Wheat Value Chains and Food Security in the Middle East and North Africa Region

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Ghada Ahmed
Danny Hamrick
Andrew Guinn
Ajmal Abdulsamad
Gary Gereffi
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Global Value Chain Analysis of Food Security and Food Staples for Major Energy-Exporting Nations in the Middle East and North Africa

The Duke University team is a partnership between the Nicholas School of Environment and the Center on Globalization, Governance and Competitiveness.

The following authors can be contacted at:
Ghada Ahmed: ghada.ahmed@duke.edu
Gary Gereffi: ggere@soc.duke.edu

Duke University, Center on Globalization, Governance and Competitiveness (Duke CGGC)

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Abstract

This project focuses on the energy-exporting countries in the Middle East and North Africa region (MENA) whose food staples are at most risk to insecurity. These staples form a major source of the caloric needs for the peoples in MENA and include wheat, rice, and corn. In this report we identify the structure, size and scope of the wheat value chain, the players involved in them, and the drivers governing their operation. The Global value chain (GVC) analysis provides both the conceptual and methodological tools for looking at global, regional, and local economies by using a top-down approach that examines the global lead firms that control trade, as well as a bottom-up approach that studies countries and regions, which are explored in terms of their economic, social and environmental upgrading or downgrading trajectories. This study uses the GVC framework to understand:

1. The global wheat industry
2. The industrial organization of the wheat GVC
3. The structure of the wheat value chain in five MENA countries, specifically Egypt, Iran, Saudi Arabia, Syria and the United Arab Emirates
4. The key value chain challenges and strategies for maintaining a staple wheat supply in these countries
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Executive Summary
The MENA region is the largest net importer of wheat in the world. The high dependence on international wheat makes the organization of the industry important for studies of food security in the region and how nations maintain a sustainable wheat supply. Despite the mostly shared dependence on imports across the region, the structure of wheat value chains varies across nations.

This report details the structure of the wheat Global Value Chain (GVC) in five country cases (Egypt, Iran, Saudi Arabia, Syria, and United Arab Emirates) for the MENA region. By comparing the institutional framework, which moves wheat within the region, different food security strategies emerge in response to challenges in the chain to reduce each country’s potential for food insecurity, dependence on imports and exposure to global price volatilities.

Key Findings on global wheat value chains and MENA

1. **Five major firms dominate the global wheat industry.** Five firms, based in the global north, control 90% of wheat traded internationally. These firms are able to use their size to broker deals that allow for immense profits, even during global food shortages like the 2007-2008 global food crisis.

2. **The MENA region uses a variety of approaches to achieve food security.** Countries in the region are utilizing several approaches to address food security challenges. The United Arab Emirates (UAE) and Saudi Arabia capitalize on oil resources to secure food through trade and invest in offshore production. Others, such as Egypt, Syria, and Iran, seek to increase domestic production to reduce dependency on imports, and the drain on foreign reserves.

3. **Several issues cut across the cases.** Environmental distress, particularly water shortage, constrains domestic production. The role of the government is high in controlling the movement of wheat along the chain and in regulating the cost of bread. Countries are upgrading their storage capacity to mitigate changes in supply.

4. **Institutional legacies are very strong in all countries.** This includes government monopolies, subsidies and price controls. It is quite difficult to change subsidy systems and attempts to do so are usually followed with civil unrest.

5. **Countries are diversifying their supply base.** Saudi Arabia, UAE, and Egypt (to a lesser extent) are investing in offshore production. However, these projects are in their early stages of implementation. There are a number of concerns about these projects such as low farming skills and underdeveloped infrastructure in host countries.
1. Introduction

Wheat represents about 37% of caloric consumption in the Middle East and North Africa (MENA) region. The region is collectively a net importer of 58 million metric tons of cereal, making it the largest net importing region in the world (Wright and Cafiero 2010). Wheat is a strategic commodity in the region with most governments using direct protection instruments to safeguard local production. The political economy and social dynamics in MENA countries play a major role in how the populations view the increasing dependence on wheat imports and access to bread. The interdependencies between global trade and local access to wheat and wheat products can be best understood by using a global value chain (GVC) lens. This study seeks to provide a more comprehensive methodology to food security issues in five MENA countries to better understand the complexity of wheat markets and their underlying chain governance structure that determines food security outcomes.

Global value chain analysis provides both the conceptual and methodological tools for looking at global, regional, and local economies by using a top-down approach that focuses on global lead firms that control trade, as well as a bottom-up approach that focuses on countries and regions, which are analyzed in terms of various trajectories of economic, social and environmental upgrading or downgrading. This study uses the GVC framework to understand:

1. The input-output structure of the global wheat industry
2. The industrial organization of the wheat GVC
3. The structure of the wheat value chain in five MENA countries, specifically Egypt, Iran, Saudi Arabia, Syria and the United Arab Emirates
4. The key value chain challenges and strategies for maintaining a staple wheat supply in these countries

This report is presented in the following sections. Section Two provides a brief overview of the structure of the global wheat industry and the major firms active in the trading of wheat. Section Three focuses on global value chains as a methodology and the generic components of the wheat GVC. Section Four introduces the MENA region and provides details about food security from a regional perspective, while Section Five analyzes the selected country cases, including the institutional framework in each nation and major challenges within the wheat value chain. The report concludes by synthesizing the major cross-cutting themes across the country cases as well as pointing out important variations.

2. Global Wheat Industry

The global wheat industry represents an important commodity both in terms of food security and in the development of other goods, including animal feed and high-value food products. Despite its importance, less than 25% of annual wheat production is traded across borders, the remainder being utilized domestically (Murphy, Burch et al. 2012, FAO 2013). However, imported wheat remains crucial for several regions, such as the Middle East and North Africa (MENA), which depend on imports to meet regional demand (Sadler and Magnan 2011). The wheat trade is characterized by a decline in bulk
trade, despite its continued importance in select regions and increasingly volatile price fluctuations. The industry is highly concentrated among five multinational grain trading companies and their expansion into other agricultural enterprises.

**Wheat Trading**

The global trade of wheat remained less than 23% of total production over the last 10 years (see figure 1). This can best be explained as a shift towards high-value production by many firms and a rising interest in corn and soybeans for biofuels and other nonfood usage.

**Figure 1: Percentage of global wheat traded, 2000-2010**

Despite the decline, wheat trade in MENA is increasing, with the region buying approximately 27% of all globally traded wheat (FAO 2013). The dependence on imported wheat makes the region vulnerable to international price shocks and supply disruptions, such as during the 2007-2008 global food crisis when Russia banned exports that reduced global supply and increased prices (Goetz, Glauben et al. 2010). Russia again banned exports in 2010 due to a small harvest, further destabilizing import dependent nations (The World Bank 2011).

Globally, price volatility is increasing along with the average cost of wheat. These increases are due to several factors, including: (a) growth in demand for biofuels; (b) fluctuation in oil prices which impacts transport and production cost the wheat industry; (c) depreciation of the US dollar relative to other currencies; and (d) the increase in commodity speculation (The World Bank and FAO 2012).

**Industrial organization**

The global wheat industry is marked by a rise in large multinational firms with strong control over the commodity. Reports estimate that five corporations control about 90% of wheat traded globally: Archer Daniels Midlands, Bunge, Cargill, Louis Dreyfus and Glencore Xstrata (Morris 2013). Despite a rise in smaller firms that generate some competition, these five majors continue to dominate the grain industry. These firms are often known for their opaque operations and their global reach through the numerous subsidiaries that they own.
Various aspects of the agro-food chain experienced shifts during the last two decades, including the input sector, food processors and retailers. Input-oriented firms, such as Monsanto, have moved towards life science firms, with a focus on pharmaceuticals and biotechnologies. Food processors, such as Nestle, continue to expand and consolidate the industry through mergers and acquisitions. Similar trends are seen in mega-retailers, as the growth of giant supermarkets (like Walmart and Tesco) consolidates another aspect of the agro-food chain (Murphy, Burch et al. 2012).

The grain industry, while less dynamic than the areas mentioned above, is also reorganizing in major ways. Specifically, there is a move towards diversification, both in the use of grains and in the activities of firms. Another major shift is the rise in offshore production and the continued acquisition of firms across the globe.

The grain industry is continually evolving and moving into new products and sectors of the grain value chain. This includes the rise in biofuels, which increase the demand for grains beyond human and animal consumption. Grains are also used in chemical production, they are a critical input in growing meat consumption, and they are linked to animal byproducts worldwide. These shifts do not always directly involve wheat, but are important for the study of wheat GVCs because as the demand for biofuels, grain-based chemicals and livestock feed increases, the arable land that historically has been devoted to wheat is moving to other grains (Murphy, Burch et al. 2012).

As farmers shift into higher value crops and grain for non-human consumption, there is an increase in offshore production to meet the dietary needs of populations. Many multinational companies and countries, including MENA nations, are purchasing land abroad, often in Africa to cultivate wheat and other grains. The offshoring of food production to these countries is challenging for many reasons, such as the impact on small producers, less-skilled farmers, and the underdeveloped roads and ports infrastructure (Woertz 2013).

**Major Firms**

Table 1 identifies the five major companies involved in global wheat trading. Many of the firms use subsidiaries to operate abroad and they often acquire their competitors in order to maintain their dominance in the sector. However, competition from new firms is growing and these five majors are increasingly moving into high-value end-markets such as biofuels and industrial chemical production (Murphy, Burch et al. 2012).
Table 1: Company Profile for Major Wheat Traders

<table>
<thead>
<tr>
<th>COMPANY</th>
<th>YEAR FOUNDED</th>
<th>HEADQUARTERS</th>
<th>REVENUES Billion USD</th>
<th>OWNERSHIP</th>
<th>OPERATING COUNTRIES</th>
<th>ADDITIONAL INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Archer Daniels Midlands</td>
<td>1902</td>
<td>USA</td>
<td>89</td>
<td>Publicly traded on NYSE</td>
<td>75</td>
<td>*Operates in several sectors including animal feed, biofuels and agro-chemical products</td>
</tr>
<tr>
<td>Bunge</td>
<td>1818</td>
<td>USA *Founded in Belgium</td>
<td>60.9</td>
<td>Publicly traded on NYSE</td>
<td>40</td>
<td>*Largest of all grain traders *Operations in a variety of agro-products *Expanding into animal feed, biofuels and industrial products *Buys and sells wheat with subsidiaries across the globe</td>
</tr>
<tr>
<td>Cargill</td>
<td>1865</td>
<td>USA</td>
<td>133.9</td>
<td>Private owned and managed by two families</td>
<td>65</td>
<td>*Largest of all grain traders *Operations in a variety of agro-products *Expanding into animal feed, biofuels and industrial products *Buys and sells wheat with subsidiaries across the globe</td>
</tr>
<tr>
<td>Louis Dreyfus</td>
<td>1851</td>
<td>France</td>
<td>57.7</td>
<td>80% privately held and 20% employee owned</td>
<td>90</td>
<td>*Major acquirer of land and subsidiaries across the globe</td>
</tr>
<tr>
<td>Glencore Xstrata</td>
<td>1974</td>
<td>Switzerland</td>
<td>214.4^</td>
<td>* Publicly offered in 2011 with listings on the London Stock Exchange</td>
<td>50</td>
<td>*Controls 9% of total tradable grain *Merger of Glencore and Xstrata occurred in May 2013 *Active in several commodities outside of grain, including the energy sector</td>
</tr>
</tbody>
</table>

* Source: CGGC based on Company reports, Murphy, Burch et al. 2012
^ Figure shows Glencore revenue only. Xstrata is a mining company bought by Glencore in 2013.
3. The Wheat Global Value Chain

This section analyzes the wheat GVC (Figure 2) and provides an overview of key trends within each segment. The primary value chain segments include: inputs, production, trade, processing, and the marketing of wheat. The wheat value chain institutions and policies have a significant impact on production and supply networks, natural resource use, prices, and consumption. Factors external to the chain, such as social unrest or climate, as well as internal factors, such as input shortages, can disrupt the chain, impact availability, and lead to price volatility for wheat and wheat products. The main wheat value chain segments are summarized below.

Figure 2: Wheat Value Chain Map

![Wheat Value Chain Map](source)

Source: CGGC

**Inputs**

The major inputs for wheat producers are: seeds, crop chemicals, equipment, fertilizers, water, land, and labor. Research and development (R&D) is expensive and important in order to improve wheat variety and adapt it to certain climatic conditions. Large global companies supply crop chemicals, fertilizers and machinery. Many countries, including MENA nations, subsidize and regulate these inputs (The World Bank and FAO 2012). Market concentration and the high cost of some inputs and limitations on natural resources (land and water) limit domestic production capacity.
Production

Production in developing countries is dominated by small-scale farmers as opposed to the large-scale wheat operations in major exporting countries, such as the United States. Wheat in most countries is a strategic crop and producers are supported by government subsidies and other financial schemes. For example, the U.S. Department of Agriculture pays supplemental income to farmers for commodities such as wheat or rice, in an effort to manage supply and control prices (MarketLine 2012). To meet the growing demand, nations are increasingly turning to imports to feed the population or looking at outsourcing production (Lampietti, Battat et al. 2011). Between 2005 and 2007, the MENA region imported 40% of the wheat used for human consumption, with some nations, such as Libya, importing over 90% of the wheat consumed by people (Larson, Lampietti et al. 2012).

Country Elevators

The storage of wheat and its subsequent grading occurs in the country elevators. All domestically produced wheat and imports are cleaned, tested, and weighed in these facilities. Value chain actors are able to curb global price fluctuations by managing storage capacity (Wright and Cafiero 2010). Because wheat reserves are considered a strategic asset, this stage of the value chain is state-controlled in many countries. The proximity of country elevators to receiving ports and farming operations is important.

Milling

Wheat milling usually occurs in the country where it will be consumed. Efficiency and costs depend on wheat type and quality. The large global traders such as Cargill are also players in this segment of the chain. Mills are increasingly multi-plant operations that process other grains such as corn or rice. The degree of vertical integration is a source of concern within the wheat GVC, since it further consolidates control and leverage within the wheat value chain in the hands of large multinational firms (The World Bank and FAO 2012).

Marketing

Human consumption is now competing for access to wheat with animal feed and biofuel production, which impacts its consumption price (Murphy, Burch et al. 2012). Wheat flour is sold to retailers, bakeries or food manufacturers, who in turn retail it to consumers as flour, bread or wheat-based products. Other buyers in the chains include food service operations and institutional customers.

Trade

Government intervention and support is prevalent in both exporting and importing countries. The traditional wheat-exporting countries are the United States, Canada, Australia, the European Union, and Argentina. In recent years, there has been a strong increase of exported wheat from the Black Sea countries, especially from Russia and from the Ukraine, making wheat global trade less concentrated (Mulvaney and Robbins 2011). The trade flow is primarily from North to South (Murphy, Burch et al. 2012). Increase in global trade agreements is putting pressure on governments to eliminate tariffs and reduce social subsidies, which could leave vulnerable populations at risk in importing countries such as Egypt (Cederstrom, Costa et al. 2009). Importing countries are exposed to price shocks and grain export restrictions. During the drought
of 2006 to 2008, which led to price spikes in staples such as wheat, many countries including Argentina, Russia and Kazakhstan controlled their food exports through higher tariffs and export bans. This spurred a shift in food security policy in many countries, including an increase in storage capacity, overseas farm investments, and expanded domestic production.

4. Overview of MENA
MENA is an important region for the global wheat market. Between 2008 and 2010, at least 29% of all exported wheat was destined for a country in the region (Larson, Lampietti et al. 2012). The Middle East and North Africa (MENA) region encompasses 24 countries and MENA is the world’s most dependent region on imported food. The region holds over 50% of the world’s known reserves of oil and 40% of its natural gas (Cueille 2011). The most commonly used typology for MENA countries is based on mineral resource wealth (oil and gas) and labor abundance. However extending this typology to include food security (see table 2) is important in order to understand the interaction between food policies and oil and gas wealth.

Table 2: MENA Country Typology and Level of Food Insecurity

<table>
<thead>
<tr>
<th>Resource-Poor Labor Abundant</th>
<th>Resource-Rich Labor Abundant</th>
<th>Resource-Rich Labor Importing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comoros</td>
<td>Yemen</td>
<td>Libya</td>
</tr>
<tr>
<td>Djibouti</td>
<td>Algeria</td>
<td>Bahrain</td>
</tr>
<tr>
<td>Mauritania</td>
<td>Sudan</td>
<td>Kuwait</td>
</tr>
<tr>
<td>Somalia</td>
<td>Syria</td>
<td>Oman</td>
</tr>
<tr>
<td>West Bank and Gaza</td>
<td>Iran</td>
<td>Qatar</td>
</tr>
<tr>
<td>Egypt</td>
<td>Iraq*</td>
<td>Saudi Arabia</td>
</tr>
<tr>
<td>Jordan</td>
<td></td>
<td>United Arab Emirates</td>
</tr>
<tr>
<td>Lebanon</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morocco</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tunisia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Israel*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Food Security is measured as total exports divided by food imports and food production per capita. Low Risk is defined as having one or both measure above global average. Moderate risk is defined as having one or both below global average. Acute risk is defined as one or both measures less than 50% the global average.

*Data not available

Source: CGGC based on data from world Bank Development Indicators and Breisinger et al, 2010

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1 Algeria, Bahrain, Djibouti, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, West Bank and Gaza, Qatar, Saudi Arabia, Somalia, Sudan, Syria, Comoros, Tunisia, United Arab Emirates (UAE), Yemen.

2 Eight out of the 10 oil-exporting OPEC countries are located in the MENA region (Algeria, Iraq, Kuwait, Libya, Qatar, Saudi Arabia and United Arab Emirates) (http://www.opec.org/opec_web/en/about_us/25.htm).
Wheat represents about 35% of caloric consumption in MENA (Larson, Lampietti et al. 2012; Wright & Cafiero, 2010). The region is the largest importer of cereal with over 58.1 million metric tons, which covers more than 50% of its consumption (Wright and Cafiero 2010). Wheat is a strategic commodity in MENA with most governments using direct protection instruments to safeguard local production.

The food crisis of 2007-2008 and the significant increase in global food prices brought the issue of food security and self-sufficiency to the forefront of the policy debate. During this time, regular food suppliers to MENA, such as Russia, restricted exports, thus elevating international prices of food commodities. The FAO estimates that food commodity price increases ranged from about 26% to over 106% (Al Masah Capital Limited 2012, FAO 2013). The 2008 food import bill of the region totaled USD6.14 billion and is expected to reach USD92.4 by 2020.

Agricultural production, especially of cereals, faces significant water and land constraints in the region (Al Masah Capital Limited 2012). At least 12 countries in MENA are water scarce and less than 4% of total land is under cultivation. At the same time, the food requirements of the region are growing. Population growth is projected to be 1.7% per year, which is significantly higher than the world rate of 1.1% (The World Bank 2009). Consequently, the region’s food balance projections are estimated to exceed 64% over the next 20 years (The World Bank 2009).

**Key issues relevant to food security from a GVC perspective**

The main factors that drive the food value chains of the MENA region, including wheat, and impact food security are:

**Environmental Stress**

Food production in the MENA is limited due to shortage of arable land, water and unfavorable weather conditions in many countries. Arable land is under four% and many countries suffer from poor soil quality and unfavorable weather conditions. MENA is one of the most water scarce regions in the world with a regional average of 1,200 m³/person/year compared to a global average of about 7,000 – 10,000 m³/person/year (Afreen Siddiqui and Anandon 2011). By 2025 the regional average is estimated to drop to about 500 m³/person (Afreen Siddiqui and Anandon 2011).

The sources of the water in MENA are: rainfall, rivers, springs, and underground water. Countries in the Arabian Peninsula have almost non-existent renewable water resources. About 60% of the region’s water flows across international borders (The World Bank 2007). Rainfall patterns are shifting in MENA with countries such as Syria and Iran undergoing chronic draughts. Demand on the region’s rivers is high for fresh water uses, water supply and sanitation services, and irrigation networks. Factors such as high use in the agricultural sector, draughts, weak institutions, and sensitivities associated with water policies and agriculture are some of the causes of water stress in MENA.

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3 FAO estimates that cereal prices increased exceeded 86 percent.
Role of the State

The state plays an active role throughout the wheat GVC in MENA. The sensitivities associated with wheat supply and food prices make wheat one of the most protected agricultural commodities. Government intervenes on the input side of the chain through state monopolies, subsidies, and agricultural credit. In producing countries, production is regulated through land ownership schemes, production quotas and higher purchase prices by public institutions. The government controls storage facilities, imports, and marketing mostly through state owned monopolies.

Food Pricing

High levels of poverty and legacies of government intervention mean that food pricing is critical within the region. In most countries, the government sets prices for wheat and final goods made from wheat. This is to ensure the affordability of wheat products and thereby reducing the threat of unrest (Ciezadlo 2011). Countries with oil and gas exports depend on revenues from trade to finance subsidies.

These value chain challenges are discussed in greater detail in the subsequent section for five strategic MENA countries: Egypt, Iran, Saudi Arabia, Syria and United Arab Emirates (UAE). All five countries are importers of wheat, depend on wheat trade to meet domestic needs and suffer from food inflation. Egypt is the largest importer of wheat in the world, has the highest per capita consumption, and has the largest population in the region. Iran is a traditionally self-sufficient country, with about 47% of daily caloric intake from wheat, and now depends on imports due to chronic droughts. Saudi Arabia is the largest global exporter of oil and is moving away from its self-sufficiency strategy to reliance on imports after depleting its aquifers (Woertz 2013). Syria is a traditionally a self-sufficient wheat producer for the last 20 years but harvest reduced 50% due to drought and recent conflicts in the nation. Finally the United Arab Emirates is an oil-rich country and regional trade hub that is completely dependent on imports and increasingly investing in offshore production. Figure 2 shows the import trends for the selected country cases and Table 3 below provides summary statistics on these countries.
Figure 3: Country Cases Wheat imports, 1990-2010

Table 3: Country Cases Summary statistics, 2009

<table>
<thead>
<tr>
<th>Variable</th>
<th>Egypt</th>
<th>Iran</th>
<th>Saudi Arabia</th>
<th>Syria</th>
<th>UAE</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (millions)</td>
<td>79.7</td>
<td>73.1</td>
<td>26.8</td>
<td>20.1</td>
<td>6.9</td>
<td>FAO (2009)</td>
</tr>
<tr>
<td>Wheat Per-Capita Consumption (kg/year)</td>
<td>145.2</td>
<td>157.1</td>
<td>89.3</td>
<td>162.8</td>
<td>122.7</td>
<td>FAO (2009)</td>
</tr>
<tr>
<td>Wheat Imports (USD billions)</td>
<td>2.6</td>
<td>1.1</td>
<td>0.4</td>
<td>0.3</td>
<td>0.3</td>
<td>FAO (2009)</td>
</tr>
<tr>
<td>Wheat Import Dependency Ratio*</td>
<td>51.7%</td>
<td>29.0%</td>
<td>53.0%</td>
<td>31.0%</td>
<td>122.74%</td>
<td>FAO (2009)</td>
</tr>
<tr>
<td>Agriculture as % GDP</td>
<td>14.7%</td>
<td>11.3%</td>
<td>1.9%</td>
<td>16.5%</td>
<td>0.8%</td>
<td>CIA Factbook (2012)</td>
</tr>
<tr>
<td>Energy Exports (USD billions)</td>
<td>6.9</td>
<td>N/A (2010 exports: 62.6)</td>
<td>162.7</td>
<td>3.7</td>
<td>64.6</td>
<td>UN COMTRADE (2009)</td>
</tr>
<tr>
<td>Top sources of Wheat Imports</td>
<td>Russia, France, USA, Belarus, Australia</td>
<td>Canada, Latvia, Lithuania, Netherlands, Russia, Uzbekistan</td>
<td>Russia, Ukraine, Romania, Germany, Turkey</td>
<td>Canada, Germany, Australia, Argentina, Czech Republic</td>
<td>UN COMTRADE (2009)</td>
<td></td>
</tr>
</tbody>
</table>
5. Country Cases

Egypt

Egypt has the largest population in the MENA region and is the world’s leading importer of wheat (Abdel-Razek 2013). The country depends on imports to supply around 50% to 60% of its wheat needs, which makes it vulnerable to global price shocks (World Food Program 2013). Egypt procures most of its wheat from the United States, France, Russia, and Ukraine and is diversifying its supply base towards other countries, such as India and Kazakhstan (World Food Program 2013). Reducing import dependency and exposure to global prices is one of the leading concerns of policy makers and the Egyptian population. Domestic production is constrained because of limited arable land (only 2.4%), water shortages, a growing population, and shifts to high value export agro foods (Coelli 2010). In 2011 and 2012, Egypt raised its domestic wheat production by about 5% to reach an above average yield that was over 8.8 million tons (GIEWS 2013). Favorable weather conditions, availability of improved varieties, and higher government procurement prices of domestic wheat are some of the factors that contributed to the larger harvest.

Egypt mostly grows the hard winter variety of wheat, which is poorly suited to bread making. Domestically produced wheat is often mixed with imported wheat to improve its quality for bread making (Kherallah, Lofgren et al. 2000). Egyptian annual per capita consumption is higher than the global average at about 180-200 kg of wheat (World Food Program 2013). Almost two thirds of the grain is used to produce baladi bread (Hamza and Beillard 2013). Subsidized bread is a major staple of the Egyptian diet utilized by almost 75% and is consumed approximately 6.4 days a week by poor households (The Media Line 2011, FAO 2013, World Food Program 2013). Access to bread is a politically sensitive issue, with previous shortages, reduction in subsidies or price hikes resulting in civil unrest, such as the 2008 riots (World Food Program 2013).

Wheat GVC in Egypt

The Egyptian government controls the wheat value chain through subsidies, public private partnerships, state monopolies, and regulation. The government subsidizes most inputs including seeds, fuel, and water. Farmers cultivate wheat on small plots with yields of 4.5 to 7 tons per hectare, and they exercise some autonomy in their growing activities (Hannusch 2008). The state is the primary purchaser of wheat, and it buys from local producers at a price above the

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4 In 2012, Egypt’s total population was approximately 81 million The World Bank (2013). World Development Indicators. The World Bank. Washington, D.C.

5 There are two main types of bread in Egypt: baladi bread, which is a coarse and dark-grained pita bread, that is produced by extracting 82% of the wheat grain; and fino bread, which is produced by extracting 72% of the wheat grain. Larson, D., et al. (2012). Food Security and Storage in the Middle East and North Africa. Policy Research Working Paper. Washington DC, The World Bank.

6 This is compared to annual average global per capita wheat consumption of about 66 kg World Food Program (2013). Egyptian Food Observatory Food Monitoring and Evaluation System. Cairo, Egypt, Egyptian Cabinet’s Information and Decision Support Center (IDSC) and World Food Program (WFP).

7 Bakeries produce approximately 240 million baladi loaves daily across Egypt (ibid).
prevailing world price. Some farmers prefer to sell to the local traders because they provide loans for input purchases (fertilizer, seed, etc.) and they will collect the wheat from the farm gate (Hannusch 2008).

The General Authority for Supplies and Commodities (GASC) is the government entity responsible for importing wheat and managing the domestic procurement of wheat for baladi flour. The organization is part of the Ministry of Supply and Internal Trade and depends on other state enterprises to receive, store, transport, and mill wheat into (subsidized) flour. GASC also distributes money to the state agencies that buy domestic wheat, such as the Principal Bank of Development and Agricultural Credit (PBDAC). Purchasing wheat on the international market requires that the GASC has access to foreign reserves, which are shrinking amid the social unrest, particularly since late 2012. GASC is pushing for higher price guarantees to farmers as a means of raising domestic production and reducing dependency on imports (McKee 2013). The department tries to maintain a five-month supply of strategic wheat stocks (Mansour 2012).

The General Company for Silos and Storage (GCSS) is responsible for wheat handling and storage. The government controls most of the company’s shares, and the rest is traded on the Cairo stock exchange (McKee 2013). GCSS operates five grain terminals at ports on the Mediterranean, the Suez Canal, and the Red Sea. These have a total capacity of 350,000 tons. It also operates all inland silos with an additional 320,000 tons of storage capacity (Mansour 2012, McKee 2013). The organization moves wheat within the nation from points of import to the government-controlled mills. There are also a few private companies that operate grain terminals, including subsidiaries of Cargill. The government recently established The Holding Company for Silos and Storage (EHCSS) as part of its efforts to upgrade wheat storage capabilities in the country. EHCSS controls the modern silos built after 2005, purchases wheat from farmers, and transfers wheat to government-controlled mills (Hamza and Beillard 2013, McKee 2013).

The Egyptian milling industry consists of 231 public and private sector mills (Hamza and Beillard 2013). Public sector capacity (126 mills) represents about 55% of total milling capacity, the private sector (105 mills) controls 45% of total capacity (Hamza and Beillard 2013). The government controls the majority shares in the two holding companies that operate government mills: Holding Company for Rice and Wheat Mills (HCRWM) and Food Industry Holding Company (FIHC) (Hannusch 2008). FIHC controls most state-owned food processing companies and has a milling capacity of about 7 million tons annually. Public mills face little competition in the production of flour for the subsidized baladi bread, accounting for 70% of supply (Halawa 2013). On the other hand, private mills have grown increasingly competitive as producers of flour for other breads such as tabaki flat bread (McKee 2013).

Millers sell the flour to local bakeries, which must retail the subsidized bread and flour at the government-set price. Bakers are unable to sustain their operations and complain that
government prices do not cover their cost (Halawa 2013). There are about 19,000 baladi bakeries in Egypt (Mansour 2012). Almost 90% of them are privately owned and 10% are owned by the government (Coelli 2010). Each bakery serves about 4,000 people annually (Mansour 2012).

**Key Value Chain Challenges – Egypt**

**Subsidized Bread and Bread Politics**

Approximately 60% of the population depends on a government policy which provides three loaves of subsidized bread per day for survival (Brown 2011). Any attempts to reduce bread subsidies or raise the price of bread have triggered social discontent. The 1977 riots against President Anwar Sadat revolved around cuts to bread subsidies. Later, in 2008, popular unrest related to wheat shortages and increased prices forced the government to roll back plans to slash subsidies. In 2011 during the overthrow of Mubarak, a major chant of protestors called for “Bread, Freedom and Social Justice” (Perry and Youssef 2013). In 2012, attempts from Muslim Brotherhood’s government to ration bread and control bread prices further fueled growing discontent against the government, and bakers threatened to go on strike (Trifunov and Cunningham 2013).

Subsidized bread in Egypt is essential for the 25% of the population who live on less than $1.65/day. The selling price for the bread is less than 1 US cent per loaf, which is one-seventh the actual cost for bakers to make the bread and it has not changed since 1989 (Perry and Youssef 2013). The government compensates bakers for some losses incurred by selling at the mandated price. However the system faces several problems. For example, the government cost reimbursement program covers only two-thirds of the bakers’ costs. In addition, there is a substantial black market that interferes with stated policy goals. Due to corruption, some wheat intended for human consumption ends up being sold as animal feed, and the sale of subsidized bread on the black market is not uncommon (Trifunov and Cunningham 2013). Some analysts estimate that 30% to 50% of subsidized bread is not used for its intended purpose, a situation that creates higher cost for the government and shortages in the market (Perry and Youssef 2013).

**Wheat Infrastructure**

Egypt is the only Arab country among the top 10 holders of wheat stocks (The World Bank and FAO 2012). The Egyptian government is upgrading its storage by increasing the number of silos and allowing privately owned silos to participate in the chain. Egypt’s current political and economic woes have left the country with only a two-month supply of wheat on hand and have complicated wheat infrastructure investment plans (MacFarland 2013). Table 4 summarizes Egypt’s current and planned wheat infrastructure, including ports, storage facilities and milling capacity.

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8 This limit is rarely enforced.
### Table 4: Egyptian Wheat Infrastructure Current and Planned Capacity

<table>
<thead>
<tr>
<th></th>
<th>Current Capacity</th>
<th>Planned Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Import Ports</strong></td>
<td>5 grain terminals in primary ports with total storage capacity of 350,000 MT</td>
<td>Russia to build 8 silos in Egypt for distribution in county or re-export to Africa</td>
</tr>
<tr>
<td><strong>Wheat Storage</strong></td>
<td>25 silos currently controlled by EHCSS</td>
<td>Double number of silos in 2014</td>
</tr>
<tr>
<td></td>
<td>Port silos plus inland silos offers 750,000 MT of wheat storage</td>
<td>Increase to 1.5 million MT by 2016</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Build 150 more silos for 2014 harvest</td>
</tr>
<tr>
<td><strong>Wheat Flour Mills</strong></td>
<td>Milling 7 million MT/annually controlled by FIHC</td>
<td>No changes proposed</td>
</tr>
</tbody>
</table>

Source: CGGC based on McKee, 2013; The World Bank & FAO, 2012; Mubasher 2013

### Food Security Policy

In 2013, the deposed President Morsi’s administration started shifting to greater self-sufficiency in a period of four years (Saleh 2013). The ongoing civil unrest, combined with lower wheat stocks, shrinking foreign reserves, and difficulty securing international loans, contributed to this shift. The new policy includes bread rationing to decrease consumption, improve storage, and offer higher price guarantees to farmers. Table 5 highlights the major wheat and food security policy shifts in Egypt.

### Table 5: Egyptian Wheat and Food Policy

<table>
<thead>
<tr>
<th>Policy</th>
<th>Risks</th>
<th>Implementation/Impact</th>
</tr>
</thead>
</table>
| Moving to wheat self-sufficiency by 2017 and decreasing emphasis on imports | • Input constraints (land, water, etc.) limit the country’s ability to increase wheat production  
• 10% decrease in imports by 2013  
• Increase domestic production by 2.3% to 8.7 million tons  
• Invest in new silos to increase storage capacity to 1.5 million MT and replace outdated silos |  
| Government investing in offshore production in Sudan (since ousted President Mubarak’s time) | • Climate uncertainties increase vulnerabilities to crop fluctuations  
• Civil unrest in Sudan is a potential threat on investment  
• Competition from other investors in Sudanese agriculture  
• Purchasing land on the Egyptian/Sudanese border  
• Aimed at small farmers  
• Program is underdeveloped, with little output in Sudan |  |
| Heavily subsidized bread to support stability in country               | • Drains fiscal budget  
• Increase in illicit wheat trading to benefit from subsidized prices  
• Unsustainable due to rising cost of inputs, transport, and other aspects of production  
• 60% of population dependent on subsidies to meet dietary needs  
• Prices of bread unchanged since 1989  
• Major catalyst of riots including the overthrow of Mubarak and Morsi |  |

Iran

Securing a reliable wheat supply is critical to the food security of Iranian households, who draw on average 47% of their daily calorie intake from wheat products (Shaikhi 2003, FAO 2012). Wheat is one of Iran’s strategic crops with food security policies in the country revolving around self-sufficiency since the 1979 revolution (Amid 2007). Oil revenues, which account for approximately 60% of government income (EIA 2013), finance Iran’s dual policy of subsidizing both producers and consumers of wheat (Amid 2007). The subsidized wheat-flour-bread industry induced wheat production to expand throughout Iran’s 30 provinces, disregarding their diverse climatic and agro-ecological conditions (Faramarzi, Yang et al. 2010). By 2010, areas under wheat cultivation exceeded 7 million hectares representing a 12% increase compared to 1990 (MoJA 2010, FAO 2012).

While domestic production doubled to reach about 15 million tons per year in 2010, it continues to be highly volatile. Reliance on rain-fed agriculture makes Iran especially vulnerable to periods of drought and promotes the country’s dependence on wheat imports (FAO 2012, Zarafshani, Sharafi et al. 2012). For example, in 2008 drought and poor harvest contributed to a sizable spike in Iran’s wheat imports to over 5.5 million tons, making it the fifth largest global wheat importer of 2009 (FAO 2012). At the same time, subsidies continue to grow, which is increasing fiscal pressures.9 In 2007/2008 food and energy subsidies accounted for about 27% of Iran’s Gross Domestic Product (GDP) (World Bank 2013).10 A growing food import bill and the mounting fiscal pressures prompted economic reforms and the implementation of the Targeted Subsidy Reform Program in 2010 (Salehi-Isfahani, Stucki et al. 2012). While the reform aimed at phasing out all subsidies and replacing them with a targeted household cash transfer program by 2015, it was suspended by parliamentary vote in October 2012 due to the rapid devaluation of the Iranian currency and soaring consumer price inflation (Reuters 2012, IMF 2013).

Moreover, international sanctions, targeting Iran’s oil and banking industries, significantly reduced foreign exchange earnings that resulted in currency devaluation making imports very expensive. Sanctions are impacting oil exports which decreased by a third in 2012 (World Bank 2013). In addition, 2012 food price inflation exceed 30% and by March 2013 the Iranian currency was devalued by about 80% over the previous year (IMF 2013, World Bank 2013). These mounting fiscal pressures pose a significant challenge to Iran’s food security policy, which depends heavily on subsidies. The interplay of environmental stress, food security policies, and international sanctions are impacting Iran’s domestic production while limiting its ability to buy wheat in global markets.

Wheat GVC in Iran

Since the 1979 revolution, the Iranian state has maintained strong presence in pre- and post-production segments of wheat value chain in the country (Shaikhi 2003). Large state-owned enterprises, affiliated with the Ministry of Jihad-e-Agriculture, and the Ministry of Industry,

9 For example, in 2001 the bread subsidy accounted for 6% of public expenditure compared to less than 1% in 1979 Amid, J. (2007). "The dilemma of cheap food and self-sufficiency: The case of wheat in Iran." Food Policy 32(4): 537-552.

Mining, and Trade, have dominated the wheat-flour-bread markets. While the private sector has owned agricultural land and milling infrastructure, the state has either directly intervened or regulated the import and storage of wheat as well as the milling of flour and its distribution to bread bakeries. Bakeries are the largest consumers of wheat flour, accounting for over 95% of the Iranian market (Shaikhi 2003, MIMT 2007).

Although the private sector owns agricultural land, mostly divided into small and scattered family farms, the government has shaped crop production choices via its widespread intervention in input and product markets (Shaikhi 2003). Wheat farmers, assisted through an extensive network of over 2,000 agricultural cooperatives, have been provided with subsidized farming machinery and other inputs including seed, fertilizer, pesticides, credit, insurance, and extension services (Shaikhi 2003). The input market is practically monopolized by the Agricultural Support Services Company, affiliated to the Ministry of Jihad-e-Agriculture, which controls supply and distribution of agricultural inputs to wheat farmers across the country (ASC 2013).

Furthermore, another state-owned enterprise, the Governmental Trading Corporation of Iran (GTC), part of the Ministry of Industry, Mining, and Trade, is the main buyer of wheat in the country (GTC 2013). The company administers the nationwide guaranteed purchase program, which sets an annual floor price for domestic wheat. It is also responsible for wheat imports, financed by a subsidized official exchange rate, to supplement domestic purchases in years of deficit production. The company, through its 14 regional offices, also manages the 5.7 million ton wheat storage system, which is distributed across the country (GTC 2010).

In contrast, the milling industry is entirely owned by the private sector (GTC 2011). It is heavily regulated and provides milling services at a price mandated by the government, which is the only business customer for Iranian mills (MIMT 2007). The industry is structured around small milling factories with average nominal capacity of 60,000 tons per year; the 323 milling factories have a combined nominal capacity of 19 million tons per year (GTC 2011). With the 10 million ton wheat flour market, the industry has suffered from overinvestment and been operating at about 50% nominal capacity (GTC 2011). Furthermore, the milling industry provides an additional 6.4 million tons of temporary wheat storage capacity, attached to the milling factories, that supplement the state-owned silos across the country (GTC 2011).

Bread bakeries are similarly owned by the private sector and regulated by the state. They receive wheat flour at a subsidized price, benefit from energy subsidies, and sell bread at the regulated price annually determined by the government (Shaikhi 2003). The state considers regulated bread prices vital to market stability and food security in the country. In this regard, the lead actor, overseeing regulation of bread market, is Iran’s Producer and Consumer Protection Organization, affiliated to Ministry of Industry, Mining, and Trade.
Environmental Stress

Water scarcity is a growing problem in most parts of Iran. It is estimated that 12 out of the 30 provinces, currently using close to 100% of their annual freshwater resources, will experience complete groundwater depletion within the next 50 years if the current rate of extraction continues (Faramarzi, Yang et al. 2010). Iran, with its arid and semi-arid climate, is prone to repeated cycles of drought, making wheat harvest very unstable. The country has experienced 27 drought episodes during the past 40 years, the most recent ones being the prolonged drought periods in 1999/2000 and 2008 (Zarafshani, Sharafi et al. 2012).

While drought vulnerability disrupts stability in domestic production, strained groundwater resources in the country have severely restricted further expansion of irrigated agriculture, accounting already for over 90% of current water use in Iran (Ahmad and Giordano 2010). Inevitable dependence on rain-fed agriculture (accounting for about 60% of the area currently under wheat cultivation) has caused immense shocks in production, perpetuating dependence on wheat imports (FAO 2012). As Iran continues its pursuit of wheat self-sufficiency, strained water resources, heavy reliance on rain-fed agriculture, and periodic droughts are critical obstacles that have undermined the achievement of food security objectives based on self-sufficiency.

Sanctioned Oil and Banking Industries

International sanctions, targeting Iran’s oil and banking industries, have diminished Iran’s oil exports, which are deemed vital to financing wheat and other food commodity imports to the country. Accounting for over 80% of Iran’s export revenues, oil exports have dropped to about 1.25 million barrels per day, nearly half that in 2011 (Katzman 2013).

The cost of imported items has rapidly increased owing to the sharp drop in the value of Iranian currency, which lost about 80% of its value between March 2012 and 2013 (World Bank 2013). Food price increased by well over 30% in 2012, eroding the purchasing power of Iranian consumers (IMF 2013). Furthermore, the loss of revenues from oil exports, historically accounting for over 60% of government income (EIA 2013), has the potential to severely limit public expenditures and jeopardize the prospects for the heavily subsidized food security programs in the country.

Food Security Policy

Iran’s food security policy, based on self-sufficiency in wheat, has been guided by medium-term national economic development plans dubbed as the “Five Year National Development Plans” (Parizan and Bakhshuda 2008). Since the 1979 revolution, the country has implemented five medium-term plans, developed through a centralized policy-making process; policy priorities, however, have hardly varied over time (Amid 2007). Iran has persistently pursued self-sufficiency in wheat by concentrating on three main policy instruments: providing farmers with subsidized inputs, controlling the raw wheat market through both a guaranteed purchasing price to farmers and subsidized imports, and subsidizing bread prices to stabilize the consumer market (Parizan and Bakhshuda 2008).
The dual policy of subsidizing both producers and consumers, however, is argued to be inherently contradictory such that it has been stimulating wheat production while at the same time encouraging waste and inefficiency due to artificially cheap bread (Amid 2007). Nevertheless, the policy subsidizing bread prices has become a national goal important for the legitimacy of regime and political stability of the country (Amid 2007).

With the growing financial cost of subsidies in recent years, the Iranian government has devised a plan to reform its food and energy subsidy policies, which represents a departure from the regional tide of greater state involvement in the wheat GVC. In 2010, president Ahmadinejad even won parliamentary approval for an ambitious reform plan, despite repeated failures of his predecessors, to gradually phase out subsidies and replace them with targeted cash transfer to Iranian households by 2015 (Salehi-Isfahani, Stucki et al. 2012). The implementation of reforms has, however, run into serious challenges, partly due to international sanctions, and also due to the lack of a rigorous implementation strategy. Subsequent to the soaring consumer price inflation, further implementation of the reform plan was suspended by the Iranian parliament in October 2012 (Reuters 2012).

Although subsidy reform initiatives have been attempted by successive administrations since the mid-1990s, the policy has remained unchanged despite its rising budgetary burden (Salehi-Isfahani, Stucki et al. 2012). Because of the market distortions spurred by those policies, the Iranian state has remained the main actor controlling wheat production, its market price, and the rationed flows within the wheat-flour-bread chain in the country. Table 6 presents major recent food policy initiatives of Iran.

**Table 6: Iranian Wheat and Food Policy**

<table>
<thead>
<tr>
<th>Policy</th>
<th>Challenge</th>
<th>Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Replace food and energy subsidies with cash transfer program by 2015</strong></td>
<td>• International sanctions, soaring inflation, and rising cost of imports</td>
<td>• Phase out consumer subsidies and focus on regulation of wheat-flour-bread chain</td>
</tr>
<tr>
<td></td>
<td>• Controlled exchange rate policy and regulated wheat markets; disenfranchised private sector</td>
<td>• Allow private milling industry to directly buy wheat from producers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Launch targeted household cash transfer program</td>
</tr>
<tr>
<td><strong>Maintain self-sufficiency policy in wheat production</strong></td>
<td>• Heavy reliance on rainfed wheat cultivation</td>
<td>• Incentivize wheat production via subsidized inputs to farmers</td>
</tr>
<tr>
<td></td>
<td>• Occurrence of periodic droughts</td>
<td>• Regulate wheat-flour-bread market prices</td>
</tr>
<tr>
<td></td>
<td>• Restrained groundwater resources</td>
<td>• Regulate trade in strategic commodities, including wheat</td>
</tr>
<tr>
<td></td>
<td>5. Inefficient smallholder agriculture</td>
<td></td>
</tr>
</tbody>
</table>

Saudi Arabia

Saudi Arabia’s dry climate, poor soil quality, limited water supply and limited (1.5% of total land area) arable land significantly restrict agriculture (FAO 2013). Nevertheless, the kingdom was able to become self-sufficient in water-intensive crops such as wheat by investing in and implementing policies that support the agriculture sector from the 1970’s onwards. The country’s vast oil resources financed the kingdom’s agricultural and economic development, supported a heavily subsidized welfare system and helped ease food price inflation. By 1984, Saudi Arabia became self-sufficient in wheat and even became the sixth largest exporter of wheat in the early 1990s (Al-Shayaa, Mirza B. Baig et al. 2012). However, such an agricultural strategy was environmentally unsustainable and depended on high direct and indirect subsidies from the government (Dincer, M.M. Hussain et al. 2005).

In 2006, wheat production reached over 2.6 million MT, though this came at the high cost of depleting non-renewable underground water resources. Groundwater depletion led the country to move away from its self-sufficiency strategy and prompted the development of extensive and costly water desalination projects to meet growing water demand (Dincer, M.M. Hussain et al. 2005, FAO 2013).

Saudi Arabia mostly grows hard-winter wheat and limited quantities\(^\text{11}\) of durum wheat for pasta products.\(^\text{12}\) The main wheat variety cultivated in Saudi Arabia is ‘Yecoro Rojo’, which originated from the United States (Ahmed and Mousa 2013). Wheat is an important staple grain in the Saudi diet, where it is mostly consumed in the form of pita/flat bread and other types of European bread such as French baguettes, hamburger buns, and toast (Mousa 2012). Average Saudi per-capita consumption was 89 kg/year in 2009 and is estimated to be about 110 kg/year in 2012/2013 (Ahmed and Mousa 2013, FAO 2013). The main drivers for growing food consumption are population growth, increasing incomes, and diversification in diets, as Western-style pasta dishes, breads, cakes and biscuits become more popular. Total wheat for human consumption in 2012/13 is estimated at 3.0 million MT, of which 10% is utilized for food processing (Ahmed and Mousa 2013).

**Wheat GVC in Saudi Arabia**

The state plays a strong role throughout the various segments of the Saudi wheat value chain. In the past, the government provided significant subsidies on wheat inputs such as water, fertilizer, and agricultural machinery, and offers interest-free loans, free land, and seeds to promote wheat growing. The government also created marketing channels for wheat producers and purchased their production at prices higher than prevailing world prices through the Saudi Grain Silos and Flour Mills Organization (GSMO), which was created in 1972 (Al-Hamoudi, Sherin A. Sherif et al. 1997). The Saudi GSMO is responsible for wheat purchasing, storage, milling, and distribution throughout the country. The agency is in charge of managing wheat subsidies, allocating farmers’ production quotas, setting guaranteed prices for purchasing wheat from the local producers and importing additional wheat to cover domestic consumption needs (GSFMO

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\(^{12}\) Total wheat production in MY 2012/13 is estimated at 780,000 MT (ibid.).
The number of farmers in the chain has been steadily declining, and large commercial farms have been replacing small farmers in cultivating wheat. In 2012 the number of farmers was estimated at about 6,000 farmers, compared to more than 34,000 farmers at the peak of the Saudi wheat program in 1993 (Ahmed and Mousa 2013). The GSFMO will continue to purchase domestically grown wheat from farmers until the completion of the phase-out of wheat production in 2016. The agency imports wheat directly through public tenders that are open to registered international exporters, and it does not buy through grain brokers (Ahmed and Mousa 2013).

Domestic bakeries and supermarkets purchase their wheat on a weekly basis from the GSFMO’s mills in their cities or appointed agents in their regions. Retail stores purchase flour from wholesalers, which are sold to consumers in 1 to 10 kg packages (Mousa 2012, Ahmed and Mousa 2013). Other GSFMO activities include implementing food quality regulations and health standards, and also coordinating food security strategies with the Ministry of Agriculture, Ministry of Finance and Ministry of Planning and Economy (GSFMO 2011).

**Key Value Chain Challenges – Saudi Arabia**

**Environmental Stress**

The Arabian Peninsula is one of the world’s driest regions, with rainfall averaging less than 130 millimeters per year (Al-Shayaa, Mirza B. Baig et al. 2012). Groundwater accounts for 84% of water supply and desalinization accounts for about 8% of water supply (Afreen Siddiqui and Anandon 2011). Demand from the agricultural sector is more than 86% of the overall water consumption (Hartmann, Khalil et al. 2012). Government policies, such as artificially low water tariffs and the prioritization of fresh water for agriculture, resulted in inefficient use of water. Wheat production placed large demands on non-renewable aquifers, resulting in a growing imbalance between water recharge and water discharge. Consequently, underground water tables have fallen in grain- and forage-producing regions (Lyddon 2011). The government is now phasing out subsidies to the wheat sector and is completely terminating wheat production in the kingdom to conserve the country’s scarce water resources (Alpen Capital 2011, Ahmed and Mousa 2013).

**Wheat Infrastructure**

The Saudi government is upgrading its wheat infrastructure as the country shifts to 100% dependency on imports by 2016 (Ahmed and Mousa 2013). In 2011, the government allocated US $12.3 billion for the development of agriculture infrastructure, including electricity, transportation, storage, and ports (Alpen Capital 2011). Table 7 below summarizes current and planned capacity to meet the food security needs of the country.
Table 7: Saudi Wheat Infrastructure Current and Planned Capacity

<table>
<thead>
<tr>
<th></th>
<th>Current Capacity</th>
<th>Planned Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Import Ports</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jeddah Seaport on the Red Sea and the Dammam Seaport on the Arabian Gulf</td>
<td></td>
<td>Adding three smaller seaports in Diba, Gazan and Yanbu (all located on the Red Sea) by 2016</td>
</tr>
<tr>
<td><strong>Wheat Storage</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Covers six months equivalent to production</td>
<td>Increase capacity to 12 months by 2016</td>
<td></td>
</tr>
<tr>
<td>2.52 million MT in Riyadh, WadiAl-Dawaser, Al-Qassim, Hail, Al-Kharj, Jeddah, Al-Jouf, Tabook, Dammam, Al-Madina, and Khamees Mushayt</td>
<td>Additional silos in Makkah, Qassim, Gazan, Aseer, and Al-Hasa, with a combined storage capacity of 790,000 MT by 2014</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Adding storage capacity at three ports—King Abdullah Economic City, Yanbu, and Dhiba—to import hold stocks at the point of entry</td>
</tr>
<tr>
<td><strong>Wheat Flour Mills</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At 12,630 MT/day</td>
<td>Increase capacity to 16,050 MT/day by 2025</td>
<td></td>
</tr>
<tr>
<td>Controlled by GSFMO</td>
<td>Privatization of nine flour mills</td>
<td></td>
</tr>
</tbody>
</table>


Food Security Policy

In the 1970s and 1980s the government targeted development in the agriculture sector as part of its economic diversification strategy and as a means to ensure food security (Al-Shayaa, Mirza B. Baig et al. 2012). The kingdom subsidized wheat production through various mechanisms: interest free loans, support services, free seeds and fertilizers, low-cost water and electricity, duty free imports of machinery, and free land programs. However, wheat production was environmentally unsustainable and depended on high governmental direct and indirect subsidies (Dincer, M.M. Hussain et al. 2005).

The 2008 food crisis and water scarcity in the Kingdom prompted drastic policy shifts away from self-sufficiency to a more comprehensive and sustainable food security and agriculture strategy. GSFMO is now implementing Decree 335, which reduces domestic wheat production by about 12.5% per year, with the goal of terminating domestic wheat production by 2016 (Mousa 2012a). The government’s plan now focuses on securing and managing imports, food inflation, and addressing the water crisis. Table 8 outlines the current food security strategies of Saudi Arabia.

Table 8: Saudi Arabia’s Wheat and Food Security Policy

<table>
<thead>
<tr>
<th>Policy</th>
<th>Risks</th>
<th>Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminating Saudi Arabia’s wheat production by 2016 and substituting it by imports</td>
<td>• 100% reliance on imports, exposes the country to global price shocks, export restrictions, and changes in global supply</td>
<td>• Phasing out domestic wheat production by 12.5% annually</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Upgrade country elevators</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Increase storage capacity from six months to twelve months supply</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Encourage private investment in operational silos</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Privatize mills</td>
</tr>
</tbody>
</table>
King Abdullah’s Initiative for Saudi Agricultural Investment Abroad (Focus on overseas investments in staples such as wheat, barley and rice)

- Lack of infrastructure, corruption, political instability, limited supply of skilled labor, political resistance, water rights issues in developing countries
- Conflict around land use and land rights in candidate countries
- Tensions might occur between Saudi producers and the government to these initiatives
- Implementation gaps, low yields, and project failures; e.g. Saudi projects such as Al-Rajhi Group’s in Sudan only cultivates a fraction of its total project size
- Identified 27 countries for agricultural investments
- Follows a public/private partnership strategy
- Signing bilateral agreements with hosting countries
- Created Saudi Agricultural Investment and Animal Production Company in 2009 to provide financing and agreement protocols
- Several Saudi firms formed a consortium, for overseas agriculture investment e.g. Janat, Hail Agricultural Development Company, and National Agricultural Development Company

Strategic measures to buffer inflation and global price shocks

- Growing public expenditure can be a strain on government budget in the long run
- Depends on oil revenues
- Price subsidies on basic goods, such as food and electricity
- Increase salaries and social benefits
- Price control on goods e.g. gasoline and food
- Reducing fees and tariffs on food imports

Universal access to water and Managing and saving water resources

- Farmers replacing wheat with other water intensive crops such as alfalfa
- Tensions might occur with government as they regulate water use
- Created Ministry of Electricity and Water in 2002
- Shift from self-sufficiency in wheat to imports
- Expand investment in water desalinization and water saving technologies
- Regulate irrigation practices


Syria

Agriculture and the energy sector are the driving forces of the Syrian economy. Wheat is Syria’s primary agricultural crop, accounting for about 60% of cultivated agriculture land and is concentrated in Syria’s northern regions (Aw-Hassan, Issa et al. 2010). Wheat is produced on both rain-fed and irrigated land (Aw-Hassan, Issa et al. 2010). The country has maintained wheat self-sufficiency since 1994, though recent droughts have reduced yields significantly (Fiorillo and Vercueil 2003, USDA FAS 2012). Additionally, the 2013 civil war created disruptions that cut the country’s projected harvest in half, making it the worst harvest in over 30 years and posing a serious threat to the country’s immediate food security.

13 Agricultural income is a relatively large share of household income in Northern regions.
Syrian farms are small- and medium-sized operations, as agrarian reforms have prohibited large-scale land ownership (Minot, Chemingui et al. 2009, Lançon 2011). The country’s major export markets are Algeria and Tunisia, where durum wheat is used for the production of semolina (50% of Syrian durum export), followed by Italy for the production of pasta (around 30% of durum export); the remaining exports (less than 20%) are directed towards neighboring countries and other European countries (Lançon 2011).

Wheat provides about 40% of Syrian households’ caloric consumption, and is consumed mostly as bread (FAO 2013). The government subsidizes wheat production by paying growers premium prices and by setting retail prices below production costs. Food subsidies range from 1-2% of GDP. Oil and food subsidies account for about 20% of public spending—twice the amount spent on social protection and health programs combined (Breisinger, Ecker et al. 2012).

**Wheat Value Chain in Syria**

Government intervention in the Syrian wheat market is strong on both the supply and demand sides (Lançon 2011). The government subsidizes all inputs, monopolizes most inputs (including seeds and fertilizers), is the sole buyer of wheat, and controls all marketing channels (Aw-Hassan, Issa et al. 2010). The wheat chain is primarily organized around the goal of achieving food security. The General Establishment for Cereal Processing and Trade (HOBOOB) is the primary government agent, controlling several institutions that are active in the wheat value chain and setting the national price for wheat. The Syrian Ministry of Economy and Trade finances HOBOOB’s operations.

HOBOOB procures wheat through its 140 collection centers around the country (Goodbody, Re et al. 2013). Larger producers sell their wheat directly to these centers, while the smaller ones sell to wheat collectors who in turn resell the product in bulk at the official price at the marketing centers (Lançon 2011). HOBOOB manages the storage of wheat through the General Company for Silos, Feed Mills and Seed Plants. Wheat is stored in concrete and metal silos, as well as in open storage facilities (Maldonado 2011). HOBOOB seeks to maintain stocks of around four million tons, which stand in excess of the country’s annual milling capacity. Syria’s storage capacity is the largest among Arab countries, surpassing 10 months’ worth of consumption (The World Bank and FAO 2012).

The Syrian government determines export and import volumes based on cereal production and the level of stocks (Lançon 2011). HOBOOB stopped exporting wheat during the last several years, due to lower wheat stocks stemming from drought and poor harvest (Maldonado 2011).

HOBOOB owns the two state-run companies responsible for flour milling and baking – the General Company for Mills (GCM) and the General Company for Baking (GCB) (Fiorillo and Vercueil 2003). Private millers evolved in the late 1990s as the government started liberalizing its domestic wheat market (Fiorillo and Vercueil 2003). Nevertheless, the state continues to dominate the chain by monopolizing the purchase of wheat, which it sells to the mills exclusively. The government owns 26 mills and contracts 35 private millers (Goodbody, Re et al. 2013). The largest share of wheat is sold to GCM, the public company in charge of producing

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14 These countries are members of the Greater Arab Trade Agreement (GAFTA).
flour at a subsidized price for the General Company for Bakeries (GCB) (Lançon 2011). Private mills that deal with HOBOOB depend on these contracts and are highly competitive (Fiorillo and Vercueil 2003).

All government-milled wheat is converted into standard flour. Wheat bran is sold to the General Establishment for Feed, private feed millers and farmers. Most private flourmills operate in a relatively small market, and produce high quality flour for specialty bread, pastries and pasta markets, and avoid competing in the subsidized standard flour market. They also allegedly purchase wheat illegally from farmers and traders in order to profit from the governmental subsidy scheme (Fiorillo and Vercueil 2003). The wheat used in private mills is usually from the past year’s harvest compared to HOBOOB’s stocked wheat, which can be up to three years old and may need re-cleaning or drying if it is stored incorrectly. The demand from the private milling and pasta industries is marginal and represents only 5% of total HOBOOB deliveries (Lançon 2011).

HOBOOB is the exclusive supplier of flour to bakeries making standard bread, which they sell to consumers at the official fixed prices. The organization sells wheat at subsidized prices and delivers it by truck to the bakeries (Fiorillo and Vercueil 2003). The government owns 122 bakeries and co-owns 90 others with the private sector (Goodbody, Re et al. 2013). Bakeries that make high-quality bread buy their flour from private mills. Bread, by law, may be produced from either standard flour or high quality flour, but not from both. Public bakeries only produce standard bread, while private bakeries can produce either standard or high-quality (Fiorillo and Vercueil 2003). Consumers buy flour from public bakeries, HOBOOB’s retail outlets and private food retailers.

Key Value Chain Challenges – Syria

Environmental stress

Syria is a semi-arid country that suffers from changing weather patterns, water shortages and drought (USDA FAS 2012). Altered weather conditions such as inconsistent rainfall pose a major challenge that is adversely affecting farmers and gradually leading to desertification. Moreover, changes in temperature and rainfall created a favorable environment for pests, such as the cereal leaf miner pest that recently infested some wheat and barley crops (Bouhssini, Lhaloui et al. 2010).

Rain is the main water source, amounting to 7 billion m3/year, while groundwater recharge is about 4.2 billion m3/year (FAO and WFP 2012). There is growing concern about the over-exploitation of groundwater reserves because many farmers, facing low rainfall, are drawing down underground stocks of water. The water table is falling, and water quality is deteriorating, as indicated by growing concentrations of gypsum. The surface water resources for Syria are estimated at 17.9 billion m3/year, with the Euphrates and its tributary, the Al Khabour, as the two largest rivers (Fiorillo and Vercueil 2003, FAO and WFP 2012).

Cereal and sheep production are the industries hardest hit by chronic drought. Drought periods usually last close to four and a half years. (Breisinger, Zhu et al. 2011). The recent five years of chronic drought in 2007-2012 has contributed to economic, social and political shocks in Syria.
These droughts reduced the country’s wheat output, resulting in imports of wheat for the first time in over 10 years; this caused massive migration from rural to urban areas and fostered tensions with the government (Business Monitor International 2009, Zurayk 2013).

**Food Security Policy**

Syria has one of the most highly regulated economies in the MENA. There are a multitude of institutions involved in the formulation and implementation of policy, including the Ministry of Agriculture and Agrarian Reform, the National Agricultural Policy Center, and the Ministry of Economy and Trade. Self-sufficiency and the availability of cheap food are central to the Syrian domestic economic and food security policies. Since the early 1970s the Syrian Government used three main instruments to increase wheat productivity: (i) investments in irrigation; (ii) input subsidies (seed, fuel and fertilizer); and (iii) agricultural research to improve productivity. These interventions complemented each other and boosted wheat production, thus helping to achieve food security goals (Aw-Hassan, Issa et al. 2010).

Agricultural policies have been slowly evolving along a few distinct trajectories: (a) recognizing the critical role of marketing and processing in the wheat industry; (b) allowing private sector participation; and (c) making more efficient use of scarce natural resource (Fiorillo and Vercueil 2003). However, these efforts will not substantially alter the strong role of the government in the wheat chain. Table 9 below summarizes Syria’s agricultural and wheat policies.

Table 9: Syrian Wheat and Food Policy

<table>
<thead>
<tr>
<th>Policy</th>
<th>Challenges</th>
<th>Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land use planning (land size, crop decision, and production quota)</td>
<td>• Disregards farmers’ preferences</td>
<td>• Prepared by the state</td>
</tr>
<tr>
<td></td>
<td>• Disagreement between farmer and government objectives</td>
<td>• Is part of the national economic plan</td>
</tr>
<tr>
<td></td>
<td>• Prepared by the state</td>
<td>• Enforced by state agents</td>
</tr>
<tr>
<td>State Monopolies (HOBOOB, GCM, GCB)</td>
<td>• Producer prices are higher than consumer prices</td>
<td>• Multiple government institutions set price of wheat</td>
</tr>
<tr>
<td></td>
<td>• Mounting costs on state budget</td>
<td>• State guarantees purchase price</td>
</tr>
<tr>
<td></td>
<td>• Inefficiencies in wheat production</td>
<td></td>
</tr>
<tr>
<td>Consumer Prices</td>
<td>• Unsustainable and burdens public expenditure</td>
<td>• Government subsidizes and fixes the price of flour and bread</td>
</tr>
<tr>
<td></td>
<td>• Subsidized bread is highly politicized</td>
<td></td>
</tr>
<tr>
<td>Input Policies (Input subsidies, purchase and regulation of inputs)</td>
<td>• Continued state monopoly</td>
<td>• State monopoly in the production, imports and distribution of seeds and fertilizers</td>
</tr>
<tr>
<td></td>
<td>• Long delays in fertilizer delivery</td>
<td>• The Government created financial schemes for farmers</td>
</tr>
<tr>
<td></td>
<td>• Led to additional costs, estimated at 30% of the farmgate price</td>
<td>• Limited private sector participation</td>
</tr>
<tr>
<td></td>
<td>• State monopoly in the production, imports and distribution of seeds and fertilizers</td>
<td>• Government rations fertilizer</td>
</tr>
<tr>
<td>Marketing Policies Reforms</td>
<td>• Continued state control, slow agricultural reforms, and limited agricultural growth</td>
<td>• Reduced restrictions on farmers’ grain sales to the state</td>
</tr>
<tr>
<td></td>
<td>• Allowed conditional participation of the private sector</td>
<td>• Allowed conditional participation of the private sector</td>
</tr>
</tbody>
</table>
Investment in Irrigation
- Water overuse and mismanagement
- Lower water tables
- Negative environmental impact on Euphrates
- Started to modernize and expand irrigation systems during 10+ years period in early 2000s

Increased imports and reduced taxes on food grains’ imports
- Exposure to volatile global wheat prices
- Increasing storage from 10 to over 13 months consumption
- Restricts wheat exports

Conflict

Continued civil unrest since mid-March 2011 raises urgent concerns over the state of food security in Syria. Domestic wheat production has dropped to its lowest level in nearly 30 years and only 45% of farmers have been able to fully harvest their cereal crops (FAO 2013, Goodbody, Re et al. 2013). Irrigation systems are severely damaged due to the destruction of major irrigation canals and shortages of fuel for powering irrigation pumps (Goodbody, Re et al. 2013). Lack of fuel and electricity cuts have also affected the water supply and contributed to social tensions among the farmers (Goodbody, Re et al. 2013). Higher production costs, increases in fuel prices and difficulty with regard to securing imports have all contributed to an inflation rate of 50%, which has led to a sharp increase in food prices (GIEWS 2013). Table 10 below summarizes the wheat value chain disruptions that have occurred in the wake of the current conflict.

Table 10: Syrian Wheat Value Chain Disruptions

<table>
<thead>
<tr>
<th>Stage in the Value Chain</th>
<th>Value Chain Disruption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat Production</td>
<td>Dropped below average to about 2 million tons in 2013</td>
</tr>
<tr>
<td>Wheat Distribution</td>
<td>Transport of crop to collection centers is risky and expensive. Collection centers are inaccessible with only 40 of 140 centers are operational.</td>
</tr>
<tr>
<td>Wheat Imports</td>
<td>Importing larger volumes of wheat is difficult. Economic sanctions worsened Syria’s fiscal standing making it uncompetitive in tendering for grains globally. Exporters are discouraged from trading with Syria</td>
</tr>
<tr>
<td>Wheat Storage</td>
<td>2013 post-harvest grain losses are higher than average due to damage to equipment and storage structures. Limited access to production and collection centers</td>
</tr>
<tr>
<td>Wheat Milling</td>
<td>Most mills are not operational</td>
</tr>
<tr>
<td>Bread Production</td>
<td>Many bakeries are damaged and operating below capacity due to shortages of fuel, flour and yeast(^\text{15})</td>
</tr>
<tr>
<td>Consumption</td>
<td>Shortages of flour and bread and high gasoline prices increased the price of bread from the 0.23 USD (25 SYP) for 1.5kg of subsidized bread to about 1.4 (150 SYP) at the private bakery</td>
</tr>
</tbody>
</table>


\(^{15}\) Syria has four yeast factories with only one still operational.
United Arab Emirates

Geophysical and climactic conditions in the UAE – low rainfall, limited groundwater reserves, extreme heat, poor soil quality and small land area – have historically made wheat cultivation largely untenable. Only 0.6% of the land in the UAE is arable (World Bank 2013), and more than 70% of the 275 billion liters of water used annually in the UAE is already devoted to agricultural production in less water-intensive crops, particularly the cultivation of dates and Rhodes grass, which is used as animal fodder (EAD 2009, Solomon 2010, NBS 2012). Given the large quantities of water required for wheat production, this staple crop is not commercially cultivated at all in the UAE, even though it is responsible for 29% of calorie consumption; the country is fully dependent on imports (Larson, Lampietti et al. 2012). Nevertheless, in 2012 the Abu Dhabi Food Control Authority initiated a series of experimental trials in order to identify wheat varieties for eventual domestic production (Malek 2013). However, there is considerable doubt as to whether wheat cultivation in the UAE could ever by a cost-effective food security strategy under existing technologies (Woertz 2013). Furthermore, the Abu Dhabi Master Water Plan already warned in 2009 that water consumption trends in agriculture are unsustainable, claiming that “agriculture is… living on borrowed time” (EAD 2009).16

Given its total dependence on imports of wheat, the three main strategies by which the UAE is pursuing secure access to wheat are: 1) increasing storage capacity for imported wheat; 2) promoting offshore agricultural production projects directed towards the UAE market; and 3) deploying price controls and subsidies in order to reduce the prices faced by consumers. Though imports of wheat and other foodstuffs can be comfortably financed with income from the UAE’s vast oil reserves, even during times of high international prices, food security (especially with respect to wheat) has emerged as a major policy concern at all levels of government.

Though the UAE is not thought to be a food-insecure country, high levels of immigration could complicate food security planning over time, due to the contingent nature and sheer scale of migration inflows. Officially, immigrants make up 70% of the country’s population (non-government sources suggest the figure may be closer to 80%), and more than 90% of the labor force (ECHR 2012, NBS 2012). Low-wage migrants working in the domestic service and construction industries are the most food-insecure population in the country, due to their limited purchasing power and lack of access to food subsidy packages offered through municipal governments (ECHR 2012, Al Bustani 2013).

Wheat GVC in the UAE

The wheat GVC in the UAE is under substantially broader private control compared to other MENA countries, inasmuch as government agencies do little to directly manage prices at intermediate stages of the value chain. Milling activities are privatized in the UAE, and the management of storage silos has been partially turned over to the private sector. Nevertheless, various state organs play key roles in guiding investments in storage and production, and also regulate the prices faced by consumers. State involvement, for example, has been driving

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16 “There is a lobby that argues that continued support for agriculture contributes to food self-sufficiency and is essential for national security. However, it must be stated here that future agricultural management and expansion must be viewed within the context of available irrigation water and energy sources to ensure sustainability of production” EAD (2009). Master Water Plan. Abu Dhabi, Environmental Agency of Abu Dhabi.
investments in offshore wheat production by actively working to eliminate risks to UAE-based private business groups – such as Al Ghurair, Jenaan and Al Dahra\textsuperscript{17} – which then purchase land abroad and oversee offshore production activities. Towards this end, the Abu Dhabi Development Fund has made grants and loans to developing countries, including South Sudan and Pakistan, in order to finance the preparation of land for wheat production by these private, UAE-based investors. In addition, the Abu Dhabi government has been active in financing the expansion of the UAE’s wheat storage capacity through investments in grain silos in Al Wathba, Abu Dhabi, and Fujairah (Agthia 2011, Bundhun 2011, Sahoo 2013)\textsuperscript{18}.

On the marketing side of the value chain, federal price caps and municipal subsidies influence the price faced by consumers for wheat flour and baked goods. Though commercial wheat production is not currently undertaken – nor has it ever been – in the UAE, the Abu Dhabi Food Control Authority (FCA) is funding research and development efforts with the stated goal of introducing domestic wheat production. If viable wheat production methods are identified, the Abu Dhabi FCA, as well as the federal Ministry of Environment and Water (MOEW), would likely subsidize the inputs, as they do for other crops currently under cultivation in the UAE.

Thus, even as the state’s intervention in the wheat GVC is less direct in the UAE than in other MENA countries, it nevertheless plays a key role in enabling and guiding private sector investments to support the country’s food security goals of increased storage capacity and offshore production capabilities. The most important state agencies shaping food security are found in Abu Dhabi, which is both the largest and richest of the country’s seven Emirates. These include the Abu Dhabi FCA, the Abu Dhabi Investment Agency and the Abu Dhabi Development Fund. The federal government plays an institutional role in disseminating information about water and land use patterns through MOEW. Municipal governments also influence the domestic wheat GVC at multiple stages. Large municipalities support wheat consumption through subsidy packages to qualifying Emirati families. Additionally, the port regulations overseen by the municipal governments of Dubai and, increasingly, Fujairah support the imports and re-exports of wheat, heavily contributing to the UAE’s unique status as a trade hub for wheat and other commodities in MENA.

**Key Value Chain Challenges – UAE**

**Capital from oil wealth**

Due to the immense oil wealth controlled by the UAE, food security with respect to wheat is not seen as a threat in this country (Sathish 2011, Woertz 2013). Even in periods of high international food prices, the UAE can comfortably finance imports of large quantities of wheat. Furthermore, easy access to capital has allowed UAE-based companies to invest in relatively capital-intensive segments of the wheat GVC, including storage, milling and food manufacturing. Oil wealth has also financed offshore investments by UAE companies in a variety of industries throughout the region, including agriculture. Thus, UAE-based corporations

\textsuperscript{17} Al Dahra is a technically a privately held corporation, though it is owned and directed by Sheikh Mohammed bin Zayed Al Nahyan of Abu Dhabi.

\textsuperscript{18} The Al Wathba facility will be managed by the Agthia corporation, which is 51% owned by the Abu Dhabi Investment Agency. Agthia’s subsidiary, Grand Mills, will be oversee milling operations at Al Wathba.
play an important role in the wheat GVC, not only within the Emirates but also across MENA and in South Asia, through offshore investments in farming, trading, milling and marketing.

**Wheat infrastructure: Ports, storage, and milling**

Major investments in the UAE’s wheat infrastructure have expanded capabilities in wheat trade, storage and milling in recent years. With respect to trade, the UAE has, since 2005, expanded its capacity as a trade hub for MENA. Commodities traders import large quantities of wheat and other goods to the UAE and then re-export a large portion of these, sometimes in processed form, throughout the region. In 2010, for example, the UAE imported 1.14 million MT of wheat and exported 0.65 million MT of wheat (FAO 2012). Since domestic production is essentially zero, re-exports of wheat therefore comprise 57% of all imports to the UAE. The main ports through which wheat passes in the UAE are Mina Zayed Port in Abu Dhabi, Fujairah Port in Fujairah, and the port at the Jebel Ali free zone in Dubai, which is the site of substantial food processing operations. Due to the strategic location of Fujairah, ships headed to this port do not need to pass through the Strait of Hormuz, which Iran periodically threatens to close. Thus, Fujairah has been dubbed the “lung of the UAE” (Peel 2013) and was chosen to be developed not only as a major grain storage facility (constructed with funds from the Abu Dhabi Investment Authority) but also as a major export facility for oil and natural gas from the UAE.

Reliable data about stocks and flows of foodstuffs, including wheat, within the UAE are notoriously difficult to come by (Woertz 2013), and major regional and international publications lack information about the UAE’s wheat storage or milling capacity. Nevertheless, there is some information about four major storage and milling facilities controlled by major business groups in the UAE. Agthia, 51% of whose shares are owned by the Abu Dhabi General Holding Corporation (a government entity), operates the FCA-owned storage silos located in Al Wathba, Abu Dhabi, which have a capacity of 50,000 MT and were completed in 2011 (Kumar 2011). The diversified multinational business group Al Ghurair has the capacity to store 300,000 MT of wheat in its silos in the Jebel Ali Free Zone, as well as more than 150,000 MT of storage capacity in Sudan, Lebanon and Algeria (Resources 2013). The current wheat capacity at the Fujairah Strategic Grain Terminal is 215,000 MT (plus 60,000 MT for rice). There are plans to expand total storage capacity at Fujairah to 700,000 MT in the future, which will make it the largest wheat storage facility in the UAE (Sahoo 2013). Finally, the wheat storage facility in Mina Zayed, constructed in 1978, has a capacity of 150,000 MT (Sahoo 2013). It is not clear who retains ownership or operational responsibilities with respect to the Port Zayed facility.

Unlike in many other MENA countries, milling in the UAE is carried out primarily through the private sector. Dubai-based Al Ghurair, which is the largest flour supplier to the Middle East, operates two flourmills in Dubai under its National Flour Mills subsidiary, as well as one mill each in Lebanon, Sudan and Sri Lanka. Between these five mills, Al Ghurair has a total milling capacity of 5,000 to 5,500 MT per day (Sathish 2011, Al Ghurair 2012). Agthia, which is partially owned by the Emirate of Abu Dhabi, has the capacity to mill 400 MT of flour per day through its Grand Mills subsidiary, located near the wheat storage facility in Al Wathba. An additional mill, International Grain Silos and Flour Mills, operates in Fujairah, though it operates at a much lower scale than the mills owned by Al Ghurair and Agthia.
Food Security Policies

The policy environment with respect to food security in the UAE is relatively decentralized, due to the country’s federalized political system. While the federal government, primarily through the Ministry of Agriculture and Forestry, remained an important actor in regulating and subsidizing the production and trade of food through the early 2000’s, many of these functions have been taken over by agencies at the level of the emirate. The Ministry of Agriculture and Forestry was dissolved in 2007 and replaced by the Ministry of Environment and Water, which is responsible for collecting and disseminating information about water and other environmental conditions throughout the emirates.

The Emirate of Abu Dhabi, which controls the majority of the UAE’s land area and oil revenues, has been the most active in pushing forward new food security policies. The Abu Dhabi Food Control Authority (FCA) plays a major role in domestic agriculture through subsidies to farmers for major inputs (seeds, fertilizers and – crucially – water) as well as the construction of additional wheat storage facilities in Abu Dhabi and Fujairah (Kumar 2011, Malek 2013, Sahoo 2013). In addition, the Abu Dhabi Development Fund and the Abu Dhabi Investment Authority have pursued actions to enable the offshoring of agricultural production to nearby countries including Sudan, Pakistan, Egypt, Romania and Serbia, among others (Bundhun 2011, Woertz 2012, England and Blas 2013).

Given its role as a major trade hub for the UAE as well as the broader MENA region, Dubai’s port infrastructure, combined with streamlined municipal regulations surrounding the import and re-export of foodstuffs, serves to support the efficient administration of trade (WTO 2006, Municipality 2013). As for the demand side of the wheat value chain, federal and municipal agencies play an active role in regulating prices and providing targeted food subsidies to Emirati citizens (Al Bustani 2013).

Table 11 illustrates major policy initiatives with relevance to food security in the UAE. Overall, these policies suggest a food security strategy of securing and managing wheat imports, promoting domestic wheat cultivation, and combating food inflation through market interventions. This policy strategy resembles closely that of Saudi Arabia; however whereas Saudi Arabia is phasing out wheat production, the UAE is planning to introduce domestic cultivation. However, this policy goal, pushed primarily by the Abu Dhabi government, stands in conflict with national-level water conservation efforts.

<table>
<thead>
<tr>
<th>Policy</th>
<th>Risks</th>
<th>Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investigate possibilities for</td>
<td>• Due to reliance on water from desalination plants, water inputs</td>
<td>• Abu Dhabi FCA launched a research project to identify</td>
</tr>
<tr>
<td>introducing domestic wheat production</td>
<td>for domestic production may be very expensive</td>
<td>varieties of wheat suitable for growing in UAE</td>
</tr>
<tr>
<td></td>
<td>• Tradeoff between water conservation and wheat production</td>
<td>• Abu Dhabi FCA offers subsidies for farmers, including</td>
</tr>
<tr>
<td></td>
<td></td>
<td>subsidized farm inputs</td>
</tr>
<tr>
<td>Reduce water consumption</td>
<td>• Tradeoff between water consumption and agricultural production</td>
<td>• Abu Dhabi FCA proposes to reduce agricultural water consumption to 40% of 2011 levels before end of 2013 by incentivizing farmers to shift to less water-intensive crops and irrigation methods</td>
</tr>
<tr>
<td>---</td>
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<td>---</td>
</tr>
<tr>
<td><strong>Investments by Abu Dhabi government agencies in offshore agricultural projects</strong></td>
<td>• Lack of infrastructure, corruption, political instability, limited supply of skilled labor, political resistance, water rights issues in developing countries</td>
<td>• Conflict around land use and land rights in candidate countries; e.g. Egyptian court declared land purchase by Al Dahra group illegal in 2011</td>
</tr>
<tr>
<td><strong>Strategic measures to buffer inflation and global price shocks</strong></td>
<td>• Price caps generate tension between the government and retailers</td>
<td>• Retail price caps have been instituted by the federal Consumer Protection Agency for key goods, including flour and breads</td>
</tr>
</tbody>
</table>

Source: CGG based on (Solomon 2010, Woertz 2012, Bitar 2013, Sahoo 2013, Stanton 2013)

### 6. MENA Wheat GVC Analysis

The case studies above reveal striking variation in both the positions of various MENA countries in the wheat GVC as well as the food security strategies that they pursue. In this section, we will compare food security strategy in the five selected MENA countries along several dimensions that are of interest to both GVC and food systems research perspectives in order to: (1) highlight interconnections between the food security strategies of each country; and (2) the organization of the wheat value chain in that country. This section highlights key findings revealed through a comparative analysis of the preceding country cases with particular focus on the strategies.
employed by each country to secure wheat supplies as part of their food security policies. This discussion complements the existing literature on food security in MENA by incorporating actors and institutions at multiple levels (global, regional and national) and by highlighting the various logics that guide food security strategy in the selected MENA countries.

**Environmental Stress**

Environmental stress and water scarcity are defining features of the food system of the MENA region. In all our cases, water stress is an important driver of food security strategy, having a significant impact on wheat production capacity and import decisions. Egypt, Iran and Syria benefit from the presence of major rivers and some rainfall, but each of these countries also faces periodic droughts that threaten wheat production. Saudi Arabia and the UAE, by contrast, face much more severe water stress. Beginning in the 1980’s, Saudi Arabia attempted to rely on aquifers for wheat irrigation in order to pursue a policy of food self-sufficiency; however by the 2000’s it became clear that domestic aquifers would soon be dry, and the country decided to completely phase out wheat production in 2006. Conversely, due to water scarcity the UAE has not produced wheat commercially in the past. However, the country is currently financing R&D in order to identify varieties of wheat that might be suited to local conditions and that could be irrigated using limited aquifer resources as well as desalinated water. There is considerable doubt as to the feasibility of implementing wheat production in the UAE (Woertz, 2013).

**Financing Wheat Imports**

MENA is the most dependent region on wheat imports in the world. Consequently, securing the foreign exchange in order to finance these imports presents an additional challenge to MENA countries. The Egyptian state finances its imports through exports of primary materials, including cotton and natural gas. Nevertheless, periods of tight national budgets – including the period of regime instability beginning in 2011 – threaten the ability of the state to secure wheat and other food imports, which appears to have contributed to the onset of popular unrest in the country. In the UAE and Saudi Arabia, large conglomerates (which are often closely aligned with powerful state actors) are able to finance wheat imports with private working capital stocks, though in both cases the state regularly imports wheat, using capital from massive oil royalties. For this reason, these and other Gulf countries are generally not viewed as food insecure (Breisinger, Rheenen et al. 2010).

The UAE, Saudi Arabia and Iran each have substantial fossil fuel reserves that can be used as a source of foreign exchange to finance wheat imports and subsidize bread for citizens. However, systems of global governance constrain the ability of some states to meet food security goals. For example, international sanctions complicated the ability of Iran and Syria to finance wheat imports, driving insular and state-centric policies of self-sufficiency in production by raising the political costs of volatility along the value chain.

**Asset Ownership in the Wheat Chain**

One can see evidence of both variation and consistency in the food security strategies of the MENA countries simply by analyzing the patterns of asset ownership along the wheat value chain in each country. Across all cases, wheat emerged as a strategic commodity, accounting for an important share of caloric intake, and thus it is viewed as central to food security and social stability. Figure 4 below lays out key assets in the wheat GVC, including production inputs,
farms (the assets associated with the production stage), elevators, mills and retail outlets (supermarkets, groceries and bakeries, which are all associated with the marketing stage).

Across each of the cases, we see that state ownership is strongest in the processing stage of the GVC. The state has exclusive ownership of grain elevators in Egypt, Iran, Saudi Arabia and Syria. In the UAE, the state also owns much of the total wheat storage capacity; however, the conglomerate Al Ghurair also owns two elevators within the UAE. In Egypt and Saudi Arabia, mills are almost exclusively owned by the state, and in Syria the state controls the majority of the milling capacity. In Iran, mills are privately owned, though the strategies of mill owners are highly constrained due to the fact that the state is the exclusive buyer of milled flour. Similarly, in Syria, where ownership of mills is shared by the state and the private sector, private millers’ activities are limited by the market power of the state on both the input and output sides; the state has total monopoly in this segment through exclusive ownership of grain elevators and also purchases the majority of milled flour through the GCB. In the UAE, private actors primarily own mills, though Agthia, which is majority-owned by the Abu Dhabi government, recently opened a mill in the Al Wathba free zone through its fully owned subsidiary, Grand Mills.

It is not surprising that the state is so heavily involved in the processing stage of the wheat value chain. Storage capacity is inversely correlated with price fluctuations (The World Bank and FAO 2012) and thus it is closely tied to food security. Furthermore, both grain elevators and mills entail large sunk costs, and the state is one of the few actors with both the resources and the political incentives to invest in wheat processing. Typically, the government also owns some of the inputs to the wheat value chain through ownership of machinery and fertilizer stocks.

**Figure 4: Primary ownership patterns in wheat GVC for selected MENA countries**

![Diagram showing ownership patterns in wheat GVC for selected MENA countries](image)

[Source: CGGC]
and how much wheat is going to be cultivated, and retail outlets are periodically required to comply with price caps on bread and other key commodities.

Ownership patterns, even though they do not always represent “control” over particular stages of the value chain, are indicative of the different food security strategies being pursued by each of the selected countries. As the case studies above suggest, food security strategies – even disregarding commodities other than wheat – are complex, heterogeneous and subject to reevaluation over time. We have identified five key issues with respect to the food security strategies that the five selected countries are pursuing with respect to wheat (see Table 12).

The Role of the State

The state plays a key role in multiple segments of the wheat value chain in order to implement national food security policies. Our decomposition of the wheat industry using the GVC framework reveals that state actors deploy regulations within different segments of the value chain in order to pursue unique wheat strategies. The role of the state in the wheat GVC is clearly shaped by environmental constraints, local economic capabilities, systems of global economic and political governance, and relations between the state and major business groups. In all five cases, environmental constraints have justified strong state intervention in food systems in order to ensure that local populations are fed. In particular, water scarcity and uncertainty about the timing of droughts (both domestic and global) has driven governments to expand wheat storage facilities.

Food Price Controls

Even once wheat imports are secured, inflation and price volatility pose challenges to food security at the consumer level (Al Masah Capital Limited 2012). Across each of the cases, the state makes use of price controls and subsidies in order to reduce the variance over time in the prices faced by consumers when purchasing bread and flour. Some observers criticize these state-directed distortions of the consumer market as inefficient strains on fiscal budgets (Larson, Lampietti et al. 2012). However subsidies and price ceilings both have deep policy legacies and entrenched constituencies, and thus their repeal – particularly during the current period of perceived regional food insecurity – would likely be accompanied by extreme costs to consumer welfare and political stability.

Offshoring Agricultural Production

Offshoring entails the purchase of foreign land – usually, due to the principal of sovereignty in international relations, by private rather than state actors – for agricultural investment and production. By maintaining the flow of commodities within the organizational confines of a single, vertically integrated organizational structure, offshore wheat production allows agricultural companies to avoid the price volatility that has increasingly come to define international food markets in recent years (Woertz, 2013). The character of state-business relations and public-private partnerships are important factors in offshore production of crops. In Saudi Arabia and the UAE, the state has made critical investments, through development agencies or other investment vehicles, in land improvements abroad. These investments on the part of state actors are tightly coordinated with private investments in land, capital and labor in targeted countries. In both countries, this coordination is sharpened due to close ties – and in many cases overlap – between senior state actors and the owners of large agribusiness groups.
Nevertheless, overseas agro-investments still face significant barriers, and its viability as a strategy is in some doubt. The implementation of offshoring projects in less developed countries has been notoriously slow due to poor infrastructure, conflicts over land ownership claims, and unstable power relations (Woertz, 2013). For example, Egyptian courts overturned land purchases by both UAE and Saudi companies in 2011 after the outbreak of civil unrest (Stanton, 2011; Reuters, 2011). Securing wheat supplies through offshore production of wheat is complicated, is in its early stages of implementation, and depends on the uncertain collaboration of governments and firms.
Table 12: Key issues in the wheat GVC for selected MENA countries

<table>
<thead>
<tr>
<th>Issue</th>
<th>Egypt</th>
<th>Iran</th>
<th>Saudi Arabia</th>
<th>Syria</th>
<th>UAE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>Water primarily from the Nile Delta but vulnerable due to geopolitical struggles regarding the along Nile.</td>
<td>Strained water resources, reliance on rainfall, and periodic droughts make wheat production very unstable.</td>
<td>Water stress is a threat. Wheat production and agriculture contributed to drying aquifers.</td>
<td>Relies on rain and the Tigris and Euphrates Rivers. Regional tensions over water rights are high. Suffers from chronic drought and low water tables.</td>
<td>Heavy water stress precludes wheat production.</td>
</tr>
<tr>
<td>Financing of wheat imports</td>
<td>Largely through exports of agricultural products, such as cotton, and through revenues from natural gas exports.</td>
<td>Sanctions restrict oil revenue and international financial transactions vital to wheat imports.</td>
<td>Created financing mechanisms for offshore production. Oil revenues permit unconstrained imports through markets.</td>
<td>Sanctions restrict foreign exchange and constrain imports.</td>
<td>Government helps to fund offshore ventures. Oil revenues permit unconstrained imports under open market conditions.</td>
</tr>
<tr>
<td>Offshoring</td>
<td>Increasingly seen as a site of offshore production for other MENA nations. Beginning to explore small scale offshoring options in Sudan and other African nations</td>
<td>N/A</td>
<td>Offshoring wheat production to other countries in MENA and other regions.</td>
<td>N/A</td>
<td>UAE companies offshore wheat production to countries in MENA, Africa, Europe, North America and Australia.</td>
</tr>
<tr>
<td>Smoothing consumer prices</td>
<td>Subsidies and price controls on bread and wheat inputs. 75% of Egyptian population depends on subsidized bread for livelihood.</td>
<td>Price controls to curb soaring inflation. Rationed cash transfer to households.</td>
<td>Oil exports finance subsidies on water, energy and other inputs. Price controls and subsidies ease price fluctuations.</td>
<td>Subsidies and price controls on wheat, bread, and agriculture inputs and products. Sanctions are straining government financing.</td>
<td>Subsidies and price controls compensate for price fluctuations on an ad hoc basis.</td>
</tr>
</tbody>
</table>

Source: CGGC
7. Conclusions

The leading five multinational grain giants control global wheat trade (see Table 1). The Middle East and North Africa is the largest importer region of wheat with per capita consumption higher than global averages. Agricultural resource constraints and growing populations in the region drive increased dependency on wheat imports. The 2007-2008 food crisis and subsequent price hikes exposed the region’s vulnerability to global price volatilities, renewing calls for self-sufficiency policies. Countries have adopted various strategies to curb these price spikes and secure ample wheat supplies. These strategies included increasing subsidies, price controls, updating storage facilities, and investing in overseas crop production.

By using the GVC framework to understand the structure of the wheat industry in five strategic MENA countries, the analysis revealed the strong role that governments continue to play across the chain. This can be attributed to the critical role that wheat plays in food security and the stability of these countries. Even though specific strategy varies from one country to another, they mainly focus on finding ways to mitigate water shortages, increasing and improving storage, diversifying supply, and regulation. Our next stage of analysis will look at the interaction between the global firms and institutions in these countries in greater detail to identify global and domestic strategies in curbing food insecurity concerns.
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