



UNITED ARAB EMIRATES
MINISTRY OF CLIMATE CHANGE
& ENVIRONMENT

A Guide to Food Security in the UAE

2023

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A Guide to Food Security in the UAE 2023

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Hydroponics

GLOBAL OVERVIEW

Definition, Pillars, and Challenges

According to the Food and Agriculture Organization of the United Nations (FAO), “Food security exists when all people at all times have physical and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life.”

Food security’s four pillars:



Availability

Ensuring the availability of sufficient quantities of food of appropriate quality, supplied through domestic production or imports.



Access

Providing physical and economic access for individuals to adequate resources (entitlements) for acquiring appropriate foods for a healthy, safe, and nutritious diet.



Utilization

Ensuring that the food provides adequate nutrition, in addition to having access to clean water, sanitation, and healthcare to reach nutritional wellbeing and fulfill people’s physiological needs.



Stability

Providing access to adequate food for populations, households, and individuals at all times, and preventing them from risking losing access to food as a consequence of sudden shocks (e.g., an economic or climatic crisis) or cyclical events (e.g., seasonal food insecurity).

As per HLPE 15, the concept of food security has evolved to recognize the centrality of agency and sustainability, along with the four other dimensions.



Agency

Refers to the capacity of individuals or groups to make their own decisions about what foods they eat, what foods they produce, how that food is produced, processed and distributed within food systems, and their ability to engage in processes that shape food system policies and governance.



Sustainability

Refers to the long-term ability of food systems to provide food security and nutrition in a way that does not compromise the economic, social and environmental bases that generate food security and nutrition for future generations.

<https://www.fao.org/3/ca9731en/ca9731en.pdf>

Food security has become one of humankind’s most pressing concerns, as reflected across the Sustainable Development Goal (SDGs), more specifically SDG2: “End hunger, achieve food security and improved nutrition and promote sustainable agriculture”, also known as the Zero Hunger goal. Despite global efforts to eradicate hunger, the number of people affected by hunger globally rose to as many as 828 million in 2021, an increase of about 46 million since 2020 and 150 million since the outbreak of the COVID-19 pandemic. These staggering figures have been driven by conflict,

Global Food System Challenges

As the global population is predicted to increase to 10 billion by 2050



50%

increase in global food demand by 2030



<1.7%

growth in agricultural production



70%

global population living in cities by 2050



1/3

of food produced is wasted



1 in 3

people suffer from malnutrition

climate change, and economic slowdown, and aggravated by the fallout from the COVID-19 pandemic. Therefore, additional efforts are needed to design coherent food systems policies to tackle hunger and achieve SDG2.

An additional issue within the food system that requires reform is its considerable contribution to biodiversity loss, deforestation, drought, freshwater pollution, and the collapse of aquatic wildlife. It's also the second-biggest generator of greenhouse gas emissions after the energy industry. Therefore, current agricultural practices are a significant contributor to climate change. In turn, climate change also has detrimental consequences on crop yields. These issues create a vicious cycle that needs to be broken to ensure adequate and sufficient food supply for current and future generations.

In addition to these challenges, food loss and waste constitute an additional burden on global food systems. UN statistics show

that a staggering one-third of the food produced in the world ends up in the bin. This amounts to 1.3 billion tons of food – equal to the weight of 2,900 Burj Khalifas – or US\$1 trillion wasted every year.

The world is currently undergoing a significant transition that has adverse implications for both current and future global food security. The Fourth Industrial Revolution (4IR) is driving rapid advancement of new technologies, including artificial intelligence, (AI), robotics, Internet of Things (IoT), and bioengineering, which are transforming agricultural production and the global food supply chains as a whole.

In parallel, intensifying climate change threatens to disrupt the already fragile supply of food and water, especially in the Middle East. These compounding factors are further complicated by a volatile geopolitical environment, changing patterns of migration, and an increasingly uncertain global trade landscape.

Global Food Security Index

The annual Global Food Security Index (GFSI), developed by The Economist Intelligence Unit (EIU), provides countries with a framework to evaluate their progress and align their efforts to support global food security. The Index considers the core issues of food affordability, availability, quality and safety across a set of 113 countries as the first to examine food security comprehensively across these four internationally established dimensions. The GFSI is a dynamic quantitative and qualitative benchmarking model, constructed from 68 unique indicators, that measures the drivers of food security across developing as well as developed countries.

Moreover, it looks beyond hunger to the underlying factors affecting food insecurity. The Index now includes an adjustment factor on natural resources and resilience that assesses countries' exposure to the impacts of a changing climate, their susceptibility to natural resource risks, and their ability to adapt to these risks. As this indicator reflects

the fundamental food security status of a country, the UAE aims to rank first and top the GFSI by 2051.

Voluntary Guidelines on Food Systems and Nutrition

In February 2021, the Committee on World Food Security (CFS) launched the CFS Voluntary Guidelines on Food Systems and Nutrition (VGFSN). The VGFSN highlights the interlinkages between different sectors and the importance of concerted efforts to achieve sustainable food systems. Consequently, the VGFSN focus on encouraging countries to integrate nutrition within their national food security and climate strategies. These Guidelines are based on scientific evidence and aim to provide guidance on policies and interventions to address all forms of malnutrition.

The VGFSN align with the UAE's efforts to promote the adequate food choices for its community, as specified in its Nutritional Labelling Policy and National Nutrition Guidelines. The UAE is fiercely committed to supporting the implementation of the VGFSN in our region.



Wheat

LOCAL CONTEXT

The UAE is a thriving economic powerhouse in the Middle East, with its robust and diversifying economy playing a significant role in the region. The UAE has experienced tremendous growth and has successfully transformed into a global hub for trade and commerce. This economic prosperity has contributed to a substantial increase in the country's buying power, enabling residents to access a wide range of goods and services, including food, from both local and international sources.

One of the key pillars supporting the UAE's economic success is its exceptional transport and logistics infrastructure. The country boasts state-of-the-art airports, seaports, road networks, and an efficient transportation system, making it a strategic gateway for both regional and international trade. This well-connected network facilitates the seamless movement of goods, including food products, within the UAE and beyond its borders. Whether it's importing fresh produce or exporting locally grown commodities, the UAE's modern infrastructure ensures efficient supply chain management, reducing delays and ensuring the availability of a wide variety of food items to meet the demands of its diverse population.

The UAE's strategic geographical location, coupled with a robust food trade network, ensures a steady supply of food from around the world. Thus, the UAE has established strong trade relationships with numerous countries, fostering a diverse and extensive food trade system, and becoming a major food hub with annual figures exceeding 100 Billion Dirhams.

Local Challenges



Water Scarcity



90%

of the UAE's
reliance on food
imports



<0.1%

contribution of
agricultural production
to the GDP



11 million

population projection
by 2050



<5%

Arable Land

UAE'S EFFORTS

National Food Security Strategy 2051

The National Food Security Strategy 2051 aspires to transform the UAE into a world-leading hub for innovation-driven food security, and elevate the country's ranking on the Global Food Security Index (GFSI) to number one by 2051.

The strategy includes a series of short- and long-term initiatives that seek to ensure all our citizens and residents have access to safe, sufficient, and nutritious food at affordable prices at all times. It has set a strong foundation to enable us to deal with food crises and emergencies.

Although a prominent food trade hub, the UAE is actively pursuing strategies to become less reliant on food imports, without compromising the importance of trade facilitation. To achieve long-term food security, the UAE government has been actively investing in innovative agricultural technologies and sustainable farming practices to maximize local food production and reduce dependency on external sources. Additionally, initiatives promoting domestic food manufacturing and processing are being encouraged, fostering a self-sufficient and resilient food industry. Through these concerted efforts, the UAE is striving to strike a balance between its aspiration to be a vital food trade hub and its commitment to enhancing self-reliance, ultimately ensuring a sustainable and secure food supply for its population.

The Strategy specifically aims to implement climate-resilient agricultural

practices that increase production while helping maintain healthy ecosystems.

It also defines the elements of the national food basket, which includes 24 main food types, based on three criteria: knowledge of the volume of domestic consumption of the most important products, production capacity and processing, and nutritional needs.

Legislation and Policies

The Federal Law No. 3 of 2020 regarding the regulation of the strategic stock of food commodities aims to organize food supplies during crises, emergencies, and disasters, and achieve food sustainability in the UAE. The provisions of the law apply to suppliers and registered merchants.

The ministerial jurisdiction enabled by the law covers preparing reports as well as studies and statistics, carrying out economic evaluation of food commodities, estimating the volume of consumption, determining food surplus and deficit, and preparing databases on the production and availability of food commodities in the UAE and the countries of origin.

Government representatives may also follow up with suppliers, in addition to developing and implementing sustainability and safety policies for the strategic stock of food commodities in coordination with the National Emergency, Crisis and Disasters Management Authority (NCEMA) and other concerned authorities to ensure the availability of safe strategic stock of food commodities.

The law stipulates establishing a record

of registration and classification of suppliers and merchants. It also governs the distribution of the stock of strategic commodities in the event of emergencies, crises, or disasters under the distribution plans prepared by NCEMA in cooperation with other concerned authorities.

The provisions of this law allows for improved monitoring, better tracking and allows the uae to mitigate local and external shocks, which will guarantee stable food supply and availability and safer food utilization.

Main Food Elements



Consumption



Production



Nutrition

24 Main Food Items

Plant Products

Fruits



Apples



Bananas



Lemons



Dates



Oranges

Vegetables



Leafy Greens



Tomatoes



Bell Peppers



Potatoes



Cucumbers



Onions

Grains & Pulses



Pulses



Rice



Wheat



Sugar

Livestock Products



Red Meat



Poultry



Milk



Eggs

Fisheries



Fish

Other



Oil



Baby Formula



Tea



Coffee

The strategic targets of the National Food Security Strategy are outlined in five clear directions and supported by five enablers.



Enablers



Build an effective food security governance model



Establish and implement a National R&D Food Security Agenda



Develop the National food Security Database



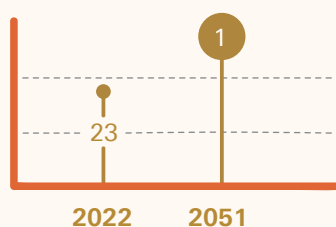
Build human capacity for food security functions



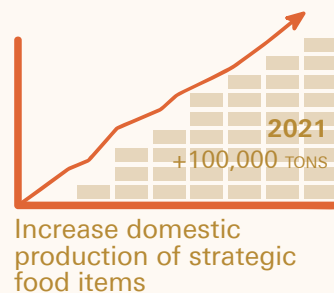
Engage the community in shifting food security nations and behaviours

Impact

UAE's Target on the Global Food Security Index



Domestic Production Impact



Economic Impact 2021 Employment



Monetary Impact



Water - Food Nexus
UAE Water Security Strategy 2036



Emirates Food Security Council

The National Food Security Strategy can be achieved by aligning the national efforts of federal and local government authorities, public and private sector entities, and civil society. Bringing together all key stakeholders, the Emirates Food Security Council, formed in 2019 and chaired by the Minister of Climate Change and Environment, is the primary council reference for all UAE food affairs that oversees the implementation of the Strategy. Through their joint efforts, the council's members are building a new frontier in food security for our nation.

The Council is supported by an Advisory Committee that works on validating outputs and providing expert advice on areas related to food security.

Meanwhile, the Ministry of Climate Change and Environment monitors the alignment of the KPIs and initiatives of the member organizations with the National Food Security Strategy.

The Council played an integral role in ensuring an uninterrupted food supply across the UAE during the COVID-19 pandemic.

Stakeholders Map



Food Security Alliance

The Food Security Alliance is a group of national companies within the food and agricultural sectors that work together to ensure the continuity and sustainability of commodities supply under any circumstances, including emergencies and crises. Through its strategic

partnerships and foreign investments, the Alliance drives the adoption of sustainable food and agricultural practices, development of food-related industries, and other aspects supporting the national economy and social wellbeing.

Alliance Members



Agricultural Innovation

Climate changes exacerbates the already scarce natural resources such as water scarcity and limited arable land, which have a negative impact on agriculture and food security in the UAE. Therefore, we seek to leverage state-of-the-art technologies and innovative cultivation methods, including vertical farming, hydroponics, organic farming, and controlled-environment agriculture, to boost local agricultural production while enhancing the quality and variety of homegrown produce. We are also implementing advanced robotics to support data-driven agricultural practices.

Our government is committed to driving innovation in agriculture. In 2019, Abu Dhabi Investment Office (ADIO) introduced a program to develop agricultural technologies, valued at US\$272 million. So far, ADIO announced partnerships with seven companies (AeroFarms, Madar, Farms, RNZ, RDI, Pure Harvest, FreshToHome and Nanoracks) where these companies received financial and non-financial incentives totaling USD 140 million. The research and technologies developed by these companies will expand existing capabilities in the UAE's AgTech ecosystem and promote innovation in the sector to address global food security challenges.

An important area of agri-tech that is relevant to our region is vertical farming, as it provides an ideal solution to the challenges the UAE faces. This method uses considerably less water, and has a much smaller carbon footprint than traditional farming.

In this context, Badia Farms opened the region's first urban commercial vertical indoor farm in Dubai in 2018. In 2020, the company launched a large-scale high-tech vertical farm in Dubai Industrial City with a capacity to produce 3,500 kg of fruits and vegetables per year.

In addition, Emirates Airlines built the largest vertical farm in the world - Bustanica. It is a state-of-the-art vertical farm that reduces the UAE's reliance on fresh produce imports and reduces the amount of water required to grow produce by 95% by creating the optimal growing environment for these plants all year round. The facility spans a 31,000 m² farm equivalent to farmland that is two times the area of Dubai International Airport. In other words it has a production output equivalent to 900 acres of farmland at 2,700 kg per day.

Pure Harvest Smart Farms, an Abu Dhabi start-up, is growing from strength to strength becoming MENA's Most Funded Startup 2022, and growing beyond the UAE exporting both produce and technology to the region and as far as Malaysia and Singapore. 2022 witnessed a preliminary agreement with the Singapore Food Agency to develop the city-state's first hybrid greenhouse tomato farm that is aimed at boosting sustainable food security.

Through these efforts, we are progressively moving forward in the disruption of food systems to be able to grow anything anywhere regardless of climate and environment.

Agricultural R&D

The UAE is heavily investing in R&D in the agricultural sector. We are working on establishing a network of research centers, developing the capacities of our laboratories, and building synergies between the public and private sectors as well as with international academic and research institutions.

Our research efforts in the agricultural field cover several areas:

- Genetic resources for food and agriculture
- Impact of climate change on local agricultural production
- Developing crop varieties that can better adapted to local climatic conditions, such as crops resistant to salt and heat
- Use of soil conditioners to increase organic production
- Use of biological control agents in organic farming
- Cultivation of rice in open fields
- Use of agricultural pesticides
- Algae cultivation for environmental, climate, and agricultural purposes
- Sustainable agricultural systems, such as greenhouses and hydroponics

An important part of our research focuses on the marine environment and living aquatic resources, as they are closely linked to food security. Among the priority areas is aquaculture of fish species of economic importance, such as kingfish, sheri, and Arabian safi. Another adopted method is the release of farmed fish into the wild to enhance fish stocks and raise the efficiency of the marine food supply chain.

International Center for Biosaline Agriculture

International Center for Biosaline Agriculture (ICBA) is an international, non-profit applied agricultural research center based in the UAE. The institution was formed in 1999 as a result of collaboration between the UAE Government, the Islamic Development Bank (IsDB), the Arab Fund for Economic and Social Development, and the OPEC Fund for International Development. The Center's R&D activities and programs are supported by the UAE Government and IsDB.

ICBA is a global center of excellence that develops tailored agricultural solutions for marginal environments with a focus on the areas of the world that face the problems of salinity, water scarcity, and drought.

The institution conducts its work under four research and innovation themes:

1. Management of natural resources in marginal environments
2. Climate change modeling and adaptation
3. Crop improvement and sustainable production
4. Integrated agri-aquaculture systems

As part of knowledge and technology transfer, the Center also works to build individual and institutional capacities in various countries, paying special attention to youth and women's empowerment.

Spanning around 100 hectares, ICBA has international interdisciplinary research teams and world-class research and

training facilities, including the Training Auditorium, the Emirates Soil Museum, and the Gene Bank that stores a unique collection of plant species with proven or potential drought, heat, and salt tolerance from around the world.

The institution has carried out R&D activities and programs in around 40 countries in Central and South Asia, the Middle East, North Africa, South Caucasus, and sub-Saharan Africa. The Center has partners in over 50 countries, enabling it to leverage a vast and diverse pool of expertise to maximize its impact on the ground.

ICBA is a founding member of the Association of International Research and Development Centers for Agriculture.

Initiatives

Agriculture Innovation Mission for Climate (AIM for Climate)

At COP26 in November 2021, US President Joe Biden officially launched a major new joint initiative between the US and UAE – Agriculture Innovation Mission for Climate (AIM for Climate) that aims to increase and accelerate investment in innovation and R&D in climate-smart agriculture by 2025.

The multi-stakeholder initiative seeks to fast-track the development and deployment of cutting-edge solutions in the vital sector worldwide. Its benefits include enhancing the productivity and sustainability of the agricultural sector,

reducing its carbon footprint, boosting its climate resilience, conserving natural resources, and improving livelihoods.

To date, AIM for Climate has garnered the support of more than 500 state and non-state actors and partners, bringing in more than \$13 billion in investments, through 51 innovation sprints across various technical areas.

There are three levels of participation in AIM for Climate – Government Partner, Knowledge Partner, and Innovation Sprint Partner. Detailed information about the types of partnership as well as sign-up forms are available at <https://www.aimforclimate.org/>. For enquiries, please contact info@aimforclimate.org.

Food Tech Valley

Our latest and largest project in the field of food systems innovation is the Food Tech Valley in Dubai. The first-of-its-kind agtech city in the world aims to serve as a testbed for pioneering agricultural innovations that will spearhead the regional transformation to more sustainable food systems.

Spanning 16 million square feet, the Food Tech Valley takes a holistic approach to agriculture in line with the objectives of the National Food Security Strategy 2051 and the National Net Zero by 2050 Pathway. The project seeks to position the UAE as a leading exporter of sustainable agricultural solutions.

Further information is available at <https://www.foodtechvalley.ae/>.

FoodTech Challenge

To promote the development and implementation of sustainable and technology-driven solutions across the food value chain, we launched the FoodTech Challenge, the largest global competition of its kind. The Challenge is a driving force for innovation for the UAE's food security and self-sufficiency at the national, community, and household levels.

In line with the objectives of the National Food Security Strategy, the competition calls upon youth, innovators, entrepreneurs, companies, and scientific and research institutions from around the world to identify and propose groundbreaking ideas to enhance food security in the UAE.

In the latest edition, four winners (out of almost 700 participating teams) benefited from a \$2M award pool consisting of a cash prize, startup incentives, acceleration services, innovation grants, localization support, and mentorship programs.

Further information is available at www.foodtechchallenge.com.

National Food Loss and Waste Initiative (Ne'ma)

In May 2020, His Highness Sheikh Mohamed bin Zayed Al Nahyan, UAE President, outlined his vision for enhancing food security and promoting a culture of rationalization and sustainable practices in food production and consumption. This vision sowed the seeds for the National Food Loss and Waste Initiative (Ne'ma).

Due to food security's holistic nature, the initiative aims to bring together all stakeholders to address food loss and waste, from production to consumption, covering farms, producers, distributors, retailers, restaurants and households with the aim to reduce food waste by 50 percent by 2030 in line with Target 12.3: 'Halve global per capita food waste' under the Sustainable Development Goal (SDG) 12: Responsible Consumption and Production.

Through Ne'ma, we seek to inspire our community to see food as a blessing, and drive home the importance of adopt sustainable food behaviors within their day to day activities.



National Food Loss and Waste Initiative (Ne'ma)

Food for Life

We have teamed up with FAO and Emirates Nature-WWF to launch Food for Life, a bold, first-of-its-kind community awareness and engagement campaign that addresses the nexus of health, nutrition, and planetary well-being through promoting healthy diets from sustainable food systems.

Highlighting the link between food systems and climate change, the initiative aims to inspire people to connect with food – understand where it comes from, and eat and live mindfully, adopt diets that are safe, diverse, balanced, and nutritious, and, wherever possible, consciously opt for food that is locally produced to minimize its carbon footprint. Food for Life features a packed calendar of activities across UAE communities and digital platforms.

Further information is available at <https://www.foodforlife.ae/>.

Beyond Food

In 2021, the UAE teamed up with the International Renewable Energy Agency (IRENA) to launch Beyond Food, an initiative that aims to provide people in communities in low-resource settings around the world with crucial access to sustainable energy for cooking. Beyond Food is a result of a close examination of the global food systems, particularly the cooking environment, from all angles, which has highlighted the importance of promoting the deployment of clean cooking solutions.

UAE as a Food Trade Hub

With its strategic location, robust infrastructure, and progressive policies, the UAE has emerged as a prominent food trade hub, facilitating the movement of food products across regional and international markets, with aggregate food trade amounting to more than 100Billion dirhams in 2022. The UAE's proximity to major food-producing regions allows for efficient transportation and distribution of food products. With world-class infrastructure, including state-of-the-art seaports, airports, and logistics facilities, as well as free trade zones and logistics parks that offer businesses attractive incentives and streamlined procedures for food trade, the UAE grows from strength to strength. Noteworthy the fact that Jebel Ali port in Dubai is one of the largest container ports globally and serves as a crucial hub for food trade. Food products imported - a wide array including fresh produce, grains, meat, and dairy products - are often processed, packaged, and re-exported to neighboring countries. Also, the UAE hosts several prominent international food exhibitions and trade events, attracting industry professionals, manufacturers, and traders from around the world. Events like Gulfood, the largest annual food trade show, provide a platform for networking, showcasing products, and exploring new business opportunities.

Food Safety and Quality Standards

The UAE has implemented stringent food safety and quality standards to protect consumers and ensure the

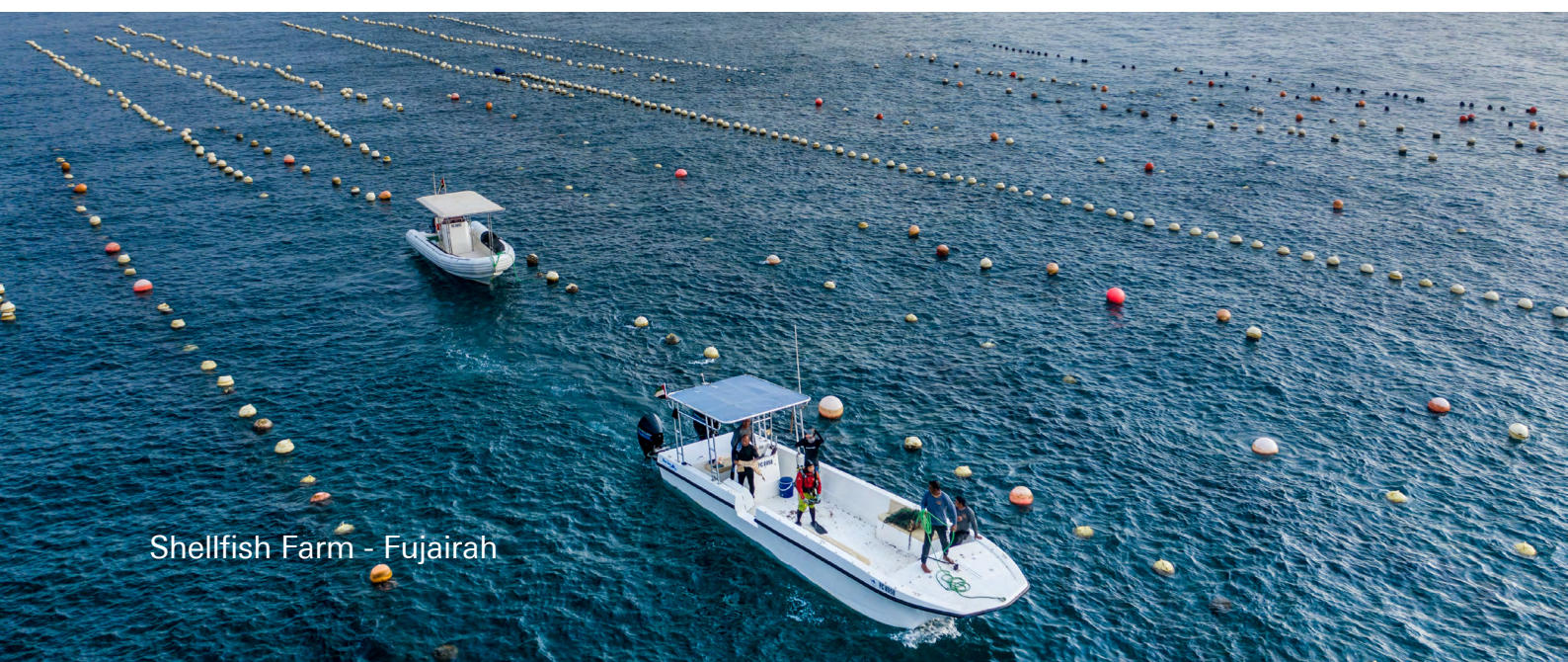
import and distribution of safe food products. Regulatory bodies, and whole-of-government joint committees such as the National Committee for Food Safety, enforce these standards, contributing to consumer confidence in the UAE's food trade sector. Technical regulations and standards for various food products, including permissible levels of contaminants, labeling requirements, and hygiene practices are always evolving. Moreover, the UAE maintains a comprehensive system of inspections and monitoring to ensure compliance with food safety regulations by coordinating federal and emirate-level efforts. Foodborne illness prevention leverages the strong capacity in laboratory testing, traceability and product recall mechanisms, effective consumer complaint handling, as well as collaboration on international alerts and standards' updates.

National Strategic Food Security Reserves

The UAE places great importance on maintaining national reserves of food to ensure a stable and secure food supply. These reserves act as a strategic buffer, safeguarding against potential disruptions

in food availability or price volatilities due to emergencies, global market fluctuations, or geopolitical factors.

The UAE has established strategic food security reserves to store essential food commodities and staples, such as rice, wheat, sugar, pulses, edible oils, and other essential commodities that are vital for meeting the basic needs of the population. The management and monitoring of food reserves are carried out by specialized entities, responsible for overseeing the stockpile levels, ensuring proper storage conditions, and maintaining the quality and safety of the stored food items. Regular inspections, quality assessments, and inventory management systems are employed to effectively manage and monitor the reserves. The UAE encourages public-private partnerships to support the establishment and management of food reserves and to help ensure the efficiency and effectiveness of the operations. Private sector entities, including food suppliers, storage companies, and logistics providers, play a crucial role in the storage, handling, and transportation of food reserves. Beyond the reserves, protocols are always simulated to enhance emergency preparedness, enabling the UAE to respond effectively to food crises.



Shellfish Farm - Fujairah

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