

4 Past, present and future of food security in Egypt

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1 Introduction

Egypt is a net food importing country with a population of more than 100 million in 2023, a GDP per capita of USD 4,089 (in constant 2015 prices) and an unemployment rate of 7.1% (according to the data from World Development Indicators). Poverty and food security are major challenges to the development of Egypt. Food demand, mainly for cereals, is expected to increase with population growth, and changes in dietary habits. As local agricultural production is insufficient to meet demand, dependence on imports increases. Within this context, food security in Egypt is challenged by several factors at both food supply (national production and imports) and food demand (access and utilization). These factors are expected to be exacerbated in future with urbanization and climate constraints, in addition to crises such as the COVID-19 pandemic and the Russian invasion of Ukraine.

On the demand side, food security in Egypt provides an economic challenge. Poverty and food price inflation limit access to food. Recently, with currency devaluation and economic slowdown resulting from the pandemic, inflation reached 25.8%, eroding the purchasing power of households. The Egyptian food subsidy system, implemented after the Second World War, plays a significant role in ensuring the availability of and access to basic food items for the Egyptian population. The importance of this system, which covers around 88% of the Egyptian population, increases during periods of crisis.

On the supply side, local agricultural production is constrained by limited natural resources such as water and land. Climate change, reflected in higher temperature, rising sea levels and water scarcity, will adversely impact agricultural production potential in the country. The growing population and increasing food demand resulted in an increasing gap between food demand and food supply. This gap is overcome by increasing dependence on imports. Worldwide, Egypt is the seventh importer of maize (with a self-sufficiency rate of 46%) and the leading wheat importer (with a self-sufficiency rate of 43%). For other products such as rice, potatoes, fresh vegetables, eggs and milk, the self-sufficiency rates exceed 90% (FAO's Food outlook, June 2023; CAPMAS, 2020). The high dependence on imports leaves the country vulnerable to the fluctuation of international food prices.

This chapter aims to discuss different dimensions of food security in Egypt. Section 2 discusses food availability and reviews food access, food utilization and the role played by the Egyptian food subsidy system. Section 3 tackles the main challenges to food security in Egypt. Finally, Section 4 concludes and provides policy recommendations.

2 Egyptian food security: food supply and food demand

Egypt is a net food importer with an average cereal dependency ratio around 48% in 2016–2018. In 2020, 27.3% of the population was considered as moderate or severe food insecure and 6% were considered undernourished (World Development Indicators, 2023). To place Egypt's food security status in a global and African perspective, we can use the Global Food Security Index (GFSI). This index, designed and constructed by Economist Impact and supported by Corteva Agriscience, considers food affordability, availability, quality and safety, and sustainability and adaptation across 113 countries.¹ Egypt ranks 77th on this index, 5th in Africa,² with a score of 56. It is a clear score improvement but a downgrading relative to 2012, the first year of the index. The score was 51.6 while the ranking was 52nd on this index, and 2nd in Africa. Improvements were observable mainly in affordability, and in sustainability and adaptation, and less so in availability, and quality and safety.

2.1 Food availability

Food availability is ensured through local agricultural production and imports. For thousands of years, the water of the Nile has been essential for agricultural sector, which employs a third of the population, and contributes 12% of the GDP. Around 60% of total food produced in Egypt originates from the Nile Delta (Fishar, 2016).

Since the 1950s, successive Egyptian governments have tried to expand arable land, most importantly into the dry areas west of the Nile Delta (Acloque-Desmulier, 2014). Those efforts led to a substantial increase of the total cultivated land in Egypt, from 2.6% of total land area in 1961 to 5% in 2020, corresponding to an absolute increase of 1.4 million hectares. The change in covered area since 1961 is shown in Figure 4.1 and is characterized by two phases. The first phase corresponds to the “Tahrir Province” land extension project, launched in 1958, which aimed to experiment a new production model in the desert. The results of this ambitious plan proved

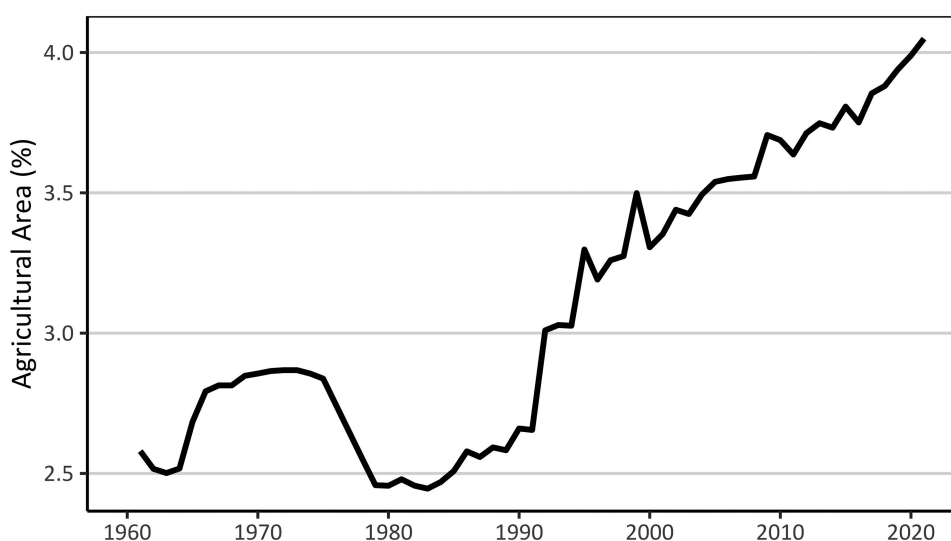


Figure 4.1 Agriculture area in Egypt (% of total land area), 1961–2022.

Source: FAOSTAT (2023).

disappointing, as the cost of land reclamation turned out to be higher than expected. Therefore, following the Six Day War of 1967, the government chose to slow down investment in the “Tahrir Province” in favour of consolidating agricultural production in the already cultivated area. In 1981, Law 143 initiated a new large-scale attempt to extend the land frontier, defining the status of desert land and the terms of its acquisition. This law stipulates that the desert land is owned by the government which decides on its allocation. This has initiated the second phase where the government encouraged the creation of large commercial farms utilizing capital-intensive agricultural technologies at the margins of the Nile Delta, known as the “New Lands” (Acloque-Desmulier, 2019). These farms focused on the production of high-value cash crops, as horticultural products, for export. The use of central-pivot irrigation in the New Lands also enabled the production of cereals such as wheat, and tubers such as barley, potato and sugar beet. New Lands now represent around 15% of the cropped area. The New Lands increasingly also hosted small family farms. Those small producers, in most cases, work with their families on the land and call upon a daily workforce during periods of high activity (Acloque-Desmulier, 2019).

The coexistence of those two models, highly mechanized and small-scale family farming, is quite specific to the New Lands. Indeed, in the “Old Lands”, Egyptian agriculture is characterized by the predominance of smallholdings (Tull, 2020; Almas and Usman, 2021). Large farms, above 50 feddans (1 feddan = 0.42 hectares), represent only 0.2% of the landholders, but around 17% of the land area. In 2010, 91.75% of farmers hold 5 feddans or less, but around 47% of the land area (Aboul-Naga et al., 2017). This high land fragmentation inhibits farmers from benefiting from economies of scale and to practise capital-intensive and market-oriented farming. Instead, old lands farmers mainly practise subsistence farming and produce small and irregular amounts for the market (Daburon et al., 2014).

To ensure food availability, increasing agricultural productivity is a key factor. This productivity is historically high in Egypt which relies on irrigation, not rainfall. In 1976, the completion of the Aswan high dam further increased agricultural productivity by putting an end to annual flooding. Until its establishment, crops located at the edge of the Nile benefited, during floods, from its irrigation and fertilizing silt. However, a flood of too high intensity could destroy the crops, while a flood of too low intensity could dry them out. The construction of this dam as well as the creation of numerous canals across the Nile Delta allows farmers to irrigate their land all year round, following a two seasonal pattern, doubling the previous period suitable to agriculture. This allows the cultivation of wheat and clover in winter, and maize, sorghum (subsistence crops), rice and cotton (cash crops) in summer. The increase in productivity, made possible by the dam, may partly explain why the arable land reduction did not affect the production. In addition, the consolidation of old lands agriculture following the disappointment of Tahrir province project around 1967 helped to improve the production, notably through investment in agricultural technology and water management improvement (Fuglie et al., 2021).

Figure 4.2 indicates the production (in tons) of the main agricultural items. It confirms the importance of not only of wheat, vegetables and fruits, but also of milk and meat. Poultry especially is one of the main agricultural industries in Egypt. There are approximately 60,000 intensive poultry farms, which contribute 10% of agricultural value added (ASL2050, 2018).

Despite the increasing agricultural production, there is a gap between local food production and food demand. Import dependency for several key staples has increased steadily to cover this gap. For cereals, the import dependency ratio was 30% in the 1960s. Since the 1970s, dependency on imports, mainly wheat, increased. The import dependency ratio has reached 48% for cereals and 43% for wheat (FAOSTAT, 2023; Tsakok, 2023). The increasing demand for imports and the rising international prices increased the value of imports, mainly during crises period. Figure 4.3 shows fluctuations in the quantity of wheat imported since 1960.

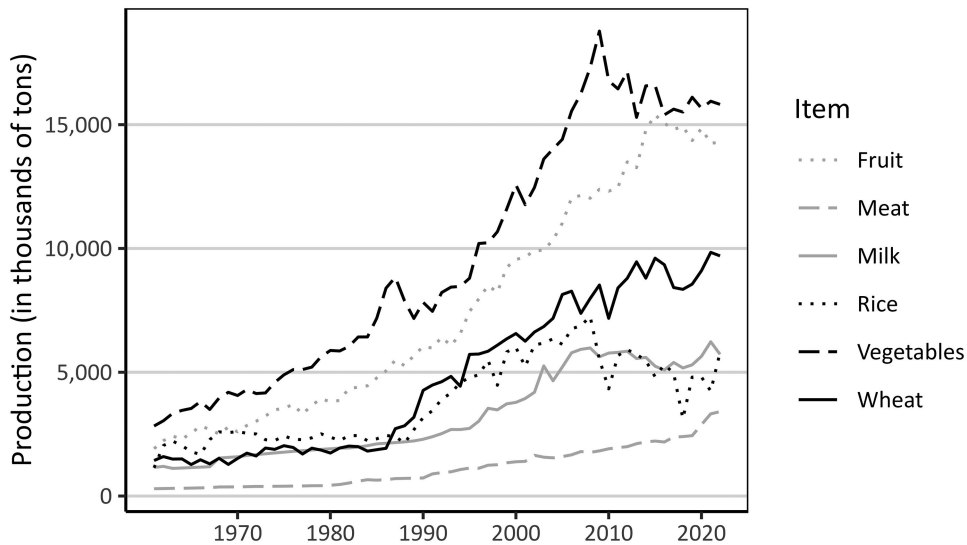


Figure 4.2 Agricultural production of the main crops products (tons).

Source: FAOSTAT (2023).

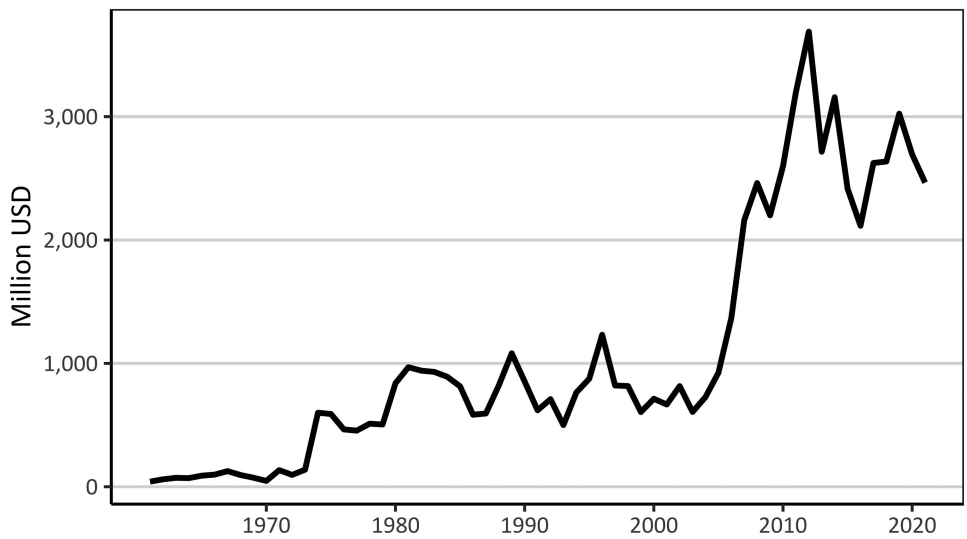


Figure 4.3 The quantity of wheat imports since 1961.

Source: FAOSTAT (2023).

The quantity imported has risen sharply since 1960. As Egyptian wheat production is not sufficient to meet the growing demand due to population growth, Egypt has become the world's largest importer of wheat. The COVID-19 crisis has severely disrupted the international market, leading to a drop in imports in 2020–2021, which seems to be recovering in subsequent years. Recently, the Russo-Ukrainian War of 2022 led to a 100% increase in the world price

of wheat; 85% of the wheat imported by Egypt comes from these two countries. As a result, the value of imported wheat has risen, which is worrying given the large quantities imported (Abay et al., 2022).

The climate and soil of the New Lands are particularly favourable to fruit and vegetable production. The government incentivizes its production of fruits and legumes. The government's strategy, since the 1990s, has been to produce high-value agricultural products, sell them on the international market and use the income to import wheat.

Seeking to reduce import dependency, the Egyptian government declares the wheat procurement price in the beginning of each season to encourage its production. Additionally, Egypt doubled the capacity of grain silos to improve grain storage and reduce waste and losses. During the pandemic and the Russo-Ukrainian War, Egypt applied several measures to ensure food availability. These measures include expanding the areas planted with wheat and diversifying the sources of imported wheat by importing from other countries such as India, France, Germany and Romania.

2.2 Food access and food utilization

Having enough food available at the country level, through local production and imports, does not necessarily translate to food security at the household level. The latter is determined by different socio-economic and demographic characteristics of individuals and households, such as individuals' sex, age, education level, employment status, economic activity, access to social security, size of the household, income level and geographical location (Rose and Charlton, 2002; Sultana and Kiani, 2011; Aidoo et al., 2013). In Egypt women, people with low education, households with a high share of children under six years old and the poor are more likely to be food insecure.

Egypt suffers from the triple burden of malnutrition: obesity, stunting and micronutrient deficiencies (leading to health problems such as anaemia). With urbanization and changes in dietary habits, the prevalence of overweight and obesity has increased. The prevalence of overweight among children under five years old increased to 19% in 2022 compared with 12% in 2000. Among the adult population, 32% were obese in 2016 compared with 22% in 2000. Although the prevalence of stunting among children under five years old has declined since 2000, it remained high with 20% in 2022. Similarly, the prevalence of anaemia among women of reproductive age has declined but it remained high with 28% in 2019 (FAOSTAT, 2023).

This specific triple burden may result from the rapid "nutrition transition" that Egypt, like many low- and middle-income countries, has experienced since the mid-1970s. Economic growth leads to an increase in food availability and a shift from a high-fibre plant-based diet towards an energy-dense diet. In Egypt, this phenomenon has been amplified by the food subsidy system. The rationed products, while ensuring sufficient caloric availability for Egyptians, also encourages the consumption of calorie-rich foods at very low prices. Traditionally, subsidizing products such as sugar, cooking oil and rice encourages their overconsumption at the expense of a more diversified diet of micronutrient-rich foods (such as meat, fish, dairy products, pulses, vegetables and fruits).

The Egyptian food subsidy system³ is one of the social protection programmes that plays a key role in keeping levels of poverty and food insecurity down. The system is financed by the government and represented around 27% of the financial year 2019/2020 budget (Ministry of Finance, 2019/2020). The system is composed of two subprogrammes. The first subprogramme consists of dark country-style bread, known as *baladi* bread. The price of subsidized bread is less than 1 cent a loaf. Bread subsidies used to be a universal subsidy since bread was available to all consumers without restrictions. The second sub-system is a ration card system that

provides the cardholders with a specific quota of several items at a subsidized price. Items include rice, sugar and other products that varied over the years.

Instead of being important for food security, especially during crises, the system has been characterized as inefficient because of waste and losses in the supply chain and lack of precise targeting of those who are eligible. Additionally, the locally produced wheat is mainly consumed by rural consumers and is insufficient to sell to the government for the subsidized bread (Ramadan and Thomas, 2011; Almas and Usman, 2021). This means that imported wheat is mainly used to produce subsidized bread, putting more pressure on the government's budget.

Several crises have affected the system over the years. In the 1970s, the recommendations of the International Monetary Fund to remove food subsidies resulted in what are known in Egyptian history as “food riots”. As a result, the government did not remove the food subsidies. In 2008, the food, fuel and financial crisis was buffered in Egypt due to the food subsidy system. Since 2015, several reforms have been implemented to reduce the system's budget burden and improve targeting and effectiveness (Hosni and Ramadan, 2018). With the new system, the bread subsidy is no longer universal. This new system provides 150 subsidized loaves of bread per month to each family member using a bread ration card. The new ration card system is considered as a quasi-cash transfer providing a more balanced diet by offering 33 different products. This system allows consumers to choose products that match their preferences and needs. At the same time, it ensures that this quasi-cash amount is spent by households on food products to ensure minimum basic goods. The beneficiaries' database was updated and revised to reduce inclusion and exclusion errors and to ensure that only eligible households have access to the subsidies. This new system allows consumers to convert savings in their bread consumption into points for consuming other subsidized products (Abdallah and El-Shawarby, 2018). Such policy reduces waste of subsidized bread, giving the consumers incentives to buy only the amount required for their own consumption. Subsidized bread used to be sold in the black market or used as feed for animals (Ramadan, 2015).

Other social protection programmes include cash transfer programmes, “Takaful” and “Karama”, which means Solidarity and Dignity in Arabic. These programmes were launched in 2015 and cover approximately 10% of Egypt's population. Takaful programme supports poor families with children under 18 years of age, while Karama supports the poor elderly disabled and orphans (World Bank, 2015, 2018). According to an International Food Policy Research Institute (IFPRI) impact evaluation study (2018), beneficiaries of Takaful increased their food consumption and improved the quality of their diets. They consume more fruits, meat and poultry. During the pandemic, the government increased the number of Takaful and Karama beneficiaries.

3 Food security challenges in Egypt

Structural challenges of food security include limited resources such as water and arable land, rising poverty, growing population, and waste in the food supply chain (Mohamed, 2018). Local agricultural production is insufficient to meet the growing demand of the rising population. Climate change puts more pressure on local agricultural production with its impact on water resources and arable land, in addition to the rising temperature. Increasing food import dependency increases vulnerability to external shocks, particularly given the slowing economic growth and devaluation.

3.1 *Natural resource constraints and climate change*

Limited natural resources, such as land and water, are constraints for local agricultural production in Egypt. Available land for food production is becoming scarce, especially when

considering competition with urbanization. Agriculture is mainly based on irrigation water from the Nile and is the major user of clean water in Egypt, accounting for 79% of total annual fresh-water withdrawals. With population and urban growth, there is an increasing competition on water between agriculture, residential, energy and industrial uses (Khedr, 2019; Almas and Usman, 2021). Additionally, ground water is slow to recharge given that rainfall in Egypt is low and the flow from the Nile River is expected to vary due to climate change and the Ethiopian Dam.

Climate change is expected to lead to less suitable conditions for crop cultivation. Estimates show that Egypt will become hotter and drier with long-term reductions in agricultural production (WFP and ODI, 2015; Kandeel, 2019; Tull, 2020). Water scarcity will persist through 2050 and climate change is expected to deteriorate water quality and quantity, decrease per capita water availability and jeopardize the food system. By 2030, the delta region is expected to lose a minimum of 30% of its food production. By 2050, crop yields will decline causing an estimated decrease by 6% of total food production, by 15% in wheat production, by 22% in maize production and by 24% in pulses production (Perez et al., 2021; UNFCC, 2022; Abu Hatab, 2023). Kandagatla and Almas (2019) estimate that wheat consumption will reach 40 million tons, while local wheat production will only be 14.5 million tons by 2050. Therefore, the gap between wheat supply and demand will grow, and dependence on imports is projected to be around 53% in 2050 (Le Mouél and Schmitt, 2018).

3.2 *Population growth*

The growing population had been a key challenge for food security and all development goals in Egypt. Since the 1970s, the average population growth rate is 2.2%, which is higher than the global average. Egypt is the most populous country in the Arab World with 111 million in 2022. However, its population growth is lower compared to other African countries and is expected to decrease to less than 2% by 2050 (UN DESA, 2022; also Van Wissen, this volume).

High fertility rate explains population growth. In the 1960s, fertility rate was 6.8 births per women. The rate declined over the years due to the government family planning programmes to reach 3.1 in 2009, then increased again in 2011 to reach 3.4. Recently, the government implemented new policy to raise awareness and control population growth known as *Two are enough*. Fertility rate declined to reach 2.9 in 2021 (World Development Indicators, 2023).

By 2050, Egyptian population is expected to increase to reach around 160.3 million and urban population is expected to reach 75% of the total population (Assaad, 2020; UNFCC, 2022). The population density inside the cities is already high, especially in the capital Cairo. The government's strategy is to promote the establishment of cities in desert land to avoid a too high urban density and at the same time reduce urban sprawl at the expense of agricultural land.

More food supply is required to match increasing future food demand. Using UN (United Nations) and FAO (Food and Agriculture Organization) recent data and assuming the kilocalorie amount remains similar to the 2021 ones (3,127 kcal/day/capita), with an estimated population (160 million), the kilocalorie demand will be 501 billion per day by 2050. All things being equal, the Egyptian government must increase the food quantity available by 75% through local production or importation.

3.3 *Economic access to food*

Food security in Egypt at the household level can be considered as an economic challenge with 29.8% of the population living in poverty. Low incomes and poverty, in addition to inflation, limit the purchasing power of households, threatening economic access to food. The COVID-19

pandemic resulted in loss of income and higher food prices, deepening the existing challenges. Food security of those working in hard-hit sectors, poor households and those who lost their income was jeopardized. Households resorted to coping strategies such as a reduction in the number of meals consumed or consumption of less nutritious cheap food items (World Food Programme, 2020; UNDP, 2021). According to the Economic Research Forum's Middle East and North Africa Household Survey data on COVID-19 (2021),⁴ 68% of households in the lowest quartile reported suffering from limited access to food during the pandemic, while 53% had to reduce their usual meals/portions. These percentages were smaller in the highest income quartile group (46% and 26%, respectively) (Ramadan, 2022).

The Russian invasion of Ukraine created a supply-driven crisis resulting in soaring international food prices. The war aggravated the existing challenges resulting from COVID-19, in a period where governments already had limited fiscal space because of the economic problems caused by the pandemic (Ben Hassan and El Bilali, 2022).

4 Concluding remarks

Security is constrained by several factors at both the food supply and food demand levels. These constraints are expected to be exacerbated with the growing population and climate change. Within this context this chapter reviews food security dimensions in Egypt and their challenges.

Based on the four pathways discussed in the introduction of this book, we can conclude that Egypt is in the agriculture stagnation path. But agriculture sector and food security are a priority on the Egyptian government development agenda. The Sustainable Agricultural Development Strategy 2030 of Egypt is based on three main pillars: improving agricultural productivity, raising food security and ensuring the sustainable use of natural resources. And the national structural reform programme is based on the agriculture sector with the manufacturing industry, communications and information technology (Ministry of Planning and Economic Development, 2023).

On the demand side, there is a necessity to slow population growth to ensure the balance between food production and consumption, as discussed above. Social safety programmes such as food subsidy providing diversified products and cash transfer programmes conditional on investment in human capital are required to face malnutrition, ensure food security and reduce poverty and population growth. But, because of the narrow fiscal space, programmes should target the poorest and most affected groups, such as workers in the informal sector, children and women.

In the long term, government's strategies to increase agricultural production and productivity must consider the adaptation to and mitigation of climate change to ensure sustainable agriculture and environment. Developing the agri-food industry to generate higher value-added products and create more non-farm economic opportunities is a necessary condition to provide more economic opportunities to the young, growing population. Egypt benefits of comparative advantages in many products such as fruits and vegetables. Increasing the competitiveness of these products in the international markets and exporting agri-food products with higher value added might be a significant source of foreign currency for the country. Developing regional cooperation and trade between the countries of the African continent would reduce poverty and ensure food security in Egypt and the whole continent.

Notes

- 1 The index is a dynamic quantitative and qualitative benchmarking model constructed from 68 unique indicators that measure the drivers of food security across both developing and developed countries. The score takes value from 0 to 100, the higher the value the better the food security status of the country. For more details about the index see: <https://impact.economist.com/sustainability/project/food-security-index/about>.

- 2 Egypt's rank is below South Africa, Morocco, Algeria and Tunisia, but above all other African countries covered.
- 3 There is a significant literature tackling the Egyptian food subsidy system and its reform (Ahmed and Bouis, 2002; Kandil, 2010; Ramadan and Thomas, 2011; Hosni and Ramadan, 2018).
- 4 The Economic Research Forum COVID-19 Monitor Data for Egypt is a phone survey that contains information on basic socio-demographic characteristics of respondents, self-reports on change in income, food expenditure, food bought, care work for women, employment status, education methods and living conditions in June 2021 – compared to February 2020, before the spread of COVID-19. The survey population consisted of mobile phone users aged 18–64 in Egypt. The samples were stratified by mobile operator and weights are used to be nationally representative.

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