PalArch's Journal of Archaeology of Egypt / Egyptology

AN INITIAL READING INTO THE UAE'S FOOD SECURITY RESPONSE DURING COVID-19

Aseel A. Takshe[1], Dionysia Angeliki Lyra[2], Faisal Alkhani[3], Nicholas Mendoza[4], Maha Talli[5]

[1,3,4, 5] Canadian University Dubai, UAE

[2] International Center for Biosaline Agriculture, UAE

Corresponding Author[1] aseel.takshe@cud.ac.ae

Aseel Takshe, Dionysia Angeliki Lyra, Faisal Alkhani, Nicholas Mendoza, Maha Talli. An Initial Reading into the UAE's Food Security Response During COVID-19. - Palarch's Journal Of Archaeology Of Egypt/Egyptology. 18(2), 336-352. ISSN -x

Keywords: COVID-19, Food Security, UAE, Agriculture

Abstract

The following report is a desk study on the impact of the COVID-19 pandemic on food security within the United Arab Emirates. It focuses on highlighting the status of food security, and its 4 pillars, within the UAE, before COVID-19. Furthermore, it talks about the impacts and effects of the COVID-19 pandemic on the food security pillars of access, availability, utilization, and stability. The study has shown that despite local and international movement restrictions, major job losses, trade restrictions, and travel bans, that the UAE is still able to provide ample, nutritious food for its community to access.

Additionally, they have invested in local food security by way of new Agri-tech solutions such as smart greenhouses, AI-controlled food-growing environments, and vertical farming. Moreover, by increasing focus on local food and water production to further bolster their food sources and prepare them for any future food security related issues and challenges. This study also compares the UAE and its response to COVID-19 towards similar countries such as Singapore and other GCC countries.

The report concludes that increasing local food production, investment in the Agri-tech sector, increasing local food storage capacity, optimizing coastal and inland farming practices, diversification and strengthening of international partners, and acquisition of international

agricultural land, will help the UAE bolster its strength, in terms of food security and stabilizing food resources, for the community in the future to come.

INTRODUCTION

During the very final days of 2019 the Chinese authorities in the city of Wuhan, China had noticed a spate of seemingly connected pneumonia cases in which the cause was unknown. By the 31st of December, the authorities in China had confirmed that there were several dozen ongoing cases that were being treated and several dozen more cases of similar symptoms reported across East Asia. As the attention grew, the focus was shifted towards a potential global pandemic. COVID-19, which is short for Coronavirus Disease 2019, was reaching a fever pitch and was consuming the minds of the world's population as the death tally was rapidly rising. COVID-19's unceasing march into the population hubs of the world, revealed just how infectious it is, despite a relatively low virulence. The infectiousness and latency of appearance of symptoms made up for the low death rate, by infecting a huge number of people and allowing them to spread it far and wide, well before they were aware of their compromise. However, as governmental and non-governmental agencies around the world began to uncover the scope and scale of the infectious abilities of the virus, as well as its latency in revealing itself, the lockdown measures mirrored this new understanding as they became stricter and more unyielding in their nature.

Mass furloughing's and firings began to take place across the economy with a focus on suspending all "non-essential" work. Under these new conditions the food supply chain, an expansive and highly interconnected not to mention a crucial slice of the economy was tested. And the resilience of countries to the stress applied by COVID was revealed. The stress has, however, not ceased yet, and though some countries' food supply systems have partially yielded the remaining countries are holding strong.

This report aims to examine the response of the United Arab Emirates (UAE) and the effectiveness of the safeguards it has placed beforehand in building up its storage capacity, distribution networks, international agreements that bolster its ability to deal with stresses on the 4 pillars of food security, and other internal and external policies that may affect the country's resilience in the face of COVID-19.

FOOD SECURITY IN UAE

The United Arab Emirates is a middle eastern sovereign state in Western Asia, which has a general population of about 9.8 million people (UN, 2019). It is widely considered as a melting pot of culture as only about 11.6% are local Emiratis, with the vast majority being from South Asia (59.4%), Egypt (10.2%), and the Philippines (6.1%) (United Arab Emirates: Introduction, 2020). Aside from the resident population, a report stated that the UAE welcomed 21.3 million visitors in 2018. In terms of climate, the UAE boasts a hot, dry, summer climate and is surrounded by deserts, saline oceans, and mountains, which makes it extremely difficult to grow and produce food locally all year long. Therefore, the UAE has been reported to import about 80-90% of its food.

Despite the difficult climate and challenging environment, the UAE still maintains its rank as it holds the 21st spot, globally, and 3rd within the MENA region, in terms of Food Security based on the Global Food Security Index (Figure 1). Furthermore, the UAE is shifting its reliance on food to locally sourced, grown, harvested, and processed goods.

North America | Central & South America | Europe | **Middle East & North Africa** | Sub-Saharan Africa | Asia & Pacific

Regional ranking	Country	Overall score	Affordability	Availability	Quality & Safety
1st	Qatar	81.2	98.9	64.0	84.1
2nd	Israel	79.0	83.0	73.6	83.8
3rd	United Arab Emirates	76.5	89.8	63.7	78.5
4th	Kuwait	74.8	88.1	62.3	75.9
5th	Saudi Arabia	73.5	86.3	61.8	73.5
6th	Turkey	69.8	74.7	64.8	71.1
7th	Oman	68.4	77.8	57.6	74.4
8th	Bahrain	66.6	81.9	56.3	56.9
9th	Egypt	64.5	57.6	70.2	65.9
10th	Morocco	62.8	61.5	64.2	61.9
11th	Jordan	61.0	70.5	54.8	54.2
12th	Tunisia	60.1	61.5	58.0	62.2
13th	Algeria	59.8	66.9	55.8	53.0
14th	Syria	38.4	34.6	38.9	46.4
15th	Yemen	35.6	45.5	28.6	30.2

Figure 1: Global Food Security Index, MENA region, wherein the UAE ranks 3rd.

Source: (GFSI, 2020).

PILLARS OF FOOD SECURITY

Food Security, as defined by the Food and Agriculture Organization of the United Nations, is when all people, at all times within a certain geographical area, have both - physical and economic access to sufficient, nutritious, and safe food. Not only does the food have to be available, but it is also required to contain and meet the dietary needs and food preferences for an active and healthy lifestyle, within that population (Swaminathan, 1996).

Furthermore, Food Security can be (said to rest on) divided into 4 main pillars which include: Availability, Access, Food Utilization, and Stability (Figure 2).

Availability refers to, having sufficient adequate food available at all times, it also addresses the "supply-side" of food with regards to food production, stock levels, and net trade.

Accessibility pertains to physical and economic access to food which includes variables such as purchasing power, food transportation, and logistics, market infrastructure, and the income of the population.

Food Utilization is achieved when the food consumed provides adequate dietary intake and the body can utilize those nutrients within the food. It includes matters such as diet diversity, micronutrients and macronutrients, feeding practices, food preparation, hygiene, harvesting and storage, and food processing.

Stability is ensured when food availability, access, and utilization is permanent and durable. It is achieved when there is consistency within the other 3 pillars. Although, it can be heavily affected by economic, political, and environmental factors.

Figure 2: A visual description of, The "Pillars" of Food.
Source: (Security SlidePlayer, 2012).

AVAILABILITY

Availability in the field of food security refers to an infrastructural ability of a polity to import, produce, store, and distribute food in a manner that is consistently in sync with the requirements of the population.

For the UAE, this area of food security has been given prime attention. The UAE, cognizant of its precarious agricultural situation due to its extreme weather and poor soils, has had at the forefront of its national development the intention to beef up its storage capacity and to compliment that capacity it has also been forging long term trade agreements to secure a constant and diverse flow of food with international partners (Gulf News, 2019). Concurrently, the UAE had built up its storage capacity through its main holding firm Al Dahra. The country's storage capacity sits at around 900,000 metric tons (MT) of grain, a large proportion of which is found in silos in the emirate of Fujairah (Hamza, 2019). This amounts to approximately 6 months' worth of food and animal feed for the UAE's consumption rate.

The UAE along with at least one other GCC nation (Saudi Arabia) attempted to grow its grain, primarily wheat. However, both countries have shelved those ambitions citing the immense costs incurred by the harsh weather conditions and the high number of inputs those conditions necessary to grow enough food to make these projects worth pursuing. Although the UAE is still able to produce a substantial amount of food resources locally, in a study conducted based on averages from 1994-2018, the UAE produces 600,000 tons of fruit primary, about 500,000 tons of dates, and 550,000 tons of vegetables primary annually (Figure 3). Additionally, in a more specific view, the three most largely produced crops, in the UAE, within the year 2018 are Alfalfa, Maize, and Millet (Figure 4).

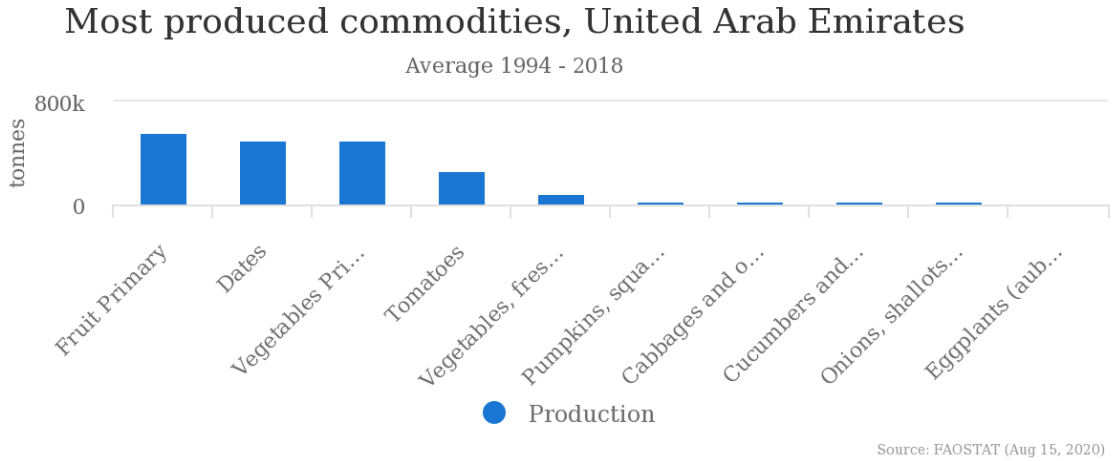

Figure 3: Most produced commodities in the UAE, on average, annually from 1994-2018.
Source: (FAOSTAT, 2020).

Instead, the UAE, through joint partnerships with Saudi Arabia, has signed multi-billion Dirham contracts through its holding firm, Al Dahra Holding, to acquire tens of thousands of hectares of agricultural land across the globe (Arabian Business Community, 2015). From Serbia to Ukraine, Australia, and Spain among other nations. This diversification of sources from different regions in the world is a clear attempt to mitigate the negative effects that potential political/military

conflicts, bad growing seasons, or trade restrictions might materialize as they did in the early 2010s in the form of the Arab Spring. The political instability and the attendant military conflicts that followed the Arab Spring revealed a weakness in the UAE's food supply chain, specifically in terms of availability. The UAE's food security initiative can be seen as a countervailing measure to such disruptive events. The bolstering of the country's storage capacity, the diversification of areas in the world from which grain and other foodstuffs can be sourced, and a nascent, however small, the industry of local food production.

_id	Year	Crop_Ar	Crop_En	Indecator_Ar	Indecator_En	Value
191	2018	جت	Alfalfa	كمية الإنتاج (طن)	Quantity of Production (Ton)	82654.13771679214551113545894622802734375
195	2018	أخرى	Others	كمية الإنتاج (طن)	Quantity of Production (Ton)	18366.582718502897478174418210983276367187 5
194	2018	ذرة	Maize	كمية الإنتاج (طن)	Quantity of Production (Ton)	8169.5445177962019442929886281490325927734375
193	2018	مسيلو	Millet	كمية الإنتاج (طن)	Quantity of Production (Ton)	65037.797418984860996715724468231201171875
192	2018	رودس	Rhodegrass	كمية الإنتاج (طن)	Quantity of Production (Ton)	293675.43398681114194914696860076904296875
176	2017	جت	Alfalfa	كمية الإنتاج (طن)	Quantity of Production (Ton)	142909.607783687184564769268035888671875
177	2017	رودس	Rhodegrass	كمية الإنتاج (طن)	Quantity of Production (Ton)	373795.704223785200156271457672119140625
180	2017	أخرى	Others	كمية الإنتاج (طن)	Quantity of Production (Ton)	35014.45483034342760220170021057128906 25
179	2017	ذرة	Maize	كمية الإنتاج (طن)	Quantity of Production (Ton)	17142.746990326373634161427617073059082031 25
178	2017	مسيلو	Millet	كمية الإنتاج (طن)	Quantity of Production (Ton)	76419.605625996133312582969665527343 75
162	2016	رودس	Rhodegrass	كمية الإنتاج (طن)	Quantity of Production (Ton)	299173.68064906343352049589157104492187 5
161	2016	جت	Alfalfa	كمية الإنتاج (طن)	Quantity of Production (Ton)	124289.898978849043487571179866790771484375
165	2016	أخرى	Others	كمية الإنتاج (طن)	Quantity of Production (Ton)	30260.765268341525370487943291664123535156 25
164	2016	ذرة	Maize	كمية الإنتاج (طن)	Quantity of Production (Ton)	5987.69254043441651447210460901260375976562 5
163	2016	مسيلو	Millet	كمية الإنتاج (طن)	Quantity of Production (Ton)	46965.080000000001746229827404022216796875
74	2015	أخرى	Others	كمية الإنتاج (طن)	Quantity of Production (Ton)	10105.888570666167652234435081481933593 75
22	2015	جت	Alfalfa	كمية الإنتاج (طن)	Quantity of Production (Ton)	111004.476232615314074791967868804931640625
35	2015	رودس	Rhodegrass	كمية الإنتاج (طن)	Quantity of Production (Ton)	273069.734027666621841490268707275390625
48	2015	مسيلو	Millet	كمية الإنتاج (طن)	Quantity of Production (Ton)	49232.842834453098475933074951171875
61	2015	ذرة	Maize	كمية الإنتاج (طن)	Quantity of Production (Ton)	3695.4941679749472314142622053623199462890625
19	2014	جت	Alfalfa	كمية الإنتاج (طن)	Quantity of Production (Ton)	139885.5046349445474334061145782470703125
45	2014	مسيلو	Millet	كمية الإنتاج (طن)	Quantity of Production (Ton)	52499.019395399358472786843776702880859375
32	2014	رودس	Rhodegrass	كمية الإنتاج (طن)	Quantity of Production (Ton)	317366.084364970389287918806076049804687 5

Figure 4: Crop production, UAE. Value in tons from 2014-18
Source: (Bayanat. ae, 2018).

ACCESS

In terms of food accessibility, the UAE maintains stability in key areas such as economy, politics, and physical access. The UAE boasts a gross domestic product, or GDP, of about $400 billion as of 2019 (World Population Review, 2020), and a stable currency, in the UAE Dirham, which secures a stable purchasing power to acquire food. The average income of an individual working in the UAE can vary depending on their nature of work. A construction laborer will earn around the range of AED800 to AED2,000, a month while most office jobs can pay upwards of AED5,000. In terms of income of the population, a large majority work in the Construction industry, with it being the 2nd largest sector, only superseded by Trade and Repair services.

A meal for one in a local cafeteria would cost around AED15, while a meal at a fast-food to a casual restaurant would cost from about AED20-60 per person. Fruit, vegetables, and meat are much more reasonably priced compared to F&B outlets, a kilogram of apples can run you AED5 and a kilogram of beef would go for around AED20.

Physical food access in the UAE is greatly available, with restaurants, cafeterias, groceries, wholesale fruit and vegetable markets in mass numbers, scattered around the UAE. In a report conducted by Ardent Advisory in 2017, they stated that there are about 18,000 F&B outlets in the UAE as of 2015. Additionally, the UAE F&B market is estimated to be valued at $7.2 bn in 2015. Although, about 19.5% of the population falls under the poverty line, which is an area of concern with regards to food accessibility (Central Intelligence Agency, 2020).

Food access is further solidified by the diversity and variety of food delivery applications which help bridge the restaurants with the consumers in a seamless fashion. In a report conducted by KPMG in 2018, with regards to the Food and Beverage Industry in the UAE, 86% of 1,700 surveyed outlets are already listed on local food applications such as Zomato, Talabat, and Deliveroo. In terms of results, 68% of listed restaurants and F&B outlets, have had a positive response, stating that, "they see a reasonable volume of bookings and orders" (K., 2018).
Furthermore, the UAE has strong trade relations, an excellent road system, 12 commercial ports, and one of the most advanced airports in the world, which enables the food transportation and logistics operations aspect of accessibility, to run smoothly. In terms of climate, the UAE barely experiences any rainfall, therefore transportation obstructions due to climate concerns are few and far between.

FOOD UTILIZATION

Food utilization in the UAE is one of its strongest pillars as the country invests a great number of resources into ensuring that food in the UAE is safe, diverse, and healthy. In terms of Food Safety, the president of the UAE, passed Federal Law No.10 of 2015 on Food Safety, in January 2016 (UAE Government, 2020). The law states several rules regarding the assurance of food safety such as imposing hefty fines on the use of incorrect labels and false descriptions of food, dealing with pork and alcohol or their by-products without prior permission, and strict ruling which states that no food may be imported into the UAE without approval from designated government bodies, to name a few.

Additionally, the law also entails a section regarding the Trading of food and feed, which states that traded and imported food shall comply with technical regulations and must fall under mandatory standard specifications. It is also prohibited to trade in the feed that causes damage to humans' or animals' health. The Dubai Municipality conducts frequent control and inspection visits to Food & Beverage (F&B) outlets and food production plants ensuring that all the documentation is available and up to date which further ensures food safety and hygiene within the country.

Food diversity is also widely available in the UAE, largely due to the diverse population that resides and works in the country. It has become the culmination of a globally attuned F&B destination with the presence of international F&B cuisines and international supermarkets. Although the preference of cuisine is reflective of

the demographic as Arabic, Indian, and Italian are the top 3 most favored cuisines followed by Japanese and American food [5].
With regards to food utilization and the consumption of nutritious food, a study conducted by Sulaiman, N. et al, in 2017, showed that in a sample of 2724 individuals living in the UAE, 43% were overweight and 32.3% were obese (Sulaiman, Elbadawi, Hussein, Abusnana, Madani, Mairghani, ... & Shaw, 2017). Furthermore, an audit on the F&B industry, conducted by KPMG, stated that "UAE consumers generally appear to love burgers, pizzas, fried chicken, as well as sugar- and chocolate-based offerings [5]. However, increasing awareness about health has led some to reduce or give up meat, gluten, and milk products. Multiple operators indicated a noticeable increase in vegetarian and vegan options." To action on this, the UAE has taken several steps such as deploying the National Food Security Strategy, which will focus on the UAE population "having access to sufficient, safe and nutritious food for an active and healthy life at affordable prices at all times."

One of the strategy's key goals is to sustain food safety and improve nutritional intake through a target of -35% reduction in food safety incidents and -15% reduction in consumption of unhealthy food elements. Moreover, according to the Global Food Security Index, the UAE achieved an above-average score in "Dietary diversity" and a perfect score of 100 in the categories of "National dietary guidelines", "National nutritional plan or strategy", "Nutritional standards" and "Nutrition monitoring and surveillance" which exhibits the country's ideals and focus on achieving total food utilization.

STABILITY

Through its governmental institutions, the UAE has managed to, within the world political and economic context, achieve a great deal of stability in the 3 previous pillars that. The UAE is a small nation in a volatile area of the world, but despite that, it can maintain internal security, relative economic stability, and policies geared towards distributing nutritious whole at affordable prices to most of the working populations within the country. Furthermore, due to the political, economic, and social stability within the country, the UAE is considered an international trading port, wherein they can facilitate the import and export of goods. As seen in (Figure 5), it shows that India imports and exports about $30 million within the year 2019. Aside from India, the UAE also has solid trade relations with various other countries such as Japan, the USA, Switzerland, and Singapore.

UN Comtrade Database Extract data Data Availability Metadata Reference Knowledge base API portal

5. Preview (224 records)

Show 25 entries

Period	Trade Flow	Reporter	Partner	Commodity Code	Trade Value (US$)	Netweight (kg)	Qty Unit	Qty	Flag
2019	Import	India	United Arab Emirates	TOTAL	$30,308,878,832	0	No Quantity	0	4
2019	Export	India	United Arab Emirates	TOTAL	$29,539,357,727	0	No Quantity	0	4
2019	Import	Japan	United Arab Emirates	TOTAL	$26,194,240,356	0	No Quantity	0	4
2019	Export	USA	United Arab Emirates	TOTAL	$20,035,803,205	0	No Quantity	0	4
2019	Import	Switzerland	United Arab Emirates	TOTAL	$15,031,734,509	0	No Quantity	0	4
2019	Import	Singapore	United Arab Emirates	TOTAL	$11,519,321,439	0	No Quantity	0	4
2019	Export	United Kingdom	United Arab Emirates	TOTAL	$9,979,354,772	0	No Quantity	0	4
2019	Export	Germany	United Arab Emirates	TOTAL	$9,915,150,110	0	No Quantity	0	4
2019	Import	Rep. of Korea	United Arab Emirates	TOTAL	$8,991,147,424	0	No Quantity	0	4
2019	Export	China, Hong Kong SAR	United Arab Emirates	TOTAL	$8,104,076,134	0	No Quantity	0	4
2019	Export	Japan	United Arab Emirates	TOTAL	$7,179,390,217	0	No Quantity	0	4
2019	Import	Thailand	United Arab Emirates	TOTAL	$7,078,449,084	0	No Quantity	0	4
2019	Import	Pakistan	United Arab Emirates	TOTAL	$6,328,431,896	0	No Quantity	0	4
2019	Export	Italy	United Arab Emirates	TOTAL	$5,116,899,952	0	No Quantity	0	4
2019	Export	Viet Nam	United Arab Emirates	TOTAL	$4,785,303,281	0	No Quantity	0	4
2019	Import	USA	United Arab Emirates	TOTAL	$4,569,353,642	0	No Quantity	0	4
2019	Import	China, Hong Kong SAR	United Arab Emirates	TOTAL	$4,453,041,795	0	No Quantity	0	4
2019	Import	Turkey	United Arab Emirates	TOTAL	$4,388,996,383	0	No Quantity	0	0
2019	Export	Singapore	United Arab Emirates	TOTAL	$4,057,755,365	0	No Quantity	0	4
2019	Export	Switzerland	United Arab Emirates	TOTAL	$3,748,612,716	0	No Quantity	0	4
2019	Import	Malaysia	United Arab Emirates	TOTAL	$3,724,422,664	0	No Quantity	0	4
2019	Export	France	United Arab Emirates	TOTAL	$3,669,633,176	0	No Quantity	0	4
2019	Export	Turkey	United Arab Emirates	TOTAL	$3,627,297,968	0	No Quantity	0	4
2019	Export	Rep. of Korea	United Arab Emirates	TOTAL	$3,469,771,904	0	No Quantity	0	4
2019	Re-Export	USA	United Arab Emirates	TOTAL	$3,375,780,879	0	No Quantity	0	0

Figure 5: UN Comtrade Database, highlighting imports and exports within UAE in 2019.

Source: (COMTRADE, 2020).

IMPACT OF COVID-19 ON FOOD SECURITY IN UAE

The impact of COVID-19 in the UAE amounts to, as of August 25th, 2020, 0.7% of the population being infected with COVID-19, which is approximately 67,282 cases out of 9.6 million people. Furthermore, the UAE has streamlined its COVID-19 testing within medical facilities all around the country, pop-up centers in malls, as well as drive-throughout COVID-19 test facilities. This has resulted in over 6.5 million tests conducted within the UAE which amounts to a staggering 662,164 tests per 1 million population, placing the UAE at rank 6 in terms of testing. On a positive note, the UAE has accounted for 58,582 recoveries while the currently active cases are at 8,324, with the death toll reaching 376 deaths Worldometer, 2020).

COVID-19 has led to a nationwide lockdown and the implementation of curfews wherein movement within the country was limited to medical professionals and necessary workers. Permits were required by anyone who wished to leave their homes and not wearing masks has become a punishable offense. Work from home became the new normal and various major international events such as the Dubai Expo 2020 scheduled for October and the Dubai World Cup 2020 scheduled for the end of March, had to be postponed. The UAE also imposed a travel ban heavily restricting movement in and out of the country unless permitted by the government.

As of August 27th, 2020, the lockdowns have been lifted and eased with most of the population going back to work, although new cases remain, and they hover around 200-400 per day (Figure 6).

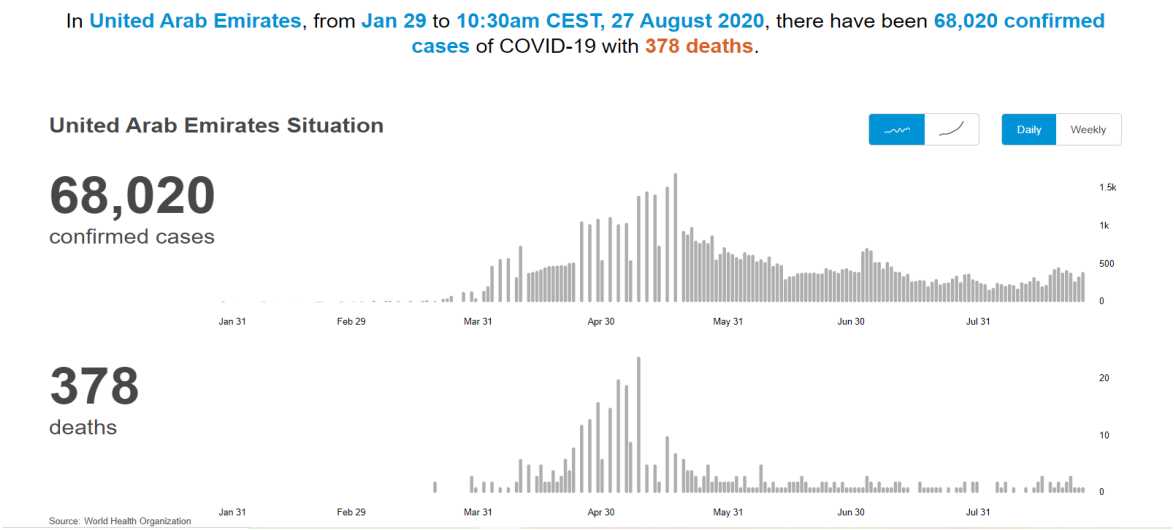

Figure 6: A status update of COVID-19 in UAE, as of August 27th, 2020.

Source: (WHO, 2020).

In terms of Food Security, the UAE imports 90% of its food, and due to the travel bans and flight restrictions the country has been forced to look inwards. Despite the challenges with exporting and importing food due to disrupted supply chains, the UAE has not experienced any food shortages, the UAE has managed to maintain stability in terms of food access and availability due to expert management of food resources within the country. "I'd like to reassure every citizen and resident of the UAE that our Country is infinitely able to supply everyone with all the food and medicine they could ever need. We are well prepared to face any challenge that arises," the Crown Prince of the UAE, Sheikh Mohammed Bin Zayed Al Nahyan, stated during a press release during the early onset of COVID 19 in mid-March (Al Arabiya English, 2020). The statement stays true 5 months later, as the UAE has not experienced any food shortages within the span of the lockdowns due to the pandemic. According to the Dubai Food Security Committee, Dubai "has a year's worth of essential food supplies, including enough wheat and rice to last eight months."

On the other hand, the main issue in terms of Food Security is economical access. Due to the lockdowns, movement restrictions, and lack of business on a national and an international level, a majority of workplaces have let go of staff or have them under a No Work, No Pay basis which leads to several employees and residents that have struggled to put food on the table daily. In an article written by the International Labor Organization, it has stated that one in six young people have stopped working due to the onset of COVID-19 (Emirates News Agency, 2020). Additionally, on average, employees have seen their work hours cut by 23%. According to TradingEconomics.com, the unemployment rate in the UAE is

forecasted to rise from 2.64% to 2.8% by 2021, in light of the pandemic (Trading Economics, 2020). Moreover, in a study conducted by Oxford Economics, the UAE could lose 900,000 jobs and see 10% of its residents uproot due to the coronavirus pandemic (ThePrint, 2020), which is an astonishing number because the UAE is home to 9.6 million people.

Reports state that a long-haul carrier company group are reducing their workforce, upwards to 30,000 jobs. Additionally, it is forecasted that the Dubai hotel industry is expected to cut its staff by up to 30%. A myriad of companies has reduced pay indefinitely and a popular ride-hailing service has reduced their staff by nearly a third.

In the industry of Food and Beverage outlets, about 50% of the 11,000 registered firms in Dubai, are expected to close as landlords refuse to implement any sort of payment waivers. In the article by ArabNews.com, they stated that most of these small businesses do not have enough cash flow to keep the operation running and to cover the overhead costs (Arabnews, 2020).
With regards to Food Security, the global pandemic has pushed the UAE into investing and focusing more on local production of food resources. The country only grows and produces 10% of its food requirements locally. In a statement made by the Vice President and Ruler of Dubai, Sheikh Mohammed bin Rashid al Maktoum he highlighted during a meeting with the Minister of State for Food Security, Mariam Al Mheiri, that the country must make its food and water security strategy a top priority (The National UAE, 2020). Furthermore, he emphasized the idea of the UAE being self-sustainable and properly managing and protecting its resources will be key in the country's development, in the post-pandemic age.

THE UAE'S INTERVENTIONS TO ADDRESS COVID IMPACT ON FOOD SECURITY

Despite the global challenges on food transportation, availability, and access - the UAE has continued to persevere due to its preparation and sufficient food reserves to serve the needs of the community. Various interventions have been taking place all over the country, such as the prioritization of increasing local food production to ensure food security moving into the post-pandemic stage.

In a report by The National UAE, officials stated that local food production to triple essential food production and air cargo has ramped up to compensate for the global shipping restrictions on food - where 110 cargo flights from 12 airlines were operating daily to compensate for the global food shipping restrictions. Furthermore, the Emirates Food Security Council announced measures to increase local essential food production by 15% by 2021 (The National UAE, 2020).

A successful supplementary effort from the emirate of Sharjah brought about a harvest of 1,700 kilograms of rice in May. In a collaboration with South Korea's Rural Development Administration, they were able to plant and harvest, Asemi rice, which was able to withstand the heat and saline soil, which is a step in the right

direction (Tesorero, A. 2020). Aside from increasing local production, the UAE's former Minister of Climate Change and Environment, Thani Ahmed Al-Zeyoudi, stated that the UAE is also strengthening their international agreements, international alliances and ensuring that they are stronger than ever before. The UAE is also said to own farms in over 60 countries worldwide, which should be bolstered and expanded to meet food security assurance in the future of the UAE.

Furthermore, an initiative called the Food Security Dashboard has been launched, it is a dashboard developed by a local government team that is capable of utilizing data analytics and artificial intelligence to instantaneously measure five important food security indicators: stock availability, local production, consumption levels, the supply index and cost of vital commodities in the emirate. Using this data, the committee can create proactive risk and emergency management plans and prepare studies and forecasts to find out which areas in food security are facing the most stress and which areas would require action. The dashboard is supported by the Dubai Port, Customs and Free Zone Corporation, Dubai Economy, and Dubai Chamber of Commerce and Industry. Dubai Customs supports the initiative by providing accurate statistics and data on the trade of food commodities and materials through a messenger system. An example of such data retrieved from Dubai Customs is that Dubai has officially registered "AED11 billion, or 2.87 million tons" worth of foreign trade related to the food supply in Q1 of 2020 (Khaleej Times, 2020).

In an article published by the Oxford Business Group, it stated that a Kuwaiti company, Wafra International Investment Company has invested $100 million into a start-up company called Pure Harvest, located in Abu Dhabi which is single-handedly the largest-ever commitment to an Agri-tech firm in the Middle East (FastCompany, 2020). Pure Harvest plans to implement 'high-tech, climate-controlled greenhouses that use natural sunlight to produce pesticide-free fruit and vegetables. Moreover, a fellow Emirati company, called Smart Acres, is also expected to bring about a series of 'high-tech vertical farms' within the UAE in Q3 of 2020. Smart Acres will utilize vertical farming techniques and practices which use Agri-tech to monitor humidity, temperature, and nutrients - they are also expected to yield 8 tons of lettuce per cycle whilst only requiring 90% less water than traditional farming techniques.

In addition, the lockdown revealed that the UAE has to focus on its own water and land resources for food production despite the low quality. The desert lands and freshwater resources have deteriorated over the years in the United Arab Emirates, significantly decreasing the production of vegetables in the country. The International Center for Biosaline Agriculture (ICBA - https://www.biosaline.org/) is focusing on developing sustainable, climate-resilient farming schemes using saline water resources and degraded lands such as salinized areas. Several national and international projects have been implemented since ICBA's establishment in 1999 focusing on bringing into production deteriorated areas boosting the food, nutrition, and livelihood security of the local households. One of the projects is

focusing on the use of the reject brine from desalination, which constitutes an environmental hazard, to grow fish and salt-loving plants, the so-called halophytes. Approximately 15% of the farmers in UAE are installing small-scale desalination units to desalinate the brackish groundwater and to produce good quality water for their cultivation. However, they dispose of the reject brine in the soil, a practice that aggravates the problem with the salinity of the underground water reservoirs.

The reject brine a by-product from desalination can be utilized through modular farming systems to grow fish and the aquaculture effluents enriched in nutrients are used for halophytes (salt-loving plants) irrigation. In addition, the potential of using seawater and water from fish farming for halophytes production is also explored in a coastal desert area in Umm Al Quwain. The goal of the project is to bring into production degraded or barren lands with economic benefits for the local communities. The project helps in developing and optimizing the inland and coastal multi-component farms using marginal saline water resources to grow unconventional crops to enhance food, nutrition, and income security of rural communities that are struggling to produce in hot and dry environments like UAE (Lyra, D. A., Dr., 2020).

Although the UAE cannot entirely depend on halophyte-based products to strengthen its food security, however, these parallel food sources can complement the local dietary needs in times of crisis. In an effort entitled, "EXPO LIVE (Phase II)", spearheaded by the International Centre for Biosaline Agriculture, or ICBA, and lead by Dr. Dionysia Lyra, they have put halophytic plants at the forefront and have found that halophytic plants such as Salicornia bigelovii, can be irrigated with saline water sources and can be grown on poor soils. This specific plant is a viable food source, for both human and animal consumption, and it can also be utilized in biofuel production. Although the current challenge is finding a demand for the product and its lack of a value chain, it can be solved by promoting and creating awareness of the plants' health benefits, to encourage growth in demand from growers and consumers, which will integrate the product into the market and complement local dietary needs (Lyra, D. A., Dr., 2020).

THE UAE IN COMPARISON TO OTHER COUNTRIES

The UAE is a rich country wherein the native population of Emiratis is a minority, comprising 11.5% of the total population. The lion's share of the population being comprised of foreign workers. With a per capita GDP of around 43,100 (USD), it is one of the wealthiest nations relative to its population size. The UAE has a highly financialized economy and a neo-liberal approach to capitalism. This model of economic structuring is comparable to Singapore. A very wealthy island nation with a high per capita GDP (65,200 USD) (The World Bank, 2020).

Similarly, Singapore has a high percentage of foreign workers composing approximately 40% of the population of the nation (WaybackMachine, 2014). Singapore's neo-liberal economy is talent-driven and therefore multiracial making it quite similar to the UAE. Singapore has achieved a very high spot on the list of nations with the best food security initiatives, frequently topping the list.

Singapore, much like the UAE, imports 90% of its food and through a rigorous campaign to approach the issue of food security holistically has achieved a system that is the envy of many of the world's nations. Singapore's food security roadmap

consists of 3 broad categories: core strategies, supporting strategies, enabling strategies. The core strategies, which are the most important pillars of the roadmap, include investment abroad, stockpiling, diversification of import sources, and local production. The supporting strategies include research and development, food waste reduction, and the strengthening of infrastructure. Finally, the enabling strategies which make all these strategies possible are cross-governmental coordination, emergency planning, internal communication, market monitoring, and a fiscal/legal/regulatory framework (AVA, n.d.).

In 2012 Singapore's government set up an inter-ministry committee on food security that was tasked with coordinating between government agencies specifically for the aim of increasing food security through the aforementioned means. Concurrently, Singapore has 160 importing countries to supplement its food requirements. Such a high number of candidate countries is important for a quick substitution in the case of the inaccessibility of a country as a source for some reason.

A more relevant comparison, due to similar resource and climate conditions, is Qatar. Qatar is a small nation on the west banks of the Arabian Gulf whose border is separated by a few kilometers of Saudi Arabian land from that of the UAE. Qatar is rich in natural gas and has a small population of citizens which is outnumbered by a foreign workforce several times larger than its citizenry. Qatar does well on the food security index ranking system and that is due to a comprehensive approach to holistically reinforce its food security and mitigate any possible risks from a precarious world food market, though a series of strategic partnerships established with international partners, a keenness for reducing the time between production and consumption (the State of Qatar, 2020.

CONCLUSION

Although the UAE possesses enough food stores to provide food to the community for a year, the area of food security is highly complex and multi-disciplinary. It seems that a few principles if abided by, could aid in a country's efforts in securing its food requirements. Increasing local food production, further investing in the Agri-tech sector, increasing local food storage capacity, diversification of international partners and acquisition of international agricultural lands from which to export food from and dealing with food wastage will help the UAE bolster its strength in terms of food security and stabilizing food resources for the community.

Moreover, the fate of the UAE and its weathering of the COVID-19 storm depends heavily on the resilience of the heretofore durable supply lines on which it has relied on. Luckily, the agricultural sector through labor-intensive is highly mechanized and automated in most phases of production and therefore does not expose the laborer in the field to excessive threats. The caveat being, however, that there are bottlenecks in which the production labor is required and dangerous in the context of a highly infectious airborne pandemic. The UAE, therefore, is precarious in terms of food security. Its precarity is a result of a highly possible worsening of the virus. If the COVID-19 virus imitates the Spanish Flu model (meaning a less infectious but much more virulent strain) then there will be a high more inhibitory death toll that will translate into a less-willing-to-risk-its-life workforce.

Such conditions can be mitigated by increasing food stockpiles, but most foods cannot be stockpiled, save for grains and rice. With the entrance of a new vaccine into the world market it is possible that a second wave or worsening of conditions can be avoided.

REFERENCES

Al Arabiya English. (2020, March 17). Abu Dhabi Crown Prince: Food, medicine supply 'infinite' in UAE amid coronavirus. Retrieved 2020, from https://english.alarabiya.net/en/News/gulf/2020/03/17/UAE-Crown-Prince-Food-medicine-supply-infinite-amid-coronavirus-

Arabian Business Community. (2015, November 13). Al Dahra aims to open UAE's Fujairah grain silos by Jan. Retrieved August 27, 2020, from http://www.tradearabia.com/news/MISC_294591.html

Arabnews. (2020, May 8). Coronavirus crisis spoils UAE food and beverage sector's outlook. Retrieved 2020, from https://www.arabnews.com/node/1671506/business-economy

AVA, A. (n.d.). Singapore's Food Security. Retrieved September 06, 2020, from https://agrifood.net/images/cfs43/CFS43 Side-event background document - Lessons from Singapore.pdf

Bayanat .ae. (2018). Crop Production Quantity UAE. Retrieved August 27, 2020, from http://data.bayanat.ae/en_GB/dataset/crop-area-production-quantity-and-value-of-field-crops-by-crop/resource/16d80237-35bb-4220-8732-f3b0a87aa2f2

Central Intelligence Agency. (2020). Middle East: UNITED ARAB EMIRATES. Retrieved 2020, from https://www.cia.gov/library/publications/the-world-factbook/geos/ae.html

COMTRADE. (2020). UN Comtrade Database. Retrieved August 27, 2020, from https://comtrade.un.org/data/

Emirates News Agency. (2020, May 31). UAE Press: COVID-19 youth job losses cause for worry. Retrieved August 27, 2020, from https://wam.ae/en/details/1395302845406

FAOSTAT. (2020). Food and Agriculture Organization of the United Nations. Retrieved August 27, 2020, from http://www.fao.org/faostat/en/#data/QC/visualize

FastCompany. (2020, April 9). Abu Dhabi is investing $100 million in indoor farming as it tries to become more resilient. Retrieved August 27, 2020, from https://www.fastcompany.com/90485666/the-united-arab-emirates-is-100-million-in-indoor-farming-as-it-tries-to-become-more-resilient

GFSI. (2020). Global Food Security Index. Retrieved August 27, 2020, from https://foodsecurityindex.eiu.com/Index

Gulf News. (2019, March 28). UAE-India food security alliance planned. Retrieved August 27, 2020, from https://gulfnews.com/uae/government/uae-india-food-security-alliance-planned-1.1553792695628

Hamza, M. (2019, April 18). 2019 UAE Wheat, Corn, Ric,e and Barley Report. Retrieved August 27, 2020, from

https://apps.fas.usda.gov/newgainapi/api/report/downloadreportbyfilename?filename=Grain and Feed Annual_Dubai_United Arab Emirates_4-18-2019.pdf

K. (2018). UAE 2018 Food & Beverage report. Retrieved August 27, 2020, from https://assets.kpmg/content/dam/kpmg/ae/pdf/food-beverage-2018.pdf

Khaleej Times. (2020, June 25). Dubai launches Food Security Dashboard. Retrieved August 27, 2020, from https://www.khaleejtimes.com/news/government/dubai-launches-food-security-dashboard

Lyra, D. A., Dr. (2020). EXPO LIVE project Phase II: "From desert farm to fork: Value chain development for innovative halophyte-based food products". Retrieved September 06, 2020, from https://www.biosaline.org/projects/expo-live-project-phase-ii-desert-farm-fork-value-chain-development-innovative-halophyte

Lyra, D. A., Dr. (2020). Inland and coastal modular farms for climate change adaptation in desert environments. Retrieved September 06, 2020, from https://www.biosaline.org/projects/inland-and-coastal-modular-farms-climate-change-adaptation-desert-environments

SlidePlayer. (2012, February 20). Food Security Fundamentals. Retrieved August 27, 2020, from https://slideplayer.com/slide/3971846The statete of Qatar. (2020, January). Qatar National Food Security Strategy. Retrieved September 06, 2020, from http://www.mme.gov.qa/pdocs/cview?siteID=2&docID=19772&year=2020

Sulaiman, N., Elbadawi, S., Hussein, A., Abusnana, S., Madani, A., Mairghani, M., ... & Shaw, J. (2017). Prevalence of overweight and obesitthe y in United Arab Emirates Expatriates: the UAE national diabetes and lifestyle study. Diabetology & metabolic syndrome, 9(1), 88.

Swaminathan, M.S. (1996). Sustainable agriculture: towards food security.

Tesorero, A. (2020, June 3). UAE grows its own rice in game-changing sustainability project. Retrieved September 06, 2020, from https://gulfnews.com/uae/environment/uae-grows-its-own-rice-in-game-changing-sustainability-project-1.71846205

The National UAE. (2020, August 23). Coronavirus: Sheikh Mohammed says Covid-19 challenge highlights need to make food and water security a top priority. Retrieved 2020, from https://www.thenational.ae/uae/government/coronavirus-sheikh-mohammed-says-covid-19-challenge-highlights-need-to-make-food-and-water-security-a-top-priority-1.1067316

The National UAE. (2020, May 19). Coronavirus: UAE steps up local production and trade partnerships amid outbreak. Retrieved August 27, 2020, from https://www.thenational.ae/uae/government/coronavirus-uae-steps-up-local-production-and-trade-partnerships-amid-outbreak-1.1021488

The World Bank. (2020). GDP per capita - United Arab Emirates, Singapore. Retrieved August 27, 2020, from

https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?end=2019&locations=AE-SG&start=2015

ThePrint. (2020, June 10). Why expats leaving Dubai is bad news for the economy. Retrieved 2020, from https://theprint.in/world/why-expats-leaving-dubai-is-bad-news-for-the-economy/439352/

Trading Economics. (2020). United Arab Emirates - Economic Forecasts - 2020-2022 Outlook. Retrieved August 27, 2020, from https://tradingeconomics.com/united-arab-emirates/forecast

UAE Government. (2020). Federal law on food safety. Retrieved August 27, 2020, from https://u.ae/en/information-and-services/health-and-fitness/food-safety-and-health-tips/federal-law-on-food-safety

UN, U. (2019). World Population Prospects - Population Division. Retrieved August 27, 2020, from https://population.un.org/wpp/Graphs/DemographicProfiles/Line/784

United Arab Emirates: Introduction. (2020). Retrieved August 27, 2020, from https://globaledge.msu.edu/countries/united-arab-emirates

WaybackMachine. (2014). 2014 Population In Brief. Retrieved August 27, 2020, from https://web.archive.org/web/20141211034148/http://www.nptd.gov.sg/portals/0/homepage/highlights/population-in-brief-2014.pdf

WHO. (2020). World Health Organization - UAE Situation COVID-19. Retrieved August 27, 2020, from https://covid19.who.int/region/emro/country/ae

World Population Review, W. (2020). GDP Ranked by Country 2020. Retrieved August 27, 2020, from https://worldpopulationreview.com/countries/countries-by-gdp

Worldometer. (2020). COVID-19 Coronavirus Pandemic. Retrieved 2020, from https://www.worldometers.info/coronavirus/?utm_campaign=homeAdvegas1?#countries