

Policy Paper

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Short of Water and Under Increasing Pressure to Deliver Food Security: Key Policy Considerations The Case of the Arab Republic of Egypt

By Isabelle Tsakok

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Climate change threatens to reduce the water flow in the Nile and increase the frequency and severity of droughts and floods in Egypt, which already suffers from water scarcity. This threat is a looming crisis as it seriously undermines the Government of Egypt's long standing food self-sufficiency approach to food security, an approach which is wasteful of increasingly precious arable land and water resources, while achieving neither more food self-sufficiency nor meaningful food security for the poor and vulnerable. Given its fiscal constraints and the substantial budgetary resources it has been spending on subsidizing basic foods, this looming crisis is an opportune moment for Egypt's government to reassess and rebuild its food security approach, in the context of a fast urbanizing and youthful Egypt in a water-constrained, climate-change impacted world.



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INTRODUCTION

Egypt was hit hard by the COVID-19 pandemic. On March 17, 2020, after Egypt recorded its first COVID-19 death, the Government of Egypt (GoE) declared a public health emergency and imposed social distancing and lockdown measures. These response measures were necessary to contain the contagion but took a heavy socio-economic and financial toll. The economy, which grew by 6.5% in 2019 (up from an average of 4.6% from 2016-18), grew only 3.6% in 2020 (World Bank, Oct 2021). Key economic sectors including tourism, manufacturing, Suez Canal traffic, and oil and gas extraction, were severely impacted by the slump in demand, and disruptions to trade and global supply chains. Poverty (measured at the national poverty level, of approx. \$3.80/day at 2011 PPP) was around 33%.¹ The number of informal workers increased, and suffered particular hardship (World Bank, April 2021).

Fortunately, the recent pre-COVID-19 macro-economic reform measures helped stabilize the economy under the COVID-19 assault. Other reform measures in the energy sector also helped boost electricity supply and gas exports, and attracted private-sector interest in renewables. Additional reforms that are critical and urgent are in agriculture, water, and trade, three closely interacting sectors. Reforms in these different sectors must be undertaken in a coordinated way because they jointly impact on how Egypt uses its arable land and water, and therefore, impact its very survival.

Egypt is already short of water and must find efficient and sustainable ways to strengthen its food security, despite lower water predictability and availability. Fresh water availability per capita/per year was only 570 cubic meters (2018), close to the extreme water-scarcity threshold—water stress level—of 500 m³. If the annual population growth rate averages 1.9% (2021) (WDI), and water resources remain constant, Egypt is projected to reach that extreme scarcity threshold in 2033. (World Bank Group, Nov 2022).²

But water resources may not remain constant. Climate change is projected to increase the uncertainty in the availability of water resources, with increases in heatwaves and desertification affecting biodiversity. Under these more demanding climatic conditions, food and water security will be even more tightly interconnected.

This policy paper presents the key policy considerations for Egypt at a time when the GoE needs to re-assess its food self-sufficiency approach to achieve food security. This paper adopts the holistic FAO concept according to which *“food security exists when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life”* (1996 World Food Summit). Food security thus requires that the four pillars of availability, access, utilization, and stability exist simultaneously. This holistic concept is different from the more popular concept that food security is food self-sufficiency (FSS), which equates a country with no food imports as the ideal of being food secure, and from food sovereignty (FSY), which requires a country to have control over its food policy and to not be subjugated to foreign corporate interests. Egypt adopts the FSS approach.

Section I sets out the global and country context with a focus on macro factors with an important bearing on the state of food security in Egypt and the GoE’s approach to ensuring it. Section II identifies inter-related sector-level factors, namely in Egypt’s agriculture and agro-business, in its water supply and availability, and its agro-food trade, which strengthen and/or weaken its food and water security. Section III presents the main policies that should be considered to achieve food security (as opposed to FSS Egyptian-style) in a world undergoing climate change.

1. At lower middle income poverty level of \$3.20/day (at 2011 PPP), the poverty rate is around 30%.

2. The gap between the demand for and supply of water is expected to exceed 20 billion cubic meters by 2037 (WBG, Oct 2021).

EGYPT: GNI/PER CAP US\$3,510 (2021, CURRENT \$, ATLAS METHOD) (WDI)

SECTION I: GLOBAL AND COUNTRY CONTEXT

Egypt's recent macro-economic performance in the shadow of a darkening global context: After battling the socio-economic downturn caused by closures imposed to contain COVID-19 in 2020, the GoE is fiscally constrained. The government debt-to-GDP ratio at 85.7% at the end of fiscal year (FY) 2019-20 was expected to rise to 90% by end FY 2020-21. The overall budget deficit was expected to rise from 8% to 8.2% of GDP over the same period (World Bank, April 2021). The debt-to-GDP ratio increased mainly as a result of the adverse valuation effect of the exchange rate depreciation (World Bank, Nov 2022). The Egyptian pound (LE) slid 14% twice (in March and Oct 27, 2022) against the dollar (Abdou, Oct 2022). Before the Russian invasion of Ukraine on Feb. 24, 2022, Egypt did manage a bounce-back, supporting an increase in economic growth to 6.6% in FY 2021-22, which is double its GDP growth rate during the pandemic year of FY 2020-21. Previously, in 2015, the GoE undertook major reforms to raise GDP growth and transform Egypt's economy: measures to reduce energy subsidies, broaden the tax base, increase prices of fuel products and electricity tariffs, reform the civil service, and improve the targeting of the social safety nets. Growth subsequently picked up, rising to 5.6% in 2019. But then came the pandemic and soon after, the Russian invasion of Ukraine. The prices of wheat, sunflower oil, and fertilizers have soared. Core and urban inflation accelerated to nearly 14% and 13% respectively (March-August 2022) as Egypt is one of the world's largest wheat importers (USDA, July 2022).³ These wheat imports are essential for Egypt's subsidy of baladi bread, a key component of the social contract between the people of Egypt and their government since the 1950s⁴ (Eddin, Dec 2021). Despite the years of high growth prior to 2020, poverty (at \$3.20/day) rose from around 28% in 2015 to nearly 29% in 2017 (World Bank, 2021). Growth was definitely not pro-poor. In fact, this pattern of growth goes way back to the early 2000s. Post COVID-19, GDP growth has slowed amidst fears of an impending global recession or a global growth slowdown. Several ongoing factors give cause for concern. These include:

- The Russia-Ukraine war showing no signs of ending soon, while geopolitical tensions are intensifying between the United States and China over Taiwan, and between North Korea and U.S. allies in the north Pacific;
- Geopolitical tensions feeding the trade war between the United States and China, and the tightening of sanctions by the United States and NATO against Russia;
- Central banks around the world withdrawing financial support by raising interest rates to control inflation, and governments reducing social safety nets to assist vulnerable groups as government debts soar and their fiscal spaces narrow;
- Highly synchronous tightening of monetary and fiscal policies, which is expected to continue into 2023, thus constituting a major brake on global demand growth.

Indeed, policymakers worldwide are in a very uncomfortable position as they have to navigate a narrow path and undertake seemingly contradictory policies. They must constrain demand growth in order to restore price stability, while still supporting vulnerable groups hurting from inflation to reduce the risk of social instability, and without endangering their own debt sustainability. But they also need to ease supply-side constraints, e.g., in supply/value chains, in trade networks, in energy

3. Egypt is next to Indonesia which is the largest wheat importer in the world.

4. In fact, food subsidies for the poorest groups started in 1940s, during the Second World War.

markets, and to promote public and private investment, e.g., in productive, green energy and climate-resilient technologies, and to do this in an inclusive manner (Guénette et al, Sept. 2022). Added to this thorny global situation, COVID-19 is still very much around, with the constant threat of new strains developing, while health systems continue to struggle to cope, although humanity's immunity has increased.

The structure of growth in Egypt is not pro-poor: Egyptian GDP grew at an annual average growth rate of 4.5% over the 2004-19 period, punctuated by periods of higher annual growth of 7% during 2005-08 and 5.4% during 2017-19. Egypt's growth performance was very much in line with its middle-income country peers⁵, but what stood out is that such growth did not significantly translate into per-capita income growth and did not improve socio-economic conditions for Egyptian households. Per-capita income growth averaged 2% over 2004-18, 2 percentage points below that of middle-income country peers. From 2010 to 2017, all the peer countries selected, except for Ukraine, experienced negative poverty-to-GDP growth elasticities, ranging from -1.0 in Sri Lanka to -4.0 in Malaysia (World Bank, Oct 2021). The combination of a non-inclusive growth strategy and continued high population and urbanization growth, contribute to this non-pro-poor Egyptian growth. Contributory factors include:

1. Labor productivity (growth in output per worker) is low at 2.5% per year, much lower than in peer countries. This low labor productivity is not surprising given that workers are moving to sectors such as private manufacturing, transport, and logistics, sectors with the largest gains in employment, but where productivity is declining or barely growing.
2. Capital accumulation is low and the share of private investment in total investment is small. Public investment in total investment is high, higher than in peer countries, at 60% in 2018, though this share dropped to 50% in 2019, because of an increase in private investments in new energy projects.
3. The Incremental Capital Output Ratio has been rising over time, which shows that investment has become less efficient.⁶
4. Domestic markets are small, segmented, and relatively closed. Although Egypt has recently lowered trade barriers, and has signed trade deals with the European Union, Turkey, and Arab countries, it still maintains relatively high trade barriers, which limit competition from foreign firms. Its average most-favored nation (MFN)⁷ tariff is 19%, the second highest in the world (after Sudan). The higher tariffs have also become more unpredictable in recent years (2016-21 approx.) and have benefited mainly wealthier producers/firms. In addition, there are structural and regulatory barriers to entry. In such markets, firm-level productivity growth is nearly stagnant. These firms are in the majority and cannot afford to pay high wages. Only the small number (fewer than in peer countries) of large formal firms are able to pay higher wages, and provide the stability and benefits which most employees seek. Formal and informal firms operate in segmented markets, which makes it virtually impossible for labor in informal markets to transition into the formal sector.

Impacting on the entire economy and constraining its productivity growth is the Egyptian state, which borrows heavily from the domestic financial sector, thus crowding out the private sector. Also, instead of being solely the actor that sets out and monitors the rules and regulations of the economic game,

5. The peer economies chosen by the World Bank are: Tunisia, Turkey, Morocco, and Jordan, all in the same North Africa-Middle East region; Poland and Ukraine in Europe; and much further afield in Asia: Pakistan, Sri Lanka, Vietnam, the Philippines, and Malaysia; and in Latin America, Peru and Mexico. (World Bank Group, Oct 2021).

6. A lower Incremental Capital Output Ratio (ICOR) is preferred as it indicates a country's production is more efficient as less additional capital is needed for any additional unit of output.

7. The MFN is the tariff imposed on imports of nations that do not have a trade agreement with the country in question, Egypt in this case.

the state plays potentially conflicting roles as business manager and shareholder on one hand, and as regulator on the other. Its regulatory regime is criticized for being opaque, bureaucratic, and discretionary, thus adding another layer of risk and uncertainty for business to deal with.

Poverty, vulnerability, nutrition, and health status of disadvantaged groups: Since 1980, average per-capita growth has been around 2% per year. With Egypt's high population growth rate, and with non-pro-poor growth even during the brief periods of higher growth, poverty rates have increased steadily from nearly 17% in 2000 to around 24% in 2010 (World Bank, 2015). By 2020, the national poverty rate approached 33%. With continued low labor participation and high rates of unemployment and informality, especially among women, young people⁸, and in Upper Egypt, vulnerability increased further. Between 2005-10, the annual income growth of the bottom 40% fell by 1.3%, while overall household income fell by even more: -1.7%. Under such widespread precarious economic conditions, and despite the GoE's ability to subsidize basic foods, the nutritional and health status of Egyptians is a cause for concern. Chronic poor nutrition contributes to these severe health problems. In terms of macronutrient deficiencies, one in five children under the age of five are classified as stunted,⁹ and one in ten is severely stunted. Wasting (low weight-for-height) has increased in recent decades. More than one in four children suffer from some degree of anemia—at 29%, with rural children—at 23%. Although Egypt has seen gains in maternal and childcare (MCH) in the last decade or so—maternal mortality has decreased by one third, from 100.0 to 66.0 per 100,000 live births, and under age five mortality by almost half, from nearly 50 to 22 infant deaths per 1000 live births—there are major disparities in rural, remote, and slum areas. Egypt has the highest prevalence of hepatitis C¹⁰ globally, with a prevalence rate of almost 15% among 15-59 years old. There is a rising burden of non-communicable diseases (NCD), with 72% of all mortality and morbidity in 2010 due to NCDs.¹¹ According to the Egyptian authorities,¹² (EgyptMAP-NCD, 2017), NCDs account for 85% of all deaths in Egypt; and cardiovascular diseases accounted for most NCD deaths (46%). There is also an increasing prevalence of substance abuse and mental health issues, especially among young people and women (World Bank, Jan 2015).

SECTION II: WATER AVAILABILITY IN A CLIMATE-CHANGE WORLD AND ITS MAJOR USER: AGRICULTURE

The Nile is the life blood of Egypt, especially in our age of climate change: This obvious fact is worth repeating as the fate of the Nile has profound implications for every aspect of life in Egypt. Water flow in the Nile is being impacted by climate change and possibly by the construction up-stream of the Grand Ethiopian Renaissance Dam (GERD)¹³ (Gobran, Oct 2022). Climate change is changing the temperatures, evapotranspiration, and precipitation in the Nile Basin. The Nile supplies about 97% of fresh water in Egypt. Agriculture is 99.8% irrigated and accounts for more than 80% of water demand. It contributed around 12% of GDP (2010-15), 11.8 % (2021) (WDI), but is said to have

8. Some 70% of the unemployed are between 15-29 years of age. The population growth rate dropped from 3.6% in 1980 to 1.9% in 2007, then rebounded to more than 2.5% in the 2010s (World Bank, 2015). Egypt is one of the most populous Arab countries with a population slightly above 100 million, with another 10 million living abroad.

9. Stunting results from chronic malnutrition that retards linear growth.

10. Hepatitis C is a viral infection that causes liver inflammation, sometimes leading to serious liver damage. The hepatitis C virus spreads through contaminated blood.

11. Among the leading causes of death from NCDs are: cardiovascular disease, diabetes, cancer, and chronic respiratory disease (Ahmed, Dec 2022).

12. The Egypt National Multisectoral Plan for Prevention and Control of Non-Communicable Diseases 2017-2021 (EgyptMAP-NCD) The report points out that "Common modifiable risk factors of NCDs are unhealthy diet, physical inactivity, tobacco and alcohol use, and exposure to environmental pollutants."

13. GERD was started July 2011 and completed July 2021. It costs US\$ 5 billion.

contributed to “more than 15 percent of GDP” during the pandemic, according to the Minister of Agriculture of Egypt (El-Din, May 2022). Global models recognized by the IPCC¹⁴ all predict higher temperatures, but show a wide range of precipitation changes. Even small changes in precipitation can dramatically affect water availability in Egypt. Thus, a 1 mm change in precipitation results in a roughly 3 billion cubic meter (BCM) change in the runoff at Lake Nasser. Estimates show a 50% increase in variability in rainfall by 2100 will inevitably impact Nile flow into Egypt. The change will result in more frequent droughts and high-flow years, and increase the frequency and intensity of flash flooding in the coastal areas of Egypt, putting more than 1.1 million people annually at risk. By mid-century, temperatures are expected to rise between 1.5° C and 3° C, with greater increases in the interior of Egypt and during the growing season. Temperatures in Egypt have already increased over the last 30 years by 0.53° C per decade. High temperatures and more heatwaves will accelerate crop transpiration, increase soil aridity, and raise water requirements for human consumption and agriculture. Evidence shows that temperature rises from 26° C to 31° C can lead to a 30% drop in labor productivity. Egypt is classified as ‘highly vulnerable’ to climate-change effects by the Notre-Dame Global Adaptation Index (ND-GAIN)¹⁵ (WBG, Nov 2022).

Climate change and rapid urbanization also threaten Egypt’s scarce arable land: The desert dominates Egypt and only around 4% of its vast land is arable. About 12-15% of Egypt’s most fertile arable land in the Nile delta is threatened by sea-level rise and salt-water intrusion. Sea-level rise already requires the building of a system of sand dykes along the shores of the Nile delta to hold back the sea during stormy weather, thus preventing the Mediterranean from swallowing these coastal areas¹⁶ (Farouk, March 2022). Arable land is also shrinking at the rate of roughly 2% per decade as desertification intensifies, especially around cities. The rate at which arable land is being lost accelerated between 2000 and 2015 because of urban expansion is concerning: an overall decrease of roughly 8.6% (43,000 ha) of arable land (WBG, Oct 2021). Egypt’s high population and urbanization growth rates are definitely increasing the stress on its scarce arable land and water resources.

Structure and performance of agriculture with focus on FSS crops: Egyptian agriculture¹⁷ is dualistic with the majority of small family farms in the delta and along the Nile, usually 2 feddans¹⁸ or less, and large, state-of-the art commercial farms on reclaimed lands.¹⁹ The incidence of small family farms is higher in Upper than in Lower Egypt. These small farms grow mainly field crops, e.g., cereals, legumes, sugar crops, oilseeds, and forage for livestock feed, and rear livestock. Cereals—wheat and rice—and sugar beet are subsidized and water-thirsty. Their marketing is guaranteed by the state as they are considered important for FSS. These field crops dominate the cropping pattern. Thus, total grains (wheat, maize, and rice) occupied nearly 43% of total cultivated area by 1975-79 and 46-48% by 2000-10. For sugar cane (and beet) and cotton, the numbers were 14% (1975-79) and 7% (2000-10), while horticulture occupied only 11% and 22% of the total respectively (El Sayed, 2021). The medium and large farms allocate most of their land to high-value horticultural crops, which are not price controlled and which generate major export earnings. Efficient use of land with irrigated water resources on smallholder farms is limited by several factors which include:

- i. The fragmentation of landholdings into very small plots, which makes it harder to exploit economies of scale as these smallholders get no assistance from cooperatives to exploit these economies;

14. IPCC: Intergovernmental Panel on Climate Change.

15. The ND-GAIN Index assesses a country’s vulnerability to climate change and capability to improve resilience.

16. Critics however warn that building dykes to protect the lowlands is not good enough. They will simply push the water to go elsewhere. The whole area needs to be protected, not just the lowlands. Protecting only the lowlands will turn them into small islands in the long term.

17. Total agricultural land in Egypt has grown over the years from 3, 291 m ha in 2000 to 3, 971 m ha in 2020. (Galal, Sept 2022 in *Statistica*).

18. 1 feddan = 0.42 ha; or 1 feddan = 1.04 acre.

19. From 1930 to 2015, land reclamation efforts yielded an additional 1.09 m ha (or 2.6 m feddans). In 2014, the Government of Abdel Fatah All Sisi announced plans to reclaim another 630,000 ha (or 1.5 m feddans) by 2030 (USDA, May 2016).

- ii. The use by smallholders of the traditional flood-irrigation system, which does not allow them to control the amount of water they use per plot or for different types of crops.
- iii. In the Nile Delta and valley, water pricing of irrigation water covers only operation and maintenance costs, with nothing for environmental externalities. Farmers do not pay for the volume of water they use. The GoE pays a large portion of the fixed cost of delivery. These factors result in an efficiency of water use as low as 50% according to Nin-Pratt and others (2018);
- iv. Dearth of market information for crops other than field crops, and weak inter-sectoral linkages between farm and off-farm opportunities, prevent farmers from responding to rising domestic demand in urban areas and from participating in export value chains. Smallholder associations do not exist to provide these services. Agricultural cooperatives focus only on agricultural inputs, mainly distributing subsidized fertilizer.

Egypt was more self-sufficient in basic staples in the 1960s. It was 70% self-sufficient in wheat. In the second half of the 1970s, Egypt imported more than 40% of its food consumption, of which about 78% was for wheat only. President Anwar Sadat expanded the food-subsidy program greatly from what it was under President Nasser.²⁰ By 1980/81, the budgetary cost had grown from 0.02% of total government expenditure to 14%. So, despite its FSS approach, which focuses on these water-thirsty field crops, in particular, wheat, Egypt has become one of the largest wheat importers in the world. Nevertheless, it continues to prioritize greater self-sufficiency in wheat and maize. The GoE has set a target of 81% self-sufficiency in wheat, and 92% in maize by 2030 (Tsakok and Mengoub, pp. 20-33, Nov 2020).

The impact of agricultural and trade policy, and the related institutional framework, on the agriculture–water nexus in Egypt: Agricultural policy is dominated by the FSS food policy of Egypt. Despite the Economic Reform and Structural Adjustment (ERSAP, 1982-1991), the policy structure and institutional framework since the early 1950s has promoted an underperforming agricultural sector with enormous wastage, not only in terms of foregone productivity and value added, but also in terms of continued rural poverty, and unsustainable use of scarce agricultural and water resources. From the 1950s to the mid-1960s, Egypt pursued an industry-first import-substituting strategy characterized by high tariffs and other non-tariff barriers, an overvalued exchange rate, and a strong urban bias. Arab socialism in the form of central planning prevailed during 1956-1966.²¹ During this period and well into the 1970s, agriculture was ‘taxed’ through extensive control of pricing and through marketing (forced procurement of a fixed quota) to transfer the agricultural surplus to non-agricultural sectors. The Nominal Rates of Assistance (NRAs)²² for the major import substitutes of wheat, maize, sugar, meat, and milk, were negative—ranging from minus 25% to minus 65%. Exports of cotton and rice were also ‘taxed’ (through price controls), but by less²³ (Cassing et al, Dec 2007). High-value fruits and vegetables, major exports, were not price controlled or taxed. Although the agricultural inputs of fertilizers, pesticides, and water were subsidized, agriculture did poorly under such a regime: it stagnated, yields fell, cropping patterns were distorted, and cotton exports declined. The poor performance of agriculture, the political

20. Anwar Sadat was president (Oct 1970–Oct 1981) following Nasser (June 1956–Sept 1970). Nasser had led the 1952 Egyptian Revolution and introduced far-reaching land reforms in 1953. Hosni Mubarak served as fourth president from Oct 1981 to Feb 2011.

21. The period of 1967-73 began and ended with wars. The two Arab-Israeli conflicts were the Six-Day War in 1967 and the Yom Kippur War in 1973.

22. A Nominal Rate of Assistance is defined as a price of a product in the domestic market less its price at the border, expressed as a % of the border price, and adjusted for transport costs and quality differences. A negative NRA means the producer is being taxed; a positive NRA, the producer is being subsidized.

23. These seven commodities (import substitutes and exports) constituted 70% of primary agriculture output (Cassing et al, 2007).

turmoil of two wars, and the oil price collapse of 1982, all contributed to make the macro situation increasingly difficult.

Reform of agricultural policies did not reduce water wastage. Reforms were in two phases. During the first phase (1986-90), there was liberalization in the form of partial or complete removal of price controls on ten main crops, reduction or removal of forced procurement for 'strategic' crops, reduced subsidies on farm inputs and removal of government monopoly on farm inputs, and expansion of the market for private investment. The second phase (1990-97) continued the liberalization at the macro and trade level. Public companies—state-owned agri-businesses—were privatized, the exchange rate became market-determined, there was some financial liberalization, and tariffs were reduced somewhat, though not for basic consumption items which are major users of water, especially sugar. These food crops are all of low commercial value (especially when compared to fruits and vegetables), but high in food self-sufficiency value. Such low value may get even lower according to some climate models that project average yields for food crops to decline by 10% (compared to the no-climate change scenario) by 2050, as a result of heat stress (4.9%), water stress (4.1%), and salinity (1.6%) (World Bank, Oct 2021).

Institutional disfunction: In addition to the above-noted structural features that contribute to water wastage by farmers, the multiplicity of institutions in the water sector, and their limited coordination with the agriculture sector, leads to further inefficiencies in the use and allocation of water. There are at present eight different agencies tasked with implementing climate-adaptation actions, each with its different timelines and priorities.

SECTION III: THE AGRICULTURE-FOOD-WATER NEXUS: KEY POLICY CONSIDERATIONS

The elusive quest for food self-sufficiency as food security: For over 50 years, Egypt has committed its scarce resources of irrigated land and water to making itself food self-sufficient in basic staples, in particular wheat, maize, and sugar. Instead of becoming more food self-sufficient, as measured by a reducing percentage of domestic consumption that has to be imported, it has become less food self-sufficient. Indeed, it is now the second largest wheat importer in the world. There is nothing wrong with trying to produce the maximum domestically, consistent with one's comparative advantage and mindful of the efficiency of use of one's scarce resources. But to do so, at such high and soon to be unsustainable costs, is not developmentally smart or strategic. Yet, successive GoEs continue to aim for higher FSS ratios, and continue to devote substantial budgetary resources to maintaining food subsidies. The likelihood is that, even if the GoE were to conclude on the basis of past experience that its quest for food self-sufficiency is unlikely to succeed, it may not stop its food subsidies, especially for wheat flour and bread. Bread subsidies have become a key component of the social contract between the government and the people of Egypt: a component deemed essential for maintaining social stability.

Powerful forces requiring a re-think on how to achieve food security: As discussed above, the GoE must confront several seemingly inexorable/powerful forces which will continue to make achievement of FSS even more costly and soon non-viable. At the global and economy-wide level are: (i) climate change with its projections of warmer temperatures, which are likely to reduce yields and biodiversity, increase the variability and unpredictability of precipitation, with more frequent and more life-threatening droughts and floods; (ii) increasing geopolitical tensions which may require the GoE to re-think its agriculture-food trade strategy and the risk management instruments it uses; (iii) continued high population and urbanization growth; and (iv) constrained fiscal space, especially after having to allocate so much for pandemic-support measures. At sector and micro

levels, cropping patterns and farming practices are wasteful of water, and deficiencies in storage and marketing infrastructure contribute to substantial food losses along the supply value chains, but fail to connect smallholders to lucrative urban markets. Furthermore, the lack of coordination in the missions and operations of multiple national and sector-level institutions, which impact on both agriculture and water, contribute to wastage of water. Finally, the completion of the Grand Ethiopian Renaissance Dam (2017) on the Blue Nile, Ethiopia, may or may not constitute a threat to the Nile flows into Egypt.

Egypt's food security policy at crossroads—key policy considerations: Increasing water scarcity and unpredictability, in the context of climate change in an already water-constrained Egypt,²⁴ threatens all four dimensions of food security—availability, access, utilization, and stability. Egypt's FSS goal is anchored in a one-dimensional approach to solving a multidimensional/holistic problem that impacts supply and demand, public and private, and the short and long terms. The FSS approach cannot address the complex nature of the many interlinked factors that jointly promote or undermine food security. Addressing these inter-linked factors, raises the following key sets of policy considerations, which impact on:

Availability—adequacy of supply

Supply is domestic production and substantial food imports.

- In the short to medium term (1-5 years), how to reduce the inefficiencies in cultivated land and water use in the production of wheat and other basic field crops, and how to reduce losses along their domestic supply chains?
- As climate change threatens valuable irrigated land through sea-level rise and salt-water intrusion, and given tight fiscal resources, what infrastructure must Egypt invest in to protect the people and their livelihoods, as well as its coastal lands and urban areas, in the coming decades?
- In the short to longer terms, what changes in agricultural policy should the GOE make to assist smallholders to mitigate the impact of, and to better adapt to, the exigencies of climate change?
- In the short and longer terms, how to improve the water allocation system, as well as on-farm irrigation efficiency, along the entire irrigation and drainage system?
- In the short to longer terms, what measures should be prioritized, to reduce the growth in demand by controlling population growth (e.g., family planning and education services) and improving the healthcare system, especially for the poor and vulnerable?

Access and stability—purchasing power of the poor and vulnerable

Access is primarily a function of consumer purchasing power and affordability through price stability (or lack thereof), and food subsidies.

- In the short and longer terms, what should Egypt do to promote pro-poor growth in income and employment?

24. Water availability per person/per year in Egypt was 570 m³ in 2018. It has not yet reached the extreme water scarcity threshold of 500 m³ per person/per year. If available water resources remain constant, and population grows along trend lines, then Egypt will reach the extreme scarcity threshold by 2033. (World Bank, Oct 2021)

- In the short to longer terms, what combination of subsidies and/or cash transfer programs (e.g., Takaful and Karama in Upper Egypt) are the most targeted, cost-effective, and financially and socially sustainable?

Utilization—nutritional adequacy

There is a synergistic interaction between proper nutrition and proper health. Calorie-dense subsidized foods need to be supplemented by protein-dense foods, which in turn requires at least sufficient income (need for inclusive growth discussed above). Proper health in turn requires proper healthcare. Egypt spends around 5.1% of GDP on healthcare, which includes private out-of-pocket expenditure, with a low government contribution—one of the lowest ratios of public health to total expenditure in the region, at around 21% (World Bank, Nov 2015). The GoE is committed to increase its contribution.

Egypt's Constitution of Jan 2014 enshrines the 'Right to Health', which ensures that *"every citizen is entitled to health and to comprehensive healthcare with quality criteria. The state guarantees to maintain and support public health facilities that provide health services to the people, and work on enhancing their efficiency and their fair geographical distribution."* The state commits itself to spending at least 3% of GDP on healthcare, which would mean doubling its allocation of 2015. The twin goals for Egypt's Universal Health coverage are: (1) all Egyptians have access to family healthcare services by 2030; and (2) all Egyptians have mandatory social health insurance by 2030. The Universal Health Insurance (UHI) plan was launched in 2018, and the GOE plans to cover all governorates by 2032 (Ahmed, Dec 2022).

How should policymakers move forward to implement a health system that fulfills the promise of Egypt's Constitution of 2014, and in so doing, ensure that the currently fragmented and disparate healthcare system is transformed over the short to longer term into one that delivers social justice? ²⁵ (World Bank, Jan 2015)

CONCLUSION

Egypt's experience shows both the value and the limitations of its FSS approach to food security. After over 50 years of its FSS approach, Egypt has benefitted from the social stability it has 'bought'²⁶, but can it continue to afford the high costs of FSS in terms foregone production, productivity, and income growth? After distorting its land and water resources to produce low value but 'strategic' crops, Egypt is less FSS today than when it started on this long journey. The nutritional and health status of millions of its people are problematic. Increasing water scarcity and unpredictability projected under climate change are creating a crisis for Egypt, an already water-constrained country: Egypt has to restructure its entire food security and development model. Egypt already undertook critical macro-economic reforms in 2016, but much more is needed. Though battered by COVID-19, and fiscally constrained like so many developing countries, this crisis is also an opportunity to develop a new roadmap and find a just transition to achieve the four dimensions of food security.

25. Social justice in health has three main components: (1) improve the health of disadvantaged groups; (2) Increase financial protection for disadvantaged groups; and (3) improve the quality of health care delivery. (World Bank, Jan 2015)

26. Social stability is essential for the functioning of society, in particular, because Egypt is located in one of the most turbulent, and conflict-ridden regions of the world.

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