-260.1	306.9	-1850.2	2021	0.0	Resilience: off-track
ST2	Political stability - ranking	n.a.	20.0	16.9	15.8	2021	0.5	Resilience and inclusivity: off-track
ST3	Production variability (R) - 1,000 international \$/capita	2.6	13.9	10.0	13.2	2020	2.7	Resilience: on-track
ST4	Supply variability (R) - kcal/cap/day	3.0	33.3	49.5	33.5	2023	2.6	Resilience: on-track
Agency indicators								
AG1	Income inequality (R) - ratio	6.5	3.8	3.8	3.7	2021	1.3	Inclusivity: stagnating
AG2	Gender inequality (R) -index	0.5	0.5	0.5	0.5	2021	0.3	Inclusivity: off-track
AG3	Education inequality (R) - %	21.7	25.8	27.6	33.3	2021	0.7	Inclusivity: off-track
AG4	Voice and accountability - ranking	n.a.	14.8	16.5	14.6	2021	0.4	Inclusivity: off-track
Sustainability indicators								
SU1	Agriculture water (%) (R)	n.a.	173.9	223.3	217.3	2020	0.0	Sustainability and inclusivity: off-track
SU2	Land cover - index	100.0	80.6	100.0	101.2	2020	3.0	Sustainability: on-track
SU3	Agroecological footprint (R) - bio ha	2.6	2.4	2.6	2.2	2022	1.8	Sustainability: stagnating
SU4	Food waste (R) - kg/cap/yr	121.0	n.a.	n.a.	141.2	2021	0.0	Sustainability: off-track

(R) = Reversed
n.a. = Not available

Green: positive trend
Yellow: neutral trend
Red: negative

Arab country name

Food systems	Off-track	Stagnating	On-track
Food Systems Transformation Stage			
Level of income (LICs/MICs/HICs)			MIC
Conflict or Fragile (World Bank FY24) - Y/N			
LDCs (UN) -Y/N			
Food system outcome (PoU, FIES, stunting) - % of population	23		
Food policies (share agriculture in GDP) - % of GDP			5
Sustainability resource use (productivity) - U\$/worker		8473	
Length supply chain (urbanization) - % of population		60	
Supply chain complexity (industrialization) - % of GDP		42	
Source dietary energy (starchy foods) - kcal/cap/day		57	

Food systems averages	World	Arab	HIC	MIC	LIC
Food Systems Transformation Stage	Emerging	Emerging	Modernizing	Emerging	Traditional
Level of income (LICs/MICs/HICs)	MIC	MIC	HIC	MIC	LIC
Conflict or fragile (World Bank FY24) - Y/N					Y
LDCs (UN) -Y/N					Y
Food system outcome (PoU, FIES, stunting) - % of population	20	23	5	18	28
Food policies (share agriculture in GDP) - % of GDP	4	5	2	10	17
Sustainability resource use (productivity) - U\$/worker	4042	8473	40034	12511	4784
Length supply chain (urbanization) - % of population	55	60	86	62	37
Supply chain complexity (industrialization) - % of GDP	27	42	47	35	13
Source dietary energy (starchy foods) - kcal/cap/day	51	57	46	59	47

The core pillar shows that the Arab region is afflicted by undernourishment, obesity and child stunting. Addressing these challenges should be high on the agenda of the region given their potential costly impact on the economy, the health-care system and productivity. Moreover, not prioritizing action in these areas could increase the likelihood of food security destabilizing further given the protracted sociopolitical and economic crises plaguing the region.

The availability dimension shows that yields are below their potential, which is notably the case for critical commodities like cereals, while expenditure on the agricultural sector is low. These two factors might lead to a high import dependency.

The access dimension indicators reveal the high levels of poverty and inflation while the logistic indicator is low, pointing to potential challenges in accessing food, particularly in remote areas and for highly vulnerable members of the population.

Performance in the utilization dimension is also underwhelming. The consumption of starchy food is high and more than a third of the population does not have access to healthy diets; additionally, a third of women are affected by anaemia. The stability dimension shows ambivalent results. Food stocks and political stability are declining while food production and supply variability appear to be resilient in the face of structural weaknesses as a result of the multiple subsidies being extended, which take a substantial toll on public budgets.

The agency dimension points to inequalities in income, gender and education and is underpinned by inadequate voice and accountability. The sustainability dimension also shows weaknesses, as a considerable share of water is used for agricultural purposes despite the low productivity while food waste and the ecological footprint are high.

The food system of the Arab region is not contributing towards achieving the key attributes of inclusivity, resilience and sustainability. In other words, it is failing to provide food security and to respond appropriately to shocks while also endangering the natural resource base. The regional food system could thus be described as being in an emerging transformation stage as it fails to deliver on key outcome indicators and represents a low share of the economy.

2. Subregional overview

A comparative analysis of the three country income groups found in the Arab region provides useful insights into the functioning of food systems. The Arab high-income countries are characterized by a high-performing economy relying mostly on the export of petroleum products. They enjoy a well-developed infrastructure, higher standards of living and a high level of technology adoption. Arab middle-income countries are a relatively mixed group with some displaying fairly strong economies while others tend more towards the characteristics of lower income countries, with most displaying a mix of traditional and modern food systems. They face challenges related to income inequality, low youth employment and a lack of sociopolitical strength. Arab low-income countries tend to be marred in sociopolitical weaknesses, leading to high poverty and limited access to basic social services with a lack of economic opportunity. The majority of Arab countries are facing rising natural resource scarcity, which further impedes development and the achievement of food sovereignty.

Regarding the core indicators, only the high-income countries display low undernourishment levels. Middle-income countries are on par with the global average and a fifth of the population in low-income countries is undernourished. All subregions have a prevalence of obesity in the adult population that is worse than the world average, which is a cause for concern. Child stunting is above 10 per cent in high-income countries and middle-income countries, while close to a third of children are affected in low-income countries. The achievement of food security is a challenge that is poised to worsen with the advent of climate change and the continued sociopolitical instability in the region.

In the availability dimension, notable characteristics include low yields, which tend to be well below potential yields. The fact that public spending towards the agriculture sector is low means that conditions are not likely to improve soon. As a result, all subregions rely on food imports to achieve food security, with high-income countries displaying the highest food import reliance due to their lack of natural resources but ample economic ones.

In the access dimension, high-income countries are performing relatively well. Poverty affects about a third of the population in middle-income countries and more than half the population in low-income countries, which are also facing high inflation rates, both of which hamper food access. Logistics remain relatively average in all subregions, though with a lag in data, the situation in conflict countries might have further degraded in the wake of recent events, particularly in the State of Palestine and the Sudan, while the intermittent blockades on the Red Sea are adding to the woes in the region.

Table 11. Subregional Food Systems Dashboard

Indicator		World	Arab	HICs	MICs	LICs	Year
Code	Description						
Core indicators							
CO1	Undernourishment (R) - %	9	13.5	3	9	24	2022
CO2	Food insecurity (R) - %	30	37	0	29	34	2022
CO3	Obesity (R) - %	13	32	39	35	19	2022
CO4	Child stunting (R) - %	22	19	11	15	28	2022
Availability indicators							
AV1	Yield gap - %	n.a.	n.a.	n.a.	70	2	2021
AV2	Agriculture expenditure - index	0.5	0.5	0.5	0.2	n.a.	2021
AV3	Dietary energy supply - %	124	124	134	134	98	2022
AV4	Import dependency (R) - %	-2	-2	94	60	32	2021
Access indicators							
AC1	Poverty (R) - %	26	26	10	31	57	2022
AC2	Food expenditure (R) - %	n.a.	n.a.	19	34	n.a.	2021
AC3	Logistics - index	3.0	3.0	3.5	2.8	2.1	2022
AC4	Inflation (R) - %	8	8	3	13	101	2022
Utilization indicators							
UT1	Water and/or sanitation access - %	84	84	n.a.	56	n.a.	2022
UT2	Starchy food (R) - %	51	51	46	59	47	2019
UT3	Healthy diet (R) - %	42	42	0	38	n.a.	2021
UT4	Women's anaemia (R) - %	30	30	27	30	35	2019
Stability indicators							
ST1	Food stock - (1000t)	50016	50016	-500	-2580	-230	2021
ST2	Political stability - ranking	n.a.	n.a.	40	16	3	2021
ST3	Production variability (R) - 1,000 international \$/capita	3	3	7	15	14	2020
ST4	Supply variability (R) - kcal/cap/day	3	3	49	33	24	2023
Agency indicators							
AG1	Income inequality (R) - ratio	7	7	5	3	3	2021
AG2	Gender inequality (R) - index	0.5	0.5	0.2	0.5	0.5	2021
AG3	Education inequality (R) - %	22	22	17	34	27	2021
AG4	Voice and accountability - ranking	n.a.	n.a.	10	19	5	2021
Sustainability indicators							
SU1	Agriculture water (%) (R)	n.a.	n.a.	1118	85	44	2020
SU2	Land cover - index	100	100	104	101	70	2020
SU3	Agroecological footprint (R) - bio ha	3	3	7	2	1	2022
SU4	Food waste (R) - kg/cap/yr	121	121	144	139	100	2021
(R) = Reversed n.a. = Not available							
Food systems averages		World	Arab	HIC	MIC	LIC	
Food Systems Transformation Stage		Emerging	Emerging	Modernizing	Emerging	Traditional	
Level of income (LICs/MICs/HICs)		MIC	MIC	HIC	MIC	LIC	
Conflict or Fragile (World Bank FY24) - Y/N						Y	
LDCs (UN) -Y/N						Y	
Food system outcome (PoU, FIES, stunting) - % of population		20	23	5	18	28	
Food policies (share agriculture in GDP) - % of GDP		4	5	2	10	17	
Sustainability resource use (productivity) - U\$/worker		4042	8473	40034	12511	4784	
Length supply chain (urbanization) - % of population		55	60	86	62	37	
Supply chain complexity (industrialization) - % of GDP		27	42	47	35	13	
Source dietary energy (starchy foods) - kcal/cap/day		51	57	46	59	47	

For the utilization dimension, all subregions tend to be worse off than the world average with few exceptions. Access to basic social services is low even in middle-income countries, mostly because this grouping includes countries with largely differing characteristics. Anaemia among women affects a third of the population while only a third of the population seems to have access to healthy diets.

In the stability dimension, all subregions appear to have relied on their food reserves to ensure food access to their populations in recent years, most likely due to the disturbance in the functioning of food systems that occurred in the

aftermath of the COVID-19 pandemic and the war around the Black Sea region. They also display a low sociopolitical stability ranking despite the fact that food production and supply seem to have remained relatively stable.

In the agency dimension, income inequality is relatively high. In most cases, the top earners receive three times as much as the lower earners, while both gender inequality and inequality in education are relatively high. The population is not adequately involved in decision-making processes.

The sustainability dimension tends to favour the low-income countries in the Arab region, as they seem to devote less of their renewable water resources to agriculture and have a smaller ecological footprint with less food waste. Of greater concern are the high-income countries, which record an overdraft of their non-renewable water resources and consume seven times more than needed.

Challenging situations in the Gaza Strip and the Sudan

In the Gaza Strip, the war has taken a heavy toll on the population and the economy. The daily bombings have caused substantial civilian casualties, constant displacement of the population, and the destruction of dwellings and public infrastructure. Roughly 9 in 10 people across the Gaza Strip are internally displaced, usually multiple times, and lack proper shelter, as most buildings need full reconstruction or major rehabilitation before they can become functional again. Children are unable to find sufficient daily food and nearly all households opt to skip meals or reduce their food intake. Public services are barely functioning as, for example, almost half of the health-care infrastructure has been destroyed while that remaining provides minimum services due to a severe shortage of supplies. The provision of humanitarian assistance is also minimal due to the prevailing insecurity, damaged infrastructure, fuel shortages and access restrictions. (Source: UNRWA, July 2024, <https://www.unrwa.org/resources/reports/unrwa-situation-report-125-situation-gaza-strip-and-west-bank-including-east-jerusalem>).

In the Sudan, since the war broke out in 2023, about 10.7 million people have become internally displaced while 25.6 million people – over half of the population – face hunger, with 8.5 million individuals experiencing emergency levels of hunger and 750,000 on the brink of famine. The escalating conflict is restricting humanitarian access while hampering food production and other economic activities, meaning that the situation is likely to deteriorate further. Many public services, including the health-care system, are barely functioning while poor sanitation and hygiene conditions and water contamination are leading to the spread of diseases. Humanitarian assistance is being hampered by a lack of adequate resources and risks imposed by the deteriorating situation but also by the onset of the rainy season, which has led to heavy flooding in many parts of the country, cutting off roads and hampering logistics activities. (Source: OCHA, July 2024, <https://reports.unocha.org/en/country/sudan/>).

The food systems found in the Arab region predictably range from traditional to modernizing. Food systems are traditional in the low-income countries, emerging in the middle-income countries and modernizing in the high-income countries. All subregions display poor outcomes in terms of food system performance, as the majority tend to underperform in terms of the Food Insecurity Experience Scale and child stunting. For most of the remaining food system classification criteria, all subregions are in the moderate performance category, albeit for a few exceptions of strong performance for selected criteria in the high-income countries and poor performance in the low-income countries, as could have been expected.

3. Country case study: Yemen

Yemen is predominantly a highland country with multiple biomes, ranging from desert to lush tropical valleys. With the help of the monsoon rains, the fertile and productive ancient terraces that stabilize the slopes of the country's mountains allow food to be produced in otherwise barren highlands. The narrow Tihama coastal plain is largely agricultural, as are the subtropical wadis that dissect the vast mountain range.

Yemen has faced war and conflict throughout its long history, with the latest ongoing since 2011. As a result, the prevalence of undernourishment is close to 40 per cent of the population, with more than 20 million people in need of humanitarian assistance. Food security is a challenge due to the ongoing conflicts, economic decline, population displacements, port blockades and high prices for key commodities. Overall agricultural productivity remains low due to erratic rains while aquifers are being mined unsustainably.

Table 12. Yemen Food Systems Dashboard

Indicator		Arab	Yemen			Trend	Score	Food system attribute
Code	Description	Latest	2010	2015	Latest year	Latest vs 2015	Latest	Latest
Core indicators								
CO1	Undernourishment (R) - %	13.5	25.1	38.7	39.5	2022	0.0	Outcome: off-track
CO2	Food insecurity (R) - %	36.8	n.a.	45.7	72.5	mult.	0.0	Outcome: off-track
CO3	Obesity (R) - %	31.7	13.5	16.5	13.7	2022	0.0	Outcome: off-track
CO4	Child stunting (R) - %	19.0	50.4	42.3	35.1	2022	0.0	Outcome: off-track
Availability indicators								
AV1	Yield gap - %	63.7	45.4	42.5	40.4	2021	0.0	Sustainability: off-track
AV2	Agriculture expenditure - index	0.2	0.1	0.1	0.1	2021	0.2	Resilience and sustainability: off-track
AV3	Dietary energy supply - %	125.8	103	95	95	2022	0.9	Inclusivity: off-track
AV4	Import dependency (R) - %	65.4	87	89	93	2021	0.2	Resilience: off-track
Access indicators								
AC1	Poverty (R) - %	33.9	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
AC2	Food expenditure (R) - %	31.5	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
AC3	Logistics - index	2.7	2.6	n.a.	2.2	2022	1.0	Resilience: stagnating
AC4	Inflation (R) - %	17.9	11.2	n.a.	n.a.	n.a.	n.a.	n.a.
Utilization indicators								
UT1	Water and/or sanitation access - %	64.2	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
UT2	Starchy food (R) - %	56.7	64.0	65.0	65.0	2019	3.0	Inclusivity: on-track
UT3	Healthy diet (R) - %	38.1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
UT4	Women's anaemia (R) - %	33.2	62.1	61.3	61.5	2019	0.0	Inclusivity: off-track
Stability indicators								
ST1	Food stock - (1000t)	-1850	-96.0	-158.0	-269.0	2021	0.0	Resilience: off-track
ST2	Political stability - ranking	15.8	1.9	n.a.	0.9	2021	0.0	Resilience and inclusivity: off-track
ST3	Production variability (R) - 1,000 international \$/capita	13.2	4.7	2.1	6.5	2020	2.9	Resilience: on-track
ST4	Supply variability (R) - kcal/cap/day	33.5	16.0	40.0	83.0	2023	1.9	Resilience: stagnating
Agency indicators								
AG1	Income inequality (R) - ratio	3.7	6.4	6.2	6.2	2021	0.0	Inclusivity: off-track
AG2	Gender inequality (R) - index	0.5	0.8	0.8	0.8	2021	0.0	Inclusivity: off-track
AG3	Education inequality (R) - %	33.3	48.1	46.1	46.1	2021	0.0	Inclusivity: off-track
AG4	Voice and accountability - ranking	14.6	11.4	7.4	3.9	2021	0.1	Inclusivity: off-track
Sustainability indicators								
SU1	Agriculture water (%) (R)	217.3	154.1	154.1	154.1	2020	0.0	Sustainability and inclusivity: off-track
SU2	Land cover - index	101.2	102.0	100.0	101.2	2020	3.0	Sustainability: on-track
SU3	Agroecological footprint (R) - bio ha	2.2	0.9	0.7	0.6	2022	3.0	Sustainability: on-track
SU4	Food waste (R) - kg/cap/yr	141.2	n.a.	n.a.	147.1	2021	0.0	Sustainability: off-track

Yemen country name					
Food systems		Off-track	Stagnating	On-track	
Food Systems Transformation Stage					
Level of income (LICs/MICs/HICs)		LIC			
Conflict or fragile (World Bank FY24) - Y/N					Y
LDCs (UN) - Y/N					Y
Food system outcome (PoU, FIES, stunting) - % of population		49			
Food policies (share agriculture in GDP) - % of GDP		27			
Sustainability resource use (productivity) - US\$/worker			7029		
Length supply chain (urbanization) - % of population		39			
Supply chain complexity (industrialization) - % of GDP		25			
Source dietary energy (starchy foods) - kcal/cap/day			65		
Food systems averages					
	World	Arab	HIC	MIC	LIC
Food Systems Transformation Stage					
Level of income (LICs/MICs/HICs)	Emerging	Emerging	Modernizing	Emerging	Traditional
Conflict or Fragile (World Bank FY24) - Y/N					Y
LDCs (UN) - Y/N					Y
Food system outcome (PoU, FIES, stunting) - % of population	20	23	5	18	28
Food policies (share agriculture in GDP) - % of GDP	4	5	2	10	17
Sustainability resource use (productivity) - US\$/worker	4042	8473	40034	12511	4784
Length supply chain (urbanization) - % of population	55	60	86	62	37
Supply chain complexity (industrialization) - % of GDP	27	42	47	35	13
Source dietary energy (starchy foods) - kcal/cap/day	51	57	46	59	47

The core pillar shows that Yemen has a high prevalence of undernourishment, obesity and child stunting. Addressing these challenges should be high on the agenda of Yemen, as they impose a heavy cost on the economy, social protection and economic productivity, including in the food system, which could continue to further destabilize the country.

In the availability dimension, the yields are below their potential. The country is highly dependent on food imports and food aid and investments in agriculture are lacking. The access dimension has only one indicator with sufficient data originating from international databases, meaning that there should also be more investment in the collection of adequate data to monitor the functioning of the food system, which could aid in prioritizing efforts to help Yemen recover and rebuild.

The utilization dimension also has only two indicators, with one showing a dire situation, an indication that the nutritional status of the country is uncertain. In the stability dimension, two indicators are “off-track”, i.e. the level of food stocks and the sociopolitical situation of the country, and one shows stagnation, i.e. food supply variability. All the indicators in the agency dimension are “off-track” while in the sustainability dimension, two are “off-track” and the other two are “on-track”.

The food system of Yemen shows weaknesses and is not functioning properly to ensure food security and nutrition, or the desired economic, social and environmental outcomes, and is likewise not achieving the attributes of inclusivity, resilience and sustainability. It is essentially failing to deliver and to respond effectively to shocks. The food system is largely in a traditional transformation stage, which is characteristic of low-income countries and those considered as least developed countries, both classifications in which Yemen belongs.

4. Concluding remarks

There are many challenges in the Arab region that require immediate action: tackling poverty and inflation, closing the yield gap, addressing and mitigating the food import dependency, responding to nutrition-related issues, notably child stunting and anaemia among women, and resolving the protracted sociopolitical and economic crises endemic in the region. In addition, recent events such as the COVID-19 pandemic, the war around the Black Sea region, the wars in the Gaza Strip, Yemen and the Sudan, the deteriorating economic conditions in many countries including Lebanon, and the potential of trade disruptions on the Red Sea have heightened concerns. Concerted regional efforts will be needed to reverse the negative trends and put the region on a path towards achieving growth and food security. In Yemen, there is an urgent need to stabilize the overall sociopolitical situation, which is leading to disastrous outcomes for the country and the population. It is imperative to start planning for the future and mobilizing resources to rebuild with a special emphasis on food systems.

4. Conclusion and reflections on the findings

This report presents an innovative assessment tool for food systems that builds on an existing framework for monitoring food security. The framework was expanded to account for two additional food security dimensions – agency and sustainability – as well as available frameworks that have been put forward to describe food systems in terms of their components, external drivers and outcomes.

In addition, this report provides an overview of food systems in the Arab region, including a description of food system components, drivers and outcomes. It also delves into how the assessment tool was put together by combining the available food systems framework with an innovative way to use selected typologies to categorize food systems in a select number of transformation stages that best encompass the food systems found in the Arab region. This categorization is then complemented with an identification of food systems' key attributes: inclusivity, resilience and sustainability.

A macro-level analysis was conducted using a solid understanding of Arab food systems and a broad description of the principal drivers, constraints and components according to the framework put forward by Fanzo et al. (2020). Subsequently, a typology of Arab food systems was developed, based on the crossing of the Food Systems Dashboard methodology and countries' economic status and presence of conflict. This yielded six different types of Arab food systems:

- Traditional food systems in low-income countries: Somalia, the Sudan and Yemen, noting that all three countries are also listed as least developed countries and are in conflict or fragile.
- Traditional food systems in middle-income countries: the Comoros, Djibouti and Mauritania, noting that all three countries are listed as least developed countries while the Comoros is also listed as a fragile country.
- Emerging food systems in low-income countries: the Syrian Arab Republic, which is also listed as a conflict-affected country.
- Emerging food systems in middle-income countries: Algeria, Egypt, Iraq, Libya, Morocco, the State of Palestine and Tunisia, noting that Iraq, Libya and the State of Palestine are also listed as conflict-affected or fragile countries.
- Modernizing food systems in middle-income countries: Jordan and Lebanon, noting that Lebanon is listed as a fragile country.
- Modernizing food systems in high-income countries: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates.

This typology-based analysis of Arab food systems sheds light on factors that limit inclusivity, resilience and sustainability in the region. Some of the constraints are common to all countries while others are specific to a food system type.

To further describe the intricacies of food systems, this report also re-explored the updated dimensions of food security – availability, access, utilization, stability, agency and sustainability – while echoing the importance of core indicators that play a crucial role in assessing the outcome of the food system, such as undernourishment, food insecurity experience, obesity and the prevalence of stunting among children under 5 years of age. The most determining indicators across all six food security dimensions were matched with the food systems components and external drivers while new and more appropriate ones were also identified so they could provide a more telling overview of the prevailing conditions in the food system. Some of the new indicators included in the utilization dimension – the affordability and source of healthy food – shed light on the accessibility and affordability of nutritious food options. In the stability dimension, an indicator related to food stock levels – assessing the availability of strategic food storage – was added while a few other indicators were

removed to keep the overall framework manageable, as additional indicators also had to be identified for the new dimensions of agency and sustainability.

The additional indicators included in the agency dimension were wealth inequality, gender inequality, inequality in education, and voice and accountability, with the objective of capturing the sociopolitical factors influencing food security outcomes. In the sustainability dimension, the indicators selected included agricultural water resources, land cover changes, ecological footprint and food waste to highlight the environmental impact of food systems with the aim of promoting sustainable practices. By incorporating these updates and additions, the assessment tool provides a more comprehensive and holistic approach to evaluating food systems, as it considers a wide range of dimensions, addresses key factors that influence access to nutritious food, and emphasizes the importance of inclusivity and sustainability. This updated framework serves as a valuable tool for policymakers, researchers and organizations working towards ensuring the well-functioning of food systems at the country and regional level.

Overall, this report has shed light on the complexities of assessing food systems and the need for a multidimensional approach that considers a wide range of sectors and indicators. By adopting this updated assessment tool, stakeholders can better understand the challenges and opportunities to move towards a well-functioning food system, leading to more targeted interventions and policies to improve the well-being of individuals and communities.

Below are a few recommendations and ways forward for the region that build on the results of the Arab Food Systems Assessment Tool and are provided along the lines of the food system attributes of inclusivity, resilience and sustainability.

A. Inclusivity

Inclusivity reflects the level of equity and food justice in the system. The analysis shows how income and food inequality are high throughout the Arab region, and how the population perceives their ability to participate in decision-making as low. Some populations, such as refugees, internally displaced individuals and minority groups suffer disproportionately. In addition, the gender roles prevalent in the Arab region negatively impact the roles and outcomes of women within the food system.

1. Regional level recommendations

- Promote inclusive policies as an integral part of the transition towards equitable and inclusive food systems.
- Recognize the role of all actors in the food system to their true value. Address inequalities in resource allocation through constitutional channels.
- Make local food production an integral part of the struggle for peace, liberation and equality.
- Support food sovereignty groups, especially those operating across sociocultural divides.
- Involve displaced people and host communities in food security and sovereignty programmes.
- Network with governments and donors to create safety nets for vulnerable groups.

2. Food system type recommendations

- In emerging and diversifying middle-income economies (Algeria) or modernizing and formalizing middle-income economies (Lebanon or Jordan), analyse refugee groups' nutritional outcomes and take active steps to increase their agency and incorporate them into the food system.
- In GCC countries and modernizing and expanding food systems, extend the food security successes to migrant workers and ensure that there are no double standards.

B. Resilience

Resilience represents the food system's ability to bounce back to its initial status following a shock, such as a conflict, pandemic or drought. This analysis shows how most countries in the Arab region present a high import dependency, are vulnerable to market changes and have a certain degree of political instability. In addition, some countries are suffering from economic crises, high inflation and violent conflicts, which hinder their ability to overcome shocks.

1. Regional level recommendations

- Make the resilience of food and farming systems an essential component of development aid during and after conflicts.
- Promote innovative, smallholder-based initiatives for food systems' resilience in conflict zones through financing and recognition.
- Support small and medium holders in adopting ecologically friendly technologies and accessing agricultural knowledge, financing and markets.
- Promote the diversification of crops, animal species and import sources.
- Apply lessons learned from success stories at overcoming the COVID-19 pandemic and the Ukraine war.
- Enhance the role of multi-stakeholder platforms and embed learnings into policy.

2. Food system type recommendations

- In low-income countries, food production and commercialization are achieved essentially through small farmers operating through informal or semi-formal networks. While they can be vulnerable to economic shocks at the individual level, their diversity can confer a degree of short-term resilience to the system at the macro level. Supporting small farmers through training, financing and providing access to markets would endow the food system with an even higher degree of resilience.
- In high-income countries, such as those in the Gulf Cooperation Council, and in some urban locations in oil-producing middle-income countries, such as Algeria, direct State expenditures can contribute to absorbing shocks. Other similar locations could benefit from the lessons learned by the GCC countries and Algeria during the COVID-19 pandemic.

C. Sustainability

Sustainability primarily relates to the state and sustainability of resources and practices within food systems. This report's analysis showed that resource scarcity – especially water, soils, arable land and biodiversity – is a common hindrance to food systems in all Arab countries. However, this challenge is more acute in countries in conflict and occupation, for reasons related to governance and the destruction of infrastructure, and in low-income countries with a limited ability to invest in protection and adaptation measures.

1. Regional level recommendations

- Promote agroecology in technology transfer and development.
- Link healthy diets to sustainable food production systems.
- Adopt ecosystem-based sustainable natural resource management and control the use of technology, focusing on the improvement of the system's sustainability.
- Enhance cross-sectoral coordination and food system governance.
- Engage in research for policy processes in relation to the sustainable use of resources, highlighting linkages between food security and human health.

- Protect scarce resources through a strong legislative framework.
- Enhance multi-stakeholder linkages and strengthen the existing food security governance systems.
- Invest in research for sustainability and become the research hub for agroecological technologies.

2. Food system type recommendations

- In middle-income countries with emerging and diversifying food systems, the pressure of economic growth is high and that can translate into overuse of natural resources, especially in industrialized export-oriented agriculture. This is, for example, the case of Morocco and Egypt where the expansion of farming into the desert lands, irrigated with scarce or non-renewable water, can exert a heavy toll on natural resources. Opposite economic and environmental goals should be acknowledged and addressed while developing action plans.
- In Gulf Cooperation Council countries where modernizing and formalizing food systems are the norm, resources are scarce and food is mostly imported. Modern technologies are commonly used for local food production, and the countries are aware of environmental pressures and able to mitigate them through a combination of technological advances and effective regulation and governance. The key challenges to sustainability originate from the competition for resources (land, sea) with other economic sectors, especially real estate, which produce higher short-term financial returns. These can cause land abandonment and expansion of construction over natural space, resulting in resource degradation. Specific provisions should be made to address these issues.

Annex 1. Descriptives of the selected indicators

Below is an expanded review of all indicators comprising the assessment tool. It provides the full name or a description of each indicator, an overview or definition, the justification of its selection, potential policies to act on it, its linkage to select Sustainable Development Goals (SDGs) or other related frameworks, as well as possible data sources.

Core pillar indicators

A. CO1: Undernourishment (%)

Name/description: Prevalence of undernourishment (% of the population).

Overview: Estimates the proportion of the population whose habitual food consumption is not enough to provide adequate dietary energy to lead a normal, active and healthy life.

Justification: Good nutrition is required for survival, health and development. Undernourishment leads to illnesses, mortality and childhood metabolic imprinting, which in turn leads to long-term developmental challenges.

Potential action areas: Suggested policies include making more healthy food available and accessible, enhancing social safety nets and promoting good nutrition.

Link to action plans: This indicator is related to Sustainable Development Goal 2, target 2.1 (indicator 2.1.1). It is also part of the Food and Agriculture Organization of the United Nations (FAO) Suite of Food Security Indicators.

Data source: Data for this indicator can be obtained from FAO.

B. CO2: Food insecurity (%)

Name/description: Prevalence of moderate or severe food insecurity based on the Food Insecurity Experience Scale (FIES) (% of the population).

Overview: Estimates the proportion of the population who experience moderate or severe food insecurity in a referenced time period and is associated with either an inability to access food or reduced food intake.

Justification: Inability to obtain enough food, having to compromise on food quality or diversity, or reducing food intake, including by skipping meals, could lead to nutritional challenges.

Potential action areas: Suggested policies include enhancing food availability and access, monitoring food prices, providing income and establishing adequate social safety nets.

Link to action plans: This indicator is related to Sustainable Development Goal 2, target 2.1 (indicator 2.1.2) and is part of the FAO Suite of Food Security Indicators.

Data source: Data can be obtained from FAO.

C. CO3: Obesity (%)

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

Overview: Estimates the proportion of the population with a body mass index (BMI) or weight-to-height ratio higher than 30, which denotes excess fat accumulation that could affect health.

Justification: Obesity generally results from an overconsumption of dietary calories associated with low physical activity and can lead to serious health issues and impede economic participation and growth.

Potential action areas: Suggested policies include promoting good nutrition and physical activities, encouraging reduction in the consumption of certain foods or revisiting food subsidy programmes.

Link to action plans: This indicator is not part of the SDGs but could be related to Sustainable Development Goal 2 and Sustainable Development Goal 3 and is part of the FAO Suite of Food Security Indicators.

Data source: Data can be obtained from the World Health Organization (WHO) or FAO.

D. CO4: Stunting (%)

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

Overview: Estimates the proportion of children under the age of 5 who are too short for their age, which usually results from chronic or recurrent malnutrition.

Justification: Stunting is a health issue caused by poor diet, chronic or recurrent malnutrition or infections, and/or poor environmental conditions leading to serious health issues and possibly death.

Potential action areas: Suggested policies include promoting breastfeeding, strengthening nutrition programmes for children, improving micronutrients intake and increasing food safety.

Link to action plans: This indicator is related to Sustainable Development Goal 2, target 2.2 (indicator 2.2.1) and is part of the FAO Suite of Food Security Indicators.

Data source: Data can be obtained from FAO or WHO.

Availability dimension indicators

A. AV1: Yield gap (%)

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

Overview: Estimates the difference between current farm yields and potential yields assuming optimal production and is proxied through wheat production. It has no associated metadata information.

Justification: Closing the yield gap is necessary for increasing food availability and reducing food import dependency. It is proxied through the wheat crop, which is a major staple in the Arab region.

Potential action areas: Suggested policies include sustainable intensification, provision of incentives, reducing post-harvest losses and enhancing irrigation, including supplementary irrigation for rain-fed systems.

Link to action plans: This indicator is related to Sustainable Development Goal 2, target 2.3 (indicator 2.3.1).

Data source: Data on yields can be obtained from FAO and yield potential from Mueller et al. (2012).

B. AV2: Agriculture expenditure (index)

Name/description: Agriculture orientation index for government expenditures.

Overview: Estimates the agriculture share of government expenditures divided by the agriculture share of the economy (GDP), with a value of 1 denoting optimal government expenditures towards agriculture.

Justification: Agricultural intensification requires investing in areas that do not receive sufficient private investments such as soil, land, water and infrastructure improvement, pest and disease control, extension and capacity-building.

Potential action areas: Suggested policies include improving rural infrastructure, providing extension services, supporting a healthy environment, giving incentives and facilitating investments, reinforcing capacity and research and development, and protecting the environment.

Link to action plans: This indicator is related to Sustainable Development Goal 2, target 2.a (indicator 2.a.1).

Data source: Data can be obtained from FAO.

C. AV3: Dietary energy (%)

Name/description: Average dietary energy supply adequacy (%).

Overview: Estimates the average supply of dietary energy or calories from food consumption, which compares the requirement for the concerned population to the food supplied in caloric terms.

Justification: Reflects the adequacy of food supply in caloric terms at the national level. The quantity of food provided should fulfil the energy needs of the population to allow a healthy and active life.

Action areas: Suggested policies include enhancing food supply (availability and access), promoting healthy diets, encouraging a dietary transition or enhancing social safety net programmes.

Link to action plans: This indicator is associated with Sustainable Development Goal 2, targets 2.1 and 2.2, and is part of the FAO Suite of Food Security Indicators.

Data source: Data can be obtained from FAOSTAT.

D. AV4: Import dependency (%)

Name/description: Import dependency (wheat or cereals) ratio (%).

Overview: Estimates the degree to which the domestic food supply (proxied through wheat or cereals) is dependent on food imports and is computed as net food imports to net food supply.

Justification: The region is not self-sufficient in terms of food production, and since wheat/cereals are the main source of dietary energy, they are used to estimate the level of dependence on food imports.

Potential action areas: Suggested policies include intensifying local food production, enhancing merchandise exports or improving logistics (import infrastructure and policies).

Link to action plans: This indicator is related to Sustainable Development Goal 2, target 2.3, and is part of the FAO Suite of Food Security Indicators.

Data source: Data can be obtained from FAO.

Access Dimension Indicators

A. AC1: Poverty (%)

Name/description: Poverty headcount ratio (% of the population).

Overview: Estimates the proportion of the population living on less than US\$3.20 a day, the poverty line for lower-middle income. Poverty is understood as a lack of adequate resources to cover needs.

Justification: Poverty is a determinant of economic access to food, as it reflects a lack of means and thereby allows the evaluation of the capacity to access resources to acquire food.

Action areas: Suggested policies include promoting economic growth, investing in rural development, creating jobs, providing social services and protection or promoting equitable access to resources.

Link to action plans: This indicator is related to Sustainable Development Goal 1, targets 1.1 (indicator 1.1.1) and 1.2 (indicators 1.2.1 and 1.2.2).

Data source: Data can be obtained from the World Bank or the ESCWA Portal.

B. AC2: Food consumption (%)

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

Overview: Estimates the share of the monetary value of the purchased and non-purchased food in the total household purchased and non-purchased items as obtained through household surveys.

Justification: It allows the understanding of how affordable it is to access food, which is a fundamental requirement for survival. Vulnerable households spend a larger share of household income on food.

Action areas: Suggested policies include reducing poverty, creating jobs, lowering taxes for the poor, training and education, as well providing adequate social safety nets and targeted subsidies.

Link to action plans: This indicator is related to Sustainable Development Goal 1, targets 1.1 and 1.2, and Sustainable Development Goal 10, target 10.1.

Data source: Data can be obtained from the World Bank, knoema.com or ourworldindata.org.

C. AC3: Logistics (index)

Name/description: Logistics performance index.

Overview: Estimates the quality of trade and transport-related infrastructure, including efficiency of customs, quality of infrastructure and quality of logistics services, which are collected through surveys.

Justification: It looks at the quality of trade and transport-related infrastructure, which influence access to food through port logistics, red tape and quality of road infrastructure, among other areas.

Action areas: Suggested policies include improving infrastructure, facilitating trade and services, improving efficiency of supply chains and reducing red tape.

Link to action plans: This indicator supports Sustainable Development Goal 9, target 9.1.

Data source: Data can be obtained from the World Bank.

D. AC4: Inflation (%)

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

Overview: Estimates the movement or changes in the level of prices of consumer goods and services over a defined period of time and is measured through the consumer price index.

Justification: Inflation measures changes in the average prices of goods and services, as substantial price variations lead to shortages of goods, which affect the ability of people to acquire food, among other purchases.

Action areas: Suggested policies include acting on economic policies to combat inflation, notably interest rates and other monetary policies.

Link to action plans: This indicator is related to Sustainable Development Goal 2, target 2.c.

Data source: Data can be obtained from the World Bank.

Utilization dimension indicators

A. UT1: Water and sanitation access (%)

Name/description: Proportion of the population using safely managed drinking water and sanitation services (%).

Overview: Estimates the proportion of the population using safely managed water services, i.e. water of drinking quality, and improved sanitation facilities not shared with other households.

Justification: Access to clean water and good sanitation promotes healthier lifestyles and prevents nutrition-related diseases and infections, thereby reducing the incidence of debilitating illnesses.

Action areas: Suggested policies include improving infrastructure, mainstreaming good hygiene into programmes, promoting good practices or reducing leakages.

Link to action plans: This indicator is related to Sustainable Development Goal 1, indicator 1.4.1, and Sustainable Development Goal 6, indicator 6.1.1.

Data source: Data can be obtained from the ESCWA Portal, FAO, the World Bank or the WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene.

B. UT2: Starchy foods (%)

Name/description: Share of dietary energy supply derived from cereals, roots and tubers (%).

Overview: Estimates the energy supply (in kcal/cap/day) provided by cereals, roots and tubers as a percentage of the total dietary energy supply (in kcal/cap/day).

Justification: This indicator provides information on the quality of the diet, as it provides the share of dietary energy supply derived from cereals, roots and tubers.

Action areas: Suggested policies include adopting and disseminating nutrition guidelines, assessing nutritional outcome, raising awareness or mainstreaming healthy nutrition into programmes.

Link to action plans: This indicator is related to Sustainable Development Goal 2 and is in the FAO Suite of Food Security Indicators.

Data source: Data can be obtained from FAO.

C. UT3: Healthy diets (%)

Name/description: Percentage of the population unable to afford a healthy diet (% of the population).

Overview: Estimates the percentage of the population unable to afford a healthy diet based on national income distributions expressed in 2017 purchasing power parity (PPP).

Justification: A healthy diet is considered unaffordable when its cost exceeds 52 per cent of household income and affects the ability to lead an active and healthy life.

Action areas: Suggested policies include transforming agrifood systems, improving economic access to healthy diets, promoting nutrition-sensitive food systems or promoting sustainable agriculture.

Link to action plans: This indicator is not part of the SDGs but is related to Sustainable Development Goal 2.

Data source: Data can be obtained from FAO.

D. UT4: Anaemia (%)

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

Overview: Estimates the level at which women of reproductive age are affected by low blood hemoglobin concentrations due to health issues and poor diets with an inadequate intake of micronutrients.

Justification: Anaemia is a public health issue which affects psychological and physical development, behaviour and work performance. It is the most common nutritional disorder and is gender-specific.

Action areas: Suggested policies include encouraging better nutrition and diet diversification, supporting food fortification and providing dietary supplements, or strengthening reproductive health programmes.

Link to action plans: This indicator is not part of the SDGs but is related to Sustainable Development Goal 2, Sustainable Development Goal 3 and Sustainable Development Goal 5.

Data source: Data can be obtained from FAO, WHO or the World Bank.

Stability dimension indicators

A. ST1: Food stocks (%)

Name/description: Stock variation as a percentage of opening stocks (%).

Overview: Estimates changes in stock levels compared to opening stocks during the reference period, as substantial changes are associated with price spike and volatility.

Justification: Stock levels can have an effect on food prices and play a strategic role in safeguarding domestic food security, making them a policy priority for countries.

Action areas: Suggested policies include increasing production, increasing imports, supporting production, increasing storage or providing social support.

Link to action plans: This indicator is not part of the SDGs but could be related to Sustainable Development Goal 2.

Data source: Data can be obtained from FAO.

B. ST2: Political stability (rank)

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

Overview: Provides a perception of the stability of the country in relation to politically motivated acts of violence, including terrorism, which could lead to deteriorating conditions such as food insecurity.

Justification: 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.

Action areas: Suggested policies include preventing conflicts, involving citizens and civil society in political and governance processes, and promoting stability and social cohesion.

Link to action plans: This indicator is not part of the SDGs but could be related to Sustainable Development Goal 16, target 16.1.

Data source: Data can be obtained from the World Bank.

C. ST3: Production variability (US\$/capita)

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

Overview: Estimates the volatility occurring in the food production system over time and assesses the difference between actual production values and fitted values.

Justification: Assesses changes in food production, as high levels of food production and productivity imply a higher likelihood of food availability and access at affordable levels.

Action areas: Suggested policies include supporting food production and productivity, expanding irrigation, supporting rain-fed systems and promoting agriculture-based rural development.

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

Data source: Data can be obtained from FAO.

D. ST4: Supply variability (kcal/capita/day)

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

Overview: Assesses fluctuations within the dietary energy supply based on the standard deviation over the previous five years.

Justification: The prevailing variability in the food supply system affects the ability of people, particularly the most vulnerable, to access enough food and provides an indication of price volatility.

Action areas: Suggested policies include supporting local production, enhancing trade, adopting good macroeconomic policies or stabilizing prices.

Link to action plans: This indicator is not part of the SDGs but is closely related to several targets of Sustainable Development Goal 2.

Data source: Data can be obtained from FAO.

Agency dimension indicators

A. AG1: Income inequality (%)

Name/description: Income inequality in terms of the income gap between the top 10 per cent and the bottom 50 per cent.

Overview: Estimates the uneven distribution of income through a comparison of the income gap between the top 10 per cent and the bottom 50 per cent.

Justification: Inequality results from inadequate policies, which lead to different economic outcomes among different segments of the population and potential economic instability.

Action areas: Suggested policies include enhancing financial integration, adopting redistributive fiscal policies, and liberalizing and deregulating labour and product markets.

Link to action plans: This indicator is related to Sustainable Development Goal 10, target 10.1.

Data source: Data can be obtained from the World Inequality Database (WID).

B. AG2: Gender inequality (%)

Name/description: Gender inequality index.

Overview: Estimates existing inequality in achievements between women and men in terms of health, empowerment and the labour markets.

Justification: Provides insights into gender disparities to show how human development achievements are affected by gender inequality, as it could affect nutrition status.

Action areas: Suggested policies include improving the health system, particularly reproductive health, empowering women, facilitating access to social services or ensuring equal opportunity.

Link to action plans: This indicator is related to Sustainable Development Goal 5.

Data source: Data can be obtained from the United Nations Development Programme (UNDP) (human development data).

C. AG3: Education inequality (%)

Name/description: Inequality in education (%).

Overview: Assesses inequality in years of schooling of the adult population and is derived from the highest level of schooling achieved.

Justification: Education can lead to equal opportunities, as higher average education tends to lead to better outcomes. Education inequality is often related to inequalities in human development.

Action areas: Suggested policies include provision of access to credit, scholarships or other benefits, or universal policies such as progressive taxation, public expenditure or social protection including anti-discrimination legislation.

Link to action plans: This indicator is related to Sustainable Development Goal 4.

Data source: Data can be obtained from UNDP (human development data).

D. AG4: Voice and accountability (rank)

Name/description: Voice and accountability (rank)

Overview: Assesses the perception of the extent to which the population is able to determine how it is governed, freedom of expression and association, and freedom of the press.

Justification: It assesses whether citizens can express their preferences, secure rights and participate in governing to achieve better outcomes.

Action areas: Suggested policies include empowering individuals and communities, enabling participation in decision-making processes or holding decision makers accountable.

Link to action plans: This indicator is related to Sustainable Development Goal 16.

Data source: Data can be obtained from the World Bank.

Sustainability dimension indicators

A. SU1: Agriculture water (%)

Name/description: Agricultural water withdrawal as a percentage of total renewable water resources (%).

Overview: Estimates the share of water withdrawn for agriculture purposes in total renewable water resources and shows the sustainability of water use for food production.

Justification: Water is crucial for food production and the exacerbating water scarcity in the region points to the need to readapt agricultural practices to preclude their overexploitation.

Action areas: Suggested policies include tightening and enforcing water regulations, incentivizing water saving, improving water use efficiency, reassessing practices and adopting new technologies and techniques.

Link to action plans: This indicator is related to Sustainable Development Goal 6, target 6.4 (indicator 6.4.2).

Data source: Data can be obtained from AQUASTAT (FAO).

B. SU2: Land cover (index)

Name/description: Climate Altering Land Cover Index.

Overview: Estimates changes in the share of climate altering land cover compared to the base year of 2015 when all countries reported their land cover.

Justification: The land cover considered includes areas that have climate-influencing, climate-regulating and climate-neutral impacts, and their fluctuations over time influence climate regulation and climate change.

Action areas: Suggested policies include protecting natural resources, reversing degradation, establishing protected areas or rehabilitating degraded lands.

Link to action plans: This indicator is related to Sustainable Development Goal 15.

Data source: Data can be obtained from the International Monetary Fund (IMF) (computed) and FAO (raw/background data).

C. SU3: Agroecological footprint (global hectare per capita (gha/cap))

Name/description: Ecological footprint of consumption (global hectare per capita).

Overview: Estimates the ecological footprint as measured through production, imports, exports and consumption, where consumption equals production plus imports minus exports.

Justification: The ecological footprint accounts for natural resources used for food, materials, settlements and infrastructure, and to sequester human-generated carbon emissions.

Action areas: Suggested policies include promoting sustainable production and consumption, adopting and enforcing sustainability measures, reducing waste or promoting recycling.

Link to action plans: This indicator is related to Sustainable Development Goal 12.

Data source: Data can be obtained from the Global Footprint Network or York University (Toronto, Canada).

D. SU4: Food waste (kg/cap/year)

Name/description: Food waste estimates (kg/capita/year).

Overview: Estimates the total amount of food that is wasted per capita, thereby evaluating the food value chain and providing a measure of the efficiency of the food system.

Justification: Food waste results in economic loss and increased pressure on food systems; reducing food waste thus maximizes the value of agricultural land and ensures natural resource sustainability.

Action areas: Suggested policies include promoting sustainable management in the food system, improving food value chain efficiency or publishing guidelines and tips for waste reduction.

Link to action plans: This indicator is related to Sustainable Development Goal 12 (indicator 12.3.1).

Data source: Data can be obtained from the United Nations Environment Programme (UNEP).

Annex 2. Additional characterization of the selected indicators

Indicators				
Code	Short name	Attribute	Normalization	Source of data and link
Core indicators				
CO1	Undernourishment (%)	Outcome	Reversed (R)	FAO: fao.org/faostat
CO2	Food insecurity experience (%)	Outcome	Reversed (R)	FAO: fao.org/faostat
CO3	Obesity (%)	Outcome	Reversed (R)	FAO: fao.org/faostat
CO4	Stunting (%)	Outcome	Reversed (R)	FAO: fao.org/faostat
Availability dimension				
AV1	Wheat yields (%)	Sustainability		FAO: fao.org/faostat and Mueller et al. (2012): nature.com/articles
AV2	Agriculture expenditure (index)	Resilience		FAO: fao.org/faostat
AV3	Average dietary energy supply adequacy (%)	Inclusivity		FAO: fao.org/faostat
AV4	Cereal import dependency (%)	Resilience	Reversed (R)	FAO: fao.org/faostat
Access dimension				
AC1	Poverty (%)	Inclusivity	Reversed (R)	World Bank: data.worldbank.org
AC2	Food consumption (%)	Inclusivity	Reversed (R)	Various: knoema.com or ourworldindata.org or ers.usda.gov
AC3	Logistics (index)	Resilience		World Bank: lpi.worldbank.org or data.worldbank.org
AC4	Inflation (%)	Resilience	Reversed (R)	World Bank: data.worldbank.org
Utilization dimension				
UT1	Water and sanitation (%)	Inclusivity		FAO: fao.org/faostat
UT2	Dietary energy from starchy foods (kcal/cap/day)	Inclusivity	Reversed (R)	FAO: fao.org/faostat
UT3	Access to healthy diet (%)	Inclusivity	Reversed (R)	FAO: fao.org/faostat
UT4	Anaemia (%)	Inclusivity	Reversed (R)	FAO: fao.org/faostat
Stability dimension				
ST1	Food stocks (1000 t)	Resilience		FAO: fao.org/faostat
ST2	Political stability (rank)	Resilience		World Bank: info.worldbank.org

Indicators				
Code	Short name	Attribute	Normalization	Source of data and link
ST3	Production variability (1000 international \$/cap)	Resilience	Reversed (R)	FAO: fao.org/faostat
ST4	Supply variability (kcal/cap/day)	Resilience	Reversed (R)	FAO: fao.org/faostat
Agency dimension				
AG1	Income inequality (ratio)	Inclusivity	Reversed (R)	World Inequality Database: wid.world
AG2	Gender inequality (index)	Inclusivity	Reversed (R)	UNDP: hdr.undp.org
AG3	Inequality in education (%)	Inclusivity	Reversed (R)	UNDP: hdr.undp.org
AG4	Voice and accountability (rank)	Inclusivity		World Bank: info.worldbank.org
Sustainability dimension				
SU1	Agricultural water (%)	Sustainability		FAO: fao.org/aquastat
SU2	Land cover (index)	Sustainability	Reversed (R)	IMF: climatedata.imf.org
SU3	Ecological footprint (gha/cap)	Sustainability	Reversed (R)	Global Footprint Network: data.footprintnetwork.org
SU4	Food waste (kg/cap/year)	Sustainability	Reversed (R)	UNEP: wedocs.unep.org

Draft for Discussion

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Endnotes

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53. Jones and others, 2013; Pangaribowo and others, 2013.
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55. See e.g. Ericksen and others, 2010.
56. See e.g. Garnett and others, 2013; Berry and others, 2015; Béné and others, 2019; Béné and others, 2020.
57. HLPE, 2020; Clapp and others, 2022.
58. Sen, 1985, p. 203.
59. Clapp and others, 2022, p. 4; Fukuda-Parr, 2003; Ibrahim and Alkire, 2007.
60. HLPE, 2020, p. 202.
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63. HLPE, 2020, p. 10.
64. FAO, 2006.
65. FAO, 2005.
66. To evaluate the performance of each indicator, a score had to be computed through a normalization process to make it easier to understand the implication of the data using a similar scale for all countries. A normalization process allows all indicators to be re-scaled to a same or comparable range regardless of their value ranges or units of measure such as percentages, indices, kilocalories, ranks, cubic meters, monetary, etc., as they vary for many indicators. Thus, a score between 0 and 3 is computed using the actual numerical values of the variables compared to the determined global minimum and maximum values of those indicators. Thus, the performance of each indicator is evaluated on a scale from 0 to 3, with 0 being the worst performance (off-track to achieve the goal) and 3 the best performance (on-track to achieve the goal) using the below equation:

- When a high value is best (e.g. yields): $(X - \min) / (\max - \min) * 3$.
- When a low value is best (e.g. obesity): $(X - \max) / (\min - \max) * 3$.

Here, "X" is the value of the indicator to be normalized. The maximum and minimum are global values and thus are not country- or region-specific to lessen their fluctuations. This allows for greater stability as it becomes less subject to national or regional fluctuations as condition changes. (Note: This methodology builds on the one outlined by LaFortune et al. in the document "SDG Index and Dashboards Detailed Methodological paper" (2018). Following the linear normalization used, a score between 0 and 1 indicates an "off-track" goal trend, while between 1 and 2 indicates a "stagnating" goal trend and between 2 and 3 indicates an "on-track" goal trend.)

Abstracts

Long version

This report focuses on assessing food security and developing an updated assessment framework for evaluating food systems in the Arab region. It outlines a comprehensive approach to assessing food systems in a way that accounts for the key dimensions of food security – availability, access, utilization, stability, agency and sustainability – by integrating them into a food systems framework through its commonly accepted components, external drivers and outcomes. This allows for a categorization of Arab food systems based on income levels, conflict status and food system development stages to highlight known challenges and recommend action steps for achieving the desired food systems transformation. It also enables the evaluation of Arab food systems based on their ability to support three key attributes: inclusivity, a measure of equity and food justice; resilience, the capacity to recover from shocks such as conflicts or pandemics; and sustainability, which concerns resource scarcity and environmental pressures. The Arab Food Systems Assessment Tool thus aims to provide a comprehensive understanding of the Arab food systems landscape, enabling policymakers to make informed decisions and implement targeted interventions to improve food security, reduce inequalities, enhance resilience and promote sustainability in the region.

Draft for Discussion