Food Security in the Gulf Cooperation Council

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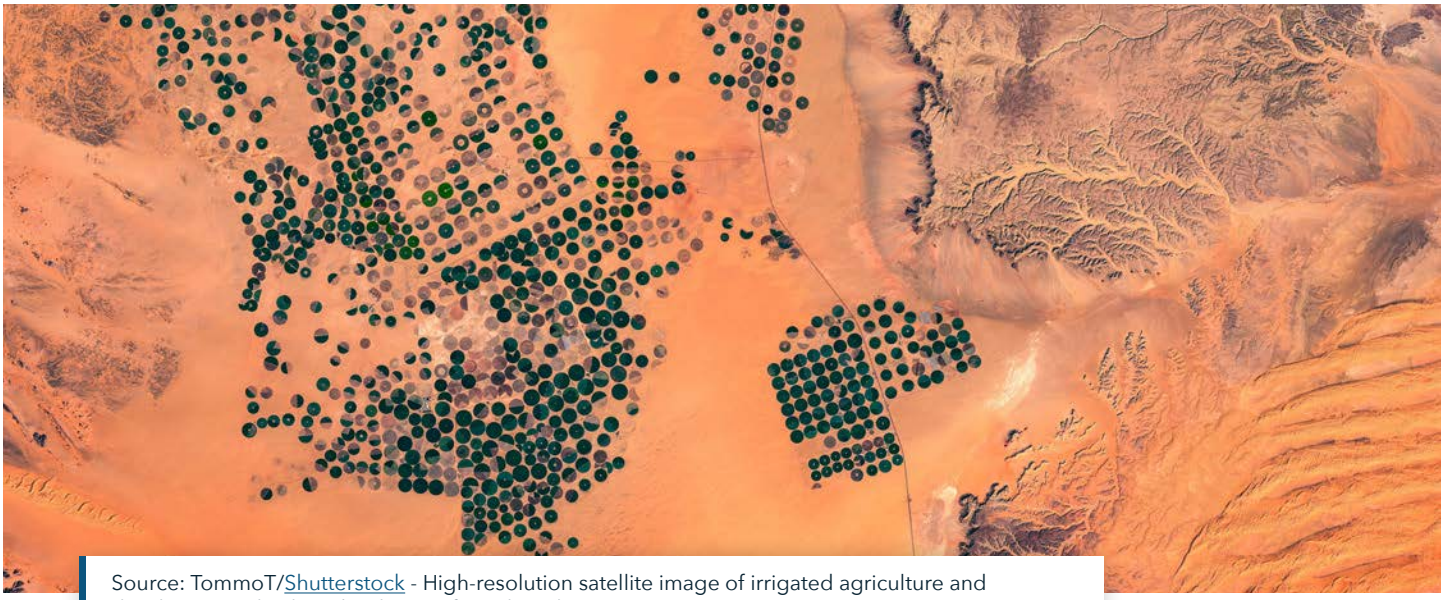
Source: Haffizzuddin/Shutterstock - A storekeeper in Taif, Saudi Arabia, waits for customers.

Summary

Natural conditions have made domestic food production an ongoing challenge for the countries of the Gulf Cooperation Council (GCC): Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates (UAE). Over the past few decades, these countries have been able to leverage their substantial economic resources to address these challenges, largely through food imports. Given their fiscal strength, the GCC countries' main food security challenge will not likely be due to an increase in the price of food, but rather a natural or man-made disruption that blocks one or more of the countries' access to food imports.

In this report by a team of researchers from emerge85 and the RAND Corporation, we characterize the food security status of GCC countries and document the predominant strategies they have taken to increase domestic food production or to facilitate access to food imports. We then consider these strategies in the context of two different scenarios: one with a high likelihood of import disruption, and one with a low likelihood of such disruption. Our analysis suggests that with a high risk of disruption, continued investment in emergency stockpiles, the establishment of a diverse portfolio of trading routes and partners, and an investment in increased domestic agriculture – particularly in improved water management – could enhance food security for GCC countries. With a low risk of disruption, these countries will likely be able to afford food imports, as long as they can continue to export oil and gas. That said, as sustained high food prices may strain national budgets or make food less accessible for some parts of the population, financial tools to hedge against the risk of an increase in price may be valuable.



Source: TommoT/Shutterstock - High-resolution satellite image of irrigated agriculture and dried-out river beds in the desert of Saudi Arabia.

Image: Sabino Parente/Shutterstock

PART 1

Overview of Food Security in the GCC

We begin with an overview of the current food security situation in the GCC, viewed through the lens of food, energy, and water security and utilizing RAND's Food, Energy, and Water (FEW) Index. We then consider the implications of one particular characteristic of GCC food security: its dependence on imported food.

1.1. Food-Energy-Water Index

Food security cannot be adequately examined without reference to the complex interactions between the food, water, and energy sectors. Numerous studies have described the important links among these three resources. For example, energy is used in the conveyance, treatment, and distribution of water. Energy production, in turn, requires substantial quantities of water. Moreover, the production of biofuels affects food markets and requires water inputs. Food production requires access to both water and energy for each step across the value chain for irrigation, cooling, processing, and transport, for example.

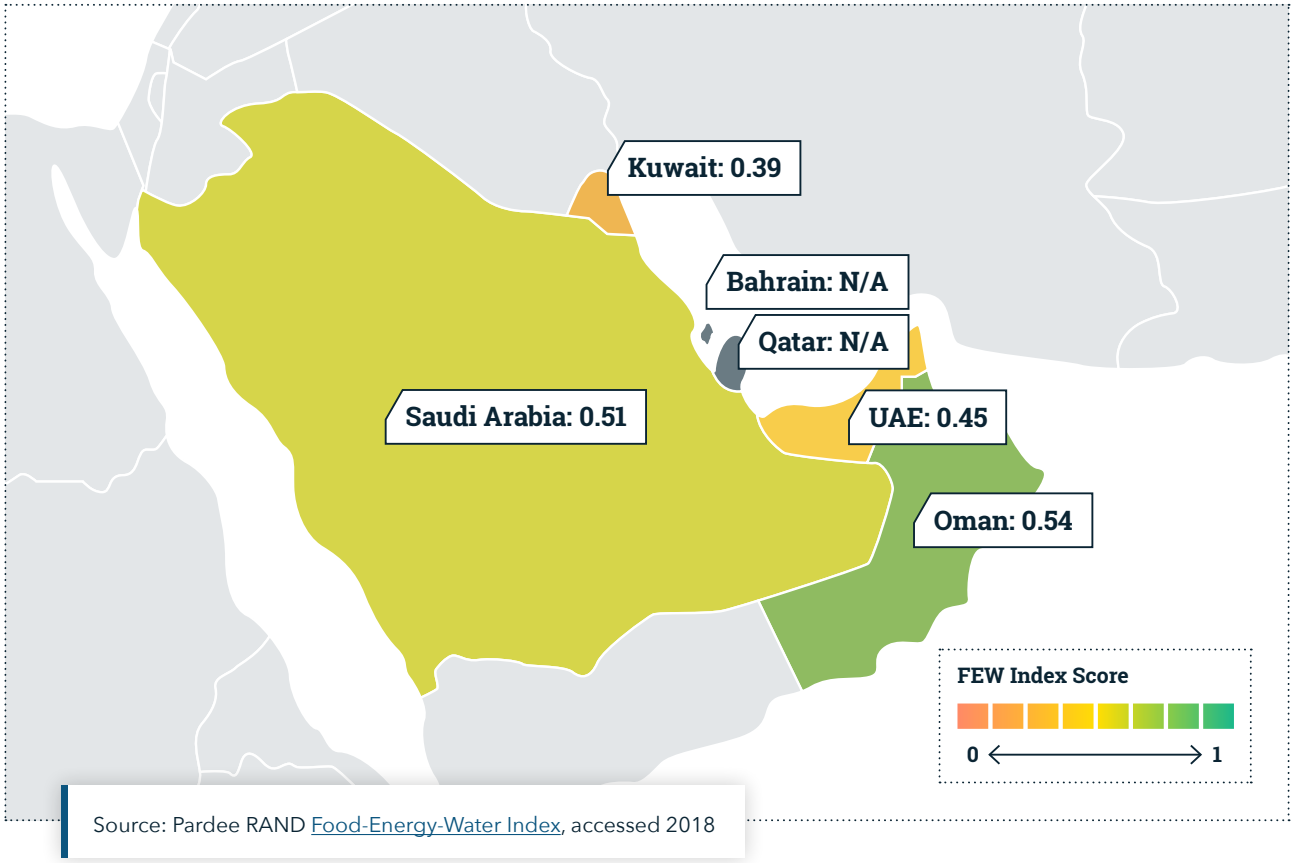
RAND's FEW Index is a composite measure combining country scores for food, energy, and water into a single score for overall resource vulnerability. Each measure is itself a composite score of sub-factors for *availability* – the extent to which a population is provided adequate resources to support its needs for a particular resource – and *accessibility* – the distribution of a particular resource across society. The score for water also includes a measure of *adaptive capacity,* or a nation's ability to provide resources over time and in response to disruptions.

Table 1: GCC FEW Index Scores

Country	FEW Score	FOOD SUB-INDEX	Food Accessi-bility	Food Availability	ENERGY SUB-INDEX	Energy Accessi-bility	Energy Availability	WATER SUB-INDEX	Water Accessi-bility	Water Availability	Water Adaptive Capability
Bahrain			0.45		0.90	0.96	0.84	0.26	1.00	1.00	0.02
Kuwait	0.39	0.64	0.47	0.87	0.92	0.96	0.88	0.10	0.99	1.00	0.00
Oman	0.54	0.60	0.43	0.83	0.88	0.96	0.80	0.30	0.95	0.41	0.07
Qatar			0.57		0.92	0.96	0.89	0.17	0.99	1.00	0.01
Saudi Arabia	0.51	0.61	0.42	0.87	0.89	0.96	0.83	0.25	0.98	0.93	0.02
UAE	0.45	0.70	0.58	0.85	0.91	0.96	0.85	0.14	0.99	0.92	0.00
GCC Average	0.47	0.64	0.49	0.86	0.90	0.96	0.85	0.20	0.98	0.88	0.02

Source: Pardee RAND Food-Energy-Water Index, accessed 2018. *Note: Overall indices are not available for Bahrain or Qatar given that a food availability index for these countries was not determined given data limitations.*

Figure 1: GCC FEW Overview



Source: Pardee RAND Food-Energy-Water Index, accessed 2018

The FEW Index ranges from 0.0 (lowest security) to 1.0 (highest security). It is important to recognize that the FEW Index values are calculated based on the entire population of the country. This fact is particularly salient in GCC countries, where the share of expatriates in the total population ranges from more than 30% in Saudi Arabia to more than 80% in Qatar and the UAE.

Table 1 shows each sub-factor as well as the overall measure for the GCC countries, and Figure 1 illustrates the overall FEW indices. The FEW Index in GCC countries ranges from 0.39 (Kuwait) to 0.54 (Oman), close to the middle of the full range. These scores result from a mid-level food sub-index, a high energy sub-index, and a low water sub-index. The food sub-index generally falls into the mid-to-high range (0.6 to 0.7). GCC countries generally have high scores for food availability, which is based on the dietary food supply. Scores for food accessibility – which take into account the share of dietary food supply from non-starchy foods, as well as the overall price level – are near the middle of the range (0.42 to 0.58). Not surprisingly, all of the GCC countries score high in terms of the energy sub-index, which is based largely on electricity consumption and access to electricity and modern fuels.

The low scores for the GCC in the water sub-index are almost entirely driven by adaptive capacity. This measure captures total per-capita internally available renewable water, which is defined as "the sum of internal renewable water resources and external actual renewable water resources", and is based on UN Food and Agriculture Organization (FAO) measures of total water resources per capita (Table 2). Geographical drivers of water scarcity (e.g., low precipitation and sandy soils with limited water-holding capacity) have been exacerbated by increasing per-capita water consumption, coupled with continued population growth.

Kuwait and the UAE have the lowest renewable water resources and the lowest adaptive capacity scores. In contrast, Oman has the highest per-capita amount of renewable water resources per year and the highest water adaptive capacity score among the GCC countries. This is a result of fresh groundwater stored in several aquifers as well as natural springs that benefit from precipitation and recharge, especially in mountainous areas.

Table 2: Total Renewable Water Resources per Capita in GCC Countries, 2015

GCC Country	Total renewable water resources per capita (m3/inhabitants/year)
Bahrain	84.24
Kuwait	5.14
Oman	311.70
Qatar	25.95
Saudi Arabia	76.09
UAE	16.38
GCC Average	**86.58**

Source: FAO AQUASTAT, 2015

To provide water for their populations despite low levels of freshwater resources, GCC countries rely on desalination. While estimates vary between studies, desalination provides the majority of potable water (more than 70%), and a large percentage of total water usage including industry, irrigation, municipal drinking water, and other uses. The large-scale use of desalination means GCC countries have nearly universally high scores for water accessibility and availability, which measure municipal water use and access to improved drinking water and sanitation. Oman stands out as the only GCC country with a water availability score below 0.9. Its score is substantially lower, at 0.41, because its desalination activity is more limited in scale. It is worth noting that Oman is planning to increase water desalination capacity by 66%, from 186m gallons to 310m gallons per day to meet the projected household demand for the near future. In contrast with the GCC countries' generally high scores for water accessibility and availability, though, the low scores for water adaptive capacity suggest that if there should be disruptions to their ability to desalinate in the future, GCC countries would have few domestic freshwater resources to use as a substitute.

The high scores for water accessibility and availability also highlight the tight links between energy and water: Despite low levels of renewable fresh water, GCC countries are able to provide potable water by drawing on their energy resources to desalinate water. In fact, electricity and water plants are often co-located, so that the excess heat from energy production can be used to fuel the desalination process. Nonetheless, estimates suggest that desalination may still account for substantial shares of electricity use in GCC countries (with a lower bound of 4-12%), above and beyond the heat provided by energy production. Some scholars estimate that a move from groundwater extraction to desalination by 2050 will require 40% more electricity relative to a 2010 baseline.

1.2. Import Dependence

A key component of food security for GCC countries – which is not fully addressed in the FEW Index – is their dependence on imported grains. According to the most recent FAO estimates, the cereal import dependency ratio – the ratio of imported to domestically consumed cereal – was more than 90% in Oman and more than 95% in Kuwait, Saudi Arabia, and the UAE. Due to their robust fiscal positions, the oil-exporting GCC countries have historically been less vulnerable to price risk (i.e., the risk that food is available for import but the importing country may not be able to afford to purchase a sufficient amount for its residents) than other food importers.

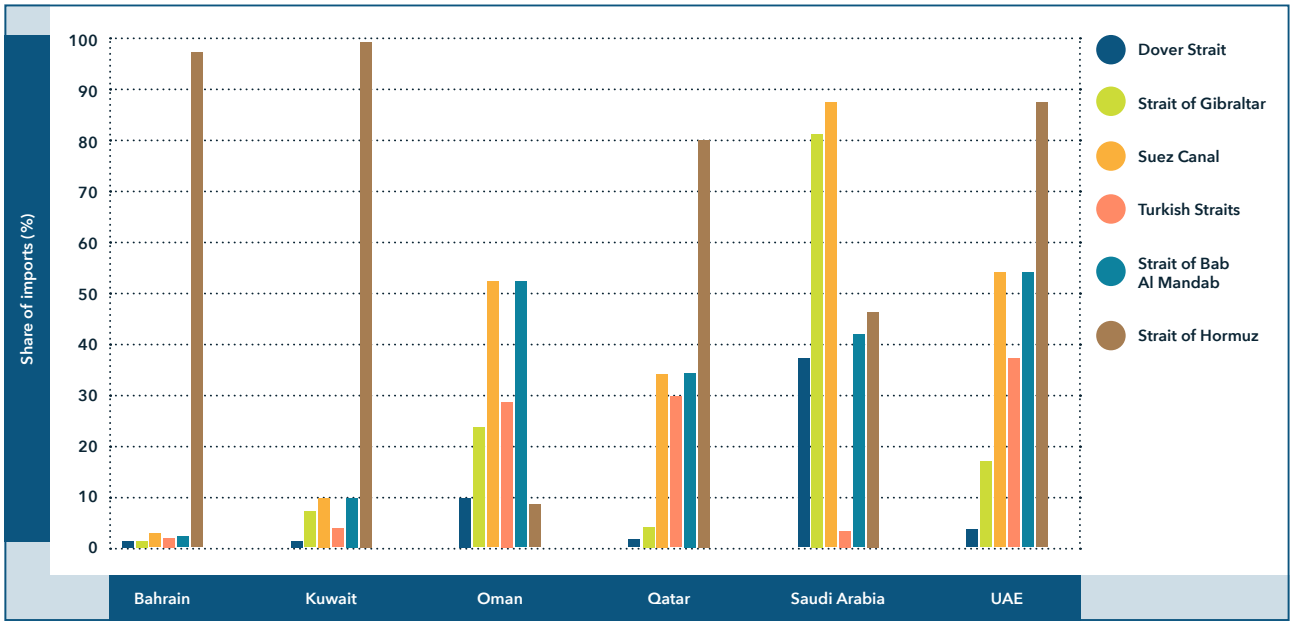
The GCC's dependence on oil exports, however, creates its own vulnerability. In 2013, just before the price of oil dropped sharply, fuel exports accounted for 50-95% of each GCC country's merchandise exports (ranging from 52% in the UAE to 94% in Kuwait). Between 2012 and 2015, 50-90% of government revenues in the GCC were from oil. The price of oil dropped sharply in 2014 and has remained relatively low since then. During this time, the current account positions of GCC countries weakened substantially, with Oman, Qatar, and Saudi Arabia all reporting current account deficits in 2016. The fiscal deterioration may make it more difficult to use food subsidies as a coping strategy during a future spike in food prices.

Nonetheless, this concern may be mitigated by two factors. First, lower oil prices translate into lower transport and fertilizer costs, which can lower the cost of food production to some extent, and thus lead to lower import prices or lower costs of domestic production. Lower oil prices also mean that the opportunity cost of using energy for desalination is lower, which can reduce the cost of a key input (i.e., water) to domestic food production. Second, in the longer term, if the GCC countries' efforts to restructure and diversify their economies away from oil and natural gas are successful, they may also mitigate the fiscal risk posed by low energy prices.

Potentially more critical to GCC food security is availability risk, which arises when an import-dependent country is not able to obtain food, even if it has sufficient funds to purchase it. There are a number of global and local factors that may create availability risk, including drought or other shocks in producer nations; export restrictions such as those imposed by a number of food producers in 2007-08; natural disasters or poor infrastructure that hamper transport of the crops; and political factors such as war, civil conflict, or blockade.

One particularly salient factor contributing to availability risk for the GCC is the fact that much of their imported grain passes through one of six maritime chokepoints, or "critical junctions on transport routes through which exceptional volumes of trade pass". Figure 2 shows the share of wheat imported by GCC countries that passed through each chokepoint in 2015.

Figure 2: Share of Wheat Imports into GCC Countries Transiting Selected Maritime Chokepoints, 2015



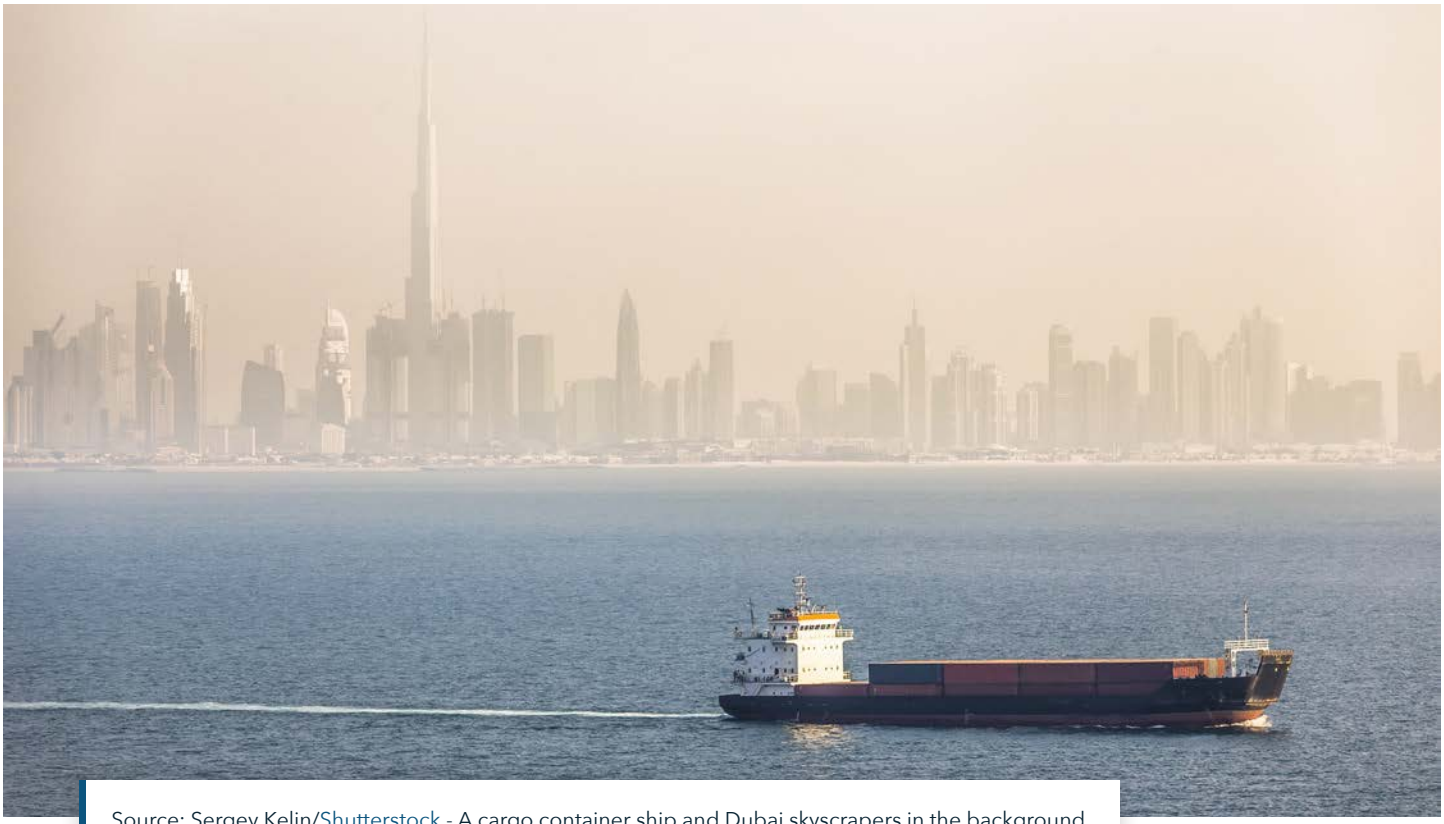
Source: Chatham House, 2017

While 80% or more of wheat imports to five of the six GCC countries passed through at least one chokepoint, the likelihood of availability risk differs substantially across the countries. Oman, Saudi Arabia, and the UAE are less likely to face the risk of a disruption in food availability due to a natural or man-made barrier at a chokepoint than Bahrain, Kuwait, and Qatar. In 2015, Oman's wheat imports principally came from Russia, Germany, Australia, and Canada. More than half of these imports passed through the Suez Canal and the Strait of Bab Al Mandab. If one or both of these chokepoints were disrupted, the most straightforward maritime route from Europe would no longer be available; however, there are alternative maritime routes to reach Oman's ports in the Arabian Sea and the Gulf of Oman, and Oman could also import more grain from Asia.

Unlike Oman, Saudi Arabia does not have direct access to the Arabian Sea. In 2015, its wheat imports most commonly came from Europe and passed through the Strait of Gibraltar and the Suez Canal; a large share also came through the Strait of Bab Al Mandab and the Strait of Hormuz. Yet, with access to both the Red Sea and the Arabian Gulf, Saudi Arabia would retain a maritime import route unless the Suez Canal, the Strait of Bab Al Mandab, and the Strait of Hormuz were simultaneously disrupted.

Most of the ports in the UAE, meanwhile, are in the Arabian Gulf, and in 2015, nearly 90% of its wheat imports passed through the Strait of Hormuz. The UAE does, however, have ports that face the Gulf of Oman and has recently built grain silos at the port in Fujairah. Thus, like Oman, it retains access to shipments from the Arabian Sea.

The GCC countries most vulnerable to a chokepoint disruption are Bahrain, Kuwait, and Qatar. About 80% of Qatar's wheat imports and nearly all of Bahrain's and Kuwait's passed through the Strait of Hormuz, and there are no alternative maritime routes from the Arabian Sea to the Arabian Gulf. But the possibility of non-maritime routes should not be discounted; in the case of a disruption to the Strait of Hormuz, these three countries could still import food via the sea route from a few countries along the Arabian Gulf, or could bring in food by land or air. In the next section, after discussing strategies the GCC countries have adopted to mitigate ongoing food security challenges, we also examine how Qatar has addressed a disruption to one of its major food import routes.



Source: Sergey Kelin/Shutterstock - A cargo container ship and Dubai skyscrapers in the background.

Image: Laborant/Shutterstock

PART 2

Food Security Strategies in the GCC

To date, a host of strategies have been adopted by GCC countries in an effort to ensure food security. Below, we discuss a number of these approaches, which we group into two broad categories: increasing domestic agricultural production, and facilitating and hedging against disruptions to imports. We then examine the strategies Qatar has used to address a sudden disruption to its food imports.

2.1. Strategies for Encouraging Domestic Agricultural Production

One set of strategies aimed at encouraging domestic agricultural production centers around water management. Most notable, all GCC countries have developed, and continue to increase, their capacity for desalination. Although desalination remains a costly means of freshwater production, these countries can absorb the cost more easily than most, leaving them less pressured to find alternatives. In fact, if the price of oil falls, thus making GCC countries' exports less valuable, this also decreases the opportunity cost of using energy to produce water.

A potential problem with relying on desalination is vulnerability to disruptions in supply. GCC countries' low FEW scores for water adaptive capacity suggest it would be challenging to find alternative sources of potable water in the event of a major disruption. One particular concern is the risk of contamination through an oil spill or nuclear leak in the Arabian Gulf. Some scholars have proposed a GCC planning body to co-ordinate the future construction of nuclear and desalination facilities and the locations of offshore drilling sites to ensure adequate geographic separation, thereby mitigating the threat of pollution or contamination.

To mitigate the risk to a disruption in desalination, the UAE has created the world's largest reserve of desalinated water. The man-made aquifer lies under the Liwa desert, holds roughly 26bn liters of water, and can provide about 100m liters of water per day. It is worth noting that this serves as an emergency reserve to replace drinking water supplies for a short time, but is unlikely to replace the total amount of desalinated water used by industry and agriculture. Similarly, Qatar has recharged depleted aquifers with treated water.

Many GCC countries also augment their water supplies by using treated wastewater to irrigate certain types of crops. While Kuwait and Saudi Arabia reuse about 50% of their total wastewater, Bahrain and Qatar only reuse about 10-15%. Public perception and stigma represent a considerable hurdle in expanding the use of this strategy.

Concurrent with ramping up the supply of water through desalination and reuse, GCC countries have made efforts to improve groundwater management. As early as 20 years ago, Saudi Arabia became self-sufficient in a variety of agricultural products including wheat, date palm, eggs, and some vegetable and dairy products, and has relied predominantly on what is known as "fossil aquifer", or underground freshwater reserves that do not recharge directly with rainfall and are thus especially vulnerable to over-extraction. However, in an effort to conserve water resources, the country has phased out wheat production and is looking to end green fodder production by 2019. Furthermore, Saudi Arabia signalled its intention to improve the sustainability of groundwater extraction by signing the 2015 Disi Aquifer Pumping Agreement with Jordan, a measure aimed at avoiding and resolving disputes over transboundary groundwater.

There has also been some movement towards curbing growing water demand through water pricing; Dubai and Abu Dhabi have increased the price of both electricity and water for industry, government, and expats users, and begun charging UAE nationals too, albeit at lower rates than expats.

Several GCC countries have also aimed to improve the potential for domestic agriculture by adopting alternative crop varieties. The Kuwait Institute for Scientific Research and International Center for Biosaline Agriculture in Dubai have both advanced research in developing drought- and saline-tolerant crop varieties. Field trials in the UAE have shown promising results for "salt- and drought-tolerant non-native species such as leaf mustard, quinoa, salicornia, guar, amaranth, and New Zealand spinach".

In many cases, improved varieties have been coupled with new management strategies such as amendments and the use of trees as wind blocks to prevent the further erosion of sandy soils. Together with a Chinese partner, the UAE is undertaking efforts at "soilization" in the Al Ain desert. This effort will test various grass and tree species together with diverse water sources (including groundwater and treated wastewater) for their reclamation potential. Still, to date, only limited investment has been made in combating desertification through increased forestry and land management.

Greenhouse vegetable production is also expanding across GCC countries in an effort to reduce vegetable price volatility and improve access to off-season produce. Some GCC countries are experimenting with vertical farming, in which plants are grown in stacked layers. The first indoor commercial vertical farming operation in the GCC recently opened in Dubai. The UAE also invests heavily in greenhouse vegetable production, and recent work suggests there is considerable potential to scale up vertical greenhouse designs.

2.2. Strategies to Maintain a Supply of Food Imports

Despite efforts to increase domestic agricultural and livestock production, GCC countries remain heavily dependent on food imports. In fact, in certain cases – the growing dairy industry in Saudi Arabia, for example – it is not clear that domestic production reduces a country's dependence on food imports, since animal feed must be imported. Thus, strategies to facilitate and maintain a supply of imported food remain critical to GCC countries. Here, we discuss three main strategies these countries have used: stockpiling, investing in food-producing companies, and acquiring foreign land.

Perhaps the most straightforward strategy, and one that can mitigate availability risk, is to hold large government stockpiles of staple grains. But stockpiling is expensive due to the risk of spoilage and the need to cycle the stock periodically. It may also reduce incentives for private sector participation in the grain market, although this risk could be mitigated if the government could credibly commit to selling grain at the same price as imports or – when cycling stock – export the grain rather than selling it domestically.

Given the difficulties of domestic production, stockpiling will likely remain an important strategy for GCC countries. Oman, for example, recently announced plans to develop an agricultural bulk terminal with a storage capacity of 60,000 tons of grain reserves, designed to serve as a trading hub for the region and to store grain for the country.

A related strategy, and one that can avoid some of the cost of physical stockpiling such as spoilage, is to use a 'virtual stockpile' approach. Virtual stockpiles rely on a variety of financial tools and investments. One such tool is an options contract, which allows a buyer to purchase a specific amount of grain at a certain price within a certain period. Some analysts have instead suggested that import-dependent countries develop long-term relationships with producers in other countries. In fact, using long-term contracts with a range of suppliers rather than purchasing grain on the spot market may also help mitigate price risk. Such strategies, however, are less likely to mitigate against availability risk. For example, in the case of a disruption of supply routes, it is unlikely that options contracts would be helpful; and long-term relationships with producers would only be helpful if they were with producers with whom trading was still physically and economically viable.

A related strategy is to directly invest in producing companies; for example, the UAE's Al Dahra Holding has been investing in producers in Serbia and India. Similarly, the UAE has secured food needs through agro commodities supply chain firms such as Hakan Agro, which is headquartered in Dubai, and through strategic infrastructure agreements, such as the China-UAE industrial food cluster in the Dubai Food Park. The planned complex will house "30 food plants, including two Chinese catering companies and two advanced manufacturing plants for food packaging materials."

Going one step further, import-dependent GCC countries are pursuing a strategy of purchasing or leasing farmland abroad with the aim of exporting at least some of the crops produced there back to the purchasing country. According to recent estimates, between 0.7% and 1.75% of agricultural land across the globe is involved in such agreements. Over the last decade, GCC countries have made considerable investments in land-for-food production on the African continent. The UAE and Saudi Arabia have been particularly active in gaining access to foreign farmland.

These foreign land holdings demonstrate an interesting shift in the food security calculus of some GCC countries. The considerations are sometimes political, as in the case of Sudan, where, after a recent rapprochement, Saudi Arabia invested in cultivating approximately 100m acres of farmland. In other cases, foreign land holdings are obtained in response to domestic policy changes. For example, Almarai, the Saudi public-private food company, bought 14,000 acres in California and Arizona several years ago to farm green fodder for livestock because it was phased out of production in-country due to high water requirements for cultivation.

This type of arrangement comes with various risks. Many of the land deals have been in parts of Africa already suffering from food insecurity. From the point of view of the land-owned country, exporting crops could worsen existing food insecurity and poverty, and may cause political unrest. From the point of view of the land-acquiring country, there are not only risks inherent in farming, particularly in host countries lacking good infrastructure, as in the case of Ethiopia where investors have encountered difficulty transporting agricultural machinery and skilled labor to the most remote areas of the landlocked country. In addition, there is the risk that the host country may renege on a contract or restrict exports. The Ethiopian government, for example, has "cancelled seven leases after investors failed to deliver on their promises". Challenges exist even in countries that are not food insecure. For example, the California land purchased by Saudi Arabia is part of a region that has senior rights to Colorado River water. Some local stakeholders have raised concerns that these rights will allow Almarai to cultivate thirsty crops there despite periodic droughts in California.

2.3. Dealing with Disruption: The Qatar Blockade

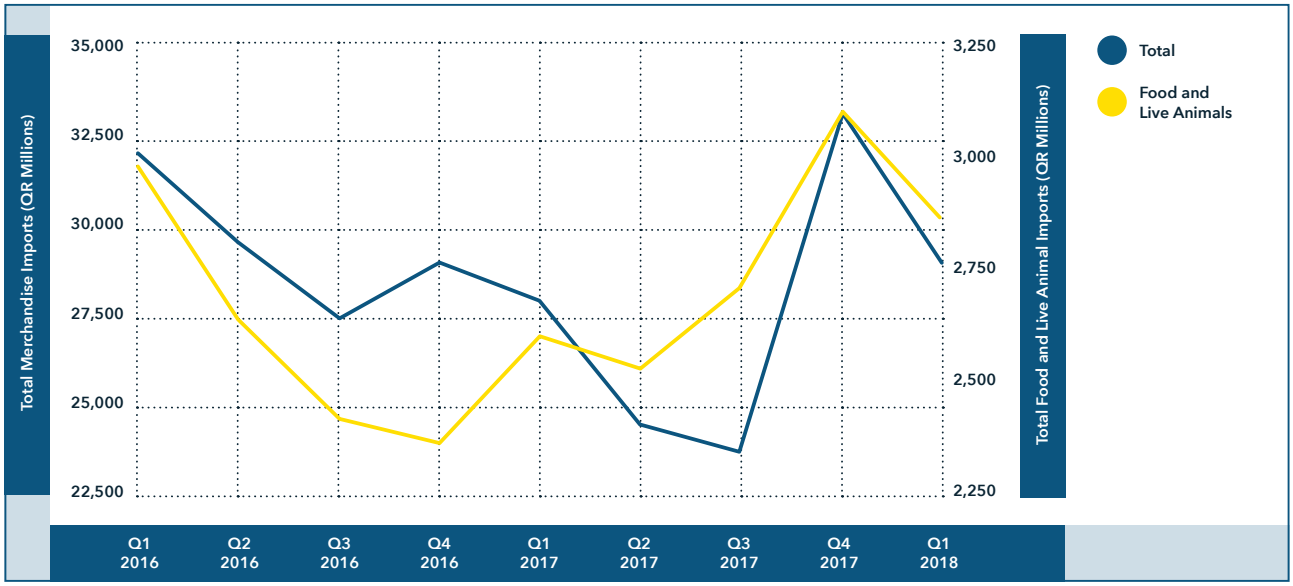
The strategies outlined above have generally been undertaken in response to long-term patterns of climate, energy and water availability, and consumption. In contrast, the recent blockade of Qatar by Saudi Arabia, the UAE, Bahrain, and Egypt, provides a case study that illustrates how a GCC country has dealt with a sudden disruption to its traditional food supply.

Prior to the blockade, about 25% of the total value of agricultural products and 60% of dairy products imported by Qatar came from Saudi Arabia and the UAE. About 80% of Qatar's food imports passed through a neighboring country, with 40% passing via the land border with Saudi Arabia. In June 2017, Saudi Arabia, the UAE, Bahrain, and Egypt severed diplomatic relations with Qatar, citing Qatari support to terrorist groups and close relations with Iran, among other reasons. Saudi Arabia closed its land border with Qatar, and the four countries also restricted Qatar's access to their airspace.

Although Qatar lost access to its only land border, it retained access to the Strait of Hormuz. The UAE initially restricted all access to its ports by ships traveling to or from Qatar through the Strait of Hormuz, but later allowed ships to refuel at the Fujairah port as long as they were not owned by Qatar or flying Qatari flags. Similarly, Qatar was banned from using ports along the Suez Canal, but retained access to the Canal itself.

Qatar has used a range of strategies to deal with the blockade and ensure its food security. In the immediate aftermath of the blockade, the Qatari government indicated it had sufficient strategic food reserves to provide staples for 10 months; nonetheless, Qatar also flew in goods from Turkey, Iran, and other countries not part of the blockade. In the longer term, it has continued the strategy of shifting toward a different set of trading partners, most notably Iran, Oman, Turkey, and Pakistan. Although Qatar's only land border is with Saudi Arabia, Qatar and Turkey have also explored ways to improve a land route to bring goods by road from Turkey to Iran, and subsequently by sea across the Arabian Gulf to Qatar. Qatar is also upgrading its ports to prepare for additional shipping. In fact, Figure 3 shows that food imports dipped slightly in the second quarter of 2017, when the blockade was first announced, but subsequently rose, and that food imports as well as total merchandise imports were substantially higher in the fourth quarter of 2017 than they had been in the fourth quarter of 2016.

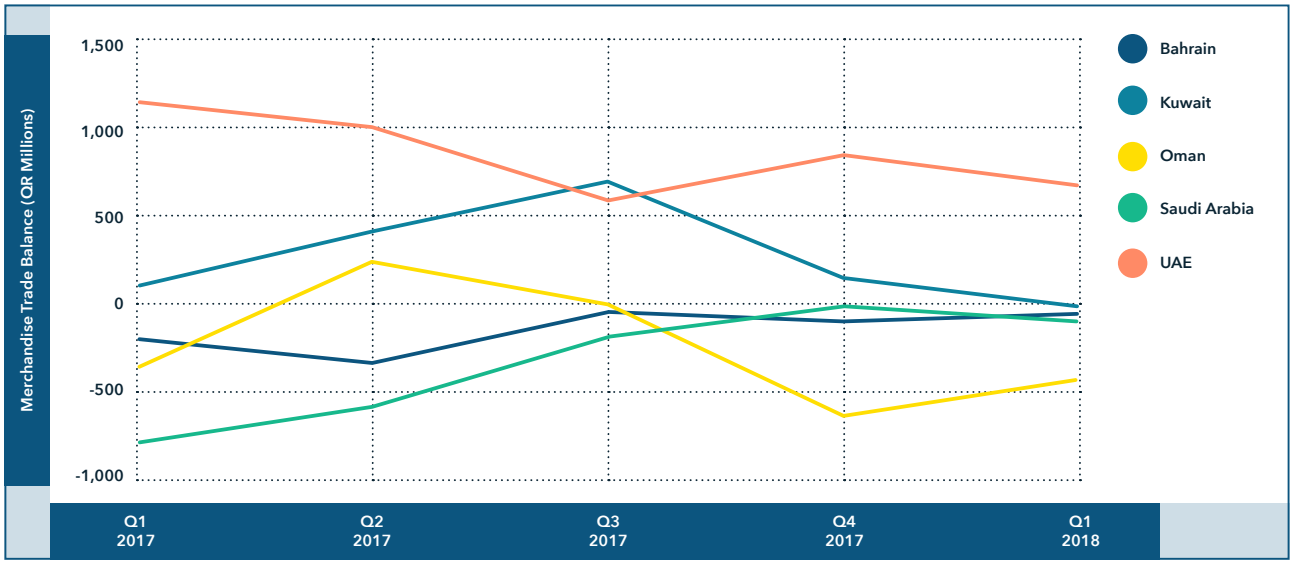
Figure 3: Qatar's Total Merchandise Imports and Food Imports, 2016-18



Source: Qatar Ministry of Development Planning and Statistics, 2018

Figure 4 shows the merchandise trade balance between Qatar and each of the other GCC countries from the first quarter of 2017 to the first quarter of 2018. During the first quarter of 2017, the merchandise trade deficit with Saudi Arabia reflects its exports to Qatar. After the blockade, Qatar's trade deficit with Saudi Arabia rapidly closed, as Qatar began importing from other partners including Oman, as illustrated by the increasing trade deficit with Oman during late 2017 and early 2018. Qatar's trade surplus with the UAE fell but remained positive; as we discuss below, this is largely due to continued gas exports from Qatar to the UAE.

Figure 4: Merchandise Trade Balance between Qatar and Other GCC Countries, 2017-18



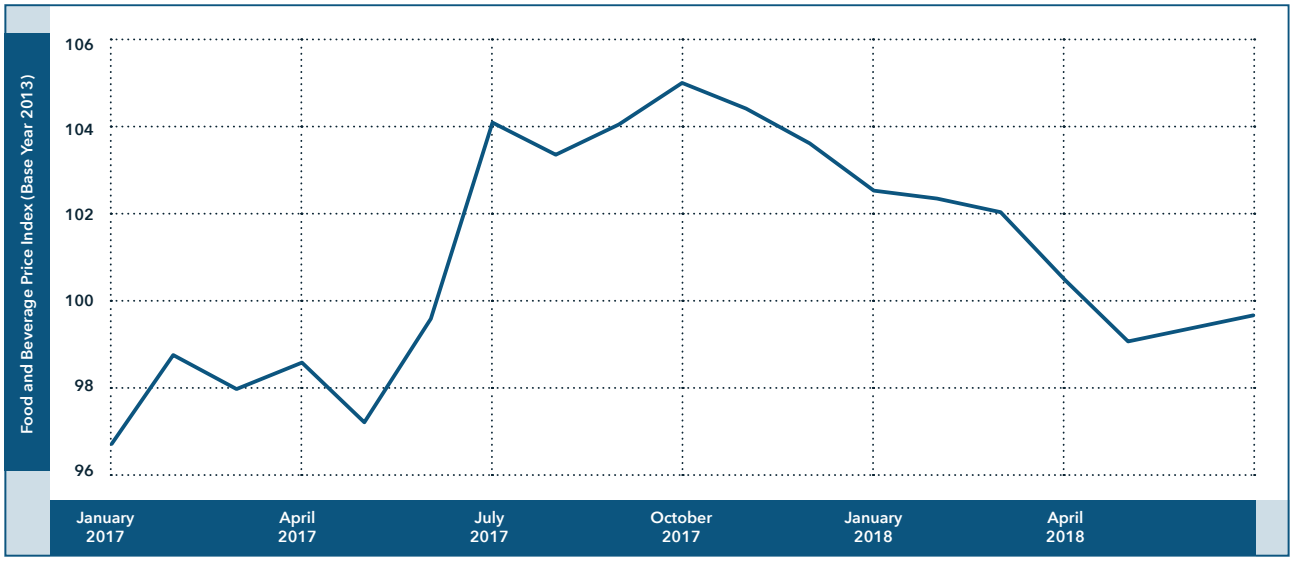
Source: Qatar Ministry of Development Planning and Statistics, 2018

While Qatar's immediate strategies for coping with the blockade have focused on substituting toward new trading partners and routes, the country is also taking steps to increase domestic food production. Local news reports indicate there are efforts underway to adapt vegetable production to Qatar's climate and increase local livestock production.

Perhaps the main reason Qatar has managed to weather the blockade is because it continues to export natural gas. The Strait of Hormuz remains open, allowing shipments by sea, and even though the UAE is one of the countries involved in the blockade, Qatar continues to export natural gas there via the Dolphin pipeline (the exports are reflected in Qatar's continued trade surplus with the UAE in Figure 4). Qatar has, therefore, been able to maintain and even improve its fiscal position, especially given the recent rise in oil and natural gas prices.

While the long-term consequences of the blockade remain to be seen, Qatar's strategies appear to have been successful to date. Food prices initially jumped following the blockade but stabilized by the fall of 2017, and by summer of 2018 had fallen almost back to their pre-blockade levels (Figure 5). Overall inflation also remained low. Qatar's economy grew by 2.1% in 2017 and is projected to grow by 2.6% in 2018.

Figure 5: Qatar's Food and Beverage Price Index, 2017-18



Source: Qatar Ministry of Development Planning and Statistics, 2018

Source: elfoly/Shutterstock - An irrigation system for farming in pivots located at the Southern Desert of Saudi Arabia.

Image: Abdelrahman Hassanein/Shutterstock

PART 3

Scenario Analysis

The blockade of Qatar illustrates that food security in the GCC will depend not only on the countries' policies and programs, but also on how a host of social, economic, political, and technological factors evolve. A useful device for examining how strategies might be made robust to uncertainty is scenario-based planning. Scenarios allow policymakers and analysts to test assumptions about the future that they may be predisposed to believe.

In 2017, the World Economic Forum (WEF) released four potential "future worlds" with different implications for global food producers and consumers in 2030. These scenarios were built on two principal axes: market connectivity and demand trends. Given the unique position of the GCC countries – that they enjoy robust fiscal health and are highly import dependent – their degree of food security is most closely tied to their physical access to grain imports, rather than their ability to pay higher prices for those imports.

We thus explore a modified version of the WEF scenarios, focusing on the issue of market connectivity and access. We consider (1) a scenario in which GCC countries face substantial risk of physical disruption to their imported food supplies, and (2) a scenario in which they face little risk of physical disruption. In both scenarios, we assume the countries continue to export oil and gas, and thus remain relatively wealthy. We then consider which of the countries' food security strategies might be more or less useful in each scenario.

3.1. High Risk of Supply Disruption

Faced with a high potential for import disruptions, the GCC may find it helpful to focus on three different sets of strategies. The first is to increase physical stockpiles. In the event of a disruption, physical stockpiles of food and water, located sufficiently close to population centers to serve as emergency supplies, are likely to be a critical short-term response. If the disruption affects only one country, and if local trade routes remain viable, establishing intra-GCC agreements to provide emergency food or water supplies could reduce the amount of stockpiles any one country would have to maintain. Such regional agreements, however, are less helpful in the event of a shock that affects multiple countries, closes off local trade routes, or is triggered by regional strife. Short-term substitutes other than physical stockpiles, such as air transport of food, are costly and unsustainable.

Once immediate food and water needs are met, GCC countries are likely to be able to substitute towards other maritime and land trading routes and partners, except in the unlikely event that all trade routes are simultaneously disrupted. Establishing alternative trade routes could take time, especially if additional infrastructure must be built. Thus, a second set of strategies these countries may find helpful involves proactively developing a diverse portfolio of trading routes, trading relationships, and long-term contracts with suppliers. Thus, if one route is disrupted or one supplier fails to deliver, it would be possible to more quickly switch to imports from another trading partner or supplier, or to import food via another land or sea route.

Creating a diverse portfolio is also important if GCC countries continue to purchase or lease foreign land for food production. Given persistent undernourishment for many in Africa, public perception and tolerance of foreign landholders on the continent may deteriorate, especially as African food imports themselves increase. GCC countries seeking to produce food abroad for their domestic markets may wish to consider investing in a broad range of geographically diverse countries.

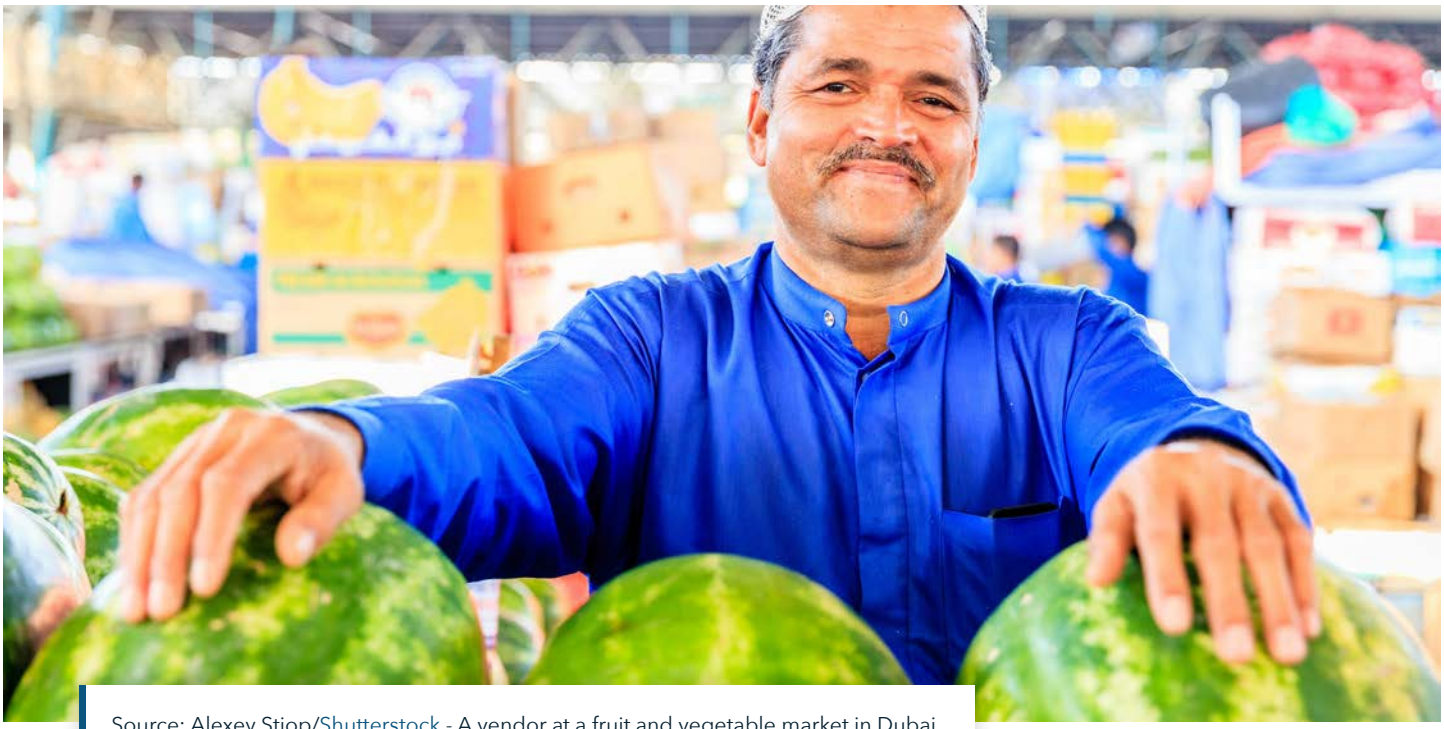
The third set of strategies – which will become critical if multiple trade routes are simultaneously disrupted – is to increase the potential for domestic production. Given the GCC's low water adaptive capacity, these strategies are most likely to be fruitful if they focus on improved water management and technology development. This could include investment in technology such as additional desalination capacity and atmospheric water generation. But since such techniques are costly and energy intensive, improved water management through wastewater reuse, improved groundwater management, and water pricing, would also be valuable, as would investments in advanced technologies for food production such as high-yield, brackish (saline) water-tolerant seed engineering and cultivation. It is also important to note that if, in encouraging domestic agriculture, the GCC continues to rely on imported fertilizers and other inputs for domestic agriculture, these inputs could be subject to similar disruptions as imports of food itself. Thus, maintaining substantial physical stockpiles, and developing a wide range of trading routes, will remain central in a food security approach where there is a high risk of supply disruption.

3.2. Low Risk of Supply Disruption

With a low risk of food supply disruption, GCC countries will likely find it less useful to focus on increasing domestic food production. Although they will likely continue to increase desalination capacity, this will be driven primarily by residential and industrial use rather than agricultural use.

GCC countries – particularly those only with access to the Gulf – may still face some risk of disruption, and will thus need to maintain some physical stockpiles to provide for short-term needs. Those physical stockpiles, however, are likely to be smaller than in the prior scenario. In addition, foreign land acquisition and contracts with specific suppliers are less likely to be a focus in this scenario, since GCC countries can typically purchase food from a large variety of trading partners as needed.

Instead, the most promising food security strategies are likely to focus on mitigating the price risk associated with imports. Given our assumption that GCC countries will continue to export oil and gas, it is likely they would be able to afford food imports even with higher food prices. Nonetheless, sustained higher food prices could reduce food accessibility for some portion of the population and strain government budgets; thus GCC countries may find it helpful to hedge against price risk by using various financial instruments.



Source: Alexey Stiop/Shutterstock - A vendor at a fruit and vegetable market in Dubai.

Image: Curioso/Shutterstock

PART 4

Conclusion

In recent years, GCC countries have taken steps to enhance domestic food production – through the adoption of salt- and drought-tolerant crop varieties, soilization designed to reclaim desert land, and improved land and water supply management, among other interventions. But natural agroecological conditions continue to stymy these efforts or reduce their potential at scale. In particular, the limited availability of renewable freshwater resources is captured in GCC countries' low scores in the FEW index water adaptive capacity component.

Despite unfavorable conditions for domestic agricultural production, though, GCC countries are generally food secure: Their fiscal strength through exports of oil and gas has allowed them to maintain high levels of food availability and accessibility through imports, thus driving their resilience.

Nonetheless, the GCC's food security status is subject to a number of potential disruptions. Much of the grain imported by these countries passes through one of six maritime chokepoints: In 2015, for example, more than half of Oman's wheat imports passed through the Suez Canal and the Strait of Bab Al Mandab, and in that same year, nearly 90% of the UAE's wheat imports passed through the Strait of Hormuz. These countries, in other words, are vulnerable to availability risk – that is, the inability to obtain food even if a country has sufficient funds to purchase it – in the event of a disruption of trade routes due to natural disaster, political instability, or other causes.

Our analysis suggests that continued investment in storage infrastructure for stockpiling of food and water is warranted to provide emergency supplies in the event of a disruption. Furthermore, a (re)commitment to increased regional economic integration and establishing an intra-GCC food security policy (or bilateral agreements) to provide emergency food or water supplies could reduce the potential risk of supply disruptions and the amount of stockpiles any one country would have to maintain in the event of a shock that does not affect the entire region or cause a disruption to intra-GCC trade. Given the GCC's likelihood of continued reliance on imports, establishing alternative trade routes and partners will also be an important part of the GCC's food security strategy.

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