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Green Recovery and Balancing Between Paradoxes: The Egyptian Holistic Approach to Promote Food Security and Tackle Related Challenges

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Introduction

Food security in Egypt is under threat due to many domestic and external challenges, such as climate change, water scarcity, global instability and disruption of supply chains, especially during the Russian-Ukrainian crisis, and the economic deficit and need for reforms, particularly in the post-COVID era. This threat is expected to worsen in the near and distant future.

Due to these crises and their cross-cutting repercussions, it has become increasingly necessary to adapt to these challenges in order to guarantee the stability of food security, regardless of any threats, particularly for the poor and vulnerable groups, bearing in mind that they are the worst affected by domestic and external challenges. In other words, the poor and marginalised are most affected by the repercussions of several predicaments, such as climate change, economic crisis, wars, pandemics, and so on, as these groups are more vulnerable to so much suffering, such as poverty and hunger, especially given the lack of social protection.

Thus, Egypt has planned to adopt a holistic developmental approach to promote food security as a part of human development and social justice, overcome these multidimensional troubles, and make sure that no one is left behind, as well as balancing between paradoxes in this regard by promoting socioeconomic and environmental goals. The green recovery approach could be the right one to achieve all these objectives, as these policies provide a framework for attaining inclusive and sustainable development, promoting human rights, protecting the environment, and tackling climate change.

Nonetheless, these objectives and strategies are challenged because of a number of constraints, such as water scarcity, climate change and economic deficit. Thus, the gap between strategic objectives and the situation on the ground expands.

Furthermore, disregarding food security could lead to severe threats to national security. In this regard, mention could be made of *The Economist's* estimations based on a statistical model. Egypt is threatened with a new wave of turmoil if food insecurity worsens. From that point of view, food insecurity was one of the triggers for the outbreak of the Arab Spring in 2011.

Based on the foregoing, the current policy paper aims to examine the following research question: how could green recovery policies contribute to improving food security and social justice, and address socioeconomic and environmental challenges in Egypt? To what extent is there a gap between objectives and practices? And how can this gap be bridged?

Objectives and added value of the paper

This policy paper aims to illustrate the food security issue in Egypt in order to present alternative solutions to address that challenge by promoting self-sufficiency, food sovereignty, rural development, sustainable agricultural policies, and inclusive development; and all under the umbrella of green recovery policies, funds and investments, alongside SDGs policies and strategies.

It targets tackling the gaps between strategic objectives and the situation on the ground concerning food security and inclusive and sustainable development policies in order to address the related socioeconomic and environmental challenges.

Therein lies the importance of the policy paper, bearing in mind that Egypt is one

of the vulnerable countries in terms of food security, as it depends heavily on importing food to fill the food security gap, which is more than 50% of Egyptian food needs. Furthermore, the food insecurity situation in Egypt has deteriorated, especially since the escalation of the Russian-Ukrainian war, as it imports more than 85% of its wheat needs from Russia and Ukraine, according to 2021 data (World Bank, 2022a).

Methodology

The paper has analysed the Egyptian context through the related variables, using secondary data collected from global and national datasets. It includes a descriptive analysis of the Egyptian context, as well of the relationship between food security, and socioeconomic and environmental variables.

To analyse the dilemma of food security and related issues, it is important to distinguish between some intertwined concepts, such as food security, food sovereignty and food self-sufficiency, bearing in mind that some of these terms are debatable. Thus, they have been mentioned briefly. According to the Food and Agriculture Organization (FAO, 2023), food security refers to the sustainability of access to sufficient, safe and nutritious food needed to provide an active and healthy life for all people all the time. It focuses mainly on the linkage between development, security and human rights, and consists of four dimensions: food availability, food access, utilisation, and stability (Gordillo, 2013; FAO, 2006). While food sovereignty is a wider concept that goes beyond food security, it refers to the dominance of modern states to determine their own food policies. It depends on six main pillars: placing food needs at the centre of policy; sustaining food production; localising food systems; empowering local actors; promoting knowledge and skills; and caring about the environment (FAO, 2014b; Gordillo, 2013). On the other hand, food self-sufficiency focuses on the extent to which a country could provide the needed food depending on its own domestic production, including the balance between food imports and exports. According to some definitions, food self-sufficiency is measured by the ratio of food produced to cover the calories needed to provide an adequate daily diet (Clapp, 2017).

Moreover, the paper has studied the literature review about the main variables, and has shed light on the related global experience, whether successes or failures, to extract lessons from these experiences in order to present policy recommendations about the Egyptian case study.

The intertwined relationship between climate change, food security, and overcoming other relevant challenges

Theoretical perspective

The literature has made clear that tackling hunger is one of the most difficult current challenges globally, so the Sustainable Development Goals (SGDs) have ranked it as the second goal in order to reach zero hunger level by 2030. Accordingly, combating hunger requires adopting a collective approach to sustainability in order to achieve food security by promoting durability of rare resources and stretching them to fill the widening gaps resulting from the urgent demands and declining resources over time (The Global Goals, n.d.).

Food security is considered a national security issue correlated to state sovereignty. In particular, in the current situation, food is like a weapon for those whose food security is vulnerable to external factors due to their heavy dependence on exports to bridge food gaps. It has therefore become necessary for each country to work on promoting food security through agriculture to achieve food self-sufficiency. By achieving food sovereignty, a country can reduce its vulnerability to external factors that could threaten its food security.

Nonetheless, working on promoting food security and food sovereignty could exacerbate climate dilemmas related to food production and agriculture and their negative impacts on the environment, such as pollution and draining resources, given that agriculture is a major contributor to emissions and loss of biodiversity. According to the FAO, agriculture was responsible for 9.3 billion tonnes of CO_2eq globally in 2018, while crop and livestock activities were responsible for 5.3 billion tonnes of CO_2eq in the same year (FAO, 2018).

Consequently, the dilemma of food production escalates under climate change, as agriculture itself can cause climate deterioration, and worsen matters due to economic difficulties. Thus, promoting food security is threatened as a result of the impacts of climate change on agriculture, such as desertification, water scarcity, and soil erosion. Therefore, the gap between sustaining food production and environmental protection must be bridged (Lazzat et al., 2014).

In addition, the implications of food production and agriculture on climate change could lead to the deterioration of social justice, inequality and food security, due to poor adaptation and the dark side of climate mitigation and adaptation policies, especially for farmers, the poor, and all vulnerable groups who find it very difficult to face climate change, as misapplication of climate policies could increase their vulnerability instead of reducing it. Meanwhile, in developing economies, vulnerable and poorer groups like farmers suffer from a lack of protection and resilience to climate change together with an absence of climate insurance measures (Asare-Nuamah et al., 2021; Schipper, 2020).

In such circumstances, alternative policies are needed in order to enhance mitigation and adaptation, and avoid maladaptation, promoting food security, sustaining food, and modifying food production without neglecting the socioeconomic perspectives. Green policies could provide an approach to tackle all these challenges and paradoxes and balance between social, economic and environmental aspects; this could be achieved by adopting climate-smart agriculture (CSA) and other related mechanisms, such as climate insurance in agriculture. But green policies require careful consideration to avoid their socioeconomic implications on vulnerable groups (Raworth et al., 2014).

On the other hand, the transformation of food production systems to become more just and ecologically sustainable could increase concerns about human rights while working on adopting inclusive policies to make sure that no one is left behind regarding food production or consumption. In order to avoid these troubles, coordination between agriculture and food systems must be enhanced to promote governance and food sovereignty (Gonzalez, 2012).

Hence the importance of promoting rural development in order to enhance food

sovereignty and sustain food production in addition to improving quality of life and achieving social justice, especially for rural inhabitants (Pachón-Ariza, 2013). In other words, green recovery policies could help to increase economic growth and achieve environmental goals in the long run, but it could harm small-scale farmers who are considered vulnerable, as their food security could be threatened at either supply or demand levels. Therefore, it is important to promote social justice together with rural development and smart agriculture techniques in order to tackle this nexus (Longo, 2016). With that in mind, small-scale farmers suffer from poverty, food insecurity and vulnerability to climate change because of the lack of access to technical or financial aid to enhance their ability to adapt to climate-resilient agriculture (Harvey et al., 2018).

According to McKinsey's estimations, small-scale farmers were responsible for 32% of global greenhouse gas (GHG) emissions resulting from agriculture globally. So it is necessary to consider them while tackling the dilemma of climate change, food security and social justice (Frost et al., 2023).

According to the International Fund for Agricultural (IFAD), small-scale farmers would not be left behind by adopting a holistic approach to promote SDGs, as this approach could focus on their role in producing food and sustaining natural resources and the environment. A range of support and funds for small-scale farmers is needed to tackle food insecurity and climate change, which could eventually lead to promoting sustainable agricultural systems in addition to reducing poverty in these vulnerable groups. To achieve these objectives, it is vital to provide some services for small-scale farmers, such as fertile soil, freshwater, pollination and pests, in order to enhance their food production practices. In turn, small-scale farmers need to enhance their practices to reduce their contribution to the deterioration of the environment and resources, as in certain conditions and due to poverty these farmers could cause many problems to increase their production. This confirms the importance of promoting rural development and combating poverty among these groups for the sake of the economy, society and the environment (IFAD, 2013).

Furthermore, COVID-19 has shed light on the importance of combining climate action plans with green recovery and the importance of transforming food production systems to increase their resilience to climate shocks to guarantee the sustainability of these systems in the future, especially in the more vulnerable countries and climate-sensitive agriculture. Thus, the United Nations Development Programme (UNDP) has adopted Scaling up Climate Ambition on Land Use and Agriculture (SCALA) in cooperation with the FAO to help 12 developing countries to enhance climate action in land use and agriculture (UNDP, n.d.). Moreover, the FAO has launched the COVID-19 Response and Recovery Programme designed to prevent a global food emergency in the post-COVID era, as the pandemic's lockdown has worsened malnutrition and hunger as a result of disturbed food availability. This programme has targeted the achievement of the sustainable transformation of food systems to avoid any future crises (FAO, n.d.).

Tackling the dilemma of climate change and food security, and overcoming other relevant challenges

In order to illustrate the nexus between the main variables mentioned above in the theoretical framework from a realistic perspective, this could be achieved by tackling a group of failures and successes in

dealing with the dilemma of social justice, food security, and socioeconomic and environmental challenges.

There is a noticeable global shift from climate actions in agricultural strategies and food systems towards CSA[1] and sustainable and circular bioeconomy. During COP-27, the FAO shed light on the benefits of bioeconomy in making agrifood systems compatible with climate goals (Gomez San Juan et al., 2022). Even the World Bank adopted that transformation through the climate change action plan. According to this action plan, a number of economies have adopted CSA policies, such as India, Pakistan and Bangladesh (World Bank et al., 2016). The Indian case study is discussed further below.

India is one of the most populated countries in the world and that overpopulation raises the threat of hunger and food insecurity in addition to the negative implications of climate change. Thus, India has adopted agroecological farming[2] practices in order to guarantee the sustainability of food in the future by promoting the nexus between food, health and climate. This could be achieved by working on enhancing traditional agricultural practices to tackle hunger and climate change (Tripathy, 2019) Moreover, policies should be adopted that focus on rural development and the role of smallholder agriculture in order to sustain food production, tackle hunger and poverty, and promote social justice (Saxena, 2011).

Another example is New Zealand, which has sought to tackle climate change together with food insecurity by adopting CSA policies and intensification of food production strategies on the national level (McCusker et al., 2014). To do so, it has stopped agricultural subsidies while increasing the role of the private sector in investing in R&D (Negra et al., 2014). Moreover, New Zealand has planned to impose taxes on agricultural emissions in 2025 in order to make food production match climate goals (Frangoul, 10/12/2022). Despite all these policies and strategies, these transformations could create many challenges for social justice and wellbeing, especially for vulnerable groups including farmers (Rowarth and Entine, 2022).

Surprisingly, a country like Sri Lanka has taken another approach to tackle this nexus by adopting policies of transformation towards organic farming and banning fertilisers in food production. Unfortunately, these strategies have led to a threat to food security domestically as well as causing an economic crisis and domestic turmoil due to the disruption of the sustainability of food production in addition to the decline of living standards and increased poverty and inequality (Guzman, 2022). Consequently, about 30% of

[1] According to the FAO, CSA refers to that agricultural system approach which responds to climate change by reducing emissions in addition to targeting the sustainability of food production. This approach could lead to a surplus in food productivity, a poverty reduction, especially for vulnerable rural groups and small-scale farmers, and tackling climate change. This approach does not consist of a set of practices but has some major elements, such as ecosystem and landscape management, to promote food security, agricultural development, climate goals, providing services for farmers to enhance their climate risks response, and changes in the food system, including supply and demand sides, and so on. More information about CSA is available at the following link: Climate-Smart Agriculture, FAO, https://www.fao.org/climate-smart-agriculture/overview/en/

[2] According to the FAO, agroecological farming refers to that holistic approach aimed at promoting sustainable agriculture and food systems by focusing on the nexus between the environment and food systems. In addition, it considers the socio-cultural, ecological, technological, political and economic aspects of food systems throughout these chains, from production to consumption. For more information, see: Agroecology Knowledge Hub, FAO, retrieved from: https://www.fao.org/agroecology/overview/en/

Sri Lankan people have been threatened with food insecurity, according to FAO estimations (FAO, 2022c).

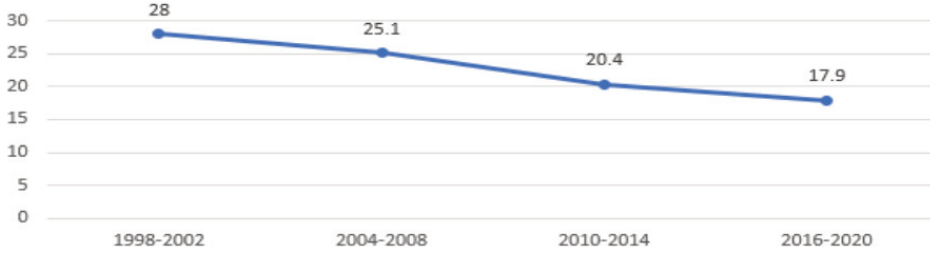
In short, good practices require a cautious adoption of policies and strategies, without neglecting the possible negative impacts that could result from maladaptation and misreading of the contextual features.

Egypt within the global context concerning the dilemma of climate change, food security, and overcoming relevant challenges

The current situation sounds the alarms about the growing threats of food insecurity globally. According to the global hunger index, food insecurity has soared globally as a result of stalled efforts to combat hunger within the context of the escalation of wars, armed conflicts, the recessionary situation of the global economy, especially since the COVID-19 pandemic, and the catastrophic impacts of climate change on food security. In this context, reaching the target of combating hunger has slowed down over time, making it difficult to reach the zero hunger goal (SDG2) by 2030 globally. This is illustrated in Figure 1, which shows the slight drop in hunger rates globally due to the complex challenges that have led to slow progress in the global fight against hunger and malnutrition.

In addition, the number of people who are threatened by food insecurity has risen up to 193 million across 53 countries, according to FAO estimations in 2022; and according to the World Food Programme (WFP), about 345 million people are threatened by food insecurity, and more than 828 million people currently suffer from hunger every night globally (Georgieva et al., 2022a).

Figure 1. Global Hunger Index Scores.



Source: Global Hunger Index, 2021. Global, Regional and National Trends.

A severe deterioration in food security is expected globally due to the Russian-Ukrainian war, as it has caused a surge in food, energy and fertiliser prices, together with the implications for the food supply chains globally, as both countries contribute mainly to food production, especially grain and fertiliser. Consequently, food availability locally has become increasingly difficult, bearing in mind that most countries depend on imports to fill food insecurity gaps resulting from the lack of local food production, together with the negative impacts on local production and farmers' profitability. Thus, under these conditions, food

security is more vulnerable to external changes (FAO, 2022a).

Furthermore, the escalation of the economic shocks has affected food insecurity globally as rising inflation has led to a surge in food prices, which could not be afforded by consumers, and put more burdens on government budgets due to rising costs of food imports and of providing more subsidies for these vulnerable groups to help them overcome hunger and promote social justice in these hard times. Hence, this catastrophic situation is expected to continue in 2023 (World Bank, 2022b; FAO, 2022b).

Meanwhile, the climate change crisis reached unprecedented levels in 2022, causing severe food security hazards globally due to damaged crops as a result of global warming, droughts, floods, and so on. In this extreme climate, it is difficult to guarantee sustainability of food production, availability, and affordability of food costs due to the deterioration in irrigation, water resources, agriculture, and soil. Researchers have indicated that summer 2022 was unprecedentedly hot and accompanied by severe heatwaves and wildfires as a result of climate change, and stronger and more frequent summer droughts are expected in the future (Hodgson, 2022).

In summary, the current challenges make it hard to reach the goal of zero hunger globally by 2030. In such a context of climate change, economic crisis, polarisation and armed conflicts, it is difficult to address food insecurity, achieve the SDGs, and promote the wellbeing of all humans. The situation in Egypt is deeply affected by the global deterioration of food insecurity, as illustrated in the following section.

Food security in Egypt

Food security in Egypt is highly vulnerable and threatened by many factors, with climate change foremost among them, bearing in mind that the country suffers from resource shortages for food security and food production, in particular water and soil for many reasons, in addition to climate change.

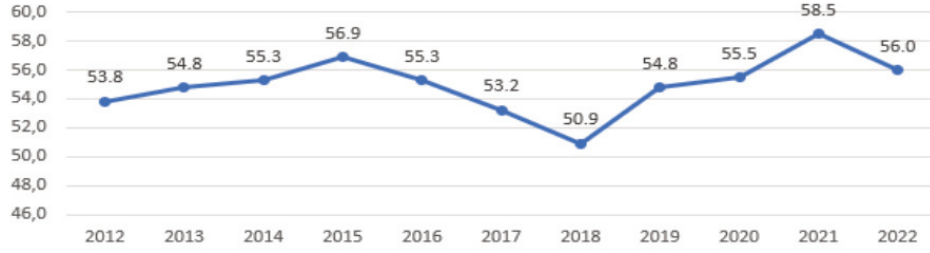
Egypt is one of the countries threatened by water scarcity. According to the United Nations International Children's Emergency Fund (UNICEF), Egypt suffers from an annual water deficit estimated at 7 billion cubic metres (UNICEF, 2022). Moreover, it could run out of water by 2025, as Egypt depends on the River Nile to provide more than 90% of its water needs.[3] Limitation of soil is another challenge for food security in Egypt, as the agricultural lands are threatened to decline by 30% of their total areas in the Nile Delta by 2030 (UNFCCC, 2022).

According to the Global Food Security Index (GFSI),[4] Egypt was ranked 77th out of 113 countries in 2022, with an overall score of 56, a decline of 2.5 times compared to the previous years as it has dropped by six ranks. Figure 2 illustrates the food security trend in Egypt during the period 2012-2022. The lowest value was in 2018, followed by a relative increase, and then another decline in 2022.

[3] In addition to the impacts of climate change on water security in Egypt, it is also threatened by other aspects, such as the Great Ethiopian Renascence Dam (GERD), demographic growth, the lack of other sources of fresh water, etc. (Cohen, 2021).

[4] This is an annual index that captures year-on-year changes in structural factors impacting food security across 113 countries, by focusing on four main issues: affordability, availability, quality and safety, and sustainability and adaptation.

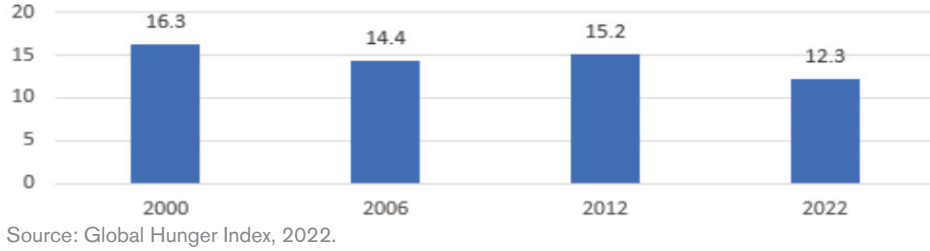
Figure 2. Food Security Environment.



Source: Global Food Security Index. 2022. *The Economist.*

According to the Global Hunger Index (GHI)[5], Egypt was ranked 57th globally out of 116 countries in 2022 (Global Hunger Index, 2022a), and was categorised as moderate to severe. Egypt still suffers from malnutrition in addition to the vulnerability in food affordability, quality and safety because of the heavy dependence on imports to bridge the food insecurity gap domestically. Figure 3 illustrates the progress in the hunger situation from 2000 to 2021 (Grebmer et al., 2021).

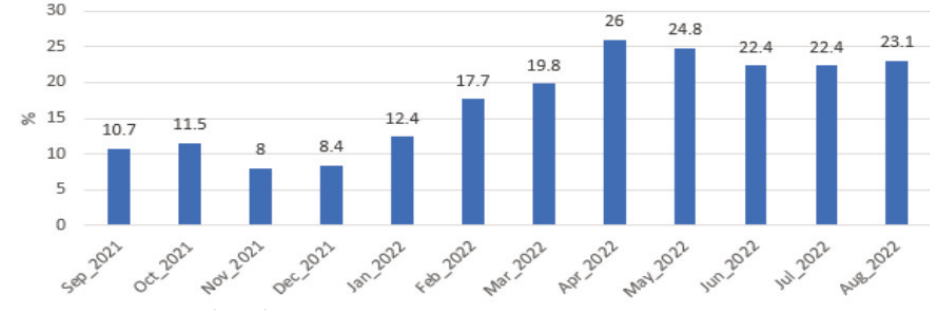
Figure 3. Hunger Index Scores in Egypt.



Source: Global Hunger Index, 2022.

Accordingly, food inflation rates have increased since early 2022, with an unprecedented spike since April 2022, as shown in Figure 4.

Figure 4. Percent Change in Food Inflation in Egypt from September 2021 to August 2022 (Year on Year).



Source: World Bank (2022): Food Security Update. Available online at https://thedocs.worldbank.org/en/doc/40ebbf38f5a6b68bfc11e5273e1405d4-0090012022/related/Food-Security-Update-LXX-September-29-2022.pdf

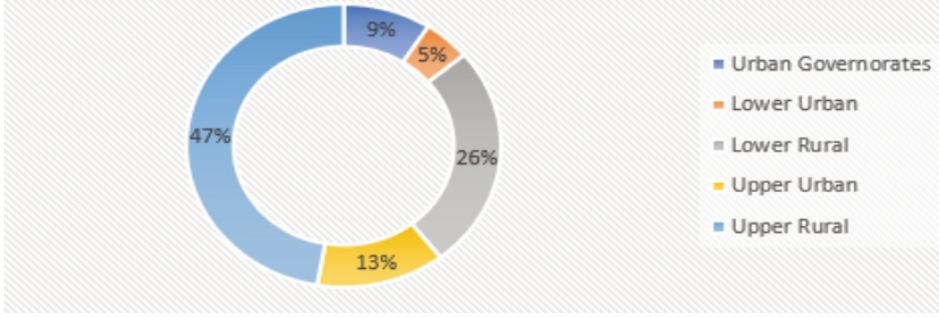
[5] This is an annual report that measures and tracks hunger at global, regional and national levels, reflecting multiple dimensions of hunger over time.

By looking at the national data concerning food security indicators, it is important to note that food security in Egypt is vulnerable to external factors as Egypt imports over 50% of its food needs (Fayyad, 2022).

Moreover, the poor in Egypt are centralised in rural areas, according to official data, as illustrated in Figure 5.

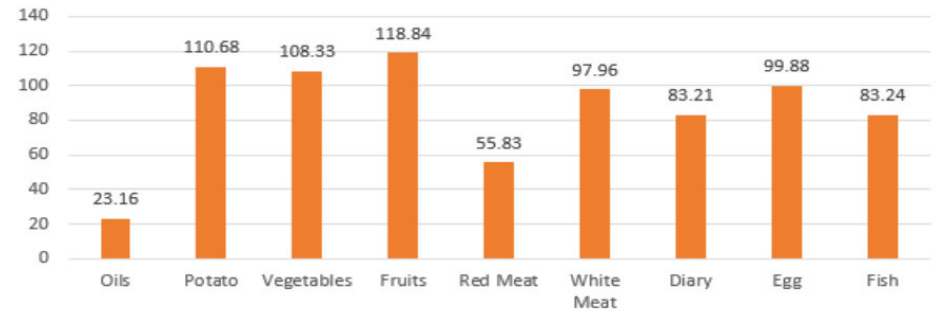
Figure 6 shows vulnerability to food security due to lack of food self-sufficiency in a

Figure 5. Poverty Rate in Egypt's Regions 2019/2020.



Source: CAPMAS, Income and Spending Report, 2022.

Figure 6. Percentage of Food Self-Sufficiency In Egypt in 2020 for some of Foodstuffs.



Source: Fayyad (2022): ālfḥw ā ālġḏā ī y ā wsbl tʿzyz āl î mn ālġḏā ī y fy mṣr. In AL Mallaf Al Masry (93), pp. 5-19.

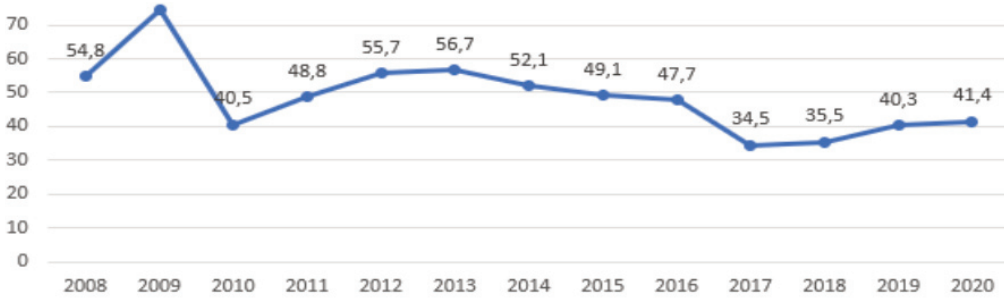
number of foodstuffs. Some foods are in surplus, such as fruits, vegetables, eggs and potatoes, while others are in deficit, such as oil and red meat (Fayyad, 2022).

Figure 7 shows that self-sufficiency in wheat, a basic foodstuff, declined between 2009 and 2020, starting at 74.4% in 2009 and ending at 41.4% in 2020 (CAPMAS, 2022a).

In addition, cereals per capita saw a gradual decline between 2008 and 2022, as shown in Figure 8 (CAPMAS, 2022a).

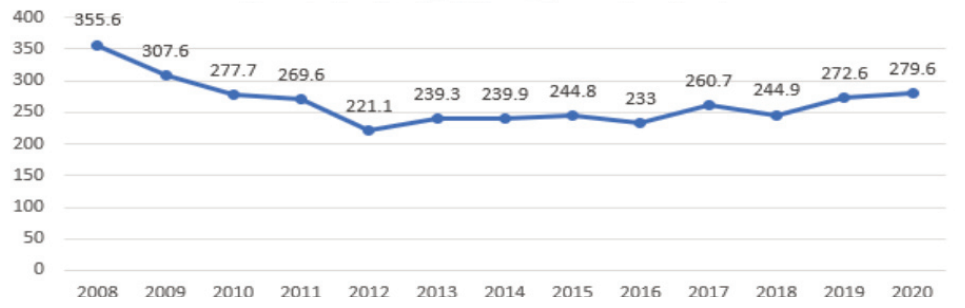
Moreover, the cost and affordability of a healthy diet is another challenge in Egypt, which is illustrated in the following figures. The cost of a healthy diet was close to the global level, but the percentage of people unable to afford a healthy diet was higher than the global and North Africa levels: the number of people unable to afford a healthy diet in Egypt was 74.6 million in 2020, as illustrated in Figure 9. Figure 10 also shows that this cost declined steadily in 2020 to below global level.

Figure 7. Percentage of Self Sufficiency of Wheat in Egypt.



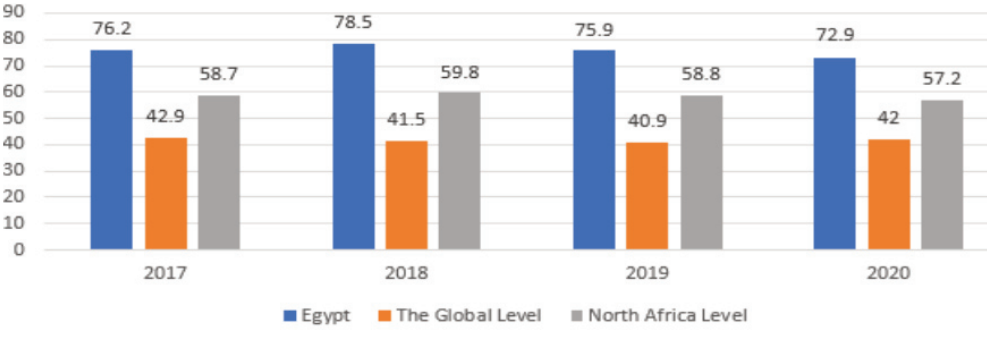
Source: CAPMAS, data about food security, 2022.

Figure 8. Cereals Per Capita (KG per Person in a Year).



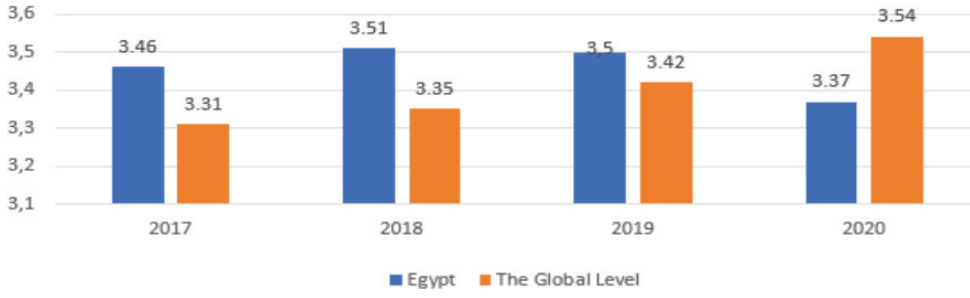
Source: CAPMAS (2022), data about food security.

Figure 9. Percent of People Unable to Afford A Healthy Diet.



Source: Food Security Index, 2020.

Figure 10. The Cost of a Healthy Diet (USD Per Person Per Day).



Source: Food Security Index, 2020.

In summary, the current situation in Egypt shows that Egyptian food security is vulnerable to many factors. Hence, it is important to work on promoting food sovereignty domestically. To do so, it is necessary to tackle challenges related to the Egyptian context, such as the problems that small-scale farmers face to get access to land, water, and infrastructure (Bush, 2023).

The Egyptian approach to address the dilemma of climate change, food security, and other relevant challenges

This section analyses the key determinants and principles concerning Egyptian policies aimed at tackling these interconnected challenges in order to define the current policies and weak points that require further actions.

The key drivers of Egyptian policies concerning the dilemma of climate change, food security, and other relevant challenges

The way Egypt addresses these problems is based on specific factors, and it's grounded in their view of human rights. In Egypt, human rights are primarily focused on improving people's economic and social conditions while also developing the country's citizens.

Besides seeking to promote the SDGs, the Egyptian Constitution states in Article 79: "Every citizen has the right to adequate and healthy food and clean water. The state is committed to provide food for all citizens, and ensure the sustainability of food sovereignty, in addition to maintaining agro-ecology diversity and local planet species to safeguard the rights of all generations" (dstwr mṣr ālṣādr ʿām, 2014).

In addition, these principles have been reflected in both domestic and foreign policies. In domestic policies, Egypt has adopted social policies and rural development goals in order to guarantee food sustainability and affordability, raise well-being, improve living standards, and tackle challenges facing farmers in rural areas (El-Nour, 2017). For instance, Hayah Karima's presidential initiative has launched a number of projects to solve the dilemma of the nexus between socioeconomic and environmental aspects (SIS, 2022). Meanwhile, Egyptian foreign policy seeks to promote food sovereignty and reduce the catastrophic impacts of disruption of supply chains.

Egyptian policies and strategies

Egypt has adopted a wide range of policies and strategies in order to tackle food security dilemmas, climate change and socioeconomic challenges, in addition to achieving the goals and objectives mentioned above.

a. Mega national projects

According to the Egyptian Presidency, a number of mega national projects were launched between 2015 and 2022 in the agriculture and food production fields to achieve food self-sufficiency, sustainability of food and resources, tackling environmental burdens, increasing exports, and promoting food security, such as the "Future of Egypt" project for sustainable agriculture, the Greenhouse Project at the Mohamed Naguib Base, the 1640 Agricultural Feddans Project, the 100,000 Greenhouses Project, and so on[6] (The Arab Republic of Egypt Presidency, 2022a).

Regarding the "Future of Egypt" project for sustainable agriculture, its total cost is around 8 billion L.E., and it aims to achieve a surplus in food production by adopting advanced techniques. Furthermore, the project has socioeconomic objectives, such as reducing unemployment rates, increasing economic growth, and achieving sustainable development (The Arab Republic of Egypt Presidency, 2022b).

In addition, Egypt has a distinctive vision to promote rural development, such as the "Haya Karima" (Decent Life) mega project. The main objectives of this initiative is to improve living standards, especially in the rural and periphery areas, promote inclusive development for all citizens, eliminate poverty, bridge the developmental gaps in villages, and achieve the socioeconomic and environmental goals in these targeted areas (Haya Karima, 2022).

b. Social justice policies

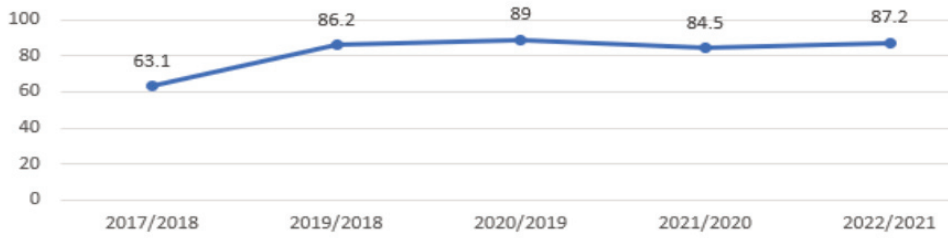
On the other hand, the Egyptian government has a significant vision of social justice and widening social safety nets through different types of subsidies and support for eligible needy groups. The "Takaful and Karama" (Solidarity and Dignity) cash transfer programme provides social protection for millions of beneficiaries to help households survive poverty, afford food and other basic needs, and enhance their living conditions to enjoy decent and healthy lives (World Bank, 2018). One of the main results of this programme is that it has helped households to overcome the crisis and afford food consumption (El Enbaby et al., 2022).

In addition, the Egyptian government provides different types of food subsidies for needy households to help them afford food prices, such as providing financial subsidies for some basic foodstuffs. Figure 11 shows the change rates in the subsidies of basic food goods in Egypt, which has steadily increased and reached 87.2 million L.E in 2021/ 2022 (CAPMAS, 2022a).

Moreover, the Egyptian government provides ration cards for all households throughout the region. Figure 12 illustrates the percentage of ration card coverage by geographic regions in Egypt in 2019/2020, and it is obvious that all regions are covered by this subsidies programme in order to achieve social justice, especially for needy and vulnerable groups (CAPMAS, 2022c).

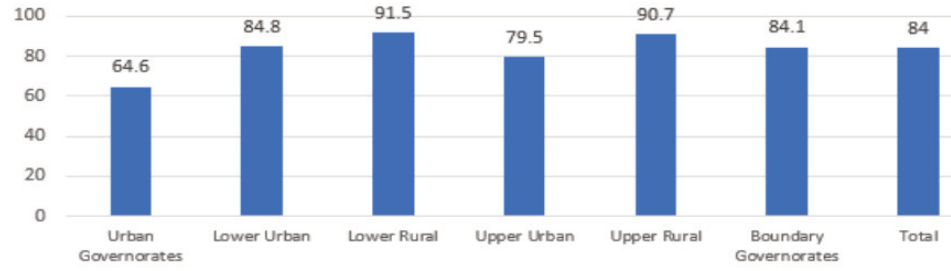
[6] For more details on the aims of these projects, see National Projects - "Agriculture", The Arab Republic of Egypt Presidency, https://bit.ly/3MaFOKG

Figure 11. Subsidies for Basic Food Goods in Egypt (million LE).



Source: CAPMAS, data about food security, 2022.

Figure 12. Percentage of Ration Cards Coverage by Geographic Regions in Egypt in 2019/2020.



Source: CAPMAS, 2, Percentage of Ration Card Coverage by Geographic Regions 2019/2020, 2022.

c. Supporting farmers

In order to achieve rural development and ensure the promotion of food sovereignty, together with keeping up with the latest agricultural techniques and climate actions without harming farmers themselves, the Egyptian government has adopted a number of initiatives and policies.

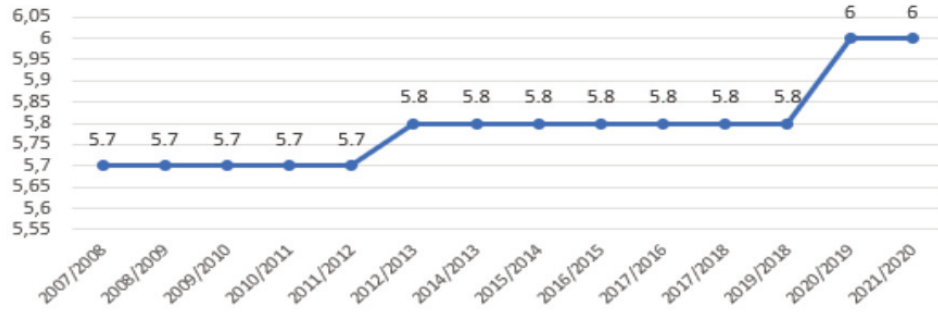
The Ministry of Agriculture has adopted different policies and strategies to promote food sovereignty and food security, and improve nutrition and the standard of living of the rural population, by improving the efficiency of resource use. According to the Ministry's vision, the aim is to achieve comprehensive socio-economic development based on sustainable and inclusive growth of the agricultural sector within the framework of integrated rural development, in particular for the neediest and poorest groups (Ministry of Agriculture, n.d.).

In addition, the government has adopted a comprehensive approach to enhance food security and tackle the socioeconomic and environmental nexus through a number of policies and programmes, such as the programme of building the capacities of beneficiaries supported by the Ministry of Social Solidarity in the targeted governorates by stimulating agriculture and the food chain, which aims to empower small-scale farmers (Ministry of Agriculture, 2022), encouraging the agricultural commodity investments programme (Ministry of Agriculture, 2021a), and strengthening biosecurity governance to support sustainable aquaculture production in Egypt (Ministry of Agriculture, 2021b).

Moreover, the Egyptian government mainly depends on the role of agricultural cooperatives to support farmers. Figure 13 shows the change rate in the

number of agricultural cooperatives in Egypt between 2008/2009 and 2020/2021, and the overall trend is that it has increases steadily during this era, as it reached six in 2020/2021 (CAPMAS, 2022b). Moreover, the Ministry of Agriculture has worked on providing in-kind support to agricultural cooperatives, civil associations and farmers' groups in Upper Egypt with the aim of bridging gaps in value chains and improving export and competitiveness in local markets for horticultural crops (Ministry of Agriculture, 2020). However, the role of agricultural cooperatives is challenged due to the lack of independence, in addition to financial and administrative burdens. As a result, the contribution of agricultural cooperatives to rural and agricultural development has declined (Ahmed & Ali, 2020).

Figure 13. The Change Rate of the Number of Agricultural Cooperatives between 2007/2008 and 2020/2021.



Source: CAPMAS, Data on Agricultural Cooperatives, 2022.

Another way of supporting farmers is through the role of small and medium sized enterprises (SMEs) and civil society, as these actors have played a significant role in supporting farmers through the transformation in the agricultural strategies towards smart and sustainable models, such as Pure Harvest, H2Grow, Fresh Source and ElMozare3 (Naccarato, 2022).

d. Diplomacy and international cooperation

Egypt has cooperated with international partners to tackle the nexus of food security, climate change, and socioeconomic challenges. For example, the FAO has supported the Egyptian agriculture sector through the mobilisation of sustainable investments to sustain food security (FAO, 2017). Moreover, USAID has provided support for small-scale farmers, whether technical or financial aids, and, as a result, the Egyptian economy has achieved an increase in export revenue of 1,500% since the 1990s. Currently there are some joint programmes, such as the Feed the Future Egypt Rural Agribusiness Strengthening Project aimed at modernising food production techniques at a total cost of 36.3 million USD (USAID, n.d.).

Other examples of multilateral efforts to promote food sovereignty and rural development are Smart Farming to Boost Sustainability funded by the United Nations International Fund for Agricultural Development (IFAD) at a total cost of 1.11 billion USD, and Strengthening Farmers' Agribusinesses, funded by the European Bank for Reconstruction and Development (EBRD), with an approximate total fund of 200 million USD (Ministry of International Cooperation, 2022a).

Furthermore, Egyptian diplomacy has pursued cooperation with international partners on food security and ensuring that the agriculture sector can cope with the climate goals. Through the climate diplomacy during COP-27, for instance, the Nexus of Water, Food and Energy (NWFE)'s National Green Projects Platform has managed to sign some agreements aiming at modernising the agriculture and irrigation system to align with climate goals and promote rural development (Ministry of International Cooperation, 2022b).

In fact, the Egyptian partnership with the European Union (EU) has provided more opportunities for helping Egypt with these dilemmas for many years. The EU granted Egypt about 100 million euros in June 2022 for food security as it has been threatened due to the implications of the Russian-Ukrainian war (Mbewa, 2022).

Moreover, food security has been prioritised in the Multi-Annual Indicative Programme between the EU and Egypt during the period 2021-2027. The plan is to help Egypt tackle food security, agriculture, water and climate challenge, in addition to providing all the needed support for the Egyptian efforts and strategies in this regard (European Union, 2022).

Way forward for 2050

In addition to the current policies and strategies, Egypt has promising future plans to tackle the dilemma of food security, climate change, and socioeconomic challenges. Hence, the Ministry of Agriculture has launched the 2030 Sustainable Agricultural Development Strategy, which aims to promote rural development for needy and vulnerable groups, together with developing agricultural and food production techniques to achieve climate action, food security, and food sovereignty (Abd El Rahman, 2022).

Moreover, the 2050 National Climate Change Strategy has crystallised some objectives in the agricultural sector, such as establishing agricultural infrastructure, which could reduce emissions, sustain resources, and achieve waste recycling. The approximate cost of mitigation and adaptation policies in the agriculture sector is about 52.400 billion USD between 2020 and 2050 (Ministry of Environment, 2022).

Policy recommendations

The foregoing makes the particularity of the Egyptian case clear. Despite having present and future policies and strategies, it is important to make some policy recommendations in order to ensure a better response to the dilemma of food security, climate change and related socioeconomic challenges.

One of the most important issues is social protection. Under the classification of food security and social justice as part of human rights, this could be achieved through the continuation of social safety net programmes, such as Takaful and Karama. These existing programmes should be built on to have a comprehensive social protection strategy (El Enbaby et al., 2022).

In addition, investments in R&D are required to sustain food security by developing advanced solutions to keep up with climate goals. These investments could contribute to increasing food availability and affordability of healthy diets (The Economist Intelligence Unit, 2021).

In order to ensure farmers are committed to the climate actions and transformation in agricultural techniques, it is important to guarantee their profits will not decline because of these changes and, hence, to have agricultural policy support and

provide more incentives (FAO, 2022b). Moreover, it is important to consider the variation between farmers and the differences in their preferences concerning green agricultural policies, as senior and highly educated farmers would cope with this trend whereas small-scale farmers would not. Thus, work on promoting awareness of small-scale farmers is needed, together with providing a combination of green subsidy and technical support, to ensure that they keep pace with the green agriculture revolution (Zhu & Chen, 2022).

Small-scale farmers also need more support and protection to promote social justice and food sovereignty. So it is important to apply responsible policies that focus on transparency and inclusion of all actors and citizens, especially the most vulnerable groups like women and small-scale farmers (Global Hunger Index, 2022b).

While transforming towards CSA, there is a great need to reduce gender inequality in rural areas in order to solve the climate-gender nexus, bearing in mind that women play a significant role in changing agrifood systems and developing a sustainable agricultural value chain, as they are major actors in farming and agrifood production (FAO, 2015; Ahmed & Shaheen, 2022).

Meanwhile, the reciprocal influence of rural development and CSA requires work on both issues in parallel, especially in developing countries, to tackle climate change, food insecurity and socioeconomic challenges, as CSA could lead to sustainable rural development, and rural development paves the way to transform towards CSA (FAO, 2014a).

As illustrated in the previous section, it is vital for Egypt to promote investments through international cooperation and partnerships. Hence, it is recommended to promote this approach to enhance Egyptians' ability to tackle all dilemmas and challenges and to cope with the advanced strategies and techniques (Ministry of International Cooperation, 2022a; Georgieva et al., 2022b).

In terms of CSA, it is still important to expand the use of advanced methods and provide support for farmers to be able to use these techniques, in addition to providing more data and conducting more research to provide scientifically-based solutions for any challenges that could hinder transformation in agrifood strategies towards the CSA model (El Mowla & El Aziz, 2020; Soliman, 2019).

Structural reforms are needed for the agricultural system to adopt an alternative agricultural policy that considers socioeconomic and environmental aspects, depending on a holistic approach which includes all stakeholders: the state, farmers, consumers, and research centres. In order to have a sustainable food system, it is necessary to focus on localising food production to promote food self-sufficiency, empowering and training local farmers to modify their practices to match with agroecological farming, in addition to using scientifically-based evidence by promoting the role of research centres specialised in agroecology (El-Nour, 2017).

Conclusion

The study found that Egypt has promising opportunities which will boost the gains in transformation towards a green economy, CSA, and a sustainable food system in order to promote food security and food sovereignty without neglecting climate change and socioeconomic burdens. Another remarkable finding is that the Egyptian government has already adopted different policies and strategies in order to tackle food security, climate change, and related socio-

economic challenges, while there is a gap between the objectives targeted by policies and strategies and the situation on the ground. Therefore, this gap must be bridged by tackling the socioeconomic and environmental aspects nexus in order to promote food security and social justice, and sustain the environment.

It is recommended that the Egyptian government should eventually work on enhancing the response to these dilemmas, drawing on the lessons learned from studying the literature and different case studies to determine best practices consistent with the Egyptian context, as well as learning from the challenges and negative implications of these policies.

The study has identified some key policy recommendations, such as proceeding with social safety net programmes like Takaful and Karama and Hayah Karema, increasing investments in R&D, providing more incentives and support for farmers to stimulate transformation in agrifood systems, applying responsible policies that guarantee the inclusion of all actors and citizens, especially the most vulnerable groups like women and small-scale farmers, reducing gender inequality in rural areas to tackle the climate-gender nexus, working on promoting rural development and CSA in parallel, promoting investments through international cooperation, and finally providing more data and doing more research to provide scientifically-based solutions for any challenges that could hinder transformation towards CSA.

References

ABD EL MOWLA, K.E & ABD EL AZIZ, H.H. (2020). Economic Analysis of Climate-Smart Agriculture in Egypt. *Egyptian Journal of Agricultural Research* 98 (1), pp. 52–63.

ABD EL RAHMAN, M. (2022). qrāʾ ة tqyymy ة fy ālāstrātyǧy ة ālmḥdṯ ة lltnmy ة ālzrāʿy ة ālmstdām ة 2030 . *AL Mallaf Al Masry* (93), pp. 34–41.

AHMED, K. & ALI, M. (2020). tfʿyl dwr ālǧmʿyāt ālтʿāwnyt ālzrāʿyḫ. *The Egyptian Journal for Agrarian Economy* 20 (3), pp. 713–726.

AHMED, L. & SHAHEEN, Y. (2022). *The Climate-Gender Nexus: A Deep Dive into the Egyptian Women's Agricultural Sector.* The American University in Cairo AUC. Retrieved from: https://documents.aucegypt.edu/Docs/GAPP/GAPP%20Policy%20Brief%20Issue%2019.pdf

BUSH, R. (2023). Land and small farmer resistance in authoritarian Egypt. *Journal of Agrarian Change* 23 (1), pp. 167–184. DOI: 10.1111/joac.12488

CAPMAS. (2022a). *Data about food security.* Retrieved from: https://www.capmas.gov.eg/Pages/SemanticIssuesPage.aspx?page_id=6116

CAPMAS. (2022b). *dd lt wny t fy m r.*

CAPMAS. (2022c). *Income, Expenditure & Consumption. Percentage of Ration Card coverage By Geographic Regions 2019/2020.*

COHEN, Y. (2021). *Egypt has a water problem—and no, it's not only the GERD.* Atlantic Council. Retrieved from: https://www.atlanticcouncil.org/blogs/menasource/egypt-has-a-water-problem-and-no-its-not-only-the-gerd/

DSTWR MṢR ĀLṢĀDR ʿĀM. (2014). *Arab Republic of Egypt.* Retrieved from: https://www.constituteproject.org/constitution/Egypt_2014.pdf?lang=ar

SCHIPPER, E. L. F. (2020). Maladaptation: When Adaptation to Climate Change Goes Very Wrong. *One Earth 3* (4), pp. 409–414. DOI: 10.1016/j.oneear.2020.09.014.

EL ENBABY, H.; ELSABBAGH, D.; GILLIGAN, D.; KARACHIWALLA, N.; KOCH, B.; AND KURDI, S. (2022). *Impact evaluation report: Egypt's Takaful Cash Transfer Program: Second round report.* International Food Policy Research Institute (IFPRI).

EL-NOUR, S. (2017). *The Challenges of food sovereignty in the Arab region. The Case of Egypt*. Arab Forum for Alternatives; Rosa Luxemburg Foundation.

EUROPEAN UNION. (2022). *Multi-Annual Indicative Programme European Union-Egypt 2021-2027.* Retrieved from: https://neighbourhood-enlargement. ec.europa.eu/system/files/2022-06/C_2022_4049_1_ANNEX_EN_ V3_P1_1915690.pdf

FAO. (2006). *Food Security. Policy Brief (*2). Retrieved from: https://www.fao.org/ fileadmin/templates/faoitaly/documents/pdf/pdf_Food_Security_Cocept_Note.pdf

FAO. (2014a). *FAO Success Stories on Climate Smart Agriculture.* Retrieved from: https://www.fao.org/3/i3817e/i3817e.pdf

FAO. (2014b). *Food Sovereignty Systems. Feeding the World, Regenerating Ecosystems, Rebuilding Local Economies, and Cooling the Planet – all at the same time.* Retrieved from: https://afsafrica.org/wp-content/uploads/2014/05/AFSA-Document.pdf

FAO. (2015). *Climate change and food security: risks and responses*. Retrieved from: https://www.fao.org/3/i5188e/I5188E.pdf

FAO (2017): Egypt eyes investment in efficient and sustainable agriculture. Available online at https://www.fao.org/support-to-investment/news/detail/en/c/1071089/.

FAO. (2018). *Emissions due to agriculture. Global, regional and country trends 2000 - 2018.* Retrieved from: https://www.fao.org/3/cb3808en/cb3808en.pdf

FAO. (2022a). *The Global Report on Food Crises 2022.* Retrieved from: https://www.fao.org/3/cb9997en/cb9997en.pdf

FAO. (2022b). *The State of Food Security and Nutrition in the World 2022.* Retrieved from: https://www.fao.org/publications/sofi/2022/en/

FAO. (2022c). *Food insecurity in Sri Lanka likely to worsen amid poor agricultural production, price spikes and ongoing economic crisis, FAO and WFP warn.* Retrieved from: https://www.fao.org/asiapacific/news/detail-events/en/c/1604608/

FAO. (2023). *FAO COVID-19 Response and Recovery Programme.* Retrieved from: https://www.fao.org/partnerships/resource-partners/covid-19/en/

FAYYAD, S. (2022). ālfḥw ʿs ālġḏā ئ y ʿs wsbl tʿzyz āl ỉ mn ālġḏā ئ y fy mṣr. *AL Mallaf Al Masry* (93), pp. 5–19.

FRANGOUL, A. (10/12/2022). *New Zealand plans to tax emissions from livestock burps and dung.* CNBC. Retrieved from: https://www.cnbc.com/2022/10/12/new-zealand-plans-to-tax-emissions-from-livestock-burps-and-dung.html

FROST, C.; JAYARAM, K.; PAIS, G. (2023). *What climate-smart agriculture means for smallholder farmers. McKinsey.* Retrieved from: https://www.mckinsey.com/industries/agriculture/our-insights/what-climate-smart-agriculture-means-for-smallholder-farmers#/

GEORGIEVA, K.; SOSA, S.; ROTHER, B. (2022a). *Global Food Crisis Demands Support for People, Open Trade, Bigger Local Harvests.* IMF. Retrieved from: https://www.imf.org/en/Blogs/Articles/2022/09/30/global-food-crisis-demands-support-for-people-open-trade-bigger-local-harvests

GEORGIEVA, K.; SOSA, S.; ROTHER, B. (2022b). *Global Food Crisis Demands Support for People, Open Trade, Bigger Local Harvests.* IMF. Retrieved from: https://www.imf.org/en/Blogs/Articles/2022/09/30/global-food-crisis-demands-support-for-people-open-trade-bigger-local-harvests

GLOBAL HUNGER INDEX. (2022a). *Egypt.* Retrieved from: https://www.globalhungerindex.org/egypt.html

GLOBAL HUNGER INDEX. (2022b). *Policy Recommendations.* Retrieved from: https://www.globalhungerindex.org/policy-recommendations.html

GOMEZ SAN JUAN, M.; HARNETT, S.; ALBINELLI, I. (2022). *Sustainable and circular bioeconomy in the climate agenda: Opportunities to transform agrifood systems.* FAO. Retrieved from: https://www.fao.org/3/cc2668en/cc2668en.pdf

GONZALEZ, C. (2012). The Global Food System, Environmental Protection, and Human Rights. *Natural Resources & Environment 26* (3), pp. 1–15.

GORDILLO, G. (2013). *Food Security And Sovereignty.* FAO. Retrieved from: https://www.fao.org/3/ax736e/ax736e.pdf

GREBMER, K.; BERNSTEIN, J.; WIEMERS, M. ET.AL. (2021). *Hunger and Food Systems in Conflict Settings.* Global Hunger Index. Retrieved from: https://www.globalhungerindex.org/pdf/en/2021.pdf

GUZMAN, C. D. (JULY 13, 2022). *The Crisis in Sri Lanka Rekindles Debate Over Organic Farming. Time.* Retrieved from: https://time.com/6196570/sri-lanka-crisis-organic-farming/

HARVEY, C. A.; SABORIO-RODRÍGUEZ, M.; MARTINEZ-RODRÍGUEZ, M. R.; VIGUERA, B.; CHAIN-GUADARRAMA, A.; VIGNOLA, R.; ALPIZAR, F. (2018). Climate change impacts and adaptation among smallholder farmers in Central America. *Agriculture & Food Security* 7 (1), p. 57. DOI: 10.1186/s40066-018-0209-x.

HAYA KARIMA. (2022). Initiative Objectives. Retrieved from: https://www.haya-karima.com/goals_en.html

HODGSON, C. (2022). *2022 droughts 'virtually impossible without climate change', study finds.* Financial Times. Retrieved from: https://www.ft.com/content/949f0a8f-d6d4-437a-bac0-9e90381989c1

IFAD. (2013). *Smallholders, food security, and the environment.* Retrieved from: https://www.ifad.org/documents/38714170/39135645/smallholders_report.pdf/133e8903-0204-4e7d-a780-bca847933f2e

CLAPP, J. (2017). Food self-sufficiency: Making sense of it, and when it makes sense. *Food Policy* 66, pp. 88–96. DOI: 10.1016/j.foodpol.2016.12.001.

YERKINBAYEVA, L.; OZENBAYEVA, A.; NURMUKHANKYZY, D.. (2014). The Ecological and Legal Aspects of Ensuring the Food Security of the Republic of Kazakhstan Under the Transition to a "Green" Economy. *Procedia - Social and Behavioral Sciences* 143, pp. 971–975. DOI: 10.1016/j.sbspro.2014.07.536.

LONGO, P. (2016). Food justice and sustainability: a new revolution. *Agriculture and Agricultural Science Procedia* 8, pp. 31–36.

MBEWA, D. O. (2022). *European Union pledges $104 million to help Egypt boost food security.* CGTN. Retrieved from: https://africa.cgtn.com/2022/06/15/european-union-pledges-104-million-to-help-egypt-boost-food-security/

MCCUSKER, K.; MANHIRE, J.; SAUNDERS, J.; LUCOCK, D.; ROSIN, C.; MOLLER, H. ET AL. (2014). *Climate Smart Intensification options for New Zeal-and Pastoral Farmers.* Agriculture Research Group on Sustainability AGROS. Retrieved from: https://www.mpi.govt.nz/dmsdocument/28176-climate-smart-intensification-options-for-new-zealand-pastoral-farmers

MINISTRY OF AGRICULTURE. (n/d). *Mission and Vision.* Retrieved from: https://moa.gov.eg/about/mission-and-vision/

MINISTRY OF AGRICULTURE. (2020). *Security and Agricultural Support Project (FAS).* Retrieved from: https://moa.gov.eg/projects-and-initiatives/fas/

MINISTRY OF AGRICULTURE. (2021a). *Encouraging agricultural commodity investment in Egypt.* Retrieved from: https://moa.gov.eg/projects-and-initiatives/%D8%A7%D9%84%D9%81%D8%A7%D9%88-1/

MINISTRY OF AGRICULTURE. (2021b). *Strengthening biosecurity governance to support sustainable aquaculture production in Egypt*. Retrieved from: https://moa.gov.eg/projects-and-initiatives/7-%D8%A7%D9%84%D9%81%D8%A7%D9%88/

MINISTRY OF AGRICULTURE. (2022). *Building the capacities of beneficiaries supported by the Ministry of Social Solidarity and Labour in the targeted governorates by stimulating agriculture and the food value chain.* Retrieved from: https://moa.gov.eg/projects-and-initiatives/%D8%A7%D9%84%D9%81%D8%A7%D9%888/

MINISTRY OF ENVIRONMENT. (2022). *Egypt National Climate Change Strategy (NCCS) 2050*. Retrieved from: https://www.eeaa.gov.eg/portals/0/eeaaReports/N-CC/EgyptNSCC-2050-Summary-En.pdf

MINISTRY OF INTERNATIONAL COOPERATION. (2022a). *Agriculture. The Future Breadbasket.* Retrieved from: https://moic.gov.eg/sector/Agriculture/1

MINISTRY OF INTERNATIONAL COOPERATION. (2022b). *Dr. Rania Al-Mashat on Signing the Partnership Agreements for the "NWFE +", "NWFE +" and Green Funding at COP27: Egypt Provides a Model for the World to Shift from*

Pledges to Implementation through the National Platform for Green Projects "NWFE" program. Retrieved from: https://moic.gov.eg/news/778

NACCARATO, F. (2022). *New Innovations and Technologies to improve Food Access and Livelihoods.* Food Security Symposiu. WFP.

NEGRA, C.; VERMEULEN, S.; BARIONI, L. G.; MAMO, T.; MELVILLE, P.; TADESSE, M. (2014). Brazil, Ethiopia, and New Zealand lead the way on climate-smart agriculture. *Agriculture & Food Security* 3 (1), p. 19. DOI: 10.1186/s40066-014-0019-8.

PACHÓN-ARIZA, F. A. (2013): Food sovereignty and rural development: beyond food security. In *Agronomía Colombiana* 31 (3), pp. 362–377.

ASARE-NUAMAH, P.; DICK-SAGOE, C.; AYIVOR, R.. (2021). Farmers' maladaptation: Eroding sustainable development, rebounding and shifting vulnerability in smallholder agriculture system. *Environmental Development* 40, p. 100680. DOI: 10.1016/j.envdev.2021.100680.

RAWORTH, K.; WYKES, S.; BASS, S. (2014). *Securing social justice in green economies. A review and ten considerations for policymakers.* International Institute for Environment and Development (IIED). Retrieved from: https://www.iied.org/sites/ default/files/pdfs/migrate/16578IIED.pdf

ROWARTH, J.; ENTINE, J. (2022). *How social justice activists are undermining New Zealand's efforts to produce a sustainable farming system.* Genetic Literacy Project. Retrieved from: https://geneticliteracyproject.org/2022/08/02/how-social-justice-activists-are-undermining-new-zealands-efforts-to-produce-a-sustainable-farming-system/

SAXENA, N. C. (2011). *Hunger, Under-Nutrition and Food Security in India.* Indian Institute of Public Adminstration. Retrieved from: https://assets.publishing.service.gov.uk/media/57a08ac540f0b652dd0008cc/CPRC-IIPA44.pdf

SOLIMAN, S. (2019). ālzrāʿ ā ālḏky ā mnāḫyā́fy mwāḡh ā t ỉ ṯyr āltġyr ālmnāḫy ʿl ى āl ỉ mn ālġḍā ئ y ālmṣry. *Egyptian Journal of Agricultural Economy* 29 (4), 1867- 92.

STATE INFORMATION SERVICES (SIS). (2022). *The "Haya Karima" Foundation Participates In The Task Of Saving The Earth At The Climate Summit (COP27).* Retrieved from: https://www.sis.gov.eg/Story/245802/%D9%85%D8%A4% D8% B3%D8%B3%D8%A9-%D8%AD%D9%8A%D8%A7%D8%A9-%D9%83% D8% B1%D9%8A%D9%85%D8%A9-%D8%AA%D8% B4%D8%A7%D8%B1%D9% 83-%D9%81%D9%8A-%D9%85%D9%87%D9%85%D8%A9-%D8%A5%D9% 86%D9%82%D8%A7%D8%B0-%D8%A7%D9%84%D8%A3%D8%B1%D8% B6-%D9%81%D9%8A-%D9%82%D9%85%D8%A9-%D8%A7%D9%84%D9% 85%D9%86%D8%A7%D8%AE-(COP27)?lang=ar

THE ARAB REPUBLIC OF EGYPT PRESIDENCY. (2022a). *National Projects.* Retrieved from: https://www.presidency.eg/en/%D8%A7%D9% 84%D9%85% D8%B4%D8%A7%D8%B1%D9%8A%D8%B9-%D8%A7%D9%84%D9% 82%D9%88%D9%85%D9%8A%D8%A9/

THE ARAB REPUBLIC OF EGYPT PRESIDENCY. (2022b). *The Inauguration of the "Future of Egypt" Project for Sustainable Agriculture.* Retrieved from: https://www.presidency.eg/ en/%D8%A7%D9%84%D9%85%D8%B4%D8%A7%D8%B1%D9%8A%D8%B9-%D8%A7%D9%84%D9%82%D9%88%D9%85%D9%8A%D8%A9/%D8%A7%D9%81%D8%AA%D8%AA%D8%A7%D8%AD-%D9%85%D8%B4%D8%B1%D9%88%D8%B9-%D9%85%D8%B3%D8%AA%D9%82%D8%A8%D9%84-%D9%85%D8%B5%D8%B1-%D9%84%D9%84%D8%B2%D8%B1%D8%A7%D8%B9%D8%A9-%D8%A7%D9%84%D9%85%D8%B3%D8%AA%D8%AF%D8%A7%D9%85%D8%A9/

THE ECONOMIST INTELLIGENCE UNIT. (2021). *Global Food Security Index 2020. Addressing structural inequalities to build strong and sustainable food systems.* Retrieved from: https://nonews.co/wp-content/uploads/2021/03/GFSI2020.pdf

THE GLOBAL GOALS. (n/d.). *Zero Hunger.* Retrieved from: https://www.globalgoals.org/goals/2-zero-hunger/

TRIPATHY, S. (2019). Rooting for Sustainable Agriculture and Food Security Through Improved Regulatory Governance in India. In Kung-Chung Liu, Uday S. Racherla (Eds.): *Innovation, Economic Development, and Intellectual Property in India and China: Comparing Six Economic Sectors.* (pp. 387–411). Springer Singapore. Retrieved from: https://doi.org/10.1007/978-981-13-8102-7_17

UNDP. (n/d.). *Scaling up Climate Ambition on Land Use and Agriculture (SCALA).* Retrieved from: https://www.adaptation-undp.org/scala/overview

UNFCCC. (2022). *Egypt's First Updated Nationally Determined Contributions.* Retrieved from: https://unfccc.int/sites/default/files/NDC/2022-07/Egypt%20Updated%20NDC.pdf.pdf

UNICEF. (2022). *Water Scarcity in Egypt. Growing Concerns, and Partnerships.* Retrieved from: https://www.unicef.org/egypt/media/7986/file/Water%20Scarcity%20in%20 Egypt.pdf

USAID. (n/d.). *Agriculture and Food Security.* Retrieved from: https://www.usaid.gov/egypt/agriculture-and-food-security

WORLD BANK. (2018). *The Story of Takaful and Karama Cash Transfer Program.* Retrieved from: https://www.worldbank.org/en/news/feature/2018/11/15/the-story-of-takaful-and-karama-cash-transfer-program

WORLD BANK. (2022a). *Project Information Document (PID), Report: PIDA34063.* Retrieved from: https://drive.google.com/file/d/1_XGRvFxlhxLvqso4E7K0_PLhcxDQU7mo/view

WORLD BANK. (2022b). *Food Security Update.* Retrieved from: https://thedocs.worldbank.org/en/doc/40ebbf38f5a6b68bfc11e5273e1405d4-0090012022/related/Food-Security-Update-LXX-September-29-2022.pdf

WORLD BANK; IFC; MIGA. (2016). *World Bank Group Climate Change Action Plan 2016-2020.* World Bank. Retrieved from: https://openknowledge.worldbank.org/handle/10986/24451

ZHU, Y.; JUAN CHEN, J. (2022). Small-Scale Farmers' Preference Heterogeneity for Green Agriculture Policy Incentives Identified by Choice Experiment. *Sustainability.*

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