Agriculture and Food Security

in OIC Member Countries

2020

ORGANISATION OF ISLAMIC COOPERATION

STATISTICAL, ECONOMIC AND SOCIAL RESEARCH AND TRAINING CENTRE FOR ISLAMIC COUNTRIES

AGRICULTURE AND FOOD SECURITY IN OIC MEMBER COUNTRIES

2020

Organization of Islamic Cooperation

Statistical, Economic and Social Research and Training Centre for Islamic Countries

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ACRONYMS

COMCEC	OIC Standing Committee for Economic and Commercial Cooperation
COVID-19	Coronavirus Disease of 2019
ECA	Europe and Central Asia
ESALA	East and South Asia and Latin America
FAO	Food and Agriculture Organization of the United Nations
FIES	Food Insecurity Experience Scale
GFSI	Global Food Security Index
GHG	Green House Gases
GHI	Global Hunger Index
HHI	Hidden Hunger Index
ICT	Information and Communication Technologies
IOFS	Islamic Organization for Food Security
IsDB	Islamic Development Bank
LIFDC	Low-Income Food Deficit Countries
MENA	Middle East and North Africa
OIC	Organization of Islamic Cooperation
PoU	Prevalence of Undernourishment
PPP	Public Private Partnership
RAI	Rural Access Index
SESRIC	Statistical, Economic and Social Research and Training Centre for Islamic Countries
SSA	Sub-Saharan Africa
TRWR	Total Renewable Water Resources
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
WASH	Water, Sanitation, and Hygiene
WHO	World Health Organization

FOREWORD

The agriculture sector has continued to play an important role in the social and economic development of OIC member countries and elsewhere by providing employment and livelihood for millions of people living especially in rural areas. I am pleased and excited to present to you SESRIC's report on *Agriculture and Food Security in OIC Member Countries 2020*. The report investigates the recent state as well as the constraints and challenges of this key sector and the situation of food security in OIC member countries by looking into a wide range of latest relevant statistics. This report also includes a special chapter on the impacts of the COVID-19 pandemic on agriculture and food security in OIC member countries.

The OIC member countries, as a group, are well-endowed with agricultural resources such as water, arable land, and human resources and account for a significant share of global agricultural production and trade. The latest statistics show that gross agricultural production index in OIC member countries has recorded a growth rate of 13.5% during the period 2010-2016. Half of the OIC member countries were also ranked among the top 20 producers of major agricultural commodities worldwide. Furthermore, the agriculture sector accounted for more than 20% of employment in 36 OIC member countries. In fact, this ratio even exceeds 50% in 12 OIC members located in Sub-Saharan Africa. In terms of trade, OIC countries have witnessed an impressive increase of 30% in the total volume of agriculture trade over the period of 2010-2018.

However, despite of this considerable progress and huge potency, agricultural productivity in OIC member countries remained insufficient to feed the growing population. It is worth to highlight that despite recording a significant growth rate in gross agricultural production index in 51 OIC member countries; the average per capita gross agricultural production growth index for the OIC group remained negative during the period 2010-2016. Still many OIC member countries rely heavily on food imports to meet their local demand. This state of affairs has serious socio-economic repercussions particularly for the 28 OIC Low Income Food Deficit Countries (LIFDCs) which are vulnerable to any sharp rise in the international food prices, trade restrictions and consequently, worsening of the already deteriorated state of food security through increasing the number of undernourished people.

In fact, despite the significant decline in recent decades in the level of hunger and malnutrition in many OIC countries, this level is still quite alarming in some of them. The number of people battling with acute hunger and malnutrition stands at around 230 million, corresponding to 12.7% of the OIC total population. Besides, multiple threats to food security are currently existing in many OIC member countries such as internal conflicts, pest/locust outbreak, extreme weather, displace population and last but not least COVID-19 outbreak. All of these threats show that the pressure on food systems in the OIC member countries is very severe and needs immediate attention to address the underlying causes.

The development of the sustainable agriculture sector and food systems in OIC member countries is mired by a multitude of constraints concerning agricultural resources, infrastructure and international commodity markets. In line with the spirit and guidance of OIC-2025 Programme of Action, this report suggests concrete policy actions to improve agriculture and food security

situation in OIC member countries by enhancing intra-OIC cooperation towards adopting sustainable agricultural resource management practices, facilitating investment in infrastructure, and implementing micronutrient fortification programmes to address malnutrition.

SESRIC's report on *Agriculture and Food Security in OIC Member Countries 2020* is the product of extensive time, effort and dedication undertaken by SESRIC Research Team. I would like to acknowledge their hard work and contributions with the anticipation that this report will contribute to the policy debate on how to address the challenges in the most effective ways and improve the agriculture development and food security situation in the OIC member countries.

Nebil DABUR
Director General
SESRIC

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This report is prepared by a research team at SESRIC led by Mazhar Hussain, Director of Economic and Social Research Department, and comprised of Fahman Fathurrahman, Tazeen Qureshi and Cem Tintin. The work was conducted under the leadership and supervision of H.E. Nebil Dabur, Director General of SESRIC.

Chapter 1 on Agricultural Resources and Chapter 2 on Agricultural Production were jointly prepared by Fahman Fathurrahman and Mazhar Hussain. Chapter 3 on Agricultural Trade was prepared by Cem Tintin. Chapter 4 on Food Security was prepared by Tazeen Qureshi. Chapter 5 on Challenges and Prospects and Chapter 6 on Impacts of COVID-19 were prepared by Fahman Fathurrahman. Chapter 7 on Concluding Remarks and Policy Suggestions was jointly prepared by all team members. Tazeen Qureshi also helped in data visualisation and formatting of the report.

EXECUTIVE SUMMARY

Agricultural Resources

Agricultural activities play a vital role in the employment, production, and development of OIC economies. Recent statistics show that with an arable land area of 1.38 billion hectares, the OIC countries accounted for more than one-fourth of the world's agricultural land area. In terms of the agricultural population, working people employed in agriculture activity exceeded 50% in 12 OIC countries in 2019, most of which are in Sub-Saharan Africa. In Chad and Niger, the percentage of working people employed in agriculture activities even exceeded 75%. In 2018, rural population in OIC countries accounted for 49.5% of their total population, compared to 48.8% in the Non-OIC developing countries and 44.8% in the world.

In terms of water resources and their use in agricultural activities, the long-term average annual precipitation in volume amounted to 17,718 km^3 in OIC countries during the period 2013-2017. This shows that collectively OIC countries received only 16.2% of the world's annual average precipitation volume. Considering the agricultural land area and the average precipitation at the individual country level, the distribution of average precipitation among sub-regions in OIC countries becomes clearly uneven. During the same period, OIC countries in Middle East and North Africa (MENA) and Europe and central Asia (ECA) received the lowest average annual precipitation weighted by the countries' agricultural land, while LAC and EAP received the most.

With 8400 km3 total renewable water resources (TRWR) per year during the 2013-2017 period, the OIC countries collectively accounted for 13.3% of the world TRWR. The structure of total renewable water resources among country groups is quite similar where 83.2% of the world's renewable water resources are surface water and the remaining is ground water. This is similar to OIC countries where 82% of total renewable water resources is surface water and the remaining is composed of ground water.

On average, the OIC countries, as a group, are dependent on neighbouring countries for 32.5% of their total water supply per year during the period 2013-2017. Dependency ratios in some OIC countries are even higher than 50%. Considering the rapid growth of their population, many OIC countries are still facing serious challenges in meeting the increasing demand for water, particularly in the agricultural sector. Out of the annual average of 933 km3 of water withdrawal in countries, 785 km3 is being withdrawn by the agriculture sector; accounting for 84% of the total water withdrawal.

The part of the arable land area under irrigation has a crucial role in agricultural production in many OIC countries, particularly those suffering from water scarcity in arid

and semi-arid regions of the MENA. Therefore, irrigated agriculture and the use of efficient irrigation systems and techniques have a particularly key role in agricultural development and food production in these countries. In this respect, the available data on the irrigation techniques used in OIC countries show that surface irrigation, which is the most traditional and least water-saving technique, is by far the most widely used technique, practised on 82.1% of the total area equipped for irrigation, compared to other developing countries' level of 89.3%. This ratio is even recorded at more than 50% in 38 OIC countries, 17 of them are still practicing only surface irrigation technique. Consequently, vast amounts of water diverted for irrigation in these countries are wasted at the farm through either deep percolation or surface runoff.

When it comes to the fertilizers and mechanization, the average use of fertilizer per hectare of the arable land in OIC countries climbed from 113.9 kilograms in 2007 to 127.9 kilograms in 2017. However, this level of using fertilizer in OIC countries is still insufficient, particularly when compared to the world average and the average of other developing countries. On the other hand, the level of agricultural mechanisation in OIC countries has also remained low with the total number of tractors per 1000 hectares of arable land declining from 9.81 in 2002 to 6.94 in 2009.

Agricultural Production

While agriculture is widely known to be a primary economic activity and assumed to play a major role in the economies of developing countries, this feature does not stand firm in the case of OIC countries as a group. The share of agriculture in the total GDP of OIC countries has gradually declined from 11.3% in 2000 to 9.8% in 2018. This is partly due to structural transformation, agricultural market instability, environmental stresses and depletion/degradation of land and water resources.

In terms of agricultural production index of the FAO, OIC countries, as a group, have recorded a comparable performance vis-à-vis non-OIC developing countries as well as the world during the period 2000-2016 and a much better performance when compared to the developed countries. Yet, as of 2016, there were still 16 OIC countries, which recorded a lower agricultural production index score than that of the world average score of 118.7.

Moreover, over the last decade, the OIC countries recorded undesirable levels in terms of the production of major commodities. For example, in 2018, the OIC countries accounted for 12.7% of the world's total cereals production, 15.1% of the world's fruit production, 9.5% of the total production of vegetables in the world and only 8.0% of the global meat production. However, in terms of the production volume of major agricultural commodities in OIC countries, the OIC countries have exhibited highest

shares globally in the total production of palm oil (87%), cocoa (64%), millet (44%), cassava (37%) and sorghum (37%).

Over the years, OIC countries, as a group, have also witnessed significant increase in production of livestock products. During the period 2000-2018, production of meat, milk eggs in OIC countries increased by 85.4% (from 18.7 to 34.6 million tonnes) 68.9% (from 82.2 to 138.8 million tonnes) and 97.8% (from 5.2 to 10.3 million tonnes), respectively. Their share in the overall production of livestock in the world has also improved to 12.9% in 2018 compared to 11.0% in 2000.

With sustained growth in fish production and improved distribution channels, world fisheries production has grown significantly during the last decade with a compound annual growth rate of 2.2% per annum during the period 2000–2017. Inland fisheries production has expanded globally from 28.8 to 62.8 million tonnes, while marine production has remained relatively stable (i.e., 144.2 million tonnes in 2017 vis-à-vis 110.9 in 2000). OIC countries also improved their share in world inland fisheries production from 13.9% in 2000 to 19.4% in 2017. A significant improvement is also visible in the case of marine production, whereby OIC countries have increased their overall share in global marine fisheries production from 9.6% to 19.6% over the same period.

Agricultural Trade

Agricultural trade could play a significant role in the development of OIC countries such as through its impacts on food security, poverty, job creation and economic growth. OIC countries are diverse in terms of climate, geography and production of agricultural commodities. As a result, many OIC countries extensively export and import agricultural products to and from the world. To this end, the total trade volume of OIC countries in agriculture grew by 30% over the period 2010-2018 and reached 371.9 billion in 2018. The OIC group represented a share of 11.8% in the global agricultural trade market in 2018. In the period 2010-2018, intra-OIC agricultural trade grew by about 20% and reached USD 120.1billion in 2018.

All these figures reflect a better integration of OIC countries, as a group, with the global agricultural trade markets. Nevertheless, the prevailing agricultural trade performance of OIC countries is still far from its true potential stemming from a number of reasons such as limited agricultural mechanization, high transportation costs and relatively high tariff rates. In this context, OIC countries need to work on increasing their trade competitiveness, for example, such as through investing in agricultural mechanization. At the same time, they need to remove restrictions and barriers that distort agricultural trade such as high-tariff rates and time-consuming customs procedures. Developing agricultural trade policies with the inclusion of views of various national stakeholders

would also help OIC countries to identify national priority areas in agricultural trade more effectively.

Food Security

Eradication of hunger and malnutrition and making households more food secure are basic human rights protected under various international conventions and policy platforms and clearly emphasized in both the UN SDGs and the OIC-2025 Programme of Action. Hosting almost 175.98 million undernourished people, the challenge of food security in OIC countries takes on an added importance because it affects their overall developmental trajectory in both the short- and the long-terms. However, policies and programs aimed at ensuring food security often fail to realize the critical importance of tailoring interventions to national needs. Similar to the variations in the level of income and development amongst OIC member countries, the level of food security – or lack of it – is highly varied in OIC member countries. This is because food security is directly affected by factors including, but not limited to, difficult economic conditions, weak commodity prices, lack of adequate infrastructure, poverty, conflicts, adverse climatic conditions, and more recently, the unprecedented COVID-19 pandemic. Such factors can either prolong or worsen chronic and transitory food insecurity around the world. This in turn can prove catastrophic for food availability, access, stability, and utilization.

In terms of production, from 2010 to 2016, 33 OIC member countries increased their gross value production (in monetary terms). Yet, some OIC member countries such as the United Arab Emirates, Kuwait, Lebanon, Djibouti, and Jordan continue to be heavily dependent on cereal imports to meet their core food needs between 2015 and 2017. Whereas, member countries of Kazakhstan, Guyana, Suriname, and Pakistan were net exporters of cereal in the same period. Food accessibility and affordability in OIC member countries continues to rely heavily on factors such as household income, expenditure, food prices, and accessibility to markets that are all pivotal in translating food supply into food security. Yet, from 2017 to 2018, the GDP per capita in purchasing power parity declined in OIC member countries by -318.74$ (current USD). OIC member countries were the only group to experience this decrease between 2017 and 2018.

Shocks such as uneven economic recovery, economic recession, natural disasters, conflicts, pandemics, etc. have a significant impact on the state of food security in many OIC member countries. For instance, the COVID-19 pandemic will undoubtedly affect the demand and supply of food around the world. On the demand side, lower income households may find it difficult to access food due to their loss of income. Similarly, countries with a higher dependence on food import may be exposed to shocks caused by the slowing down of international trade, currency fluctuations, and price fluctuations. On the supply side, the restrictions on mobility prompted by the COVID-19 pandemic combined with shocks associated with production and distribution of intermediate inputs

such as fertilizers are also likely to have wide-ranging effects on the production and distribution of food. All of these shocks are expected to exacerbate food insecurity around the world. For instance, FAO predicts that the COVID-19 pandemic may increase the number of people that are undernourished by 83 to 132 million in 2020.

In the recent past, shocks associated with food security have had the most impact on member countries in Sub-Saharan Africa and the Middle East and North Africa. Amongst OIC member countries, food production in Kazakhstan (47.4), Chad (23.1), Guyana (22.9), Syria (22) and Tunisia (20.3) was more variable as compared to other OIC member countries. Higher variability indicates a stark increase or decrease in domestic food production in these member countries in 2015. Similarly, per capita food supply variability (measured in kcal/caput/day) was also quite varied amongst OIC member countries in 2017; with the highest supply variability noted in the member countries of Lebanon (187), Kuwait (162), Albania (157), Sierra Leone (107), and Guinea Bissau (104).

The desired level of utilization of food is still a major developmental hurdle persisting in several OIC member countries. For example, although the average dietary energy supply improved in 48 OIC member countries between 2000 and 2017, low- and middle-income OIC countries such as Yemen, Somalia, Uganda, Afghanistan, and Chad continued to experience a shortage of adequate supply of dietary energy through food. Food insecurity also had a major impact on the state of nutrition in OIC member countries. For instance, due to the lack of proper nutrition, over 17.5% of adult population above the age of 18+ was obese in 2016. In the same year, more than 50% of the population in OIC member countries suffered from iron-deficiency anemia that poses risks such as birth complications, increased risk of maternal mortality and impaired physical and mental development of a child. In 2019, approximately 2% of all children under 5 in OIC member countries were overweight. Yet at the same time, the prevalence of stunting and wasting in children under-5 due to malnutrition continued to be a persisting issue for OIC member countries. For example, in 2019, OIC countries bore 10.3% of the global burden of stunted children and 3.1% of global burden of wasting. Among the OIC regions, the burden of wasting was highest in ESALA and SSA regions, which accounted for 80.6% of total wasted children in OIC member countries. Proper child nutrition helps not only in improving children's chances of survival during the early years of life but also contributes towards their physical and cognitive development. Without adequate food security, proper child nutrition is under jeopardy.

Lastly, food security is also inherently reliant on the provision of adequate Water, Sanitation, and Hygiene (WASH) services. A lack of access to proper and safe WASH services is detrimental to the nutritional status of individuals because of health risks posed by contamination from the use of untreated water and waste disposal, risk of infections from using and storing water in unsafe ways, and spread of infectious diseases

from consuming unhygienic water or being exposed to poor waste disposal. Globally, the access to basic sanitation and hygiene services has improved significantly since 2000. Similarly, in OIC member countries, the percentage of population using at least basic sanitation increased by 14.8% between 2000 and 2017 and the population using at least basic drinking water services increased by 9.6% in the same period. Yet, in line with global trends, data on OIC member countries supports the finding that lower-income economies suffer disproportionately from the absence of adequate WASH services resulting from a lack of economic resources and infrastructure. For example, in 2017, the bulk of population with access to safe and proper WASH services resided in member countries in Europe and Central America, whereas the lowest percentage of population with either basic sanitation or basic drinking water services were concentrated in Sub-Saharan Africa (sanitation – 32.4%, drinking water – 64%).

Challenges and Prospects

Despite the pressing need to solve the problem of hunger and malnutrition, the agriculture sector in many OIC countries is still not fully utilized. Sustainable agricultural practices need to be implemented in order to improve agricultural productivity and thus the state of food insecurity and poverty. Agriculture resource management is the core of a sustainable agriculture system with the main approach of using agricultural inputs efficiently to improve agricultural productivity. The way OIC countries use their agriculture inputs is still inefficient. Land and labour productivity are respectively 14% and 19% lower than the developing countries average. These problems are associated with crosscutting issues such as lack of modern inputs, inefficient land market and non-existent of modern finance.

Infrastructure improvement is an important requisite to incite growth in the agriculture sector as well as rural development. Several OIC countries still lack of sufficient infrastructure that is need to support sustainable agriculture sector. Three important agriculture infrastructures are needed to be addressed as priorities, namely rural roads and accessibility, irrigation, and electricity. Roads in the rural areas are very important to make the movement of goods and population that would make agriculture supply-chain more efficient thereby improving productivity. There are many pieces of evidences that investment in rural roads helps to increase household income and consumption.

OIC countries are among the countries most vulnerable to micronutrient deficiency owing to the high level of food insecurity. Food fortification can be the answer for the need for micronutrient intake of the population, where natural food containing high micronutrient is unattainable. OIC countries have made progress in terms of food fortification programmes. Some countries have already equipped with various food fortification regulations in a varying way. However, most of them solely focus on salt iodization. Only around half of OIC countries imposed mandatory to fortify non-salt foods

(e.g. either flour, oil, or rice) with various micronutrients such as B12, Vitamin D, Folate (B9), Vitamin A, Iron, and Zinc.

Climate change is another major challenge for the development of agriculture sector in OIC member countries and elsewhere. Two-ways feedback effects exist between agriculture and climate change. On one hand, agriculture activities emit GHGs emissions, which contribute to climate change, on the other hand, the gradual changing of climate gives a significant impact on agricultural productions. It is estimated that climate change will decrease agriculture productivity to between 2% - 15% by 2050. To cope with climate change challenge is through the realization of the sustainability of food production by adopting "climate-smart" agricultural practices. Climate-smart agriculture has the main aim to increase agricultural productivity while at the same time reducing GHG emissions and increasing the capacity and resiliency to climate shocks.

Impacts of COVID-19

The COVID-19 pandemic and the accompanying socio-economic crisis are already affecting the state of food and agriculture development thereby threatening the well-being of the society. The country's risks on food security may differ depending on the degree of exposure on both production and consumption. According to some studies, developing countries, in general, have a higher risk in terms of demand-side exposure. That means the consumption side is the more vulnerable channel of transmissions of the COVID-19 impacts, rather than the production side. This is also true for OIC countries.

The OIC countries, especially the low income, are the most susceptible to demand-side transmission of the pandemic as almost 70% of OIC countries have intermediate-high to high levels of risks in terms of demand-side transmissions. In contrast, only 10% have a low risk of exposure to the demand side. Overall, economic and income contraction amid the pandemic control measures would possibly increase the poor population thereby putting more people under a food-insecure state.

CHAPTER ONE

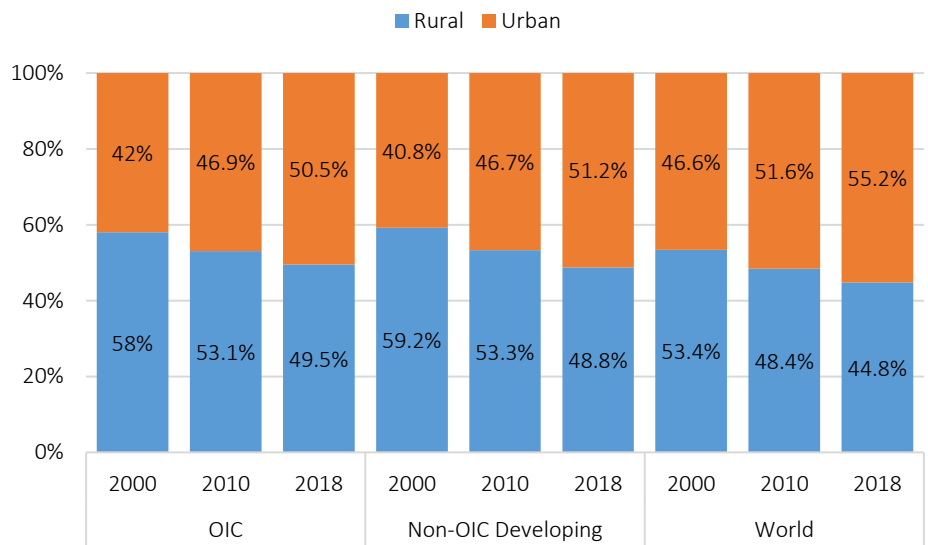
1. Agricultural Resources

Agricultural activities play an important role in OIC economies, as in many other developing countries, in terms of employment, production and therefore, social and economic development. Given the vast agricultural potential of OIC member countries, this chapter overviews selected indicators on agricultural resources such as rural population, land use, water resource management and use of fertilizers in OIC member countries from a comparative perspective.

1.1. Agricultural Population and Land Use

With an agricultural land area of 1.38 billion hectares and a total population of over 1.8 billion in 2018, the OIC member countries accounted for more than a quarter of the world's agricultural land area and population. In 2018, the rural population in OIC countries accounted for 49.5% of the total population, compared to 48.8% in the non-OIC developing countries and 44.8% world average (Figure 1.1).

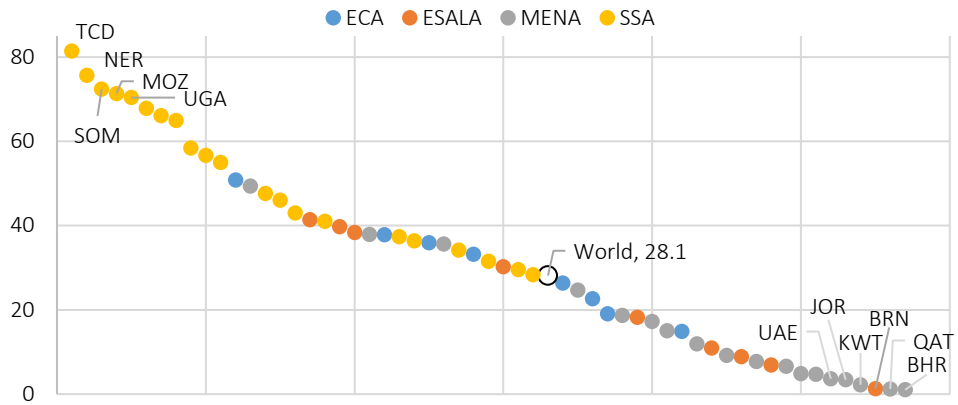
Figure 1.1: Urban and Rural Population (% of total population), 2000-2018



Source: SESRIC Staff calculations based on UN Population Division

As shown in Figure 1.2, the proportion of working people employed in agricultural activity exceeds the global average in 32 OIC member countries. While employment in agriculture has decreased in the majority of OIC countries during the last couple of decades, working people employed in agriculture activity exceeds 50% in 12 OIC countries in 2019, most of which are in Sub-Saharan Africa. In Chad and Niger, the percentage of working people employed in agriculture activities even exceeds 75% (Figure 1.2).

Figure 1.2: Employment in Agriculture (% of total employment), 2019

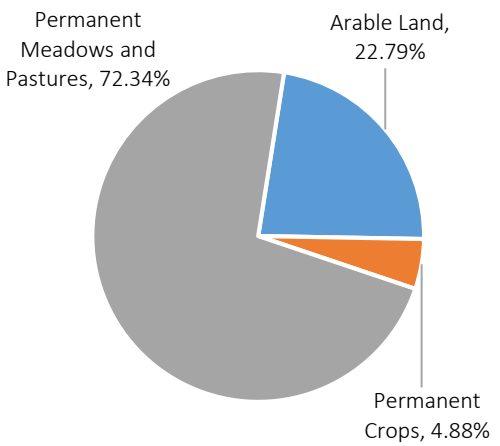


Source: SESRIC Staff calculations based on ILOSTAT

Agricultural Land

In addition to the agriculture labour force, the effective and productive use of agricultural land is an essential element in agricultural development. In this regard, OIC countries have a total agricultural land area of 1.38 billion hectares, corresponding to 25.7% of the world total agricultural land area in 2017. Considering the cultivated area, which is the sum of the arable land and permanent crop land, it is observed that the percentage of cultivated land area in the total agricultural area in OIC countries (27.67%) is still significantly below the global average, which is over 30%.

Figure 1.3: Structure of Agricultural Land in OIC Countries, 2017



Source: FAOSTAT Online Database

The arable land area in OIC countries amounted to only 310 million hectares in 2017, corresponding to 22.79% of their total agricultural area. The permanent crops land of OIC countries (67 million hectares) accounted for only 4.88% of their total agricultural land area. Conversely, as shown in Figure 1.3, the bulk of the agricultural land area in OIC countries (72.34% or 995 million hectares) is permanent meadows and pastures, largely used for grazing of livestock.

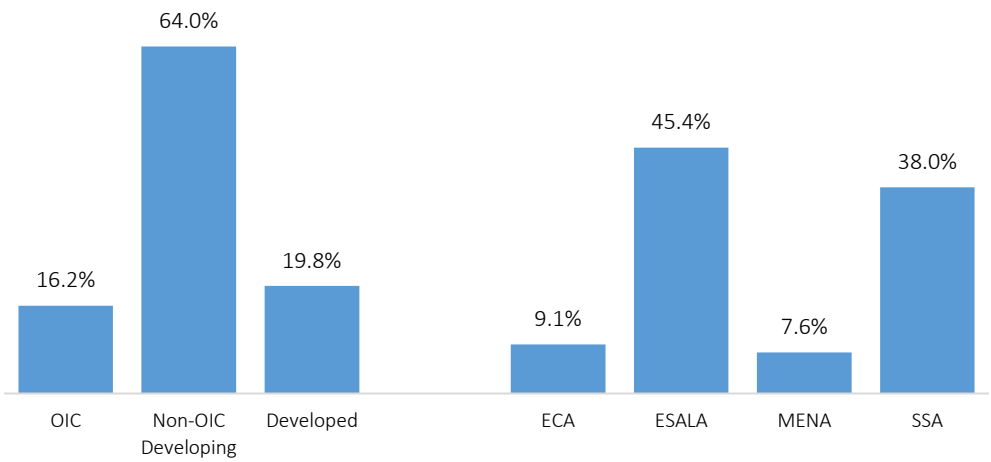
1.2. Water Resources and Irrigation

Considering that the bulk of the world's water resources are used in agriculture and that the global demand for food is increasing rapidly, the role of water resources management, through efficient irrigation systems and techniques, has recently assumed greater importance in agricultural development and food security. Water is a scarce resource in arid and semi-arid regions where many OIC countries are located, particularly in West Asia, North-eastern Africa and Middle East. Most of the OIC countries in these regions are facing severe water pressures due to increasing water demand and limited availability of water resources. These pressures are expected to increase in the face of increasing populations and the increased level of water use per capita. Therefore, the efficient use of water resources in agriculture, through improving irrigation systems and techniques, is one of the most urgent needs and prerequisites for sustainable agricultural development and food security in OIC countries, particularly those in water-scarce regions.

Precipitation in depth

According to the latest estimates, OIC member countries have reported approximately 17,705 km^3 of precipitation in 2017, corresponding to 16.2% of the world's annual precipitation volume of 109,227 km^3. Meanwhile, OIC countries in MENA and ECA regions received the lowest annual precipitation, while ESALA and SSA received the most. The share of average annual precipitation in OIC and country groups as comparison is illustrated in Figure 1.4.

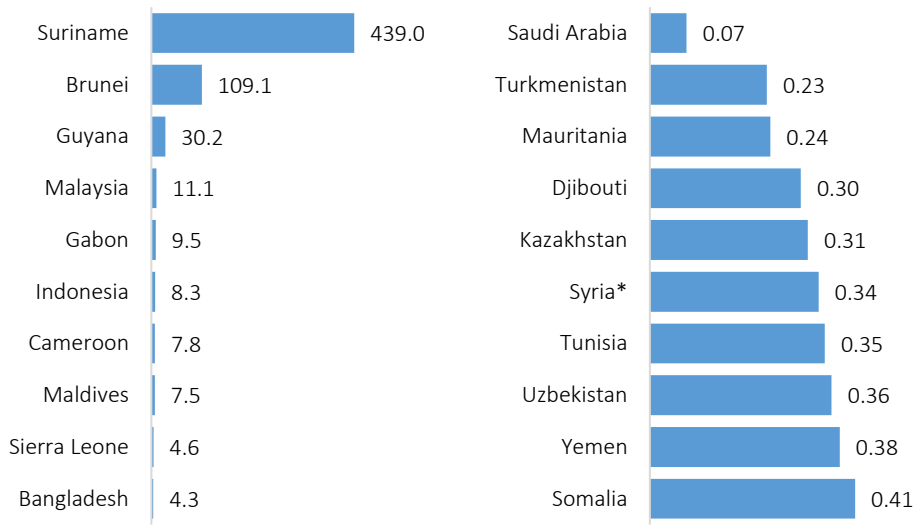
Figure 1.4: Share of Long-Term Average Annual Precipitation in the World (left) and OIC (right), 2017



Source: SESRIC Staff calculations based on AQUASTAT Online Database

Considering the agricultural land area and the average precipitation at the individual country level, the distribution of average precipitation among OIC countries becomes clearly uneven. At the individual country level, Suriname, Brunei Darussalam and Guyana are ranked at the top with the highest precipitation level per agricultural land (Figure 1.5, left). In contrast, many OIC member countries located in the arid-regions of MENA, Central Asia and SSA have received the lowest volume of precipitation weighted by their agricultural land (Figure 1.5, right).

Figure 1.5: The Highest (left) and Lowest (right) Average Annual Precipitation (m^3) Weighted by Agricultural Land ($1000m^2$) in Top 10 OIC Countries, 2017



Source: AQUASTAT Online Database * Membership suspended

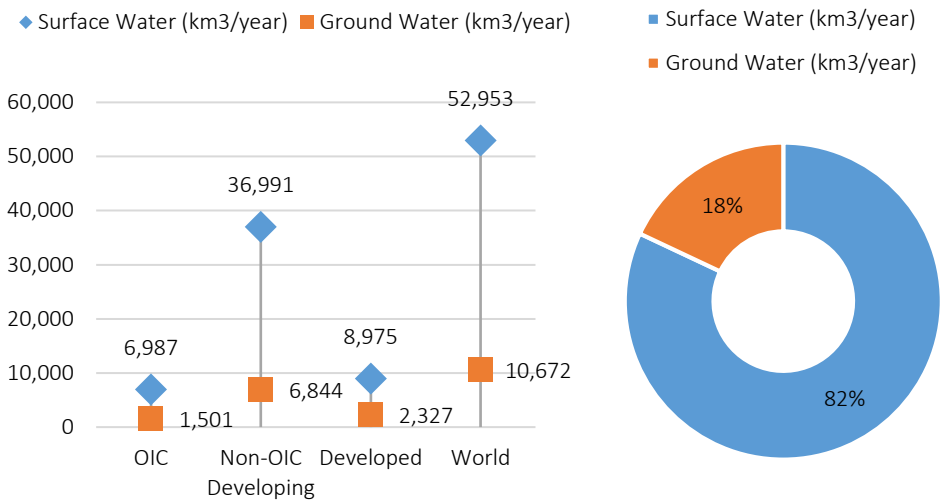
Renewable water resources

The OIC member countries with 7,261 km^3 total renewable water resources (TRWR) per year accounted for 13.3% of the world TRWR of 54,737 km^3 in 2017. The share of OIC countries remained comparatively lower than the non-OIC developing countries which accounted for more than two thirds (69%) of world TRWR. On the other hand, per capita TRWR (4,029m^3/year) in OIC countries was also significantly below the level of other developing countries (8,042m^3/year) in 2017.

The structure of total renewable water resources among country groups is quite similar. As shown in Figure 1.6, 52,953 km^3 or 83% of the world's renewable water resources are surface water and the remaining are ground water. This is similar to OIC countries where 82% of total renewable water resources consist of surface water and the remaining is ground water. The percentage of surface water is slightly higher in Non-OIC

developing countries corresponding to 84% of all renewable water resources, while in developed countries the highest level of ground water as a percentage of renewable water resources is observed at a value of 21% (Figure 1.6).

Figure 1.6: Structure of Renewable Water Source in the World (left) and in OIC Countries (right), 2017



Source: SESRIC Staff calculations based on AQUASTAT Online Database

Water stress

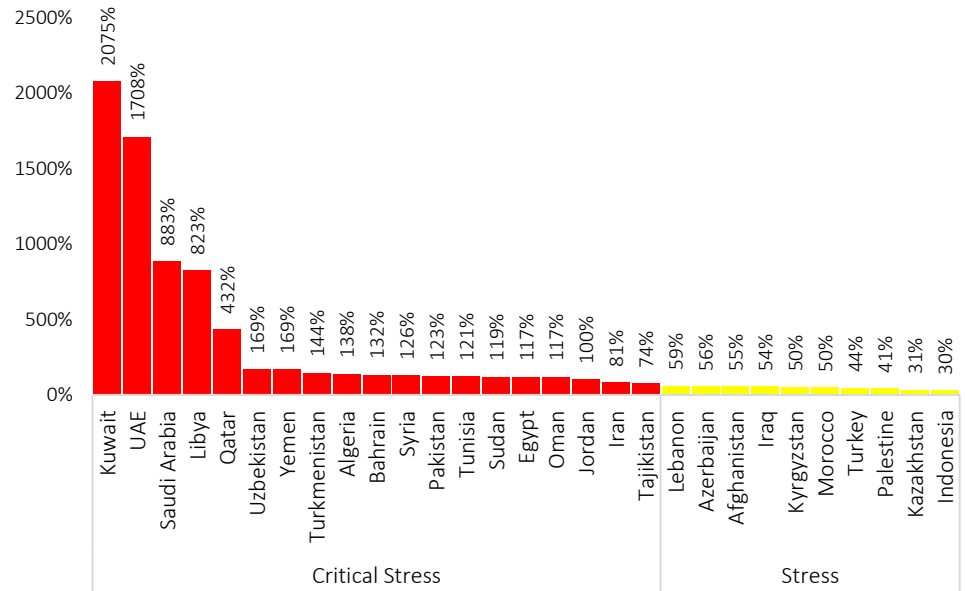
The level of water stress measures the proportion of water withdrawal by all sectors in relation to the available water resources, while also taking into consideration water requirements for sustaining natural environment. This indicator provides information on weather water is sufficient to consume both for environment and society at large, thereby indicating the water security status of a country/ region. A high level of water stress not only hinders the sustainability of natural environment, but also could have negative impacts on socio-economic development and food security, due to competing use for water. This indicator is used to track progress towards SDG Target 6.4[1].

During 2000-2017 period, global water stress level was estimated at 19%. According to this indicator, a country begins to experience water stress at 25% level, while above 70% is considered as critically stressed (UN Water, 2018). The group of OIC countries is experiencing water stress with an average stress level of 33%. At the individual country

[1] SDG Target 6.4: By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity.

level, 29 OIC countries are experiencing water stress, 19 of which are exposed to critically water stress level ranging from 30% in Indonesia to 2075% in Kuwait (Figure 1.7). Most of these member countries are the ones located in arid and semi-arid regions with limited and scarce water resources.

Figure 1.7: Water Stress Level (%), 2000-2017

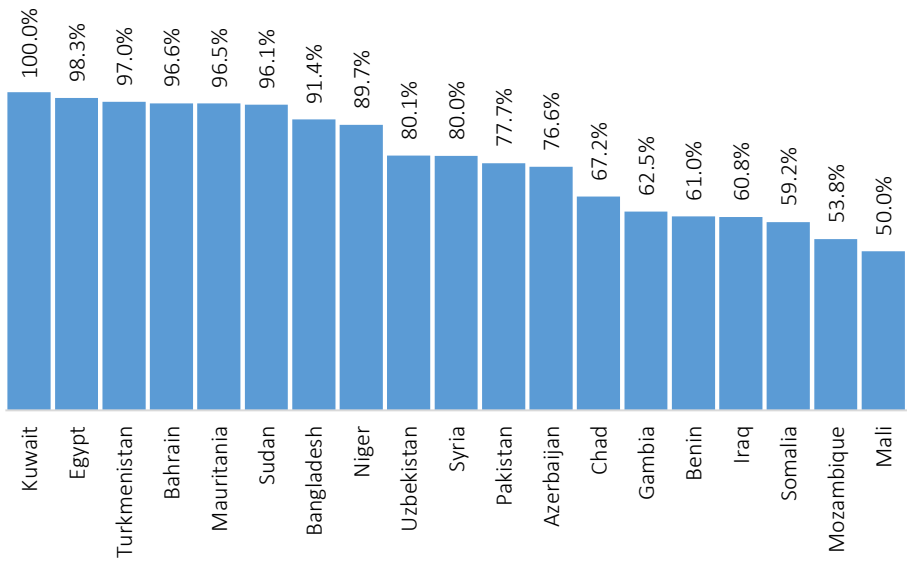


Source: AQUASTAT Online Database

Water dependency

The term water resources dependency ratio indicates to what extent a country is dependent on its neighbouring countries to meet its water needs. It is observed that in 2017, OIC countries were dependent on neighbouring countries for 29.8% of their total water needs. This ratio was higher than the averages of both other developing countries (24.6%) and the world (22.2%). Figure 1.8 depicts 19 OIC countries with water dependency ratios at 50% or higher. In particular, OIC countries in the Middle East and North East Africa recorded the highest water resources dependency ratios in 2017.

Figure 1.8: External Sources Dependency Ratio, 2017



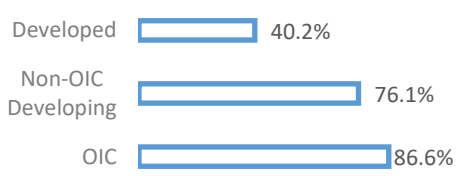
Source: AQUASTAT Online Database

Among the OIC countries, Kuwait ranks first with 100% dependency on external sources, followed by Egypt (98.3%), Turkmenistan (97.0%), Bahrain (96.6%), Mauritania (96.5%), and Sudan (96.1%). Most of these member countries depend on eight main international river basins: the Nile, Niger, Senegal, Lake Chad, and Limpopo River Basins in African Region; Euphrates and Tigris River Basin, Aral Sea Basin (Amu Darya and Syr Darya Rivers), and Ganges River Basin in Asian Region. For example, Kuwait and Bahrain depend heavily on groundwater aquifer flowing from Saudi Arabia while Egypt depends on the Nile River flowing from Ethiopia, Mauritania on Senegal River, Turkmenistan on the Amu Darya and Syr Darya Rivers.

Agricultural water withdrawal

Considering the rapid growth of their population, many OIC countries are still facing serious challenges in meeting the increasing demand for water, particularly in the agricultural sector. During the period of 2000-2017, OIC member countries recorded total water withdrawal of 1,030 km^3. Around 892 km^3 of which was used in the agriculture sector, accounting for 86.6% of the total water withdrawal (Figure 1.9).

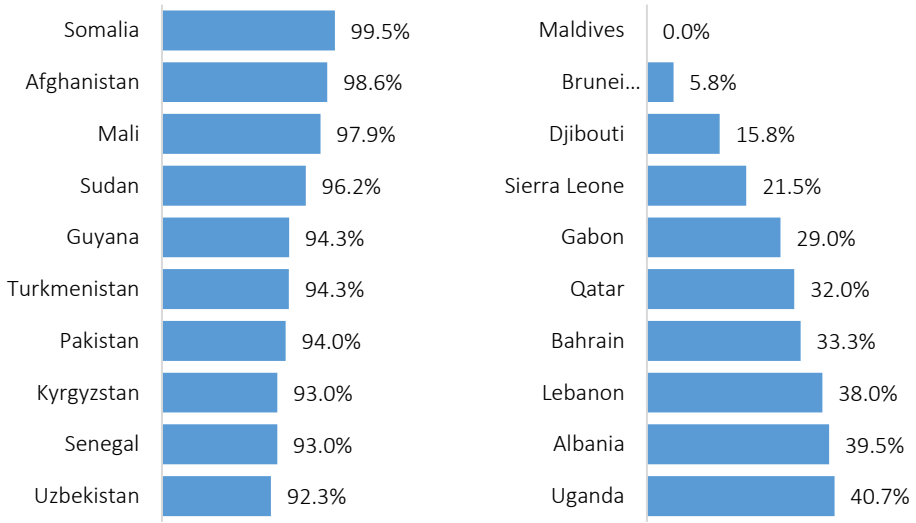
Figure 1.9: Share of Agriculture Sector in all Water Withdrawal, 2000-2017



Source: SESRIC Staff calculations based on AQUASTAT Online Database

The distribution of agricultural water withdrawal within OIC countries is far from being uniform as Figure 1.10 reveals. This divergence can be attributed to the availability of renewable water resources and the socio-economic conditions, which dictate how much water is withdrawn by the agricultural sector in comparison to the water withdrawal for the industrial and municipal use.

Figure 1.10: Top 10 OIC Countries with Highest (left) and Lowest (right) Agricultural Water Withdrawal % of Total Water Withdrawal, 2000-2017



Source: AQUASTAT Online Database

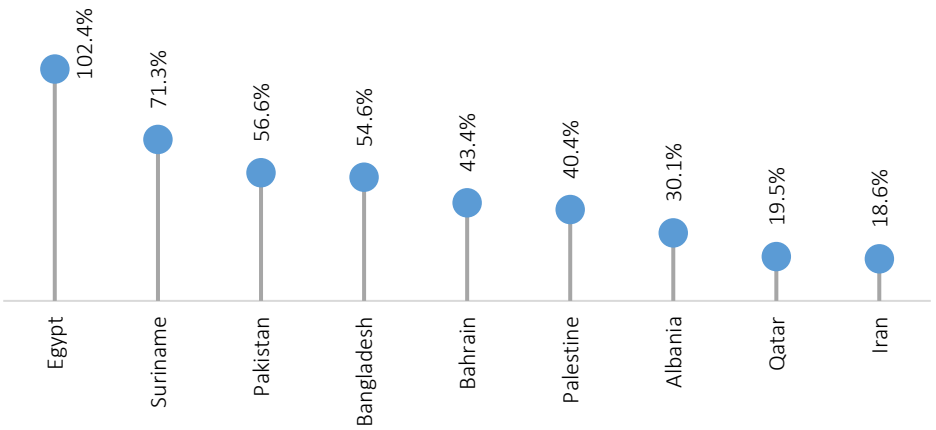
Irrigation

The bulk of agricultural water withdrawal is used in irrigation. The terms "area equipped for irrigation, irrigation area, area under irrigation," all refer to land area equipped to provide water, other than direct rainfall to the crops. According to this definition, the total agricultural area equipped for irrigation in OIC countries covers 80.2 million hectares accounting for only 5.9% of their total agricultural area, compared to the world average of 6.8%. Yet, the total area equipped for irrigation in OIC countries accounts for 26.4% of their arable land, the level that is higher than that of other developing countries (26.1%) and the world (23.9%).

However, at the individual country level, it is observed that the distribution of the irrigation area varies across OIC countries. According to the latest estimates, only 15 countries with 69 million hectares account for 86.0% of the total irrigation area in OIC countries. Pakistan stands out among these OIC countries with its irrigation area of 20.0 million hectares, which alone accounts for 24.9% of total irrigation area in OIC countries.

Alternatively, shares of irrigation areas within countries' agricultural areas also differ, ranging from negligible levels (less than 0.1%) to 102.4%. As Figure 1.11 shows, among the top ten OIC countries in terms of area equipped for irrigation as a percentage of agricultural land only nine countries had shares reaching more than 20%.

Figure 1.11: Top-10 OIC Countries with Area Equipped for Irrigation as % of Agricultural Land, 2000-2017



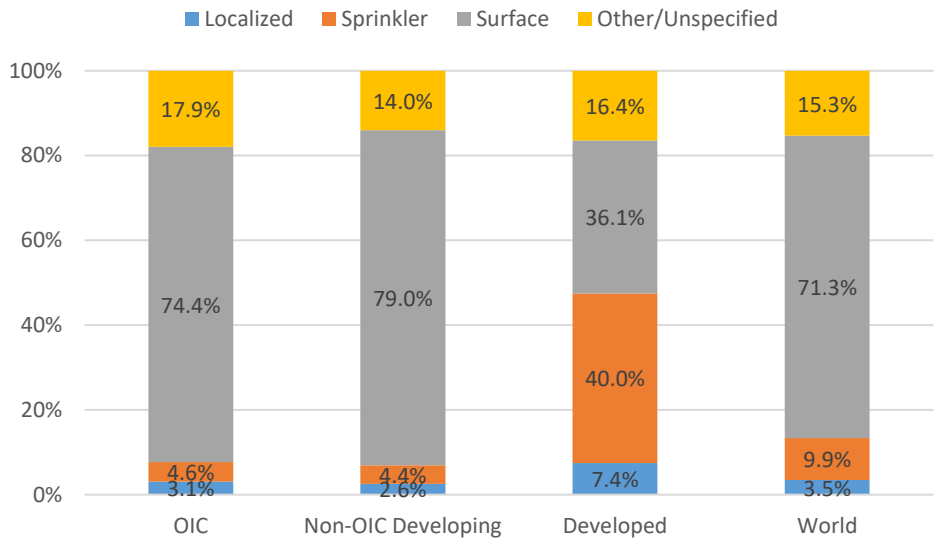
Source: AQUASTAT Online Databases

The part of the arable land area under irrigation has a crucial role in agricultural production in many OIC countries, particularly those suffering from critical water stress in arid and semi-arid regions. Therefore, irrigated agriculture and the use of efficient irrigation systems and techniques have an especially significant role in agricultural development and food production in these countries. In this respect, the available data on the irrigation techniques used in OIC countries show that surface irrigation, which is the most traditional and least water-saving technique, is by far the most widely used. This practice is carried out on 74.4% of the total area equipped for irrigation, compared to other developing countries level of 79% (Figure 1.12). This ratio is more than 50% in 24 OIC countries, out of that, 6 OIC countries use surface irrigation as the single technique practised for irrigation. Consequently, massive amounts of water diverted for irrigation in these countries are wasted at the farm level through either deep percolation or surface runoff.

In contrast, sprinkler irrigation is practised on 4.6% of the total area equipped for irrigation in OIC countries (Figure 1.12). At the individual country level, sprinkler technique, which is more water-saving than surface irrigation, is practised on more than 20% of the irrigation area in seven OIC countries, notably Saudi Arabia (44%), Azerbaijan (42%), Algeria (31%), and Lebanon (31%). This ratio is almost negligible (less than 0.1%) in 23 OIC countries. On the other hand, localized irrigation technique, which

is the most water-saving one, is practised on 2.3 million hectares, corresponding to only 3.1% of the total area equipped for irrigation in OIC countries; a ratio which is below the world average of 3.5%. The prevalence of this technique also varies across the OIC countries. Palestine, the United Arab Emirates and Jordan stand out with their remarkably high levels of using localized irrigation, reaching to 83%, 77% and 60%, respectively. In addition to these three countries, this ratio was more than 20% in only four OIC countries, namely, Tunisia (32%), Lebanon (32%), Oman (24%), and Algeria (23%). On the other hand, this ratio was negligible in 26 OIC countries (less than 0.1%). In general, countries found in arid regions choose to develop localized and sprinkler irrigation techniques more intensively to save more water.

Figure 1.12: Irrigation Techniques as % of Total Area Equipped for Irrigation, 2000-2017



Source: SESRIC Staff calculations based on AQUASTAT Online Databases

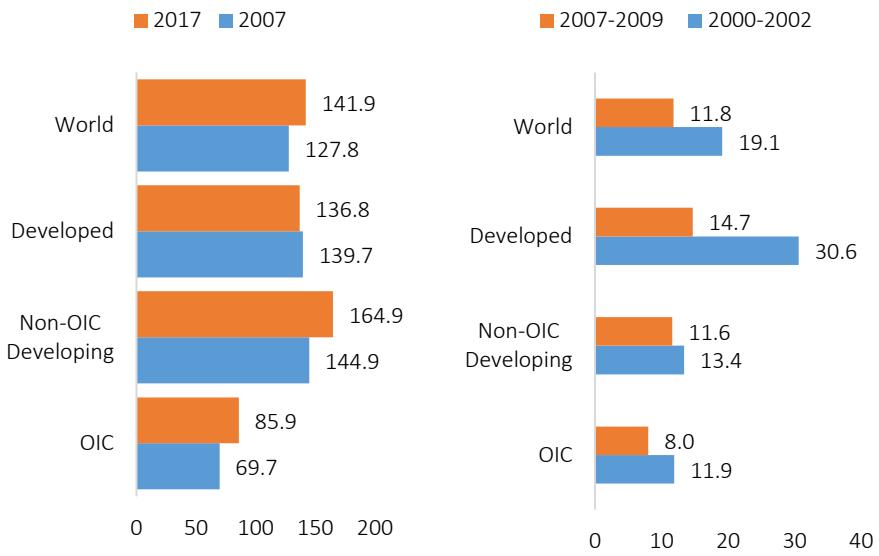
1.3. Fertilizers and Mechanization

The average use of fertilizer per hectare of the arable land in OIC countries climbed up from 69.7 kilograms in 2007 to 85.9 kilograms in 2017. However, as shown in Figure 1.13 (left), this level of fertilizer use is insufficient, particularly when compared to the world and other developing countries averages of 141.9 kilograms and 164.9, respectively. Developed countries, on the other hand, used 136.8 kilograms of fertilizer per hectare in 2017.

The latest data on agricultural mechanization is outdated and therefore, the available estimates should be interpreted with caution. As per the available data from FAO, the

level of agricultural mechanisation in OIC countries has remained low with the total number of tractors per 1000 hectares of arable land declining from 11.9 during 2000-2002 period to 8.0 in 2007-2009. As depicted in Figure 1.13 (right), a similar declining trend was also experienced by the other country groups. As of 2007-2009, the world average was 11.8 and the average of other developing countries was 11.6. In other words, compared with other developing countries and the world average, the use of tractors in OIC countries remained low. OIC countries also have insufficient agricultural mechanization relative to developed countries group where the same area of arable land was harvested by 14.7 tractors.

Figure 1.13: Fertilizer (left) and Tractor (right) Use in the World



Source: SESRIC Staff calculations based on FAOSTAT Online Database

CHAPTER TWO

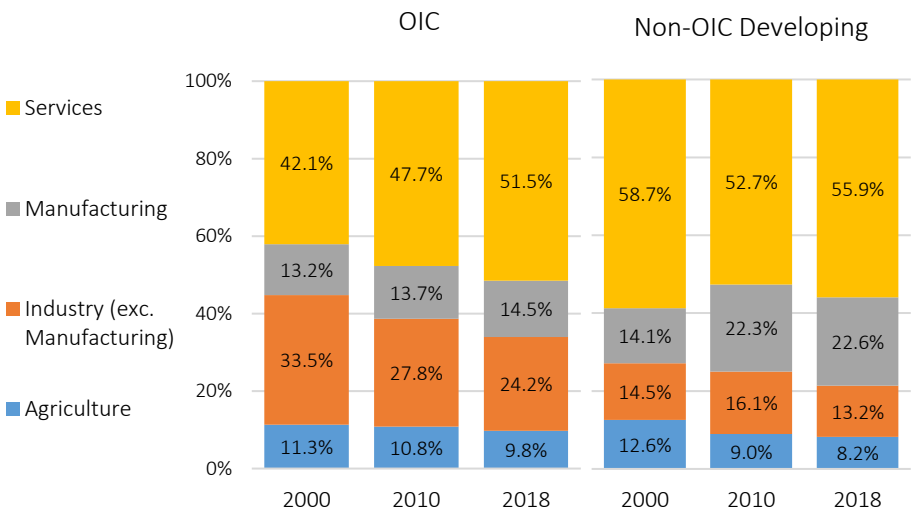
2. Agricultural Production

Although agriculture is widely known to be a primary economic activity and assumed to play a major role in the economies of developing countries, its contribution to the GDP is on decline in OIC member countries and elsewhere. Furthermore, despite of having substantial agricultural resources majority of developing countries continued to rely heavily on imports to feed their local populations. In this context, this chapter provides a detailed analysis of agricultural production in OIC member countries by looking into the relevant latest statistics.

2.1. Agricultural Production

The share of agriculture in the total GDP of OIC countries has gradually declined from 11.3% in 2000 to 9.8% in 2018 (Figure 2.1). This declining trend is in line with the situation in other developing countries where agriculture accounted for only 8% of GDP in 2018. In general, the relative decline in agricultural value addition to the GDP in developing world can be associated with structural transformation, agricultural market instability, environmental stresses and depletion/degradation of land and water resources.

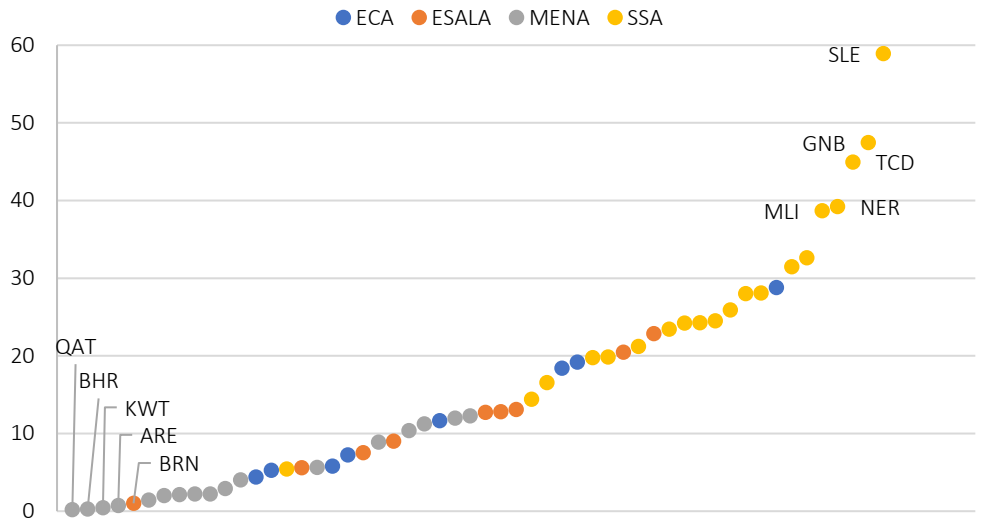
Figure 2.1: Value-added by Agricultural Sector (% of GDP)



Source: SESRIC Staff calculations based on UN National Accounts Main Aggregates Database

At the individual country level, the agriculture sector has a particular importance for many OIC economies. In 2018, it made up more than 20% of GDP in 18 OIC countries (Figure 2.2). Even in seven OIC countries located in Africa, this share exceeded 30% in the same year. There are also 23 OIC countries in Central and East Asia and MENA regions for which the contribution of the agricultural activities to GDP remained below 10%.

Figure 2.2: Value-added by Agricultural Sector in OIC Countries (% of GDP), 2018



Source: UN National Accounts Main Aggregates Database.

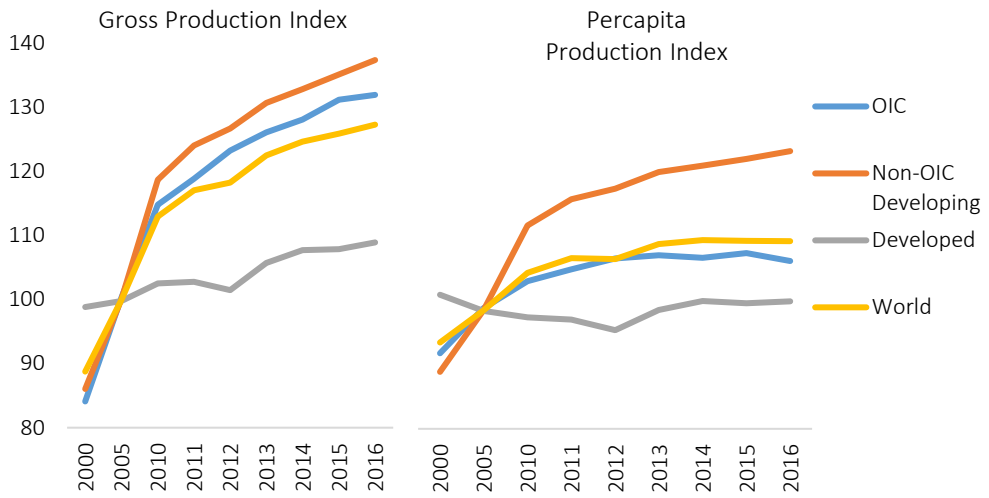
In terms of agricultural production index of the FAO, OIC countries, as a group, have recorded improvement in their performance during the period 2000-2016. Particularly, since 2010, OIC member countries recorded a much better performance when compared to the developed countries and world average (Figure 2.3, left). Yet, as of 2016, there were still 24 OIC countries, which recorded a lower agricultural production index score than that of the world average score of 127. On the other hand, during 2000-2016 period, the gross production index has recorded noticeable growth in some OIC countries; namely Sierra Leone with a compound annual growth rate of 10.1%, followed by Niger (6.4%), Kuwait (6.2%) and Tajikistan (6.0%)

As far as the per capita agricultural production index is concerned, it is observed that during the period under consideration, the average per capita agricultural production in OIC countries experienced a modest increase as compared to non-OIC developing countries and the world as a whole. The stagnation in the per capita production trend has worsen particularly during the 2013-2016 and this led to a significant widening in the per capita production gap between OIC countries and non-OIC developing countries (Figure 2.3, right).

At the individual country level, 37 OIC member countries have reported positive compound annual growth rate (CAGR) in per capita agriculture production during 2000-2016. Among these member countries, Sierra Leone recorded the highest CAGR of 6.8% followed by Brunei Darussalam and Algeria (4.0% each), Tajikistan (3.7%,) Albania (3.5%), Uzbekistan (3.4%), Kazakhstan (3.3%) and Azerbaijan (3.1%). Nevertheless, still 39 OIC

member countries recorded a lower score for per capita production index compared to the world average of 112. The poor performance of OIC countries indicates that a majority of them has insufficient food production capacity to meet the domestic demand for their growing populations and, therefore, have to rely heavily on food imports.

Figure 2.3: Agricultural Production Indices (2004-2006=100), 2000-2016

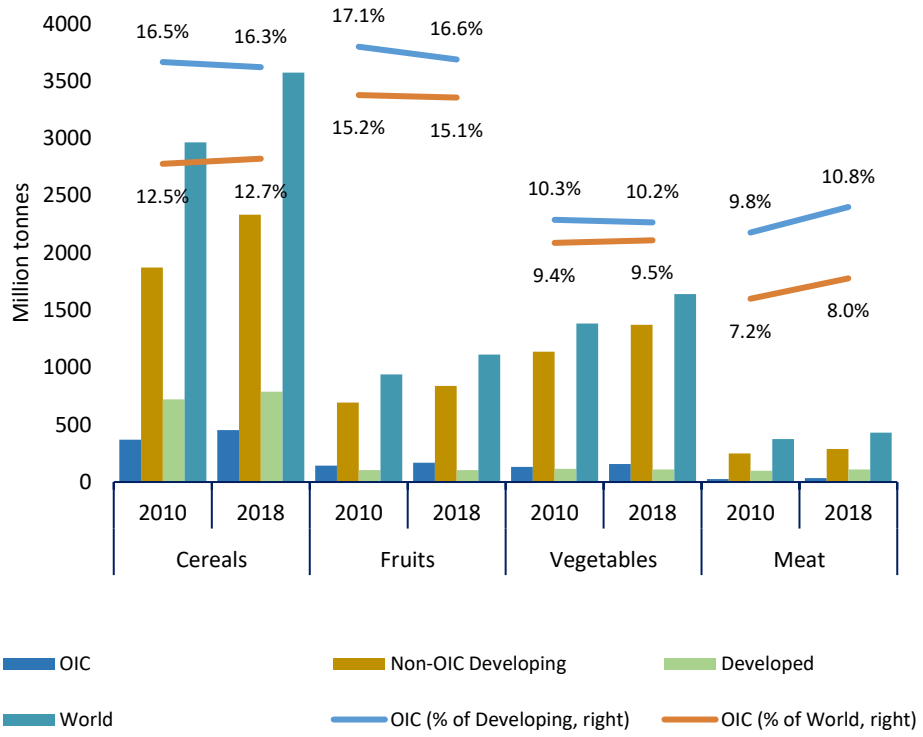


Source: SESRIC Staff calculations based on FAOSTAT Online Database

2.2. Production of Major Agricultural Commodities

Over the last decade, OIC countries, as a group, showed a positive trend in terms of the production of major commodities. In 2018, OIC countries accounted for 12.7% of the world's total cereals production, with a slight improvement from its 2010 levels of 12.5% (Figure 2.4). This corresponds to a production volume of 352.7 million tonnes in 2018. Again, in 2018, with 167.5 million tonnes, the share of OIC countries in the world's fruit production was recorded at 15.1%, decreasing slightly from 15.2% in 2010, and their cumulative share in the developing countries was recorded at 16.6% in 2018, decreasing from 17.1% in 2010. The total production of vegetables in OIC countries was recorded at 155.9 million tonnes in 2018. The share of OIC countries in the total production of vegetables in the world increased slightly from 9.4% in 2010 to 9.5% in 2018 while the share in developing countries' production decreased from 10.3% in 2010 to 10.2% in 2018. As far as meat production is concerned, the OIC countries have seen improvements in their shares in the world as well as among developing countries. With 34.6 million tonnes in 2018, OIC countries registered 8.0% and 10.8% shares in total meat production of the world and developing countries, respectively.

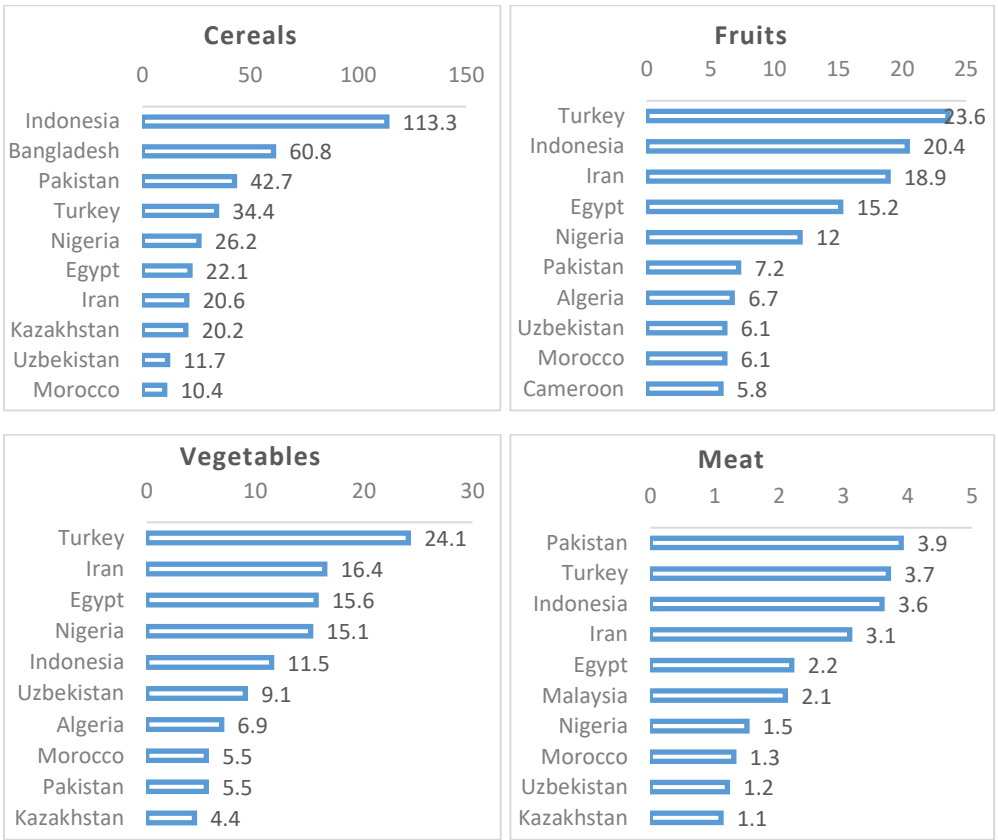
Figure 2.4: Production of Major Agricultural Commodities (million tonnes)



Source: SESRIC Staff calculations based on FAOSTAT Online Database

It is also observed that the total OIC agricultural production concentrated in a few member countries. As shown in Figure 2.5, top ten producers accounted for more than 80% of cereals, 85% of fruits, 78% of vegetables and 65% of meat produced in OIC member countries in 2018.

Figure 2.5: Top 10 Agricultural Producers (million tonnes), 2018

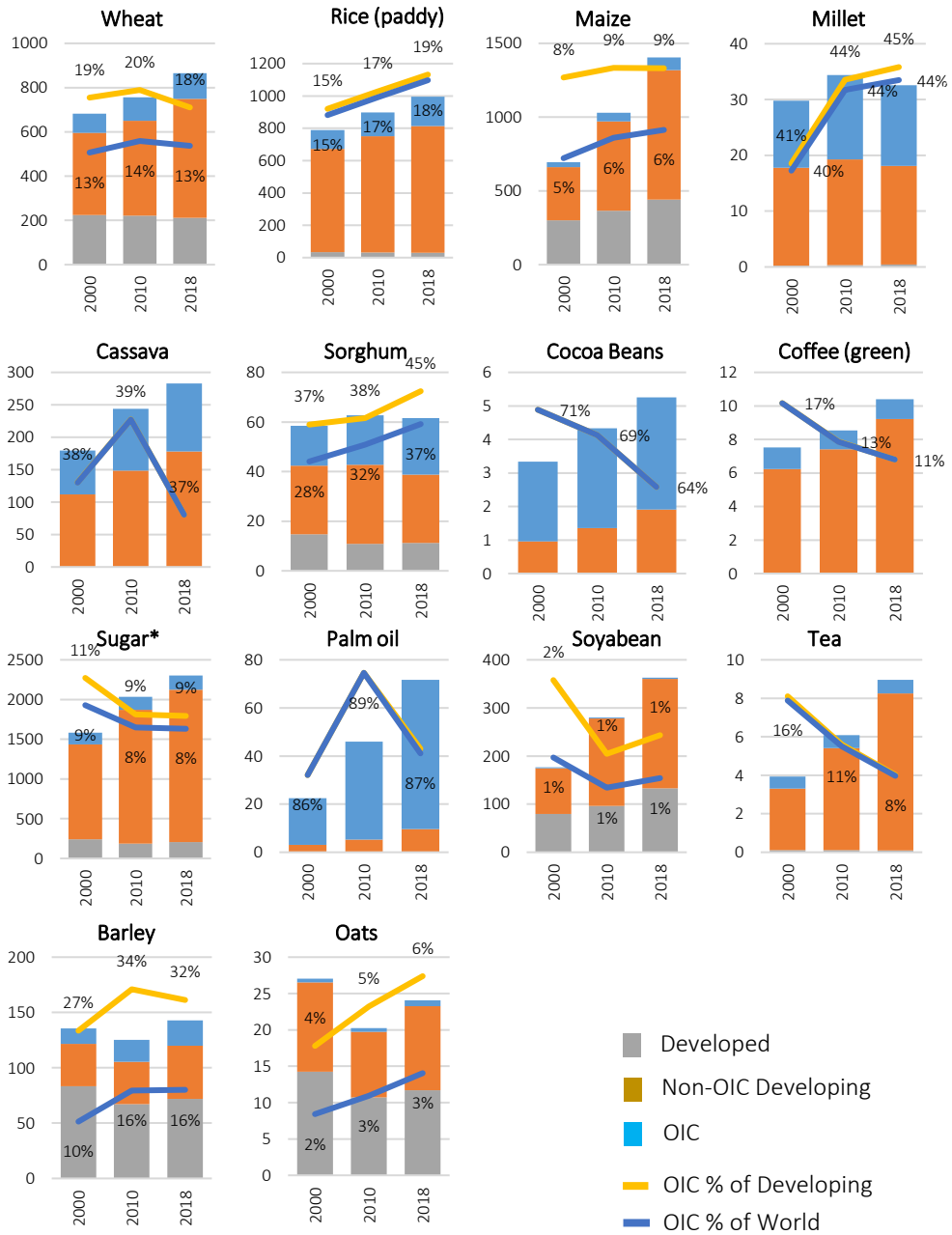


Source: FAOSTAT Online Database

Figure 2.6 shows the production volume of major agricultural commodities in OIC countries and their corresponding shares in other developing groups as well as the world average. The OIC countries have exhibited the highest shares globally in the total production of palm oil (87%), cocoa (64%), millet (44%), cassava (37%) and sorghum (37%) – as compared to other major commodities (Figure 2.6). For commodities such as rice, maize, sorghum, millet, palm oil, barley and oats, OIC countries have been able to improve their share in both other developing countries as well as the world since 2000.

On the contrary, OIC countries observed a decrease in their share of cassava, sugar, cocoa beans, coffee, tea, and soybeans during the period under consideration. In all cases, except for coffee, the OIC member countries as a group have increased the volume of production. The most significant increase has been observed in the production of palm oil (222% increase from 19.3 to 62.1 million tonnes), maize (156% increase from 33.4 to 85.5 million tonnes), barley (64% increase from 13.9 to 22.9 million tonnes), and soybeans (61% increase from 1.7 to 2.8 million tonnes).

Figure 2.6: Production of Major Agricultural Commodities (million tonnes)



Source: SESRIC Staff calculations based on FAOSTAT Online Database,

* Sugar includes Sugar crops, Sugar cane and Sugar beet

At the individual country level, 26 OIC countries are ranked among the top-20 producers of major agricultural commodities worldwide (Table 1). These commodities vary from

cereals, such as wheat, barley, rice and maize to tropical/temperate zone commodities, such as palm oil, cocoa, coffee, rubber and sugar. However, for many of these countries, particularly those in which the bulk of their exports concentrate on a few of such agricultural commodities, price fluctuations in the international commodity markets may pose additional risks and challenges. In addition, exporting these primary commodities with low or no value added mainly due to inappropriate processing facilities is another challenge related to the competitiveness of their commodities in the international trade markets.

Table 1: OIC Countries among Top 20 Global Producers of Agriculture Commodities, 2018

Commodity	Country (World Rank)
Barley	Turkey (8), Kazakhstan (11), Morocco (15), Iran (16), Algeria (18)
Cassava	Nigeria (1), Indonesia (6), Mozambique (9), Cameroon (13), Côte d'Ivoire (14), Benin (16), Uganda (20)
Cocoa Beans	Côte d'Ivoire (1), Indonesia (3), Nigeria (4), Cameroon (5), Sierra Leone (11), Uganda (14), Togo (13), Uganda (15), Guinea (17).
Coffee	Indonesia (3), Uganda (10), Côte d'Ivoire (15).
Maize	Indonesia (6), Nigeria (14), Egypt (18), Pakistan (20).
Millet	Niger (2), Sudan (3), Nigeria (4), Mali (5), Burkina Faso (7), Chad (9), Senegal (10), Pakistan (11), Guinea (17), Uganda (18), Cameroon (20).
Natural Rubber	Indonesia (2), Malaysia (6), Côte d'Ivoire (9), Nigeria (12), Cameroon (16), Gabon (17), Guinea (20).
Palm Oil	Indonesia (1), Malaysia (2), Nigeria (5), Côte d'Ivoire (11), Cameroon (13).
Rice	Indonesia (3), Bangladesh (4), Pakistan (10), Nigeria (14), Egypt (17)
Sorghum	Nigeria (2), Sudan (3), Niger (9), Burkina Faso (10), Mali (12), Cameroon (13), Chad (16), Egypt (17).
Soybeans	Indonesia (14), Nigeria (15).
Sugar cane	Pakistan (5), Indonesia (12), Egypt (17).
Tea	Turkey (5), Indonesia (7), Iran (8), Bangladesh (12), Uganda (13), Mozambique (18).
Wheat	Pakistan (7), Turkey (11), Iran (13), Kazakhstan (14), Egypt (18), Morocco (20).

Source: SESRIC staff analysis based on data from the FAOSTAT Online Database.

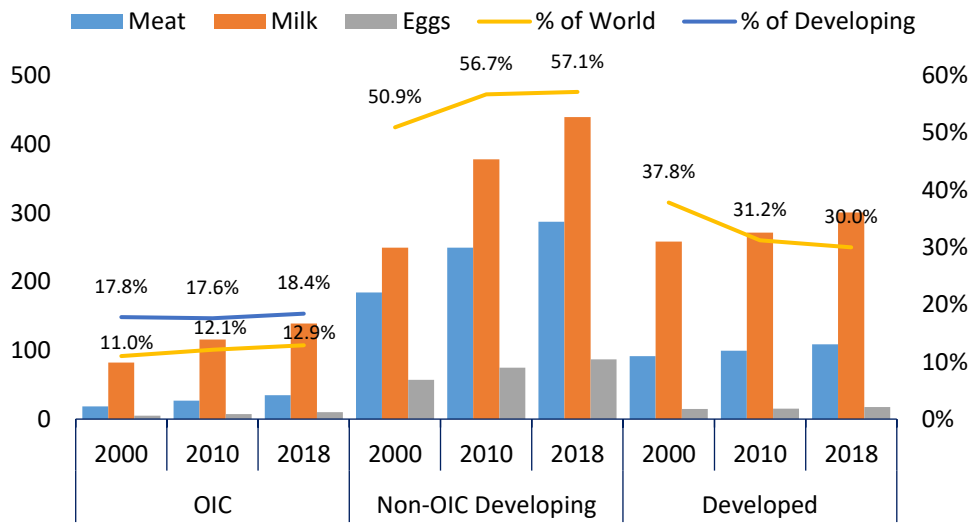
2.3. Livestock and Fisheries

Livestock

Rapid growth and technological innovation have led to profound structural changes in the livestock sector, including a move from smallholder mixed farms to large-scale specialized industrial production systems; a shift in demand and supply to the developing countries; and an increasing emphasis on global sourcing and marketing. These changes have implications for the ability of the livestock sector to expand production sustainably in ways that promote food security, poverty reduction and public health.

Between 2000 and 2018, OIC countries as a group have increased their meat, milk and eggs production by 85.4% (from 18.7 to 34.6 million tonnes), 68.9% (from 82.2 to 138.8 million tonnes) and 97.8% (from 5.2 to 10.3 million tonnes), respectively (Figure 2.7). Accordingly, their share in the overall production of livestock produce in the world has also improved. In 2018, OIC countries accounted for 12.9% of the world's total production of livestock products, registering an increase since its 2000 value of 11.0%. As far as the drivers of the production growth are considered, the current report concludes that supply-side factors have enabled expansion in livestock production. Cheap inputs, technological change and scale efficiency gains in recent decades have resulted in declining prices for livestock products.

Figure 2.7: Production of Livestock Products (million tonnes)



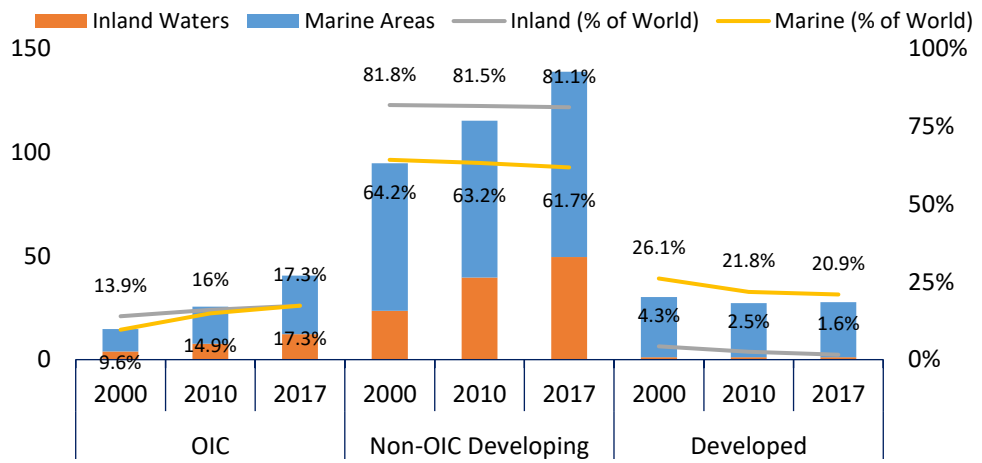
Source: SESRIC Staff calculations based on FAOSTAT Online Database

Fisheries

Fisheries and aquaculture continue to make crucial contributions to the world's wellbeing and prosperity. They make up an important source of nutritious foods and animal protein for much of the world's population. Data from Fisheries and Aquaculture Department of the FAO reveals that capture fisheries and aquaculture supplied the world with about 207 million tonnes of fish in 2017. With sustained growth in fish production and improved distribution channels, world fisheries production has grown significantly during the last decade, with a compound annual growth rate of 2.2% during the period 2000–2017.

Figure 2.8 depicts the total volume of aquatic species caught by different country groups according to the fishing area (i.e., inland, or marine). In this context, it is observed that inland fisheries production has expanded globally from 28.8 to 62.8 million tonnes between 2000 and 2017, while marine production has remained relatively stable (i.e., 144.2 million tonnes in 2017 vis-à-vis 110.9 in 2000) (Figure 2.8). As a result, the share of inland production has seen significant improvements across the board against marine production during the examined period. As also observed from graph, OIC countries improved their share in world inland fisheries production from 13.9% in 2000 to 17.3% in 2017. Yet, a significant improvement is visible in the case of marine production, whereby OIC countries have increased their overall share in global marine fisheries production from 9.6% to 17.3% over the same period. In 2017, OIC member countries recorded fish production of 12.2 and 28.3 million tonnes from inland and marine fishing areas, respectively. Non-OIC developing countries continued to produce the bulk of the global inland and marine production, with 81.1% and 61.7% shares in 2017, respectively.

Figure 2.8: Production of Fisheries by Fishing Area (million tonnes)



Source: SESRIC Staff calculations based on FAOSTAT Online Database

CHAPTER THREE

3. Agricultural Trade

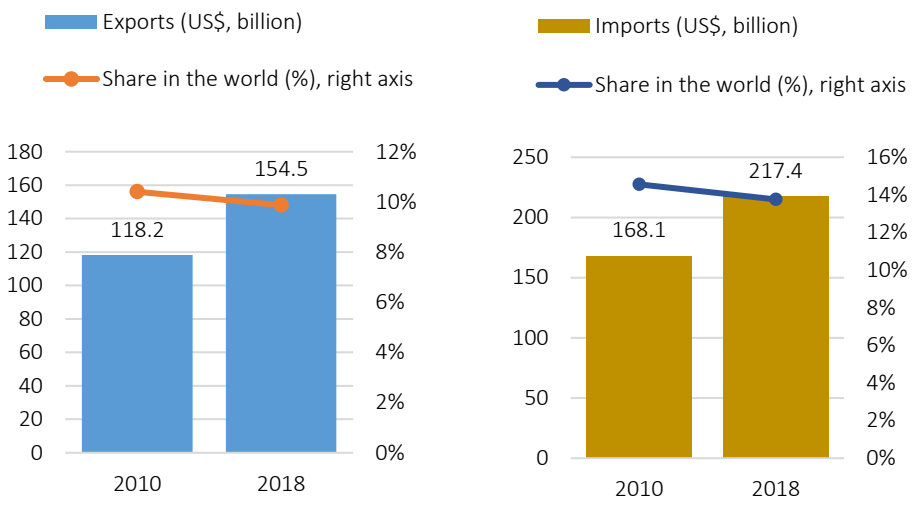
International trade promotes economic growth and triggers development by creating welfare gains for trading partners. The OIC member countries are located on four continents and the levels of agricultural development vary substantially across members. Some OIC countries are net exporters of a variety of products, whereas others are among net importer countries in a group of agricultural products. In this picture, agricultural trade policies play a crucial role in ensuring food security and sustainable supply of critical commodities. Yet, a handful number of OIC countries face serious challenges that prevent them from fully reaping the benefits of international trade, particularly in agricultural products. Although the nature, size and scope of challenges about the agricultural trade vary across OIC countries, there are some similarities and common patterns. In this context, the aim of this section is to identify common trends in the light of recent statistics and understand major challenges in the agricultural trade. This would allow policy makers to develop evidence-based policies to enhance trade in agricultural products among OIC countries and beyond, as well as, to improve the wellbeing of millions of workers in the agriculture sector and their families.

3.1. Export and Import Trends

Around 910 million people in OIC countries, representing a share of 49.5% in the total population, were living in rural areas in 2018. It implies that almost a half of the population living in OIC countries has links with agricultural production and trade networks given the extensive backward and forward linkages of the agriculture sector (IFAD, 2016). In this context, trade in agriculture could play an important role in improving livelihoods of a significant number of people such as through allowing them to access more and better food, reduce the cost of production in agricultural products, generate higher revenues, and promote specialization and competitiveness.

Figure 3.1 shows the agricultural exports and imports trends in OIC countries. The value of agricultural exports increased from US$ 118.2 billion in 2010 to US$ 154.5 billion in 2018. In the same period, the share of the OIC group in the world total agricultural exports slightly regressed from 10.4% to 9.9%. In a similar vein, the value of agricultural imports in OIC countries climbed up from US$ 168.1 billion in 2010 to US$ 217.4 billion in 2018. Nevertheless, the share of the OIC group in the world total agricultural imports went down from 14.6% to 13.8% in the same period.

Figure 3.1: Total Agricultural Exports and Imports in OIC Countries



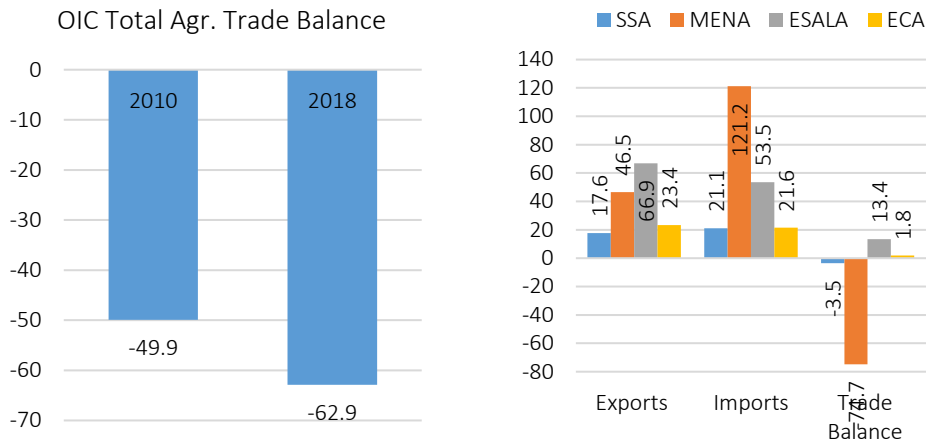
Source: SESRIC Staff calculations based on UNCTADSTAT Online Database

The OIC countries, as a group, generated trade deficits in agricultural products in 2010 and 2018 as the value of imports exceeded the value of exports. In other words, OIC countries, as a group, continued to stay as a net importer in agricultural trade. The value of the OIC total agricultural trade deficit increased from US$ 49.9 billion in 2010 to US$ 62.9 billion in 2018 (Figure 3.2). Nevertheless, the performances of OIC sub-regions show variation. In 2018, both the SSA and MENA sub-regions of the OIC registered net trade deficits of US$ 3.5 billion and US$ 74.7 billion in agricultural products, respectively. Meanwhile, the ESALA and ECA sub-regions generated agricultural trade surpluses of US$ 13.4 billion and US$ 1.8 billion in 2018, respectively. At the individual country level, 48 OIC countries, representing 84% of all member countries, were net importers. In addition, nine OIC countries, representing 16% of all member countries, were net exporters in agricultural trade in 2018 (Figure 3.3).

The data reveal that OIC countries, as a group, were able to expand their international trade capacities in agricultural products over time. This can be attributed to a surge in product diversification, reduced trade barriers, increased competition and productivity gains. Nevertheless, not all OIC countries achieved a similar performance. There are OIC countries and sub-regions that are net importers or generate trade deficits in agricultural products. OIC countries with trade deficits are mostly concentrated in SSA and MENA sub-regions. The existing disparities across OIC countries and sub-regions in terms of international trade of agricultural products could be considered as a window of opportunity to enhance intra-OIC agricultural trade. Achieving a match between OIC countries and sub-regions with excess supply (i.e. net exporter) and those with excess

demand (i.e. net importer) for various agricultural products would help to deepen intra-OIC cooperation and generate more resources for socio-economic development in OIC countries.

Figure 3.2: Agricultural Trade Performance in OIC Countries and OIC Sub-regions (2018, billion US$)

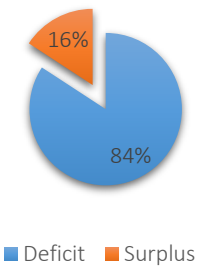


Source: SESRIC Staff calculations based on UNCTADSTAT Online Database

At the regional and individual country level, the trade performances vary considerably stemming from a number of factors. For instance, some OIC countries gave more priority to regional trade integration and removal of agricultural trade barriers while a few of them implemented some product diversification strategies to improve their agricultural trade volumes. Yet, OIC countries, as a group, still need to do more in order to gain a higher share in the worldwide trade of agricultural products as the global competition intensifies (COMCEC, 2018; OECD, 2015).

OIC countries are rich in terms of developing and implementing successful national agricultural trade policies and schemes. In this context, COMCEC (2019) presents an in depth analysis of such practices implemented by Morocco, Turkey, Gambia and Chad that could give ideas about the availability of a wide range of policies in OIC countries on how to increase international trade in agricultural products. To this end, enhancing intra-OIC cooperation in this important area could help to learn from each other's experiences.

Figure 3.3: Agricultural Trade Balance in OIC Countries, 2018

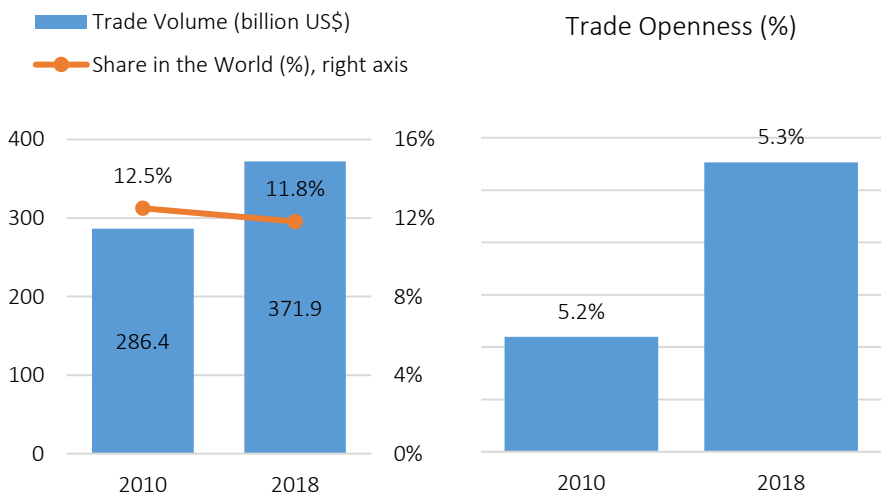


3.2. Economic Importance

Understanding the real economic importance of a sector is critical to determine the right policies and identify priority areas. In many developing countries including several OIC countries, the economic importance of the agriculture sector is very high in terms of employment, contribution to GDP and international trade.

In terms of economic contribution to GDP, the agriculture sector has particular importance for many developing countries and OIC economies (please see chapter 2 for more details). In terms of international trade, the total trade volume of OIC countries in agriculture grew by 30% over the period 2010-2018 and reached US$ 371.9 billion in 2018. With this performance, the OIC group represented a share of 11.8% in the global agricultural trade market in 2018. The agricultural trade openness of OIC countries, which mirrors the relative share of the total agricultural trade in GDP, also increased from 5.2% in 2010 to 5.3% in 2018 reflecting a slightly better integration with the global agricultural trade markets (Figure 3.4).

Figure 3.4: Total Agricultural Trade Volume and Openness in OIC Countries



Source: UNCTADSTAT Online Database

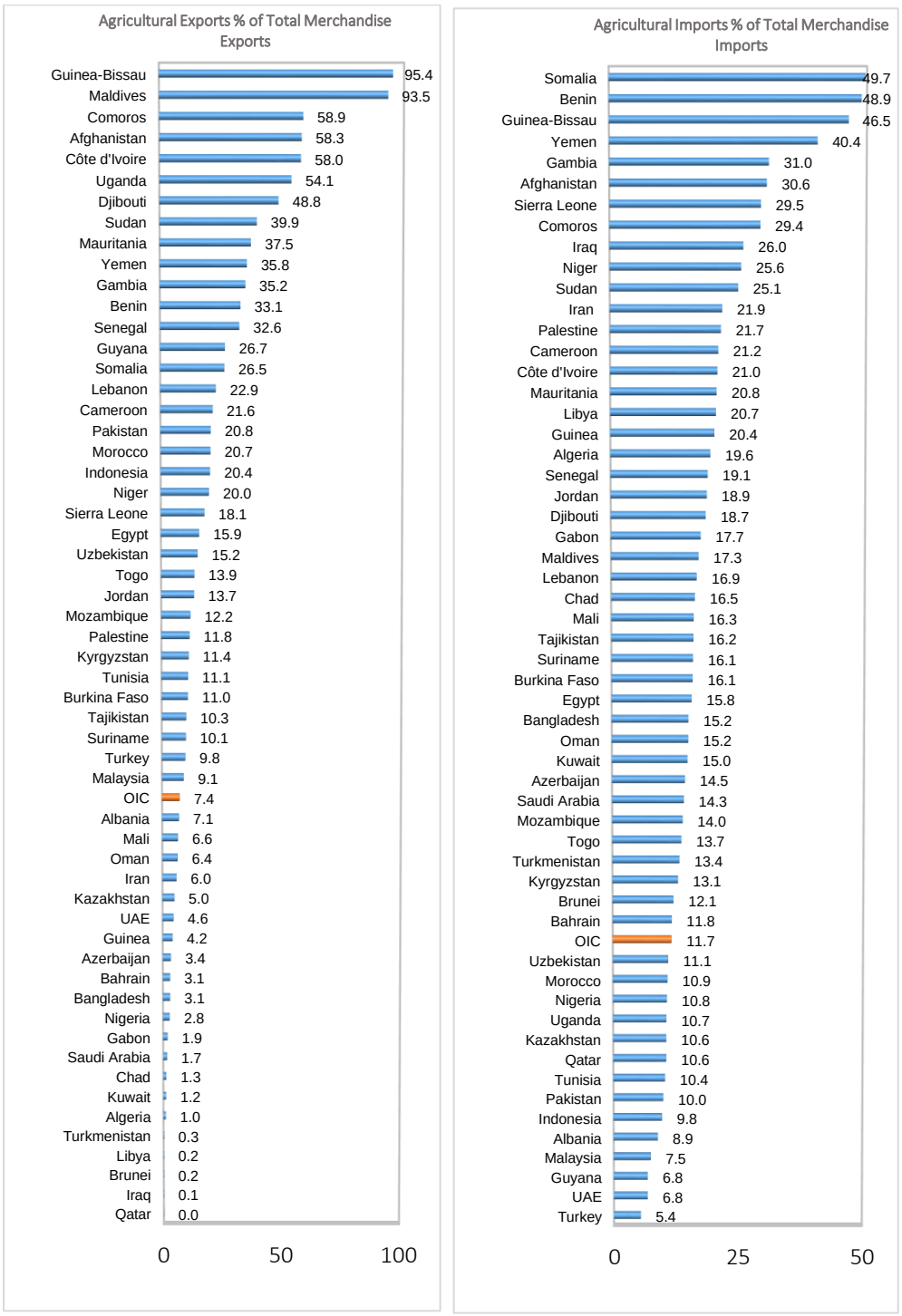
At the individual country level, agricultural trade openness was higher than 20% in four OIC countries namely Somalia (48%), Guinea-Bissau (32.1%), Benin (24.5%) and Côte d'Ivoire (21.2%) in 2018. In 16 OIC countries, the agricultural trade openness stayed below the OIC average of 5.3% in the same year. In other words, the relative importance of agricultural trade in the economies of OIC countries varies substantially and is affected by factors like total population, geographical location, climatic zone, agricultural trade infrastructure, and availability of mineral resources for exports (e.g. gas, oil).

In a good number of OIC countries international trade of agricultural products play a key role in their economies both in terms of exports and imports. In this respect, Figure 3.5 displays the role of agricultural trade in OIC economies by looking at the relative shares of agricultural exports and imports in total merchandise trade in 2018. The share of agricultural exports in total merchandise exports exceeded the 50% threshold in Uganda (54.1%), Côte d'Ivoire (58%), Afghanistan (58.3%), Comoros (58.9%), Maldives (93.5%), and Guinea-Bissau (95.4%). In 17 OIC countries, agricultural exports contributed less than 5% to the total merchandise exports. In a similar vein, the performance of OIC countries in agricultural imports is diverse when measured as a share of total merchandise imports. On the one hand, in six OIC countries (Somalia, Benin, Guinea-Bissau, Yemen, the Gambia, and Afghanistan) the share of agricultural imports in total merchandise imports was found to be higher than 30%. On the other hand, in 14 OIC countries this share stayed below the average of the OIC group (11.7%) in the same year.

Overall, OIC countries, as a group, moved towards improving their international trade capacities in the agriculture sector in recent years. In terms of economic contribution, the sector is an important source for job creation and added-value generation in many OIC countries (COMCEC, 2018). In this context, effective and sound policies towards further eliminating existing trade barriers and improving regional integration in agriculture would help OIC countries to get a higher share in the global trade market of agricultural products.

The analysis further reveals that in some OIC countries, particularly located in Africa and Asia, agricultural exports and imports play a vital role in their international trade relations and economies as an engine of growth and a source of foreign exchange earnings. Nevertheless, a very high dependency on agricultural exports and imports make countries less resilient to external shocks. For instance, a shock in the world trade, such like the one experienced due to the COVID-19 pandemic can lead to significant losses in foreign exchange earnings. In a similar vein, a high reliance on imports of agricultural products may increase the risk of food insecurity in case of a shock or crisis in the global economy. In this respect, those OIC countries with high dependency on agricultural exports and imports need to exert more efforts to diversify their export products as well as invest in local production of agricultural products and food by using new techniques (e.g. irrigation, mechanization) particularly to increase their resilience.

Figure 3.5: Role of Agricultural Trade in the Economy (2018)



Source: UNCTAD Stat and FAO

3.3. Commodity Composition

Looking at the commodity composition in agricultural trade in OIC countries could provide additional insights. In this context, Table 2 presents detailed trade information on selected seven commodity groups in agricultural trade in 2018. In four out of seven major commodities, the value of imports exceeded the value of exports, thus implies a trade deficit. The highest deficit among the seven major commodity groups was observed in the group of "cereals and cereal preparations", valued at US$ 36.2 billion. In the commodity groups of "vegetables and fruits", "coffee, tea, cocoa, spices", and "fish, crustaceans, molluscs and preparations thereof", the value of exports were recorded higher than the value of imports which reflects the existence of comparative advantage in OIC countries. In other words, in these commodity groups, OIC countries, as a group, offered internationally competitive prices that enabled them to extensively export to the rest of the world. The value of trade surpluses in these three commodity groups ranged between US$ 1.8 billion and US$ 6.1 billion.

In four commodity groups namely "cereals and cereal preparations", vegetables and fruits", "coffee, tea, cocoa, spices", and "fish, crustaceans, molluscs and preparations thereof", OIC countries, as a group, were able to generate exports revenue totalling US$ 74.2 billion in 2018. The lowest value of exports (US$ 2.7 billion) was recorded in the group of "meat and meat preparations" among the seven groups listed in Table 2.

In 2018, the total value of imports for major seven commodity groups exceeded US$ 141 billion. Among all commodity groups, the lowest import value was recorded in the group of "fish, crustaceans, molluscs and preparations thereof" in the same year. OIC countries imported a significant amount of "cereals and cereal preparations", which was valued at US$ 49.7 billion in 2018, that made it the number one major commodity group in terms value of imports.

The relative shares of major agricultural commodity groups could provide additional insights about their relative importance. In this context, the commodity group of "vegetables and fruits" represented the highest share (35.5%) in the total value of the OIC agricultural exports of seven major agricultural commodities, followed by the group of "coffee, tea, cocoa, spices" with a share of 18% (Table 2). In terms of imports, "cereals and cereal preparations" obtained a share of 35.3% in the total value of the OIC agricultural imports of seven major agricultural commodities and was followed by the commodity group of "vegetables and fruits" (19.5%).

Overall, OIC countries are diverse in terms of climate, geography and production of agricultural commodities. As a result, many of them export and import agricultural products to and from the world until they reach an equilibrium in terms of aggregate demand and supply. The ongoing changes in the global trade patterns on agricultural

commodities constitute a window of opportunity for many developing countries including several OIC countries that would allow them to be part of global value chains (OECD, 2015).

Table 2: Agricultural Trade in Selected Major Commodities in OIC Countries, 2018

Commodities	Exports (billion US$)	Imports (billion US$)	Trade Balance (billion US$)	% Share in OIC Total Agricultural Exports of Seven Major Agricultural Commodities	% Share in OIC Total Agricultural Imports of Seven Major Agricultural Commodities
Cereals and cereal preparations	13.5	49.7	-36.2	15.5%	35.3%
Coffee, tea, cocoa, spices	15.7	13.9	1.8	18.0%	9.8%
Dairy products and birds' eggs	6.4	15.7	-9.3	7.3%	11.2%
Fish, crustaceans, molluscs and preparations thereof	13.9	7.8	6.1	15.9%	5.5%
Meat and meat preparations	2.7	13.3	-10.6	3.1%	9.4%
Sugar, sugar preparations and honey	4.1	13.1	-9.0	4.7%	9.3%
Vegetables and fruits	31.1	27.5	3.5	35.5%	19.5%

Source: SESRIC Staff Analysis based on the UNCTADSTAT Online Database

Nevertheless, the prevailing trade policy measures namely tariffs, non-tariff measures and trade agreements could distort the optimum equilibrium level in terms of agricultural trade (COMCEC, 2019). It is also important to highlight that the agricultural trade performance of the OIC countries is also affected by global prices of agricultural products. Many OIC countries have limited influence on the global price level of agricultural products such as due to limited production capacities, disorganized markets, lack of organized exchange commodity platforms, connectivity problems, and imperfect competition. In this context, OIC countries need to work on increasing their competitiveness through investing in production techniques such as investing in the use

of fertilizers and agricultural mechanization. At the same time, they need to remove restrictions and barriers that distort agricultural trade such as high-tariff rates and complex and time-consuming customs procedures. In this way, OIC countries could be able to reach their full potentials in the production and trade of major agricultural commodities and get an increasing share in the world.

3.4. Intra-OIC Agricultural Trade

No country can produce all types of agricultural products to meet the national aggregate demand. It is also almost impossible for any country to consume all domestically produced agricultural products. Consequently, countries trade their agricultural products internationally. The diversity of OIC countries in terms of production of climate, geography and major agricultural commodities presents a great window of opportunity for enhancing intra-OIC trade (SESRIC, 2016). In fact, the positive trend seen in the value of intra-OIC agricultural trade supports this argument. Intra-OIC agricultural trade grew by about 20% over the period 2010-2018 and exceeded US$ 120.1 billion in 2018 (Figure 3.6, right). Nevertheless, the total agricultural trade value in OIC countries increased more than the value of intra-OIC agricultural trade volume. As a result, the share of intra-OIC agricultural trade in all agricultural trade witnessed a slight decrease from 34.9% in 2010 to 32.3% in 2018. In other words, about one third of the agricultural trade of OIC countries took place among the member countries of the OIC. The remaining two thirds of the agricultural trade was realized with the rest of the world.

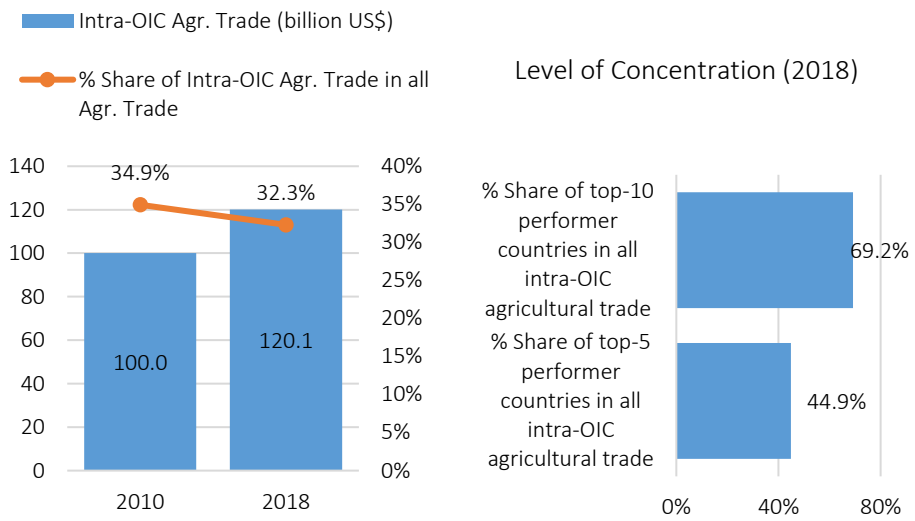
Not all OIC countries extensively benefit from intra-OIC agricultural trade that such trade activities are heavily concentrated in a few OIC countries (Figure 3.6, left). The total value of intra-OIC agricultural trade registered by top-five OIC performer countries (UAE, Saudi Arabia, Indonesia, Malaysia and Turkey) represented a share of 44.9% in all intra-OIC agricultural trade in 2018. When this list is expanded to include Iraq, Iran, Pakistan, Oman and Egypt, those top-10 performer OIC countries obtained a share of 69.2% in all intra-OIC agricultural trade. In other words, the remaining 47 OIC countries could only get a share of 30.8% in all intra-OIC agricultural trade in 2018.

In short, those figures highlight the existence of untapped potential in terms of intra-OIC agricultural trade in many ways. Although there is a positive trend in terms of the value of intra-OIC agricultural trade, the prevalence of concentration of these activities in only a few OIC countries limits the expected extensive benefits from intra-OIC trade.

Looking at the numbers at the individual country level even makes it clearer that many OIC countries have trade deficits and surpluses in a number of major commodities. For instance, in “sugar, sugar preparations and honey”, six OIC countries had a net trade surplus where 50 of them reported net trade deficits in this commodity group (Table 3).

From an intra-OIC cooperation perspective, six OIC countries could export more towards 50 OIC countries by using the cooperation platform of OIC. In a similar vein, 31 OIC countries had trade deficits in the group of "vegetables and fruits", whereas 25 of them generated a trade surplus in the same group. Again, a good match between those two groups of countries could take intra-OIC trade to greater heights.

Figure 3.6: Intra-OIC Agricultural Trade



Source: UNCTADSTAT Online Database.

Table 3: Intra-OIC Trade Potentials in Major Commodities, 2018

Commodities	Status of OIC Countries (as a group)	Number of OIC Countries with Trade Deficit	Number of OIC Countries with Trade Surplus
Cereals and cereal preparations	Net Importer	51	5
Dairy products and birds' eggs	Net Importer	52	4
Meat and meat preparations	Net Importer	50	5
Sugar, sugar preparations and honey	Net Importer	50	6
Vegetables and fruits	Net Exporter	31	25
Coffee, tea, cocoa, spices	Net Exporter	44	12
Fish, crustaceans, molluscs and preparations thereof	Net Exporter	31	25

Source: SESRIC Staff Analysis based on the UNCTADSTAT Online Database

CHAPTER FOUR

4. Food Security

Countries around the world have been slow to recover from the food crisis of 2006-2008. Since 2015, patterns of food insecurity remain unchanged, posing serious socio-economic challenges for both individuals and policy makers even as the eradication of hunger has taken a center stage in major international strategic documents such as the Agenda 2030 and the Sustainable Development Goals. More particularly, in some low- and middle- income economies, such as those in Sub-Saharan Africa and South Asia, hunger and undernourishment – two key indicators of severe food insecurity – are on the rise. Whereas, in developed economies, such as those in Europe, the prevalence of obesity in adults and overweight children is unparalleled. All of this is a direct result of food insecurity resulting from a combination of factors including, but not limited to, difficult economic conditions, weak commodity prices, lack of adequate infrastructure, poverty, conflicts, and adverse climatic conditions, that either prolong or worsen chronic and transitory food insecurity around the world. This is of special concern to OIC member countries because most of these countries are currently experiencing one or more of these exacerbating factors.

In the light of these challenges, the OIC 2025 Programme of Action realizes that "without enough and adequate food, it is not possible for OIC member countries to climb the ladder of development" (Pillar 8 of the OIC 2025 Programme of Action, p. 10). Therefore, for OIC member countries to achieve food security it is of utmost importance to 'consolidate the structures of the Islamic Organization for Food Security (IOFS) to achieve its objectives of coordinating intra-OIC food security operations" (Goal 2.8.6. of the OIC 2025 Programme of Action, p. 22).

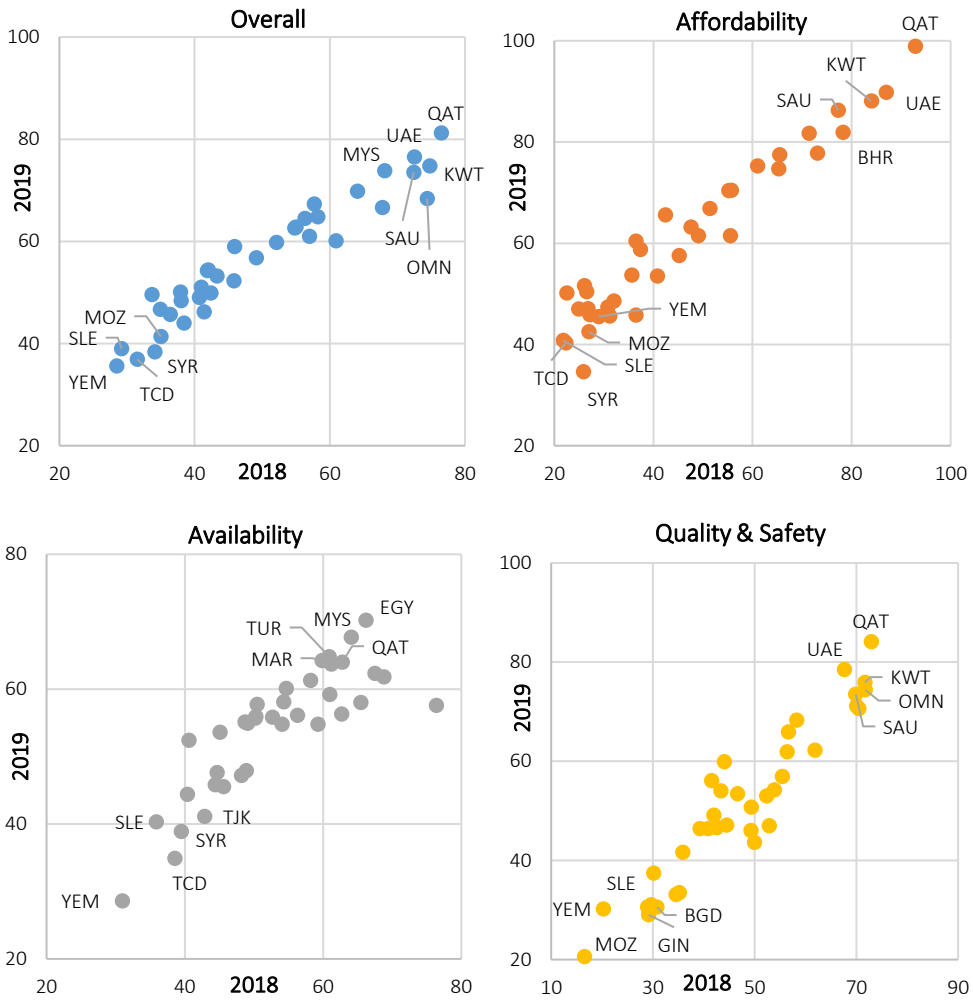
Food security "at the individual, household, national, regional, and global levels is achieved when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy lifestyle" (FAO, 1996). Within this broader definition, food security incorporates four strategic dimensions: Availability, Access, Stability, and Utilization. This chapter highlights the state of food security in OIC member countries in reference to these four strategic dimensions.

4.1. Overview

The Global Food Security Index (GFSI) (EIU, 2019) evaluates 'how food-secure are countries around the world?' by considering core issues of availability, affordability, and quality and safety using a set of 34 indicators, scoring countries from zero to 100, where 100 = best. According to the GFSI 2018 vs. 2019, the performance of OIC member countries is highly variable depending on their geographical location, income status, and current political climate (stability/conflict). On one hand, high-income member countries such as Qatar, Kuwait, United Arab Emirates, and Saudi Arabia are amongst some of the

most food secure countries in the world (Figure 4.1). Upgrading critical food-related infrastructure has been key in making some of these member countries more food secure. For instance, in the past years, Qatar has improved port and rail infrastructure, while in Kuwait the government has invested in new grain silos and expanded crop storage at a major port (EIU, 2019).

Figure 4.1: Global Food Security Index (GFSI) Scores of OIC Countries, 2018 vs. 2019



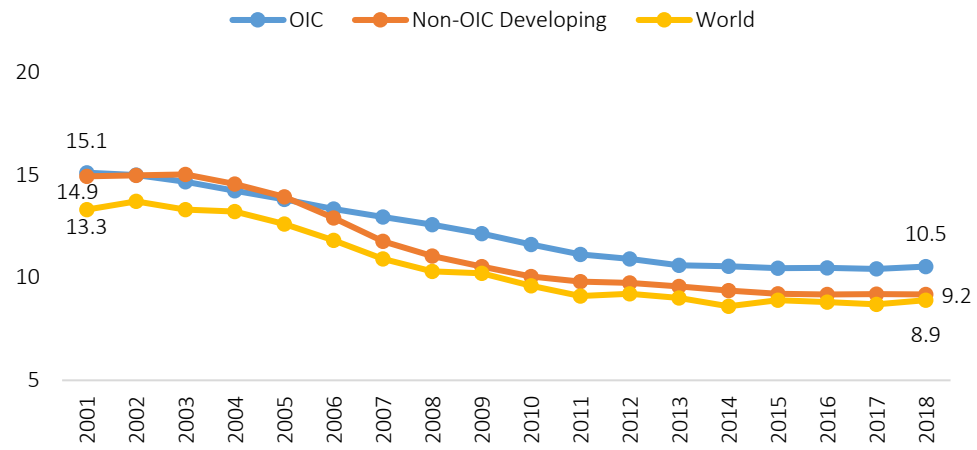
Source: Global Food Security Index by The Economist's Intelligence Unit, 2019 update

On the other hand, some of the more food insecure member countries are also those experiencing violent conflicts such as Yemen and Syria. Political instability, combined with conflicts, famine, and economic recession has resulted in the decrease of food security in these countries leading to shortages in food supply and production and increased

dependency on food aid (EIU, 2019). Similarly, in several member countries in Sub-Saharan Africa (SSA) – such as Uganda, Sierra Leone, and Chad – food production has been volatile in recent years mainly due to unpredictable shocks resulting from climate change such as famine, pests, and crop diseases.

According to the latest estimates of FAO (Figure 4.2), some 678.1 million (8.9% of the world's population) people across the globe were undernourished in 2018 - meaning that their habitual food consumption was insufficient to provide the dietary energy levels required for a healthy life. The majority of these undernourished people reside in developing regions of Asia (381.1 million), Sub-Saharan Africa (234.7 million) and Latin America and the Caribbean (47.7 million).

Figure 4.2: Prevalence of Undernourishment (% of total population), 2001-2018



Source: SESRIC staff calculation based on the UN SDG Indicators Database. Note: (OIC: N = 42; Non-OIC Developing: N = 77; World: N = 154)

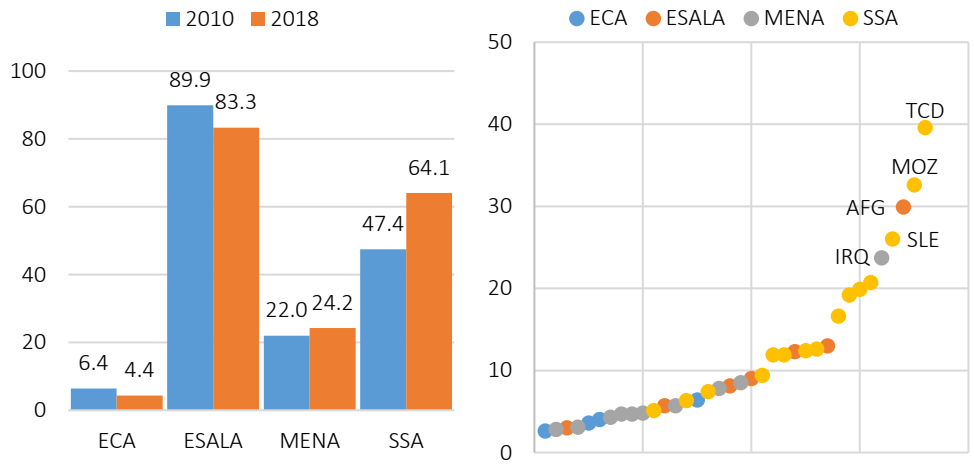
Being a substantial part of the developing countries, OIC countries are no exception. In 2018, there were 175.98 million undernourished people in OIC countries, corresponding to 25.9% of the world's total undernourished people and 10.5% of the total population in OIC member countries. Majority of these undernourished people (83.7%) were living in ESALA (47.3%) and SSA (36.4%) regions (figure 4.3, left).

Similar trends can be seen at individual country level as well. For example, the highest number of undernourished people in OIC member countries were recorded in Pakistan (26.1 million), Nigeria (24.6 million), Indonesia (24 million), Bangladesh (20.9 million), and Afghanistan (11.1 million). Together, these five member countries are home to 106.7 million out of the total 175.98 million undernourished people in the OIC region.

In terms of the prevalence of undernourishment, the highest instances were observed in Chad (39.6%), Mozambique (32.6%), Afghanistan (29.9%), Sierra Leone (26%), and Iraq (23.7%). On the other hand, Azerbaijan, Kazakhstan, Turkey, Kuwait, Tunisia, and Brunei recorded less than 2.5% prevalence of undernourishment in 2018. The prevalence of undernourishment also remained below 5% in Algeria, Uzbekistan, Malaysia, UAE, and Albania (Figure 4.3, right).

These country level statistics from member countries in East and South Asia show that the lack of sufficient economic growth and income is not the only factor that can result in the prevalence of undernourishment. Instead, unpreventable factors such as conflicts that create refugees and internally displaced persons, political instability, and centralization/decentralization of food policy and programs are also of vital importance in bettering or worsening undernourishment.

Figure 4.3: Undernourishment in OIC Regions (Millions) and Countries (%), 2018



Source: SESRIC staff calculation based on the UN SDG Indicators Database, March 2020 update. Note: Six OIC countries (Azerbaijan, Kazakhstan, Turkey, Brunei Darussalam, Kuwait, and Tunisia) with the lowest prevalence of undernourishment in 2018 are not shown in the graph because FAO database doesn't provide exact value for each country.

In 2020, FAO classified all OIC member countries in Sub-Saharan Africa except Gabon either as 'low-income food deficit countries (LIFDC)', 'countries in crisis requiring external assistance', or as both (Table 4). Low-income food deficit countries are those that are 'poor' (their net income per person falls below the level used by World Bank to determine eligibility for International Development Assistance). These countries are also 'net importers of food' i.e. they cannot produce enough food to meet their needs and lack foreign exchange to fill the gap by purchasing food on the international market – thus

outweighing their exports over imports. In addition to OIC member countries in Sub-Saharan Africa, Kyrgyzstan, Tajikistan, and Uzbekistan are also LIFDC.

Countries in crisis requiring external assistance are those that lack resources to manage and respond to problems resulting in, and arising from, food insecurity. Crises in various OIC member countries result in their performing disproportionately in some critical food security related areas as opposed to others. For example, in Afghanistan, Iraq, Pakistan, and Uganda – food insecurity stems from localized drivers such as the presence of large refugee populations and civil conflicts. Similarly, in Syria, exceptional shortfall in aggregate food production/supplies has occurred due to a civil conflict. In Yemen, there is a widespread lack of access to food resulting from conflict, poverty, and high food and fuel prices. Conflicts in Nigeria and Somalia, Civil insecurity is another reason causing severe localized food insecurity in Burkina Faso, Cameroon, Chad, Libya, Mali, Niger, Somalia, and Sudan. A shortfall in cereal production in Guinea, Senegal, and Uganda, reduced availability of pastures in Mauritania, cyclone damage and production shortfalls in Mozambique, lack of rains in Djibouti and Somalia, high food prices in Sierra Leone and Sudan, are some of the main causes triggering food crises in these member countries. Furthermore, member countries of Afghanistan, Bangladesh, Djibouti, Libya, Syria, and Yemen are classified as both, low-income food deficit countries and countries in crisis requiring external assistance – facing a situation of double gravity when it comes to food security.

Table 4: Low-Income Food Deficit Countries and Countries in Crisis Requiring External Assistance

Afghanistan	Djibouti	Mozambique	Togo
Bangladesh	Gambia	Niger	Uganda
Benin	Guinea	Senegal	Uzbekistan
Burkina Faso	Guinea-Bissau	Sierra Leone	Yemen
Cameroon	Kyrgyzstan	Somalia	Iraq
Chad	Libya	Sudan	Nigeria
Comoros	Mali	Syria	Pakistan
Côte d'Ivoire	Mauritania	Tajikistan	Libya

LIFDC LIFDC in crisis requiring external assistance Countries in crisis requiring external assistance

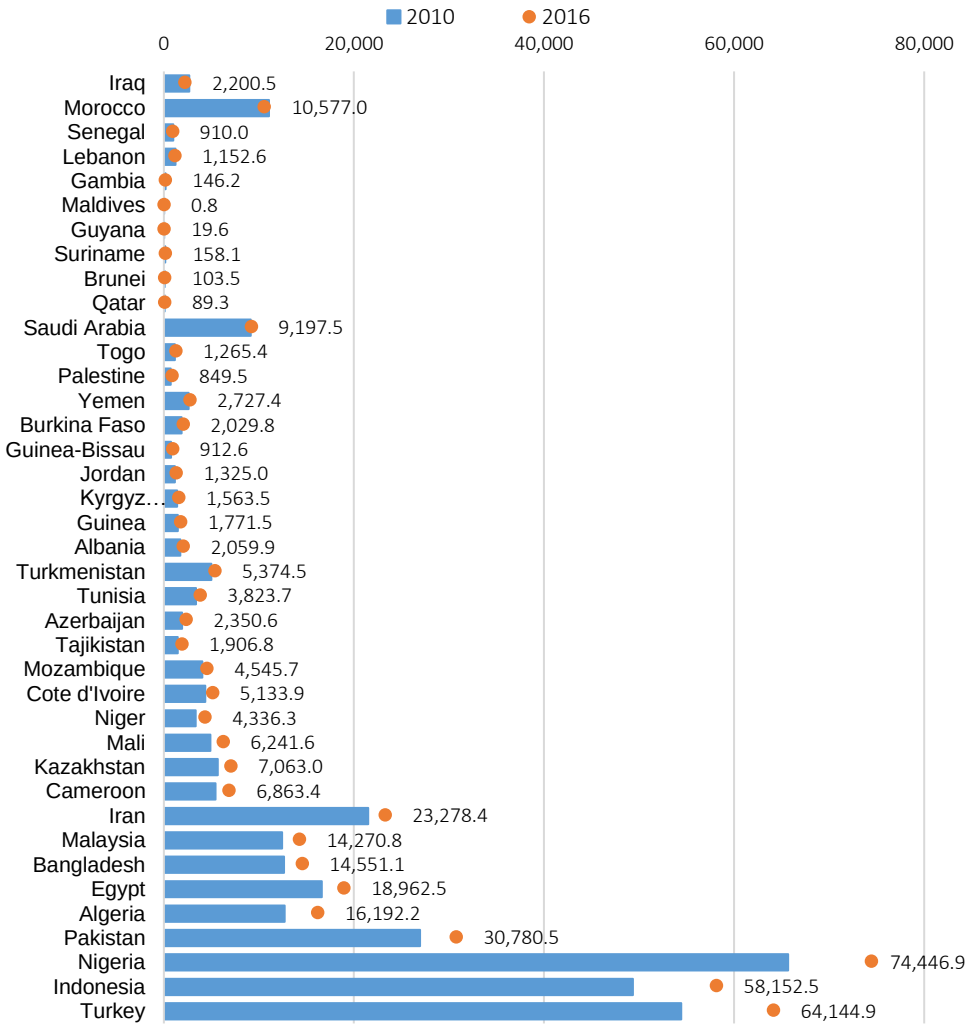
Source: SESRIC staff compilation based on www.fao.org , July 2020.

4.2. Food Availability

On the 'supply side', food availability refers to the "availability of sufficient quantities of food of appropriate quality, supplied through domestic production or imports

(including food aid)" (FAO, 2006). In terms of production, the gross value of food production sheds light on the value of food being produced in a country. From 2010 to 2016, 33 OIC member countries increased their gross value production (in monetary terms); ranging from 1% increase in Saudi Arabia to 88% increase in Guyana. In the same period, 6 OIC member countries experienced a decrease in gross food production value ranging from -4% in Morocco to -20% in Gambia (Figure 4.4).

Figure 4.4: Change in Gross Production Value of Food (%)

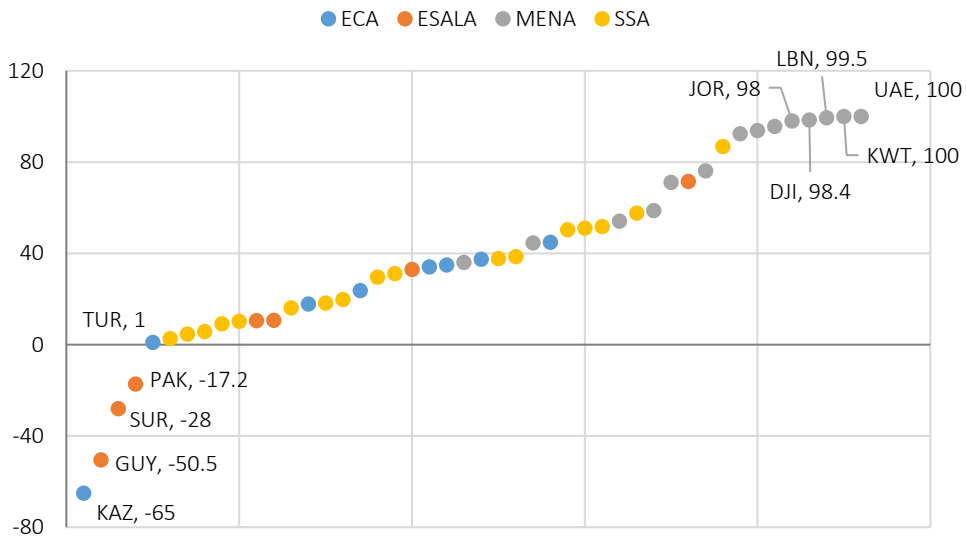


Source: SESRIC staff calculation based on the FAO Stat.

As discussed in the previous chapters, many OIC countries extensively export and import agricultural products to and from the world. To this end, the total trade volume of OIC countries in agriculture grew by 30% over the period 2010-2018 and reached 371.9 billion

in 2018. Yet at the same time, some OIC member countries more than others continue to be heavily dependent on cereal imports to meet their core food needs in addition to suffering from low levels of consumption in major livestock products, namely, meat, milk and eggs. For example, as shown in Figure 4.5, 3-year averages from 2015-2017 show that on one hand United Arab Emirates and Kuwait were completely dependent on cereal imports, whereas Lebanon (99.5%), Djibouti (98.4%), and Jordan (98%) were also highly dependent on imported cereal. On the other hand, countries such as Kazakhstan (-65%), Guyana (-50.5%), Suriname (-28%), and Pakistan (-17.2%) were net exporters of cereal in the same time period – meaning that their domestic supply of cereals was adequate enough to fulfill local need and export to other countries.

Figure 4.5: Cereal Import Dependency Ratio (%) in OIC Countries, 2015-2017



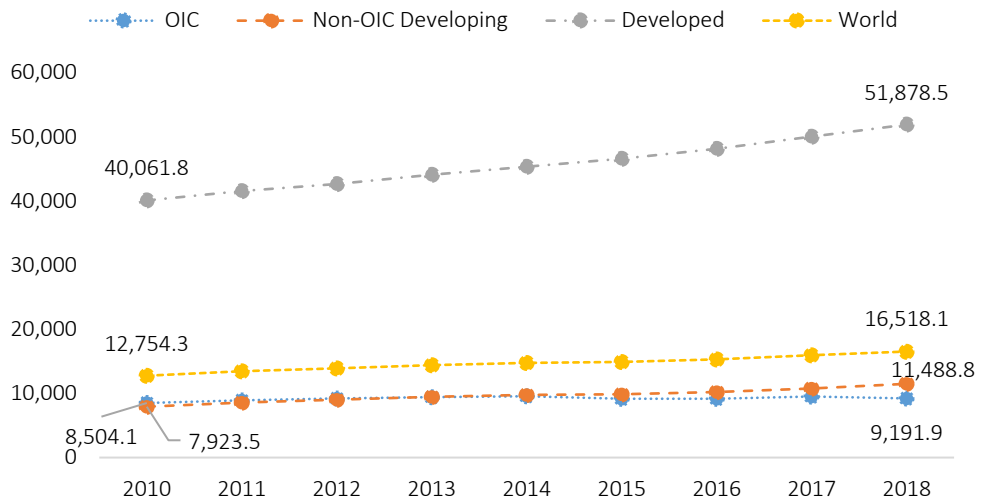
Source: FAO Suite of Food Security Indicators, July 2020 update. Note: Countries with higher values are more dependent on cereal imports. A negative value indicates that the country is a net exporter of cereals.

4.3. Food Access and Affordability

Yet, even as the gross production value of food has increased in a majority of OIC member countries, access to food is another matter altogether. This is because an adequate supply of food at the national and international level is not a guarantee of household food security (FAO, 2008). Factors such as household income, expenditure, food prices, and accessibility to markets are all pivotal in translating food supply into food security. A critical dimension of food security, 'food accessibility' refers to "access by individuals to adequate resources (entitlements) for acquiring appropriate foods for a nutritious diet"

(FAO, 2006). One of the more visible, and impactful, factors affecting household food security is the purchasing power of the consumers. The GDP per capita in purchasing power parity declined in OIC member countries from 2017 to 2018 by -318.74$ (current international $) (Figure 4.6). OIC member countries were the only group to experience this decrease between 2017 and 2018. Around the world, the GDP per capita in purchasing power parity improved by 589.9$. In non-OIC developing countries this value increased by 727.9$ and in developed countries it increased by 1863.5$ from 2017 to 2018. This decline was observed after steady improvement in purchasing power across the world between 2010 and 2017 (Figure 4.6).

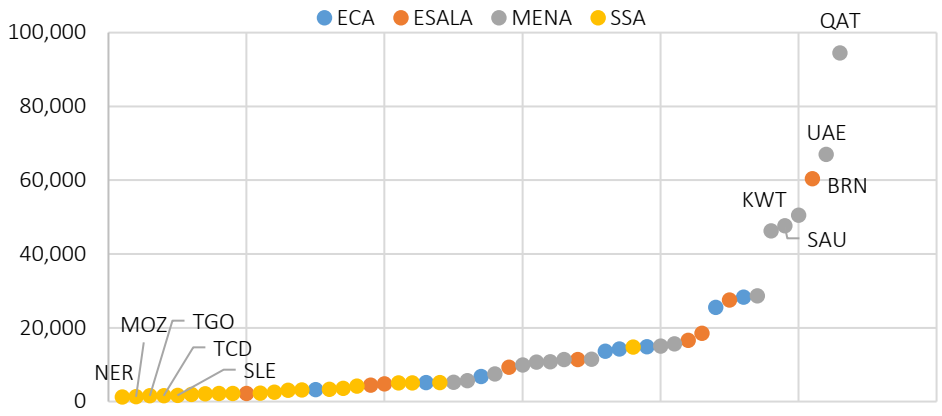
Figure 4.6: GDP Per Capita (PPP, Current International $), 2010-2018



Source: SESRIC staff calculation based on the World Bank Development Indicators, 2019 update.

A decrease in purchasing power parity makes it difficult for customers to afford food, which is of special consequence for poorer fractions of society. Economic contraction and recessions leading to increased unemployment and income inequalities is by far the biggest factor affecting the affordability of food in OIC member countries, directly affecting the purchasing power of poorer households that spend up to 40% of their income on staple foods. This lack of purchasing power also has drastic impacts on increasing malnutrition in these households. Amongst OIC member countries (Figure 4.7), the lowest purchasing power amongst individual member countries is observed in Sub-Saharan Africa of Niger (1,196.5), Mozambique (1,289.5), Chad (1,576.3), Togo (1,552.5), and Sierra Leone (1,663.6). The highest purchasing power amongst individuals is observed in Qatar (94,502.7), United Arab Emirates (66,968.3), Brunei Darussalam (60,388.9), Kuwait (50,478.6), and Saudi Arabia (47,596.7).

Figure 4.7: GDP Per Capita in OIC Countries (PPP, current international $), 2018



Source: FAO Suite of Food Security Indicators, July 2020 update.

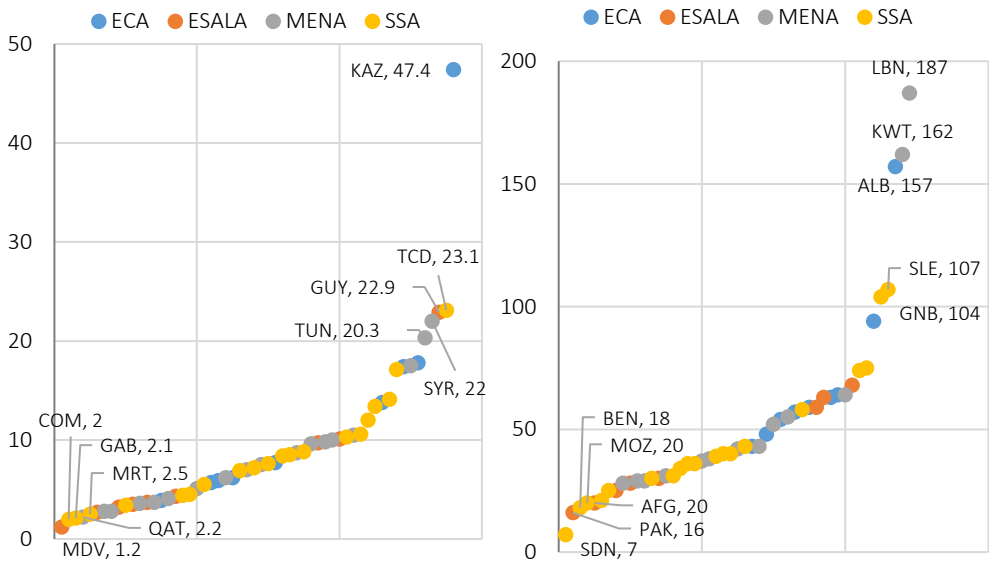
4.4. Food Stability

Production and import trends are also significantly affected by shocks such as uneven economic recovery, economic recession, natural disasters, pandemics, conflicts, etc. – especially in low- and middle-income economies. A core element of food security – 'food stability' – is directly related to shock factors that can affect both, national and household, food security. Food stability is ensured when "a population, household or individual have access to adequate food at all times, i.e. they should not risk losing access to food as a consequence of sudden shocks (e.g. an economic or climatic crisis) or cyclical events (e.g. seasonal food insecurity)" (FAO, 2006). Events affecting food stability also have an impact on both the availability and access to food, which makes them particularly important for policy makers.

Amongst OIC member countries, the variability of per capita food production and per capita food supply is relatively volatile. According to FAO's Suite of Food Security Indicators, per capita food production variability around the world decreased by 0.6 thousand international USD (2004-06 constant) per capita from 2010 to 2015. As shown below (Figure 4.8), amongst OIC member countries, food production in Kazakhstan (47.4), Chad (23.1), Guyana (22.9), Syria (22) and Tunisia (20.3) was more variable as compared to other OIC member countries. Higher variability indicates a stark increase or decrease in domestic food production in these member countries in 2015. Whereas in Maldives (1.2), Comoros (2), Gabon (2.1), Qatar (2.2), and Mauritania (2.5) the variability of domestic food production was comparatively more stable in 2015, as compared to other OIC member countries. Similarly, around the world, per capita food supply variability reduced by 6 kcal/caput/day from 2010 to 2017. Amongst OIC member

countries, per capita food supply variability (measured in kcal/caput/day) was also quite varied in 2017. For instance, the highest instances of supply variability were recorded in Lebanon (187), Kuwait (162), Albania (157), Sierra Leone (107), and Guinea Bissau (104). In contrast, Sudan (7), Pakistan (16), Benin (18), Mozambique (20), and Afghanistan (20) experienced lower per capita food supply variability in the same period (Figure 4.8, right).

Figure 4.8: Per Capita Food Production (constant 2004-06 thousand intl. $ per capita 2015) (left) and Supply (kcal/caput/day, 2017) Variability (right) in OIC Countries



Source: FAO Suite of Food Security Indicators, July 2020 update.

Low per capita food supply variability can be explained by factors such as a steep rise in food prices, which can result in poorer populations consuming cheaper and less nutritious foods, while high per capita food supply variability can be accredited to the effects of climatic events, conflicts, and other shocks. It is important to note here that higher variability in food production and supply connote wider fluctuations but they may not always result from negative causes. For example, in UAE higher production variability can be partially accredited to an improvement in food-related infrastructure between 2010 and 2016. However, variability and volatility in per capita food production and supply is detrimental to the long-term food security in a country because it, in essence, contradicts the consistency (of supply and production) vital to food security.

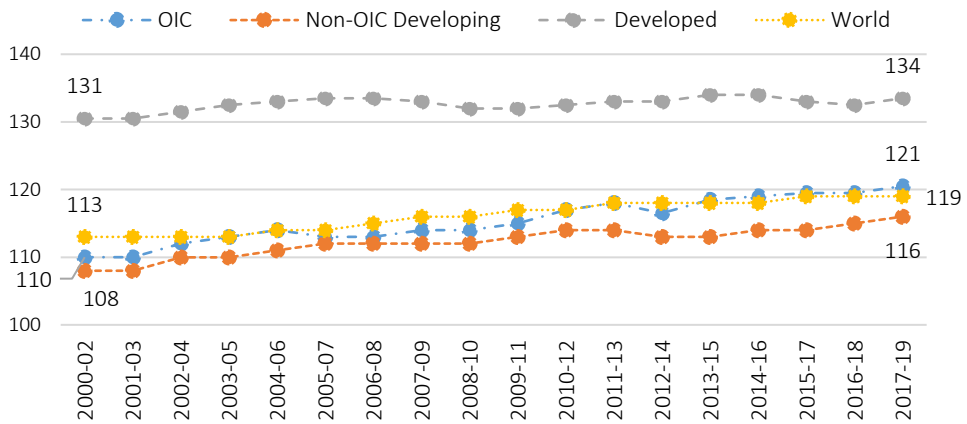
It is partly due to factors such as variability of production and supply that various OIC member countries were classified as moderately or severely food insecure between 2017 and 2019. The proportion of people affected by moderate or severe food insecurity was particularly alarming in Sierra Leone (81.4%), Guinea (74.1%), Mozambique (68.4%), Uganda (66.3%), Afghanistan (60.8%), and Gambia (54.3%) – where more than half the

population faced vulnerabilities associated with "reduced quality and/or quantity of food, uncertainty about their ability to obtain food due to lack of money, and various forms of malnutrition"; this also includes people "who have run out of food and, at the most extreme, have gone days without eating" (FAO, 2020).

4.5. Food Utilization

While the supply side indices of food availability explain the quantity of food available in a country, non-food indices determine the quality of food being consumed and its impact on individuals' nutritional status. In theory, 'food utilization', the fourth core factor contributing to food security, looks at how adequate access to water, sanitation, healthcare, feeding practices, food preparation, diet diversity, and household distribution of food is optimally utilized to generate energy and nutrients required by individuals to lead a healthy life (FAO, 2008). For instance, a lack of purchasing power leads households to change their eating habits, resorting to cheaper, unhealthier foods. When combined with the quality and distribution of food supply, this can have impacts on meeting the average dietary energy supply of populations. Average dietary energy supply adequacy around the world have shown an upward trend in the past two decades. In OIC member countries, average dietary energy supply adequacy has assumed a positive upward trend, having increased by 9% since 2000 (Figure 4.9).

Figure 4.9: Average Dietary Energy Supply Adequacy (%), 2000-2019



Source: SESRIC staff calculation based on the FAO Suite of Food Security Indicators, October 2019 update. Note: The percentages depicted in this chart are median values. (OIC: N = 54; Non-OIC Developing: N = 89; Developed: N = 36; World: N = 179).

Median value of 121% also indicates that dietary energy supply in OIC member countries is above average (or more than adequate). However, this growth is still shadowed by developed countries at 134%. Yet even as average dietary energy supply has improved in

a majority of OIC member countries between 2017 and 2019, Somalia (76%), Uganda (90%), Maldives (92%), Tajikistan (92%), Palestine (94%), Afghanistan (95%), Chad (95%), Mozambique (95%), Yemen (96%), and Guinea Bissau (98%) continued to experience a shortage of adequate supply of dietary energy through food.

The severity of food insecurity worsens malnutrition and has serious impacts on an individual's health and well-being. People who are food insecure may not suffer from hunger, but they may lack access to nutritious and sufficient food, exposing them to malnutrition in the form of adult obesity, anemia in adults, child stunting, wasting, over and underweight children – amongst a host of other diseases such as diabetes and cardio-vascular disorders (FAO, 2019). From a developmental perspective, malnutrition can have critical impacts on national economies stemming from economic costs resulting from a loss of human capital combined with the direct cost of healthcare. For example, FAO projects that obesity is expected to cost 2 trillion USD per year in lost economic activity and healthcare costs (2019). Undernutrition, similarly, is projected to result in the contraction of GDP by 11% in Africa and Asia by FAO (2019).

Yet, throughout the world, overweight and obesity are on an upward trajectory – responsible for approximately 4 million deaths (FAO, 2019). And though overweight was once associated mainly with high-income countries, the number of overweight children under five has tripled between 2000 and 2018 in Eastern Europe and Central Asia. In OIC member countries, over 17.5% of the adult population above the age of 18+ was obese in 2016 (SESRIC, 2019). The prevalence of obesity was concentrated in member countries in the Middle East and North Africa where 29.1% of the population above the age of 18 was obese, followed by member countries in Europe and Central Asia (20.1%), Latin America (17.3%), East Asia (11.3%), Sub-Saharan Africa (9%), and South Asia (5.9%) (SESRIC, 2019).

Food insecurity can also have detrimental impacts on households whose quantity and quality of nutrition intake is affected. For women, this can affect maternal nutrition, child growth, and an increased risk of diseases and anemia (FAO, 2019). Malnutrition is currently the leading cause of anemia in 33% (one in three) of women of reproductive age around the world. It has also proven to be one of the more obstinate nutritional challenges, with the prevalence of anemia not having changed since 2012. Iron deficiency is the most common cause of anaemia in women and children. It is also one of the more common nutritional disorders prevalent around the world. The consequences of anemia and iron deficiency is can result in birth complications, increased risk of maternal mortality and impaired physical and mental development of a child (SESRIC, 2019). And while the prevalence of anaemia was just 11% for developed countries, the numbers were staggering in non-OIC developing and OIC countries with 41% and 50% of the population suffering from anaemia, respectively (SESRIC, 2019). Among the OIC region,

anaemia remained a major health challenge in Sub-Saharan Africa and South Asia. These two regions accounted for over 70% of total anaemic populations in OIC countries (SESRIC, 2019).

[2]For children under-5, overweight can cause serious health consequences throughout an individual's life cycle. Currently, there are approximately 38.3 million overweight[3] children under-5 in the world. In 2019, the prevalence of overweight among children under-5 was comparatively lower in OIC countries (2%) than the non-OIC developing countries (2.9%). Overweight prevalence remained highest in ESALA and MENA regions (Figure 4.10). These two regions accounted for 68% of the OIC burden of overweight children (with 33.4% of OIC total living in ESALA and 35.6% in MENA). At the country level, the highest proportion of OIC's total moderately and severely overweight children lived in Libya (22%), followed by Syria (18%) and Lebanon (17%).

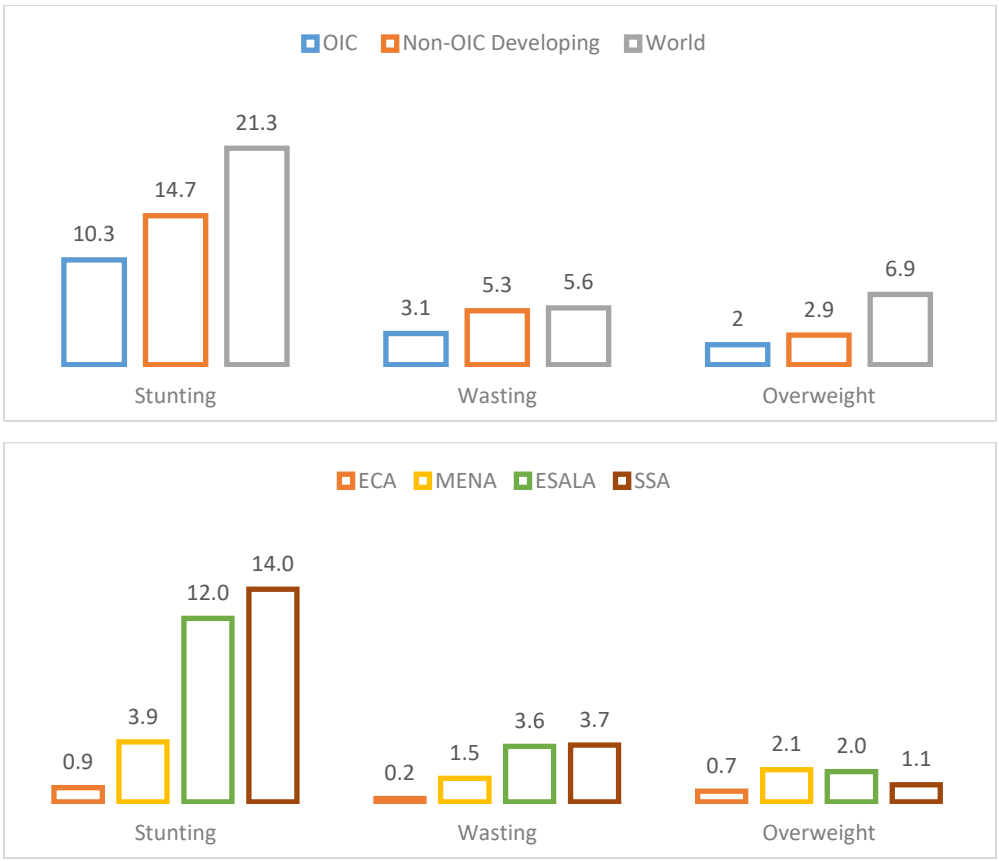
Yet at the same time, the prevalence of stunting[4] and wasting[5] in children under-5 due to malnutrition continues to be a persisting issue for OIC member countries even as the global prevalence of malnutrition related issues in children have improved in the past few years. Proper child nutrition helps not only in improving children's chances of survival during the early years of life but also contributes towards their physical and cognitive development. Without adequate food security, proper child nutrition is under jeopardy. In 2019, OIC countries bore 10.3% of the global burden of stunted children, as shown in Figure 4.10. In comparison, around 14.7% of children under 5 in other non-OIC developing countries were stunted. Among the OIC regions, the highest prevalence of stunting was recorded in ESALA (12%), followed by SSA (14%), MENA (3.9%), and ECA (0.9%). Distribution of stunted children remained highly uneven across the OIC countries. Stunting in OIC member countries was more prevalent in Yemen (46%), Nigeria (44%), Mozambique (43%), Afghanistan (41%), Niger (41%), and Chad (40%).

Globally, more than 47 million children under 5 years of age were wasted in 2019, accounting for about 6.9% of children under the age of 5 in the world. As shown in Figure 4.10, wasting prevalence in OIC member countries was relatively lower at 3.1% as compared to 5.3% in non-OIC developing countries. Among the OIC regions, the burden of wasting is highest in ESALA and SSA regions, which accounted for 80.6% of total wasted children in OIC countries (with 39.8% living in ESALA and 40.8% in SSA). It is worth noting that in the highest prevalence of wasting amongst children under 5 was noted in the following member countries: Djibouti (22%), Sudan (17%), Yemen (16%) and Mauritania (15%), and Somalia (15%).

The nutritional status of children is defined as follows (UNICEF, WHO, and World Bank, 2020):
[3] An overweight child is too heavy for his/her height.
[4] Stunting is a form of undernutrition where children are too short for their age.
[5] Wasting refers to an extreme form of undernutrition where a child is too thin for his/her height.

Another critical set of non-food indicators – Water, Sanitation, and Hygiene (WASH) services – are also directly responsible for bettering or worsening the nutritional well-being of populations around the world. Access to basic WASH services has an impact on not just the availability of food, but also access to it and its utilization. A lack of adequate WASH services is mainly detrimental to the nutritional status of individuals because of: contamination from the use of untreated water and waste disposal, risk of infections from using and storing water in unsafe ways, and spread of infectious diseases from consuming unhygienic water or being exposed to poor waste disposal. For example, UNICEF (2006) provides evidence that "diarrhea caused by a lack of WASH interventions accounts for more deaths in children under five than any other cause of death in countries with high child mortality rates".

Figure 4.10: Nutritional Status of Under 5 Children (% of total children under-5) in the World (top) and OIC Sub-regions (bottom), 2019



Source: SESRIC staff calculation based on UNICEF/WHO/World Bank Joint Child Malnutrition Estimates, March 2020 update. Note: Data is from latest year available during 2013-2018. (OIC: N = 57; Non-OIC Developing: N = 110; World: N = 202)

WASH services also determine the safety of the food being consumed and stored by households. For instance, contamination of food due to unavailability of clean water, irregular hand-washing practices, lack of water to wash utensils and prepare food, etc. are some of the major causes of undernutrition caused by the spread of infectious microorganisms.

Nevertheless, when it comes to access to at least basic drinking water and sanitation services, the world has seen a significant improvement since 2000. Around the world, the percentage of population using at least basic sanitation services increasing from 54.2% in 2000 to 64.2% in 2017 and the percentage of population using at least basic drinking services increasing from 75% in 2000 to 84.6% in 2017 (Figure 4.11 & 4.12). In OIC member countries, the percentage of population using at least basic sanitation increased by 14.8% and population using at least basic drinking water services increased by 9.6% in the same period. However, in 2017, the bulk of this population lived in member countries in Europe and Central America, whereas the lowest percentage of population with either basic sanitation or basic drinking water services were concentrated in Sub-Saharan Africa (sanitation 32.4%, drinking water 64%).

The situation is particularly concerning in Chad where less than 10% of the population had access to basic sanitation services in 2017. In Niger, Sierra Leone, Togo, Benin, Uganda, Burkina Faso, Guinea-Bissau, Guinea, and Mozambique – between 11% and 30% of the population had access to basic sanitation. In Cote d'Ivoire, Comoros, Sudan, Somalia, Cameroon, Nigeria, Gambia, Mali, Gabon, and Mauritania only 31% to 50% of the population had access to basic sanitation. In Senegal, a little over half of the total population (51.5%) had access to basic sanitation. The situation was also dire in several South Asian member countries, such as in Afghanistan (43.4%), Bangladesh (48.2%), and Pakistan (59.9%) of the population did not have access to basic sanitation.

In terms of basic drinking water services, the outlook amongst OIC member countries was far better, with only three member countries with populations less than 50% having access to basic drinking water services (Chad 38.7%, Burkina Faso 47.9%, and Uganda 49.1%). Yet, in five OIC member countries the percentage of population with access to 'safely' managed drinking water services was quite low. These countries are Cote d'Ivoire (36.5%), Pakistan (35.3%), Nigeria (20.1%), Sierra Leone (9.9%), and Uganda (7.1%). Safe management of drinking water and sanitation services are critical to ensure that the food safety during collection/purchase, storage, preparation, and consumption stages. Given the population density of these member countries, these statistics are staggering. They also indicate that millions of people in these member countries are without access to basic sanitation and drinking water services, which are essential to a healthy life.

Figure 4.11: People Using At least Basic Sanitation Services (% of population), 2000-2017

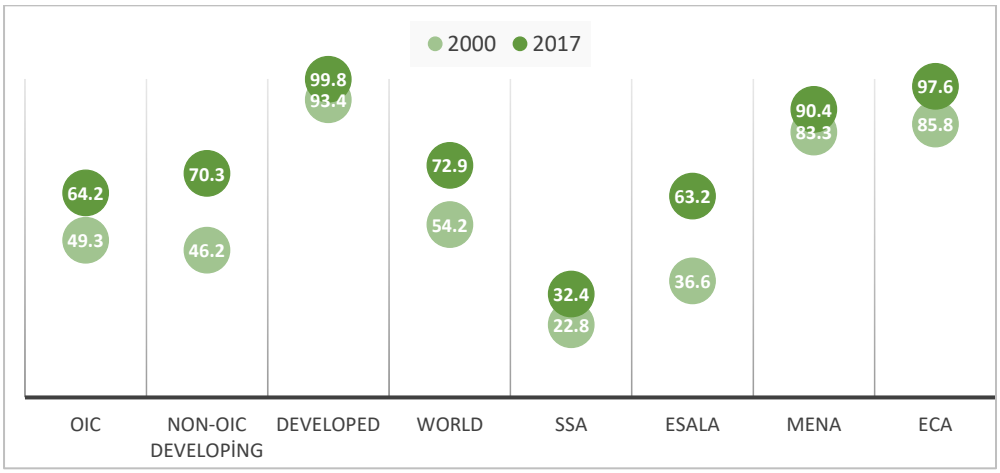
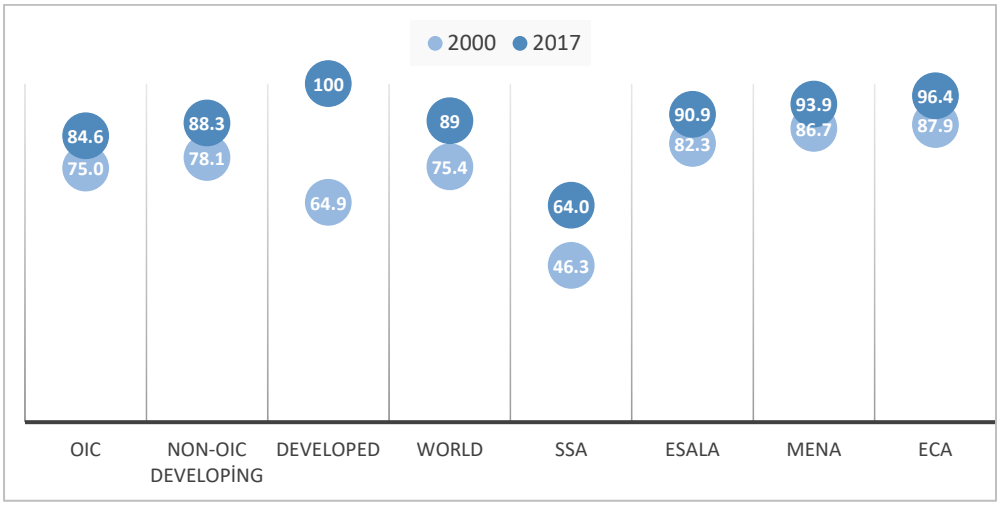


Figure 4.12: People Using Basic Drinking Services (% of population), 2000-2017



Source: World Development Indicators by the World Bank

In line with global trends, data from OIC member countries supports the finding that lower-income economies suffer disproportionately from the absence of adequate WASH services resulting from a lack of economic resources and infrastructure. Where available, it is relatively common for WASH services to be unequally distributed based on residence (urban/rural), gender, socio-economic standing, minority status, etc. For instance, in rural areas or poor neighborhoods, women are more likely to be the primary collectors, transporters, and users of water in developing countries (SIDA, 2015). In Sub-Saharan Africa, a study of 25 countries shows that women spend at least "16 million hours each day per round trip to collect water from its source as compared to men who spend 6 million hours and children who spend 4 million hours" (SIDA, 2016, p. 3). As a result,

women - who are also primarily responsible for a majority of the housework and care giving - have to face added burden due to the inaccessibility of WASH services. Furthermore, a lack of basic drinking water and sanitation contributes to the cycle of inequality and poverty in low-income countries by reducing household resources to purchase and consume nutritious food. For example, women dedicating their time to collecting water may be trading off on economic, income-generating, opportunities that may affect the feeding practices of their households.

CHAPTER FIVE

5. Challenges and Prospects

Agriculture is still considered to be an important economic sector for the livelihood of the population in many OIC countries. However, despite its huge potency, the sector remains unproductive and member countries have not yet capitalized fully on its potential. Food insecurity remains a problem in OIC member countries. With a vastly growing population, many OIC Countries have some of the highest of hunger and undernourishment worldwide. As a result, agricultural import increases from time to time, putting an additional burden on foreign exchange reserves.

Improving agricultural productivity is crucial in OIC countries for alleviating poverty and eradicating hunger. Therefore, member countries need to take into consideration sustainable agricultural practices to increase production with the limited available resources and the growing demand for food. This chapter sheds light on some important challenges of the agriculture sector and food security in OIC countries and reviews the prospects that member countries can pursue in implementing more sustainable agricultural practices.

5.1. Agricultural Resource Management

Moving towards sustainable agriculture is deemed to be the most appropriate approach to answer current agriculture challenges. To be sustainable, there is a need to fulfill present and future generation's agricultural products and services demand, while ensuring environmental health, social and economic equity (FAO, 2014). Good practice of agriculture resource management is one of the most important aspects of sustainable agriculture production. The main challenge in this respect is how to efficiently manage the resources and thereby safeguard agriculture productivity and sustainability. The main resources and services of concern are agriculture factors of production (i.e. land, labour, and other agricultural inputs). In this context, agricultural productivity depends on the quantity and quality of inputs to such an extent that natural and human resources are efficiently utilized.

One of the major agricultural resource management issues in many OIC countries relates to land use. In 2017, the agriculture land area in OIC members accounted for 1.4 billion ha. or equivalent to 28.5% of the world's agricultural land area. The agriculture area in OIC is accounted for 45.3% of its total land area, compared to 28.4% in other developing countries and 37.1% in the world. Despite the significant amount of agricultural land, land productivity in OIC is quite low. As shown in Table 5, on average, in 2016, the land productivity of OIC was 780 constant 2004–2006 US$, much lower than average level in developing countries of 906 constant 2004–2006 US$. However, the growth of land productivity shows a promising prospect. Between 2005 and 2016, the compound annual growth rate (CAGR) of land productivity of OIC is 2.3% while developing countries'

average value was 1.7%. This could indicate a considerable improvement in more intensive use of other agricultural inputs (such as fertilizer and machinery) (IFPRI, 2019).

Similar to land productivity, labour productivity in OIC countries remain low. As shown in Table 5, in 2016, OIC countries on average have labour productivity of 3,622 constant 2004-2006 US$, much lower compared to developing countries average of 4,493 constant 2004-2006 US$. The data also suggest that the growth of labour productivity in OIC during 2005-2016 is around only 1.1%. This number is also lower than developing countries' average of 2.0%.

Table 5: Land and Labour Productivity, 2005-2016

	Land Productivity (constant 2004-2006 US$)			CAGR	Labour Productivity (constant 2004-2006 US$)			CAGR
	2005	2010	2016	2005-16	2005	2010	2016	2005-16
OIC	608	692	780	2.3%	3,210	3,370	3,622	1.1%
Developing Countries	754	837	906	1.7%	3,603	4,006	4,493	2.0%

Source: SESRIC Staff calculations based on (IFPRI, 2020) [6]

Both indicators mentioned above indicate the lack of agricultural productivity in OIC. This can be associated with crosscutting factors such as lack of modern inputs, inefficient land market and non-existent of modern finance. While in general modern inputs (such as inorganic fertilizer and other agro-chemicals, or mechanization and water control) are already used in even the least developed OIC countries, the utilization of such inputs was still low and not always efficient (Sheahan & Barrett, 2017). For example, although the average use of fertilizers increased from 313.1 kg per ha. of arable land in 2010 to 315.5 kg in 2016, it is still far below the amount used in developed countries (1,191 kg). Furthermore, although the average consumption of OIC is higher than the world average consumption (140.6 kg), there is a disparity of consumption within OIC countries, with SSA-OIC still consume an extremely low level of fertilizer use of 14.5 kg per ha. of arable land.

Low level of average machinery and technology utilization in OIC countries is another impediment for agricultural productivity since there is a strong correlation between agricultural productivity and investment rates per agricultural worker. Lack of machinery

[6] IFPRI 2020 includes a dataset containing 132 developing countries and region that measures total factor productivity. It is also included measures of land and labour productivity. The land productivity is calculated as the ratio of total output to total agricultural area. While the labour productivity is the ratio of total output to the number of economically active persons in agriculture.

can be seen through the low level of capital stock. According to the latest data in 2016, the average net capital stock of agriculture in the OIC countries was 16,093.8 US$ while in the other developing countries and the world average was 1,613,681.4 and 57,183.7 US$ respectively.

The lack of access and utilization of modern inputs is partly due to inefficient land markets and a lack of access to modern finance. While traditional tenure systems have been good, rising population density, urbanization and political instabilities in some OIC member countries will exacerbate the pressure on the availability of land area for agriculture even further. The land market is not functioning well due to insecure property rights, poor contract enforcement and stringent legal restrictions that limit the performance of land markets (World Bank, 2008). This is a major problem in OIC, particularly in the least developed member countries, where land tenure security is not established. Inequality in land ownership reduces access to land and creates inefficiencies in land productivity (Binswanger-Mkhize & McCalla, 2010). Ensuring access to land and providing control over land for poor and marginalized rural households is significant for promoting agricultural growth. Lack of asset ownership to serve as collateral in some OIC countries also creates problems in securing bank loans, which hinders the ability of farmers to do additional investments and modernize their farming practices (Foster & Rosenzweig, 2010).

The way for agricultural productivity to improve is also bound to the availability of an accessible and well-functioning financial market. Many farmers in OIC countries still lack access to credit, particularly in rural areas. This hinders the ability of farmers to improve productivity since farmers often cite a lack of capital as the main reason for not modernize their farming practices (Mohammed et al., 2019). Constrains regarding access to financing again bring to the fore the issue of land tenure since as previous studies indicate in places where land tenure is weak and property rights are insecure, farmers may not have incentives to invest in beneficial technologies that would improve their agriculture productivity (Jack, 2011). As a result, the lack of modern use of agriculture inputs in OIC countries not only reduces agricultural productivity but also prevents long-term agricultural development.

5.2. Agricultural Infrastructure Improvement

Infrastructure improvement has been proven as one of the key factors for development (Luu et al., 2019). It is also true in the case of the agriculture sector. Agricultural productivity growth can be boosted in the presence of reliable infrastructure. Productivity is improved mainly through reduced transaction costs within agricultural input and output markets. In various African countries, the lack of infrastructure makes the difference in price among cities quite large (Gajigo & Lukoma, 2011). Furthermore,

infrastructure makes various related markets connected better and prevent market failure.

OIC countries on average still lack the infrastructure that supports agriculture sectors. SESRIC (2016) pointed out that the lack of infrastructure is the major challenge for fertilizer uses in many OIC countries. Additionally, within the OIC group, there is a huge gap within regions, with one region already established reliable agriculture infrastructure, while the others lagging.

One of the basic infrastructure requisites to foster agriculture productivity is rural roads and accessibility. Improved rural transportation infrastructure would make various markets accessible for farmers, thus, cutting the transaction costs of inputs required for agricultural productivity. Furthermore, road access may also increase households' welfare under the condition where it helps rural populations' access to new job markets and social services. For example, empirical evidence suggested that, in Indonesia improved road quality increased labour wages and decrease working time for agricultural workers (Yamauchi, 2016). Similarly, in Ethiopia, access to an all-season road reduced headcount poverty by 6.9% and increased household consumption by 16.3% (Dercon et al., 2009). However, a road may bring little economic benefit in areas with no market to sustain non-agricultural jobs.

Rural accessibility in many OIC countries is still very low. In many developing countries, rural accessibility, measured in Rural Access Index (RAI)[7] is below 60%, while all countries in Sub-Saharan Africa (SSA) have RAI below 51%. Developed countries, in comparison, have rural access close to 100% (Mikou et al., 2019). While it is crucial to improve the rural road access, the cost may not always be affordable. In Burkina Faso for instance, the effort to increase RAI to 42% would require investment equivalent to 42% of their GDP (Mikou et al., 2019).

Another important infrastructure relates to the development in the agriculture sector is irrigation technology. Agriculture in many OIC countries is almost wholly dependent on rainfall, which is highly unpredictable. This poses a significant uncertainty and shock in agricultural productions. The risk of farmers from not getting water (or receiving too much water) from rainfall is increasing as the impact of climate change intensifies. Furthermore, the current overuse and degradation of water resources and competition for consumption by the non-agriculture water consumers will surge the cost of water, and tighten its availability for agriculture even further.

7 Rural Access Index (RAI), defined as (Roberts et al., 2006) "the number of rural people who live within two kilometres (typically equivalent to a walk of 20-25 minutes) of an all-season road as a proportion of the total rural population".

Irrigation infrastructure has an important role to free farmers from these constraints. However, the state of irrigation infrastructure development in OIC countries is still very low and fragmented. For instance, while OIC group on average had 25.7% of its arable land equipped for irrigation, member countries in SSA only have 3.5%. Investments in irrigation systems is a major challenge, particularly in SSA countries. On the other side, where agricultural irrigation is intensive such as in Pakistan, Egypt, and Iraq, salinization has emerged as a major problem because 82% of the agricultural area in OIC countries is irrigated through surface irrigation (see Chapter 1).

Another important infrastructure for agriculture is energy access. The penetration of the modern form of energy (e.g. electricity) not only can pose as agriculture input but also improve the wellbeing of the farmers. The supply of electricity to rural communities, in the short run, would promote incremental improvement in rural farm population, agricultural employment, and values of rural property, while in the long-run lead to increase in economic growth through expansion in the agricultural sector (Lewis & Severnini, 2017).

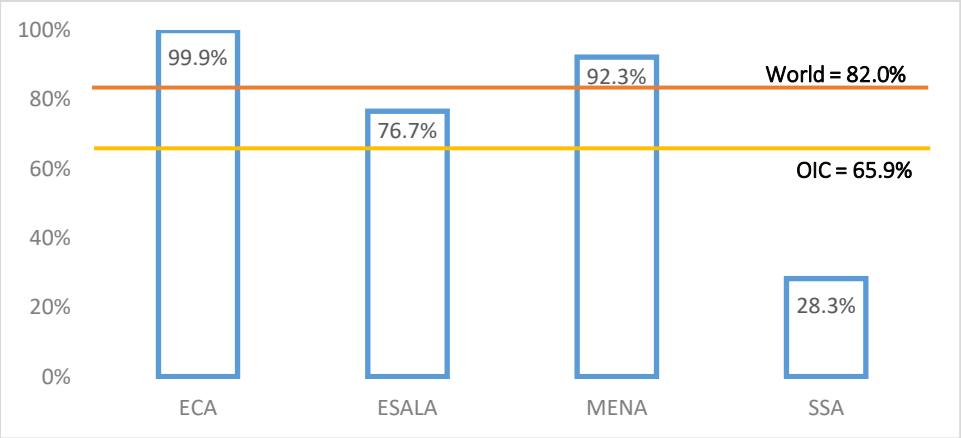
Studies show that gap in energy development is apparent within developing and developed countries (Fathurrahman, 2016), which is also true in OIC countries. Access to electricity in many rural areas in OIC is still a challenge. In 2018, on average, only 65.9% of the rural population in OIC countries had access to electricity. This figure is lower than the share of the average rural population in the world that have access to electricity as 82.0%. Moreover, looking at the regional level among OIC countries, SSA region seems to need particular attention. As shown in Figure 5.1, only 28.3% of the rural population in SSA had access to electricity, while at the same time, other regions of OIC have significantly higher level. Paramount importance to foster the penetration of modern energy needs to be addressed to improve agricultural production in the region.

As a side note, the supply of electricity should also be coupled with improved telecommunication infrastructure to foster innovation through digital technology. Relevant technology and knowledge transfer in developing countries can be increased significantly with better access to information and communication technologies (ICT) (Chapman & Slaymaker, 2002). There is a huge potency that ICT can help in raising the level of efficiency and effectiveness in the agriculture sector.

While infrastructure improvement is doubtfully important, delivering it proved to be costly. The lack of investments in rural and agricultural-related infrastructure led to the stagnation of agriculture development. That is the reason why the least developed countries in OIC are not able to provide a sufficient level of infrastructure. The budget allocation for this sector is not strong enough to incite agricultural growth. Paradoxically, countries that are strongly dependent on agriculture have significantly reduced support to agriculture (SESRIC, 2016). It is observed that agriculture in many OIC countries has

been replaced by industrial activities where the average share of agriculture in the overall GDP of the OIC member countries decreased from 19.1% in 2000 to 16.1% in 2016.

Figure 5.1: Rural Electricity Access among OIC sub-regional Groups, 2018



Source: SESRIC Staff calculations based on World Bank WDI Database.

Securing investment from private sectors could be an option, nevertheless face several issues. The payment imposed on the users (user fees) to recover investment and operational costs may be very high and the project becomes unattractive if not say unfeasible. Furthermore, social and political complications may exist when the project has sensitivity in nature, making it more difficult to secure financing for the project (Gajigo & Lukoma, 2011).

To finance the rural agriculture project, stakeholders need to think outside of the conventional means to recover their investment. In the case where investment cannot be recovered through user-fees, revenue generation should be pursued from another channel. This is where the importance of public-private partnerships (PPPs) comes to light.

PPP could mitigate risk in infrastructure projects through recourse to different sources of financing. The government can participate in the project through subsidies or equity stakes of the components where recovering revenue may be difficult. Finance of the project can be accessed through both concessionary lending (given the presence of a government) and the private market (due to the presence of private participants).

5.3. Micronutrient Deficiency

The OIC countries are among the countries most vulnerable to micronutrient deficiency owing to the high level of food insecurity. Compared to macronutrients (energy, protein, and fat), micronutrients are consumed in small quantities and fundamental for mental

and physical development. Some of the most important micronutrients are iodine, calcium, zinc, iron, vitamin A, vitamin B, and vitamin C. The prevalence of micronutrient deficiency in OIC countries can be seen through the Hidden Hunger Index (HHI) (Muthayya et al., 2013). HHI estimates the severity of micronutrient deficiency in 149 countries (most of which are developing countries) through three main indicators: prevalence data on stunting, anaemia due to iron deficiency, and low serum retinol levels among preschool-aged children.

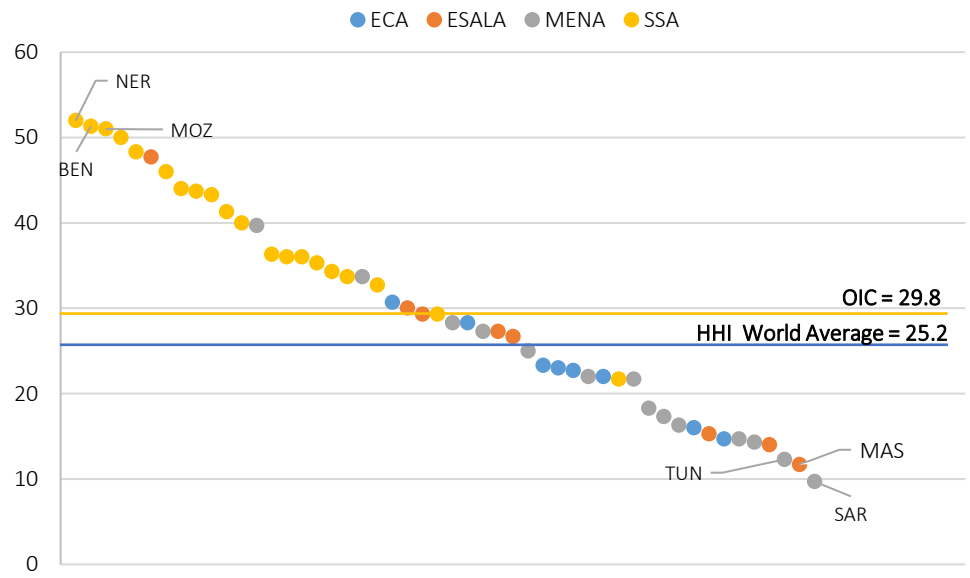
The problem of hidden hunger in OIC countries is quite severe. Among 20 countries with the worst level of hidden hunger, half of them were OIC members. Figure 5.2 shows the level of HHI among OIC countries and their regions. Higher index levels mean a worsening level of hidden hunger occurrence. At the regional level, we can see disparities among OIC countries, with SSA region lagging behind the others. The data also reveal that OIC has an average hidden hunger prevalence level of 29.8, which indicates a higher micronutrient deficiency than the global average HHI level of 25.2 (Figure 5.2).

Food fortification can be the answer for the need for micronutrient intake of the population, where natural food containing high micronutrient is unattainable. For example, in the case of Africa, many of the population rely on cereals and root staples that lack vital micronutrients, millions do not have access to micronutrient-rich foods such as fruits, vegetables, and dairy products (UNDP, 2012). This is where food fortification can help by enhancing the micronutrients into the food that commonly consumed by the population. Furthermore, food fortification is also considered as the best investment in economic development due to its cost-effectiveness by improving the health of society while indirectly boosting productivity and economic progress (Center, 2013). For instance, the cost to iodize salt is estimated at less than US$20 cents per person per year, and for every dollar spent, the resulting benefits (in terms of increased productivity and a reduction in spending on health care) are valued at as much as US$30 (Mannar & Hurrell, 2018).

OIC countries have made progress in terms of food fortification programmes. Some countries have already equipped with various food fortification regulations in a varying way. Nigeria in 2002 become the first country in Africa that enforced mandatory salt iodization programme, and also began to fortify maize and cooking oil with vitamin A, and sugar and flour with iron (Sablah et al., 2013). The dataset in FFI et al. (2019) shows that the majority of OIC members have in place mandatory fortification regulation. However, most of them solely focus on salt iodization. Only around half of OIC countries imposed requisite to fortify non-salt foods (e.g. either flour, oil, or rice) with various micronutrients such as B12, Vitamin D, Folate (B9), Vitamin A, Iron, and Zinc. On the bright side, the majority of countries are already equipped with fortification standards to fortify various food vehicles with different types of micronutrients. Mandatory fortification beyond salt

iodization needs to be done by member countries considering the specific deficiency of micronutrients in their localities.

Figure 5.2: Hidden Hunger Index among OIC Countries



Source: SESRIC Staff calculations based on Muthayya et al. (2013).

Apart from setting up legislation and standards, there are several factors that need to be considered to implement a successful food fortification programme, namely: fortification vehicle, fortificants, and food fortification scale. The type of food to be fortified has to consider the socio-cultural habits of society. Furthermore, the choice of fortified vehicles should be cost-effective and well targeted as so the benefit is received by the population. In terms of the choice of fortificants, it must be stable, long shelf life and should not alter the physical characteristic of the food such as colour and taste. The constraints to the successful implementation of fortification programmes are usually the use of low-cost, low-bioavailability and non-recommended fortificants. Thus, it is crucially important for the government to have the necessary regulation and guidelines for food producers to implement food fortification programmes.

Although the benefits are apparent, food fortification might not be able to solve the micronutrient deficiency issue when any of the following conditions occur: (1) most of the population does not have access to fortified food (due to either poverty or locality) (2) the level of hidden hunger is too severe (3) the concurrent presence of infections increases the metabolic demand for micronutrients (WHO & FAO, 2006). Moreover, varying technological, social, political and economic constraints can also delay food fortification interventions. Thus, proper fortification programme would require other

assessments beyond the technical food fortification, but also to its economic, social and cultural considerations. Complementary strategies are needed in these contexts that support culturally appropriate dietary modification and community- and agriculture-based interventions, with simultaneous efforts to improve capacity and reach of supplementation and fortification.

5.4. Climate Change and Agricultural Development

Two-ways feedback effects exist between agriculture and climate change. On one hand, agriculture activities emit greenhouse gases (GHG) emissions, which contribute to climate change, on the other hand, the gradual changing of climate gives a significant impact on agricultural productions. The solution will lie into how well the agriculture sector can mitigate the damage to climate while at the same time adapting to irreversible changes in the climate.

Anthropogenic GHG emissions from the agriculture sector come from various agricultural production processes such as agricultural soil treatment, manure management, rice cultivation, burning crop residues and savanna, and enteric fermentation. The latest FAO data (2020) show that in 2017 global emissions from agriculture reach 5.4 $GtCO_2eq$ which contributes to around 10-12% of global anthropogenic emissions (Smith et al., 2014). OIC countries in this respect, contribute to 21% of global agriculture GHG emissions. Out of the total agricultural emissions, agricultural soil treatment (such as synthetic fertilizers, cultivation of organic soils, manure applied to soils and left to pasture, and crop residues) and enteric fermentation contribute the highest share amounted to each 39% of total agricultural emissions. Furthermore, energy use in agriculture production, such that for machinery, added around 0.8 GtCO2eq (FAOSTAT, 2020).

Impacts of Climate Change

Agriculture is highly vulnerable to the adverse impacts of global climate change since higher temperatures, lower precipitation levels, CO_2 concentration, and extreme climatic events (such as drought or floods), can lead to reduced crop yields or even crop failures. Without any interventions to the current trend of greenhouse gas emissions, average global temperature is expected to increase more than 2°C above pre-industrial levels by the end of this century (UNEP, 2019). According to modelling results, the highest increases in temperature are estimated to occur in arid and semi-arid regions, particularly in the Mediterranean region of North Africa and the extreme south of Africa (World Bank, 2009) where many OIC countries are also located. The same region will also have to bear the negative impact of climate change on renewable water resources, as global climate change will very likely reduce precipitation in the region (Niang et al., 2015). Besides, according to the FAO (2007), by 2025 two-third of the population will live in the water-

stressed area, making the competition to consume water for varying uses become more severe. Considering all of these impacts, it is estimated that climate change will decrease agriculture productivity to between 2% - 15% by 2050 (Delince et al., 2015).

Mitigation and Adaptation Efforts

Climate change is a global problem needing local actions in various economic sectors as a solution. When all the above-mentioned adverse impacts of climate change are taken into account, it is apparent that the agricultural capacities of OIC countries will have to be reinforced. Efforts to mitigate and adapt to climate change will not only contribute to reducing stress to the environment but will also provide various economic and social benefits. In 2030, various climate change mitigation efforts in the agricultural sector are estimated to potentially abate until 2.3 GtCO2-eq/yr. at carbon prices up to 50 US$/tCO2-eq (Smith et al., 2007). Furthermore, those efforts would increase food production and resiliency towards the future changing climate. It may also have co-benefits (improved efficiency, reduced cost, environmental co-benefits) which could give positive spill over effects to other sectors in the economy.

To cope with climate change challenge, the solution, as suggested by FAO (2017), is through the realization of the sustainability of food production by adopting a “climate-smart” agricultural practices. Climate-smart agriculture has the main aim to increase agricultural productivity while at the same time reducing GHG emissions and increasing the capacity and resiliency to climate shocks (FAO, 2016). Several practical measures are available such as cropland management, grazing land management, and livestock management (see Annex I for more details).

While the practices mentioned in Annex I mostly show the options for reducing GHG emissions (i.e. climate change mitigation), those efforts are also relevant as climate change adaptation. Both mitigation and adaptation efforts in the agriculture sector might occur simultaneously with different spatial and temporal characteristics. For example, in the case of nutrient management, it can also be seen as adaptation efforts as it improves the resiliency of the farmers to adapt to the future changing climate. It is also important to integrate weather information generation and dissemination with agricultural market development to equip farmers’ preparedness on their farming practices from the coming weather shocks (Maggio & Sitko, 2019).

CHAPTER SIX

6. Impacts of Covid-19 on Agriculture and Food Security

The COVID-19 pandemic and the accompanying socio-economic crisis are already affecting food and agriculture systems thereby threatening the well-being of the society. Looking back at the previous health epidemic (e.g. Ebola outbreaks) and food price crisis in 2008, negative impacts were seen on agriculture production-consumption chains and affect the price volatility in the market. The current COVID-19 pandemic, however, is quite unprecedented in its speed and scale, severity, socio-economic disruptions, and uncertainties, thus potentially exacerbating pressure on agriculture and food security.

Access to food is the primary need that is required for the survival of human beings, yet continues to be a global issue. The latest report by the Food Security Information Network (FSIN) (2020) suggests that in 2019, 135 million people suffer acute food insecurity across 55 food-crisis countries. With the COVID-19 outbreak going on, the number could double, adding 130 million more people falling to food insecure state (Welsh, 2020).

As previously discussed in Chapter 4, many OIC countries are already struggling with food insecurity and the occurrence of COVID-19 pandemic could further amplify the problem, if not handled with correct measures. To make matters worse, some OIC countries are experiencing multiple threats to food security such as internal conflicts, pest/locust swarms in Eastern Africa, extreme weathers such as drought and heat wave, and displaced population (FSIN, 2020). For example, the current locust swarm's outbreak- that is happening mostly in Eastern Africa- is the worst that happened in 70 years. It is reported that the locust has already infested beyond Eastern African countries to countries such as Yemen, Iran, and Pakistan. Hundreds and thousands hectare of crops already affected by these locust swarms. These threats plus COVID-19 show that the pressure to the food insecurity in OIC region is very severe and need immediate attention.

To prevent worsening food crisis, countries need to assess and take appropriate actions to save guard the access to food, keep global food supply chains alive, and mitigate the pandemic's impacts across the agri-food systems (Cullen, 2020). Moreover, special attention must be paid to the vulnerable population as the impacts of the pandemic hit the hardest on the poorest and most vulnerable groups, including the displaced. Past experiences during the Ebola outbreak and the food price crisis in 2008, show that the poorest households that spend the largest share of their income on food, suffered immensely (CFS HLPE, 2020). The shock on the food supply-chain increased food prices which makes food more difficult to attain. Poor households also often do not have enough savings and lack of access to credit, risking themselves deeper to poverty.

6.1. Demand and Supply Side Exposure

How does COVID-19 pandemic affect agriculture and food security? There is no straightforward answer to this question since the impacts of the pandemic could be directly on the food supply chains as well as indirectly through the impact of other

economic sectors. The degree of impacts will also depend on the severity of the epidemic in the region as well as the level of measures taken by the government to handle the crisis. In general, initial assessments point out to a decrease in both demand and supply of food and agriculture products owing to shock on logistics and trade (Schmidhuber et al., 2020).

On the supply side, the pandemic poses a great risk to disturb the production of food and agriculture products. The impacts on agriculture and food production are due to shock in factors of production such as intermediate inputs (fertilizer, etc.), fixed capital (machines, etc.), and labour. The shock may come from stringent government efforts to contain the spread of the coronavirus, as well as a direct implication from vastly spreading infections among the population.

Efforts to contain the epidemic which usually restricts the movement of people and closure of businesses could have devastating impacts on the availability and affordability of various production factors in the agriculture sector. For example, disruption on the supply of pesticides or fertilizers, veterinary medicines, and other input could incite low availability and/or high prices of the agriculture inputs which influence yields and crop production. For instance, farmers in Pakistan are hindered to buy fertilizers due to the shutdown of fertilizer dealers, leaving disturbance on crop production (Hanif, 2020). In other cases, efforts to fight desert locust outbreak in East African Countries (some of which are OIC members) are disturbed by the delay in pesticide supply due to the significant decline in global air freight (Ngotho, 2020). The disruption of agricultural production can also happen when people working in agriculture become ill or constrained by restrictions on movement or activity. They will be prevented from working on their land or accessing markets to sell produce, buy food, or get seeds and supplies.

The demand side transmissions of COVID-19 are through disturbance on consumption. The population who suffer a loss of income is susceptible to not be able to afford food for their daily needs. This situation is amplified by a possible higher price of food due to supply disruption. At the individual country level, countries that have a high dependency on foreign food supply could have a higher risk. Shock to international trade and currency exchange fluctuation could hamper the food stock, rising the local prices, and threatening the food security of the country. In Sudan for instance, amid the fight to control COVID-19 outbreak, the prices of various staple foods have increased to record highs in March following a further devaluation of the country's currency (FAO, 2020c).

The country's food security risks may differ depending on the degree of exposure on both production and consumption. According to Schmidhuber et al. (2020)[8], developing countries, in general, have a higher risk in terms of demand-side exposure. That means

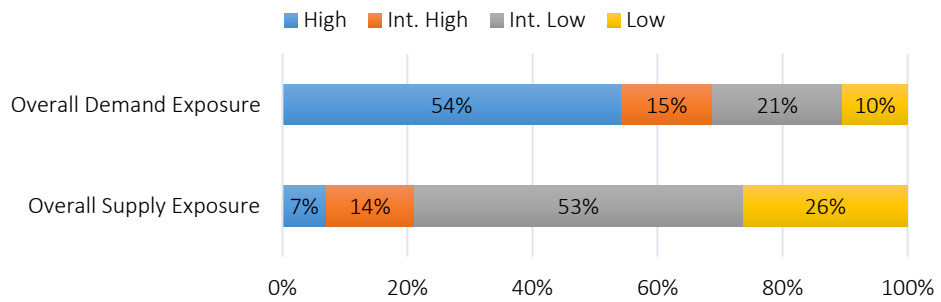
[8] Schmidhuber et al. (2020) estimate the possible risk to agriculture and food sector based on demand and supply side exposure. For supply side (production), the proxies are: share of intermediate inputs, consumption of fixed capital per agricultural worker, gross output per agricultural worker, share of agricultural exports. The demand side (consumption) is derived from share of food expenditures per capita and share of agricultural imports.

the consumption side is the more vulnerable channel of transmissions of the COVID-19 impacts, rather than the production side. This is also true for many OIC countries (see Annex II).

The OIC countries, especially the low income, are the most susceptible to demand-side transmission of the pandemic. As shown in Figure 6.1, almost 70% of OIC countries have intermediate-high to high levels of risks in terms of demand-side transmissions. In contrast, only 10% have a low risk of exposure to the demand side. Overall, economic and income contraction amid the pandemic control measures would possibly increase the poor population thereby putting more people under a food-insecure state.

During the crisis, the most vulnerable groups are compelled to react with negative coping strategies – for instance, less diverse diets and selling of productive assets – to overcome the income decline (FAO, 2020). The demand side risk also threatens countries that rely on food imports and fiscally dependent on exports of raw commodities (e.g. oil) of which the prices have collapsed during the pandemic. This situation is applicable mostly in OIC countries in the MENA region. Imported food supply is threatened owing to decreased revenue from commodity exports, fluctuation of exchange rates, and disruption of the global agri-food chain.

Figure 6.1: Demand and Supply Exposure to the Impacts from the Pandemic (A higher level means higher risk)



Source: SESRIC Staff calculation based on data in Schmidhuber et al. (2020).

In contrast, although with overall lower risks, some countries in OIC are also likely to face disruptions from the supply side (see Annex II), given the high integration to the global food chain and capital-intensive agriculture systems of some countries (Schmidhuber et al., 2020). Disruptions on the supply of inputs following shocks on trade and logistics could contract agriculture production in the short term. During the outbreak of COVID-19, blockages to transport routes are particularly obstructive for fresh food supply chains and may also result in increased levels of food loss and waste (FAO, 2020). In the medium and long-term, the confidence in global value chains may be eroded due to COVID-19 particularly in the trade of agricultural products. In some cases, disruptions and delays in

the agricultural trade may lead to a breakdown of regional and global value chains that could reduce the global agricultural trade volume substantially.

From a food security perspective, the quarantine measures (mobility restrictions, along with the loss of income and a general economic downturn) might even amplify the negative effect of agri-food trade restrictions particularly in the Least Developed Countries (LDCs) (Mensah, 2020). Most LDCs are net food-importing developing countries; hence, their food security could be threatened, especially when export restrictions are imposed by major suppliers. Moreover, LDCs are more vulnerable to sharp increases in the price of staple crops as they have a limited capacity to produce these crops domestically (WTO, 2020).

A capital-intensive agriculture system is also threatened by disruptions in credit markets, which tend to be more volatile during the crisis. Moreover, the agriculture sector in countries with labour-intensive production systems, are also exposed to labour shortages. Experience from the Ebola outbreak, for example, has shown us that the restrictions on the movement led to labour shortages at harvest time and thus giving a negative impact on agriculture productivity (FAO, 2016). This will further leave an unintended effect on food security especially in countries where subsistence farming systems predominate.

6.2. Policy Measures by OIC Member Countries

OIC countries have put in place various measures to mitigate the negative impacts of COVID-19 outbreak on food security and livelihood of society. Containment measures, such that closure of nonessential business and restriction of mobility should not hamper the agri-food supply chain. Smallholders farmers which account for most of the overall farmers in OIC countries should also be supported in terms of their productivity and access to the market. On the consumer side, the most vulnerable groups in the population need to be equipped with social safety nets, so that basic food needs can be fulfilled.

In order to keep the food value chain alive, many OIC member countries have made efforts to remove the key logistics bottleneck. UAE for instance recently passed a law aiming at organising the food supplies in the event of crises as well as achieving food sustainability (Wam, 2020). Within the law, registered agri-food suppliers and merchants are required to monitor their inventories and obliged to distribute their food stock during the crisis as directed by the National Emergency Crisis and Disasters Management Authority. The law also allows retailers to get various forms of incentives and facilities, as well as penalties for violators.

To sustain the supply of agri-food products in the country, access to the global market should also be kept open. This is especially crucial for the country which depends mostly on imported products to satisfy domestic food and agriculture demand. During the crisis,

trade barriers should be relaxed, allowing easy access to goods from abroad and stabilizing prices. The Kazakh government has made a significant effort in this regard by temporarily reducing VAT for agricultural and food products and allowing zero custom duties on essentially important imports (KPMG, 2020).

Many OIC member countries have also provided support to farmers to both enhance their productivity and market the food they produce amid the spread of COVID-19 pandemic. During the containment measures, agriculture activity should be exempted from constraints to keep the agri-food sector productive. Several countries exempted agriculture-related activities from mandatory lockdown as in the case of Pakistan. Some provincial governments in Pakistan keep the agriculture-related sector exempted from lockdown to be able to meet the countries production target (The News International, 2020).

Furthermore, initiatives to boost productivity, such as easing access to production inputs and credits are also necessary. As in the case of Kazakhstan, land tax payments for 7,000 producers of agricultural goods are exempted (KPMG, 2020). Similarly, the Egyptian government passed the moratorium on the tax law on agricultural land for 2 years (Egypt Today, 2020). Monetary and fiscal measures to boost productivity are also in place in Kazakhstan, such as availability of access to loans with the total amount of KZT 170 billion, the ability of farmers to finance their operations through forward contracts (under its future harvest), and fuel subsidy for the next sowing season (KPMG, 2020). In Turkey, the debt payments of farmers were postponed for a 6 months period (Ergocun, 2020).

It is also important to ensure the access to agricultural intermediate inputs. In Burkina Faso for instance, the government purchased agricultural inputs and livestock feed amounting to CFA Franc 30 billion (ILO, 2020). Cote d'Ivoire in contrast, put in place other measures to maintain the productivity of the sector, such as providing financial support for the agricultural sector (cashew nut, cottonseed oil, hevea, palm oil, cocoa, and coffee) of CFA Franc 250 billion, through price and income support and the provision of goods and services, including fertilizer subsidies and seed distribution (Sy, 2020).

In parallel with various containment measures to control the spread of the disease, measures to scale-up emergency food assistance under the social protection programmes are also enforced in OIC countries. These measures are meant to provide the most vulnerable population with necessities to get through the epidemic. The measures that are already applied in OIC countries are in the form of direct cash-transfer, basic food assistance, or both.

CHAPTER SEVEN

7. Concluding Remarks and Policy Suggestions

The agriculture sector has critical importance for many OIC member countries, especially for the least developed ones, as agricultural development is among the various prerequisites for economic development and provides the livelihood for a major part of the OIC population. The OIC-2025 Programme of Action strongly emphasizes the development of the agriculture sector to attain food security and enhance growth and prosperity across the Islamic world. The biennial Ministerial Conference on Food Security and Agriculture Development (MCFSAD) is the high level gathering of policy makers and other relevant stakeholders to discuss and debate the major developments and design joint policy action in this domain. So far, OIC countries held seven sessions of the MCFSAD.

Over the years, many OIC member countries have witnessed significant improvement in agriculture development and food security. However, in general, progress has been slow and uneven along with widespread inequalities between and within countries. The situation is particularly alarming in low income and least developed member countries, as majority of these countries are characterized by inadequate capacity, poor infrastructure, inefficient use of agricultural resources, and fragile peace and security situation. These challenges and constraints should be carefully addressed by the relevant national authorities and policy makers.

Agriculture resource management is the core of a sustainable agriculture system with the main approach of using agricultural inputs efficiently to improve agricultural productivity. The way OIC countries use their agriculture inputs is still inefficient. Land and labour productivity are lower than the other developing countries average. This state of affairs is associated with crosscutting issues such as lack of modern inputs, inefficient land market and non-existent of modern finance.

Many farmers in OIC countries still lack access to credit, particularly in rural areas. This hinders the ability of farmers to improve productivity since farmers often cite a lack of capital as the main reason for not modernize their farming practices. Constrains regarding access to financing again bring to the fore the issue of land tenure since, in places where land tenure is weak and property rights are insecure, farmers may not have incentives to invest in beneficial technologies that would improve their agriculture productivity. The land market is not functioning well due to insecure property rights, poor contract enforcement and stringent legal restrictions that limit the performance of land markets. This is a major problem in OIC countries, particularly in the least developed member countries, where land tenure security is not established. Inequality in land ownership reduces access to land and creates inefficiencies in land productivity. Ensuring access to land and providing control over land for poor and marginalized rural households is significant for promoting agricultural growth.

Infrastructure improvement is an important requisite to incite growth in the agriculture sector as well as rural development. OIC countries still lack infrastructure that can support agriculture sector. Three important agriculture infrastructure needing priority in OIC countries are rural roads and accessibility, development of water resources (i.e. irrigation, dams etc.), and electricity. Roads in the rural area are very important to make movement of goods and population that would make agriculture supply-chain more efficient thereby improving productivity. There are many pieces of evidences that investment in rural roads helps to increase household income and consumption.

Many of the farmers in OIC countries still depend on rainfall for irrigation. This is not always efficient as the rainfall is highly unpredictable. This poses a significant uncertainty and shock in agricultural productions. The risk of farmers from not getting water (or receiving too much water) from rainfall is increasing as the impact of climate change intensifies.

The diffusion of modern energy into the rural areas will not only boost agriculture productivity but also improve the wellbeing of society. The supply of electricity to rural communities, in the short run, would promote incremental improvement in rural farm population, agricultural employment, and values of rural property, while in the long-run leads to increase economic growth through expansion in the agricultural sector.

Challenges to secure finance for infrastructure projects must be tackled. Instead of pursuing a conventional model to recover the investment, an innovative financial scheme may be needed for agricultural infrastructure projects. When user-fees alone could not cover the investment, revenue generation has to be pursued from other channels. In this regard, public-private partnerships (PPPs) scheme can be a good alternative. This type of model will allow stakeholders to mitigate the risks in the project. The government may take part as a subsidy provider and/or equity stakes of the components where generating revenue may be difficult. Finance of the project can be generated through concessionary lending and the private markets.

Agricultural trade could play a significant role in the development of OIC countries such as through its impacts on food security, poverty, job creation and economic growth. Over recent years, the agricultural trade in OIC countries recorded a significant growth and reached 371.9 billion in 2018. Nevertheless, OIC countries, as a group, still could not export more than they import. The trade deficit in a number of major agricultural commodity groups even constitutes a threat to some OIC countries in terms of food security and foreign exchange requirements.

BOX 1: Essentials of Agriculture Infrastructure Development

A robust agriculture infrastructure is important for the livelihood of farmers and rural communities and improving efficiencies in agricultural value chains. The following 10 points need to consider by the policymakers and infrastructure authorities before carrying out any agriculture infrastructure projects to get the most benefits of it.

- Promote ambitious systems approach to food and agricultural investments to account for complex, interrelated challenges and feedback loops that can occur within and across sectors.
- Collaborate with farmers and end-users in the design, planning, O&M of projects. They know their needs best.
- Assess which projects have the highest multiplier effects for food security outcomes and establish project pipelines accordingly. By identifying these multipliers, international donor funding can also be secured more easily.
- Think about financial viability or bankability not in the narrow sense (revenue through user fees) but in a larger and more long-term sense (over time, how can revenue sources evolve, and what is the government willing to invest—with other donors and investors—to improve food security?).
- Use grants smartly and efficiently. Instead of funding infrastructure projects outright, grants should be used to mobilize additional sources of funding.
- Hone the ability of public procurement officials to design, assess and negotiate sound infrastructure projects. This is essential for the financial viability of projects. Well-designed financial solutions cannot compensate for poor procurement procedures.
- Conduct value-for-money assessments before looking to private investors to see how to structure financing in a way that also provides value to taxpayers.
- Focus not only on the quantity of infrastructure developed but also on its quality and maintenance. Refurbishment and maintenance of existing infrastructure should also be a priority.
- Create a market for "intermediate infrastructure" providers such as logistics and transport service companies that support improved value chains.
- Combat corruption in all its forms. Corruption undermines the effectiveness of all investments, including infrastructure investments, and creates the risk of derailing efforts to end hunger.

Source: *Adapted from Turley & Uzsoki, 2018.*

To this end, it is important for OIC countries to realize the economic potentials in intra-OIC agricultural trade that reached USD 120.1billion in 2018. There is some evidence that policy makers in OIC countries are aware of the importance of improving bilateral trade relationship with OIC countries. In a survey conducted in COMCEC (2019), 97.8% of respondents (policy makers and senior experts from OIC countries) mentioned that improving bilateral trade relationship with OIC countries is beneficial for the country's

export performance in agricultural products. Nevertheless, COMCEC (2019) also found out that high tariff protection being implemented effectively by many OIC countries towards agricultural products of other OIC countries remained an important obstacle. Moreover, some regional trade agreements signed by OIC countries also lead to negative discrimination in terms of trade and tariff rates. Therefore, without reviewing such factors that limit intra-OIC cooperation in terms of agricultural trade, it is less likely to reach full potentials of intra-OIC cooperation.

Against this background, OIC countries need to consider removing trade barriers such by lowering tariff rates and easing non-tariff barriers with a view to enhancing intra-OIC trade. In this regard, agricultural trade policies in OIC countries need to be effective and evidence-based. The inclusion of views of various national stakeholders into policy-making is critical to identify national priority areas and develop policies that could promote trade in agricultural products.

The relevant OIC institutions like the Islamic Development Bank, SESRIC, ICDT, ICCIA and COMCEC could also offer a number of tools and programmes such as targeted trade credits, specialized trade fairs, capacity-building and training programmes for the benefit of the OIC member countries. Such programmes could help to increase the capacities and skills of OIC countries that would allow them to trade more within the OIC region. Within the scope of such programmes, OIC countries could also learn from their national experiences and best practices in agriculture and agricultural trade. Such practices and sharing of knowledge among OIC countries in this important area could have the potential to take intra-OIC cooperation to another level.

The past decades have seen the importance to address micronutrient deficiencies, also known as hidden hunger. Deficiency in micronutrient intake has increasingly become an important global health issue, affecting key development outcomes including poor physical and mental development in children, mental retardation, blindness, vulnerability or exacerbation of diseases, and losses in productivity.

The OIC countries are among the countries most vulnerable to micronutrient deficiency owing to the high level of food insecurity. Among 20 countries with the worst level of hidden hunger, half of them were OIC countries. Food fortification can be the answer for the need for micronutrient intake of the population, where natural food containing high micronutrient is unattainable. OIC countries have made progress in terms of food fortification programmes. Some countries have already equipped with various food fortification regulations in a varying way. However, most of them solely focus on salt iodization. Only around half of OIC countries imposed mandatory to fortify non-salt foods (e.g. either flour, oil, or rice) with various micronutrients such as B12, Vitamin D, Folate (B9), Vitamin A, Iron, and Zinc.

On the brighter side, most countries already equipped with fortification standards to fortify various food vehicles with different types of micronutrients. Mandatory fortification beyond salt iodization needs to be done by member countries considering the specific deficiency of micronutrients in their localities. Proper fortification programme would require other assessments beyond the technical food fortification, but also to its economic, social and cultural considerations. Complementary strategies are needed in these contexts that support culturally appropriate dietary modification and community- and agriculture-based interventions, with simultaneous efforts to improve capacity and reach of supplementation and fortification.

OIC water vision addressed climate change as one of the most important challenges of water security in OIC countries. Climate change pressure on water system will hamper agricultural production and thereby putting more pressure on poverty alleviation and famine eradication in OIC countries. Various mitigation and adaptation efforts need to be pursued to face this challenge. These efforts will not only contribute to reducing stress to the environment but will also provide various economic and social benefits by increasing food production and resiliency towards the future changing climate. It may also have co-benefits (improved efficiency, reduced cost, environmental co-benefits) which could give positive spillover effects to other sectors in the economy.

Coping with climate change challenge requires, among others, the sustainable food production by adopting “climate-smart” agricultural practices. Climate-smart agriculture has the main aim to increase agricultural productivity while at the same time reducing GHG emissions and increasing the capacity and resiliency to climate shocks. The potential of each mitigation and adaptation efforts is context-specific, with different issues and adaptive capacities among communities and regions. Prerequisites for the successful implementation of agricultural mitigation and adaptation projects are to ensure that: (1) communities are engaged in implementing the programmes; (2) there is consistency between the new strategy with the ongoing policies or programmes, and (3) a priori consent is given to smallholder farmers. Furthermore, there is an important need to analyze the implications of climate change and to share experiences within OIC member countries in terms of coping policies, management and technology use.

The COVID-19 pandemic affects significant elements in both food supply and demand. Measures to prevent devastating food crises are needed with the aim to sustain access to food, keep global food supply chains intact, and mitigate the pandemic's impacts across the food system. In this regard, access to food should sufficiently be provided to ensure the continuity of agricultural activities and preventing shock on the supply chains. Any barriers that hinder the supply of food from producer to customer need to be removed. Locally produced foods also need to be prioritized, which will also help rural farmers get their income.

The most vulnerable groups such as poor, small-scale farmers, pastoralists, and fishers and displaced population need to be protected. Identification on the scale of these vulnerable populations is important to get an idea of the degree of people needing assistance. Appropriate budget reallocation, therefore, can be adjusted accordingly for this emergency food insecurity measure. Various social safety nets can be applied such as direct cash transfer, food baskets assistance, or both.

Delivering social protection might be a challenge for the government in developing countries, due to the low quality of data availability, lack of manpower, appropriateness of program design, and bureaucratic challenge. Therefore, deploying social protection programs should not solely depend on government arms but also employing cooperation and coordination with local communities. This can be critical for the program to scale up and reaching its intended target groups, such that hard-to-reach rural areas.

There is enough food for everyone for the whole year as reported by FAO (2020b) for the current and projected main crop production throughout the year. The global supply of food would not get disrupted provided restrictive trade policies (such as export bans) are not pursued by countries. Therefore, exporting countries should continue to provide their commodities to the global market, while the importer countries could lower their trade barriers to facilitate the free-flowing trade. This would ensure the global agri-food trade to remain running, even with logistical challenges. In the time of the crisis, countries should work together to ensure the stable food supply for everyone thereby preventing undesirable derivative problems such as food crisis.

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Annexes

Annex I: Various Sustainable Agriculture Practices

Categories		Practices
Cropland Management		
Croplands — plant management	-	High input carbon practices, e.g., improved crop varieties, crop rotation, use of cover crops, perennial cropping systems, and agricultural biotechnology.
	-	Improved N use efficiency.
Croplands — nutrient management	-	Fertilizer input to increase yields and residue inputs (especially important in low-yielding agriculture).
	-	Changing N fertilizer application rate, fertilizer type, timing, precision application, inhibitors.
Croplands — tillage / residues management	-	Reduced tillage intensity; residue retention.
Croplands — water management	-	Improved water availability in cropland including water harvesting and application.
	-	Decomposition of plant residues.
	-	Drainage management to reduce emissions, reduce N runoff leaching.
Croplands — rice management	-	Straw retention.
	-	Water management, mid-season paddy drainage.
	-	Water management, N fertilizer application rate, fertilizer type, timing, and precision application.
Rewet peatlands drained for agriculture	-	Ongoing CO2 emissions from reduced drainage (but CH4 emissions may increase).
Croplands — set-aside and land-use change	-	Replanting to native grasses and trees. Increase C sequestration.
	-	N inputs decreased resulting in reduced N2O.
Biochar application	-	Soil amendment to increase biomass productivity, and sequester C
	-	Reduced N inputs will reduce emissions.
Grazing Land Management		
Grazing lands — plant management	-	Improved grass varieties/sward composition, e.g., deep rooting grasses, increased productivity, and nutrient management. Appropriate stocking densities, carrying capacity, fodder banks, and improved grazing management.
Grazing lands — animal management	-	Appropriate stocking densities, carrying capacity management, fodder banks and improved grazing management, fodder production, and fodder diversification.
	-	Stocking density, animal waste management.
Grazing land — fire management	-	Improved use of fire for sustainable grassland management. Fire prevention and improved prescribed burning.

Revegetation	-	The establishment of vegetation that does not meet the definitions of afforestation and reforestation (e.g., Atriplex spp.).
	-	Increased grazing by ruminants may increase net emissions.
	-	Reduced N inputs will reduce emissions.
Organic soils — restoration	-	Soil carbon restoration on peatlands; and avoided net soil carbon emissions using improved land management.
	-	May increase.
Degraded soils — restoration	-	Reclamation (afforestation, soil fertility management, water conservation soil nutrients enhancement, improved fallow).
Bio solid applications	-	Use of animal manures and other bio solids for improved management of nitrogen; integrated livestock agriculture techniques.
Livestock		
Livestock — feeding	-	Improved feed and dietary additives to reduce emissions from enteric fermentation; including improved forage, dietary additives (bioactive compounds, fats), ionophores/antibiotics, propionate enhancers, archaea inhibitors, nitrate and sulphate supplements.
Livestock — breeding and other long-term management	-	Improved breeds with higher productivity (so lower emissions per unit of product) or with reduced emissions from enteric fermentation; microbial technology such as archaeal vaccines, methanotrophs, acetogens, defaunation of the rumen, bacteriophages and probiotics; improved fertility.
Manure management	-	Manipulate bedding and storage conditions, anaerobic
	-	Manipulate livestock diets to reduce N excreta, soil-applied and animal fed nitrification inhibitors, urease inhibitors, fertilizer type, rate and timing, manipulate manure application practices, grazing management.

Source: Smith et al. (2014)

Annex II: Food Demand and Supply Exposure to COVID-19

Country	Share of Intermediate Inputs	Consumption of Fixed Capital per Worker	Gross Output per Worker	Share of Agricultural Exports	Overall Supply Exposure	Share of Food Expenses	Share of Agricultural Imports	Overall Demand Exposure
Afghanistan	L	IL	H	H	IH		H	
Albania	IL	IL	IH	IL	IL	H	IH	H
Algeria	L	L	IH	L	L	H	IH	H
Azerbaijan	IH	IH	IH	L	IL	H	IH	H
Bahrain	IL	IH	IL	L	L	L	IL	L
Bangladesh	IL	L	H	L	L	H	IH	H
Benin	IL	L	H	H	IH	H	H	H
Brunei	H	H	L	L	IL	IL	IL	IL
Burkina Faso	L	L	H	H	IL	H	IL	IH
Cameroon	L	L	H	H	IL	H	IH	H
Chad	L	L	H	L	L	H	IH	H
Comoros	L	L	H	H	IL	H	H	H
Côte d'Ivoire	L	IL	IH	H	IL	H	IH	H
Djibouti	H	L	H	IH	H	IH	H	H
Egypt	L	IL	IL	IH	L	IH	H	H
Gabon	IH	IH	IH	L	IL	IL	H	IH
Gambia	L	L	H	H	IL	IH	H	H
Guinea	L	L	H	L	L	H	H	H
Guinea-Bissau	IL	IL	H	H	H	H	H	H
Guyana	IL	IH	IL	IH	IL		IL	
Indonesia	IL	IL	IH	IH	IL	H	IL	IH
Iran	IH	IH	IL	IL	IL			
Iraq	IL	IH	IL	L	L	IH	H	H
Jordan	H	IH	IL	IH	H	IL	H	IH
Kazakhstan	IH	IH	IL	IL	IL	IL	IL	IL
Kuwait	IL	IH	L	L	L	IL	IH	IL
Kyrgyzstan	H	IL	IH	IL	IH	IH	IL	IL
Lebanon	L	H	L	H	IL		IH	
Libya	IL	H	IH	L	IL		H	
Malaysia	IH	IH	IL	IL	IL	IL	L	L
Maldives	IH	IL	IH	IH	IH	IH	IH	IH
Mali	L	L	IH	IH	L	H	IH	H
Mauritania	L	L	H	IH	IL	H	H	H
Morocco	IH	IL	IH	IH	IH	IH	IL	IL
Mozambique	L	L	H	IL	L	H	IH	H
Niger	L	L	H	H	IL	IH	H	H
Nigeria	IL	L	IH	L	L	IH	IL	IL
Oman	IL	IL	IH	L	L	IL	IL	IL
Pakistan	L	IL	IH	IH	IL	H	IH	H
Palestine	IH	IL	IL	H	IH	IH	H	H
Qatar	IH	H	L	L	IL	L	L	L
Saudi Arabia	L	IH	L	L	L	L	IH	IL
Senegal	L	L	H	IH	IL	H	H	H
Sierra Leone	L	L	H	IH	IL	IH	H	H
Somalia	L	L	H	H	IL		H	
Sudan	L	L	IH	H	IL	H	H	H
Suriname	IL	IH	IL	IL	IL	IH	IH	IH
Syria	IL	IH	IH	H	H		H	
Tajikistan	L	IL	H	IL	IL	H	IH	H
Togo	L	L	H	IL	L	IH	L	IL
Tunisia	IL	IH	IL	IL	IL	IL	IL	IL
Turkey	IH	IH	IL	IL	IL	IL	L	L
Turkmenistan	IL	IL	IH	L	L		IL	
Uganda	IL	L	H	H	IH	IH	IH	IH
United Arab Emirates	IH	IH	IL	L	IL	L	L	L
Uzbekistan	IL	IL	IH	IH	IL		IL	
Yemen	IH	IL	IH	IH	IH	IH	H	H

Source: Schmidhuber et al. (2020). Note: L=Low, IL= Intermediate Low, H=High, IH=Intermediate High

Annex III: Country Classifications

OIC Member Countries (57):

Afghanistan	Gabon	Maldives	Sudan
Albania	Gambia	Mali	Suriname
Algeria	Guinea	Mauritania	Syria*
Azerbaijan	Guinea-Bissau	Morocco	Tajikistan
Bahrain	Guyana	Mozambique	Togo
Bangladesh	Indonesia	Niger	Tunisia
Benin	Iran	Nigeria	Turkey
Brunei Darussalam	Iraq	Oman	Turkmenistan
Burkina Faso	Jordan	Pakistan	Uganda
Cameroon	Kazakhstan	Palestine	United Arab Emirates
Chad	Kuwait	Qatar	Uzbekistan
Comoros	Kyrgyz Republic	Saudi Arabia	Yemen
Cote d'Ivoire	Lebanon	Senegal	
Djibouti	Libya	Sierra Leone	
Egypt	Malaysia	Somalia	

* Syria is currently suspended from OIC membership.

Non-OIC Developing Countries:

Angola	Dominica	Madagascar	São Tomé and Príncipe
Antigua and Barbuda	Dominican Republic	Malawi	Serbia
Argentina	Ecuador	Marshall Islands	Seychelles
Armenia	El Salvador	Mauritius	Solomon Islands
The Bahamas	Equatorial Guinea	Mexico	South Africa
Barbados	Eritrea	Micronesia	South Sudan
Belarus	Ethiopia	Moldova	Sri Lanka
Belize	Fiji	Mongolia	St. Kitts and Nevis
Bhutan	Georgia	Montenegro	St. Lucia
Bolivia	Ghana	Myanmar	St. Vincent and the Grenadines
Bosnia and Herzegovina	Grenada	Namibia	Swaziland
Botswana	Guatemala	Nauru	Tanzania
Brazil	Haiti	Nepal	Thailand
Bulgaria	Honduras	Nicaragua	Timor-Leste
Burundi	Hungary	Palau	Tonga
Cabo Verde	India	Papua New Guinea	Trinidad and Tobago
Cambodia	Jamaica	Paraguay	Tuvalu
Central African Republic	Kenya	Peru	Ukraine
Chile	Kiribati	Philippines	Uruguay
China	Kosovo	Poland	Vanuatu

Colombia	Lao P.D.R.	Romania	Venezuela
Democratic Republic of the Congo	Lesotho	Russia	Vietnam
Republic of Congo	Liberia	Rwanda	Zambia
Costa Rica	FYR Macedonia	Samoa	Zimbabwe
Croatia	Panama		

Developed Countries (39):**

Australia	Germany	Lithuania	Singapore
Austria	Greece	Luxembourg	Slovak Republic
Belgium	Hong Kong	Macao SAR	Slovenia
Canada	Iceland	Malta	Spain
Cyprus	Ireland	Netherlands	Sweden
Czech Republic	Israel	New Zealand	Switzerland
Denmark	Italy	Norway	Taiwan
Estonia	Japan	Portugal	United Kingdom
Finland	Korea, Rep.	Puerto Rico	United States
France	Latvia	San Marino	

** Based on the list of advanced countries classified by the IMF.

Annex IV: Geographical Classification of OIC Member Countries

Sub-Saharan Africa (21): OIC-SSA

Benin	Gambia	Nigeria
Burkina Faso	Guinea	Senegal
Cameroon	Guinea-Bissau	Sierra Leone
Chad	Mali	Somalia
Comoros	Mauritania	Sudan
Côte d'Ivoire	Mozambique	Togo
Gabon	Niger	Uganda

Middle East and North Africa (19): OIC-MENA

Algeria	Kuwait	Saudi Arabia
Bahrain	Lebanon	Syria*
Djibouti	Libya	Tunisia
Egypt	Morocco	United Arab Emirates
Iraq	Oman	Yemen
Iran	Palestine	
Jordan	Qatar	

*Syria is currently suspended from its OIC membership.

East and South Asia and Latin America (9): OIC-ESALA

Afghanistan	Guyana	Maldives
Bangladesh	Indonesia	Pakistan
Brunei Darussalam	Malaysia	Suriname

Europe and Central Asia (8): OIC-ECA

Albania	Kyrgyzstan	Turkmenistan
Azerbaijan	Tajikistan	Uzbekistan
Kazakhstan	Turkey	