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# **FOOD SECURITY POLICIES IN JORDAN, TUNISIA, AND EGYPT**

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# Imprint

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# ACRONYMS

CPF	Country Programming Framework
EU	European Union
FAO	The Food and Agriculture Organization Of The United Nations
IFAD	International Fund for Agricultural Development
ILO	International Labor Organization
INS	National Statistics Institute
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature and Natural Resources
MALR	Egyptian Ministry of Agriculture and Land Reclamation
MENA	Middle East and North Africa region
MoA	The Ministry of Agriculture
MoE	Ministry of Education
MWRI	Egyptian Ministry of Water Resources and Irrigation
NSFNS	The National Strategy for Food and Nutrition Security
ONAGRI	The National Observatory of Agriculture
SADS	Sustainable Agricultural Development Strategy
SEMED	The Southern and Eastern Mediterranean region
UNICEF	United Nations Children's Fund
WFP	World Food Programme
WHO	World Health Organization

# I. INTRODUCTION

## 1.1 Research Objective

Food security is a crucial issue for many countries worldwide, including in the Middle East and North Africa (MENA) region. The countries of Jordan, Tunisia, and Egypt have all faced food security challenges and have implemented various policies to address them. This research will examine the food security policies in these three countries, specifically focusing on their effectiveness and potential areas for improvement. In specific, this literature review aims to identify and analyze the critical issues related to food security policies in Jordan, Tunisia, and Egypt, assess the effectiveness of current policies in addressing food insecurity and malnutrition in these countries, identify and evaluate any gaps or challenges in existing policies and suggest potential recommendations for improvement.

## 1.2 Research Methodology

The methodology undertaken for this research paper was a literature review. The literature review for this methodology will involve a thorough and systematic examination of relevant academic and policy literature as well as analyzing any available data in this literature. This will include papers from academic journals, books, and other scholarly sources, as well as reports and documents from international organizations, NGOs, and other relevant sources.

Various online databases have been utilized to conduct the review, including academic databases such as JSTOR, ProQuest, and Google Scholar. In addition to these databases, relevant online repositories from organizations such as the World Bank, the Food and Agriculture Organization (FAO), and the World Food Programme (WFP) have been used to ensure a comprehensive and diverse range of sources are included in the review.

Overall, the literature has been conducted thoroughly and systematically to ensure that all relevant literature is included and the findings are robust and reliable, which will provide a strong foundation for the research project and will enable the researcher to identify gaps in the existing literature and contribute to the advancement of knowledge in the field.

## II. FOOD SECURITY POLICIES IN JORDAN, TUNISIA, AND EGYPT

### 2.1 Overview of Food Security Worldwide

The Food and Agriculture Organization (FAO) of the United Nations defines food security as "a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life."<sup>1</sup> Furthermore, it encompasses the consistent availability, accessibility, and reliability of sufficient, safe, and nutritious food for all individuals.<sup>2</sup> Food security is a significant concern for many developing countries today. Research indicates that in 2021, nearly 30% of the global population was moderately or severely food insecure.<sup>3</sup> This is attributed to the impacts of the COVID-19 pandemic, including disruptions in food supply chains and increased food prices due to transportation costs.<sup>4</sup> Additionally, climate change poses a significant threat to global food security, as predicted by the Intergovernmental Panel on Climate Change (IPCC) year in 2019, as it is likely to lead to disruptions in food systems due to an increase in extreme weather events.<sup>5</sup>

The countries in the Southern and Eastern Mediterranean (SEMED) region face significant challenges concerning food security. The increasing population in these countries,<sup>6</sup> coupled with limited arable land, water scarcity, internal crises, and fluctuations in the global economy, have resulted in an inability to meet the population's food needs.<sup>7</sup> Additionally, the food security and nutrition of vulnerable groups, such as those living in poverty, are particularly at risk due to the exacerbating effects of rising food prices. This can have a ripple effect and impact the region's social and political stability.<sup>8</sup>

To respond to the food security challenges, countries develop their food security strategies and policies, which are government-led initiatives and programs that aim to ensure that all individuals have access to sufficient, safe, and nutritious food for an active and healthy life. These policies can include measures to increase food production, enhance distribution and storage systems, and provide support and safety nets to vulnerable groups. The ultimate goal of these

policies is to decrease or eliminate hunger and malnutrition.<sup>9</sup> In recent years, there has been a growing recognition of the right to adequate food and the significance of fair and safe housing in food policy. These policy shifts have been observed over the past decade.<sup>10</sup> This is especially important because food security is an essential part of human security, directly affecting social and political stability.

### 2.2 An Analysis of Current Policies and Interventions in Jordan, Tunisia, and Egypt

#### 2.2.1 Current Policies and Interventions in Jordan

Jordan has implemented several policies aimed at addressing food security challenges. Some of the key policies and initiatives include:

1. **National Nutrition Strategy 2023-2030** by the Ministry of Health (MoH) and the World Health Organization (WHO) aims to achieve better nutrition levels in Jordan. The strategy is essential because it constitutes a roadmap to guide the government's and relevant partners' efforts to improve nutrition for the entire population, including women of reproductive age, children under five, adolescents and older people.<sup>11</sup>
2. **The National Food Security Strategy** by the Ministry of Agriculture (MoA) seeks to establish Jordan as a strategic regional hub for food security. The strategy aims for Jordan to act as a center for storage and logistics, agricultural production, food processing, irrigation systems, greenhouses, modern technology, and knowledge transfer. Additionally, it would be a hub for emergency assistance to neighboring countries, create resistance to the effects of climate change, and minimize COVID-19's adverse effects on food security. The strategy focuses on several key areas, including increasing food production, improving the efficiency of food supply chains, and strengthening social protection for vulnerable groups.<sup>12</sup> The government of Jordan is working to turn the agricultural strategy recently

<sup>1</sup> Agreed definition for "food security" the 1996 World Food Summit, available on: <http://bit.ly/3ks3heg>

<sup>2</sup> IUCN (2013). Food Security Policies: Making the Ecosystem Connections, available on: [bit.ly/3XxW0b7](http://bit.ly/3XxW0b7)

<sup>3</sup> FAO, IFAD, UNICEF, WFP and WHO (2022). The State of Food Security and Nutrition in the World 2022, page: 10, available on: [bit.ly/3QLTLif](http://bit.ly/3QLTLif)

<sup>4</sup> Ibid page: 1, available on: [bit.ly/3QLTLif](http://bit.ly/3QLTLif)

<sup>5</sup> Behnassi, M., Barjees Baig, M., El Haiba, M., & Reed, M. R. (Eds.). (2021). Emerging Challenges to Food Production and Security in Asia, Middle East, and Africa. "Impacts of Climate Change on Agriculture and Food Security in Tunisia: Challenges, Existing Policies, and Way Forward," page: 66, available on: [https://sci-hub.se/https://link.springer.com/chapter/10.1007/978-3-030-72987-5\\_3](https://sci-hub.se/https://link.springer.com/chapter/10.1007/978-3-030-72987-5_3)

<sup>6</sup> FAO (2015). Egypt, Jordan, Morocco and Tunisia Key trends in the agrifood sector, available on: [bit.ly/3IR402V](http://bit.ly/3IR402V)

<sup>7</sup> Ashraf, I (October 2022) Food insecurity threatens the Middle East, available on: <https://bit.ly/3WgnWj>

<sup>8</sup> FAO (2015). Egypt, Jordan, Morocco and Tunisia Key trends in the agrifood sector, available on: [bit.ly/3IR402V](http://bit.ly/3IR402V)

<sup>9</sup> FAO, IFAD, UNICEF, WFP and WHO (2022) The State of Food Security and Nutrition in the World 2022, page: 55, available on: [bit.ly/3QLTLif](http://bit.ly/3QLTLif)

<sup>10</sup> IUCN (2013). Food Security Policies: Making the Ecosystem Connections, p. 6 - available on: [bit.ly/3XxW0b7](http://bit.ly/3XxW0b7)

<sup>11</sup> UN Jordan (December 2022) WHO and Ministry of Health launch national nutrition strategy 2023–2030, available on: <http://bit.ly/3IWq4cz>

prepared by the MoA into an action plan and measures to enable the sector to overcome the ongoing difficulties, enhance the ability to compete, increase contribution to job creation, and develop local communities.<sup>13</sup>

3. **The National Water Strategy 2016-2025** aims to ensure the sustainable management of water and sanitation for all Jordanians. To achieve this, the strategy essentially covers the national water sector goals and approach through the five components: integrated water resources management; water, sewage, and sanitation services; water for irrigation, energy and other uses; institutional reform; and sector information management and monitoring.<sup>14</sup>
4. **The National School Feeding Strategy**, which the Ministry of Education (MoE) implements, supports the government in improving the well-being and health of the new generations. The strategy will strengthen social safety nets that provide educational, health and economic benefits for schoolchildren in the most vulnerable areas. It will also improve the opportunities and environment the MoE offers its students in schools.<sup>15</sup>

### 2.2.2 Current Policies and Interventions in Egypt

Egypt has implemented several policies and programs to address its food security challenges. Some examples include:

1. **Sustainable Development Strategy: Egypt Vision 2030** aims to achieve food security, improve living standards, and promote sustainable development in Egypt. It includes a project that aims to create global storage and logistics centers on an area of 3.5 million m<sup>2</sup>, including developing an industrial zone, at an investment cost of up to nearly \$2 billion. This includes the establishment of a global logistics center in Damietta.<sup>16</sup> The project will contribute to the achievement of food security in Egypt.
2. **"Sustainable Agricultural Development Strategy Towards 2030" (SADS)**, developed by the Egyptian Ministry of Water Resources and Irrigation (MWRI) in 2019. It looks at the sustainable use of agricultural land and water resources through agricultural land maintenance and protection, increasing water-use efficiency within the irrigation system from 50% in 2007 to 80% by 2030 and reducing rice plantings from 1.67 million to 1.3 million feddans between 2007 and 2030. These measures were intended to conserve the water needed for reclaiming 1.25 million feddans of land by 2017 and further to 3.1 million feddans by 2030.<sup>17</sup>

3. **The Egypt Country Strategic Plan (2018–2023)**. The plan is a comprehensive document that outlines a comprehensive strategy for addressing food insecurity in the country. The plan is centered on five strategic outcomes, each of which is aimed at improving the food security and livelihoods of the most vulnerable populations in Egypt. The first strategic outcome focuses on ensuring that food-insecure and vulnerable children and families in targeted areas have access to adequate food all year round. The second outcome aims to ensure that food-insecure refugees, displaced populations, and host communities have sufficient food all year round. The third outcome is focused on improving the nutritional status of targeted populations in Egypt by 2030. The fourth outcome aims to ensure that vulnerable smallholder farmers and Bedouin communities in targeted governorates have resilient livelihoods by 2030. Finally, the fifth outcome is focused on enhancing the capacity of the Government of Egypt to target and assist vulnerable populations and to share its experience with selected countries to achieve zero hunger by 2030.<sup>18</sup>

4. **FAO Country Programming Framework (CPF) for Egypt for (2018–2022)** focuses on three government priority areas.<sup>19</sup> The first is focused on improved agricultural productivity by developing strategies and plans for increased productivity in the small-scale dairy farming sub-sector through improved breeding, feeding and biosecurity, as well as implementing enhanced regulations and frameworks of sanitary and phytosanitary measures, sustainable agriculture, and good hygienic practices. Additionally, it seeks to provide collection, transportation, and storage facilities to improve the small-scale dairy farming sector and secure local supply.

The second focuses on raising the degree of food security in strategic food commodities by developing additional national strategies and plans/programs for food and nutrition security, strengthening public-private policy and dialogue, and improving the enabling environment and coordination among agricultural development stakeholders for agricultural investment. Additionally, strategies and plans will expand social protection to rural areas, including smallholder farmers and small-scale fisher folks, and specifically support the most vulnerable.

Finally, it focuses on the sustainable use of natural agricultural resources by enhancing innovative technologies and practices for increased water productivity and availability in irrigated agriculture and climate change adaptation. Additionally, it looks to

<sup>12</sup> Ministry of Agriculture (June 2021). The National Food Security Strategy 2021 – 2030, page: 7, available on: <https://bit.ly/3W9jpPf>

<sup>13</sup> World Bank, WFP, FAO, IFAD (July–August 2020). Jordan Food Security Update Implications of COVID-19, page: 11, available on: <https://bit.ly/3w7mwg4>

<sup>14</sup> UNEP (2016), National Water Strategy of Jordan, 2016 – 2025, available on: <http://bit.ly/3IZACHF>

<sup>15</sup> Ministry of Education (2021) THE NATIONAL SCHOOL FEEDING STRATEGY, 2021-2025, page: 7, available on: <https://bit.ly/3D00XQp>

<sup>16</sup> Ministry of Planning, Monitoring and Administrative Reform (n.d.) Sustainable Development Strategy: Egypt's Vision 2030, available on: <https://bit.ly/3iPGpFj>

<sup>17</sup> Abdelaal, Hamdy Sayed Abdou, and Dawn Thilmany. (2019). "Grains Production Prospects and Long Run Food Security in Egypt" Sustainability 11, no. 16: 4457 - available on: <http://bit.ly/3D0AAvA>

<sup>18</sup> WFP (2018). Egypt Country Strategic Plan (2018–2023), available on: <https://bit.ly/3iHWhJQ>

<sup>19</sup> FAO (2018) Egypt Country Programming Framework (2018-2022), available on: <https://bit.ly/3CTJEXM>

develop strategies and plans for improved water supply, including the water-energy-food nexus, multi-sectoral use of Nile River water, alternative freshwater sources, water harvesting and use of treated wastewater, and also developing strategies and plans for climate change adaptation and natural disaster risk reduction and management in agriculture.

It's worth mentioning that FAO has supported other key strategies to guide the sustainable development of agriculture and food security, including the Sustainable Agricultural Development Strategy Towards 2030, the National Policy for the Sustainable Reuse of Wastewater in Agriculture, and the Strategy for the Development of the Date Palm Sector.<sup>20</sup> The FAO has also implemented the project "Reducing Food Loss and Waste and Developing Value Chains in Egypt and Tunisia." The project's overall aim was to build the capacities of public and private sector actors, including young people and women, to reduce food loss and waste in the selected value chains to increase food security. In Egypt, the project focused on the tomato and grape value chains.<sup>21</sup>

### 2.2.3 Current Policies and Interventions in Tunisia

Tunisia has implemented several policies aimed at improving food security in the country, such as:

#### 1. The National Strategy for Food and Nutrition Security (NSFNS)<sup>22</sup> was adopted in 2015. The NSFNS aims to improve access to adequate, safe, and nutritious food for all Tunisians and includes measures such as the promotion of school feeding programs, the improvement of food safety and quality, and the strengthening of social safety nets for vulnerable groups. The strategy implies multiple measures:

- Policy measures: creating a National Food Security and Nutrition Council with representatives from regional, business, scientific, and civil society organizations to emphasize a solid national political commitment to the strategy's goals and to encourage the adoption of a participatory approach for their realization.
- Horizontal measures: The development of a national food security index, drawn up periodically by the National Statistics Institute (INS), will allow the progress in the implementation of the national strategy to be monitored to make timely corrections to the policies and programs implemented.
- Sectoral measures, which include:
  - o The launch of a specific program for the support of smallholder farmers shall be accompanied by adjustments in macroeconomic policies (such as the liberalization of the job market) and

the strengthening of self-sufficiency through the enhancement of the national cereal supply. Furthermore, the adoption of a new import policy, entrusting the management of imports to the Office of Commerce and reviewing the tasks of the offices of oil and cereals, aiming at improving the storage infrastructure in their respective fields, as well as to provide more consistent support to producers

- o Social protection and school feeding: Reaffirm the role of school feeding as an indispensable component of the social protection floor and improve targeting to reach the most vulnerable families to benefit from social safety nets, including school feeding.
- o Consumer protection: The strengthening of food quality control by equipping control structures with the necessary technical means and implementing standards for the classification of fresh produce.

#### 2. Climate Change Strategies: The Tunisian government has been mainly engaged during the last three decades in setting up and implementing appropriate strategies to mitigate and adapt to climate change. The main considered adaptation actions can be listed as follows:<sup>23</sup>

- Improving water demand control and strengthening the national water-saving program (especially in the irrigation sector).
- Increasing the water storage capacity (dams, etc.) and mobilization of all available resources (wastewater, desalination, water harvesting, etc.)
- Reducing energy consumption during water production and expanding the use of renewable energies.

#### 3. Reducing Food Loss and Waste and Developing Value Chains in Egypt and Tunisia Project by FAO: the overall aim of the project was to build the capacities of public and private sector actors, including young people and women, to reduce food loss and waste in the selected value chains as a means of increasing food security. In Tunisia, the project focused on the cereals and dairy value chains.<sup>24</sup>

<sup>20</sup> FAO (n.d.). Partnering for sustainable food security and climate change adaptation, available on: <https://bit.ly/3Wj7QVJ>

<sup>21</sup> FAO, (n.d.) Reducing food loss and waste and developing value chains in Egypt and Tunisia, available on: <https://bit.ly/3wifAFP>

<sup>22</sup> ITES (n.d.), Strategic Review on Food Security and Nutrition in Tunisia, available on: <https://bit.ly/3GHJwa0>

<sup>23</sup> Behnassi, M., Barjees Baig, M., El Haiba, M., & Reed, M. R. (Eds.). (2021). Emerging Challenges to Food Production and Security in Asia, Middle East, and Africa. "Impacts of Climate Change on Agriculture and Food Security in Tunisia: Challenges, Existing Policies, and Way Forward," page: 91-94, available on: [https://sci-hub.se/https://link.springer.com/chapter/10.1007/978-3-030-72987-5\\_3](https://sci-hub.se/https://link.springer.com/chapter/10.1007/978-3-030-72987-5_3)



## 2.3 Investigating the Challenges of Countering Food Insecurity in Jordan, Egypt, and Tunisia

### 2.3.1 Challenges of Countering Food Insecurity in Jordan

<sup>25</sup> Jordan is facing significant challenges concerning food security, driven by various factors such as the increasing demand for food due to population growth, a massive influx of refugees, and more complex food consumption patterns. Another factor is the lack of a unified or robust institutional structure and inadequate coordination among relevant institutions and policies related to agriculture, industry, trade, water, food, nutrition, health, and labor. <sup>26</sup>Recent studies indicate that approximately 53% of the Jordanian population is vulnerable to food insecurity due to the impacts of the COVID-19 pandemic. <sup>27</sup> Additionally, given that Jordan is a host to a large population of refugees, food insecurity also affects this community, with 21% of refugee households in host communities being food insecure. <sup>28</sup>

Climate change also impacts all aspects of Jordan's food security and food systems, as demonstrated by the increased frequency of droughts, scarcity of water, and acceleration of land degradation. <sup>29</sup> These factors negatively impact production and productivity, particularly for small and subsistence farmers who rely primarily on rain-fed agriculture and extensive semi-intensive livestock rearing. <sup>30</sup> Furthermore, Jordan is characterized by inadequate agricultural resources, especially grains, with arable lands covering less than four thousand square kilometers (less than 1000 square meters per person). Also, it faces a significant shortage of regenerated soft water resources, which do not exceed 750 million cubic meters per year or an average of 170 cubic meters per person per year for all uses. <sup>31</sup>

Jordan has implemented several policies to address food security challenges. However, these policies face some challenges in their implementation. Some of the main challenges include the following:

1. High food import dependency: Jordan is 98% dependent on food imports, including wheat, barley, sugar, rice, powdered milk, tea, coffee, corn, vegetable oil (excluding olive oil), cheese, chickpeas, vermicelli, and lentils<sup>32</sup> which makes the country vulnerable to fluctuations in global food prices. This makes it difficult for the government to implement policies that ensure food security for all citizens.<sup>33</sup>
2. Political instability: the region's continued political instability has caused a significant influx of Syrian and other refugees into Jordan<sup>34</sup>, with the world's second-highest share of refugees per capita.<sup>35</sup> This has placed considerable strain on the nation's already-scarce resources and raised competition for employment and services.<sup>36</sup>
3. Limited resources: Jordan has limited resources, particularly in terms of water and arable land, which limits the country's ability to increase food production and improve food security.<sup>37</sup>
4. Food Waste: According to a statement by the MoA in 2022, food waste in Jordan is estimated at 93 kilograms per person annually. This equates to 955 thousand metric tons of food, enough to feed 1.5 million people for an entire year. Additionally, it is estimated that 22% of locally produced fruits and vegetables are lost throughout the different stages of the supply chain<sup>38</sup>
5. Cost of energy: this leads to higher transportation prices, which burden farmers and consumers.
6. Climate change: food security is closely linked to the environment and climate change as it affects and is affected by them, especially in Jordan. Climate change is expected to affect the country's amount and quality of stressed water resources. According to the Comprehensive National Report on Climate Change in Jordan, rainfall will decrease by 15%. Jordan will also see a continual increase in temperature by 1.5-2.5°C and an increase in dry seasons and heat waves. Although the rainfall rate is expected to decline in Jordan, there is an increase in its severity, leading to floods that may affect Jordan's sustainable development and fragile ecosystems.<sup>39</sup>

<sup>24</sup> FAO (n.d.), Reducing food loss and waste and developing value chains in Egypt and Tunisia, available on: <https://bit.ly/3wifAfP>

<sup>25</sup> Global Food Security Index 2022, available on: <http://bit.ly/3iVRtkb>

<sup>26</sup> Minister of Agriculture (June 2021), The National Food Security Strategy 2021 – 2030, page: 24, available on: <https://bit.ly/3W9jpPf>

<sup>27</sup> World Bank, WFP, FAO, IFAD (July-August 2020). Jordan Food Security Update Implications of COVID-19, page: 4, available on: <https://bit.ly/3w7mwg4>

<sup>28</sup> Ibid.

<sup>29</sup> Minister of Agriculture (June 2021), The National Food Security Strategy 2021 – 2030, page: 11, available on: <https://bit.ly/3W9jpPf>

<sup>30</sup> Ibid.

<sup>31</sup> AARDO (2010). Food security – global trends and perspective, page 213, available on: <https://bit.ly/3km1bga>

<sup>32</sup> Jordan - Agricultural Sectors, available at: <http://bit.ly/3Xr81zE>

<sup>33</sup> Maria Christoforidou, M, Borghuis, G, Seijger, G, van Halsema G E, and Hellegers, P (2022) Food security under water scarcity: a comparative analysis of Egypt and Jordan, available on: <https://bit.ly/3H9D10X>

<sup>34</sup> Ibid.

<sup>35</sup> UNHCR (n.d.) Jordan country page, available at: <https://bit.ly/3kxp7NK>

<sup>36</sup> Christoforidou, M, Borghuis, G, Seijger, G, van Halsema G E, and Hellegers, P (2022) Food security under water scarcity: a comparative analysis of Egypt and Jordan, available on: <https://bit.ly/3H9D10X>

<sup>37</sup> Ibid.

<sup>38</sup> UN (October 2022) Jordan, food loss and food waste, available on: <http://bit.ly/3GMZkZi>

<sup>39</sup> Minister of Agriculture, (June 2021) The National Food Security Strategy 2021 – 2030, page: 21, available on: <https://bit.ly/3W9jpPf>

### 2.3.2 Challenges of Mitigating Food Insecurity in Egypt

Recent studies show Egypt ranked 77 out of 113 countries on the Food Security Index in 2022. Thus, Egypt's ability to achieve food security is threatened by several factors, including population growth, limited resources, and a weak economy.<sup>40</sup> According to recent statistics, Egypt's population has grown to 107 million people in 2020,<sup>41</sup> and the average number of moderately and severely food insecure individuals for 2019-2021 is 27.9 million,<sup>42</sup> which exacerbates the country's difficulties in feeding its population.

Egypt's total land area is over one million square kilometers, of which almost 96% is desert. The Delta and the River Nile valley are home to 96% of the country's inhabitants. The uneven distribution of population and rapid population growth (about 2% annually) have led to severe socioeconomic issues such as declining living standards, high unemployment, and rising crime rates.<sup>43</sup>

Regarding food sufficiency, Egypt has achieved only 56% self-sufficiency in wheat production, which has led to heavy dependence on imported food to meet domestic consumption.<sup>44</sup> This dependence on imported food makes poor individuals more vulnerable to changes in global food prices.<sup>45</sup> The limited resources and weak economy of Egypt make it difficult for the country to sustain sufficient food production to feed its large population, exacerbating the threat to its food security.

Water scarcity represents a significant challenge to food production and security in Egypt due to the impacts of climate change.<sup>46</sup> This is particularly true for the agricultural industry, which is vital to Egypt's socioeconomic development and represents a significant portion of the country's economy.<sup>47</sup> Water scarcity by 2025 is expected to impact the agricultural sector negatively. As a result, the production of cereals is predicted to fall by 11% from its level in 1995 due to irrigation water shortages.<sup>48</sup>

The farmers' reliance on traditional inefficient agricultural and irrigation systems and failure to fully understand the negative consequences of climate change shall also increase the farmers' vulnerability to the effects of climate change and water scarcity.<sup>49</sup>

A significant proportion of food produced in Egypt is lost or wasted due to inadequate storage and transportation infrastructure, poor coordination between farmers, processors, and retailers, and ineffective post-harvest handling practices and harvesting skills.<sup>50</sup> Despite a significant portion of the population facing food insecurity, Egypt still ranks among the world's worst food wasters.<sup>51</sup> In 2022, the FAO released a statement indicating that approximately 50% of all fruits and vegetables, 40% of fish, and 30% of both milk and wheat in Egypt are wasted.<sup>52</sup> These losses are a waste of resources and contribute to the country's food insecurity and harm the economy.

On the other hand, arable and fertile lands in Egypt are scarce, and farming is limited to less than 4% of the total land area.<sup>53</sup> In 2018, the total agricultural land area was about 2.9 million hectares, which accounted for 2.9% of Egypt's land.<sup>54</sup> Encroachment on agricultural fields has appeared recently as one of Egypt's most challenging and urgent problems that affect food security. According to research by the Egyptian Ministry of Agriculture and Land Reclamation (MALR), urbanization and development caused Egypt to lose 326,000 feddans (138,000 hectares) of arable land between 1983 and 2018.<sup>55</sup> The rapid urban expansion, mainly at the expense of agricultural land, has critical consequences for agricultural productivity and the condition of the environment.<sup>56</sup>

<sup>40</sup> Abdelaal, H.S.A.; Thilmann, D. (2019). Grains Production Prospects and Long Run Food Security in Egypt. *Sustainability*, 11, 4457. available on: <https://bit.ly/3ku0vFt>

<sup>41</sup> Worldometer (n.d.) Elaboration of the latest United Nations data, available on: <http://bit.ly/3iJqZSV>

<sup>42</sup> FAO (n.d.) Statistics for Egypt, available on: <http://bit.ly/3iPYKBX>

<sup>43</sup> Radwan, T.M.; Blackburn, G.A.; Whyatt, J.D.; Atkinson, P.M. (2019). Dramatic Loss of Agricultural Land Due to Urban Expansion Threatens Food Security in the Nile Delta, Egypt. *Remote Sens.*, 11, 332. on: <http://bit.ly/3Xh5XKq>

<sup>44</sup> ARDO (2010). Food security – global trends and perspective, page 213, available on: <https://bit.ly/3km1bga>

<sup>45</sup> WFP (2018). Egypt country strategic plan (2018–2023), available on: <https://bit.ly/3iHWhJQ>

<sup>46</sup> Khedr, M. (2017). Challenges and Issues in Water, Climate Change, and Food Security in Egypt. In: Negm, A.M. (eds) *Conventional Water Resources and Agriculture in Egypt*. The Handbook of Environmental Chemistry, vol 74. Springer, Cham <https://bit.ly/3GLTAPA>

<sup>47</sup> Ibid.

<sup>48</sup> Abdelaal, H.S.A.; Thilmann, D. (2019). Grains Production Prospects and Long Run Food Security in Egypt. *Sustainability*, 11, 4457. available on: <https://bit.ly/3ku0vFt>

<sup>49</sup> Mazloum, A., Rizk, Abdelrahman, Murhab, N., and Asal, Z. (June 2021) Policy Paper. Addressing food insecurity in Egypt Towards Sustaining food access for all. American University of Cairo, page: 14, available on: <https://bit.ly/3R5ljQ5>

<sup>50</sup> FAO (n.d.) Food Loss and Waste Reduction and Value Chain Development for Food Security in Egypt and Tunisia - Egypt Component, available on: <http://bit.ly/3ZlanM8>

<sup>51</sup> Ibid.

<sup>52</sup> Pinn, T. (2022) Egypt's Fight Against Food Waste, available on: <https://bit.ly/3ZAD8u5>

<sup>53</sup> AARDO (2010). Food security – global trends and perspective, page 213, available on: <https://bit.ly/3km1bga>

<sup>54</sup> Macrotrends (n.d.) Egypt arable land for 2018, available on: <http://bit.ly/3CU31Lt>

<sup>55</sup> Abdelaal, H.S.A.; Thilmann, D. (2019). Grains Production Prospects and Long Run Food Security in Egypt. *Sustainability*, 11, 4457. available on: <https://bit.ly/3ku0vFt>

<sup>56</sup> Radwan, T.M.; Blackburn, G.A.; Whyatt, J.D.; Atkinson, P.M. (2019) Dramatic Loss of Agricultural Land Due to Urban Expansion Threatens Food Security in the Nile Delta, Egypt. *Remote Sens.* 11, 332. available on: <https://bit.ly/3Xh5XKq>

### 2.3.3 Challenges of Mitigating Food Insecurity in Tunisia

Tunisia, a North African country, is characterized by an arid Mediterranean climate and is considered among the nations with the lowest per capita water availability, with a rate of 450 cubic meters per year per individual.<sup>57</sup> The agricultural sector, which encompasses 516,000 farms, comprises a significant portion of the country's land use, occupying 65% of Tunisia's total land area.<sup>58</sup>

According to recent studies, Tunisia ranked 62 out of 113 countries in terms of the food security index in 2022.<sup>59</sup> However, the food security situation in the country remains relatively fragile due to economic instability and limited natural resources.<sup>60</sup> The relationship between food security and the agricultural sector in Tunisia is evident, as food production is a direct output of agricultural activity.<sup>61</sup> Tunisian farming is primarily based on rain-fed, extensive systems and is highly susceptible to climatic changes, which leads to instability in domestic agricultural production. As a result, Tunisia has a high dependence on cereal imports, with a dependence ratio that has been steadily increasing over time. It was estimated at 70% between 2019-2021.<sup>62</sup>

Water scarcity poses a significant threat to Tunisia's food production and food security. As a semi-arid country, Tunisia has modest water resources in quantity and quality, similar to many countries in the Middle East and North Africa (MENA).<sup>63</sup> The total available water resources do not exceed 435 cubic meters per year per capita, and these resources are decreasing every year. This volume is considered an indicator of severe water stress. It is projected that the available water volume per capita will drop to 345 cubic meters per year by 2025.<sup>64</sup>

In addition to water scarcity, Tunisia also faces a significant problem with food waste, with an estimated 3.3 million tons of food wasted annually. This represents roughly one-third of the country's overall food production. Poor management of food supply chains and inadequate infrastructure for storage and transportation are the primary contributors to food waste in Tunisia. Consumer behavior, such as purchasing more food than necessary, and cultural attitudes towards food contribute to the problem.<sup>65</sup> Recent studies have shown that food waste in food retailing reaches 2.8 million Tunisian dinars (approximately USD 1.2 million), and households average 17 dinars (about USD 7) per month.<sup>66</sup>

<sup>57</sup> Behnassi, M., Barjees Baig, M., El Haiba, M., & Reed, M. R. (Eds.). (2021). Emerging Challenges to Food Production and Security in Asia, Middle East, and Africa. "Impacts of Climate Change on Agriculture and Food Security in Tunisia: Challenges, Existing Policies, and Way Forward," page: 91-94, available on: [https://sci-hub.se/https://link.springer.com/chapter/10.1007/978-3-030-72987-5\\_3](https://sci-hub.se/https://link.springer.com/chapter/10.1007/978-3-030-72987-5_3)

<sup>58</sup> Ibid.

<sup>59</sup> Global Food Security Index 2022, available on: <http://bit.ly/3ZN2ZPs>

<sup>60</sup> Behnassi, M., Barjees Baig, M., El Haiba, M., & Reed, M. R. (Eds.). (2021). Emerging Challenges to Food Production and Security in Asia, Middle East, and Africa. "Impacts of Climate Change on Agriculture and Food Security in Tunisia: Challenges, Existing Policies, and Way Forward," page: 91-94, available on: [https://sci-hub.se/https://link.springer.com/chapter/10.1007/978-3-030-72987-5\\_3](https://sci-hub.se/https://link.springer.com/chapter/10.1007/978-3-030-72987-5_3)

<sup>61</sup> Jeder, H, Hattab, S; Frija, I. (2020) An econometric analysis for food security in Tunisia, page: 5, available on: <https://bit.ly/3XlrVWF>

<sup>62</sup> Food security in Tunisia within water scarcity the relative importance of the meat sector, page: 46, available on: <https://bit.ly/3J505iW>

<sup>63</sup> Ouertani, E (2016). Impact of food consumption on water footprint and food security in Tunisia, available on: <https://bit.ly/3WedxUV>

<sup>64</sup> Ibid.

<sup>65</sup> Sassi, K, Capone, R, et al (2016) AGROFOR International Journal, Food wastage by Tunisian households, available on: <http://bit.ly/3HaJNUq>

<sup>66</sup> ITES (N.d.) Strategic Review on Food Security and Nutrition in Tunisia, available on: <https://bit.ly/3GHJwa0>

# III. ADDRESSING FOOD INSECURITY: RECOMMENDATIONS FOR IMPROVEMENT AND MITIGATION

## 3.1 Recommendations for Improvement and Mitigation in Jordan

- Maximizing Jordan's agri-food sector's potential economic contributions. A considerable portion of the population, particularly in rural areas, relies on agri-food as their primary source of income, employment, and subsistence. A quarter of Jordan's population depends on the agri-food industry for livelihood. As unemployment rises, the sector's labor-intensive nature and strong long-term value-added elasticity of employment are crucial. Employment can increase by 0.36 percentage points for every percentage point that the agriculture sector's value-added increases.<sup>67</sup> This can be done by subsidizing the agriculture export industry. Jordan has a significant comparative advantage for exporting high-value fresh products to premium markets, and there is room to expand agricultural production. The Jordan Valley, with its exceptional climate at 300 meters below sea level, is uniquely suited for the production and export of early season fruits and Jordan's location, with close proximity to Arab, European and Russian markets and year-round climatic growing conditions, allows Jordan to export to large nearby markets.<sup>68</sup>
- Investing in water management. Jordan is the second water-scarce country in the world, and there is a need to develop dams and water system projects in the Jordan Valley to maximize the utilization of surface water resources to prevent water from being wasted in the Dead Sea.<sup>69</sup>
- Launching awareness campaigns for citizens on rationalizing food consumption and preventing waste in its use. Such campaigns shall be directed towards high-consumption layers, including restaurants and social events.<sup>70</sup>
- Increasing the efficiency of plant production, especially in the field of irrigated vegetable production, by encouraging, supporting, and providing financial facilities to farmers.<sup>71</sup>

- Expanding the introduction of innovative technology in agriculture and modern communications to spread knowledge and awareness among farmers to increase production, improve quality, and save water.<sup>72</sup>
- Forming a strategic partnership with other countries and international organizations to secure food imports and exports by working with neighboring countries to remove all trade and customs barriers that hinder the flow of food to and from Jordan.<sup>73</sup>

## 3.2 Recommendations for Improvement and Mitigation in Egypt

- Increase domestic food production by investing in modern farming technologies such as precision agriculture and irrigation systems, promoting small-scale sustainable farming practices, and enabling small farmers to unlock and optimize a larger supply chain by granting them access to larger markets through technology.<sup>74</sup>
- Invest in irrigation infrastructure in heritage crop production areas of the Nile valley and Delta to enhance irrigation system efficiency. This will increase productivity through improved water usage efficiency, optimize potential gain in production from land restoration, conserve water and increase crop yields through reallocating water to more productive uses.<sup>75</sup>
- Reduce food waste by raising awareness for farmers and trades on the importance of reducing food waste through media campaigns and transferring excess food from those who do not need it to those in need.<sup>76</sup>
- Approve the proposed law by the Egyptian House of Representatives to regulate food waste, promote the distribution of surplus edible food and prevent food waste. The proposed law imposes both incentives and fines on businesses and restaurants. These fines, which range from 100,000 to 500,000 EGP, undoubtedly show how seriously certain lawmakers take the problem of food waste.<sup>77</sup>
- Improve land and water production by expanding agricultural research and development spending.<sup>78</sup>

<sup>67</sup> World Bank, WFP, FAO, IFAD (July-August 2020). Jordan Food Security Update Implications of COVID-19, page: 4, available on: <https://bit.ly/3w7mwg4>

<sup>68</sup> Ibid

<sup>69</sup> Al-Kharabsheh, A (2019) Challenges to Sustainable Water Management in Jordan, page: 45, available on: <https://bit.ly/3GSpGt1>

<sup>70</sup> El-Naser, H (November 2022). Some insights on Jordan's food security, The Jordan Times, available on: <http://bit.ly/3XlUHVu>

<sup>71</sup> Ibid

<sup>72</sup> Ibid

<sup>73</sup> Ibid

<sup>74</sup> Abdelaal, H.S.A.; Thilmany, D. (2019) Grains Grains Production Prospects and Long Run Food Security in Egypt, available on: <http://bit.ly/3D0AAvA>

<sup>75</sup> Mazloum, A., Rizk, Abdelrahman, Murhab, N., and Asal, Z. (June 2021) Policy Paper. Addressing food insecurity in Egypt Towards Sustaining food access for all. American University of Cairo, page: 14, available on: <https://bit.ly/3R5JjQ5>

<sup>76</sup> Pinn, T. (2022) Egypt's Fight Against Food Waste, available on: <https://bit.ly/3ZAD8u5>

<sup>77</sup> Abdelaal, H.S.A.; Thilmany, D. (2019) Grains Grains Production Prospects and Long Run Food Security in Egypt, available on: <http://bit.ly/3D0AAvA>

### 3.3 Recommendations for Improvement and Mitigation in Tunisia

- Increase agricultural productivity by investing in research and development to improve crop yields, water management, and land use practices, promote sustainable agricultural practices, and provide extension services and training to small-scale farmers.<sup>79</sup>
- Adapt to Climate Change by developing and implementing policies and measures to support the country's agricultural sector to adapt to the changing climate and reduce the vulnerability of farming communities.<sup>80</sup>
- Increase transparency and accountability in the food distribution system to prevent corruption by increasing the government's financial support for the most vulnerable and ensuring food aid reaches the most vulnerable.<sup>81</sup>
- Support rural areas' development by implementing policies such as increasing access to education, healthcare, and other social services and creating job opportunities in the agricultural sector.<sup>82</sup>
- Continue to promote the export of agricultural products to competitive and fair markets to reduce the dependency on dominant traditional markets (the EU, for example) and achieve a better food and commercial balance.<sup>83</sup>
- Promoting national productions reduces dependency on foreign markets for traditional imported products (vegetables, oil, sugar, etc.).<sup>84</sup>

### CONCLUSION

Jordan, Tunisia, and Egypt face food security challenges and have implemented various policies to address them. These policies have successfully increased food production and reduced dependence on imports to some extent. Still, the countries have faced challenges such as the high cost of infrastructure development and the need to import water for irrigation, scarce resources, especially water, and food waste.

Therefore, these countries developed policies and initiatives to mitigate and address the food security issue. However, Jordan, Egypt, and Tunisia face significant challenges regarding mitigating and addressing food security through these policies. Various factors, such as population growth, limited resources, economic instability, political instability, high food import dependency, and the impacts of climate change, drive these challenges. Inadequate institutional structures, coordination and policies further exacerbate these challenges. Despite efforts to address these challenges, they still persist and harm these countries' food security, agricultural production, and economy. Factors such as water scarcity, food waste, and encroachment on arable land compound these challenges. Addressing these issues will require a comprehensive approach that addresses the underlying causes and involves all relevant stakeholders.

Addressing food insecurity and malnutrition in Jordan, Egypt, and Tunisia requires a comprehensive and multifaceted approach. For Jordan, this includes maximizing the potential of the agri-food sector, supporting the agriculture export industry, investing in water management, launching awareness campaigns for citizens, increasing the efficiency of plant production, expanding the introduction of innovative technology in agriculture, and forming strategic partnerships with other countries and international organizations. In Egypt, this includes increasing domestic food production, investing in irrigation infrastructure, reducing food waste, and expanding agricultural research and development spending. In Tunisia, this includes increasing agricultural productivity, adapting to climate change, increasing transparency and accountability in the food distribution system, supporting rural development, promoting the export of agricultural products to competitive and fair markets, and reducing dependency on foreign markets for traditional imported products.

<sup>79</sup> European Journal of Agronomy, Wheat drought-tolerance to enhance food security in Tunisia, birthplace of the Arab Spring, available on: <https://bit.ly/3J0kI5A>

<sup>80</sup> I Behnassi, M., Barjees Baig, M., El Haiba, M., & Reed, M. R. (Eds.). (2021). Emerging Challenges to Food Production and Security in Asia, Middle East, and Africa. "Impacts of Climate Change on Agriculture and Food Security in Tunisia: Challenges, Existing Policies, and Way Forward," page: 91-94, available on: [https://sci-hub.se/https://link.springer.com/chapter/10.1007/978-3-030-72987-5\\_3](https://sci-hub.se/https://link.springer.com/chapter/10.1007/978-3-030-72987-5_3)

<sup>81</sup> Ibid.

<sup>82</sup> Ibid.

<sup>83</sup> Ibid.

<sup>84</sup> Ibid.

