

THE PUBLIC POLICY **HUB**

Addressing Food Insecurity in Egypt: Towards Sustaining Food Access for All A Policy Paper

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A Policy Paper

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List of Abbreviations

BAU	Business as Usual
EFB	Egyptian Food Bank
ERSAP	Economic Reform and Structural Adjustment Programme
FAO	the Food and Agricultural Organization
FLW	Food Loss and Waste
GASC	General Authority for Supply Commodities
GIS	Geographic Information Systems
GoE	Government of Egypt
LULC	Land Use and Land Change
NGOs	Non-Governmental Organizations
NNI	National Nutrition Institute
NPC	National Population Council
NSFP	National School Feeding Program
UAVs	Unmanned Aerial Vehicles
WFP	World Food Program

Executive Summary

Although the Egyptian civilization has historically been grounded in agriculture, Egypt today faces an imminent challenge to feed its fast-growing population. The country is one of the world's leading importers of wheat, a crop that Egypt has always farmed. Egypt's food security mainly lies on what this paper coins as the 3 As, i.e., food availability, affordability, and accessibility.

Today Egypt imports more than half of its key staple crops. With the current exponential population growth, Egypt is said to reach 150 million capita by 2050. If the same population growth and import rate persists, Egypt will likely face an imminent threat of food insecurity by 2050. This paper aims to provide evidence-based research and recommendations to the National Population Council and policymakers in Egypt. It is important to note that the goal of the Government of Egypt is to get to 2050 with the said increase in population size without negatively affecting the citizens' access to natural resources (including, water, agriculture, land, and energy).

This policy paper sheds light on the current challenges that Egypt faces to ensure food access for all. In attempts to underscore the root causes of food insecurity in Egypt, this paper looks at the country's geographical and agricultural national policies, food pricing, household expenditures on food as well as the challenges imposed on the country by climate change. These factors directly challenge the country's ability to achieve food security for all by 2050. Although the Government of Egypt (GoE) launched pro-poor policies that aim at reducing the economic burden on vulnerable groups, the government needs to explore other feasible strategies to avoid food insecurity.

To address the aforementioned challenges, the current policy paper proposes a list of policy alternatives that- if efficiently implemented- will prevent the approaching threat of food insecurity. The suggested policies in-

clude adopting the use of technology to increase food availability, reducing food waste, building communal resilience of small-scale farmers, and developing low-cost nutritional meal plans.

Research Question

The Government of Egypt (GoE) acknowledges that the problem of food security is multi-dimensional and intertwined.

This policy paper aims at laying out the root causes and challenges that Egypt is currently facing to secure food for all. This paper also suggest a list of effective policy alternatives. To do this, this paper first explores reasons that may promote or hinder the country's

ability to secure food for all its citizens by the year 2050. Second, the paper investigates the major challenges that the GoE may face during this trajectory. Finally, the paper develops alternative policies to enhance the country's abilities to secure food for all by 2050.

Problem Statement and Background

1. Situational Overview

Over the past decade, Egypt has experienced a series of shocks starting with the January 2011 revolution preceding a period of socio-economic instabilities. The Egyptian population continues to suffer from poverty, food insecurity, climate-related shocks, and environmental degradation (The World Food Program, 2018). Furthermore, the floating and devaluation of the Egyptian pound that took place in 2016 contributed to the spiking food prices (The World Food Program, 2018). Since Egypt is an importer of key staple commodities – particularly wheat and corn- the national food system remains susceptible to instabilities in international commodity prices (The World Food Program, 2018). To secure access to food, the GoE aims to ensure that no one suffers from malnutrition and to establish a sustainable food system. To reach this goal, a thorough understanding of key quantitative indicators - a term this paper coins as the 3 A's- notably food availability, accessibility and affordability in Egypt is needed.

On the socio-economic level, Egypt is a middle-income country with a population of around 100 million capita. According to the World Food Program's (WFP) office in Egypt (2018), the country's population has seen a rise in income poverty between 2011 and 2015 with the percentages moving upwards from 25 to 28 percent. Furthermore, in 2019, Egypt announced that 32.5 percent of the population live under the poverty line with a monthly income rate of 735.5 Egyptian

pounds per individual (Alsayed, 2019). Moreover, 22 percent of the population is at the risk of falling into poverty, with geographical and gender differences playing a role in widening the disparities in income. It is worth noting that 51 percent of the country's poor people and 73.6 percent of the extremely poor are concentrated in the areas of rural Upper Egypt. Consequently, rural Upper Egypt has 74.4 percent of chronically food insecure households (Breisinger et al., 2014 and 2013).

Additionally, the WFP notes that 23 percent of households in Egypt struggle to meet their basic food needs, and 4.7 percent do not have sufficient access to food (2018). Moreover, and in light of the high stunting rates, malnutrition has become a growing public health concern. The problem is further exacerbated by the increasing rates of overweight, obesity, and micro-nutrient deficiencies. For instance, 22.3 percent of children under the age of 5 in Egypt suffer from stunting and 15.7 percent are overweight (Egypt: The Burden of Malnutrition at a Glance, 2019).

Furthermore, the country has been exposed to climate change risks and is equally prone to natural shocks including cold and or heat waves, earthquakes, and flash floods (WFP, 2018). It is expected that by 2050, climate change will cause two of Egypt's major crops, wheat and maize, to suffer from a 15 and 19 percent loss in productivity respectively (IUCN, 2013).

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2. Egypt's Social Policy Overview

Article 79 of Egypt's 2014 Constitution grants each citizen access to a healthy and sufficient amount of food (The Egyptian Constitution, 2014). The GoE has increased public spending on food subsidies and cash transfers aiming at reducing the economic burden on the most vulnerable groups to secure their basic needs and livelihoods. This was mainly part of the government's response to mitigate the consequences of the Economic Reform and Structural Adjustment Programme between 2016 and 2019 on the poor in Egypt (IMF, 2016).

In Egypt's Sustainable Development Strategy - Vision 2030, the GoE has ranked food security as one of its high priorities under its Economic Development pillar, and its social protection pillar. The vision prioritizes the state's actions to boost the subsidy development system in order to ensure that the most vulnerable groups have access to food subsidies while promoting modern agricultural technology. Additionally, the vision also prioritized the transition to sustainable agriculture and the expansion of fish, livestock, and poultry (Supreme Standing Committee for Human Rights, 2020).

The expansion of Takaful and Karama cash-transfer program is one of the early responses after the aforementioned ERSAP that took place in the area of social justice. This program aims to support the most vulnerable communities prone to the negative impacts of malnutrition. The number of Takaful and Karama beneficiaries has reached 3.6 million in November 2020 and was set to reach 4 million beneficiaries by the end of December 2020 (Supreme Standing Committee for Human Rights, 2020). Moreover, the GoE has continued its food ration and subsidy system supporting almost 69 million beneficiaries with subsidized basic food commodities through the ration card system, a governmental affiliated distribution network of 1,172 branches, and over 5,605 private distribution outlets all over Egypt. These outlets were set to reach 6,000 outlets by the end of 2020 (Hamdy, 2020).

On December 30th of 2015, the President of Egypt, Abdel Fattah El Sisi, launched the National Project for Reclamation of one and a half million acres out of a total target of four million acres as a first stage (Reda, 2018). The project aims to secure Egypt's need of wheat for the next decade. Furthermore, the government has recently taken several measures to prevent encroachment on agricultural land. In 2018, the Egyptian President ratified Law No. 7 of 2018 introducing strict penalties on the encroachment of agricultural land in Egypt. This in return decreased the encroachment cases as per the 2019 report of the Central Authority on Agricultural Land Protection (El-Nouby, 2019).

The GoE also considers the National School Feeding Program (NSFP) as a priority to provide public-school children with a daily cost-free meal that responds to their nutritional needs. The project aims at improving their cognitive capacities in the classroom and easing some of the financial burden on their families. This program targets more than 10.5 million children in total across Egypt, with almost 81 percent of children enrolled in the primary education stage (Sallam, 2018).

The '1000 Days of Life' is another promising national food-assistance cash-transfer program launched by the Ministry of Social Solidarity in 2017. This program supports vulnerable pregnant and nursing mothers with a monthly cash transfer to guarantee their healthy nutrition during these critical stages (Wahba, 2017).

To protect the population from the food price volatility and to introduce a social safety net for its citizens, the Government of Egypt established a food subsidy system. During the 1990s, Egypt relied heavily on food imports where it imported more than a third of its cereal products including wheat. During 2009 to 2011, imports have reached an annual average of 44 percent.

Ever since the mid-1990s, Egypt has continued

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to be among the top three wheat importing countries (Al-Riffai, 2015). Due to its heavy reliance on wheat and cereal imports, Egypt has become vulnerable to international supply shocks and price instability (Al-Riffai, 2015).

As such, the food subsidy system is a cornerstone of the social assistance programs in Egypt. The system covers bread, flour, cooking oil and sugar, and constitutes a significant part in structuring the safety net for the poor (Ahmed & Bouis, 2002; Fan et al., 2006). Since the 1980's, Egypt has gradually undertaken many reforms and introduced ration cards - a policy that reduced the governmental burden by 8 percent in 1997 (Ramadan & Thomas, 2011; Salevurakis & Abdel-Haleim, 2008). It was not until post 2011, that Egypt for the first time in its history shifted from an input-based subsidy to an output-based subsidy, whereby the subsidy is applied to the final food product rather than subsidizing the raw materials (Al-Shawarby, 2018). Reforms introduced in 2011 focused on automating the subsidy system, providing support to financial inclusion and transparency, reducing wheat waste and storage leakage, introducing a monthly allowance for each member included on the ration card, and applying a point-based system (Al-Shawarby & El-Laithy, 2010; WFP, 2013). These reforms resulted in providing higher quality goods, inclusion of more beneficiaries with lower cost - which helped Egypt save 11 million Egyptian pounds- through the reduction in wheat procurement and the provision of diverse food commodities that led to a 30 percent increase in dietary diversification (Abdalla & Al-Shawarby, 2017).

Currently, Egypt applies the self-targeting approach, a pro poor approach that is perceived as a politically accepted option to avoid any socio-political conflict, whereby the targeting is guided by the customer preferences. For example, the higher extraction bread is less attractive for consumers but cheaper, making it a preferred selection by the lowest-in-

come households. Simultaneously, a higher quality bread that is marked at a higher price will be selected by the households of slightly higher income (De Haen & Hemrich, 2007). Reallocating the Baladi bread outlets to poorer areas was another tool to achieve self-targeting. This reallocation of subsidy resources across governorates to focus on the underprivileged areas has led to including lower-income families into the ration card system through setting legitimate eligibility criteria (Abdalla & Al-Shawarby, 2017).

3. The Underlying Challenges of Food Security in Egypt

Notwithstanding the aforementioned policies and despite the GoE's implementation of pro-poor policies, food insecurity continues to prevail. Egypt needs to address the below key challenges to reach its goal of being food self-sufficient.

First, the country's rapid population growth is an outstanding issue. Egypt's current newborn median in 2020 stood at 3.1 newborns with an average population size of about 101 million capita. Ideally, Egypt wants to reach a median of 2.4 newborns by 2030 to reach a population size of 110 million capita (The National Population Council, 2020). By 2050, Egypt is expected to reach 150 million capita, a number that will increasingly pressure the country's both natural and financial resources (The National Population Council, 2020).

Second, food accessibility and affordability continue to represent a burden for low-income households. Prices are the main determinant of food choices, and the large and sudden increase in food prices force people to adjust their dietary choices accordingly. The spikes in prices are accompanied by a decreasing purchasing power which can possibly push households towards or below the poverty line. Studies show that unhealthy dietary

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habits are more prevalent among low socio-economic households that consume less fruit and vegetables and more refined products compared to high-income households (Drewnowski & Darmon, 2005; Darmon & Drewnowski, 2008). Hence, food price-related policies such as subsidies and taxes are tools that help in improving the nutritional quality of diets through providing better nutritional choices (Wall et al., 2006). While studies show that food price policies can lead to an improvement in dietary quality, they also lead to an increase in nutritional socio-economic inequalities.

Single nutrient taxes lead to undesired effects on the demand for other nutrients as taxed food items are substituted by non-taxed items (Mytton et al., 2007; Smed et al., 2007). Moreover, evidence showed that, relative to medium-income families, implemented food subsidies and taxes lead to fewer financial and nutritional benefits to

low-income families (Darmon et al., 2014). In Egypt, the major source of calories and proteins comes from plant products rather than animal sources. In general, higher income Egyptian households exhibit increased consumption of vegetables and meats, while rural households tend to have higher food expenditure and lower non-food expenditure compared to their urban counterparts (Fabiosa & Soliman, 2008; Dawoud, 2005). As for the dietary energy sources, more than 60 percent of the dietary energy supply in Egypt is derived from cereals as shown in figure 1 (Hachem & Abi-Samra, 2011; Fabiosa & Soliman, 2008). Egypt is also facing a huge challenge to achieve self-sufficiency in food especially for livestock products. Furthermore, the demand for many food items is characterized by high price elasticity, highlighting the importance of regulating changes of food prices for households.

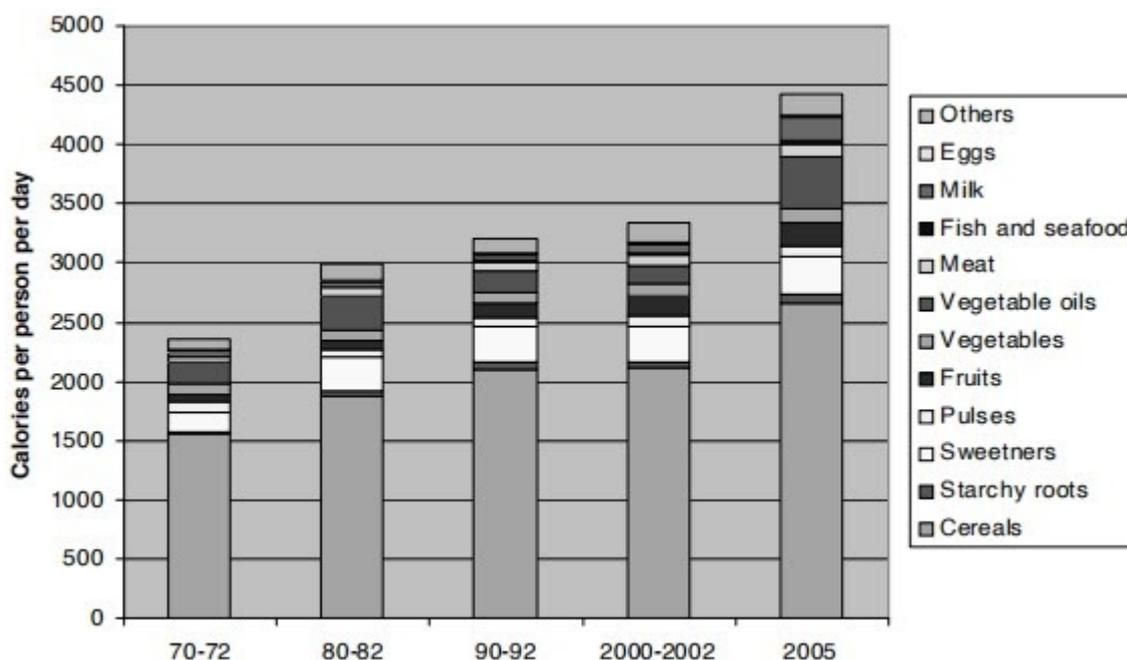


Figure 1: Contribution of Food Groups to the Daily Total Calories.

Source: Hachem & Abi-Samra, 2011

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Third, climate change also constitutes a grave threat to sustaining food security in Egypt given its direct implications on both the food supply chain and agricultural productivity. The continuing desertification and urbanization on the account of the agricultural land known as Land Use and Land Change (LULC), along with land drought and the implications of the rising sea level, impose severe challenges on food security in Egypt. These challenges invoke immediate robust mitigation policies and adaptation strategies to offset their stark consequences on the next generations. LULC is one of the condemning environmental challenges around the world (UN, 2018). According to Abdel-Aziz et al. (2020), urbanization has cost Egypt over 900 km² of fertile agricultural land in the Nile Delta in the last two decades. This amount of land exceeds the area of New York City and is considered a significant loss of crucial natural resources in a time of looming water insecurity in Egypt. Abdel-Aziz et al. (2020) did a simulation of the Business as Usual (BAU) scenario which suggests that the current patterns of urban development combined with the growing population will cost Egypt another 900 km² of fertile agricultural land in the next decade only.

Although the recent efforts from the GoE to reclaim new lands outside the Delta to achieve food security for the country's growing population has resulted in reclaiming nearly 12,000 km², it is a challenging and a very costly process given the lower fertility of the newly reclaimed land and their lower effectiveness at holding water than soils in the Nile Delta (Abdel-Aziz et al., 2020). Therefore, there is an urgent need to develop appropriate land-use and urban planning strategies to assure long-term national food security and sustainability in Egypt. The high reproduction rate and large population in Egypt in the next three decades will put Egypt at the risk of climate change and puts more strains on securing nutrients and food. Climate change studies predict a relatively high reduction in the productivity of two major

crops in Egypt, wheat, and maize, by 15 and 19 percent respectively by 2050 (IUCN, 2013). This reduction in agricultural productivity is primarily attributed to the projected increase in temperature, water stress, pests, as well as the inundation of 12 to 15 percent of the fertile land in the Nile Delta as a result of the rising sea-level and salty water intrusion (IUCN, 2013). Climate change is also expected to increase encounters with weed infestations, livestock diseases, and crop pests. The projected increase in temperatures is likely to cause higher water needs, especially for summer crops as it is projected that the water required for strategic crops irrigation in Egypt is expected to increase by a range of 6 to 16 percent by 2100 (IUCN, 2013). Moreover, water scarcity in Egypt is projected to increase in the coming decades. Therefore, national policies concerning the water intensity of crops and irrigation efficiency are crucial now more than ever. From an economic perspective, climate change represents a major challenge for around 30 percent of the Egyptian labor force who work in agriculture, which requires a resilience building strategy to support these workers.

Fourth, food waste in Egypt also constitutes an economic and nutritional challenge. As stated by the Food and Agricultural Organization (FAO), food loss and waste (FLW) in the Near East and North Africa have an annual cost of over 60 billion USD, with fruit and vegetable waste reaching 45 to 55 percent of the annual production (FAO, 2015). In Egypt, FLW is a growing concern. The average Egyptian throws away 50 kilograms of food every year, and more during special occasions such as holidays and festivals (FAO, 2018; FAO, 2019). FLW in Egypt ranges between 15 to 45 percent depending on the crop (FAO, 2019).

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Table 1 highlights the percentage loss for different crops and products at various value chain stages. As shown in the table, 30 percent of the tomato supply in Egypt is lost, and some studies estimate this amount to be even higher at around 50 percent (FAO, 2018). Losses in other critical crops such as wheat,

potatoes, and milk reached 12.8 ,20.4 and 20 percent, respectively. These high rates constitute a threat to food security in Egypt and shed the light on how important it is to take measures on the national level to reduce food waste for critical food items incurring large waste amounts.

Table 1: Food Loss and Waste in Egypt

Crop	% FLW of total production	Value Chain Stage	Date
Orange	11.10%	Production and handling	2000-2014
	14%	Post-harvest operations	2000-2014
Grapes	13.10%	Production, handling until retail	2000-2014
Mango	12.43%	Post-harvest	2001-2010
Palm Dates	19%		2017
Olives	17.56%		for the period 2001 to 2010
Pomegranates	23%	Post-harvest	n/a
Potatoes	12.80%		2000-2014
Tomatoes	30% of quantity available for consumption		n/a
Onions	8%		2001-2011
Peas	43%		n/a
Wheat	20.40%		2000-2015
Maize	9.7% of supply	Marketing	2015
Fish	35%		n/a
Poultry	15%		n/a
Milk	20%		n/a

Source: FLW M&E Unit, 2018; FLW M&E Unit Policy Brief 1,4,5,6 (2019).

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In efforts to decrease FLW, the FAO, in collaboration with the Ministry of Agriculture and Land Reclamation implemented the “Food loss and waste reduction and value chain development for food security in Egypt” project. This project aims at reducing waste through focusing on tomatoes and grapes in Nubariya and on tomatoes in Sharqiya regions. This collaboration included activities such as capacity building for different stakeholders, media campaigns, establishing processing units for drying crops and establishing a Food Loss and Waste Monitoring and Evaluation Unit (FAO, 2019).

Fifth, Egypt’s agriculture policies which originally included crop rotation schedules, crop area allocations, subsidized consumer prices, and obligatory quantity delivery quotas at prices set below the international markets were problematic policies. These government’s interventions led to agricultural stagnation which agitated farmers, distorted cropping patterns, and caused yields and exports to fall. Additionally, crop self-sufficiency gaps grew wider and the rural and urban income gap broadened as taxes took up a high percentage of farmers’ income gain. The government reversed these interventionist policies and liberated the sector. The structural adjustment program introduced in 1991 had a direct impact on the sector, granting farmers the right to plant what they want. Farmers were no longer obligated to dispatch crops to the state. This in turn resulted in a higher production of rice, a water intensive crop, that exacerbated the already existent water problem (Kassim et al., 2018). On another front, Egypt’s national security is closely intertwined with the cultivation of wheat which is used in subsidized wheat bread.

Case study 1: Food loss and waste reduction and value chain development for food security in Egypt

The «Food loss and waste reduction and value chain development for food security in Egypt» project has been implemented between 2015 to 2019 in collaboration between the FAO and the Ministry of Agriculture and Land Reclamation and was funded by the Italian Agency for Development Cooperation. With the estimated 50 kg of food wasted per person per year, most of which are lost on farms, the project aims to reduce this food waste. The project adopted a value chain approach in order to improve the economic and environmental efficiency of agricultural food sectors through improved food value chains. The project focused on tomatoes and grapes value chains originating from the main areas of production in Nubariya and Sharqiya with support in post-harvest handling, value addition and/or processing, and marketing.

Results:

- The projects managed to train 7,895 farmers, farm laborers and traders, in addition to 12 female teachers, 340 students, 60 rural pioneers and housewives, on loss and waste reduction mechanisms during the post-harvest phase.
- The project allowed for executing studies aiming to assess the loss and waste along the value chain of grape and tomato crops and managed to establish a sun-dried tomato and raisin processing units.
- The launch of an awareness campaign through social media to reduce food waste in cooperation with the Egyptian Food Bank.
- The project successfully provided technical, infrastructural, and marketing support to farmers’ associations and stakeholders in these target value chains.
- The Establishment of a Food Loss and Waste Monitoring and Evaluation Unit in cooperation with the Ministry of Agriculture.

Sources: FAO (2015), FAO (2019).

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It is worth noting that in the fiscal year of 2016/2017, the country produced 8.1 million metric tons of wheat (of which 3.4 million metric tons were purchased by the government) in addition to importing 11.4 million metric tons of wheat to fulfill the consumption demands (Kassim et al., 2018). Respectively, the increase in population will yield an increase in wheat consumption.

4. A Historical Overview of Agricultural Policies

The current food insecurity challenges in Egypt can be tracked down to policies that tended to address the issue of rural poverty and inequality by promoting development and growth through industrialization. This in return created a poor public service delivery, a growing food import bill, inequality and even more poverty. The section below will address in detail the agriculture policies under Gamal Abdel Nasser, Anwar Al Sadat, and Mohamed Hosny Mubarak (Al Riffai, 2015).

In simple terms, Abdel Nasser's attempt to eradicate feudalism and address inequality led to putting the agriculture sector in a vulnerable position. Nasser's agricultural price controls and biases in investing in urbanism reduced farmers' incentives (Al Riffai, 2015). The 1960s in Egypt was known by Nasser's "Arab Socialism" rooted in the 1952 revolution. Back then, agricultural policy focused on levelling fair distribution of income and providing affordable food supply in urban areas from rural and peri-urban areas. Agricultural policies also included crop rotation schedules, obligatory quantity delivery quotas at prices set below the rates of the international market, and subsidized consumer prices and crop allocations (Kassim et al., 2018). Moreover, the Agriculture Cooperatives at the Ministry of Agriculture and Land Reclamation used to monitor production, inputs, and marketing at the village level. The Cooperatives also coordinated output quotas with agricultural credit banks as well as credit provision (Kassim et al., 2018).

Under Sadat, and with the migration of Egyptian labor to work in oil-booming Gulf countries, the disrupted agricultural sector was left behind. The sector also suffered from land fragmentation due to inheritance customs, and the increased urbanization led to an increase in food subsidies and food imports. Such a combination led the sector to decline. Under Hosny Mubarak, price quantity controls imposed on strategic crops were eased and removed. The agricultural sector was opened to the private sector. However, the biases towards urbanism and the growing population combined with the worsening public service delivery continued to threaten Egypt's food supply and security (Al Riffai, 2015).

It is worth mentioning that the agricultural sector witnessed two policy reform programs between 1987 and 2002. Between 1987 to 1995 the Agricultural production and Credit Project was implemented. The project included decreased subsidies on certain agricultural inputs in addition to abolishing land allotment controls and price and marketing restrictions for certain crops. This project also introduced privatization of state-owned firms. This was done through the introduction of a new law that allowed public firms to re-organize in the form of government joint stakeholder holding companies. Furthermore, the Agricultural Policy Reform Program introduced in 2002 followed the Economic Reform and Structural Adjustment Program in 1991. The government changed its policies from a command economy to a market economy, which in return vitalized the private sector to play a greater role in agriculture trading, structural adjustment programs and accelerating the liberalization of markets. This was done through abolishing agricultural inputs, subsidies, pricing and market controls, and lifting mandatory crop rotations (Kassim et al., 2018).

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5. Stakeholder Analysis

The section below lists key stakeholders that are of direct relevance to the issue of food security in general and to the policy recommendation mentioned in the Policy Alternatives Analysis section below. The stakeholders are divided into three categories. The first include primary policy influences and these are government entities and regulatory bodies that have direct influence on policy formation. The second category includes secondary policy influence and are again government entities that enjoy some policy influence. The last category includes implementing partners who are relevant stakeholders with certain expertise that are of relevance to policy recommendation.

A. Primary Policy Influencers:

- **The Egyptian Cabinet of Ministers:** In light of the Prime Minister's highest political power, he has the power to place the issue of food security on the top of the political agenda. Equally, an engagement with him/his office can help influence the launch of a national Food Waste Reduction program under his auspices to encourage different competent entities and stakeholders to join the national program.
- **The Ministry of Finance:** The Ministry of Finance is responsible for drafting the yearly fiscal policy. A policy engagement with the Ministry can lead to influencing the decision to allocate more financial resources to enhance the financial capabilities of all stakeholders involved in securing food commodities in line with this paper's recommendation so as to achieve the required safety net.
- **The Ministry of Agriculture:** In light of the Ministry of Agriculture's mandate to regulate the agriculture sector, its engagement can lead to convincing the Ministry to advance the usage of technology and

safe pesticides and their subsidized provision so as to minimize crop waste due to disease and pests.

- **The Ministry of Trade and Industry:** In coordination with competent entities, the Ministry of Trade and Industry can impose a policy that prevents food waste in commercial and industrial facilities.
- **The Ministry of Supply and Internal Trade and the General Authority for Supply Commodities (GASC):** In light of the Ministry of Supply and Internal Trade's mandate to regulate the internal supply commodity, an engagement with the Ministry can set in motion a program that sets criteria of crops to be delivered to the state-owned silos and storage units. Additionally, the program can propose other regulations to ensure low food waste during the delivery process.. The Authority can also specify adequate storage facilities that will avoid quality decline and pest attacks. In addition, an engagement with GASC can influence the establishment of drying units that would enable farmers to dry their crops and sell them at higher prices.

B. Secondary Policy Influencers:

- **The National Population Council:** In light of the Council's mandate to propose strategies related to the population, an engagement with the Council will urge the drafting and adoption of a food security strategy.
- **The National Food Safety Authority:** The Authority's mandate is to ensure regulating the food safety of domestic production, inspecting imported and exported food products, as well as licensing and certification procedures. Thus, an engagement with the Authority can assist in setting a policy for food manufacturers operating in Egypt to prevent food loss.

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- **The National Nutrition Institute (NNI):** The Institute is the sole government entity that is responsible for setting nutritional standards. As such, a partnership with the Institute can help establish a nationwide cost-effective nutritional plan through specifying adequate food portions for each individual so as to maintain a healthy balanced diet.
- **The Egyptian Food Bank (EFB):** In line with the Bank's mandate to distribute food to the needy through multiple feeding programs and their network of beneficiaries, the EFB will be an important implementing partner who will disseminate the collected food to the needy across their network(s).

C. Implementing Partners:

- **The Ministry of State for Information:** The Ministry of State for Information leads national campaigns in different sectors, so an engagement with the Ministry can influence the launch of a media campaign that raises awareness on food waste and propagates citizen eating and food consumption behavior.
- **The Food and Agriculture Organization (FAO) Egypt Office:** The FAO lead a food loss and waste reduction and value chain development for food security project in Egypt. The project aims at reducing waste through focusing on tomatoes and grapes in Nubariya and on tomatoes in Sharqiya regions. Hence fostering a partnership between the FAO and the Government of Egypt to expand the FAO's Food Loss project to cover all crops producing governorates would contribute to Egypt's food security.
- **The World Food Programme (WFP) Egypt Office:** WFP runs multiple programs to improve food access to 2.7 million vulnerable children and their family members and the livelihoods of 2,000 smallholder farmer and Bedouin communities. Hence fostering a partnership between the WFP and the government of Egypt can expand the WFP programs and reach more beneficiaries.

Policy Options/ Alternatives Analysis

Based on the previous sections, the paper has established evidence of the imminent food insecurity Egypt is about to face. If not addressed adequately, Egypt will struggle to feed its ever-growing population. The paper focuses on providing alternative policies to the current outstanding issue of food insecurity. Based on the research and comparative studies done, the below policies and their analysis propose to public decision makers technically and economically feasible policy alternatives and recommendation that could be implemented to address food insecurity immediately.

Alternative 1: Adopting Technology Use to Mitigate the Threat of Food Security in Egypt

One key element that can help address food security in Egypt is adopting a technology that tackles climate change and increases land productivity. The use of technology can enable small farmers to unlock and optimize a larger supply chain by granting them access to larger markets. Through the use of artificial intelligence (AI), platforms can be designed to link physical warehouses and logistical infrastructure to enable producers to cut costs and expand operations. Technologies can also be used to increase transparency throughout the value chain. Moreover, technology can be used to automate the centralization of irrigation systems, including the spraying of pesticides via drones or unmanned aerial vehicles (UAVs). Additionally, the use of big data and the emergence of innovative data collection methods will give rise to a new form of agriculture commonly referred to as “smart farming” or “precision farming”. This kind of farming consists of utilizing site-specific data to manage water, seeding rates, pests, and nutrients. Furthermore, crop sensors can be used to measure properties of the soil, while data collected via aerial imagery using UAVs, drones, and geographic information systems (GIS) can be used to map and monitor damaged crops as well as crop yields. Farm-specific data can be combined with external data (like weather information) to help farmers monitor and

manage their inputs and production (Aguera et al., 2020).

These technological methods will introduce ways to help farmers smartly cultivate and harvest crops as well as avoid crop rotting; increase healthy crop production with outstanding crop quality through soil, water and nutrients management; assist farmers in monitoring damaged crops and acting accordingly; and assist farmers in accessing larger supply chains and markets. Moreover, the use of technology will increase farming yields, profitability, and reduce environmental impact. That being said, there are potential challenges that might hinder the wide adoption of technology in the agricultural sector in Egypt due to the lack of the needed infrastructure that would support UAV and GIS methodology to collect, transfer, and analyze data.

When looking at the technical and economic criteria to assess the feasibility of this policy alternative, it is important to note that the importation and use of this technology might need advanced infrastructure and human skills. Egypt lacks both and hence the adoption of this alternative is a long-term goal policy alternative that will need investment on several levels including the technical and infrastructural levels. Moreover, adopting a wide range of technological tools might be an expensive investment specially to cover the 9 million feddans used for crop cultivation.

Alternative 2: Reducing Food Waste

Tapping into creative and traditional approaches to limit food loss and waste is another policy alternative. In particular, scaling up the FAO’s “Food loss and waste reduction and value chain development for food security in Egypt” project to expand in more regions, cover more crops and cover entire stages of the value chain is important. This will include but will not be limited to capacity building for farmers and traders, establishing food drying units, conducting media campaigns, and establishing food banks.

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This alternative will help reduce food waste at the pre-harvest and post-harvest stages, raise awareness amongst farmers, traders, consumers, and restaurant/hotel managers on the importance of limiting food waste and how to do so, as well as provide new employment opportunities and new sources of income to workers of food drying units. This alternative can help transfer excess food from those who do not need it to those in need. Additionally, this is an easy alternative to implement due to previous implementation experience through the FAO project, and it also has the benefit of involving all stakeholders. Nevertheless, some potential challenges to this policy alternative include challenging monitoring and coordination between all parties involved in implementation. Furthermore, unless adopted by the government nationwide, it might be hard to provide incentives to stakeholders to abide by food waste limiting techniques.

As for the technical and economic criteria to assess the feasibility of this policy alternative, the FAO project has already been implemented on a smaller scale in Nubariya and Sharqiya, hence the know-how of this project can be scaled up. Moreover, this alternative aims at reducing waste and redistributing excess food from those with extra food to those in need, so it is economically efficient and leads to more economic equity across the society. Furthermore, the economic returns from minimizing food waste and creating new employment opportunities should outweigh any costs associated with this policy.

Alternative 3: Building Resilience- Improving Crisis Prevention and Management

Smallholder farmers produce nearly 70 percent of the food calories in the world and are considered a crucial key for maintaining nutritional diversity as they mostly serve domestic markets (Boto et al., 2013). However, they are minimally resilient to shocks and natural crises. The challenges facing food security in Egypt such as climate change, population growth, urbanization, and diseases are bound to aggravate the strains on the already vul-

nerable smallholder farmers' population who serve as the primary source of food in domestic markets and count for almost 30% of the working population in Egypt. Although smallholder farmers are vulnerable to the consequences of climate change and water scarcity in Egypt, they still follow traditional inefficient agricultural and irrigation systems, and they fail to fully understand the negative consequences of climate change; neither are they aware of any national adaptation measures or strategies to cope with these consequences (Froehlich & Al-Saidi, 2018). Hence, a national mitigation strategy should be in place, focusing on five main pillars; 1) Establishing a sustainable Water Use and Irrigation System; 2) Establishing a sustainable Crop and Soil Management System, 3) Establishing a sustainable Livestock Management System, 4) Raising the awareness of smallholder farmers and capacitating them with knowledge and access to financial services to adopt the mitigation tools, and 5) Supporting the livelihood diversification of the most vulnerable groups, encouraging the smallholder farmers' off-farm or non-farm income generation activities.

Ideally, this alternative is expected to enhance the readiness and adaptation of the smallholder farmers to climate change and its consequences on agriculture, mitigate the risks posed to national food security and nutrition by strengthening agricultural production in the face of climate change uncertainties, and contribute to economic stability and development. Additionally, this alternative will also support the transfer to a more sustainable irrigation system which is critical and time-sensitive given the current annual water deficit and its future development.

The technical and economic criteria to assess the feasibility of this policy alternative show that advanced scientific crop and soil research is required to adopt the most sustainable, proper, and financially feasible tools and technologies to the context of Egypt. Furthermore, climate change is expected to affect the livelihoods of almost 30 percent

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of the workforce in Egypt whose income is either fully or partially dependent on agriculture, thus in return millions will be at the risk of poverty and malnutrition. The proposed solution aims at developing a long-term mitigation strategy to support the resilience of the smallholder farmers and enhance their readiness to strengthen agricultural production against climate change and water scarcity uncertainties. However, the implementation of such mitigation strategies may impose financial constraints on the government. This is mostly expected to hinder the transition to a sustainable agriculture system, as the government needs to finance the smallholder farmers to adopt such sustainable technologies and tools which will add more pressure on the state's general budget.

Alternative 4: Establishing Partnerships to Develop Low-cost High Value Nutritional Meal Plans

In light of the aforementioned nutritional problem that Egyptians face, this alternative proposes collaborating with national organizations that work on public health such as the National Nutrition Institute (NNI) to design a high nutrition meal at the lowest cost. As such, designing low-cost meal plans that adhere to food safety standards and ensure the delivery of nutritional needs will be done in accordance with different age groups. Meal plans implementation will be done over two strategies. The first strategy targets healthy meals for children at schools in underprivileged areas, while the second strategy targets education and behavior change communication plans of vulnerable individuals. The latter strategy can target women in low-income households who are the main decision makers when it comes to feeding their families in order to increase their knowledge level to deliver nutritious meals that are budget friendly.

Additionally, this alternative is said to help in mitigating the negative consequence of the increased risk of malnutrition-that is usually

the coping mechanism that individuals use to reduce their food expenditure in response to increased food prices- as well as improve the nutritional status of the children at school age, reduce the financial burden on families; and improve household food and nutrition security. Respectively, the eradication of malnutrition for children at school age will have an impact on the children's education performance at school. Moreover, building the households capacities will be a window of opportunity to achieve sustainable food and nutrition security.

While the alternative might seem promising, it is worthy to note that the implementation challenges might incorporate the need for a multi-sectoral approach and coordination at the highest level with several stakeholders, not only the NNI, to provide school meals within the food safety measures. Additionally, the technical and economic criteria to assess the feasibility of this policy alternative shows that the food safety standards needed would constitute a huge challenge during warm seasons, in addition to the challenge of providing school meals during vacations. Moreover, there is a potential food waste as standard portions will be provided to all students. As such, this approach requires the availability of highly skilled personnel -who are probably highly paid- in underprivileged areas. Furthermore, the funds needed for preparing, delivering, and ensuring the safety of school meals would constitute a huge burden on the Egyptian government, in addition to the need of building the capacities of members of the households which would require extra funding for monitoring and impact evaluation of the training received.

Conclusion

This policy paper addressed the looming issue of food security that Egypt is said to face in 2050. The prevailing country's geography, agriculture policies, national policies to achieve better food security, food pricing and house expenditures on food, as well as challenges imposed by climate change are all factors that will negatively contribute to the country's ability to secure the needed amount of food to feed all by 2050. Although the GoE has launched pro-poor policies aiming at reducing the economic burden on the most vulnerable groups to secure their basic needs and livelihoods, the issue of food security still withstands.

To propose a thorough and feasible recommendation, the paper takes stock of all the challenges the country faces today including its booming rate and wheat consumption

per capita, food availability, accessibility and affordability, climate change, nutritional challenges, and agricultural policies. The paper studied multiple policy alternatives that might be technically and economically feasible to be implemented by the GoE and will help reduce food insecurity.

Although all policy alternatives outlined in the previous section provide short to medium- and long-term solutions to the food security in Egypt, the most feasible solution is adopting a national program to reduce food waste, preserve the agricultural production and alter consumer behavior. Through targeting seven different dimensions, food waste can be reduced. This policy alternative is said to be an immediate short-term alternative that will help Egypt achieve its goal leaving no one behind and feeding all.

Policy Recommendations

Having assessed the technical and economic feasibility and criteria for each policy alternative, it is recommended to tackle the problem of food security in Egypt through focusing on **the elimination of food loss and waste (FLW) throughout the whole value chain of food production**. We suggest scaling-up the "Food loss and waste reduction and value chain development for food security in Egypt", a FAO implemented project, by creating a national strategy that is composed of seven dimensions to cover all aspects related to FLW.

- A. Capacity building: Farmers are to be trained on the best crop harvesting methods in terms of timing and method to harvest in the most efficient way with minimal loss. Similarly, traders are to be trained on the packaging and storage of fruits and vegetables in a way that would preserve them and prevent their damage.
- B. Subsidizing pesticides: Providing safe subsidized pesticides and technological methods to minimize crop waste due to disease and pests.
- C. Improve crop handling and transportation: The use of sturdy ventilated boxes to carry the crops instead of wooden crates in order to protect fruits and vegetables from being damaged, was already implemented in the FAO project in Nubariya and Sharqiya (FAO, 2018). Furthermore, the use of refrigerated trucks to transport crops, especially during hot seasons will also reduce damaged crops during transportation.
- D. Establishing drying units: A lot of crops are lost when food prices go down. It becomes too expensive for farmers to harvest and transport their crops, so they are better off leaving food to rot in the fields (FAO, 2018). Establishing drying units would enable farmers to dry their crops and sell them at higher prices since dried crops

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are more expensive to buy. For instance, sun-dried tomatoes and raisins are more expensive than tomatoes and grapes and have a different kind of consumer that can usually afford higher price items. As such, drying units have been implemented in the FAO project in Nubariya and Sharqiya (FAO, 2018), and given the success of such methods it should be implemented at a higher scale across different areas of Egypt.

- E. Food banks: The establishment of food banks where supermarkets, hotels, restaurants and potentially individuals can call and donate their excess food before it goes bad and gets damaged. These banks will have a network of NGOs and unprivileged households and can ensure that good quality food reaches those in need.
- F. Media campaigns: Media campaigns raising awareness on the problem of food waste and directing viewers to mechanisms on how to reduce their food waste should be focused on all segments of the society to include farmers, sellers, food-related business owners and different types of consumers (young children, mothers, etc.). Given the wide target audience of these campaigns, we believe the use of different methods and different tailored messages would be the most effective strategy to reach and convince target viewers (e.g., using schools and social media to target children and younger generations and the use of TV and radio to target older generations).
- G. Penalize food waste: In 2016, France banned supermarkets from tossing away edible food, and legally required them to donate unsold food items to food banks and charities (Chrisafis, 2016). In Egypt, we suggest that legal entities support the national strategy for food waste elimination through penalizing large supermar-

kets and restaurants on the destruction of good quality edible food, and to obligate large-scale supermarkets and restaurants/hotels to have an agreement with a food bank for the safe transfer of excess food to those in need.

Case Study 2: Reducing Food Waste in France

In 2016, after campaigns led by municipal councilor Arash Derambarsh followed by a popular petition gaining more than 200,000 signatures in four months, a law banning food waste was passed unanimously by the French senate (Chrisafis, 2016; Lemos, 2019). This law prevents large shops from throwing away edible good quality food items approaching their best-before date. Supermarkets with a size of 400 sq meters or more are obligated to sign donation contracts with charities so as not to face a penalty of €3,750 (Chrisafis, 2016). Charities and food banks collect and store food items received from supermarkets and distribute them amongst those in need. Furthermore, supermarkets are also legally banned from deliberately destroying food in their trash bins in an attempt to prevent people searching their bins from eating disposed food. It was not uncommon for some supermarkets to use bleach on binned food or to lock binned food in warehouses to be collected by refuse trucks (Chrisafis, 2016). The food waste law was positively met by food banks as the quantity and quality of donated food have improved. According to Jacques Bailet, President of the French Federation of Food Banks, 5,000 charities rely on the food bank network, and almost half of the donations are donated by grocery stores (Beardsley, 2018).

References

- Abdalla, M., & Al-Shawarby, S. (Eds.). (2017). The Tamween food subsidy system in Egypt: evolution and recent implementation reforms. In *The 1.5 Billion People Question: Food, Vouchers, or Cash Transfers?* edited by Harold Alderman, Ugo Gentilini, and Ruslan Yemstov, 107–150. Washington, D.C.: The World Bank.
- Abdel-Aziz, T., Dawod, G., & Ebaid, H. (2020). DEMs and reliable sea level rise risk monitoring in Nile Delta, Egypt. *Discover Sustainability*, 1(1), 1-11.
- Aguera, P., Berglund, N., Chinembiri, T., Comninou, A., Gillwald, A., & Govan-Vassen, N. (2020). Paving the way towards digitalising agriculture in South Africa. <https://researchictafrica.net/wp/wp-content/uploads/2020/09/PavingthewaytowardsdigitalisingagricultureinSouthAfricaWhitepaper272020105251.pdf>
- Ahmed, A. U. & Bouis, H. E. (2002). Weighing what's practical: Proxy means tests for targeting food subsidies in Egypt, *Food Policy*. Elsevier BV, 27(5–6), pp.519–540. doi: 10.1016/S0306-9192(02)00064-7.
- Al-Riffai, P. (2015). How to Feed Egypt. Available online at <https://www.thecairoreview.com/essays/how-to-feed-egypt/>
- Alsayed, S. (2019). Egypt declares a new poverty line, 735.5 pounds per month. Available online at <https://almaalnewscom/%D9%85%D8%B5%D8%B1%D8%AA%D8%B9%D9%84%D9%86-%D8%AE%D8%B7-%D8%A7%D9%84%D9%81%D9%82%D8%B1-735-5-%D8%AC%D9%86%D9%8A%D9%87%D8%A7-%D8%B4%D9%87%D8%B1/>
- Al-Shawarby, S. (2018, February 26). The Tamween Food Subsidy System in Egypt. IFPRI. <https://egyptssp.ifpri.info/2018/02/26/the-tamween-food-subsidy-system-in-egypt/>
- Al-Shawarby, S., & H. El-Laithy. (2010). Egypt's food subsidies: Benefit incidence and leakages. World Bank. Available online at <http://documents1.worldbank.org/curated/en/126581468026382278/pdf/574460ESW0P12210disclosed0101211101.pdf>
- Beardsley, E. (2018, February 24). French Food Waste Law Changing How Grocery Stores Approach Excess Food. *Food for Thought*. Available online at <https://www.npr.org/sections/thesalt/2018/02/24/586579455/french-food-waste-law-changing-how-grocery-stores-approach-excess-food>
- Boto, I., Pandya-Lorch, R., Biasca, R., Brasesco, F., & Cruz, D. (2013). Agricultural resilience in the face of crisis and shocks. In a Series of Meetings on ACP-EU Development Issues: Brussels Rural Development Briefings. Available online at http://eudevdays.eu/sites/default/files/cta-reader-30_agricultural-resilience-eng-rev-21.pdf
- Breisinger, C., Al-Riffai, P., Ecker, O., Abuismail, R., Waite, J., Abdelwahab, N., Zohery, A., El-Laithy, H. & Armanious, D., (2013). Tackling Egypt's Rising Food Insecurity in a Time of Transition. Joint IFPRI-WFP Country Policy Note.

References

- Breisinger, C., Ecker, O., Maystadt, J.F., Jean, Trinh Tan, J.F., Al-Riffai, P., Bouzar, K., Sma, A. & Abdelgadir, M. (2014). Building Resilience to Conflict through Food-Security Policies and Programs: An Overview. Building Resilience for Food and Nutrition Security. 2020 Conference Brief 3.
- Chrisafis, A. (2016). French law forbids food waste by supermarkets. The Guardian. Available online at January 21, 2021, from <https://www.theguardian.com/world/2016/feb/04/french-law-forbids-food-waste-by-supermarkets>
- Darmon, N., & Drewnowski, A. (2008). Does social class predict diet quality? The American Journal of Clinical Nutrition, 87(5), 1107-1117.
- Darmon, N., Bocquier, A., Vieux, F., & Caillavet, F. (2010). L'insécurité alimentaire pour raisons financières en France. Les travaux 2009-2010 de l'ONPES. Available at <https://onpes.gouv.fr/IMG/pdf/Darmon.pdf>
- Darmon, N., Ferguson, E. L., & Briend, A. (2002). A cost constraint alone has adverse effects on food selection and nutrient density: an analysis of human diets by linear programming. The Journal of Nutrition, 132(12), 3764-3771.
- Darmon, N., Lacroix, A., Muller, L., & Ruffieux, B. (2014). Food price policies improve diet quality while increasing socioeconomic inequalities in nutrition. International Journal of Behavioral Nutrition and Physical Activity, 11(1), 66.
- Dawoud, S. (2005). An analysis of food consumption patterns in Egypt (Doctoral dissertation, Christian-Albrechts Universität Kiel). Available at <https://d-nb.info/975462458/34>
- De Haen, H., & Hemrich, G. (2007). The economics of natural disasters: implications and challenges for food security. Agricultural Economics, 37, 31-45.
- Drewnowski, A., & Darmon, N. (2005). Food choices and diet costs: an economic analysis. The Journal of Nutrition, 135(4), 900-904.
- El-Nouby, E. (2019, 28 June). Ministry of Agriculture: Strict penalties for land encroachment contributed to the decline of violation cases. Youm7. Available online at <https://www.youm7.com/story/2019/6/28/-الاراضي-على-التعديت-عقوبات-تغليظ-الزراعة-تغليظ-عقوبات-التعديت-على-الاراضي-ساهم-فى-تراجع-مخالفات/4308430>
- Egypt: The Burden of Malnutrition at a Glance (2019). Available online at <https://globalnutritionreport.org/resources/nutrition-profiles/africa/northern-africa/egypt/>
- Fabiosa, J. & Soliman, I. (2008). Egypt household expenditure pattern Does it alternative a food crisis?
- Fan, S., Al-Riffair, P., El Said, M., Yu, B., Kamaly, A. (2006) A Multilevel Analysis of Public Spending, Growth and Poverty Reduction in Egypt. 40. doi: 10.22004/ag.econ.42813.

References

- FAO (2015). Food Loss and Waste Reduction and Value Chain Development for Food Security in Egypt and Tunisia - Egypt Component. Available online at <http://www.fao.org/egypt/programmes-and-projects/food-loss-waste-reduction/fr/>
- FAO (2018). Reducing Food Loss and Waste - Egypt [Video]. Available online at https://www.youtube.com/watch?v=gF0O9R4FzQU&feature=emb_logo
- FAO (2019). FAO is closing the Food Loss and Waste Reduction project with a call for sustained efforts to eradicate hunger. Available online at <http://www.fao.org/egypt/news/detail-events/en/c/1203522/>
- FLW M&E Unit (2018). Summary of Systematic Review on Food Loss and Waste in Egypt. Available online at http://www.flwmeu-aeri.sci.eg/assets/workshop/171_34_summary%20of%20sestematic%20review%20on%20food%20loss-En.pdf
- FLW M&E Unit (2019). Food Loss and Waste Across Food Value Chains in Egypt, Can Efficient Performance Be Achieved? (Policy brief 1). Available online at http://www.flwmeu-aeri.sci.eg/assets/workshop/252_52_FLW%20ME%20Unit-Policy%20Brief%201-Fruits-New%20Version.pdf
- FLW M&E Unit (2019). Food Loss and Waste Across Food Value Chains in Egypt, Can Efficient Performance Be Achieved? (Policy brief 4). Available online at http://www.flwmeu-aeri.sci.eg/assets/workshop/84_28_FLW%20ME%20Unit-Policy%20Brief%204-fish%20EN.pdf
- FLW M&E Unit (2019). Food Loss and Waste Across Food Value Chains in Egypt, Can Efficient Performance Be Achieved? (Policy brief 5). Available online at http://www.flwmeu-aeri.sci.eg/assets/workshop/432_32_%D9%85%D9%84%D8%AE%D8%B5%D8%B3%D9%8A%D8%A7%D8%B3%D8%A7%D8%AA%20%D8%A7%D9%84%D8%A7%D9%84%D8%A8%D8%A7%D9%86.pdf
- FLW M&E Unit (2019). Food Loss and Waste Across Food Value Chains in Egypt, Can Efficient Performance Be Achieved? (Policy brief 6). Available online at http://www.flwmeu-aeri.sci.eg/assets/workshop/931_34_FLW%20M_E%20Unit%20-Policy%20Breif%20No%206%20-%20polutry-%20Ar.pdf
- Froehlich, P., & Al-Saidi, M. (2018). Local community perception of climate change adaptation in Egypt. *E&ES*, 191(1), 012003.
- GFSI. Global Food Security Index (GFSI). Available online at <https://foodsecurityindex.eiu.com/index>
- GHI. 2020. About: The Concept of the Global Hunger Index - Global Hunger Index (GHI) Peer-Reviewed Annual Publication Designed to Comprehensively Measure and Track Hunger at the Global, Regional, and Country Levels. Available online at <https://www.globalhungerindex.org/about.html>

References

- Hachem, F. & Abi-Samra, M., (2011). The Impact of Soaring Food Prices on Food Consumption and Nutrition of Poor Households: the case Egypt. Available at http://www.fao.org/fileadmin/templates/FCIT/Meetings/CFS_side_event_2011/1_Soaring_Food_Prices-Egypt-ISFP_En_.pdf
- Hamdy, S. (2020). No new conditions have introduced for obtaining a Takaful and Karama pension. Almal News. Available online at <https://almalnews.com/التزامن-استحداث-شروط-جديدة-للحصول-ع/>
- IMF (2016). IMF Executive Board Approves US\$12 billion Extended Arrangement Under the Extended Fund Facility for Egypt. Available online at <https://www.imf.org/en/News/Articles/2016/11/11/PR16501-Egypt-Executive-Board-Approves-12-billion-Extended-Arrangement>
- IUCN (2013). Resilience to Climate Change along the Nile in Egypt. Available online at <https://www.iucn.org/sites/dev/files/import/downloads/egypt.pdf>
- Kassim Y., Mahmoud M., Kurdi S., & Breisinger C. (2018). An Agricultural Policy Review of Egypt: First Steps Towards a New Strategy. Available online at <http://ebrary.ifpri.org/utils/getfile/collection/p15738coll2/id/132788/filename/132996.pdf>
- Lemos, L. (2019, July 24). 4 ways France is leading the food waste agenda. The food waste blog. Available online at <https://blog.winnowsolutions.com/4-ways-france-is-leading-the-food-waste-agenda>
- Mytton, O., Gray, A. Rayner, M, & Rutter, H. (2007). Could Targeted Food Taxes Improve Health? *Journal of Epidemiology and Community Health* 61(8): 689–94.
- Ramadan, R., & Thomas, A. (2011). Evaluating the impact of reforming the food subsidy program in Egypt: a mixed demand approach. *Food Policy*, 36(5), 638-646.
- Reda, L. (2018). A look at the National Project for Reclamation and Cultivation. *Egypt today*. Available online at <https://www.egypttoday.com/Article/3/62373/A-look-at-the-National-Project-for-Reclamation-and-Cultivation>
- Salevurakis, J. W., & Abdel-Haleim, S. M. (2008). Bread subsidies in Egypt: Choosing social stability or fiscal responsibility. *Review of Radical Political Economics*, 40(1), 35-49.
- Smed, S., Jensen, J.D., Denver, S. (2007). Socio-Economic Characteristics and the Effect of Taxation as a Health Policy Instrument. *Food Policy* 32(5–6): 624–39.
- Sallam, R. (2018). Policy Seminar: Evaluation of School Feeding Programs in Egypt. Available online at <https://egyptssp.ifpri.info/2018/05/20/policy-seminar-evaluation-school-feeding-egypt/>
- Supreme Standing Committee for Human Rights (2020). Full text of SSCHR's report on Egypt's efforts to realise the right to food. Al Ahram Online. Available online at <http://english.ahram.org.eg/News/388435.aspx>

References

- The World Food Programme (WFP) (2013). The status of poverty and food security in Egypt: analysis and policy recommendations. Available online at <https://documents.wfp.org/stellent/groups/public/documents/ena/wfp257467.pdf>
- The World Food Programme (WFP) (2018). Executive Board, Annual Session, Egypt Country Strategic Plan (2018-2023), 2018-2021. Page 2
- The National Population Council (2020). The National Population Strategy. Page 5-6.
- UN (2018). World Water Development Report 2018. Available online at <https://www.unwater.org/publications/world-water-development-report-2018/>
- UNCCD. The Global Food Security Index | Knowledge Hub. Available online at <https://knowledge.unccd.int/kss/global-food-security-index>
- Wahba, M. (2017, 7 April). All what you want to know about 1000 Days of Life programs. Youm7. Available online at <https://www.youm7.com/story/-1000-مشروع-عن-معرفة-ما-تريد-معرفته-عن-مشروع-1000-يوم/7/4/2017/3175534/يوم>
- Wall, J., Mhurchu, C. N., Blakely, T., Rodgers, A., & Wilton, J. (2006). Effectiveness of monetary incentives in modifying dietary behavior: a review of randomized, controlled trials. *Nutrition Reviews*, 64(12), 518-531.

THE PUBLIC POLICY HUB

Where Rigour Meets Creativity

The Public Policy HUB is an initiative that was developed at the School of Global Affairs and Public Policy (GAPP) in October 2017. It was designed to fill in the policy research gap in Egypt. It provides the mechanism by which the good ideas, plausible answers, and meaningful solutions to Egypt's chronic and acute policy dilemmas that are proposed by the country's best minds, the experienced and the creative from different age brackets, can be nurtured, discussed, debated, refined, tested and presented to policymakers in a format that is systematic, highly-visible and most likely to have a lasting impact.

It is designed to develop a cadre of well-informed and seasoned policy developers and advocates, while simultaneously fostering and promoting creative solutions to the challenges facing Egypt today. The project provides a processing unit or hub where policy teams are formed on a regular basis, combining experienced policy scholars/mentors with young creative policy analysts, provide them with the needed resources, training, exposure, space, tools, networks, knowledge and contacts to enable them to come up with sound, rigorous and yet creative policy solutions that have a greater potential to be effectively advocated and communicated to the relevant policymakers and to the general public.

Since its establishment, the Public Policy HUB has been supported by Carnegie Corporation of New York, UNICEF Egypt, and Oxfam. The Hub had partnerships with different ministries and governmental institutions like the Ministry of Social Solidarity, Ministry of Planning, Ministry of Health, Ministry of Trade and Industry, Ministry of Local Development, Ministry of Education, Ministry of Environment, National Council for Childhood and Motherhood, National Population Council, and General Authority For Transportation Projects Planning.

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