



Food and Agriculture Organization
of the United Nations



PRIORITIES FOR FOOD AND AGRICULTURE IN THE NEAR EAST AND NORTH AFRICA REGION 2020-2030

*A background paper prepared in view of the
35th FAO Regional Conference for the Near East*

FAO Regional Office for the Near East and North Africa
Cairo, February 2020



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I. INTRODUCTION

FAO's Regional Office for the Near East and North Africa (RNE) has embarked on a series of reflections with the purpose of informing future strategic directions in the region. Part of this process includes a strategic thinking exercise to review current trends and evolving country needs and consider future challenges and opportunities for agriculture, food systems, food security and the environment in the Near East and North Africa (NENA) Region.

The purpose of this paper is to identify key strategic priorities for food and agriculture in the region for the next ten years, and how FAO can best support countries in addressing these priorities in the context of the 2030 Agenda and the Sustainable Development Goals.

In this regard, the process is intended to provide substantive inputs ahead of the 35th FAO Regional Conference for the Near East and North Africa in March 2020, particularly in the identification of the region's challenges and priority areas of work for FAO.

The process helps bridging country demands and global issues under a regional umbrella, focusing on challenges best tackled at regional level; ensures that regional specificities are clearly reflected in FAO's work on priority issues such as nutrition, climate change and the Sustainable Development Goals; and provides a good basis for FAO to develop partnerships and facilitate resource mobilization.

This report focuses on the priorities for food and agriculture over the period 2020-2030 in the Near East and North Africa (NENA)¹ region. Its findings and recommendations may also be relevant to countries sharing similar sets of conditions, including in particular other countries of the Arab region (Comoros, Djibouti and Somalia).

Overview of the NENA region

The NENA region is home to 403 million people, with 41% of the population living in rural areas. Agriculture contributes 14 percent of the region's GDP (excluding the oil-rich countries) and provides employment to 38 percent of the economically active population. The region is the world's most land- and water-scarce, where per capita availability of agricultural land averages around 0.3 ha, and per capita water availability is 10 percent of the global average (FAO, 2019b). With increasing number of conflicts, the regions has suffered a setback in its fight against hunger: after years of progress, today one in every 8 people goes to bed hungry each night, the same percentage as 10 years ago. In addition, the region suffers from alarming problems of overweight and obesity, in particular among children and women: for adult women, overweight and obesity rates in the NENA are higher than in any of the other regions (FAO, 2019a; FAO, 2020).

The NENA is a region of strong contrasts. The countries are very diverse in their capacities, resources and needs. The region is home to some of the wealthiest countries in the world as well as some of the

¹ The region includes Algeria, Bahrain, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Qatar, Saudi Arabia, Sudan, Syria, Tunisia, UAE and Yemen, as well as West Bank and Gaza.

least developed countries. There are several ways of classifying countries. The following classification is based on a combination of geographical and socio-economic considerations.

1. **Maghreb, mostly middle-income countries:** Algeria, Libya, Morocco, and Tunisia. Located to the north of the Sahara desert, these countries see their agriculture and population concentrated along the coasts. Their position on the southern side of the Mediterranean Sea offers them market opportunities with nearby Europe, with a fast modernizing commercial agriculture alongside a substantial and less developed smallholder sector.
2. **Mashreq:** Egypt, Iraq, Jordan, Lebanon, Palestine, Syria, West Bank and Gaza. Dominated by Egypt and its 100 million inhabitants, the region's agriculture relies heavily on irrigation, which is the main source of agricultural production. These countries also share a dual agricultural system, with a dynamic, commercially-based agriculture on one side, and less developed smallholder system on the other side.
3. **NENA LDCs:** Mauritania, Sudan, and Yemen are the least developed countries of the region suffering from institutional and infrastructure gaps. In these countries, agriculture represents a larger share of GDP and the largest part of the population relies on agriculture for its livelihood.
4. **Countries of the Gulf Cooperation Council (GCC):** Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and United Arab Emirates. These countries have built their wealth on important sources of oil. The Gulf Countries are mostly deserts and agriculture plays a marginal role in their economy.

An important factor of contrast that cuts across these categories is the level of political stability. Countries subject to protracted crises and conflicts include Syria, Iraq, Libya, Palestine and Yemen. Their dynamics, challenges and needs are substantially affected by their status and require adapted response.

Small-scale family farmers in the NENA region contribute to more than 80 percent of agricultural production from nearly 75 to 85 percent of agricultural land holdings, but national priorities generally do not reflect their important contribution to the social and economic development of the countries. Proportionately lower public investments in the rural areas in relation to urban areas have resulted in growing divide between rural and urban areas in terms of income, and to migration of rural youth to cities in search of better economic opportunities. Unemployment rates in NENA countries are persistently higher than in other world regions, particularly for young workers (aged 15–24) and women. This problem is acute in the middle income, as well as in some high-income countries of the region, and has worsened in some of them in the past two decades. Youth unemployment averages over 25 percent and has been constant for the last 20 years (FAO, 2019a). For women, unemployment is only part of the problem. Female participation rates in NENA countries are the lowest in the world and have risen little in the past four decades (World Bank, 2009). Noticeably, albeit women participation in the sector is 63%, they face discrimination in accessing resources (own only about 7 percent of the agricultural land).

Beyond conflicts and crises, water scarcity and climate change are the most fundamental challenges to the achievement of SDG 2. Water scarcity is the binding factor to agricultural production in the NENA region and the driver of the region's dependency on food imports. Climate change will further exacerbate problems of land and water scarcity and degradation, and its impact on water is projected to be the largest in the world, possibly lowering the Arab region's GDP by 6-14 percent by 2050.

The region engages in the world's lowest level of intra-regional trade -10 percent of its global trade. Private sector participation in the agricultural sector is extremely low. Most countries of the Arab region are not spending enough in agriculture, making the region the second lowest (only sub-Saharan

Africa is slightly lower) in Agriculture Orientation Index (ratio of the share of agriculture in public spending relative to its contribution to GDP) in the world, seriously depleting the institutional capacities to respond to growing challenges and opportunities in the sector.

While the value of agricultural production in NENA has kept pace with population growth over the last decade, the growth of domestic food production has consistently lagged behind population growth and the ensuing growth of food demand, creating a widening gap between domestic production and demand which is filled by imports. The domestic production-consumption gap is particularly marked for cereals, which provide the bulk of the calories in the region, but also for vegetable oils, sugar and meat (FAO, 2017). The region as whole is the largest importer of wheat and it includes three of the world's largest importers of cereals: Saudi Arabia, Egypt and Algeria.

The food production and consumption gap is expected to increase, as a result of water scarcity, climate change and increasing demand from a growing and more urbanized population. The status of the region as a net food importer is therefore not expected to change. Thus, the challenge for the region rests on how to use its natural and economic resources in the most effective and sustainable manner while ensuring food and nutrition security for its people (Borgomeo and Santos, 2019). Though a negative trade balance does not necessarily suggest a lack of agricultural capacity, countries must continue using comparative advantage as a metric for agricultural growth.

But the region's opportunities are also large. Growing population signifies availability of human resources that can contribute to regional development. The energy reserves in the region, albeit concentrated in a limited number of countries, offer a large and unique resource for economic development if resulting benefits are invested and shared strategically within the region. There is also a large potential of better balancing the supply and demand of food through intra-regional trade – some countries have the natural resources to produce and export food and feed to meet a significant part of the region's needs but lack the financial and technical resources to do so; while others have the economic resources to import food, but lack the natural resources to produce their own food. The region is also strategically located to meet the growing demands of specialty agricultural products for its own market, Europe and other parts of the world.

BOX: The FAO Regional Office for the Near East and North Africa

The Regional Office of FAO for Near East and North Africa (RNE), based in Cairo, Egypt, delivers its support to member countries through a nucleus of staff at its regional office, three strategically located sub-regional offices, and an FAO Representation in majority of countries.

The sub-regional offices include:

1. Sub-regional office for North Africa (SNE): Based in Tunisia, it covers the Maghreb countries of Algeria, Libya, Mauritania, Morocco, and Tunisia,
2. Sub-regional office for the Gulf (SNG): Based in the United Arab Emirates, the office covers the Gulf States and Yemen, and
3. Sub-regional office for Mashreq (SNM): Based in Lebanon (operational in 2020) to serve Mashreq countries of Iraq, Jordan, Lebanon and Syria.

RNE, while coordinating FAO's work throughout the region, also serves Egypt, Sudan and Palestine directly.

II. EXTERNAL FACTORS INFLUENCING AGRICULTURE AND FOOD IN THE REGION

The global context

In an increasingly globalized and interconnected world, what happens in a region cannot be analyzed without considering the global context. The global economy grew at a pace of around 3 percent in 2019 and 2020 amid signs that growth has peaked, according to the United Nations World Economic Situation and Prospects (WESP) 2019 report. Economic growth is uneven and is often failing to reach where it is most needed. The global economy is currently facing a confluence of risks, which have the potential to disrupt economic activities and inflict significant damage on longer-term development prospects (United Nations, 2019)². These risks include waning support for multilateral approaches; the escalation of trade policy disputes and protectionist measures; financial instabilities linked to elevated levels of debt; and the rising climate risks, as the world experiences an increasing number of extreme weather events.

Regional realities: instability, conflicts and the role of governance

The NENA region has long been one of the most unstable regions in the world, a reality that is unlikely to change significantly in the near future. This instability is the result of ongoing conflicts and tensions as well as variety of long-term pressures growing out of natural and man-made drivers. Conflicts have affected 12 of the 22 countries of the region in the last decade (A. Ould Ahmed, 2019; personal communication) and currently affect 30% of the region (O. Ayman, 2019; personal communication). They resulted in over 14 million Internally Displaced Persons (IDPs) in 2017, in addition to 6.7 million refugees fleeing the region in 2016. Approximately, 6.2 million Syrians fled into neighboring countries like Lebanon, Jordan and Turkey, costing Syria and neighboring countries 35 billion USD (Ward, 2016). The countries with **conflicts** have five times more hungry and malnourished (27.7% of the population) than the **non-conflict** countries (5.4 %) in the Arab region and the proportion of undernourished people averages three times higher in countries with protracted crisis than in other developing countries (FAO, 2012b). The region is going through an intense period of political, economic and social tensions. Rising unemployment and socio-economic inequalities, weak social, political and administrative accountability mechanisms have eroded citizen's trust in the institution and given rise to unrest in several countries. The region now faces the challenge of proposing new forms of governance and accountability that better reflect popular aspirations (UNDP, 2019).

Population growth, urbanization and food markets

The NENA region has experienced a demographic surge. During 1950-2010, the Arab region experienced a 5-fold increase in population (similar to least developed countries), compared to about 3-fold increase at the global level. Its current annual population growth rate (2 percent during 2010-2015) is almost double the global average (1.2 percent; Figure 1). Countries such as Sudan, Iraq, Palestine, and Yemen still have relatively high growth rates, while Egypt, where population growth rates had slowed down in recent years, is showing a reversal in that trend. While absolute numbers will rise to 2050 both in rural and urban areas (Figure 2), the region's population growth rates have been slowing down in recent years and are expected to level off by 2050.

² United Nations (2019). World Economic Situation and Prospects 2019. United Nations, New York.

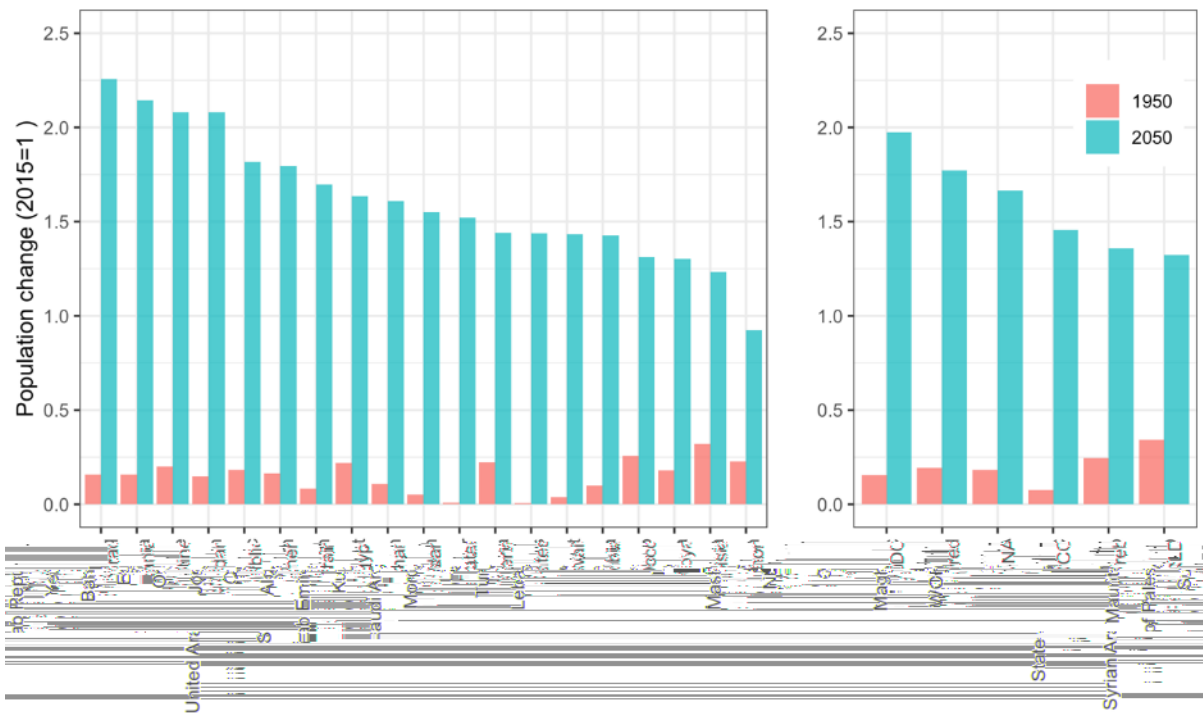


Figure 1: Relative changes in population growth between 1950/2015 and 2015/2050, indexed, 2015 =1). Source: United Nations, Department of Economic and Social Affairs, Population Division (2019). World Population Prospects 2019, Online Edition.

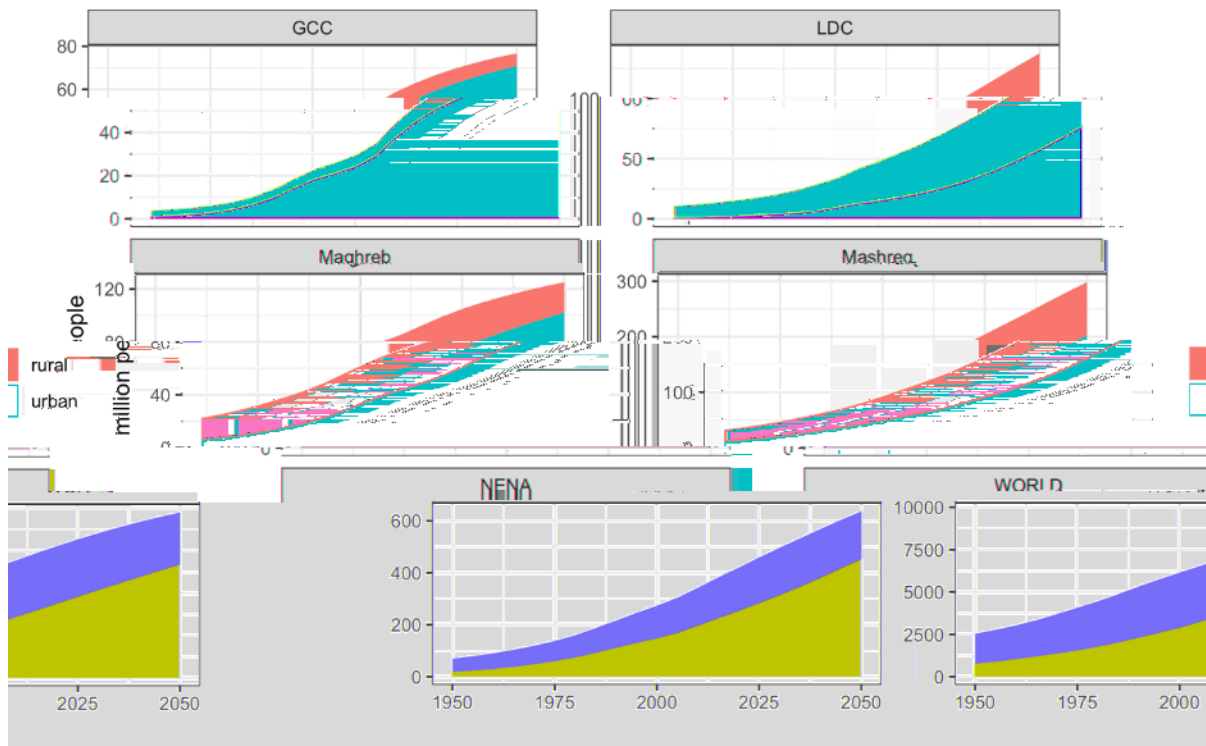


Figure 2: Urban and rural population trends and projections in the Arab region (million people) Source: United Nations, Department of Economic and Social Affairs, Population Division (2019). World Population Prospects 2019, Online Edition.

The region has been urbanized fast. In 2015, 54% of the world's population lived in rural areas, compared to 39% of the population in the NENA region. The current share of urban population in the region will rise to 75% in the next 30 years. Some countries, such as Kuwait and Qatar, are already almost 100% urban. Urban expansion has generally occurred at the expenses of productive soils along rivers and coastal areas (Woertz, 2019; Ward, 2016; Borgomeo and Santos, 2019; ESCW, 2017a; FAO, 2018a), sometimes substantially impacting agriculture.

A much larger and growing urban population will present both an opportunity and a challenge. Inevitably trade in food will increase. Food purchases will rise steeply and the food consumption mix will become more complex and higher value. This presents both an opportunity for the region's agriculture, particularly to supply more high value food, but also a challenge, as a decreasing share of foods will come from local sources.

Gender exclusion and inequalities

The NENA Region is among the most unequal in the world: the top 10% income share varies between 60%–66% over the period 1990–2016, while the bottom 50% share is less than 10% (WID, 2019). This is due both to large contrasts between countries (particularly between oil-rich countries and the others), but it is also the result of very large inequality within countries. The problem is particularly acute in the Gulf countries, with the growing population share of low-paid foreign workers.

Globally, poverty rates are more than three times higher in the rural areas (17.2% of the population) than in the urban areas (5.3%) (UNGA, 2019). Proportion of rural population considered poor in the MENA³ region stood around 34% - twice the global average (UNGA, 2019; Borgomeo and Santos, 2019), and 70% of the region's poor live in rural areas (FAO, 2019c). In Egypt, Sudan and Yemen, rural poverty is twice as high as in the urban areas. Food security among the urban populations is slightly better because of employment opportunities and social protection programs but gets complicated with influxes of rural migrants and internally displaced persons (IDPs) in countries with conflicts. In addition, urban areas tend to have higher incidence of people consuming processed foods relying less on fresh foods/vegetables and more on quick-and-easy foods, leading to high prevalence of obesity in cities. Per capita income varies greatly in the region, along with the proportion of expenditure on food (ESCWA, 2017a).

Gender inequality across the region is prevalent. Maternal mortality rates are high compared to other regions with similar incomes. Only 25% of Arab women participate in the labor force, half the average for developing world. Because of the male-centric culture in many Arab societies, many women experience limited roles outside the home. Human and income poverty reflect the convergence of social, economic and political exclusion (UNDP, 2019).

The role of agriculture in the economy

While more than 40 percent of the population is rural, agriculture - the primary occupation in rural settings - accounts for only 13 percent of the GDP and provides 38 percent of jobs to economically active population in the region (FAO, 2019b; FAO, 2019c). High unemployment rates prevail. In 2015, an agricultural worker produced USD 3 400 worth of products, about one-third of that produced by a worker across other sectors. Lower productivity of the agricultural workers leads to lower wages in the sector, which eventually leads to double poverty rates in rural areas compared to urban areas of

³ OECD and World Bank's regional grouping is the Middle East and North Africa Region (MENA). The countries are the same as in the NENA region, plus Iran.

the region (FAO, 2018a). This is apparent also observing the difference of agriculture raw commodities compared to agro-industries containing value additions. While the countries of the region have made significant progress on several development fronts over the past 40 years, such as improving life expectancy and school enrolment, the region could be more effective in translating its considerable wealth and potential into commensurate development gains.

Climate change

Climate change adversely affects livelihoods by its impact on natural resources and financial and social capital. It disproportionately affects the poor - majority of who live in rural areas, and those living in conflict-prone areas (UNGA, 2019). That has special significance for the NENA region where poverty rates are twice as high in the rural areas than in urban areas, and where several countries are living in conflicts. It also disproportionately affects the production and income of smallholders, who contribute 5.5% of regional GDP and produce 85% of the region’s fresh food supply (Ward, 2016).

Compared, to pre-industrial conditions, the temperature in the region has risen by slightly more than 1° C, a trend predicted to continue through this century, with pronounced differences in the mean annual temperatures by sub region (Figure 3). The region is already the most arid in the world where impacts of climate change are amongst the highest. Most of the region will become even drier: a 20-60% increase in drought frequency by 2050. An 8-10 mm decrease in annual rainfall by the end of the century is predicted, with large variations across the region and across seasons. At seasonal level, for instance, stronger precipitation changes are projected for countries along the Mediterranean coast for the winter months, and could reach as much as –40% in the Moroccan Highlands. By 2050, climate change-induced water scarcity is expected to lower the Arab region’s GDP by 6-14%. While increasing aridity and rising temperatures will increase demand for water by plants and animals, increased frequency of droughts and lower rainfall will reduce water recharge and water availability (ESCWA, 2017a). Reduced water availability will further complicate the management of shared water resources (ESCWA, 2017a; ESCWA, 2017b; Borgomeo and Santos, 2019).

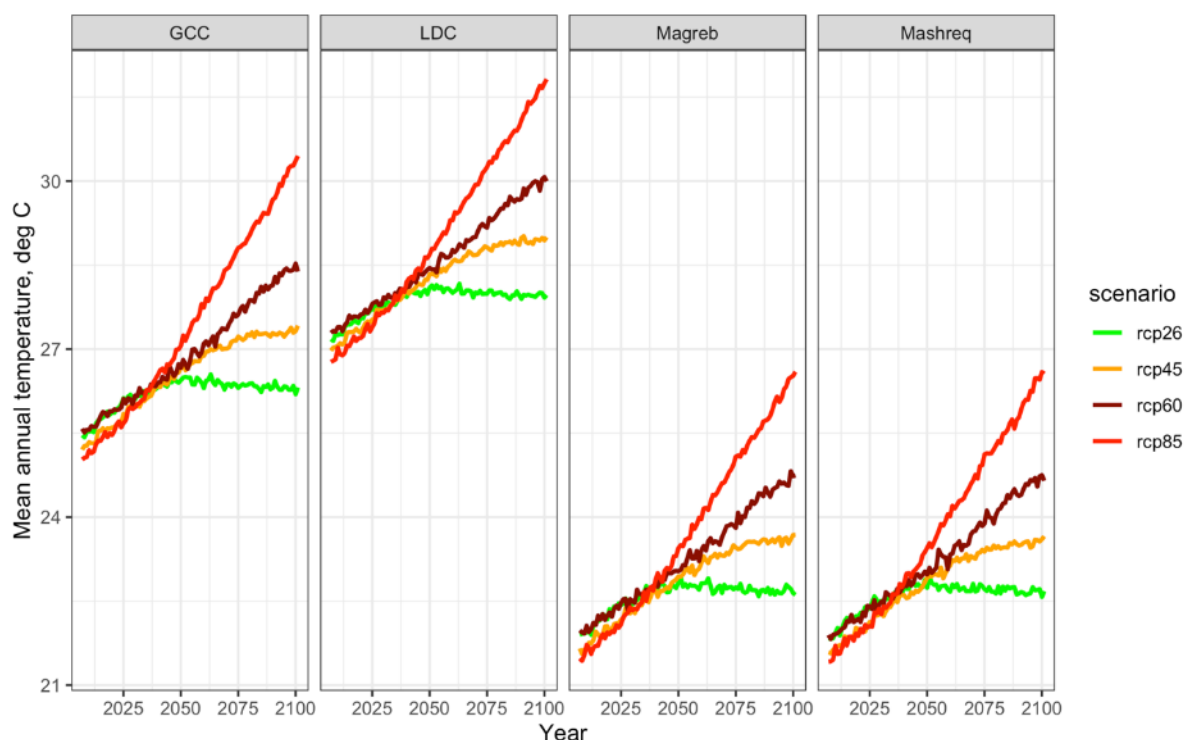


Figure 3: Projected changes in mean annual temperatures in the NENA sub regions for different scenarios (CMIP 5 mean values, aggregated by region), Source: Data downloaded from the KNMI, available at <https://climexp.knmi.nl/>

Recent years have already experienced a rise in frequency and intensity of dust storms due to land use and land cover changes. Drier soils intensify severity of heat waves, and desertification amplifies global warming by release of CO₂ stored in the lost vegetation and reduces biodiversity. Thus, climate change negatively impacts the natural resources (water, land and biodiversity) that underpin sustainable food and agriculture systems (IPCC, 2019).

Along with its impact on the natural resources, climate change will increase evapotranspiration, alter species habitats, and increase prevalence of diseases and pests, including the transboundary ones. It will affect all farming systems across the region, especially the rainfed (21% additional decline in already low and declining crop yields by 2080 (ESCWA, 2017a)) and dryland pastoral systems (Figure 4 and Table 1). It will lower quality and supply of feed, and the carrying capacity of pasturelands. Fisheries and aquaculture will suffer from increased water temperatures, flood, drought, storms, and extreme weather events. In countries with coastal areas, it will affect both lives and livelihoods: rising ocean levels will result in displacement of entire communities (I. Serageldin, personal communication), and higher frequency and intensity of tidal waves would lead to land and water salinization, while the reduction of freshwater inflow into oceans could change the pH of sea water affecting fisheries and productivity of coastal areas (Borgomeo and Santos, 2019).

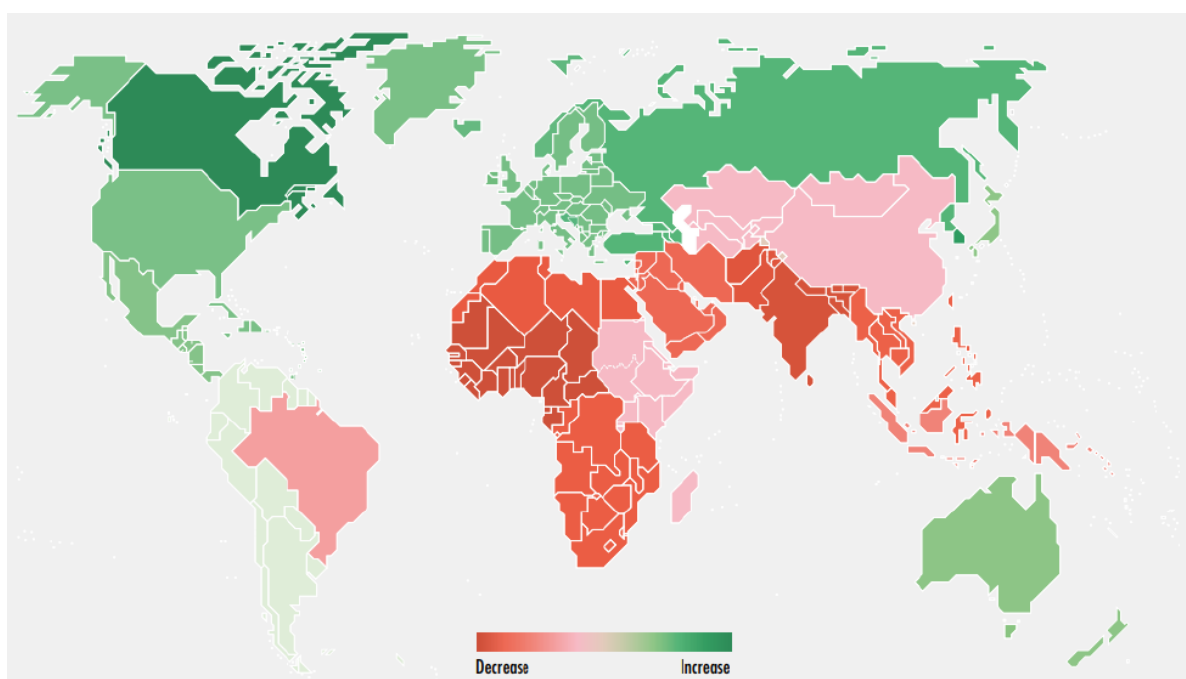


Figure 4: Projected impact of climate change on agricultural production (FAO, 2019g)

Farming system	Exposure: expected climate change-related events	Sensitivity: likely impact on farming systems
Irrigated	Increased temperatures	More water stress
	Reduced supply of irrigation water	Increased demand for irrigation and water transfer
	Dwindling of groundwater recharge	Reduced yields when temperatures are too high Salinization due to reduced leaching Reduction in cropping intensity
Highland mixed	Increase in aridity	Reduction in yields
	Greater risk of drought	Reduction on cropping intensity
	Possible lengthening of growing period	More frequent crop failure
	Reduced supply of irrigation water	Increased demand for irrigation and competition for water
Rainfed mixed	Increase in aridity	Reduction in yields
	Greater risk of drought	Reduction on cropping intensity
	Reduced supply of irrigation water	More frequent crop failure Increased demand for irrigation and competition for water
Dryland mixed	Increase in aridity	A system very vulnerable to declining rainfall
	Greater risk of drought	Some land may revert to rangeland
	Reduced supply of irrigation water	Increased demand for irrigation and competition for water
Pastoral	Increase in aridity	A very vulnerable system where desertification may reduce carrying capacity significantly
	Greater risk of drought	
	Reduced water for livestock and fodder	Non-farm activities, exist from farming, migrations

Table 1: Climate change impact on farming systems in the NENA Region (Adapted from: ESCWA, 2017a)

While agriculture will suffer from the impacts of climate change, the sector also contributes to global greenhouse gas (GHG) emissions. Globally, agriculture, forests and other land uses (AFOLU) represent between 20 and 24% of total GHG emission. Therefore, policies, technologies, investments and actions should aim at both mitigation and adaptation to climate change. The region must strengthen capacities of its institutions and individuals, especially of scientists and policymakers, to assess the impacts of climate change, and to develop and disseminate appropriate technologies and policies to

enhance adaptation and mitigation. Production should aim for greater productivity (more product per unit of land, water, biodiversity and other inputs) and lower GHG emissions per unit of product, with overall focus of technologies and policies on sustainable rural transformation and sustainable food systems.

Factors favourable to agricultural growth

Regional integration in the Arab region is far below its potential but there are signs of improvement. Intra-regional trade has improved between 2000 and 2015, with large differences between countries. While Saudi Arabia and UAE have experienced high intra-regional exports in 2015, intra-regional trade remained very low in countries like Djibouti, Libya and Mauritania (Ebaidalla and Mustafa, 2018).

High-value agricultural exports have boomed – and there is potential for further growth. Already there is a substantial export trade in agricultural to Europe, with which the region enjoys both proximity and historic ties. These exports can deepen and expand, as more neighboring countries may become important customers for high value agricultural exports.

A growing and increasingly educated population provides a pool of labour which can turn its hand to more advanced methods of production and processing, as has happened so successfully with the fruit and vegetable export industries in Jordan, Egypt and Morocco.

Access to investment capital is also an advantage. Capital flows come not only from public investment but also from the huge flow of remittances, from foreign direct investment from within the region, especially from the GCC, from outside the region, and from aid flows. Private sector investment remains low in the region due to several constraints, but it has the potential to grow substantially considering the important market that 400 million people represents.

The on-going digital revolution has a potential impact on all aspects of the economy. It can improve the collection, analysis, and sharing of trade- and market-related information across the region. Elimination of trade barriers, enhancement of capacities in setting uniform sanitary and phytosanitary, quality and safety standards across the region and their swift implementation, and efficient implementation of policies to facilitate trade would have significant impact on food security and nutrition as well as on economic development of the region. As exemplified by the experience in Palestine, there are different authorities responsible for quality and safety standards with one in the West Bank and another in the Gaza Strip. This has created an inefficacy in which goods are tested with different standards for different populations.

III. CRITICAL RISKS AND CHALLENGES TO ADDRESS

The region's food and agriculture sector faces several critical risks and challenges. Addressing them in the context of sustainable development will have large impact on the productivity and profitability of the sector as well as on the natural resources, rural livelihoods, and overall nutrition and health of the region's population.

Stagnation in smallholder agriculture

The agriculture sector contains two strongly contrasted components: a high value, commercial, export oriented agriculture, and a huge traditional smallholder agriculture. Smallholdings face the challenge of a poor resource endowment, above all the scarcity of water and the scantiness and unreliability of precipitation. Market linkages tend to be weak – what produce is marketed is generally sold for local consumption.

This smallholder sector has been relatively neglected in public policy and investment. Levels of public investment in research and producer services for what are seen as intrinsically low-yielding smallholder systems are particularly low. Public spending on rural infrastructure and services is typically only a fraction – sometimes as little as one twentieth - of spending per head on urban areas. These are major causes of low agricultural productivity, growing rural-urban divide and youth migration to cities.

Productivity is especially low and stagnating in the rain-fed smallholder systems (Figure 5) that grow cereals and horticultural crops as a diversification strategy to lower their risk, ensure a minimum income, and provide for direct consumption. Lack of investment and innovation to enhance productivity and sustainability of their systems lowers their degree of specialization and quality of their farming practices, which in turn lowers yields of both their horticultural and cereal crops. During 2010-2016, the region's wheat yield averaged 2.2 t/ha and oil-seeds yield 0.9 t/ha, and both were lower than the global average of 3.2 t/ha for both crops. Agricultural productivity growth rates are also stagnating in the region, and the small growth seen at the regional level is almost entirely due to better use of water in production of high-value crops in Egypt.

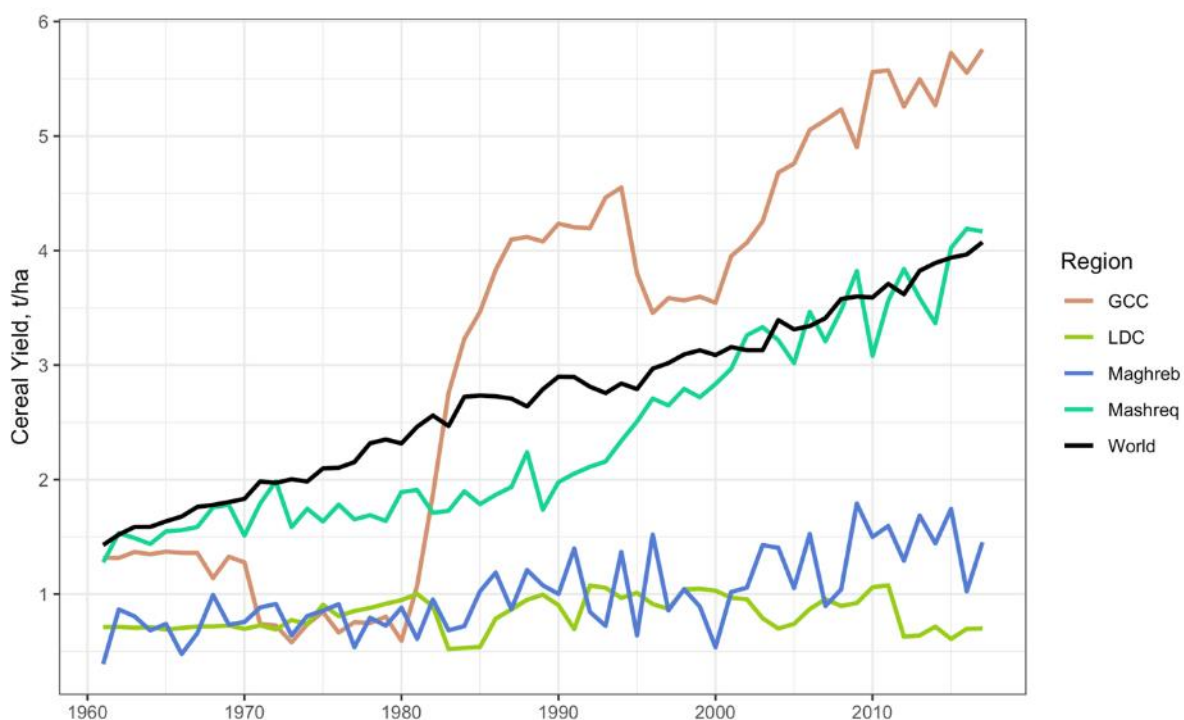


Figure 5: Trends in cereal yields in the NENA regions, and globally (t/ha) Source: FAOSTAT (accessed 2019)

Raising agricultural productivity to boost domestic production will depend on innovation to enhance productivity growth in the face of scarcity of water and arable land across the region. Use of modern biological, agronomic, and information technologies will have an important role in increasing agricultural productivity, including through genetic enhancement of productivity and adaptive capacities of species, better water and soil management, and crop husbandry. Sustainable intensification systems for enhancing agricultural productivity, including production in controlled environments (e.g., protected agriculture and hydroponics), can significantly raise resource-use efficiency and lower waste and contamination. Aquaculture, that now produces 2 million tons of fish per year, has more than doubled during the past decade and is projected to grow by another 50 percent over the next ten years throughout the region. Maximizing efficiency of the entire food value chains while integrating smallholder agriculture in it would be critical to sustainable rural transformation. Participation in commercial agriculture, in profitable value chains and value chain segments (only 20 percent of agricultural production is processed in the region), exploiting regional and global trade opportunities, can serve as a strong incentive for smallholders to raise their productivity. All this will require investments in improving infrastructure and services in rural areas, strengthening of research and policy institutions, and robust governance that promotes equitable access of resources and benefit-sharing.

High levels of rural poverty and unemployment, in particular for the youth

Unemployment rates are high across the region, and the problem is particularly acute in rural areas and for youth. Rural unemployment already averages 13 percent across the region and nearly 15 million additional jobs will be needed in the next decade, driven by high population growth. Youth

unemployment ranges between 26 and 53 percent depending on the country, and has been above 25 percent over the last 20 years (Borgomeo and Santos, 2019). The high youth unemployment rate, lower wages in the rural areas contributing to higher poverty, limitations of natural resources, conflicts, and rising expectations of the youth are major forces behind the rural to urban youth migration across the region, with consequent impacts on overall food systems, nutrition and poverty (Figure 6, Figure 7, Table 2).

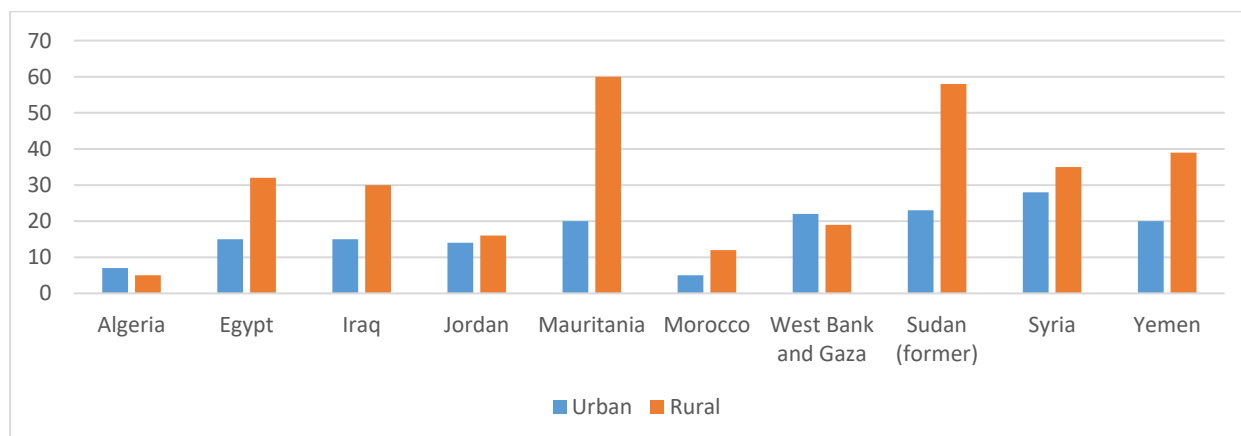


Figure 6: Urban and rural poverty rates (percentage of population). Source: ESCWA, 2017a, citing World Development Indicators: World Bank 2014).

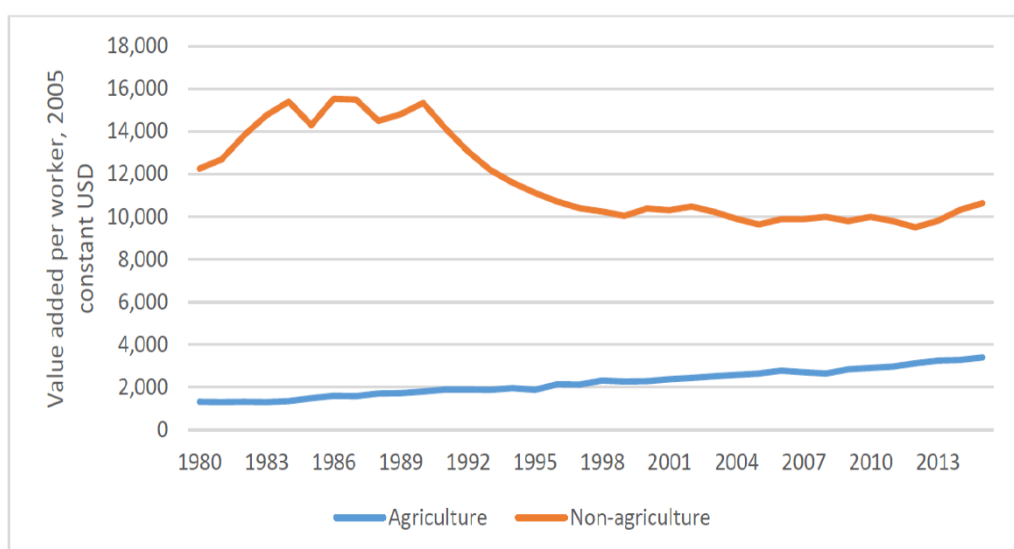


Figure 7: Rural-urban productivity gap. Source: FAO, 2018a

Youth are more attracted to jobs that employ modern technologies in relatively more comfortable settings than those requiring physical labor in harsh environments. Creation of high-paying, youth-attracting, and dependable jobs in rural areas, especially in the agricultural sector, should reduce youth migration to cities. Creation of such jobs will require public – private partnership but private sector participation is very low in the food and agriculture sector of the region.

	Total		Female		Youth (15-24)	
	2000-2010	2011-2015	2000-2010	2011-2015	2000-2010	2011-2015
High income						
Global	7	8	7	8	15	18
Bahrein	1	1	4	4	5	5
Kuwait	1	3	1	3	8	15
Oman	19	18	38	35	47	46
Qatar	2	0	8	2	9	1
Saudi Arabia	5	6	15	21	30	29
UAE	3	4	9	10	9	12
Upper middle income						
Global	6	6	6	6	15	15
Algeria	18	10	34	17	35	25
Iran	12	11	18	18	24	25
Iraq	19	15	30	25	39	33
Jordan	14	13	24	22	31	32
Lebanon	8	6	11	12	21	21
Libya	19	19	30	28	43	46
Lower middle income						
Global	6	5	7	6	13	13
Egypt	10	13	28	35	28	35
Mauritania	14	10	16	12	22	17
Morocco	11	9	11	10	18	17
Sudan	14	13	20	19	23	22
Syria	10	15	24	35	20	33
Tunisia	14	17	19	24	30	38
Yemen	15	18	22	38	28	32

Table 2: Total, female, youth unemployment in the MENA Region compared to world average, in percentage, 2000/2010 – 2011/2015 (Source: World Bank, 2018)

Government policies can do much to create the enabling environment for private sector participation in creation of attractive job opportunities for youth in rural areas. Public investments should aim at strengthening education and employability of rural youth; improving health and other infrastructure (e.g., roads, electricity, connectivity,

Poor access to resources for women

Despite recent advances in female education, the region's women face the highest unemployment rates of any region in the world, and they are 29 percent less likely to find a job than young men (FAO, 2012b; Ward, 2016). Women make significant participation at (63%) in the region's agriculture, but often lack land tenure rights, holding less than 7% of agricultural land in countries such as Egypt, Jordan, Saudi Arabia, and Tunisia (Woertz, 2019; Ward, 2016; Borgomeo and Santos, 2019; Climate Change Special Issue of September 2019; quoting UN).

Creating education and training opportunities for women to participate in the job market, developing and promoting pro-women technologies, and eliminating barriers that limit their participation in the food and agriculture sector and in rural development (e.g., rights to land, water, credit, equal rights social norms, access to extension services) will take the region a long way in balancing the needs of its rural development and food systems to improve food security and nutrition of its population in a sustainable manner.

Scarcity and degradation of natural resources

Scarcity and degradation of land, water and agrobiodiversity individually and in combinations are among the most important risks to food security, nutrition, productivity, and overall well-being of the region's population. The synergistic effect of the natural resource stresses can be seen by the projection that NENA is likely to be the only region in the world where harvested area will actually shrink due to limitations imposed by water availability and soil degradation keeping the region dependent on food imports through 2050 (FAO, 2018b).

The natural resource pressures are felt more strongly in the NENA region than in other parts of the world. Human-use and climate change-induced impacts on forest loss, waste, chemical contamination, reservoir sedimentation and urban sprawl have the potential to lower the region's GDP by 2.1 to 6% (Borgomeo and Santos, 2019). Misuse of fertilizers and pesticides has led to pollution of both water and land. Nitrates and pesticides seep down to groundwater or enter water courses through drainage or run-off. Persistent organic pollutants remain in soils and in the food chain, where they can be toxic to humans. Residues of chemical insecticides, including DDT, occur in the Nile, with high concentrations in sinks such as Lake Manzala (FAO, 2019d). Scarcity and degradation of natural resources exacerbate the problem of already stagnating productivity and income of smallholder producers who also lack the cushion and capacity of their relatively better-off counterparts to deal with financial, weather- and climate turbulences in their production systems, and, consequently, their participation in markets. The effective management of land, water systems, forests, soils and other resources is necessary for redressing root causes and the environmental drivers of vulnerability and risks for food and nutrition security.

Water

Water is the #1 limiting factor for agriculture in the region. Per-capita freshwater availability has gone down by 2/3 in the last 40 years (FAO, 2019c, Figure 8) and stands at around 1/10 of the global average at the moment (Ward, 2016). Most of the exploitable water is already withdrawn in the region leading

to serious depletion of its rivers and aquifers (FAO, 2012b), and most countries are now below the water poverty line of 1000 m³/ year (ESCWA, 2017a). Total renewable water resources are projected to decrease further by 20% by 2050, making NENA the only region in the world where agricultural land area would actually shrink because of water scarcity by then (FAO, 2018b). Rising population and climate change will further exacerbate scarcity and degradation of water. In addition to its direct impact on the food and agriculture sector, with 90% of the region’s land surface considered arid, semiarid or dry, the World Economic Forum 2015 Global Risks Report rates water crisis as the highest risk factor in the region (FAO, 2019c).

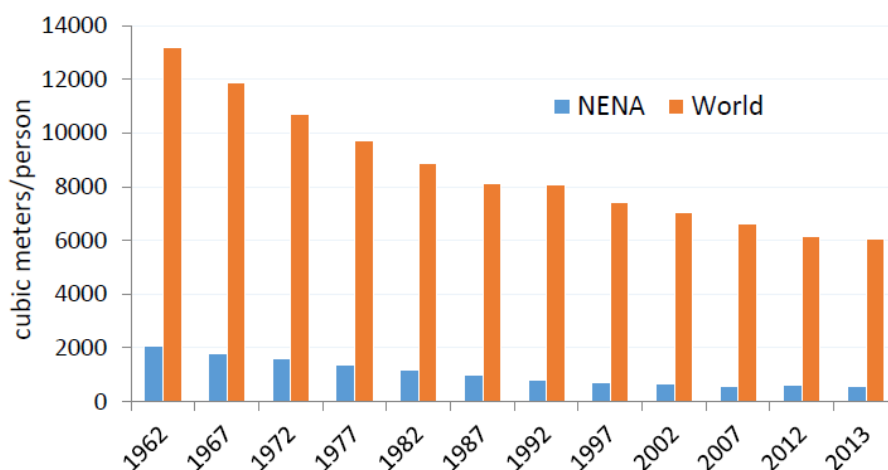


Figure 8: Total renewable water resources per country (Source: FAO-AQUASTAT, FAOSTAT)

In addition to excessive extraction and competition (Figure 9), fresh water also faces some policy constraints in the region. Countries of the region lack a coherent vision on use, allocation, and sharing of water. Fresh water management falls under mandates of many government agencies, impeding coordinated and integrated policies and implementation. About 60% of surface water in the region is transboundary but there is no legal and functional agreement on sharing the water (FAO, 2019c). In addition, the region has the lowest water tariffs in the world and heavily subsidizes water use, which contribute to lowering of water productivity to half of the world average (OECD-FAO, 2018; World Bank, 2018a).

About 10% of region’s agricultural land is irrigated and provides almost all of the region’s agricultural value. It is based on intense farming of high value crops. Rain-fed agriculture, on the other hand, is practiced on more than two-thirds of cultivated land and provides livelihoods to two-thirds of the agricultural population. Wheat, barley, legumes as well as livestock are common and integrated part of the rain-fed farming systems, with some intensive production of poultry and milk. With 23,000 km of shoreline and 16,600 km of rivers, fresh and brackish water lakes, and reservoirs, fisheries make an important contribution to the region’s food security producing 2.9 Mt from capture fisheries and 1.2 Mt from aquaculture in 2013.

Agriculture accounts for 85% of freshwater withdrawals in the region, far above global average of 70%. the sector faces growing competition for the scarce resource (scarcity exacerbated by reduced precipitation and increase temperatures induced by climate change) due to demands created by other sectors of the economy, population growth, changing food habits (rising demand for more water-intensive foods such as meat and other livestock products), and environmental services. The growing scarcity, competition among sectors depending on water, and quality deterioration of water are

expected to reduce its availability for agriculture in the future (Jean-Marc Faurès, 2019; personal communication; FAO, 2012a).

The region needs to use its available water in a way that produces maximum social and economic benefits, while protecting its quality. Benefits can be enhanced by maximizing water-productivity. Technological options include: using water-productive and drought-tolerant varieties and species of high-value crops (e.g., fruits, vegetables, medicinal plants, spices and herbs); management and cultural practices such as water harvesting and conservation agriculture; and systems such as aquaculture, hydroponics, protected agriculture. Judicious use of fertilizers and relatively safer pesticides along with the above technologies will also help protect water quality, reducing its deterioration caused by soil erosion and chemical contamination. Investments in lowering food loss and waste will result in significant savings in water use in the food and agriculture sector.

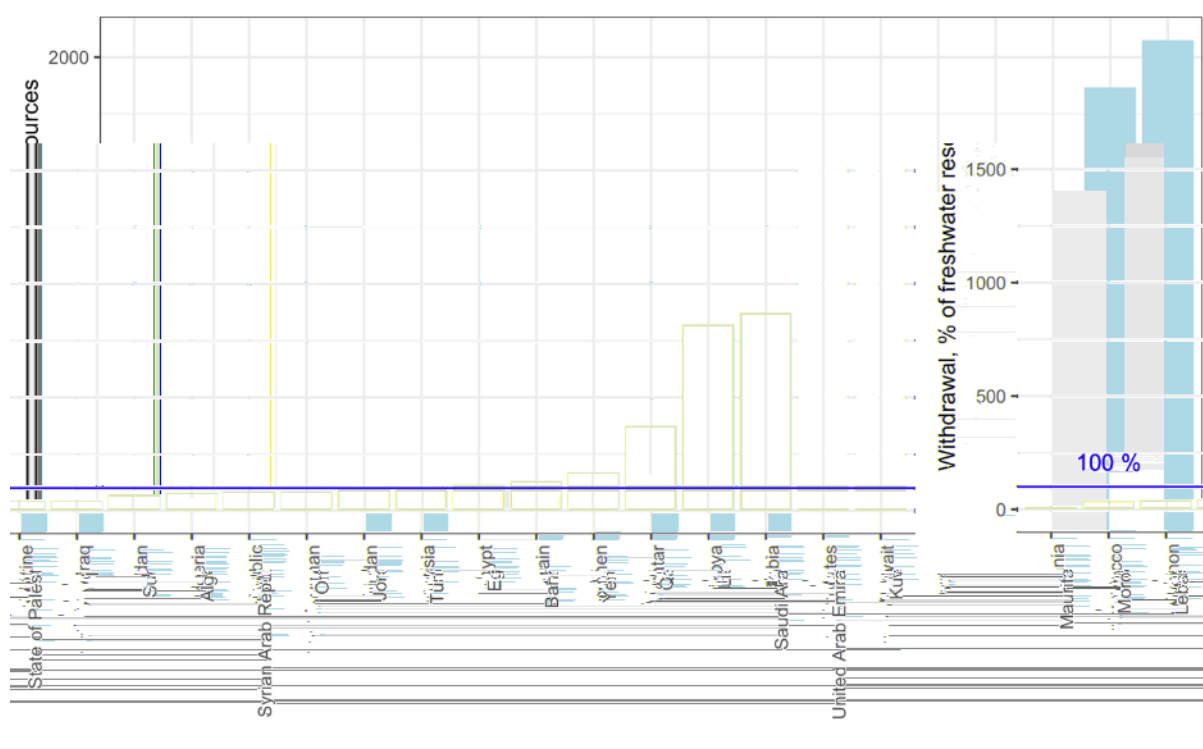


Figure 9: Water withdrawal as a share of water resources (Source: FAO-Aquastat)

On the policy front, rational use, re-use and allocation of water (including of transboundary water); promotion of water accounting and water audit; managing water demand, including through appropriate pricing; removal of water subsidies and of energy subsidies for water extraction; exploiting opportunities for virtual trade of water; improving coordination of actions across government agencies involved in water use; strengthening capacity of individuals and institutions that influence water use; and harnessing the opportunities offered by digitalization for collecting, analyzing, and sharing data for policy formulation and for raising awareness about scarcity and deterioration of water resource will help improve water-productivity and protect its quality.

The potential for reuse seems small, yet around 20 million ha of global agricultural land is irrigated using treated wastewater. Jordan has made significant advances in water reuse. So, the feasibility of treating and reusing water should be studied. Solar energy is becoming cheaper and its use in extracting water and in desalinization is growing. Studies are lacking on the economic, social and

environmental impact of this technology on different components of food and agriculture sector, as well as policies and strategies that would ensure sustainable use of water.

Land

Arable land constitutes only 6.8% of the total land areas- 26% of which is under pastures and 7% under forests (FAO, 2019c; Figure 10). While 30% of the total land is arable in Syria and Lebanon, only 0.5% of it is arable in Saudi Arabia and Oman, and 13 countries of the region have arable land below 5% of total land area. Of NENA’s 500 million ha arable land, only 17% is highly productive (FAO, 2019d). Distribution of productive land also varies: while Jordan has no highly productive land, 14% of Sudan’s land area is highly productive (ESCWA, 2017a).

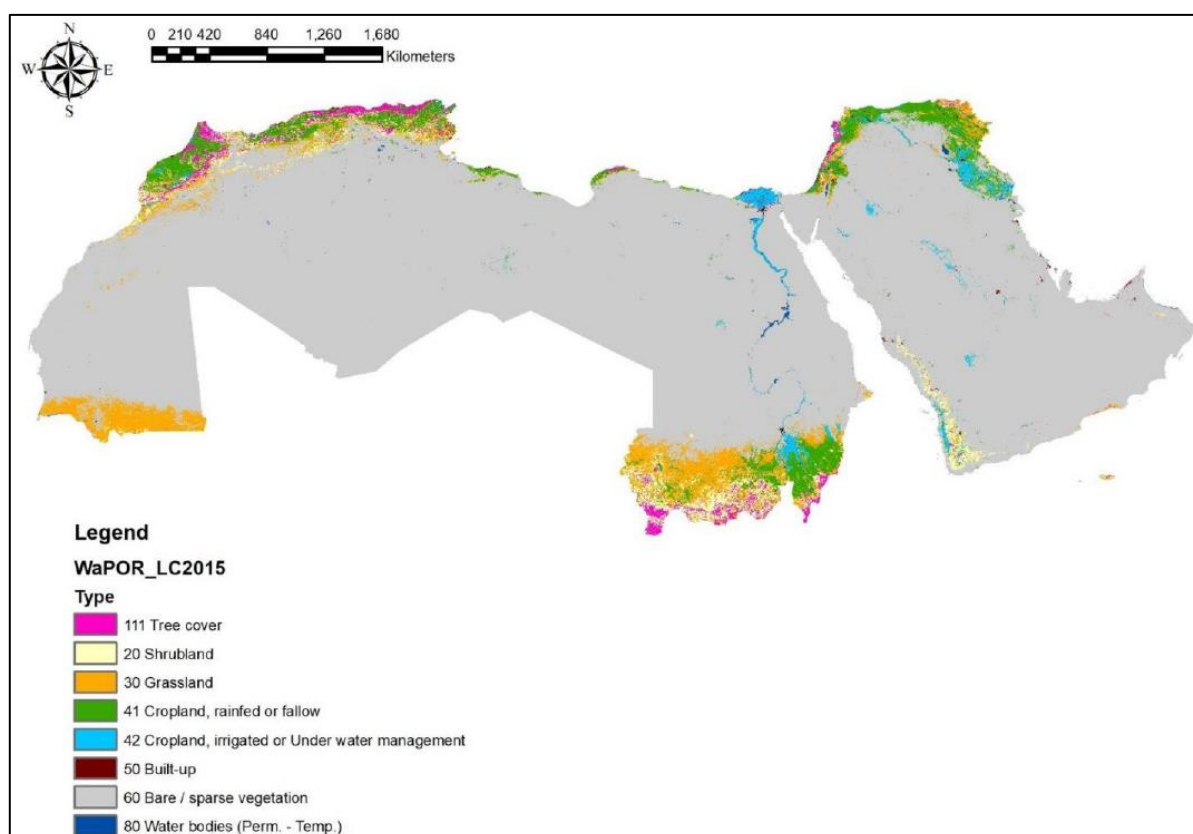


Figure 10: Land cover map for the NENA region (Source: FAO Wapor, 2019)

About 90 percent of land area in the region is degraded to different degrees by land-use/ cover change and use of unsustainable agricultural practices. Twenty-two million ha of the region’s 30 M ha of rainfed cropland are degraded. Water erosion, and unsuitable practices of irrigation, land preparation and fertilization lower soil fertility and increase its salinization, alkalinity and contamination (FAO, 2019b). Salinization of soils has increased and costs the region 1.6 billion USD (FAO, 2019d) of the total annual cost of land degradation of about \$300 billion per year (World Bank, 2018b). Fortunately, approximately 25% of the degraded land area (3.5 million km²) is suitable for restoration through sustainable land management practices (ICARDA, 2014).

Sustainable management of land resources would involve prevention of further degradation and restoration of already degraded land. Many useful technologies already exist: cropping systems that enrich and protect soils (e.g., avoidance of lengthy cereal-based monocultures), better management of irrigation to reduce salinization and sodicity, use of conservation agricultural practices, building

back soil carbon, use of input-use-efficient and stress-tolerant varieties and species, productive livestock systems using improved breeds and feeds that also lower environmental impacts, judicious use of chemicals (fertilizers and pesticides), improved species mix in the rangelands accompanied by appropriate grazing practices, use of protected agriculture and hydroponics that produce more in less land, and protection of natural forests and reforestation are but only some of them. Reducing post-harvest losses and waste can have large impact on land-use in agriculture (Figure 11). However, the existing options require research for fine-tuning them for the specific local conditions and still better ones need to be developed and promoted.

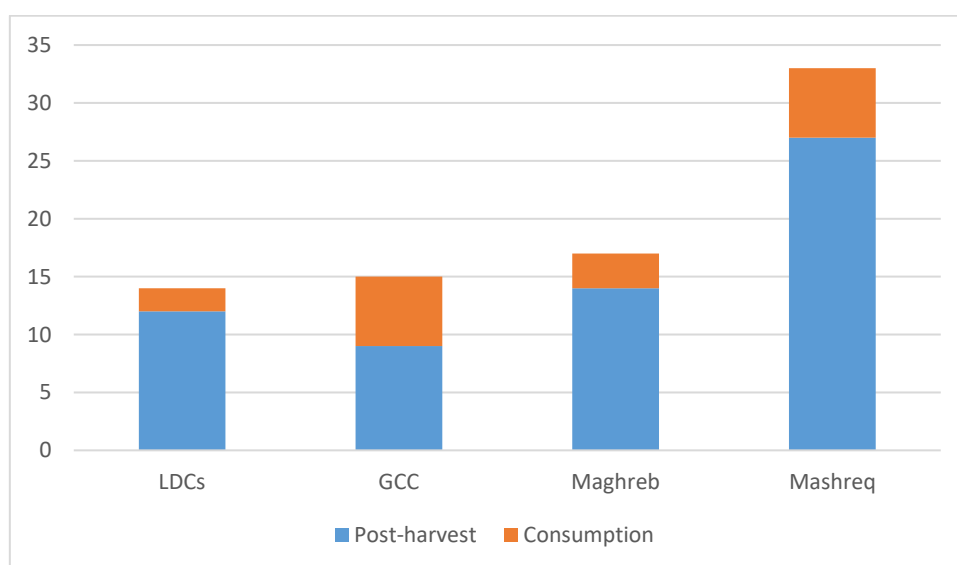


Figure 11: Food loss and waste in the Arab Region (percentage). Source: ESCWA, 2017a, citing FAO 2011

Technologies alone will not be enough - they must be supported by appropriate policies and investments. That involves strengthening capacities of policy-makers and policy-making institutions for designing and implementing appropriate policies keeping the needs of smallholders in mind; improving governance of land resources including land-rights, land consolidation; and appropriate insurance schemes. Improved land tenure systems are critical in the NENA region where 10% of the farms own 60% of the agricultural area, raising the likelihoods of conflicts arising from the need to sharing of a scarce resource (FAO, 2019c). There are huge opportunities in harnessing the power of digitalization in developing soil maps and in collection, analysis, and sharing of land and soil-related data across the region.

Biodiversity

The region is known as cradle of agriculture. It is center of domestication for many important crops and animals including wheat, barley, lentil, forages, several fruits, cattle, goat, sheep, dromedary and donkey. It also has a large number of wild foods: 135 wild food species - about 70% of which are plants, 5% birds, 5% mammals, 5% fish and the rest 'others'. Biodiversity is critical for diversification of food systems, as well as for adaptation to climate change. Farming practices (e.g., use of just few species and breeds, excessive cultivation, and indiscriminate use of pesticides) and climate change reduce habitat and alter life cycles and reduce biodiversity. They adversely affect beneficial insects such as

pollinators, increase pests and diseases including the transboundary ones, and increase invasive pest species in the region (FAO, 2019d).

It is estimated that 11% of existing species will become globally and irreversibly extinct due to global land use activities (IPR et al., 2019), and unquestionably food and agriculture sector will account for a significant part of this extinction. In the NENA region, some 2476 species are under threat, including nearly 700 species of fish and 450 plant species, according to the 2015 IUCN Red List.

As 75% of agrobiodiversity exist in forests, state of the region's forests can give an indication of the state of its agrobiodiversity. In 2015, the world had natural forest area of 3.7 billion ha (93% of the total forests), thanks to decline in net loss of natural forest area from 10.6 million ha per year during 1990 to 2000 to 6.5 million ha per year during 2010 to 2015. During the same 25 years, NENA forest cover decreased from 43.7 million ha to 42.4 million ha. Other Wood Land (OWL) cover also decreased from 41.2 million hectares to 35.4 million hectares in the region. The conversion of forest and OWL to other land uses was accelerated between 2010 and 2015 mostly for agriculture. On the positive side, the area of planted forests in NENA region has steadily increased during 1990-2015 from 7.6 million ha in 1990 to 9.7 million ha in 2015. However, that increase in area of planted forests does not compensate for the loss of 7.1 million ha of natural forests and OWLs (FAO, 2016). The impact of 8% reduction in the forests and OWLs on agrobiodiversity during 1990-2015 would be significant.

Rangelands, being the most extensive agricultural system in the region, are also a reservoir of agrobiodiversity. The Society for Range Management (1998) defines rangelands as "lands on which the indigenous vegetation (climax or natural potential) is predominantly grasses, grass-like plants, forbs, or shrubs and is managed as a natural ecosystem." In addition to those species, rangelands also host a whole range of other soil and above-ground biodiversity for the ecosystem. Rangelands are subject to land fragmentation and over-grazing, both of which contribute to habitat loss and thus to loss of agrobiodiversity. Average vegetation cover as a percentage of land area in the region decreased from 3.7% in 1990 to 2.8% in 2013, while livestock numbers increased in the same period by 25% (FAO, 2019b). This too would make a negative impact on the region's biodiversity.

Investments in building capacities and institutions to expedite documentation of the extent of biodiversity, identifying relatively more vulnerable species and areas, enhancing both in-situ and ex-situ preservation of genetic resources, preventing forest loss and increasing reforestation, promoting more sustainable rangeland management practices, contributing to and benefiting from relevant international instruments, and sensitizing the public to the importance and biodiversity to food systems will help lower loss of biodiversity, contribute to healthy food systems from production to consumption, and help protect future food systems from the impact of climate change and other natural disasters.

The problem of food security and nutrition

The region suffers from the triple burden of malnutrition: undernutrition (measured by stunting, i.e., low height for the age, and wasting, i.e., low weight for the age), micronutrient deficiencies (i.e., less than adequate levels of minerals and vitamins in diets), and over-nutrition (over-weight and obesity). An appreciation of the severity of the nutrition-related health problems in the Arab region can be obtained from the following: 20% of men and 30% of women are obese, 10% of the population is diabetic, over 35% of the population is anemic, and almost 20% of the population is stunted. Respective global averages are 10, 15%, 8, 37, and 18% (Borgomeo and Santos, 2019). Noticeably,

hunger, micronutrient deficiency, and obesity often occur at the same time in various countries of the region.

Food security

Food security has improved in many of the countries of the region, but the situation in the LDCs and conflict-affected countries is alarming. The NENA region suffers from higher average rate of undernourishment than any other global region, except sub-Saharan Africa (FAO, 2019b). The number of undernourished grew from 6.5 million to 34 million between 1990 and 2012 and declined only slightly (to 33 million) between 2012 and 2016 in the region (Ward, 2016). Fortunately, a further small decrease in these numbers is projected through to 2030 (FAO, 2018b). Unfortunately, however, the least developed countries (LDCs) in the Arab world barely reach the average level of energy adequacy and have made little progress in this regard in the last 25 years (Woertz, 2019). The proportion of undernourished people averages three times higher in countries with protracted crisis than in other developing countries (FAO, 2012b). In addition, the countries with conflicts have almost 6 times more hungry and malnourished (27.7% of the population) than the countries without conflict (5.4%) in the Arab region (Table 3).

	2004-06	2006-08	2008-10	2010-12	2012-14	2014-16	2016-18
All countries	13.5	13.2	12.8	12.8	12.5	12.8	13.2
Conflict countries ¹	25.1	24.9	24.4	25.1	26.1	26.9	27.7
Non-conflict countries ²	6.6	6.2	5.9	5.4	5.1	5.1	5.4

1: Libya, Sudan, Yemen, Somalia, Syrian Arab Republic, Iraq. 2. Comoros, Djibouti, Mauritania, Morocco, Algeria, Tunisia, Jordan, Lebanon, Palestine, Egypt, Sudan, Oman, UAE, Saudi Arabia, Bahrain, Qatar and Kuwait.

Table 3: Prevalence of undernutrition, 2004-2018 (%) Source: FAOSTAT 2019

Risks also vary within countries. Food security is higher in urban areas, where people have greater access to employment opportunities and social protection programmes, and worse in rural and remote areas. Areas most at risk are poor and remote mountain and arid regions characterized by a fragile natural resource base, poorly developed markets and frail institutional environments. Households most at risk are rural non-farm households which spend a higher share of their income on food, making them more vulnerable to price surges.

Food availability is an important dimension of food security in the NENA region. The region is heavily dependent on food imports, which are likely to continue to rise rapidly. No country in the region approaches self-sufficiency in cereals, and most countries in the region import a large share of their food needs. Only three regional countries – Egypt, Iran, Morocco – cover two-thirds of their cereals needs from domestic production. In five countries, domestic production covers less than 20 per cent of cereals consumption. The poorest of these countries - Yemen, Sudan, Mauritania - are highly dependent on imports and are vulnerable to food insecurity at both national and household level.

Imports have been constantly rising as domestic food production has not kept pace with population growth. The gap between production and consumption has grown for all foods. The gap is particularly marked for cereals, which provide the bulk of the calories in the region, but also for vegetable oils,

sugar and meat (FAO, 2017). As a result, the region is a large net importer of food, and in fact is amongst the highest food importing regions in the world, and imports are certain to continue to rise as the region's population doubles by 2050, with consequent acceleration of import dependence (OECD and FAO, 2018). It is likely that in the decades to come the region will import ever more wheat, feed, sugar, vegetable oil (except olive oil), meat and milk to meet its growing demands (see Annex 4).

The consequences of the high and rising dependence on imports are fourfold:

- Imports have to be paid for, with an impact on foreign exchange and possibly on the fiscal balance and inflation. At country level, governments will have to ensure there is sufficient foreign exchange to finance imports. The impact of this on the poorest countries can be considerable. In Yemen prior to the conflict, the share of food in merchandise imports already exceeded 20 per cent. Thus, the poorest country in the region, was spending large sums of very scarce foreign exchange on importing food.
- Countries are faced with risks from market fluctuations. Import dependency means that countries have to deal with the commercial risks of import dependency, particularly price risks. At the global level, recent years have seen higher prices and price volatility, and there have been fears that this volatility will continue. A particular concern is the effect of climate change on global food production and prices. However, this is generally considered unlikely, as production responses from temperate countries with spare production capacity such as Russia and Ukraine may compensate for expected declines in cereals production in hotter regions. World Bank commodity price forecasts are that food prices will stabilize at lower than current levels into the medium term.
- Internal markets need to be efficient. With a decreasing share of consumption being met by local production, governments and the private sector will have to collaborate to ensure that the food market chain works efficiently to ensure the availability of adequate and affordable food at the local level throughout the country.
- Most food is purchased in the market, and people need to have the money to pay for it. The great majority of households throughout the region are already net food buyers. Even near-subsistence households in the poorest parts of the region are dependent on some measure of food purchase. As the share of food demand met from imports rises, the challenge will be to ensure that there is adequate income for all households to obtain what they need from the market. Where incomes are inadequate, either structurally because of income poverty or periodically because of natural hazard like drought or because of civil strife, special public programmes will be needed to ensure both availability and access.

Malnutrition

Obesity in the Arab region is the second highest in the world (after the Americas), reaching twice the global average. Over-nutrition has become increasingly visible with the highest levels of obesity and diabetes in GCC countries. Average dietary energy supply adequacy for the NENA region was around 134 percent during 2014-2016, nearing the levels of the developed world (Woertz, 2019). In the middle-income countries of the region, the proportion of overweight in under-five children often exceeds the rates in their high-income counterparts – a worrying prospect considering that such children have strong likelihood to carry the burden into their adolescence and adulthood. If that were not enough, annual deaths from obesity that now stand around 0.5 million in Middle East and North

Africa will rise to 0.6 million by 2030 and to 1.1 million by 2050, with the current food systems (FOLU, 2019, Figure 12).

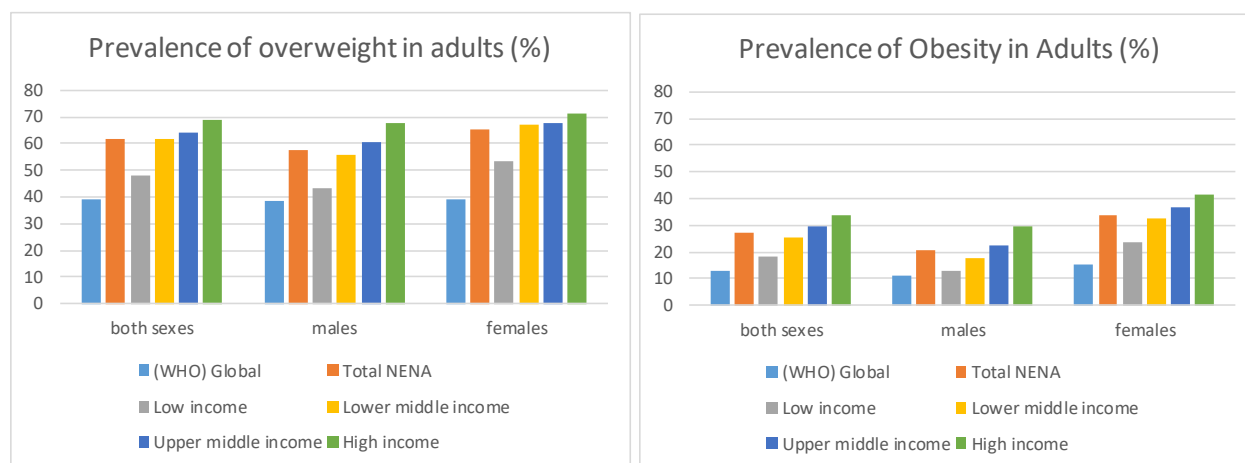


Figure 12. Prevalence of adult overweight and obesity in NENA and other regions, NENA country groupings and countries, 2016 From NERC 35 Paper 1 Source: WHO GLOBAL HEALTH, 2019.

Food safety is becoming an important issue, with 600 million cases of foodborne diseases reported globally annually. The problem especially affects children below 5 years of age and people of developing countries, causing 420,000 deaths a year. The economic loss of unsafe food is estimated at 110 billion USD a year. Concerns and awareness about food quality and safety are also increasing among the NENA consumers with growing incidence of food borne diseases (about 200 such diseases are known in the region) and increasing detection capacities for such diseases and of chemical residues in the food. Food spoilage is on the rise because of poor infrastructure (e.g., storage, roads, and cold-chains), and will exacerbate further with rising temperatures as a result of climate change. The population is now more informed about the importance of food safety because of growing use and influence of digitalization and social media.

Perverse subsidies increasing consumption of energy-dense and high-fat foods (bread, sugar and oils), sedentary life style, weak institutions, lack of nutrition information and education, inadequate infrastructure for food storage and packaging, transport and delivery, lack of reliable and credible institutions for detection and reporting of food-borne diseases and chemical residues, and high migrant population especially in GCCs with genetic disposition to develop non-communicable diseases all contribute to the triple burden of malnutrition in the region (ESCWA, 2017a; Woertz, 2019; OECD-FAO, 2018). Wheat consumption in the region is double the global average (Woertz, 2019) and almost all countries in the region consume less than recommended levels of protective foods such as beans and vegetables (227 vs 400 gm/ capita/ day) and higher levels of harmful foods (464 vs 150 gm/ capita/ day) (Hwalla and Jomaa, 2019).

Many of the nutrition related health problems of the region are because the region’s food systems do not provide and/or make ‘healthy diets’ too expensive for socio-economic groups earning below average wage. And, healthy diets were defined also by FAO (2013) as “those diets with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations. Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resources”.

Examination of the region's country priority programming frameworks (CPFs) suggests that countries do not sufficiently prioritize nutrition and healthy diets in their food and agriculture sector (Ayman and Bernard CPF paper, 2019). A move toward healthier diets require evidence-based policies that support transformation of food system, and increased investment and targeted programmes for improved nutrition, including enhanced food value chains that support economic growth and supply affordable, safe and nutritious foods. This will also require innovation to develop high-yielding, climate friendly, and nutritious varieties along with production diversification and intensification and trade promotion. Given the economic and social diversity in the region, there is a need to adapt and promote healthy diets that meet the dietary needs of the population of each country. Optimal diet of 2200 kcal/person would require that people eat food that is diverse and meets their nutritional needs.

Healthy diet would have significant implications for the way food is produced, processed, distributed and traded. Therefore, it is essential that nutrition is addressed either explicitly or as a secondary objective through nutrition mainstreaming in food and agriculture sector. There is need to advocate and communicate to raise awareness about the importance of nutrition and healthy diet, and the role the food and agriculture sector plays in delivering healthy diet that is culturally acceptable, available and accessible to all.

Low resilience in the face of protracted crises and instability

Resilience is the capacity to withstand and recover from shocks, whether natural or man-made. The resilience of smallholder rural households and all the rural poor in the region is limited. The continuation of conflicts in the region in a way that turns emergencies into protracted crises is a risk that affects all efforts towards food security and enhanced nutrition.

With little capital and few assets, deploying inherently risky and low-yielding production systems and possessing limited technical and institutional capacities, smallholders and other rural poor lack the means to deal with shocks and crises. Within households, women and children are particularly vulnerable.

The pattern is repeated at the level of specific poor areas of all NENA countries – particularly areas with a fragile natural resource base and low levels of infrastructure and services, and areas that are remote or mountainous or desert communities. At the national scale, several countries in the region – the lesser developed countries of Sudan, Yemen and Mauritania – generally have low resilience. They lack the fiscal and foreign exchange strengths and the planning and logistic capacity to anticipate and respond to shocks.

The resilience of the population of the region has been sorely tested by the multiple crises that have arisen over the last decade, during which conflict has affected more than half of NENA countries. In particular, the populations of Syria, Yemen and parts of Iraq and Libya, already dogged by resource scarcity and drought, weak governance, and poverty and inequity, have had little resilience to withstand the multiple shocks caused by civil strife. The result has been a steep rise in levels of mortality, famine and food insecurity and the collapse of livelihoods.

IV. THE WAY FORWARD: TRANSFORMING FOOD SYSTEMS TO ACHIEVE THE SDGs

The 2030 Agenda as the overarching framework

The 2030 Agenda offers the overall framework in which the transformation of agriculture and food systems takes place. The Agenda is ambitious, aimed from the outset at “transforming our world.” Its 17 SDGs and 169 Targets are deeply intertwined, with complex interdependencies, synergies and trade-offs among them. The Agenda calls for holistic, “big-picture” perspectives that demonstrate how activities and impacts are linked through specific mechanisms and show how action within these systems advance, impede or undermine progress toward SDG targets.

There can be several starting points for aligning work on food and agriculture with the 2030 Agenda. A comprehensive review of their potential contribution to the 2030 Agenda identified 85 SDG Targets, with different ‘levels’ of contribution. This is exactly half of the whole set of SDG Targets (169). A pragmatic approach to identifying key contributions to the SDG is to start with the five targets of SDG 2 that offer a comprehensive “Zero Hunger” vision, and identify the most important linkages with other goals and targets, thus offering a relatively focused set of interconnected SDG targets on which to base action. A ‘Theory of change’ exercise for the region leads to the identification of 20 SDG Targets across 11 SDGs that can be used as a basis to develop targeted programmes. The results are presented in Annex 1. Annex 2 lists the indicators associated with these Targets.

Sustainable food systems as an entry point to achieve the SDGs

The solution to the many of the challenges described in the previous section lies in the adoption of a food systems’ approach that addresses all four pillars of food security and supports healthy diets.

Food systems have been defined by FAO as “encompass(ing) the entire range of activities involved in the production, processing, marketing, consumption and disposal of goods that originate from agriculture, forestry or fisheries, including the inputs needed and the outputs generated at each of these steps. Food systems also involve the people and institutions that initiate or inhibit change in the system as well as the socio-political, economic and technological environment in which these activities take place” (FAO, 2013).

A food systems’ approach seeks to improve availability, access, stability and utilization (consumption) of nutritious and safe (free from diseases, pests and chemical contaminants) foods that constitute healthy diets. It encourages availability of such foods through their sustainable production (preferably local and regional) and trade (importing nutritious and healthy foods) through conducive policies and actions. It addresses access through making such foods affordable (focusing on employment, income and prices) and making them available where needed. It addresses the issue of stability through policies and investments in improving processing, storage, and transport of locally produced foods, imports from diversified and dependable markets, and through creating and efficiently managing strategic reserves. Finally, it improves utilization by strengthening nutrition education and provision of related information to public, taking advantages offered by the modern digitalization revolution.

Food systems that satisfy above needs must be productive and sustainable which would require for stakeholders of different components of the value chain to work towards sustainable intensification and the governments to take responsibility for entire value chain of food consumption (GSDR, 2019).

The transformation of food systems is an ideal entry point to engage countries on the way to achieving the SDGs. Starting with SDG 2 (zero hunger), the transformation of food systems reaches out to several

SDGs. Fair, sustainable and resilient food production systems establish strong links with SDG1 (poverty reduction), SDG 6, 14 and 15 (natural resources), SDG 12 (sustainable consumption and production), SDG 5, 8 and 10 (gender, employment, equality) and SDG 13 (climate action).

The transition to more sustainable agriculture and food systems requires action that builds political alliances and coalitions with actors beyond food and agriculture. Actions cut across sectors and depend on government collaboration and stakeholder dialogue. They require policymakers to recognize the need to manage trade-offs, and set out concrete measures for better aligning multiple objectives and incentive structures. They encourage both legal frameworks that recognize and secure rights of access for smallholders and local communities, and favorable policies to incentivize private sector engagement in sustainable market activity. Multi-stakeholder mechanisms and new forms of participatory governance structures will bolster policy ownership, while helping to mobilize capacities, information, technologies and access to financial and production resources.

V. PRIORITIES FOR CHANGE

Based on the above analysis of the challenges and opportunities, four major priorities emerge for FAO to organize its support across countries in the NENA region and maximize its impact, over the next 10-15 years. These four priorities are described below. They are mutually dependent and inseparable. Just as the challenges and risks facing the food security and natural resources in the region are inter-related, priorities are also inter-related, and interventions made under one will have impact on the others. Therefore, a complete separation of priorities and interventions is not attempted nor it is considered desirable. A summary of the priorities and programmatic areas for action is presented in Annex 3.

The following overarching points have been considered while identifying the priorities for the region:

1. Many of the solutions to many of the critical risks mentioned in the previous sections, that impact the region's food and agriculture sector, lie outside the agriculture sector;
2. In pursuing the food security and nutrition needs of their people, the countries of the region must use their natural- economic- and political resources wisely and sustainably, keeping in mind that the diversity of situations among- and within countries require context-specific solutions.

Priority 1: Rural transformation for youth employment and income

Problem statement: There are declining incentives and reasons to stay in many of the region's rural areas: a history of poor basic services (including health, education, and communications), low exposure to and opportunities for innovation, ever-greater pressures on natural resources, limited investment in productive infrastructure and value chains, and limited long-term employment opportunities. For many people, particularly the young, the pull of urban areas is far stronger than that of rural areas. Investing in rural areas, creating opportunities and reducing the imbalance between urban and rural areas can be a driver for rural economic growth, for increasing production of healthy food, for feeding cities and for managing resources more effectively and sustainably.

This priority would help FAO provide its support to member countries to better respond to challenges posed by:

- High rural unemployment and youth migration to cities: 13% of rural population and over 25% of youth unemployed, the latter fueling massive youth migration to cities, with higher unemployment among women than men; and
- High rural poverty and growing rural-urban divide: 40% of the region's population is rural, 34% of it is poor; and 70% of its poor live in rural areas; low rural wages: rural wages average 1/3 of the urban wages.

To address these challenges, interventions must aim at raising incomes (especially smallholder incomes) through the implementation of policies and the strengthening of institutions that support the development of market-oriented agriculture for smallholders, better integrate smallholders, in particular women, in profitable value chains such as fruits, vegetable, herbs and spices, and support their participation further along the value chains through enhancing the capacity of producers and their associations. Such interventions should support action towards boosting the productivity of smallholder producers through sustainable intensification of crops, livestock and fish production, the promotion of digital agriculture and value chains, research and development (R&D), extension, reducing agricultural risk and fostering access to credit. They should also aim at increasing living

standards and farm- and non-farm job opportunities that are attractive to youth by encouraging investments in infrastructure and services and by facilitating rural entrepreneurship and the establishment of small businesses, including hydroponics, aquaculture, organic farming, protected agriculture and agri-tourism.

Finally, these interventions should strengthen capacities of smallholder farmers to participate in intra-regional and international trade by identifying barriers and opportunities, and the policies and actions that will facilitate trade.

Enhancing sustainable rural transformation and agribusiness competitiveness may be achieved through territorial planning. Such an approach could be a critical part of the broader framework aiming at improving infrastructure and rural services to enhance market access; creating off-farm employment opportunities; providing better social protection to help vulnerable populations; strengthening local governance and institutions; and ensuring access to land and other natural resources.

Increasing commercialization of smallholder agriculture

The region possesses considerable assets which can be deployed to increase the commercialization of smallholder agriculture. First, the obverse of the demographic challenge and high unemployment in rural areas is that there are ample human resources that are available to participate in more intensive production systems. Second, the development of commercial, higher value agriculture can offer investment opportunities for the considerable private and public capital which is in search of profitable investment. Third, markets for higher value produce are growing fast, and NENA countries are well placed to take advantage of this.

There has been notable progress in boosting smallholder incomes by **strengthening linkages with markets in partnership with the private sector**. Several countries in the region have adopted a value chain approach that encouraged smallholders and the private sector to work together all along the value chain for high-value products. In these partnerships, smallholders bring land and their long experience, the private sector can bring remunerative value chains (e.g. fruits, vegetables, herbs, spices, organic products) employing modern technologies (e.g. digitalization, improved and high-precision technologies such as biotechnologies, satellite-imageries, robots and drones), and other income generating options such as protected agriculture and aquaculture. Systems of contractualization can help manage risks for all stakeholders. Governments can help stimulate these developments through several mechanisms, ranging from a conducive enabling framework for trade and investment, as in Egypt and Lebanon, through to highly organized programmes such as Morocco's *Plan Maroc Vert*, which has an entire Pillar for promoting smallholder/private sector partnerships.

There is considerable scope for governments to support the development of market-oriented commercial agriculture for smallholders. This requires a market-oriented institutional framework that could include provisions for farmer organizations, aggregation, contract farming etc. as well as incentive policies and the removal of barriers. It could include initiatives to organize clusters of farmers, processors, and traders around profitable value chains. It also requires investment in infrastructure such as farm-to-market roads and wholesale market infrastructure, as well as provision of agricultural services to support smallholder intensification and investment – research and extension organized along the value chain, access to viable financial services, seed capital, and matching grants.

Smallholders can be encouraged to participate further along the value chain. For example, currently only 20 percent of agricultural production in the region is processed, and moving along the value chain

into packing and processing could provide a strong income boost. In addition, the premium in markets for quality products can provide a strong stimulus to improve production and postharvest techniques and to reduce losses.

Governments can also facilitate national, regional and global trade. Governments can do much to facilitate and increase trade including the elimination of trade barriers through international agreements and the promotion of trade by conducive policies and incentives. Governments can also support business and trade by setting uniform sanitary and phytosanitary, quality and safety standards across the region and by building the capacity to ensure their implementation.

Smallholders will need new ways to manage agricultural risk. Agricultural risk presents a major impediment to smallholder intensification, as resource-poor farmers cannot afford to lose their slim incomes and assets in a risky world. Financial risk can be mitigated by promoting value chains in which risk is manageable, by contractual approaches, by access to credit on fair terms, and by insurance and guarantee schemes. Natural resource risk – for example, water shortages, drought or disease – can be managed through a combination of resilience measures, for example access to just-in-time supplemental irrigation, and mitigation measures such as early warning systems.

Boosting the productivity of smallholder agriculture

Agriculture, particularly smallholder agriculture, is typically low productivity, and this contributes to low rural incomes and to underemployment and unemployment.

Innovation is needed to boost productivity in the face of constraints. Government and the private sector need to invest in developing or adapting new technologies. Use of modern biological, agronomic and information technologies will have an important role in increasing agricultural productivity, including through genetic enhancement of productivity and adaptive capacities of species, better water and soil management, and crop husbandry. Research and policy institutions will need strengthening, with less focus on irrigated systems and more on smallholder farming systems.

Resource scarcity will drive innovation and adoption of water-saving, sustainable production systems. Sustainable intensification systems for enhancing water productivity can significantly raise resource-use efficiency and lower waste and contamination. The region is already a leader in many of these techniques, including drip irrigation, fertigation, conservation agriculture and production in controlled environments such as protected agriculture and hydroponics. Farmer Field Schools (FFS) can play a crucial role in building capacities and exchanging experiences on innovative tools that could increase agricultural production.

Government can ensure the robust governance and sound policies that promote equitable access of resources and benefit-sharing. This may include, for example, promotion of communal management of resources on an equitable and sustainable basis – groundwater (as in Tunisia), springs (as in Yemen), rangeland (as in Oman), and forests (as in Morocco).

Government may also **invest in public programmes** designed to support the development of smallholder agriculture. One country that has done this with some success is Morocco, which has invested heavily in fostering smallholder productivity linked to downstream markets.

Increasing living standards and farm- and non-farm job opportunities in rural areas

Beyond increasing incomes from agriculture, there is a range of other policies and investments that can improve rural living standards and boost rural incomes through the promotion of rural economic activity. These interventions can also help to improve the economic and social position of women.

To maximize opportunities for employment and incomes for youth, women and the poor, there is a need for a new generation of rural enterprises. Global and regional experience shows that there is scope for establishment of small businesses in rural areas. These may be along the value chain, for example adding value through processing and marketing; or they may introduce new systems to address new markets - hydroponics, aquaculture, or organic farming, protected agriculture; or they may involve the provision of agricultural services, such as irrigation O&M, equipment hire and repair. The enterprises may also be unrelated but rural-based businesses such as agri-tourism, which has taken off in Morocco and Oman, or the generation and sale of renewable solar and wind energy. These businesses offer the kind of challenging but remunerative openings that can attract youth and stem the flow to the cities.

Government policies can do much to create the enabling environment for rural enterprise. A conducive policy and incentive framework can do much to create the enabling environment for rural economic growth. Approaches may include the promotion of private sector investment, the creation of group enterprises, the provision of vocational training, and setting up seed capital and investment co-sharing arrangements. Morocco's INDH is an example of how such programmes can be implemented and can create attractive job opportunities for all in rural areas, including youth and women.

Investment in infrastructure and services for rural areas

Governments can target Investment in infrastructure and services to rural areas, following a territorial approach and poverty focus. Various models have been successful in the region. Tunisia's integrated rural development programme for mountain areas has had success, as have the three integrated rural development programmes in Morocco. Morocco also registered success with the watershed management approach, and Egypt's participatory and integrated programme in Matruh has proved sustainable. Programmes that integrate development of business and employment with broader investments in social services and the environment with a poverty focus – for example, Egypt's social fund or Morocco's INDH – have the capability not only of increasing employment but of raising living standards in rural areas more broadly.

Promoting gender inclusion

Solutions include education and training for the job market, devising pro-women technology, and removing barriers to female participation in agriculture. One approach is to create education and training opportunities that will help women to participate in the job market, and to develop and promote pro-women technologies. Policy measures can also help eliminate barriers to women's participation in agriculture by strengthening women's rights - to land, water, and credit.

Priority 2: Addressing the challenge of food security and healthy diets

Problem statement: Many of the region's food systems are neither healthy (they cannot ensure access to healthy diets for all people) nor are they sustainable (from an environmental and economical point of view). Building healthy food systems at local, national and regional levels will improve the region's health, reduce the economic risks of a growing dependence on food imports, will enable the region to

cope with continuing population growth – and the growing impact of climate change in ways that does not lead to further deterioration of the region’s fragile natural resources even further.

This priority would help FAO provide its support to member countries to better respond to challenges posed by:

- Growing demand for food and agricultural products driven by population growth, rising income, and urbanization, in face of scarce and declining land, water and biodiversity resources;
- Growing problem of malnutrition and food safety.

To address these challenges, the interventions will aim at adopting a food systems approach to food security and nutrition. Transforming food systems to deliver healthy diets will improve people’s health, reduce the economic risks associated with growing dependence on food imports, and enable an increasingly urbanized region to meet the food and nutrition requirements of its growing population. Interventions will focus on encouraging diversification of production and public-private partnerships towards healthier diets and on strengthening national capacities to improve food quality, food safety, traceability and the detection of contaminants. They will also seek to enhance the consumption of nutritious foods by reforming food subsidy policies, raising awareness about healthy diets, fostering consumer protection systems, encouraging appropriate food trade policies and combating food losses and waste. These interventions will focus specifically on developing more sustainable and healthier urban food systems.

The priority is to develop economically efficient national food security strategies. This may include measures at the macro level, for example modernizing and strengthening food markets, including measures to manage the risks of import dependence and reducing exposure to global market prices. Strategies may also include risk management measures to ensure the household level food security of vulnerable populations.

At the macro level, countries in the region can reduce exposure to market supply and price risks by **modernizing and strengthening food markets and managing the risks of import dependence.** Countries may pursue an export-led growth strategy to earn foreign exchange to import food, as Egypt and Morocco do, for example. These strategies also boost incomes in both rural and urban areas and so improve household level food security. Countries may also improve supply chain efficiency by boosting trade in agricultural commodities through global, regional and bilateral agreements and by promoting efficient domestic food distribution and retailing.

At the national level, governments will need to **facilitate trade and export as much as possible to be able to import the food commodities they depend on.** All countries in the region can work to improve supply chain efficiency and to cooperate with global efforts to stabilize food markets and prices. Poorer countries may also seek bilateral and multilateral agreements for food aid.

Countries requiring assurance of food supplies can reduce exposure to market supply and price risks **through modern risk management instruments.** Improving supply chain efficiency may be complemented by the use of cost-effective risk management instruments calibrated to the risk assessed. One approach is to establish food reserves or buffer stocks to help to stabilize prices and smooth consumption fluctuations. Another approach is to use market risk-management instruments, using forward contracting, employing financial hedging products, and building in risk-management provisions to bilateral and multilateral agreements.

Countries may also reassess their social protection policies to strengthen protection of vulnerable households nationwide. Safety nets can be strengthened, with cash transfers, labour-intensive employment programmes and health and nutrition interventions, with a particular focus on women and children. More investment may also be made in education and family planning.

Food safety is becoming an important issue in the region. Foodborne diseases and related deaths are on the rise, especially affecting children under five and the population of the LDCs.⁴ The range of these food borne diseases is also increasing. Capacity to detect disease and chemical residues in food has increased and today about 200 food related diseases are known in the region.

Concern is also growing amongst consumers. In tandem with diagnosis and detection, awareness and concern about food quality and safety have risen among consumers, who are today well-informed about the importance of food safety through digitalization and social media.

Finally, **Food spoilage and wastage** are on the rise. With urbanization and the increase in the proportion of food bought from market, levels of food spoilage have risen. This is in part because of poor infrastructure – poor storage and transport, the inadequacy of cold-chains.

Policies need to support the transformation of food systems. A move toward healthy diet require evidence-based policies that support the transformation of food system. Within this policy development, there is a need to mainstream nutrition considerations into both food and agricultural policy. Heathy diets also need to be reflected in trade policy, because the region would have to import more healthy foods and feed to meet its demand.

On the supply side, there is a need to link food systems to sustainable production: healthy food systems must be productive and sustainable. Increased investment and targeted programmes for improved nutrition are needed to catalyze the development of enhanced food value chains that both support economic growth and supply affordable, safe and nutritious foods. All stakeholders along the value chain need to work towards sustainable intensification. (GSDR, 2019).

The development and promotion of healthy food crops need to be promoted within sustainable agricultural systems. This could include, where economically justified, promoting domestic production of diverse, nutritious and safe foods and strengthening smallholder capacities to produce these foods. It could also include promoting urban agriculture and greener cities. This will also include innovation to develop high-yielding, climate friendly, and nutritious varieties along with production diversification and intensification and trade promotion. Measures should also be aimed at eliminating food loss along the supply chain

Demand side measures need to promote healthy diets and protect consumers. Healthy diets need to be promoted. Consumer knowledge and protection are paramount. Advocacy and communication programmes are needed to raise understanding about the importance of nutrition and healthy diet, unhealthy food consumption patterns and their impact on nutrition and health, and how different socio-economic and cultural groups can obtain and prepare sustainably-sourced healthy foods. Campaigns also need to tackle the high levels of food waste all along the value chain. Governments can reinforce change by setting targets and implementing policies and regulations to reduce food waste across the entire value chain.

⁴ 600 million cases of foodborne diseases are reported globally annually, causing 420,000 deaths a year. Annual economic losses from unsafe food worldwide are estimated at USD 110 billion.

Priority 3: Greening agriculture: addressing water scarcity and ensuring environmental sustainability and climate action

Problem statement: Agriculture is the biggest user of the region's increasingly scarce natural resources and fuels land and water degradation and biodiversity loss. With the adoption of innovative technologies, smart investments and supportive policy frameworks, it could however, become an engine of positive change, minimizing losses through the adoption of innovative and efficient production systems, energy-efficient processing models and conserving and restoring land, soil and forestry.

This priority would help FAO provide its support to member countries to address the following challenges:

- NENA is the world's most water-insecure region with water scarcity growing and its quality deteriorating; 6.8% of region's land is arable, 90% of it is degraded, and degradation is growing; nearly 3000 species are under threat; its small forest area is shrinking and its rangelands degrading; and climate change will further exacerbate scarcity and degradation of its natural resources. All this affects smallholder and vulnerable populations in a disproportionate way.
- Countries lack the capacity to design and implement coherent vision for sustainable use and protection of their natural resources.

The interventions will aim at **Protecting and restoring natural resources** by raising awareness about the state of natural resources and their relation to provision of social benefits (e.g., food, income, ecosystem services); promoting monetary valuation of social benefits and negative externalities (degradation of natural resources) in formulation of food system policies; encouraging afforestation and discouraging deforestation; preventing over-grazing of rangelands; encouraging sustainable land management (SLM) practices to restore 3.5 million km² of agricultural land is appropriate for restoration; protecting water degradation through use of appropriate technologies and policies; encouraging water-reuse; promoting good agricultural practices to reduce the use of agro-chemicals and promote more efficient irrigation techniques and practices, as well as treated water effluents. These actions are in line with the goals of the UN Decade on Ecosystem Restoration (2021-2030), for the implementation of which FAO acts as a co-leader along with UNEP, aiming to step up efforts to tackle desertification and ecosystems degradation.

What is needed is a paradigm shift towards sustainable agriculture. With the adoption of supportive policies and innovative governance mechanisms, technologies and smart investments, trends could be reversed. Agriculture could become an engine of positive change, optimizing efficient production whilst conserving and restoring ecosystem functions. Without decisive action, agricultural and climate change-induced impacts on water, land, biodiversity and forests have the potential to lower the region's GDP by 2.1 to 6% (Borgomeo and Santos, 2019).

Such paradigm change requires **improving the governance of natural resources** by encouraging allocation of resources to R&D for enhancing resource productivity and protection of land, water and biodiversity; harmonizing policies and actions across relevant agencies for protection and sustainable use of natural resources; promoting equitable access to natural resources; encouraging community-based management of natural resources; establishing consultation and coordination mechanisms/platforms (as done in case of water) to enhance synergy of natural resource-related actions among public, private, civil society, and the region; removing policies and subsidies that lead to misuse of

natural resources and encouraging sustainable use through appropriate pricing and incentives; promoting land consolidation to reduce impact of land fragmentation on natural resources; strengthening capacities in data collection, analysis and sharing, within countries, in the region, and with relevant international instruments.

Water

The region needs to use its available agricultural water in a way that produces maximum social and economic benefits, while protecting its quality. The watchword for agriculture in the coming decades will be ‘more production and income from less water – sustainably and equitably’.

This will require strengthening governance and institutions. In general there has been a successful reorientation of water resources management in recent years away from the previous approach of supply augmentation and the direct provision of water services towards a greater focus on water management, decentralization and inclusion. Over the next decade, this reorientation can be continued by sustaining the shift in the role of the state from direct provider to a regulatory and support role; strengthening the efficiency and accountability of public agencies; strengthening decentralization and the role of participation, and improving the quality of investment, continuing the move away from the legacy of capital-intensive, supply driven investment and a top-down engineering approach towards more participatory and local level approaches to investment planning together with increased delegation of responsibility, higher levels of cost-sharing and greater investment of private expertise and capital.

Reining in groundwater depletion will be critical to establish sustainable management of water resources. This could comprise establishing groundwater governance to reduce depletion through top-down or bottom-up regulation – or a blend; and recalibrating the incentive structure to encourage conservation and efficiency.

The incentive framework needs to be recalibrated to promote efficiency and sustainability. The region has begun to adjust water charges to reflect scarcity and opportunity cost, and also to cover the cost of water provision. As water becomes ever scarcer, these changes should continue. Beyond the water sector, trade and energy policies need to reflect comparative advantage of each country’s agricultural sector and promote sustainable, efficient water use.

Land

What is needed is a shift in farming systems towards more sustainable and soil-friendly agriculture and the adoption of sustainable land management practices that can avert further deterioration and restore some of the currently degraded lands. Many useful technologies already exist: cropping systems that enrich and protect soils and restore nutrients – for example, a shift from lengthy cereal-based monocultures to crop rotations that include nitrogen-fixing legumes; better management of irrigation to reduce salinization and sodicity; use of conservation agricultural practices that build back soil carbon; use of input-use-efficient and stress-tolerant varieties and species; and integrated nutrient and pest management practices that reduce or eliminate the penetration of harmful chemicals into the soil. Around one quarter of the degraded land area is suitable for restoration through these practices (ICARDA, 2014).

More generally, a shift towards production systems that use less land and water to produce more income will help to protect resources. In support of these shifts to more sustainable land management, countries can invest in:

- further research and adaptation to develop techniques and models that combine the objectives of equity and sustainability with the efficient resource use needed to boost production and incomes.
- policies and programmes that promote sustainable practices
- improved governance of land resources to tackle issues related to land tenure rights, land fragmentation and land abandonment.
- building and sharing knowledge to inventory land status and to track changes and their causes. Here, digitized soil mapping is a must - there are huge opportunities in harnessing the power of digitalization to develop soil maps and in collection, analysis and sharing of land and soil-related data across the region.

In rangeland management, traditional collaborative management systems need to be modernized to promote sustainable stocking rates and pasture management.

Improved breeds and feeds may be introduced that allow production and incomes to rise alongside sustainable and equitable management of the resource.

Fisheries and aquaculture also need to become more sustainable. Aquaculture, that now produces 2 million tons of fish, has more than doubled during the past decade and is projected to grow by another 50 percent over the next ten years throughout the region. The adoption of an ecosystem approach to fisheries and aquaculture is needed to ensure long-term benefit from this important sector.

Climate change

Climate change is a reality and a growing threat to the region's agriculture. Addressing climate change in agriculture implies the adoption of climate change adaptation and mitigation actions.

Farmers and rural households will clearly adapt to climate change effects, but spontaneous adaptation responses need to be supported. Agricultural adaptation strategies need to be designed and implemented to complement farmer efforts with proactive public policies and investment in programmes and services.

Strategies need to address the risks actually faced by farmers in a practical way. Experience shows that an iterative top down/bottom up approach to developing strategy based on evidence, research and farmer experience yields best results. The responses need to clearly target agricultural productivity and environmental protection with risk-reducing 'no regrets' measures that as far as possible not only build resilience to climate change but strengthen farmers' incomes and the sustainability of their farming practices. Research, extension and information are critical components in adaptation strategies, and learning from and with farmers will be vital, including from traditional farmer knowledge.

Where production systems are in recession, support may be required for a change of the whole farming system. The strategies developed will need to combine many different interventions ranging from local initiatives to advances in national infrastructure and developments in governance and institutional arrangements.

Mitigation of climate change will also be needed. The region's agriculture can make a combustion to reduction of CO₂ emissions, but this will require some governments to shift their position. All countries of the region are signatory to the 2015 Paris Agreement, and many made commitments to mitigation through CO₂ reductions above the levels required, largely conditional on receiving financial support for mitigation and adaptation programmes. However, several countries of the region made

no commitment to CO2 reduction. Nonetheless, there is considerable scope to reduce carbon emissions from agriculture through the generalized adoption of climate smart agriculture practices.

Priority 4: Building resilience to protracted crises and emergency situations

Problem statement: Natural and man-made shocks and emergencies, as well as protracted crises situations, are the biggest drivers of hunger and poverty in the region, costing lives, decimating livelihoods, restricting people's future life-opportunities and driving displacement and migration. Many countries and communities in the region, particularly the most vulnerable, including women and the poor, lack the technical and institutional capacities and means to anticipate, prevent, prepare for, respond to, cope with and recover from shocks and crises. Supporting countries to build the resilience of agricultural and rural livelihoods results in multiple benefits that will focus on humanitarian assistance, address hunger and poverty reduction, stimulate economic recovery and growth, and help building stronger and more sustainable livelihoods for people, communities, countries and the region.

This priority would help FAO provide its support to member countries to address the following challenge:

- About 30% of the region's population is affected by conflicts where the proportion of hungry and malnourished people is five times higher than in the non-conflict countries.
- Smallholders in many parts of the region are extremely vulnerable. With little capital and few assets, they lack the means to deal with shocks and crises.

To address these challenges, the interventions will aim at:

1. **Strengthening risk governance** by supporting countries to adopt and implement legal, policy and institutional systems and regulatory frameworks for risk reduction and crisis management. Technical advice, as well as knowledge transfer, training, tools and services provided to build the capacity of governments at all levels (local, regional, national) and their partners to manage hazards and risks that threaten agriculture, nutrition, food security and food safety; assisting countries in integrating DRR into crop, livestock, fisheries, forestry and natural resource sector policies and plans; supporting countries match such policies and plans with the necessary investment programmes and strategies.
2. **Supporting countries to develop multi-hazard situation-specific early warning systems** that integrate disaster, climate, food security and conflicts, and lead to early action for prevention with an emphasis on building resilience across all groups, geographies and sectors that could be affected; provide support and tools to help countries monitor, detect, forecast risks and, when necessary, issue alerts on impending hazards (whether natural or human-made) in order to help governments and organizations mobilize and act early to prevent humanitarian disasters, such as widespread famine or massive population displacements; advise farmers, herders, fishers and foresters on the likelihood of a threat and how to reduce their potential impacts at the community level; promote common approaches and standards for analyzing and informing on the structural causes of food and nutrition crises. Informing stakeholders and building consensus on the severity of food insecurity, particularly in crisis situations
3. **Supporting countries and communities to reduce risks and vulnerability** at household and community levels by promoting access to technologies and good practices among farmers, fishers, herders and foresters before, during and after shocks in order to address the root causes of their

vulnerability, while limiting their overall exposure to future shocks (disaster risk reduction). For example, helping countries adapt to climate change extreme events and climate variability through promoting good practices such as the use of flood- and drought-resistant crops, preserving forests, conservation agriculture, livelihood diversification, ecosystems approach to fisheries and aquaculture, improved safety for fishers, seed security, financial services provision, land access and tenure, sustainable water management and diversifying family nutrition with new and existing food sources.

4. Supporting countries to prepare for and/or manage effective responses to disasters and crises.

When disasters and crises do occur, and given that they disproportionately affect farmers, fishers, herders and foresters, providing immediate support to protect and recover livelihoods; supporting countries to translate early warning into preparedness and early action, for example through contingency planning; providing support to assess impact of such events and the needs of families with agriculture-based livelihoods. When crises become protracted it is important to operate along the Humanitarian Development-Peace (HDP) Nexus to ensure aid effectiveness and match needs with assistance, while building resilience capacity.

Conflicts in the region are increasingly protracted; climate-related shocks are more intense and frequent. Humanitarian relief, development programmes and peacebuilding are not serial processes: they are all needed at the same time. To reflect this understanding, the concept of HDP has developed. It focuses on the work needed to coherently address people's vulnerability before, during and after crises. At the centre of strengthening the coherence between humanitarian, development and peace efforts, is the aim of effectively reducing people's needs, risks and vulnerabilities, supporting prevention efforts and thus, shifting from delivering humanitarian assistance to ending need.

5. Strengthening regional collaboration on transboundary risks as transboundary vulnerabilities caused by biotic and abiotic factors cannot be fully addressed locally or even nationally. Among these transboundary risks, plant pests and animal diseases represent a real threat to the health of the region's agriculture, including forestry and fisheries, and the response need to be articulated both at national and regional levels.

VI. IMPLEMENTING CHANGE AT SCALE

To achieve transformational change in these priority areas and in recognition of the need for tailored solutions to suit these diverse but related priorities, a range of policies and tools need to be used. The entry point for successful transformation is building the **evidence base and knowledge**. This requires data collection and policy analysis using innovative and cost-effective means such as remote sensing technologies, drones, big data and weather forecasting.

Technologies and innovations are the engine of growth with the potential to boost productivity and make value chains more efficient. From drones to e-commerce, from remote sensing technologies to precision agriculture, innovations are already shaping the way we produce, process, distribute and consume food. The role of FAO will be to support countries in ensuring that they harness the potential for innovation in a way that it contributes to food security, enhanced nutrition and the sustainable use of natural resources. As the driving force to transform food systems, innovation is central to lifting family farmers out of poverty, tackling unemployment for youth and rural women, and helping the world to achieve food security and the SDGs. The 2030 Agenda explicitly refers to innovation as a critical means of implementation, acknowledging its role in accelerating the achievement of the SDGs.

Policies, investments and institutions will need to be scrutinized to assess their impact in terms of food security and nutrition. This will not be possible without good knowledge and evidence. There are still too many areas of critical importance for which information is, in the best of cases, scattered and incomplete, and despite this, is used as a basis for decision-making. These include, but are not limited to, promoting agro-industrial investments as a way to enhance value addition, create jobs, increase exports and provide markets for new and existing producers and promoting better policy targeting and alignment.

Finally, no substantial transformation will be possible without the development of broad **partnerships** around shared goals. Fixing food systems to achieve food security, healthy lives and a healthy environment will require government leadership, but above all, **the combined efforts of the private sector, civil society, producers and consumers, as well as international financial institutions**. Advocacy, communication and the development of platforms for partnerships will become increasingly important. One of the main areas in which partnerships will be important is in promoting and implementing digital innovations and the scaling up of innovative digital services. Many global and regional development agencies (e.g., FAO, UNDP, UNIDO, ILO, WFP, CGIAR institutes, among others), as well as NGOs and food and agriculture-related private enterprises are active in the region and are making important impacts in their own areas of expertise and involvement. Overall benefit would be significantly enhanced with improved communication and collaboration among them in order to provide coordinated support on strategic priorities of the countries and the region.

Harnessing the power of modern technologies, the opportunities offered by major global initiatives, and partnerships with relevant organizations and institutions operating at regional or national levels, FAO will support countries through the provision of information, analysis, capacity building, advocacy and the development of platforms for countries to share experiences and knowledge, and through the development of effective strategies and investment plans to meet countries' food security needs while sustainably using and protecting natural resources.

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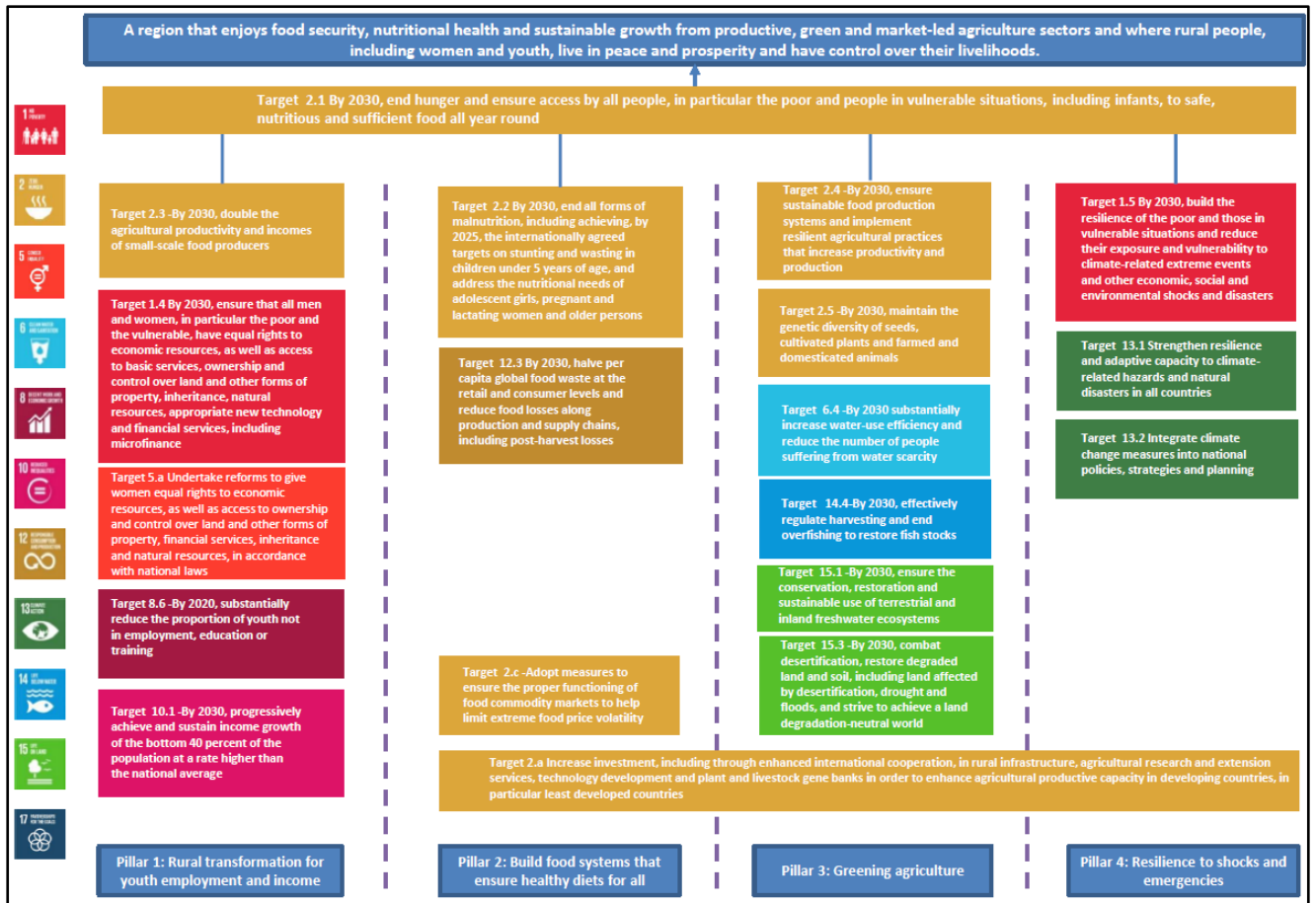
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Annex 1: A theory of change to address the SDGs in the NENA region



Annex 2. Transforming food systems: SDG Targets and their indicators

SDG Target	Indicator
By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance (1.4)	-Proportion of population living in households with access to basic services (1.4.1) -Proportion of total adult population with secure tenure rights to land (1.4.2)
By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure to climate-related extreme events and other economic, social and environmental shocks and disasters (1.5)	- Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population (1.5.1 and 13.1.1)
-By 2030 access by all to safe nutritious food (2.1)	-Prevalence of undernourishment (2.1.1) -Prevalence of moderate or severe food insecurity based on FIES (2.1.2)
-By 2030 end all forms of malnutrition (2.2)	-Prevalence of stunting among children under 5 years of age (2.2.1) -Prevalence of malnutrition among children under 5 years of age, by type (wasting and overweight) (2.2.2)
-By 2030, double the agricultural productivity and incomes of small-scale food producers through secure access of land (2.3)	-Volume of production per labour unit by classes of farming/pastoral/forestry enterprise size (2.3.1) -Average income of small-scale food producers, by sex and indigenous status (2.3.2)
-By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production (2.4)	-Proportion of agricultural area under productive and sustainable agriculture (2.4.1)
-By 2030, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals (2.5)	-Number of plant and animal genetic resources for food and agriculture secured in either medium or long-term conservation facilities (2.5.1) -Proportion of local breeds classified as being at risk, not at risk or at unknown level or risk of extinction (2.5.2)
-Adopt measures to ensure the proper functioning of food commodity markets to help limit extreme food price volatility (2.c)	-Indicator of food price anomalies (2.c.1)
5.a Undertake reforms to give women equal rights to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources, in accordance with national laws (5.a)	-(a) Proportion of total agricultural population with ownership or secure rights over agricultural land, by sex; and (b) share of women among owners or rights-bearers of agricultural land, by type of tenure (SDG 5.A.1) -Proportion of countries where the legal framework (including customary law) guarantees women's equal rights to land ownership and/or control (SDG 5.A.2)
-By 2030 substantially increase water-use efficiency and reduce the number of people suffering from water scarcity (6.4)	-Change in water-use efficiency over time (6.4.1) -Level of water stress: freshwater withdrawal as a proportion of available freshwater resources (6.4.2)
-By 2020, substantially reduce the proportion of youth not in employment, education or training (8.6)	-Proportion of youth (aged 15-24 years) not in education, employment or training (8.6.1)
-By 2030, progressively achieve and sustain income growth of the bottom 40 percent of the population at a rate higher than the national average (10.1)	-Growth rates of household expenditure or income per capita among the bottom 40 percent of the population and the total population (10.1.1)
-By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses (12.3)	-Global food loss index (12.3.1)
-Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries (13.1)	- Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population (13.1.1 and 1.5.1)

SDG Target	Indicator
Integrate climate change measures into national policies, strategies and planning (13.2)	-Number of countries that have communicated the establishment or operationalization of an integrated policy/strategy/plan which increases their ability to adapt to the adverse impacts of climate change, and foster climate resilience and low greenhouse gas emissions development in a manner that does not threaten food production (including a national adaptation plan, nationally determined contribution, national communication, biennial update report or other) (SDG 13.2.1)
-By 2030, effectively regulate harvesting and end overfishing to restore fish stocks (14.4)	-Proportion of fish stocks within biologically sustainable levels (14.4.1)
- Provide access for small-scale artisanal fishers to marine resources and markets (14.B)	-Progress by countries in the degree of application of a legal/regulatory/policy/institutional framework which recognizes and protects access rights for small-scale fisheries (14.B.1)
-By 2020, conserve at least 10 percent of coastal and marine areas (14.5)	-Coverage of protected areas in relation to marine areas (14.5.1)
-By 2030, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems (15.1)	-Forest area as a proportion of total land area (15.1.1)
	-Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type (15.1.2)
-By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world (15.3)	-Proportion of land that is degraded over total land area (15.3.1)
-Significantly increase the exports of developing countries, in particular with a view to doubling the least developed countries' share of global exports by 2020 (17.11)	-Developing countries' and least developed countries' share of global exports (17.11.1)

Annex 3: Strategic priorities for food and agriculture in the NENA Region

Vision	A region that enjoys food security, nutritional health and sustainable growth from productive, green and market-led agriculture sectors and where rural people, including women and youth, live in peace and prosperity and have control over their livelihoods.			
Priorities	Rural transformation for youth employment and income	Developing food systems that promote food security and healthy diets for all	Greening agriculture: addressing water scarcity, ensuring environmental sustainability and climate action	Building resilience to protracted crises and emergency situations
SDG Targets	<ul style="list-style-type: none"> - Equal rights to economic resources for women and men (SDG 1.4, 5a) - Increase productivity and income of smallholder food producers (SDG 2.3, 10.1) - Create opportunities for youth employment (SDG 8.6) - Access for smallholders to marine resources 	<ul style="list-style-type: none"> - Food security (SDG 2.1) - Healthy diets (SDG 2.2) - Efficient value chains (SDG 12.3) 	<ul style="list-style-type: none"> - Sustainable agriculture (SDG 2.4, 2.5) - Protection and efficient use of water (SDG 6.4) - Climate Action (SDG 13.2) - Sustainable fisheries (SDG 14.4) - Land restoration (SDG 15.1, 15.3) 	<ul style="list-style-type: none"> - Building the resilience of poor vulnerable rural women, men and children (SDG 1.5) - Strengthen adaptive capacities (SDG 13.1)
Programmatic action areas	<ul style="list-style-type: none"> <input type="checkbox"/> Adopt a territorial approach to rural development, invest in basic infrastructure <input type="checkbox"/> Promote sustainable intensification of crop, livestock and fish production <input type="checkbox"/> Scale up research, innovation, and digital extension and education. <input type="checkbox"/> Facilitate rural entrepreneurship, and promote value chain development and agro-processing <input type="checkbox"/> Strengthen farmers' associations <input type="checkbox"/> Strengthen tenure of land, water and fish resources 	<ul style="list-style-type: none"> <input type="checkbox"/> Improve food safety, quality, certification and traceability <input type="checkbox"/> Promote diversification of production and consumption and healthy diets <input type="checkbox"/> Reduce losses and waste along the value chain <input type="checkbox"/> Modernize and strengthen cereal import markets <input type="checkbox"/> Promote urban agriculture and greener cities 	<ul style="list-style-type: none"> <input type="checkbox"/> Enhance water productivity and governance and promote use of unconventional water <input type="checkbox"/> Promote nature-based solutions and recycling (incl. wastewater reuse) <input type="checkbox"/> Manage soils sustainably. Incl. reducing pollution from fertilizers and pesticides <input type="checkbox"/> Scale-up landscape restoration and conservation of biodiversity <input type="checkbox"/> Adopt an ecosystem approach to fisheries and aquaculture <input type="checkbox"/> Scale-up adoption of climate smart practices 	<ul style="list-style-type: none"> <input type="checkbox"/> Strengthen preparedness and early warning systems <input type="checkbox"/> Reduce risks and vulnerability (including through social protection) <input type="checkbox"/> Combat transboundary pests and diseases <input type="checkbox"/> Provide direct support to crisis-affected households
Tools	1. Evidence and knowledge: data collection and analysis, water accounting, use of remote sensing technologies, drones, policy analysis, big data, weather forecasting			

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2. **Technologies and innovation:** enhanced varieties and breeds; water harvesting, protected agriculture, hydroponics, digital agriculture
 3. **Policies and institutions:** cross-sectoral policy dialogue, develop green incentive schemes and trade policies
 4. **Investment:** public and private investments in support of public goods and private initiatives: blended finance
 5. **Advocacy and partnership,** including with private sector, encourage South-South cooperation, support engagement of civil society
 6. **Capacity building**

Annex 4: Projections for food and agriculture in the NENA region

FAO (2018b) has examined potential contributions of different sources for crop production under three scenarios for 2050: Business As Usual (BAU), Toward Sustainability (TSS), and Stratified Societies (SSS). Under the scenario of BAU (i.e., continuation of current trends and policies and a moderate economic growth), 92% of the crop production increases will be due to yield improvements, along with 4% reduction attributed each to area and intensification systems. Under TSS (i.e., improved overall governance including a more equitable sharing of employment opportunities and income, a move toward sustainable diets, and moderate economic growth), 42% of the growth in production is attributed to yield improvement and 21% to intensification, along with a 37% reduction due to land area. Under the SSS scenario (i.e., faster economic growth, employment and income skewed toward the elites, and little attention to sustainability and natural resources), 53% of the growth is attributed to yield improvement and 27% to area expansion, with 20% reduction due to intensification. Regardless of the scenario, the region will become even more dependent on imports to meet its food needs. However, a slight economic growth is expected under all three scenarios (Figures A4-1 and A4-2).

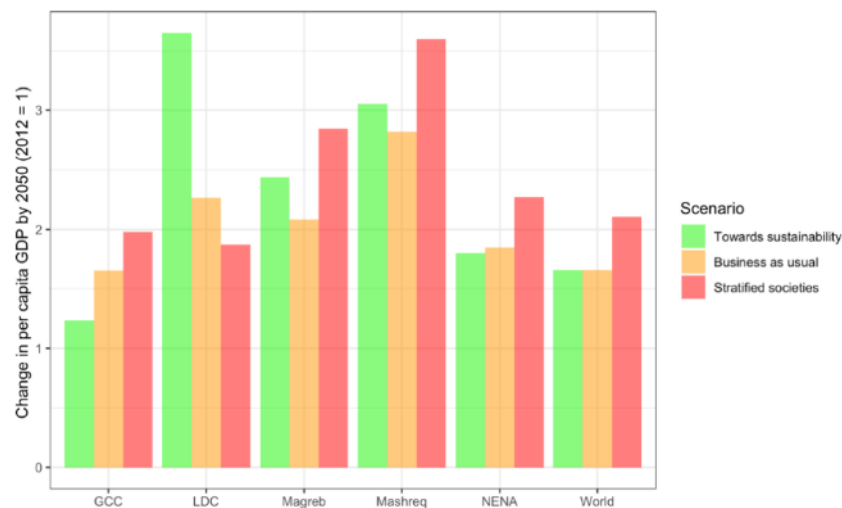


Figure A4-1: Changes in GDP per capita by 2050 (2012=1) for the NENA country groupings and globally under different scenarios. Source: based on results from FAO (2018b).

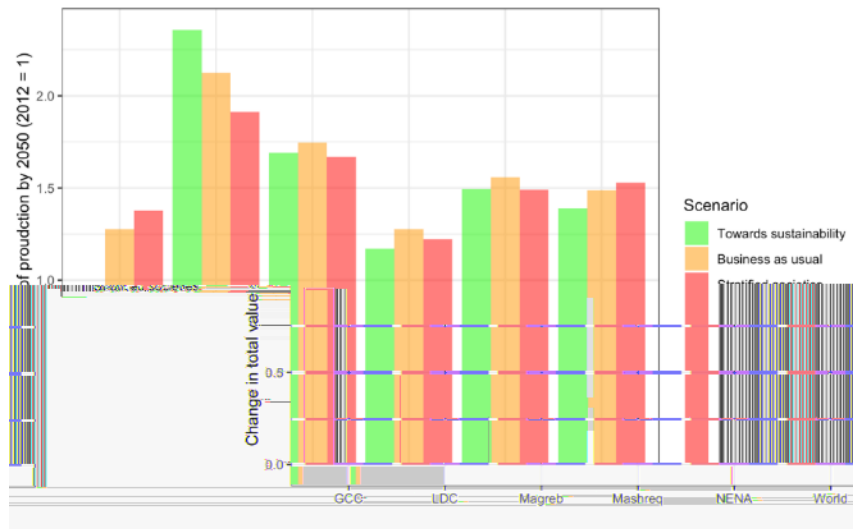


Figure A4-2: Projected change in total value of agricultural production by 2050 (2012=1) under different scenarios for NENA country groupings and globally. Source: based on results from FAO (2018b).

The MENA region accounts for 27% of the global imports of cereals, 21% of sugar, 20% of poultry meat, 39% of sheep meat, 20% of skim milk powder, and 30% of whole milk powder, and will continue to remain one of the biggest net food importers in the world through the 2030 (OECD and FAO, 2018), and remain vulnerable to changes in world food supplies and prices. In spite of a slight increase in its overall food production, driven mainly by yield improvements, the region will import even more wheat, feed, sugar, vegetable oil (except olive oil), meat and milk in 2030 to meet its growing demands (Figure A4-3).

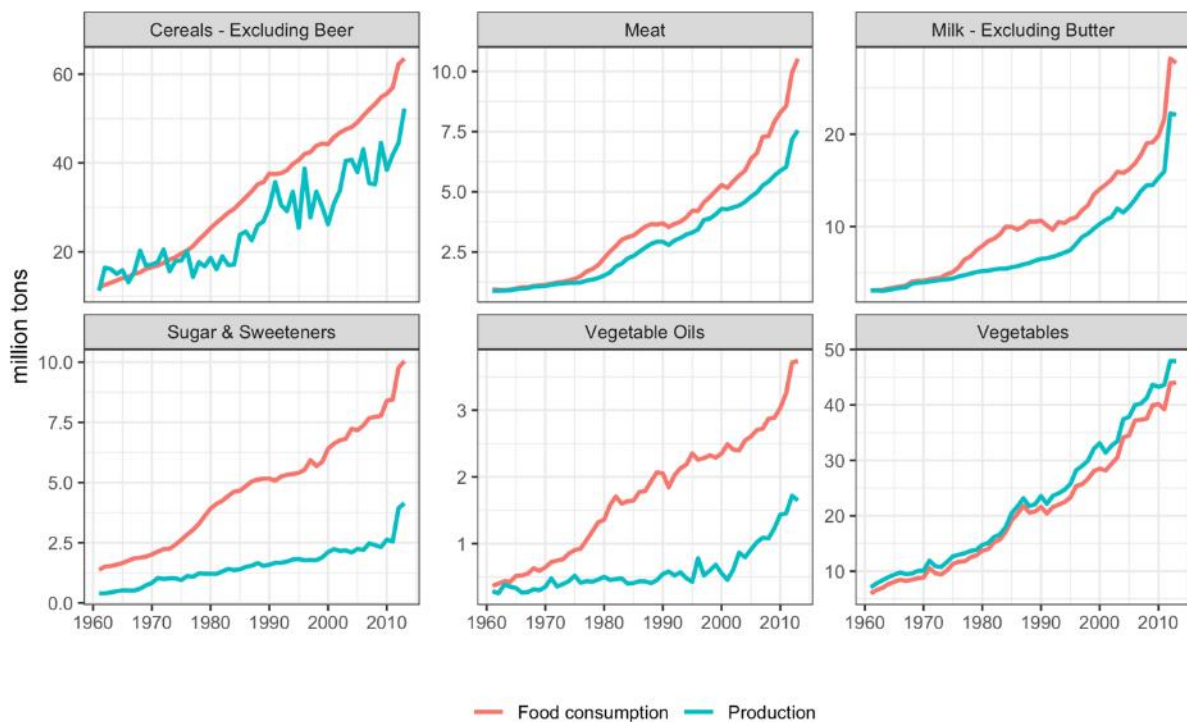


Figure A4-3: Trends in cereal production and consumption of selected food items in the NENA region.



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