



## **Food Security in Egypt Case Study: “Sweet Potatoes Baladi Bread”**

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### **Abstract**

This systematic review provides unique findings with an up-to-date examination of the global and Egyptian food market situation pre- and post-crisis, focusing on rebalancing the wheat-to-sweet potato ratio in Egyptian "Baladi" bread production to mitigate the impact of the crisis. Measurement is critical for assessing and monitoring food security. Using reports and research from Egypt's governmental statistics and strategies for Egypt Vision 2030, several articles were identified for a full examination. A literature review analyzes the scientific evidence on these indicators to comprehend the food security dimensions and components covered and the recent developments and concepts applied in food security measurement. Using content analysis, the data from the articles were extracted, analyzed, and summarized to provide clarification of Egypt's status as the world's second-largest wheat importer, how it is managing the surge in food price inflation, and what wheat alternatives are taken to pave the way for self-sufficiency, especially when it comes to the subsidized local bread production. The results of this study can be used by food security stakeholders, such as governments, practitioners, food tourism and hospitality sectors, and academics for briefs, teaching, policy-related interventions, and evaluations.

**Keywords:** Wheat, Food security, Sweet potatoes, Baladi bread, Russian-Ukraine war, Food tourism, Egypt.

### **1. Introduction**

Egypt's Vision 2030 has identified "Food Provision" for all Egyptian citizens as a critical objective, deeming it a fundamental aspect of the standard of living. The primary strategic aim, "Enhance the Quality of Life for Egyptians and Elevate their Living Standards," seeks to eliminate poverty and accomplish food security. Various elements, primarily population expansion, insufficient healthcare

facilities, and an inadequate social safety net have resulted in a decline in food levels among the Egyptian populace, posing a risk to food security, particularly for those with lower incomes. Egypt's Vision 2030 strives to ensure food provision and security by guaranteeing the accessibility of food commodities and establishing a comprehensive nutritional framework for all individuals. (Egypt Vision,2023).

As the 2023 Global Hunger Index indicates, Egypt experiences moderate hunger, securing the 57th position out of 121 nations. Challenges persist regarding food affordability, quality, and safety as Egypt relies on international markets for over half its essential food items. (Grebmer, Von, Bernstein, Wiemers, Reiner, Bachmeier, Hanano & Fritschel, 2023).

The ongoing Russian-Ukrainian conflict is anticipated to escalate poverty and hunger in numerous nations, affecting more than 40 million individuals, particularly those with limited coping mechanisms, high dependence on imports, and escalating costs of transportation, fuel, and raw materials in the Middle East/North Africa (MENA) region and sub-Saharan Africa. Consequently, food availability is expected to be inadequate, particularly in certain Middle Eastern nations (Dr. Rasha, Dr. Akila, Dr. Zahran & Dr. El-Galfy, 2023). The instances of food insecurity are projected to rise by 4-6 million in the MENA region following the commencement of the war. The annual FAO cereals index percentage dropped from 27% in 2021 to 14% within two months after the outbreak of the conflict in 2022 (WFP, 2022).

### 1.1 Refugees' Phenomena

**The Palestinian Crisis:** The severe situation in Gaza has left the entire population requiring food, shelter, and protection. In addition to the provision of food aid since the crisis began, **The Sudanese Crisis:** By the end of November, the armed conflict in Sudan, which commenced on April 15, had forced over 378,000 individuals to seek refuge in Egypt to escape danger and insecurity (UNHCR Egypt, 2023). The WFP has continued its emergency response initiatives to assist these refugees, having already provided food and monetary aid to approximately 334,000 people (UNHCR Egypt, 2023). **The Syrian Crisis:** The number of Syrian

individuals documented by UNHCR in Egypt experienced a significant increase, escalating from 12,800 individuals by the conclusion of 2012 to exceeding 153,000 individuals by the termination of 2023. (UNHCR Egypt, 2024)

The present research tends to provide a comprehensive overview of the global and Egyptian context analysis of wheat, one of the primary Egyptian cereal crops, in light of the conflict between Russia and Ukraine. Furthermore, it aimed to ascertain the intrinsic qualities, nutritional attributes, and sensory perception associated with substituting 50% wheat flour with sweet potatoes in the production of Egyptian Baladi bread, with the ultimate goal of diminishing reliance on wheat imports and fostering self-reliance.

## 2. Literature Review

### 2.1 Food Security

Food Security is defined as when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. (Peng and Berry, 2018; World Bank, 2024).

Food security was formulated in response to famine, hunger, and food crises, acknowledging vulnerable and affected populations' critical needs and behaviors (Peng and Berry, 2018). This concept was officially defined at the 1974 World Food Conference to address the challenges faced by individuals and communities in accessing an adequate and nutritious food supply as "[the] availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices" (Peng and Berry, 2018).

#### 2.1.1 Four Main Dimensions of Food Security

Four dimensions of food security have been delineated based on the definition provided by the Food and Agriculture Organization (FAO, 2008). The first dimension pertains to the availability of food sourced locally and imported from overseas. The second dimension concerns accessibility, which involves the ability of food to reach consumers through transportation infrastructure and the financial capacity of individuals to make purchases. Additionally, socio-cultural access is vital to ensure that food is culturally acceptable and that social safety nets are in place to assist the less privileged. The third dimension, utilization, underscores the importance of individuals consuming sufficient quantities of food in quantity and quality to lead healthy and fulfilling lives and achieve their full potential. This dimension also emphasizes the necessity of safe and clean food and water, implicating adequate water and sanitation.(FAO, 2008)

Furthermore, physical well-being is crucial for the digestion and absorption of consumed food(Peng and Berry,2018; World Bank,2024). The fourth dimension, stability, focuses on the capacity of nations, communities, or households to endure disruptions to the food supply chain, whether stemming from natural disasters such as climate-related events and earthquakes or human-induced crises like wars and economic downturns. Therefore, it is evident that food security encompasses various levels, with availability at the national level, accessibility at the household level, utilization at the individual level, and stability serving as a temporal dimension impacting all levels. All four dimensions must be upheld to ensure comprehensive food security. (Peng and Berry,2018; World Bank,2024)

Recent advancements highlight the significance of sustainability, which can be viewed as the extended temporal aspect of food security. Sustainability encompasses various factors at a transnational or regional scale, such as ecology, biodiversity, climate variations, and socio-cultural and economic elements. These aspects will impact the food security of forthcoming generations.(Peng and Berry,2018 ; Vuppapapati, 2022)

**2.1.1.1 Physical availability of food:** Food availability addresses the “supply side” of food security and is determined by the level of food production, stock levels, and net trade. (UN,2017; World Bank,2024)

**2.1.1.2 Economic and physical access to food:** A sufficient quantity of food at the national or international level does not automatically provide food security for households. Concerns about inadequate access to food have led to a stronger governmental emphasis on incomes, expenditure, markets, and prices to achieve food security goals. (UN,2017; World Bank,2024)

**2.1.1.3 Food utilization:** Utilization is frequently thought to be the process by which the body absorbs the most nutrients from the diet. Individuals who receive enough care and feeding will consume enough energy and nutrients due to proper food preparation, a varied diet, and intra-household food distribution. This defines a person's nutritional condition when coupled with good biological absorption of their food. (UN,2017; World Bank,2024)

**2.1.1.4 Stability of the other three dimensions over time:** Even if you now consume an acceptable amount of food, you are still seen as having food insecurity if you occasionally have insufficient access to food, putting your nutritional status in danger. Your level of food security may be impacted by unfavorable weather conditions, unstable political environments, or economic issues (such as increased food prices and unemployment). (UN,2017; World Bank,2024).

## **2.2 World Food Programme of Egypt**

The World Food Programme (WFP) assisted approximately 3,000 small-scale farmers in adjusting their farming practices to cope with the effects of climate change and reduce their losses. This initiative was executed in 85 of the most vulnerable settlements in Upper Egypt, which were identified through the national 'Haya Kareema' (Decent Life) Campaign. Farmers were offered resilient seeds, machinery, training sessions, and access to climate-oriented early warning mechanisms,

resulting in a roughly 30 percent rise in earnings. (WFP,2022)

Egypt hosts approximately 430,000 refugees on the humanitarian front, with more than 65,000 individuals receiving assistance from WFP through monthly food and cash support. Following the commencement of the Sudan crisis in April 2023, Egypt welcomed over 378,000 Sudanese refugees escaping the turmoil in their homeland and seeking refuge outside their borders. Building upon the accomplishments of the national strategic plan (CSP) spanning from 2018 to 2023, WFP is persistently aiding the Government in tackling nutritional and food security obstacles within the new CSP (2023-2028), in alignment with Egypt's Vision 2030 road-map towards attaining the Sustainable Development Goals outlined in the 2030 Agenda. (WFP,2022; WFP,2023)

The CSP is concentrated on reinforcing social safety nets and food systems, delivering humanitarian aid to refugees, and enhancing the self-sufficiency and income-generating capabilities of small-scale farmers and those most susceptible to being marginalized(WFP,2023).WFP collaborates closely with the "Decent Life" Presidential initiative for development, which strives to assist 5,000 of the most impoverished rural communities through a holistic, community-based development strategy. (WFP,2023)

The organization endeavors to improve the livelihoods and resilience of the most disadvantaged populations, establishing connections between responsive social safety nets and resilient food systems, including by advocating for proper nutrition and healthy dietary habits. To expedite advancements towards Sustainable Development Goals 2 and 17, the WFP enhances the capacity of national institutions and systems by enhancing data systems that comprehensively comprehend the contexts and effects of interventions, related programs, and targeting and distribution mechanisms. (WFP,2023)

### **2.2.1 Challenges**

Due to the ongoing Ukraine-Russia conflict, a global economic downturn, and the recent

devaluation of the Egyptian pound, Egypt is experiencing economic repercussions and rising prices, impacting access to food for the most vulnerable groups. With escalating funding requirements, the World Food Programme (WFP) is appealing to donors for assistance in mobilizing the necessary resources to sustain and expand food and nutrition aid efforts. Approximately USD 26 million is needed by WFP to continue providing food assistance to around 300,000 beneficiaries in Egypt until May 2023. (WFP,2022)

Given the increasing vulnerabilities within supported communities and the urgent needs arising from neighboring crises, the World Food Programme (WFP) seeks donor support to gather resources for maintaining and expanding food and nutrition aid for the most disadvantaged individuals. WFP estimates a requirement of approximately USD 24.2 million to sustain aid for about 900,000 vulnerable people in Egypt until May 2024. (WFP,2023).

### **2.2.2 Highlights**

From 6-18 November 2022, the World Food Programme (WFP) participated in the 27th United Nations Climate Change Conference (COP27) in Sharm el-Sheikh, Egypt, alongside global leaders, development organizations, private sector entities, and approximately 35,000 attendees(WFP,2022). During the conference, WFP presented its climate-resilient initiatives at various side events in collaboration with governmental and private partners and other United Nations agencies. These sessions emphasized the implementation of sustainable environmental strategies in Egypt and across Africa, the significance of innovation and digitalization, and the effects of WFP's initiatives on the most marginalized communities. Moreover, WFP exhibited its climate-resilient integrated programs in an interactive showcase and conducted a visibility campaign on climate change at Sharm El-Sheikh airport. (WFP,2022).

In a strategic alliance with the prominent local food technology platform, Talabat, the World Food Programme (WFP) launched a year-long awareness drive addressing the climate crisis,

nutrition, and the pursuit of a world free from hunger. This comprehensive campaign covered thematic areas and was disseminated through the Talabat application and social media channels. The initial segment of the campaign, focused on proper nutrition, has been active on Talabat platforms since November. (WFP,2022).

### 2.3 Wheat in Egypt

Throughout the years, wheat has consistently been a prevalent cultivated cereal in Egypt, constituting nearly 10% of the total value of agricultural output and 20% of all agricultural imports. Despite Egypt's potential self-sufficiency in wheat production, various technical, political, and economic inefficiencies have hindered this achievement. Furthermore, wheat cultivation spans across Egypt, particularly in the delta region, with approximately 529.2 Fadden (1260 HA) of wheat fields under harvest. The climatic conditions in Egypt are conducive to wheat growth, positioning it as one of the primary crops cultivated in the region. While investing in wheat could prove advantageous for the country, Egypt's current wheat export volume is a mere 550 tons. (Nada and Tharwat,2019).

As Nada and Tharwat (2019) indicated in the Global Agriculture Information network overseen by the USDA Foreign Agriculture Service, Egypt is recognized as the world's largest wheat importer. Moreover, Egypt is the single largest purchaser of wheat globally through the General Authority for Supply Commodities (GASC). Governmental wheat imports in 2017 reached 7.5 MMT, overshadowing the private sector imports that amounted to only 4.5 MMT. (Nada and Tharwat, 2019).

Egypt was formerly a prominent buyer of U.S.-sourced wheat; however, the country has diversified its sources of wheat procurement. It has been observed that a significant disparity exists between wheat production and consumption in Egypt, primarily attributed to the substantial imports of wheat. Egypt is the largest wheat importer globally, impacting trade balance and foreign reserves due to production challenges and economic volatility.

Given its critical role in domestic consumption, wheat production levels fall considerably short of meeting local demand, leading to heightened wheat imports(Wally and Akingobe, 2022). There has been limited positive economic progress, where domestic wheat production surpassed import levels in three distinct periods: 1999-2000, 2005-2006, and 2012. (Nada and Tharwat, 2019).

Following Wally and Akingobe (2022), most wheat imports are sourced from European and Black Sea countries like Russia, Ukraine, and Romania, a strategic move to ensure a diversified wheat supply chain. This shift underscores the critical importance of wheat to Egypt, making it a focal point of governmental policies. Consequently, Egypt grapples with a substantial trade deficit, significantly impacting its foreign reserves.(Wally and Akingobe, 2022).

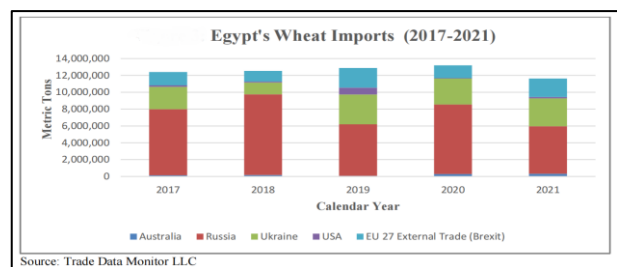
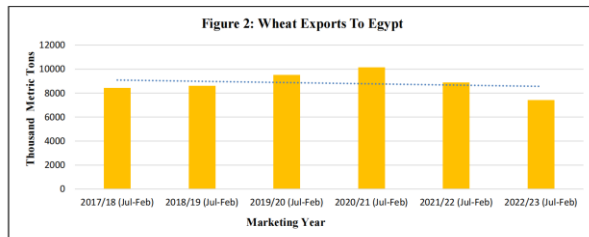


Fig. 1: Illustrates Egypt's wheat imports from 2017-2021. (Source: Wally and Akingobe, 2022)

### 2.4 Russian-Ukraine War Threat

The war between Russia and Ukraine is potentially aggravating already unsettled supply chains and causing significant wheat disruptions in supplies to import destinations in the Middle East and North Africa region. (Wally, Specialist & Akingobe,2022).

Egypt is not isolated from these catastrophic events, which are already affecting its wheat imports from both countries. Accordingly, FAS Cairo forecasts Egypt's wheat imports in MY 2022/23 (July – June) at 11 MMT, down by 8.3 percent from MY 2020/21 Post's import estimate figure of 12 MMT. The latter was revised downward by 4 percent from the USDA official estimate. (Wally *et al.*, 2022).



Source: Trade Data Monitor LLC and FAS Cairo Research

Fig. 2: Demonstrates the decline in wheat imports from 2017-2023. (Source: Formiga and Degreenia, 2023)

Russia and Ukraine collectively account for approximately 33% of the global wheat export, 20% of yellow corn, and 80% of sunflower seeds (WFP, 2022). Consequently, upholding food production systems and enhancing food reserves is crucial to safeguarding food security. To enhance agricultural productivity, various strategies are essential, including enhancing soil fertility and technological adaptation, controlling pest infestations, adjusting the agricultural landscape in response to climate variations (Ahmed et al., 2022), and curbing urbanization on agricultural territories (Shi et al., 2022).

The culmination of these challenges has positioned Egypt as the second-largest wheat importer globally, with an estimated 50% of the wheat demand, making Egyptian food security highly vulnerable due to the Russian-Ukrainian conflict. According to CAPMAS (2022), the inflation in food prices peaked at 20% in March 2022, merely a week after the onset of the Russian-Ukrainian conflict (Abay et al., 2022). A mere 1% shock to the global markets can trigger a positive shock in the Egyptian wheat spot market, leading to heightened volatility (Ahmed, 2022). Hence, forthcoming policies to enhance food security must prioritize reducing reliance on wheat imports. (Shalaby, Hamza, Zahran & El-Galfy, 2023)

Moreover, the war has led to a trade disruption of primary commodities in the world market and significant price hikes; thus, Egypt has felt the squeeze of these ramifications as Russia and Ukraine are major wheat suppliers to Egypt. The high wheat prices have prompted the Government to consider addressing the bread subsidy system. However, the high inflation

rate has made replacing the current subsidy system with a conditional cash bread subsidy harder. Furthermore, wheat prices increased by an average of \$100/MT in the final quarter of CY 2021. This resulted in an increase in expenses for the government budget set aside for the importation of wheat for the current fiscal year that ended in June 2022. (Wally et al., 2022).

## 2.5 Importance of Egyptian Baladi Bread

The word for bread in Egyptian Arabic is "aish," meaning "life". This linguistic coincidence reflects the supreme importance of bread in the Egyptian diet: Aish is the "number one" (Makollus and Mollenhauer, 2017). Baladi bread represents about 80% of all kinds of bread produced by commercial bakeries nationally, and most citizens prefer it. Making it available is vital for food security. Therefore, the Government has been careful to make it readily available (Makollus & Mollenhauer, 2017). Food subsidies are an effective type of social safety net. They target people experiencing poverty or those who might be poor due to adverse shocks. Food subsidies hope to achieve social goals, economic goals, political goals, and economic growth, alleviate the suffering of the poor, promote equitable distribution, and enhance household food security and nutrition. The food subsidy system covers Baladi bread, flour, and goods subsidized for ration card holders, such as sugar, rice, cooking oil, and tea. Commodities are distributed in rationed quantities at low prices and made available at higher but still subsidized prices through cooperatives, flour stores, and bakeries. (Makollus and Mollenhauer, 2017). Because of the country's importance of the wheat crop, the Egyptian Government buys wheat from both imports and domestic production and subsidizes different supply chain products. An example of such products is the fertilizers used in farming wheat to produce what is known as Baladi bread, which is considered the cheapest food (diet) for almost all Egyptians. (Makollus and Mollenhauer, 2017).

This type is used heavily due to Egypt's social conditions since more than 25% of the Egyptian

population is living under the poverty line. Due to that, the Government introduced the Baladi bread program that is only now available to sectors with innovative provisioning card systems that allow special income citizens to buy the Baladi bread lower than its actual price even though it has been rated at a fixed price since 1989.(Makollus and Mollenhauer,2017)

### **2.5.1 Bread Subsidy System**

Egypt distributes 150 subsidized loaves of bread monthly to beneficiaries (equivalent to five loaves daily). Baladi bread is retailed at a subsidized rate of 0.05 EGP per loaf (\$0.0016), significantly lower than its actual cost. The Government reimburses the variance in production expenses to bakeries. Subsidizing a single loaf of baladi bread is 0.60 EGP (\$0.02). The existing subsidy scheme allows recipients who consume below the stipulated amount to convert their saved bread into points (1 point = EGP 0.01). These points can be utilized to purchase 32 other food and non-food items at discounted rates ranging from 20-30 percent, offering a more varied food selection than retail stores. (Nada and Tharwat,2019; Wally et al.,2022 )

Beneficiaries conduct transactions at approximately 40,000 MoSIT-affiliated private grocery stores across rural and urban areas and 1,300 state-owned consumer complexes in urban regions. The Allocation for Bread Subsidy is Increasing: In the fiscal year (FY) 2022/23 (June - July), the Government apportioned 90 billion EGP (\$5.69 billion) towards bread and food subsidies, a rise from the 87 billion EGP (\$5.5 billion) in the previous fiscal year (USD= EGP 15.8). Out of this sum, around 49 billion EGP (\$3.1 billion) was designated for bread subsidy. Due to the repercussions of the Russian-Ukrainian conflict and the devaluation of the Egyptian pound, the current fiscal year's budget (FY 2022/23) for bread alone was projected to reach 90 billion EGP (2.9 billion USD). (Wally et al.,2022)

### **2.5.2 Milling Capacity**

The Baladi bread initiative combines imported and locally cultivated wheat mixed before milling. The integration of imported wheat is

crucial to ensure the desired flour quality. Egypt boasts over 410 public, public/private, and private mills with a combined investment exceeding \$1.5 billion. Public and public/private mills yield 82 percent extraction flour, utilized in the production of subsidized Baladi bread, accounting for 70 percent of the flour supply for the program. Conversely, private mills contribute the remaining 30 percent. Private mills focusing on 82 percent extraction flour for the bread subsidy are prohibited from producing the 72 percent extraction flour needed for non-subsidized European and white flatbread and various baked goods like cakes, biscuits, and pastries. ( Wally, Specialist & Akingbe, 2021)

The market currently hosts 5,000 private bakeries engaged in producing these baked items. Presently, 30,000 bakeries produce approximately 250 million to 270 million subsidized loaves of bread daily. Egypt's heavy reliance on wheat to manufacture subsidized bread, a fundamental component of the Egyptian diet, is evident as the populace consumes nearly 100 billion loaves of bread annually. The per capita consumption of subsidized municipal bread has escalated to 3.6 loaves per day in 2021 from 2.8 in 2019, marking a substantial increase of almost 28.6%. (Wally et al., 2021)

### **2.6 Wheat Trade**

The Foreign Agricultural Service (FAS) office in Cairo projects that Egypt's wheat imports for the marketing year (MY) 2023/24, spanning from July to June, will reach 10.8 million metric tons (MMT), indicating a rise of about 2.9 percent from MY 2022/23. Forecasts for Egyptian wheat imports in MY 2022/23 stand at 10.5 MMT, marking the second lowest level in the past decade since the imports of 10.15 MMT in MY 2013/14. This decline can be attributed to the economic repercussions stemming from the conflict in Ukraine, which have created persistent challenges related to foreign currency, thereby disrupting Egypt's wheat trade. The impact of the Ukraine conflict on global wheat trade has been profound, leading to heightened wheat prices and affecting Egypt's imports from Ukraine.



Specifically, as Trade Data Monitor LLC reported, wheat purchases from Ukraine in the calendar year (CY) 2022 plunged by 73.6 percent compared to CY 2021. (Wally, Specialist & Akingbe, 2022).

Furthermore, the economic fallout from the war has exacerbated Egypt's foreign currency crisis, partially caused by the withdrawal of approximately \$25 billion in indirect investments following the Russian-Ukrainian conflict. Consequently, Egyptian authorities have imposed restrictions on import financing, resulting in a slowdown in overall imports and a buildup of essential food commodities in ports, causing notable price hikes in cereals, flour, pasta, and privately produced baked goods. (Wally, Specialist & Akingbe, 2022). From July to February of MY 2022/23, Egypt imported approximately 7.4 million tons of wheat, reflecting a decline of 16.7 percent compared to the corresponding period in the previous year and falling below the average of the past five marketing years by 18.8 percent. Despite the economic challenges triggered by the war, Egypt has endeavored to broaden its sources of wheat imports. It has successfully ensured a steady wheat supply for its bread subsidy program by engaging in international tenders or direct purchases from various origins. The private sector has also diversified its procurement activities, with infrequent shipments from India, Brazil, Germany, and the United States. (Wally et al., 2022).

Domestic wheat production is by no means sufficient to cover the demand for flour. Egypt is the world's biggest importer of wheat. Mohamed Moselhi, Minister of Supply and Internal Trade, said, "Egypt, the largest wheat importer in the world, currently relies on 14 countries for wheat imports, including Russia, Ukraine, the US, France, Romania, and Kazakhstan. However, Egypt depends on Russia and Ukraine for 80 percent of its wheat imports; 50 percent from Russia and 30 percent from Ukraine." (Mukollus and Mullaneur, 2017)

The leading foreign wheat suppliers to the Egyptian market in MY 2021/22 (July – June) comprised Russia (4.96 MMT), Ukraine (2.93 MMT), EU 27 (2.8 MMT), U.S. (330,000 MT),

and Australia (179,000 MT). Over the past five marketing years, Egypt's wheat imports totaled 59.5 MMT, with 59.7 percent originating from Russia and 19.85 percent from Ukraine, accounting for 79.5 percent, the two key suppliers to Egypt. Egypt prefers Russian and Ukrainian wheat due to their competitive prices, lower shipping costs, and faster transit to Egyptian ports than other sources. (Wally et al., 2022)

In MY 2021/22, GASC brought in 4.47 MMT of milling wheat, representing 40.6 percent of the total wheat imports. Romania (1.92 MMT), Russia (1.37 MMT), and Ukraine (1.13 MMT) were the primary wheat suppliers for GASC during this period. The share of the private sector in total wheat imports for this marketing year was 59.4 percent. Over the past five years, the private industry has emerged as a significant player in the Egyptian wheat market, steadily increasing its market share annually. However, during MY 2022/23 (July-February), the private sector's share of total wheat imports decreased by 54.3 percent compared to the previous year due to the impacts of the Ukrainian war. Between July 1, 2022, and February 23, 2023, GASC acquired 4.83 MMT of wheat, constituting 68.6 percent of the total imports, a rise from 53.7 percent in the same period of MY 2021/22. The primary foreign wheat suppliers to GASC in MY 2022/23 (July – February) included Russia (3.12 MMT), France (910,000 MT), Romania (540,000 MT), and Bulgaria (130,000 MT). (Wally et al., 2022)

### **2.6.1 Consumption of Wheat in Egypt**

The wheat consumption in Egypt has been forecasted by FAS Cairo for MY 2022/23 to be at 20 MMT, showing a decrease of 2.43 percent from the previous estimate of 20.5 MMT in MY 2021/22. This decline is primarily linked to a 2.6 percent reduction in wheat consumption of food, seed, and industrial use (FSI). The decrease in FSI wheat consumption is primarily due to the escalation in the prices of European and white flatbread (non-subsidized) and other baked goods like cakes, biscuits, wafers, croissants, and pastries. Moreover, the MY 2021/22 wheat consumption estimate has been



revised downwards by 2.38 percent compared to the USDA official estimate due to the increased prices of flour, baked products, and non-subsidized flatbread. (Wally et al., 2022). On March 16, the Egyptian Government directed MoSIT to initiate the necessary actions to establish a fixed price for non-subsidized bread, which would be enforced for three months. This decision was influenced by escalating flour and private bread prices in local markets, driven by producers stockpiling large quantities of flour amid the strife in Ukraine. The directive was issued before Ramadan to mitigate further price surges, particularly considering the heightened demand (Wally et al., 2022).

### 2.6.2 Egypt's Wheat Imports from the Black Sea

The disruptions in the Black Sea region due to the ongoing Russian-Ukrainian conflict have significantly impacted the flow of wheat, leading to considerable uncertainty in the global wheat trade. The export of wheat is currently prohibited, and port operations have been halted in Ukraine. Moreover, the exorbitant freight insurance premiums have hindered the transportation of Russian wheat through the Black Sea. The prevailing economic sanctions have further complicated commercial transactions, causing wheat prices to surge by almost 40%, reaching their highest levels in over a decade. Egypt is not immune to these adverse circumstances, with its wheat imports from both countries being affected by the conflict between Russia and Ukraine, resulting in severe disruptions in wheat supplies. Consequently, FAS Cairo anticipates Egypt's wheat imports in MY 2022/23 (July-June) to amount to 11 MMT, lower than the previous estimate of 12 MMT for MY 2021/22 as per Post's projection, which was reduced by 4% from the USDA's official estimate. Over the past five years, Egypt has imported 62.6 MMT of wheat, with a substantial portion of 59.7% originating from Russia and 22.3% from Ukraine, making up 82% of the wheat supplied to the Egyptian market. (Wally et al., 2022).

**82% \* 62.6MMT = 51.332MMT**  
**\*Amount of wheat imported from Ukraine and Russia.**

Source:(Wally et al., 2022 & WITS,2021)

Due to their competitive pricing, reduced freight expenses, and expedited transit duration to Egyptian ports compared to alternative sources, Russia and Ukraine serve as the principal wheat suppliers to Egypt. Russia and Ukraine collectively contributed approximately 77 percent of Egypt's wheat imports during the 2020/21 calendar year. Within this period, private sector imports constituted 60% of the total imports, while government imports accounted for 40%. Over the past five years, the private sector has progressively gained prominence in the Egyptian wheat market, steadily expanding its market share annually(Wally et al., 2022). The Egyptian Government's subsidization scheme for bread involves wheat procurement tenders overseen by GASC. Russia (20.14 MMT) and Romania (4.92 MMT) have been the two leading foreign suppliers to GASC from fiscal year 2015/16 to fiscal year 2020/21 (July/June), with Ukraine (3.14 MMT) and France (1.8 MMT) following suit. (Wally et al., 2022)

### 2.7 Possible Effects of the Crisis on the Food Tourism Sector

**2.7.1 The ongoing crisis between Ukraine and Russia** has profoundly influenced the food tourism sector in Egypt, primarily through the disruption of food supply chains and the escalation of food prices. Egypt, heavily dependent on wheat imports from Ukraine, has encountered significant challenges in ensuring food security, consequently affecting the food tourism sector that relies on authentic local culinary experiences. The ramifications of this crisis have resulted in elevated costs for food products, which are integral to Egypt's culinary tourism, thus potentially diminishing Egypt's appeal as a prominent destination for food tourism. This potential loss of appeal is a matter of concern for all stakeholders. The subsequent sections will elucidate the specific impacts on

food tourism in Egypt, along with pertinent considerations.

#### **2.7.1.1 Disruption in Food Supply Chains**

The ongoing conflict has markedly disrupted the global food supply chain, resulting in shortages of critical ingredients utilized in traditional Egyptian cuisine. This has particularly impacted wheat imports essential for producing Baladi bread, a cornerstone of its food tourism offerings (Mostafa et al., 2024; Eltayb, 2023). Immediate action is needed to address these disruptions and ensure a steady supply of key food items, as prolonged transportation times and the unavailability of sourcing have culminated in a diminished supply, leading to unmet demand and significant backlogs that adversely affect the food tourism experience (Mostafa et al., 2024).

#### **2.7.1.2 Rising Food Prices**

According to Mostafa et al. (2024), The increased transportation duration and sourcing difficulties have resulted in heightened costs for food producers, which are likely to be transferred to consumers, thereby influencing the affordability of food tourism experiences. Additionally, the inflation rate for food prices escalated dramatically from 17.7% to 37.3% between February and December 2022, directly impacting the operational costs of hotels, particularly concerning the price of bread (Shalaby et al., 2023). Consequently, the global cereals index experienced a substantial decline, further affecting the affordability of bread for hotels and their clientele (Shalaby et al., 2023).

#### **2.7.2 Bread Supply and Size**

The conflict between Russia and Ukraine has significantly influenced the size of bread offered within Egypt's hospitality sector, primarily due to disruptions in the wheat supply chain. Given Egypt's substantial reliance on wheat imports from these nations, the conflict has engendered increased prices and diminished availability of essential ingredients for bread production. This predicament has necessitated adaptations within the hospitality sector in several respects.

##### **2.7.2.1 Bread Size Adjustments**

In light of escalating costs and restricted availability, hospitality providers have been compelled to diminish the size of bread

offerings or to substitute wheat with alternative grains, such as barley or millet, thereby impacting the traditional dimensions of Baladi bread (Mostafa et al., 2024; Shalaby et al., 2023).

#### **2.8 Sweet Potatoes**

Sweet potato (*Ipomoea batatas*), a dicotyledonous plant, pertains to the Convolvulaceae family, commonly known as bindweed (Elkatry, El-Beltagi, Ramadan, Ahmed, Mohamed, Al-Otaibi & Mahmoud, 2023). As a significant staple crop in tropical regions, particularly in African countries like Nigeria, sweet potato is crucial in addressing food insecurity and enhancing nutrition and economic conditions. According to Elkatry et al. (2023), it ranks fourth after rice, corn, and cassava and serves as a valuable source of carbohydrates.

A tuberous crop known as sweet potato (SP) is resistant to various environmental stresses, enabling it to thrive under diverse climatic conditions while maintaining high yields. Its significance is underscored by its ranking as the seventeenth most valuable crop, with a global production of 88.8 million tons in 2021, primarily concentrated in Asia. The edible components of the sweet potato plant, comprising its roots, leaves, and stems, exhibit diverse nutritional profiles. Sweet potatoes are a source of energy and a secondary staple in the human diet, especially in developing regions. The nutrient composition of sweet potatoes is linked to enhanced fecal volume, a favorable cholesterol profile, insulin responsiveness, and diversity in gut microbiota. (Qin, Naumovski, Ranadheera & D'Cunha, 2022).

Moreover, the orange-fleshed sweet potato is believed to combat vitamin A deficiency owing to its substantial  $\beta$ -carotenoid content (5–24.9 mg/100g) (Ginting et al., 2017). Consequently, this variety is actively involved in programs aimed at eradicating vitamin A deficiency in target populations (Neela and Fanta, 2019), as insufficiency of vitamin A can lead to health issues like night blindness, impaired growth in children, weakened immunity, and heightened susceptibility to chronic ailments such as cardiovascular diseases, cancer, and osteoporosis (Qin et al., 2022). Orange sweet

potatoes have also been used to prepare bread. A simple partial replacement of wheat flour with sweet potato puree produced bread with good nutritional qualities (De la Barca, Mercado-Gómez, Heredia-Sandoval, Luna-Alcocer, Loaiza, González-Ríos & Islas-Rubio, 2022).

Egypt is one of the leading exporters of sweet potato crops. "Egypt significantly increases the production and sales of sweet potatoes yearly and exports most of them to Europe. Sales are going great as more customers discover healthy sweet potatoes. Egypt's exports of sweet potatoes ranked sixth, with a total of more than 39,000 tons in 2022.(Salem, Abd-El Fatah, Abdel-Rahman, Fouzy & Marrez, 2021).

In Egypt, sweet potato is one of the most economically important vegetable crops. The sweet potato cultivation in Egypt during 2018 occupied an area of c. 28525.86 Fadden (Feddan 4200m<sup>2</sup>), with an average yield of c. 11.767 Tons/ Fedden (FAOstat, 2020; Mazyad, El-Attar, Amer, Ahmed, & Ismail, 2021). It is considered the seventh most important food crop. It comes after wheat, rice, corn, potatoes, barley, and cassava worldwide (FAO, 2016). Low-income people mainly consume it because it is one of the cheapest rich carbohydrate sources, mainly starch. It contains a considerable level of soluble sugars, pro-vitamin A (βcarotene), vitamins (B1, B3, E, and C), minerals (manganese, potassium, copper, iron, and zinc), and other nutrients (Neela and Fanta, 2019). With an average yield of about 12.1 tons per hectare, sweet potatoes are cultivated on about 7.4 million hectares worldwide (FAOSTAT, 2022). In Egypt, the sweet potato crop was grown in over 13154 ha in 2020, producing about 450985 tons (FAOSTAT, 2022). Air temperatures between 24 and 35 °C throughout the growing season are ideal for sweet potato growth. ( El-sayed, Abd & Wadod, 2023).

**Sweet-potato production (2021)=511,682.90 MMT**

Source: (FAOstat,2021)

Egypt, for the first time in history during the MY 2022/23 (July-June), emerged as the top

provider of sweet potatoes to Scandinavia, a highly esteemed consumer market globally, as reported by East Fruit. In the previous season, Egyptian exporters successfully supplied approximately one-third of all sweet potato imports to Denmark, Sweden, and Norway. From July 2022 to June 2023, Egypt delivered 3,700 tons of sweet potatoes to Denmark, Norway, and Sweden markets, nearly double the amount from the previous season. Furthermore, starting from the MY 2017/18, Egyptian sweet potato shipments to Scandinavia have surged 51 times, consistently doubling yearly. (EastFruit,2023)

Fruit and Vegetable Market Analyst at East Fruit remarked on the significant achievements of Egyptian suppliers in the latest sweet potato export season to Scandinavia. Egypt not only rose as a prominent player in exports, expanding its foothold in one of the most captivating markets globally, but also managed to decrease reliance on re-exporters from the Netherlands while notably increasing direct sales to Scandinavia. Additionally, Egypt continued to displace sweet potatoes from the United States, mirroring trends in various European nations (East Fruit, 2023).

**Total Export value of Sweet potatoes (2021)= \$55,549.50M**

Source:(WITS,2021)

**Total Export volume of Sweet- potatoes (2021)=46,753,800Mt**

Source: (WITS,2021)

**55,549.50M/46,753,800 Mt=\$1.2/MMT**

Source: (WITS,2021)

\*Author's elaboration

### 2.9 Pesticide Level

Using pesticides plays a crucial role in enhancing the agricultural overabundant application of pesticides, which hurts the environment and humans. The detrimental influence of yield of various crops, nonetheless, the overabundant application of pesticides harms the environment and humans in particular. The detrimental influence of pesticides on human health ranges from mild

symptoms like headaches and vertigo to severe conditions, including cancer, fertility issues, and endocrine disorders. The detrimental effect of pesticides on the younger population is on the rise. Pesticides are employed to combat insects that infest vegetable crops, particularly vegetables and fruits, to mitigate losses of these crops. Nevertheless, excessive use of these chemicals accumulates their residues in the soil. It produces exceeding permissible levels, halting their export to international markets and leading to substantial economic setbacks.(Salem et al., 2021).

Numerous pathways exist through which individuals may be exposed to pesticide contamination, such as through air and water. However, food is identified as the primary route of pesticide exposure. The World Health Organization has indicated that fruits and vegetables are the most frequently consumed food categories. Additionally, since vegetables and fruits are typically consumed fresh or minimally processed, they are anticipated to harbor elevated concentrations of pesticide residues. The ingestion of fruits and vegetables tainted with pesticide residues results in detrimental health repercussions due to their toxic and bio-accumulative characteristics. Cancer, congenital disabilities, neurological ailments, and reproductive impairments are the primary health consequences linked to pesticide ingestion. (Salem et al.,2021)

Plants can absorb pesticide residues in the soil and subsequently contaminate the crops, posing a significant apprehension regarding their safety for human and animal consumption. Numerous studies have demonstrated that substantial pesticide residues in soils can be assimilated by plant roots and transferred to edible portions such as leaves and/or fruits(Salem et al.,2021). Salem et al.(2021) asserted that most of the health effects induced by pesticides in humans stem from direct exposure, occupationally for agricultural laborers applying pesticides or through self-poisoning incidents. Fifteen samples of vegetables and crops were gathered from the Giza governorate and subjected to qualitative and quantitative evaluations of pesticide residues. The findings unveiled that

approximately 53.3% of the tested samples (including onion, sweet potato, molokhia, cabbage, beet, okra, eggplant, and lettuce) were devoid of pesticide residues. (Salem et al.,2021)

### **2.10 Toshka project**

The Toshka project, initiated in the 1970s, encountered various hindrances that impeded its fulfillment. The project's primary objective is to address the food deficit by expanding the agricultural land to encompass one million feddans in the forthcoming years. This commenced under the governance of Kamal Al-Ganzouri, who served as the prime minister during the tenure of former President Hosni Mubarak. (Egypt Today,2022)Moreover, the project endeavors to optimize the utilization of existing resources and boost agricultural exports, thereby mitigating the trade imbalance and generating employment opportunities for numerous youths. (Egypt Today,2022)

The project is 225 kilometers south of Aswan and aims to stimulate redevelopment and alleviate population pressure on the Nile Valley and Delta. As per the Ministry of Water Resources and Irrigation, the initial aim of Toshka was to channel water from Lake Nasser through a 200-meter-wide canal passing through the Toshka Depression to the Farafra Oasis(Toshka Farm Project,2020). The primary goal of the project was to bridge the gap, estimated at around \$10 billion, between production and consumption to bolster the national economy. During the inauguration ceremony, Egypt's Supply Minister Ali Moselhi highlighted the country's resilience to external shocks amidst the inflation stemming from the pandemic and the Ukrainian-Russian crisis, thanks to pertinent measures taken in response. (Egypt Today,2022)

Following Essam Eldin (2024), The Ministry of Irrigation has laid the groundwork for the project's national infrastructure across 350,000 feddans. Toshka is recognized as a pivotal national endeavor in agriculture, contributing various agricultural products to the state. The project seeks to reclaim and cultivate approximately 600,000 feddans surrounding the Toshka depression. Due to its anticipated economic benefits and its role in enhancing

food security for the Egyptian populace, the Toshka project in Upper Egypt's Aswan was revitalized by President Abdel Fattah El-Sisi in 2014, transforming into a substantial development initiative after a period of dormancy (Toshka Farm Project, 2019). Located in the South Valley in Aswan, the Toshka project is deemed the largest in the region, aiming to attain self-sufficiency in wheat, a staple commodity significantly impacted by the Russia-Ukraine crisis. (Essam Eldin, 2024)

The crisis has adversely affected the global wheat supply since both nations are key worldwide wheat exporters. Egypt has relied heavily on Russia and Ukraine for approximately 80 percent of its wheat imports in recent years, as indicated by officials (Egypt Today, 2022). Giant governmental land reclamation endeavors have contributed to the surge in exports. Initiatives such as those in Toshka, the New Delta, and north and central Sinai have expanded Egypt's cultivated land by over four million feddans, resulting in an additional 30 million tons of harvested crops (Essam Eldin, 2024).

### **2.11 New-Valley Governorate**

The New Valley Governorate, also known as El Wadi El Gedid Governorate, is among Egypt's administrative divisions, situated in the southwestern part of the country within the Western Desert (a segment of the Sahara Desert), bordered by the Nile, northern Sudan, and southeastern Libya. It shares boundaries with the governorates of El Menia, Giza, and Marsa Matrooh to the north and Assiut, Suhag, Qena, and Aswan to the east. (CISS, 2020)

In the New Valley Governorate, an artisanal bakery worker introduced the concept of blending wheat with sweet potatoes in a 50:50 ratio to create Egyptian Baladi bread. This practice refers to ancient Egyptian traditions, wherein sweet potatoes were valued for their medicinal and nutritional properties in the production of this staple food. Artisanal bakeries have embraced this concept in response to the impact of the Ukraine-Russia conflict on wheat prices, aiming to restore balance in Egyptian Baladi bread production by

incorporating sweet potatoes. This shift towards using sweet potatoes reflects traditional methods in the New Valley Governorate and seeks to improve the health and nutrition of the population.

### **2.12 Wheat Substitution**

To identify the factors influencing wheat consumption and the challenges in irrigated agriculture and food security in Egypt, Almas and Usman (2021) suggest that policymakers and stakeholders consider utilizing alternative cereals as substitutes for wheat to enhance food security.

A comprehensive examination of food analysis tables reveals that the nutritional content of sweet potatoes indicates an average carbohydrate percentage of 25%, contrasting with 72% in wheat flour. This disparity implies that incorporating sweet potatoes into bread recipes can reduce the calorie content of the loaf, thereby offering a significant nutritional benefit for Egyptian individuals who heavily rely on bread as a primary source of energy and vegetable protein. Moreover, incorporating boiled sweet potatoes into wheat flour in a one-to-one ratio results in a 50% decrease in the protein content and a 30% decrease in calories in the bread product. (Egypt Today, 2022)

This adjustment positions boiled sweet potatoes in bread production as a viable option for individuals seeking dietary solutions to manage weight-related concerns, especially compared to traditional bread varieties that serve as a staple for meeting essential protein and energy requirements. Additionally, the average moisture content of sweet potatoes is recorded at 70%, considerably higher than the 10% found in wheat flour. This disparity signifies that adding sweet potatoes to wheat flour introduces a higher water content than most other food ingredients. Furthermore, the Minister of Supply and Internal Trade, Ali al-Moselhy, has disclosed the Government's contemplation of blending mashed dried white sweet potato with wheat flour to create subsidized bread, a strategy aimed at potentially halving the country's wheat imports by five hundred thousand tons (Egypt Today, 2022).

### 3. Methodology

#### 3.1 Sensory Analysis

During the evaluation and interviews, employees at artisanal bakeries in the New Valley and Alexandria governorates noted that the recent iterations of the sweet potato baladi bread exhibit no discernible differences in terms of flavor, consistency, texture, fragrance, color, shape, texture, appearance, and general acceptance (Ekhwesky et al., 2024).

#### 3.2 Statistical Analysis

In light of recent data and the Ukraine-Russia crisis, a statistical evaluation was conducted during the height of the conflict to illustrate the potential cost savings associated with adopting our ancestors' practice of utilizing a 50:50 ratio of wheat to sweet potatoes in making Egyptian Baladi bread, the size of wheat imports from Ukraine and Russia during the peak of the crisis equaled to about 5.1 million metric tons. Preceding the Russian-Ukraine invasion, Minister of Finance Mohamed Maait stated that the price of a ton of imported wheat noticeably increased to \$504 from \$130, Hence, the overall expenditure for wheat imports amounted to \$2.57 billion. Simultaneously, Egypt's sweet potato exports in 2021 reached approximately 46.753 million metric tons, with an average price of \$1.2 per metric ton. Consequently, the total value of sweet potato exports was around 56 million USD per ton. Thus, the disparity between wheat import costs and sweet potato export earnings would result in savings of 2.51 billion USD. This amount could be redirected from importing wheat or exporting sweet potatoes towards domestic production, specifically in making Baladi sweet potato bread.

The following figures illustrate briefly the statistical analysis of cost-savings incurred from producing the sweet-potato "Baladi" bread.

#### Cost-saving Analysis

- Total cost of Wheat Import =
  - $5.1\text{MMT} * \$504/\text{MMT} = \$2.57\text{bn}$
- The total value of Sweet-Potatoes Export =
  - $46.753\ 800\ \text{MMT} * \$1.2/\text{MMT} = \$56\text{M}$
  - $\$2.57\text{bn} - \$56\text{M} = \$2.51\text{bn}$

\* This amount could be redirected from importing wheat or exporting sweet potatoes towards domestic production, specifically in making Baladi sweet potato bread.

### 4. Conclusion

Sweet potato bread has numerous robust advantages. Studies have revealed that sweet potatoes are typically free from pesticides, with minimal to potentially non-existent levels of pesticide application. Previous estimations have indicated potential savings of \$2.51 billion by restricting wheat imports at current market prices, leading to enhanced foreign currency reserves for further Egyptian projects and investments.

Cultivation costs vary across different crops and will be effectively managed by controlling factors such as cash expenses, capital replacement, owned working and fixed capital, owned land, and unpaid labor. This will result in decreased costs due to higher land productivity and reduced expenses on fertilizers and chemicals. The cost-saving measures will directly result in an increased income source for Egyptian farmers, as the Government will offer more significant incentives for farmers to sell a larger portion of their produce to the Ministry of Supply and Internal Trade. (Usaid and Egypt,2023)

The nutrient content of sweet potatoes, with its rich minerals and nutrients, is expected to positively impact the Egyptian population, owing to their nutritional and medicinal value. Enhancements in land cultivation are anticipated in the Toshka project, located in the south of Upper Egypt's Aswan, with a projected expansion of cultivated land to 1 million feddans by 2025. This expansion is estimated to save approximately \$1 billion in Egypt's wheat budget. (Usaid and Egypt,2023)



#### **4.1 Egypt Rural Agribusiness Strengthening**

The Feed the Future Egypt Rural Agribusiness Strengthening initiative, supported by USAID, aims to assist farmers in Upper Egypt and the Delta to augment their incomes by cultivating export-ready, marketable commodities. This program facilitates the connection of Egyptian farmers and food processors to domestic and international markets, providing access to financial resources and promoting consistent adherence to food safety protocols. Furthermore, the initiative supports modernizing processing facilities, refrigeration vehicles, and water-efficient irrigation systems for Egyptian agribusinesses to enhance their food technology and distribution networks. These efforts build upon prior USAID investments in Egypt's agricultural sector, including irrigation infrastructure development, formation of agricultural associations, and training programs to transition farmers from traditional crops to high-value horticulture. (Usaid and Egypt,2023)

Implementation Partner: Abt Associates;  
Project Duration: August 2018 – July 2023;  
Total Project Cost: \$36.3 million; Governorates covered: Alexandria, Assiut, Aswan, Beheira, Beni Suef, Cairo, Dakahlia, Giza, Gharbia, Ismailia, Luxor, Menoufia, Minya, Qalyoubia, Qena, Sharkia, Sohag.

Future market opportunities in the long term will include:

Enhanced quality of cultivated land for wheat and sweet potatoes: Investments in Egyptian agricultural projects such as the Toshka project will result in fertile soil suitable for cultivating wheat and sweet potatoes. Over time, there will be an increase in the yield levels of both wheat and sweet potatoes.

Strategic reserves comprise surplus quantities of healthy wheat and sweet potatoes, capable of being housed in Silos. Projections indicate a rise in local wheat production from 3.5 million tons in 2021 to six million tons this year, reinforcing the strategic wheat stock to meet domestic demand until January 2023, as per official announcements. (Usaid and Egypt,2023).

#### **4.2 Application of the Sweet Potato Baladi Bread Alternative in the Tourism Sector**

The ongoing Ukraine-Russian crisis has engendered formidable obstacles for Egypt's food tourism; however, it concurrently underscores the sector's resilience and capacity for adaptation. By formulating strategic initiatives and fortifying supply chain resilience, Egypt may effectively alleviate specific detrimental impacts and persist in attracting food tourists, notwithstanding the prevailing global adversities. The amalgamation of 50:50 wheat and sweet potato in preparing Egyptian Baladi bread carries profound implications for Egypt's hospitality and tourism industries. This pioneering methodology augments the nutritional composition of a quintessential dietary staple and fosters food tourism by integrating indigenous ingredients into the culinary offerings of hotels. The subsequent sections delineate the principal consequences stemming from this advancement.

##### **4.2.1 Nutritional Benefits**

Incorporating sweet potatoes significantly elevates Baladi bread's nutritional worth. This imparts vital vitamins and minerals, particularly beta-carotene, which confer health benefits (Olosunde et al., 2023).

##### **4.2.2 Promotion of Food Tourism**

Integrating traditional food items such as Baladi bread into hotel menus can enrich the cultural experience for tourists, thereby nurturing a connection to Egyptian heritage (Rady et al., 2021). Employing local ingredients such as sweet potatoes in culinary offerings can entice gastronomic enthusiasts, augmenting tourist engagement and overall satisfaction (Rady et al., 2021).

##### **4.2.3 Economic impact**

The fabrication of fortified Baladi bread bolsters local agriculture and food security, potentially increasing employment prospects within the hospitality sector (Shalaby et al., 2023). By promoting distinctive culinary experiences, hotels can distinguish themselves within a competitive marketplace, potentially



enhancing their revenue derived from food tourism (Rady et al., 2021).

The enhanced version of the traditional Egyptian “Baladi” bread presents a more nutritious option with elevated nutritional content derived from sweet potatoes. Various artisanal bakeries across different Egyptian governorates have confirmed that the physical and textural attributes of the new sweet potato bread closely resemble those of the original “Baladi” bread. In conclusion, the updated Egyptian “Baladi” bread will play a significant role in the country's economic development by impacting import and export activities, affecting the balance of payments (BOP), and potentially leading to a surplus. By eliminating the need to import wheat, Egypt can save an estimated cost of around \$2.51 billion that would have been spent on exporting wheat, redirecting these resources to bolster domestic production of the nutritious sweet potato bread. This shift is expected to increase financial gains and contribute positively to Egypt's trade balance, increasing the nation's net foreign currency reserves. The overall health conditions of the Egyptian population, particularly those in the low-income bracket, are anticipated to experience improvements due to this dietary enhancement.

## 5. Recommendations and Further Research

The present investigation predominantly examines the significant repercussions of the Ukraine-Russian conflict on wheat imports and the resultant governmental fiscal deficits that ensued from this event. Furthermore, it elucidates the implications for food security in Egypt, emphasizing the critical role of wheat in terms of its production, consumption, and importation both before and following the crisis. Additionally, this research has facilitated the exploration of alternative options for the Egyptian Baladi bread to ensure food security, which constitutes a fundamental component of Egypt's Vision 2030. By executing a cost-saving analysis on a composite bread composed of 50% wheat and 50% sweet potato versus bread made entirely of whole wheat, it was revealed that significant savings approximating

\$2.51 billion could be achieved. The physical characteristics of sweet potato bread and 100% wheat bread exhibited similarities in terms of loaf weight, loaf volume, and specific volumes across the various bread samples. Moreover, sensory evaluations conducted by various artisanal bakeries in Egypt indicated that the bread samples received favorable acceptance ((Ekhwesky et al., 2023).

## 5.1 Recommendations in Tourism and Hospitality Industry

Incorporating sweet potato Baladi bread within Egypt's tourism and hospitality industries offers a distinctive avenue to augment gastronomic offerings and advocate for local agricultural commodities. This methodology bolsters food tourism and resonates with the burgeoning interest in ethnic and heritage cuisines among tourists. Sweet potato Baladi bread may be positioned as a quintessential Egyptian staple, enhancing the authenticity of hotel culinary menus (Hassan et al., 2024) and attracting tourists who seek genuine local gastronomic experiences (Rady et al., 2021). Integrating this bread into various dishes can diversify hotel menus, appealing to domestic and international patrons seeking distinctive dining opportunities (Ammar et al., 2022; Hassan et al., 2022). Incorporating sweet potato Baladi bread can be pivotal in fostering sustainable practices within the hospitality sector, diminishing dependence on imported wheat, and bolstering food security (Shalaby et al., 2023; Magdy and Hassan, 2024). Utilizing social media platforms to emphasize the inclusion of sweet potato Baladi bread in hotel offerings can significantly enhance visibility and draw food tourists (Rady et al., 2021). Organizing events featuring traditional dishes utilizing this bread can engage tourists and promote the preservation of cultural heritage (Ammar et al., 2022).

Although the endeavor to enrich Baladi bread through the integration of sweet potatoes yields numerous advantages, it is imperative to acknowledge the challenges associated with preserving traditional recipes and the potential resistance from consumers accustomed to conventional formulations. Striking a harmonious balance between innovation and

tradition will be pivotal for successfully implementing this initiative in hospitality and tourism (Hassan and Magdy, 2024). Conversely, the ongoing crisis may also allow local producers to innovate and adapt in the realms of bread production and supply chain management, potentially catalyzing a revival in domestic food production and a reinvigorated focus on local culinary heritage, which could ultimately enhance food tourism over the long term. Consequently, the current study advocates for collaborative efforts among diverse ministries, sectors, and research institutions to mitigate reliance on wheat imports. It further recommends the implementation of nutrition education initiatives aimed at altering Egyptian consumption patterns in alignment with prevailing dietary habits and crisis circumstances (Magdy and Hassan, 2025). While the emphasis on sweet potato Baladi bread holds considerable promise, it is imperative to address potential challenges, such as maintaining consistent quality and availability of ingredients, which could adversely affect the overall dining experience within the hospitality sector.

The following recommendations are proposed to enhance food security and promote sustainable practices in Egypt's tourism and hospitality sector: Encourage restaurants and hotels to use locally sourced ingredients, such as sweet potatoes, in their menus. This supports local farmers and provides tourists with authentic culinary experiences that reflect Egyptian culture (Magdy and Hassan, 2025). Create packages focusing on traditional Egyptian dishes, particularly those featuring Baladi bread made with sweet potatoes. These packages can include cooking classes and farm visits, enhancing tourists' understanding of local food production. Organize workshops and events that educate tourists about food security issues and the benefits of using alternative crops. This can raise awareness and foster a deeper connection between visitors and the local community. Participate in and promote food festivals that highlight local cuisine and sustainable practices. Such events can attract food enthusiasts and showcase the versatility of

local ingredients. To promote food security and sustainability, tourism strategies should be aligned with national goals, such as Egypt Vision 2030. This collaboration can enhance the credibility of tourism initiatives and support local economies.

The promotion of sweet potato as a nutrient-dense plant product in formulating staple foods such as bread should be encouraged. This may enhance the nutritional quality and address the challenge of widespread protein-energy malnutrition in developing nations, thereby diminishing post-harvest losses and fostering food diversification. Furthermore, it is essential to alleviate the adverse effects of the food crises that emerged in the aftermath of the Ukraine-Russian conflict. Future research should be undertaken to assess the shelf stability of the newly formulated sweet potato Baladi bread.

## 6. Acknowledgement

I extend my most profound appreciation for the assistance and support provided throughout this research paper's completion. Initially, I want to extend my gratitude to A.Prof.Wael Mostafa Hassan, Professor of Finance and Investment at the Faculty of Financial and Administrative Sciences, Head of Finance and Investment at the Faculty of Financial and Administrative Sciences, Pharos University, Prof. Ahmed Elsamadicy, Professor of Marketing, Vice Dean for Educational Affairs, College of Management and Technology at Arab Academy for Science, Technology, and Maritime and Prof.Yasmine Ramzy, Professor of Economics, Head of Hotels and Tourism Department at Arab Academy for Science, Technology, and Maritime for the invaluable guidance, encouragement, and support offered during this research endeavour. Completing this paper and the research underpinning it would not have been achievable without the exceptional support of my esteemed supervisors. Their insightful feedback was crucial in shaping the trajectory of publishing my first research paper.

Additionally, I express my profound appreciation and sincere gratitude to Dr. Hamada Gamal, Assistant Professor in the Hotel Management Department, Faculty of Tourism and Hotel Management, Pharos University, for his invaluable advice and adept guidance in publishing this research.

Also, I offer heartfelt thanks to my family and friends for their constructive feedback and remarkable collaboration. Their encouragement helped me stay focused and navigate various challenges encountered during my research journey, thus enhancing the intellectual discourse of this research project. I appreciate those who have significantly contributed to my academic journey.

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