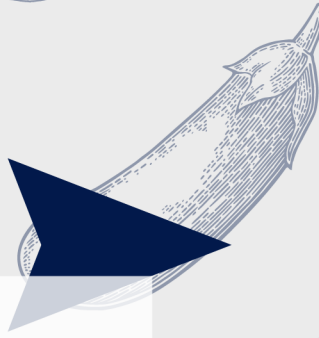
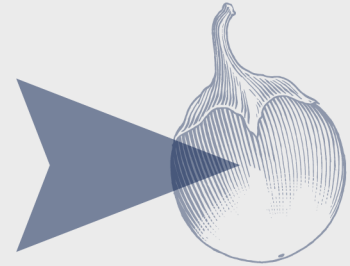
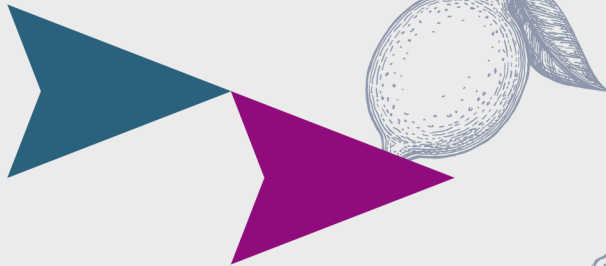
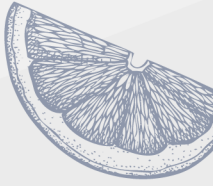




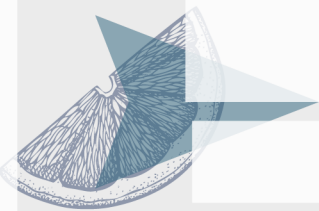
ADQ FWD

المقايسة فورورد



Cultivating the Future of Food,
Bolstering Food Resilience

PAPER



FOREWORD

Food and agriculture are at a critical inflection point.

The sector is transforming due to innovation, sustainability and volatile times. With the world's population projected to rise from 7.8 billion in 2020 to 9.9 billion by 2050, food production is at a cross section to meet consumer demand while mitigating global climate change.

The UAE recognises the importance of a robust food system.



To nourish the UAE's future generations and contribute to its economic diversification for the next 50 years, addressing food resilience requires new levels of coordination, communication and collaboration among key players.

With the UAE's food imports at approximately 90% of annual consumption, a strategic review of the entire agri-food value chain, domestic

and foreign resources, and areas of strength and weakness is essential.

Resetting the framework for the UAE's food system will require ramping up local production, strengthening the programme to diversify imports, creating strong international partnerships, and positioning the UAE as a regional food hub.

ADQ recently convened leaders and experts in food and agriculture to explore ways to collaborate and ensure year-round access to safe, sufficient, affordable and sustainable food in the UAE.

Drawing upon key lessons, recent research and successful models adopted in other countries, our ADQ FWD paper provides the context for a new food-resilient framework.

"Cultivating the Future of Food, Bolstering Food Resilience" is a compelling topic for governments, businesses, investors and entrepreneurs alike.

Mansour AlMulla
Group Chief Investment Officer,
ADQ





SECTION ONE

The global food landscape of the 21st century

The food and agriculture industry will be put under greater pressure in the coming years.

It is well established that the world population is set to increase significantly in the coming two decades; to feed the additional 2 billion people being added to the planet, the food ecosystem will need to generate an additional 35% more food over the next decade.

The quantity of food to be produced is not the only factor impacting the food system. With the middle class expected to reach 5.3 billion people worldwide by 2030, and the associated rise in disposable income, consumer diets and shopping habits are changing and are likely to create further strain on the system.

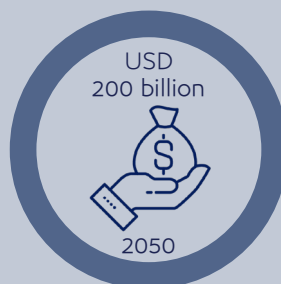
These changes are further compounded by an increasingly volatile climate, shifting geopolitical landscape and aging supply and distribution infrastructure; upending the relative stability that the major food trade routes have experienced in the last two decades.

As a result of these factors, the need to accelerate investments to meet the challenge ahead is clear.

Investments are vital across the full value chain. In production, investments are necessary to improve efficiency gains, diversify global production regions and develop novel foods. In distribution, investments can support the needed increase in quantities and help reduce waste across the system. Multi-stakeholder collaboration will be needed to achieve the levels of investments required in breakthrough technologies, infrastructure and integrated supply chains to facilitate optimal food processing, storage, production and distribution.

Investments are a key ingredient worldwide

Investment is essential to drive the growth of the food and agriculture industry in a sustainable manner.



Source: World Bank

Globally, it is estimated that USD200 billion (AED 735 billion) of investment is required annually until 2050 to meet the food supply and demand gap. However, levels of investment vary around the world.



SECTION TWO

Capitalising on the UAE's potential

The UAE has taken a proactive approach to overcoming structural factors through the years



Resource constraints



Import dependency



Cost competitiveness



Food waste

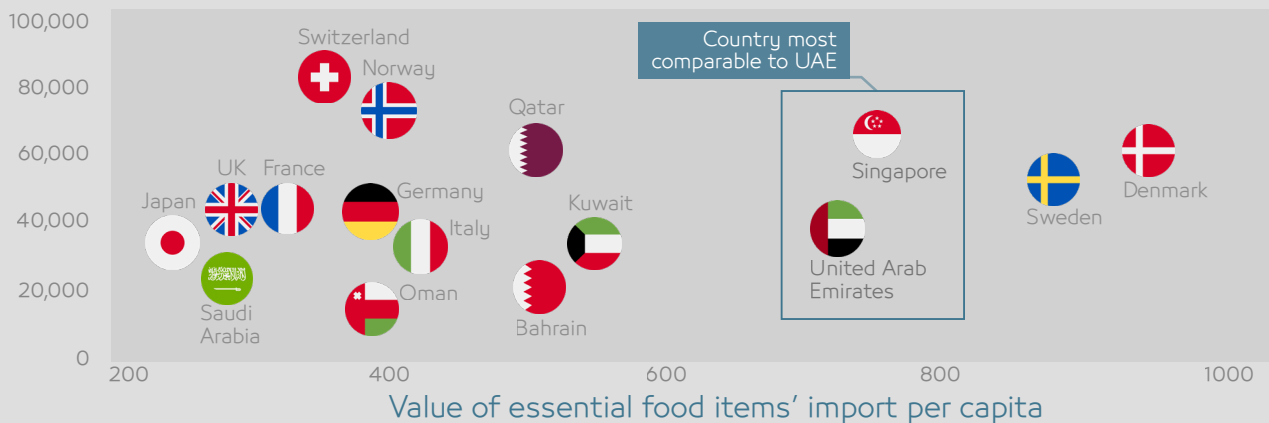
The onset of the global pandemic in early 2020 put even the strongest food supply chains to the test.

Overall, the UAE performed well, as shelves remained stocked and prices remained steady. Nonetheless, the UAE accelerated its pace of investment in food and agriculture to fortify its system and avoid the potential for disruption risk in the future.

The UAE's National Food Security Strategy 2051 aims to ensure access to safe, nutritious and sufficient food year-round. With a clear target to reach the top of the Economist Intelligence Unit's Global Food Security Index by 2051, the UAE is investing to generate sustainable local food production. It is also harnessing advanced technologies such as AI, robotics and machine learning to meet the long-term demands of a growing nation.

Top 15 Countries with highest imports (USD 2018)

GDP per capita



To cultivate the future of food in the UAE, we invest in local production as well as international supply chain interconnectivity.

Gil Adotevi
Executive Director, Food & Agriculture, ADQ



The UAE is creating a stronger trading framework for food

Local producers face severe competition from cheap imports, especially dairy and poultry products. The high cost of production in the UAE is based on a number of factors, including environmental conditions and technological advancements. Other countries face similar trends and are taking steps to increase their food resilience, such as Singapore.

We all recognise that the food supply chain is a very complex web of different players. Achieving food resilience in the UAE demands efficiency and cost effectiveness. The government is the main enabler for all stakeholders, and is prioritising sizeable opportunities for the private sector.

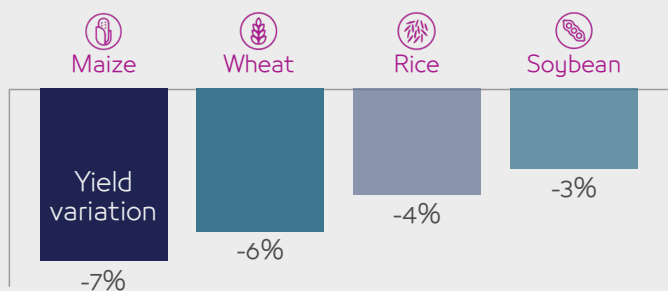
H.E Saeed Al Ameri

Director General, Abu Dhabi Agriculture and Food Safety Authority



Future shocks summarising the factors that are and will continue to exert pressure on the UAE's model

Yield variation per degree Celsius increase in global temperature



Increase in commodities & logistics

+36%
Oils

Real price increase
(CAGR, 2019 vs 2021)

+14%
Cereals

Worldwide logistics costs
(2019 vs 2020)

+14%
Logistics
Costs

Local production constraints

- 🌱 Natural resources constraint (inability to farm basic commodities due to climate and soil conditions)
- 📦 Import friendly regulations (5% duties)
- 💰 Lack of cost competitiveness of local manufacturing in some categories (small local scale, high costs)
- 🏭 Strong neighbouring competitors

It's right to support your food production sector because it is important for society to reduce its vulnerability to food supply disruption.

Dr. Dino Francescutti Motis

Coordinator of Subregional Office of Food and Agriculture Organisation of the United Nations for the GCC States and Yemen



Scaling up production



ADQ established Silal in 2020 as a key step to diversify food sources and promote local agricultural products.

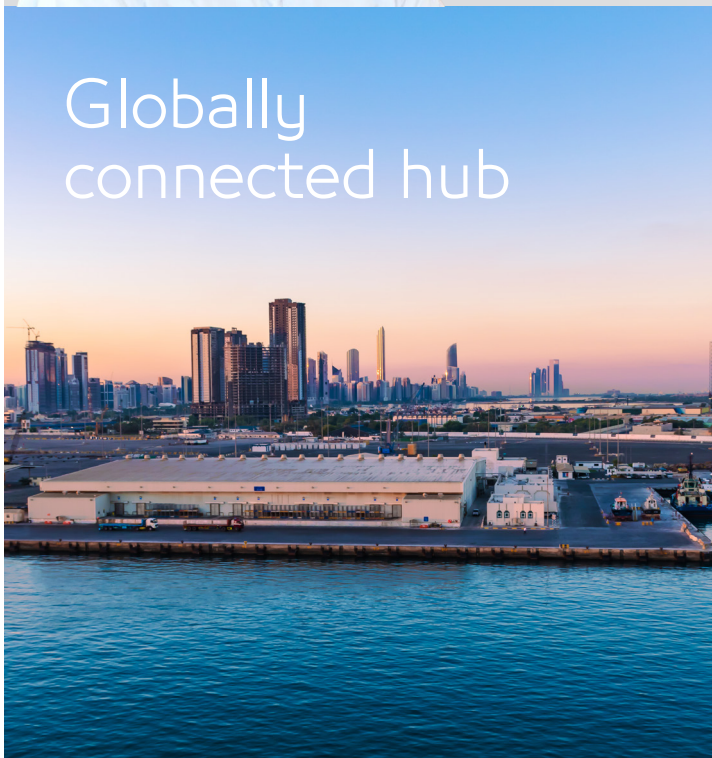
Plans for a major AgTech Park to become the regional food hub of the Middle East aim to produce 39 kilotons of locally grown fresh fruits and vegetables annually in Abu Dhabi. Firms such as Pure Harvest and Madar Farms are building commercial-scale, semi-automated, high-tech greenhouses that will contribute to the food supply system.



At Silal, we will spare no effort to invest in best-in-class infrastructure and extend our support to retailers and the community as a whole, as part of our commitment to increasing local production.

H.E. Eng. Jamal Salem Al Dhaheeri
Chief Executive Officer, Silal

Globally connected hub



Abu Dhabi Ports, which manages and operates 11 ports and terminals in the UAE and Guinea, is central to facilitating the movement of food and agriculture products in the UAE and international markets.

Its interconnected supply chain network handles more than 36,000 ships each year and 1,200 trucks on average every day, totalling 18.63 million tonnes of general & bulk cargo.

If we only consider the demand of the UAE's population, our thinking will be too small to achieve our ambitions.

Abdullah Al Hameli
Head of the Industrial Cities and Free Zone Cluster,
Abu Dhabi Ports





Optimising the UAE's local production opportunities

For most nations, a key component for increasing food resilience is maximising local production of food.

The extent to which a country can be self-sufficient varies and is influenced by several factors such as climate, cost of living and labour availability. For the UAE, it is estimated that with existing technologies, the country can more than double its local production of food.

In pursuing a strategy of localisation, governments often struggle with whether they should provide support and incentives to their local food producers to help maximise local production and create more economic value.

On one hand, they may want to protect local players from what can often be unfair international competition. On the other hand, if not structured well, incentives may stifle local productivity and innovation and drive-up consumer prices.

In the UAE, local producers face significant challenges. The climatic conditions are the first barrier. Secondly, economies of scale and cost competitiveness are difficult for purely local companies, given the relative population size.

The country's open market approach creates high competition from international brands. Finally, many consumers hold the misperception that local produce quality does not match international standards.



Singapore's successful framework

Singapore and the UAE share similar high living standards and food import levels.

Singapore aims to triple its self-sufficiency to 30% by 2030, and ensure no single country exceeds 30% of import volume of a specific product item.

If you combine an adjacent sector, such as advanced manufacturing, with the agriculture sector, you create a new tech-enabled sector.

Eugene Toh
Director, Enterprise Singapore



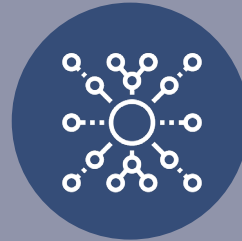
Since the establishment of the Singapore Food Agency in 2019, Singapore has based its food resilience policy on four pillars:



Strengthening local production



Stockpiling key food items



Diversifying sources of imports



Building international partnerships

To achieve these goals, the government has allocated SGD 30 million (AED 81 million) in grants to help local farmers invest in new technology to increase production. It has set – and already exceeded – targets for the local production of eggs, leafy vegetables, fish and seafood.

Demand for local produce has been supported by incentivising the purchase of local products, as well dedicated education and enhancing local food labelling.

Singapore has stockpiled one year's consumption of white rice. The government has achieved this by making rice import licenses contingent on maintaining a one-year stockpile, so these are owned and operated entirely by the private sector.

Singapore is creating partnerships with neighbouring countries, including Indonesia, Vietnam, Brunei and China, to facilitate private investments and exchange capabilities. For example, investments in aquaculture facilities in Brunei and a food zone in Jilin, China are intended to develop new food technologies. These activities support Singapore's aim to sustain stable, secure supplies of food.



Prioritising local production

Segmenting and prioritising areas of intervention can make it easier for governments to decide where and how much support local producers require.

Segment #1

Products that can be grown locally and are considered essential, and their full-value chain.

These products receive the most attention from the government.

In the UAE, these include water and other primary agricultural products such as dairy, poultry, fisheries and aquaculture, and certain fresh produce.

Maximising investment in this category also creates an economic cluster effect with further processing down the value chain. For example, milk can be processed into by-products and fish trimmings can be processed into nutraceuticals.

Expanding access and support for local products would create new opportunities, and the demand is there. Scale and quality are essential but efficiency and cost competitiveness also play a role in growing this sector of our economy.

Bader Alnuaimi
Representative of Abu Dhabi Executive Office



Segment #2

Products that can be produced or processed locally.

Most products can be processed locally via industrial processes.

In the UAE, it is estimated that approximately 60% of consumed products are processed locally. The country is already a regional exporter of several processed foods such as sugar, nuts and pasta.

Government intervention in this segment focuses on support for novel and cutting-edge food technologies, which can further strengthen the food resilience profile of the country. For instance, technologies that reduce waste and or novel plant-based protein business which provide an alternative to animal-based protein and whose ingredients are easier to stock.

From field to fork, consumers today want food and beverages that are high quality, nutritious, safe and trusted. As we expand operations across the region, we are adapting to changing consumer behaviour and market dynamics by investing, innovating and collaborating with our scientists, nutritionists, engineers and partners to deliver on consumer expectations.

Alan Smith
Chief Executive Officer, Agthia Group





Segment #3

Products that cannot be produced locally but are essential.

There are several foods, such as grains and oilseeds, that constitute the building block of most modern diets globally. For countries like the UAE, even with significant technological advances, it is unlikely these will be produced locally in the short to medium term.

For this category of food, governments commonly build local reserves. However, other measures can be explored, such as regulation to ensure diversification of sources of import and avoiding overreliance on a single import source for a specific product.

Encouraging and incentivising international investment of local food companies abroad and vice-versa attracting international investment locally can help strengthen trade and the resilience of the food supply chain.

Establishing thriving and new international connections to our food supply chain is one way we can play a critical role in strengthening the UAE's food system.

Gil Adotevi
Executive Director, Food & Agriculture, ADQ



As consumers get wealthier, protein demand is often the first to increase in the food basket. This is particularly challenging because global protein production systems are already strained. Disease transmission issues can be brought about by intensive farming practices. Additionally, there is an adverse impact on the environment – with an estimated increase of 8.8 GtCO₂e (gigaton CO₂ equivalent) of greenhouse emissions coming from agriculture, mainly livestock.

Global consumer demand for more environmentally sustainable alternatives to animal proteins have also seen exponential growth with plant-based meats and other alternatives to farmed livestock. Alternative forms of protein, such as alternative meat and mycoprotein, are increasingly popular in the UAE.

While the UAE has historically had limited animal protein production, new technologies offer modern solutions.

With funding from DisruptAD, ADQ's ventures platform, and other prominent local and international venture capitalists, tech start-up Aleph Farms has introduced a zero-emission, cruelty-free, lab-grown beef product that will be produced in Abu Dhabi and supplied throughout the UAE. Agthia, part of ADQ's portfolio, recently launched its first plant-based meat products line.

Undoubtedly, the potential of innovation in the agri-sector must be maximised to achieve a sustainable food system capable of cultivating crops, supporting farmers and providing alternative food sources (like plant-based meats) that reinforce the nation's food resilience.

Faisal Al Hammadi
Executive Director, Incubation, ADQ





SECTION FOUR

Steps to food resiliency in the UAE

Over the past 10 years, the UAE's food and agricultural sector has transformed. As the nation actively works to expand farming capabilities to protect its food supplies, these five enabling factors should be considered.

Enabler #1: Driving domestic production

The goal is to maximise the efficiency of local food production.

Enhancing food production capability will have a long-term impact on addressing structural challenges faced in the UAE.

In 2020, ADQ established a key pillar of Abu Dhabi's food system, Silal, to enhance the food and agriculture ecosystem in the UAE and diversify food sources. Prioritisation of key food items such as, poultry, fruits and vegetables, was established. Training and supporting local producers to incorporate new farming technologies into their processes is underway.



Abu Dhabi has done a phenomenal job of attracting early foundational players across a variety of technologies, now we must scale those ideas to create output and impact that are supported by enabling policies, attracting talent and nurturing a vibrant market.

Abdulaziz AlMulla
Founder and Chief Executive Officer, Madar Farms

Regulatory measures, such as more stringent quality import-entry requirements and forms of incentives and grants for the sector, are being contemplated. Early-stage companies must receive the appropriate mix of incentives and levels of support to drive growth, innovation and development. The preferred measures will be those that spur R&D to drive new agricultural varieties and robust infrastructure.



Both the public and private sectors can play an effective role in the food and agriculture value chain. It's our role as government to help them succeed and drive efficiencies, while promoting local food. The private sector is our main partner in driving food resilience.

H.E Saeed Al Ameri
Director General, Abu Dhabi Agriculture and Food Safety Authority

Enabler #2: Investing in technology

Innovations reduce production costs and lead to higher quality food varieties.

Technology is advancing agriculture in the UAE. The country is establishing best practice and expertise about cultivating crop production in the desert. New modes of irrigation or new types of greenhouse fruits and vegetables are being developed. Chicken and livestock can be bred to be more resilient to the UAE's climate. New seed types can be created that require less water. Efforts such as these pave the way for enabling SMEs and technology companies to form a tech-enabled agribusiness local cluster, driving long-term resilience.

If we build on our rapidly growing innovation ecosystem, we can provide a strong platform for innovative companies to scale homegrown technologies that will be more cost-effective, sustainable and valuable in the long-term.

H.E. Eng. Saif Mohamed AlShara
Assistant Undersecretary Sustainable
Communities Sector and Acting Assistant
Undersecretary Food Diversity Sector
Ministry of Climate Change and Environment



Future AgTech Investment in Abu Dhabi

The introduction of new technologies, such as vertical farms and 'smart' agriculture, have further accelerated following the impact of recent events on global supply chains and commodity prices.

Total AgTech Investments
over 3-5 years

AED
534m

R&D only

AED
681m

Hybrid R&D
and production

We can produce more of our own food by increasing our investments in new technology. We are committed to supporting local and foreign food tech companies, helping them expand to the UAE, localise their technologies and address challenges in our food system.

H.E. Dr Tariq Bin Hendi
Director General, Abu Dhabi Investment Office





Enabler #3: Driving local consumption

Consumers need to be encouraged to buy local.

“Made in the UAE” needs to evoke appreciation. In many countries, consumers will pay more for local products. Carefully designed labelling and packaging, incentives, and education about food sources will help influence food purchases as they have in Singapore.

Educating consumers about the nutritional benefits retained from shorter times between farm and fork is key.

Enabler #4: Internationalising food security

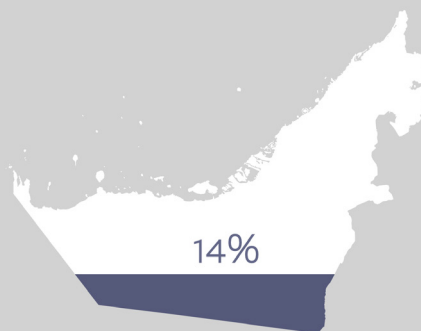
Food resilience for the UAE requires balancing local food production with strong international supply chains.

Collaborating with international producers provides opportunities for the UAE and partner countries to further diversify import origins for critical food items and strengthen existing and new trade routes. The UAE already has strong ties with many key production countries but there are opportunities to invest further internationally and share innovations, capabilities, approaches and know-how. Success will create more reliable and diversified import-export exchanges – even in the most difficult of times.

Securing long-term contracts with global trading companies can ensure stable supplies of key grains, pulses, and oils. ADQ’s investment in global agricultural commodity trader, Louis Dreyfus Company, is one such example.

In support of the UAE’s efforts to fortify the resiliency of its food system, ADQ is actively investing to enhance the nation’s position as a regional food hub. The UAE’s infrastructure and connectivity facilitates the country’s efforts to meet consumer demand across the region.

An estimated 10,000 sq. km of land (or equivalent to 14% of the UAE’s land area) is needed to grow enough grains, edible oils and legumes to satisfy the UAE’s demand.



Enabler #5: Reducing food waste

There is potential to spearhead a framework for food waste guidelines and the supporting infrastructure to mitigate waste, which is an essential driver of food resilience.

A coordinated response at key points in the supply chain is needed to drive down food waste effectively. Most food waste occurs at the start of the production process or at the point of consumption.

Storage or cold-chain infrastructure can optimise processes to minimise food waste, supported by efficient transport, underpinned by digitalisation. Private sector guidance and consumer education are also important for eliminating food waste.



SECTION FIVE

Conclusion

Strengthening food resilience is a complex journey in which the UAE has made tremendous progress. Rethinking food resilience underscores the importance of investment in local food production and a robust integrated value chain for nourishing future generations.

The investments, projects and endeavours in the food and agriculture sector to date have established a clear path to enter the next phase: scaling up for greater self-sufficiency.

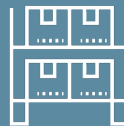
Key steps for scaling up



Continuing to expand the role of the UAE as a regional and global food hub



Encouraging consumers to support local farmers and prioritise locally sourced food produce in everyday purchases



Investing in advanced storage infrastructure



Developing the UAE's food & agriculture innovation ecosystem to align entrepreneurial, investment and research objectives



Minimising food waste and educating the community

The UAE is a nation in a strategic location with a highly competitive and productive economy, with the resources, talent and robust infrastructure in place to address food resilience.

Influential leaders are taking an active approach to find effective ways of increasing accessibility to quality food items. Applying these identified solutions will help accelerate the nation's progress to achieving long-term food resilience and nourishing future generations for the next 50 years and beyond.





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