ROAD TO **EXPO 2020**

AGRITECH OPPORTUNITIES IN THE UNITED ARAB EMIRATES

NEW ZEALAND
TRADE & ENTERPRISE
Te Taurapa Tūhono

TABLE OF CONTENTS

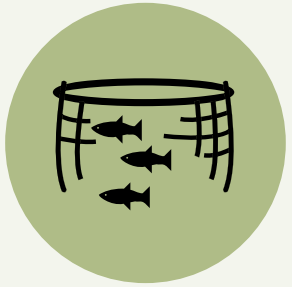
EXECUTIVE SUMMARY

THE OPPORTUNITY FOR NEW ZEALAND COMPANIES IS A USD 51 MILLION AGRITECH MARKET FORECAST TO GROW AT 15.7% CAGR

UAE's agriculture has traditionally been constrained by its challenging agroclimatic conditions.

Renewed focus on food security and a goal to be most food secure nation in the world has spurned funding and expansion of agriculture production.

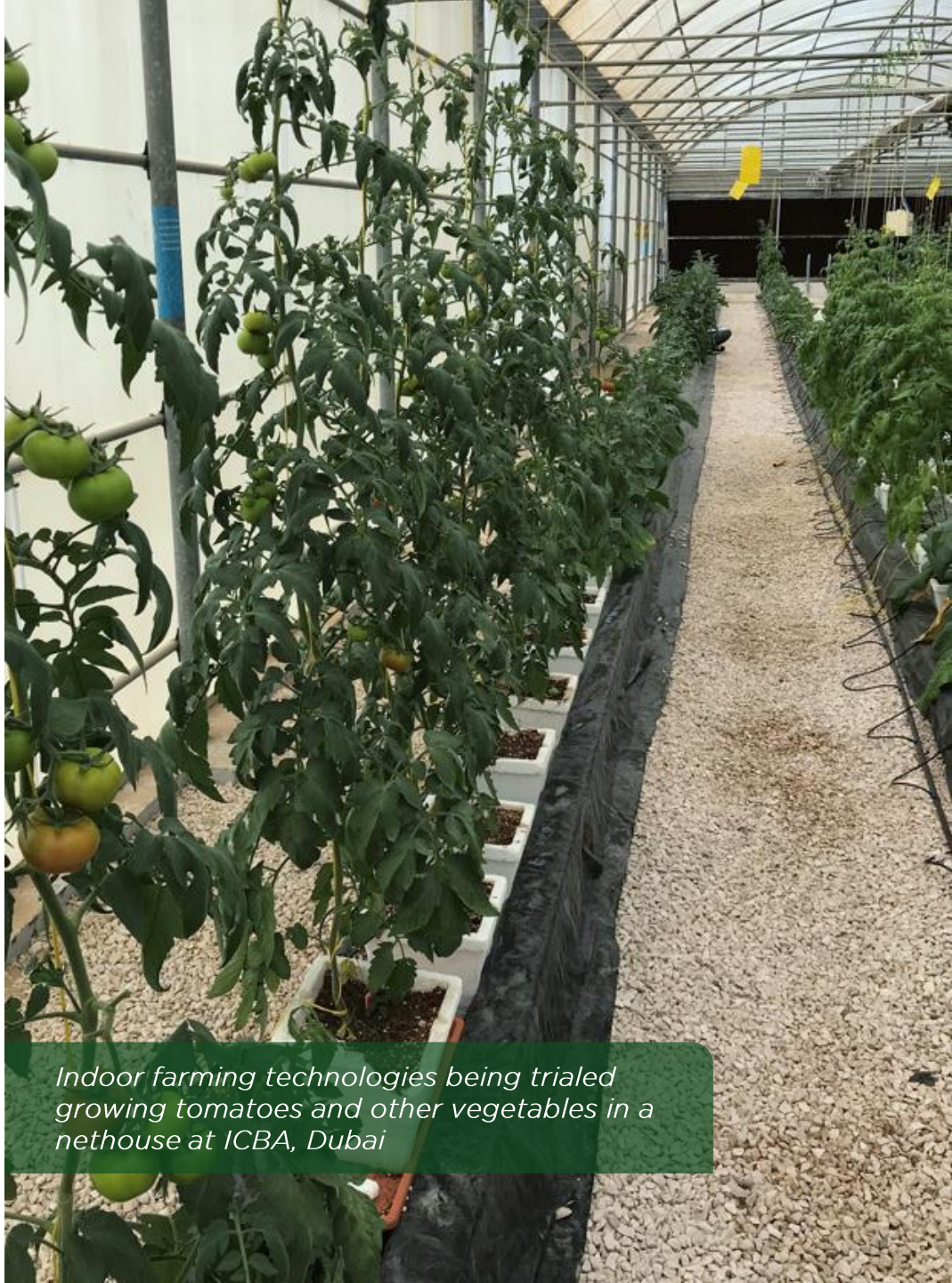
Agritech innovations offer opportunities to overcome environmental challenges.



New investment moving toward Climate Controlled Agriculture, and Intensive Aquaculture.

KEY TRENDS

- Despite increased production food, imports continue to rise.
- Horticultural production is diversifying in response to changing consumer preferences and technological adaptions.
- Reduction in open field crop production due to sustainability concerns.
- UAE Government actively incentivizing new investment into agritech focus areas.
- Increase in controlled environment agriculture systems for vegetable and fruit production.
- Aquaculture production targeted as major investment area.

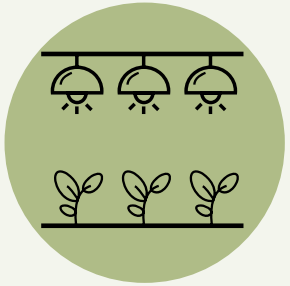


Indoor farming technologies being trialed growing tomatoes and other vegetables in a nethouse at ICBA, Dubai

EMERGING OPPORTUNITIES

Plant and Animal Genetics:
- Heat and drought resistant plants
- High yielding crops
- Heat tolerant livestock

High Efficiency Irrigation:
- Variable rate applicators
- Localized monitoring
- Irrigation mapping software



Controlled Environment Agriculture:
- Nutrient sensors and applicators
- Energy efficient lighting
- Energy efficient cooling

Intelligent Crop Monitoring:
- Drones and machine vision
- Crop management software
- Farm layout mapping

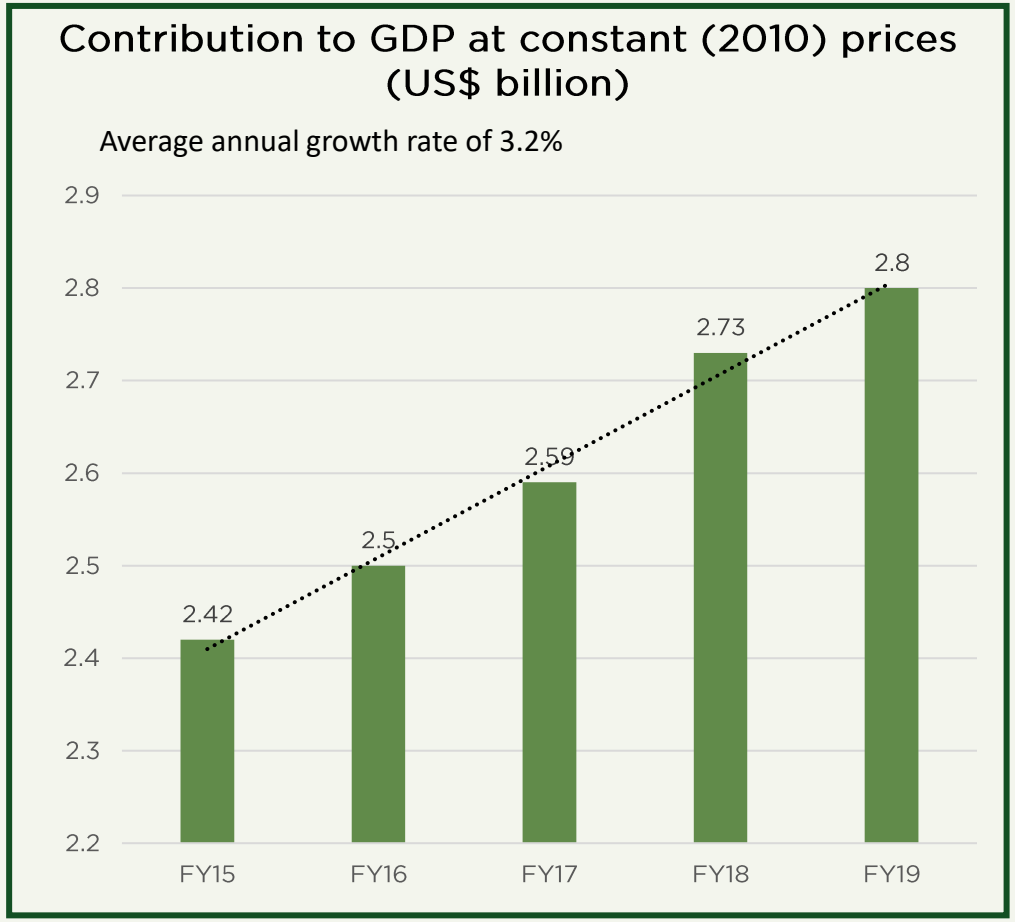
Aquaculture:
- Climatic sensors
- Cost effective and efficient feeding solutions
- Data management applications

Automation:
- Sowing, management & harvesting
- Harvesting
- Individual animal management

OVERVIEW OF AGRICULTURE IN THE UNITED ARAB EMIRATES

WHAT AGRICULTURE MEANS TO THE UNITED ARAB EMIRATES ECONOMY

- The UAE is located in an arid zone, where desert environment accounts for more than three quarters of the country's total area.
- Its environment is characterized by low rainfall, high temperatures, poor soil and lack of natural waterways, all of which have a clear impact on the country's agricultural sector.
- Fertile land is at a premium and is high-risk for overuse and nutrient depletion.
- To irrigate crops, the country is dependent on costly desalination. **Of what water the UAE does produce – 66% of it is used for agricultural purposes.**
- Repeated irrigation increases the salinity of groundwater, often to the point where it is no longer suitable for farming.
- Despite these environmental challenges, the government has **prioritized agricultural production in an effort to contribute to food diversity and food security for its citizens and residence.**
- Due to the support of innovative new technologies, agriculture strong contributor to UAE economy.



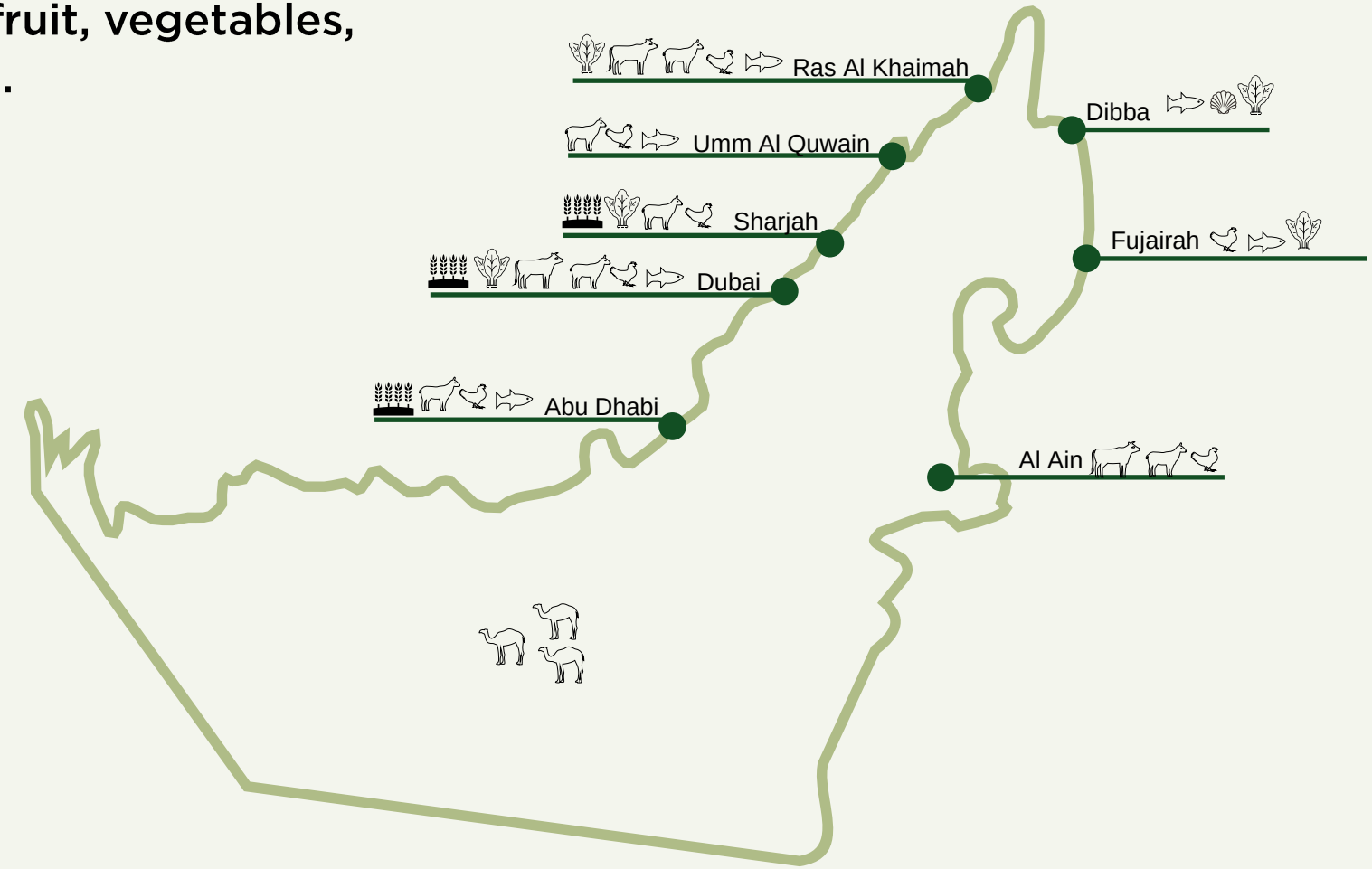
Source: Federal Competitiveness and Statistics Centre, UAE.

THE UAE'S AGRICULTURAL LANDSCAPE IS INCREASINGLY DIVERSE

Agricultural production includes fruit, vegetables, dairy, poultry and fish production.

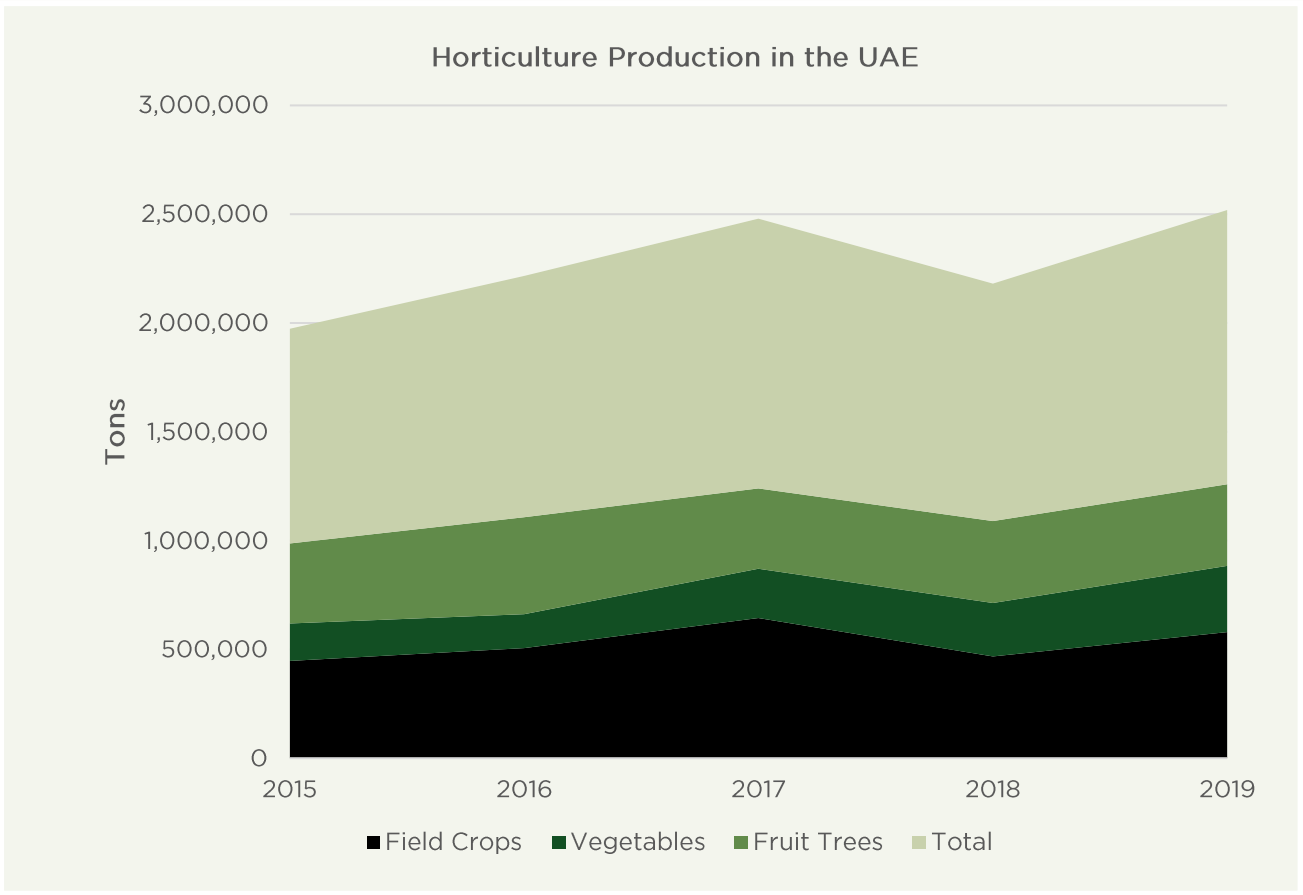
The geographic distribution of production takes into account climatic variations across the country:

- Field crops and vegetables are grown predominately in the northern emirates where the Hajar mountain range provides relief from the desert.
- Milk production is greatest inland at Al Ain where humidity is lower.
- Vertical farms for vegetable production are focused in Abu Dhabi, Dubai and Sharjah where the urban population is highest.
- Fish capture occurs off both coasts and intensive fish farming operations are underway in Fujairah, Dibba, Umm Al Quwain and Dubai.
- Shellfish (Oysters) are being produced in Dibba, where the ocean currents provide a particularly nutrient rich environment
- Poultry production takes place across the country.



HORTICULTURAL PRODUCTION IS ON THE RISE

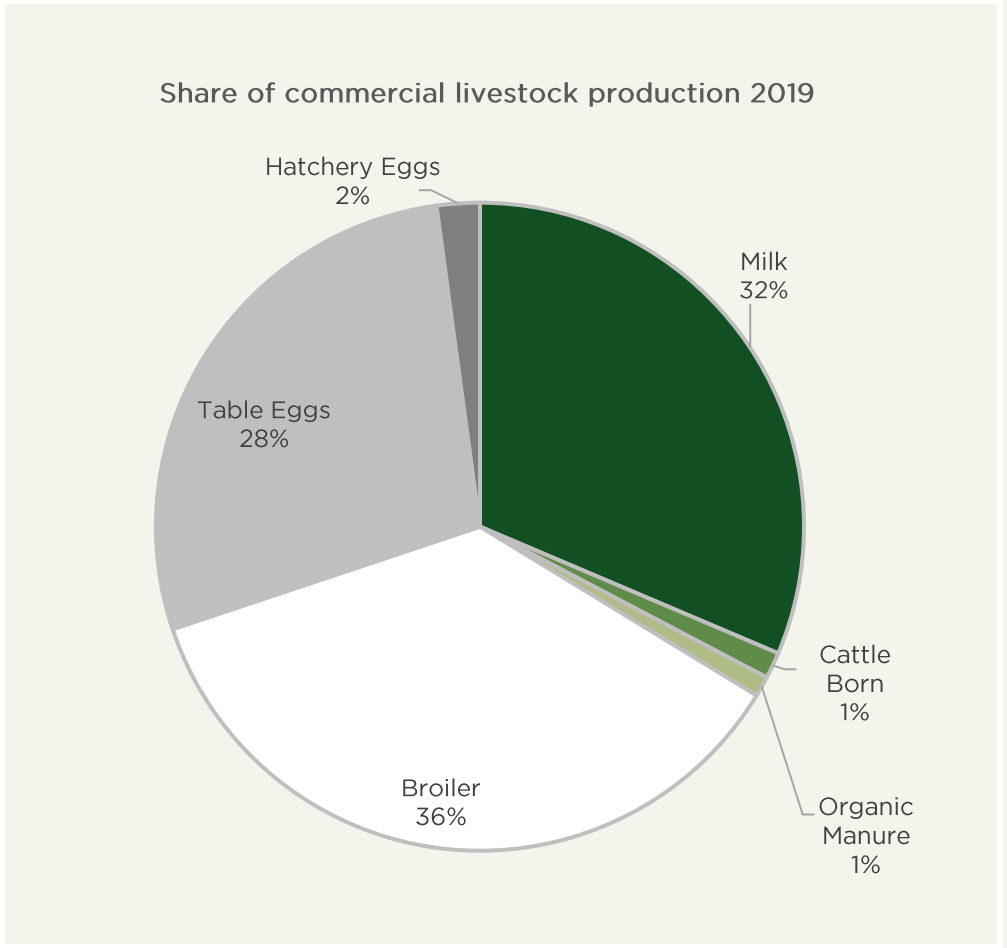
- Vegetable production has increased 76% over the last four years driven by an expansion of greenhouses and controlled environment agriculture.
- Fruit production is stable and is the second largest horticulture segment.
- Field crops have increased 29% over the same period as the government continues to provide support to the UAE's livestock sector.



Source: Federal Competitiveness and Statistics Centre, UAE.

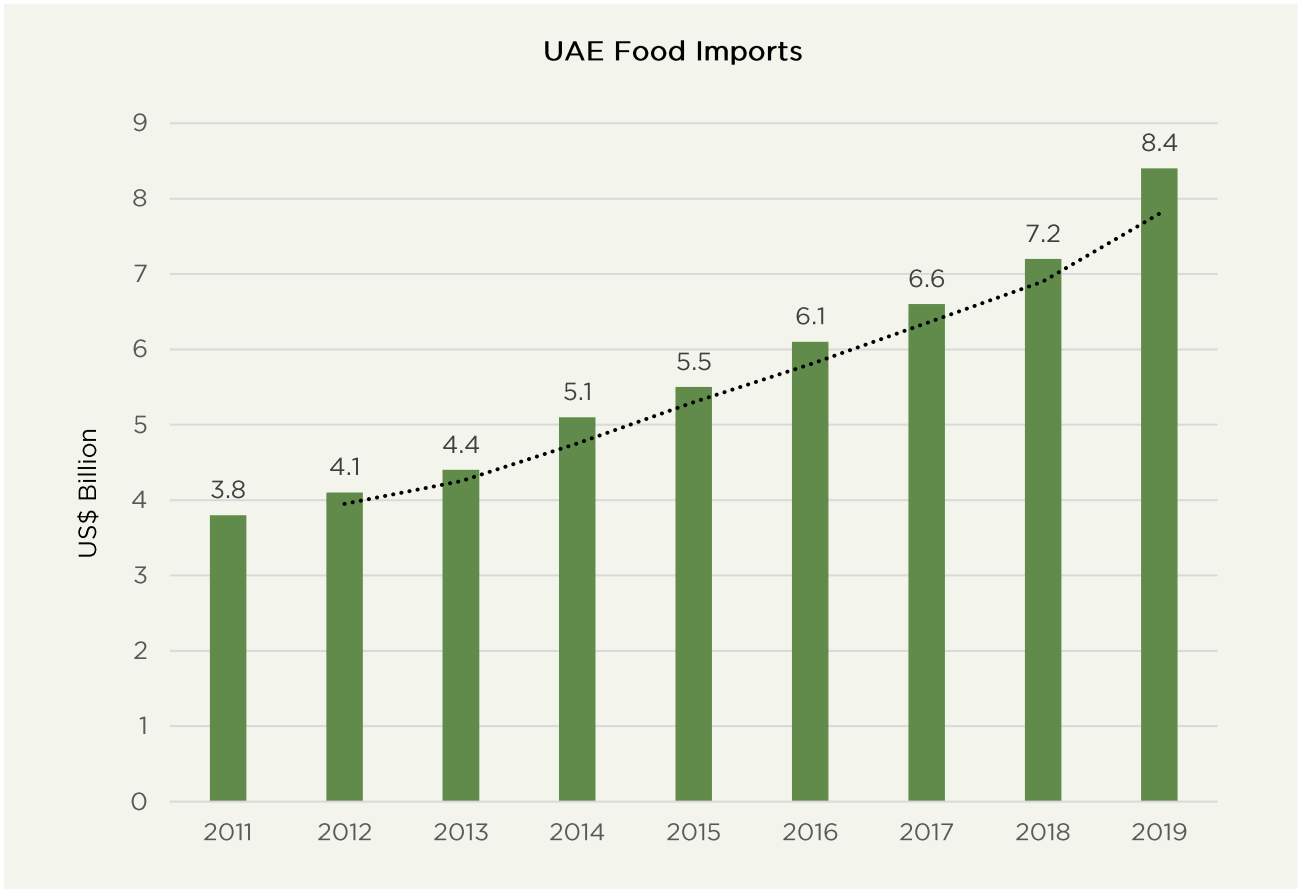
LIVESTOCK PRODUCTION IS FOCUSED ON DAIRY MILK, BROILER MEAT AND TABLE EGGS

- Livestock rearing occupies an important part of traditional Emirati culture.
- A reliance of imported fodder and climate-controlled environments for livestock productions has limited commercial livestock production to three main products – dairy milk, broiler meat and table eggs.
- Both industries face significant pressure on prices due to lower cost of imported products. •High feed costs and animal health issues are major challenges for the sector.
- The majority of red meat farms are small livestock holdings. There are only 4-5 farms with over 5,000 heads. However, two farms have over 20,000 heads.
- Livestock imports, fattening and slaughter are an important segment of the red meat market with over 1.6 million heads imported annually.



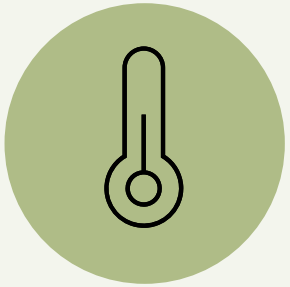
DESPITE INCREASED AGRICULTURAL OUTPUT, FOOD IMPORTS CONTINUE TO RISE

- After remaining relatively stable between 2008 and 2011, the value of food imports has risen steeply to US$8.4 billion in 2020 highlighting the need for renewed focus on improving agricultural production and food security strategies.
- With population growth of 1-2% annually forecast food imports are likely to continue increasing.
- Further investment is therefore required if the UAE is to offset food demand.



Source: Federal Competitiveness and Statistics Centre, UAE

KEY CHALLENGES OFFER OPPORTUNITIES FOR TECHNOLOGY LED INTERVENTIONS TO DISRUPT THE MARKET



Difficult to product food domestically:

- Only 0.5% of the land mass is arable.
- Soil is sandy and requires additives to cultivate produce.
- Extreme heat limits the capacity to cultivate and store produce.

Water Scarcity:

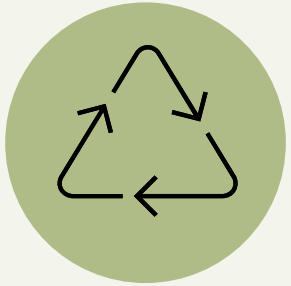
- The country receives very minimal rainfall and is dependent on desalination.
- The cost of water for agricultural production is currently being subsidized and is very costly.
- 66% of all water being used for agriculture.

Dependent on food imports:

- The UAE imports 90% of its food
- Sensitive to price fluctuations such as in 2008 and 2020

Growing population:

- The UAE has experienced substantial population growth over the last 30 years.
- UAE population forecast to reach 15 million in the next 20 years.



High levels of food waste throughout the supply chain:

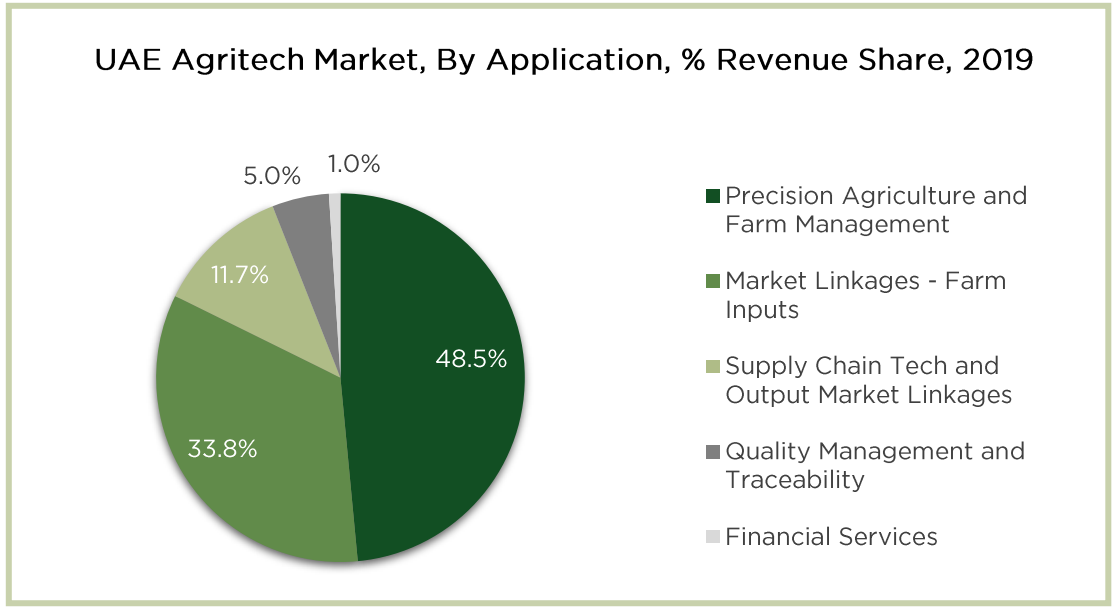
- Inefficient supply chain with gaps at all stages
- Historic overconsumption
- Little recycling of organics

Underdeveloped Agri-education ecosystem:

- Majority of farm workers are foreign workers with little agricultural experience
- Minimal agricultural extension services
- No agricultural trade training institution.

AGRITECH IN THE MIDDLE EAST WHERE DO WE STAND?

UAE AGRITECH MARKET BY APPLICATION



- Market share by application is expected to largely remain the same over the next seven years.
- Forecast from 2019 to 2027 will remain the same and wouldn't change drastically.

A new hydroponic system being installed in a greenhouse at ICBA, Dubai.

A SUPPORTIVE - GOVERNMENT LED ECOSYSTEM

Vision: To be most food secure nation in the world by 2051

POLICY

Federal Level

- Ministry of Food and Water Security
- Ministry of Climate Chane and Environment

Emirate Level

- Abu Dhabi Food Control Authority
- Municipalities

FUNDING

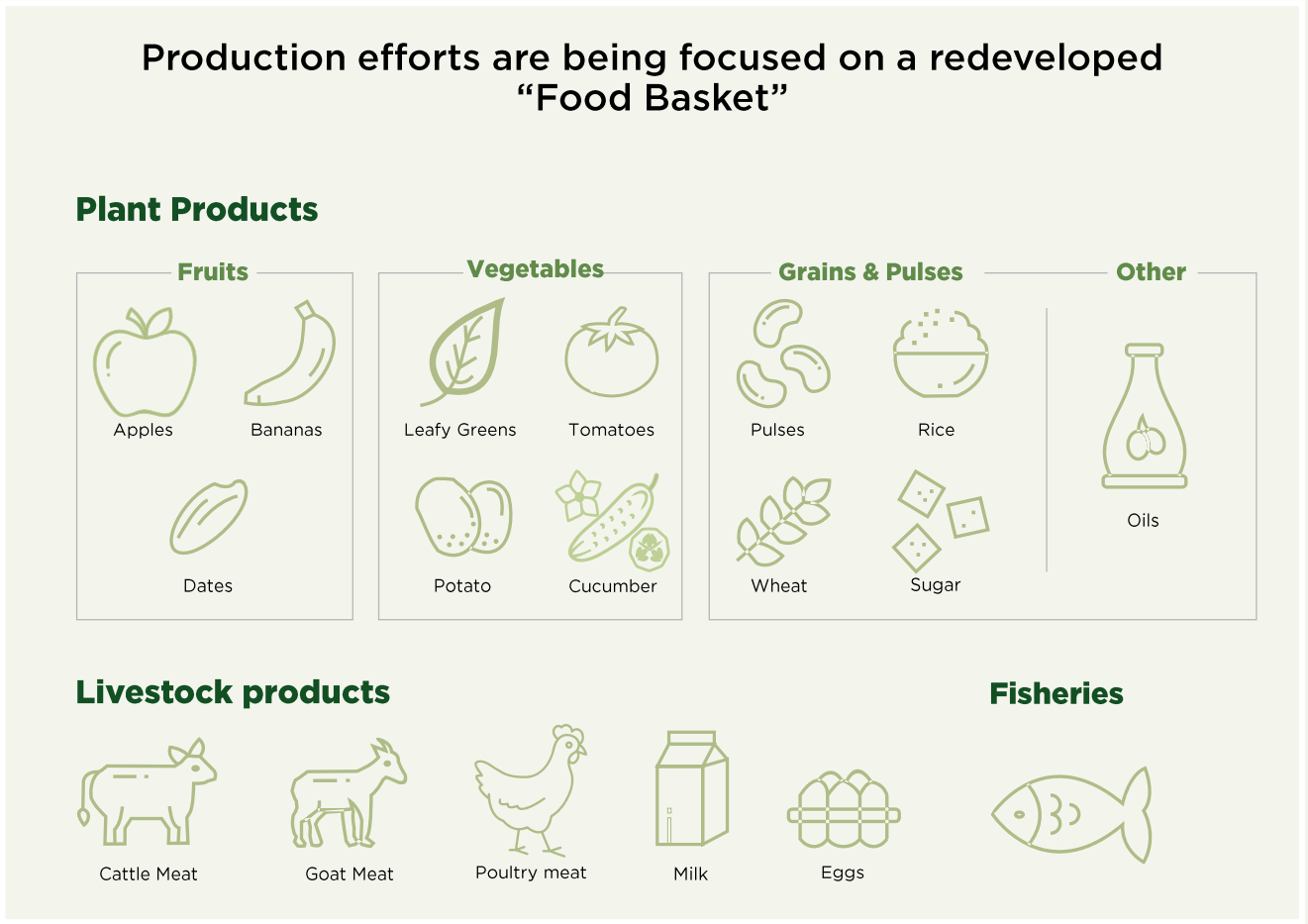
- US$ 1.5 billion has been committed over the next five years for Agritech initiatives
- Agtech loan guarantee and supply chain financing programme
- Abu Dhabi Investment Office (ADIO) established US$ 500 million fund for supporting agritech firms to establish in the emirate (Ghadan 21)

ACTIVITIES

- Abu Dhabi hosts the Global Forum for Innovations in Agriculture, the world's largest showcase of agri-tech innovation.
- National level genome mapping of livestock and key crops to spur innovation and development.
- Dubai to develop "Food Tech City" a freezone to support development of the agritech and food technolgy industry.

AGRICULTURE PRODUCTION PRIORITIZED THROUGH THE MINISTRY OF FOOD SECURITY

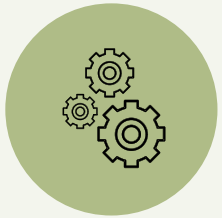
- The mission of the Ministry of Food Security is to provide the UAE's population having access to sufficient, safe and nutritious food for an active and healthy life at affordable prices
- UAE currently ranks 21st on the Global Food Security Index but has set the target of becoming the world's most food secure nation by 2051.
- Achieving this goal will require concerted effort to:
    - Increase domestic food production.
    - Acquisition or establishment of farms abroad to produce protein and crops not suited to for the country's arid environment.
    - Significant reduction in food waste from farm to plate.
- In 2018 the UAE's Ministry of Climate Change and Environment announced that food waste costs the UAE economy approximately ($3.5bn) annually.



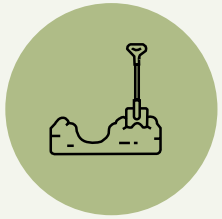
IN RESPONSE THE GOVERNMENT HAS IDENTIFIED EIGHT FOCUS AREAS

Agriculture Waste Mitigation:
- Treatment and disposal of organic waste
- Consumer education

Agricultural Biotechnology:
- Climate resilient seeds
- Improved genetics
- Micro-organisms

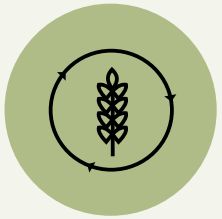


Robotics and Equipment:
- High-end manufacturing
- Autonomous cultivation and harvest
- Research and development

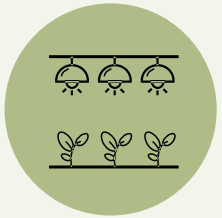


Novel Farming:
- Precision agriculture
- Improved irrigation
- Training and education

Ag Supply Chain Technologies:
- Supply chain software
- Consolidated procurement
- Food Hubs



Alternative Food:
- Lab-grown meats
- Insect and plant-based proteins



Farm IOT:
- Sensors
- Farm Management Software

Bio-based Materials:
- Recycling of organics
- Bio-diesels

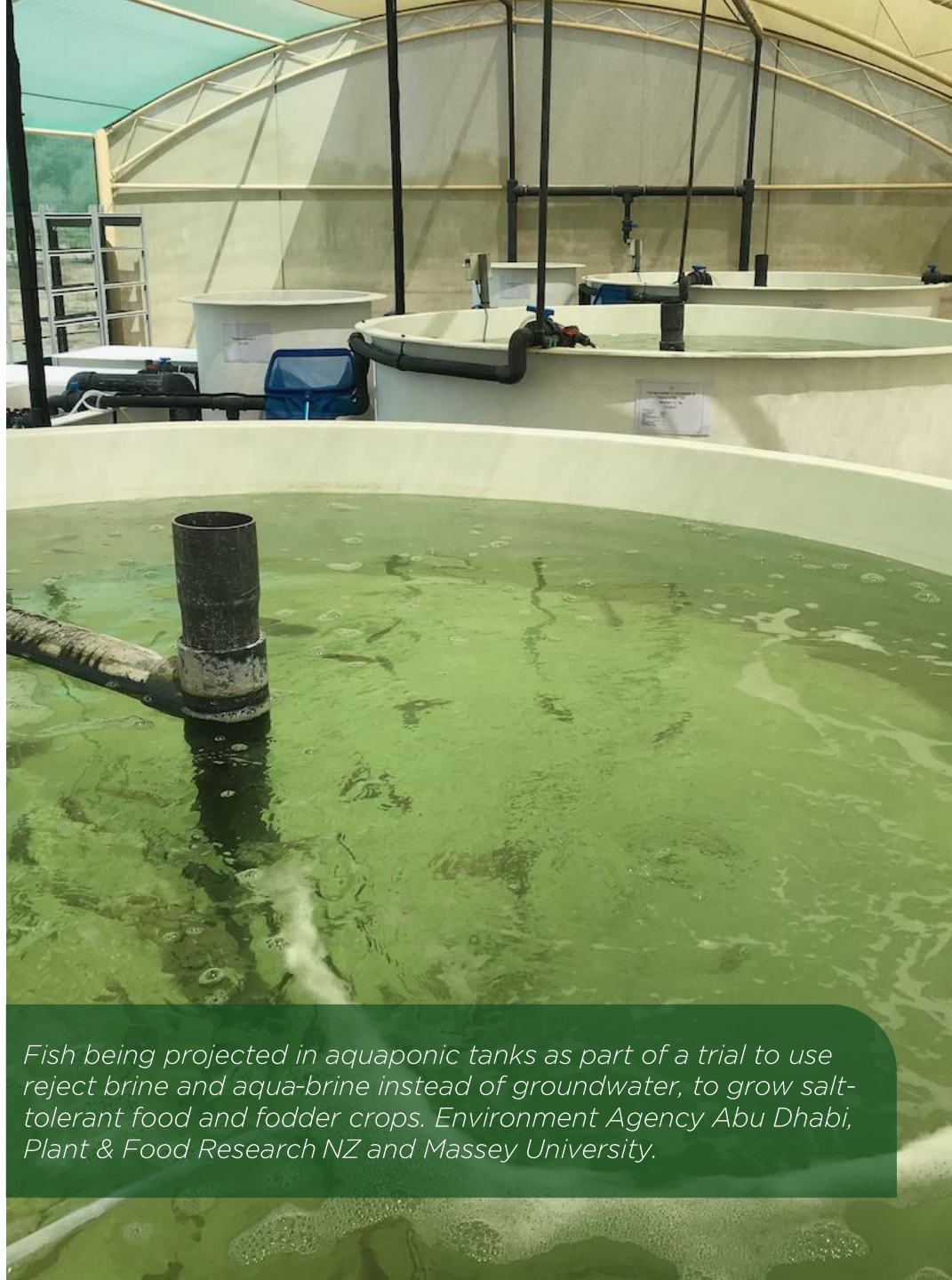
KEY MARKET TRENDS

Use of Controlled Environment Agriculture for production

Vertical farming on the rise

Focus on Aquaculture by UAE government driving new investment

Uptake of precision farming > sensors variable rate applicators



Fish being projected in aquaponic tanks as part of a trial to use reject brine and aqua-brine instead of groundwater, to grow salt-tolerant food and fodder crops. Environment Agency Abu Dhabi, Plant & Food Research NZ and Massey University.

DOMESTIC AGRITECH PRODUCTION IN ITS INFANCY

AeroFarms

As part of 25-million-euro AgTech investment by ADIO, AeroFarms will focus on next-generation genetic phenotyping and organoleptic research while also tackling the challenges of desert agriculture from its new 8,200-sqm R&D center in Abu Dhabi. The center will be the largest indoor vertical farm of its kind in the world and will employ a projected 60 plus highly skilled engineers, horticulturists and scientists. The farm will include the following centers of excellence:

1. Advanced organoleptic research and precision phenotyping laboratory.
2. Advanced seed breeding center.
3. Phytochemical analysis laboratory.
4. Machine vision and machine learning laboratory.
5. Robotics, automation and drones laboratory.

AeroFarms home • The Vertical Farming, Elevated Flavor company

Madar Farms

- Madar Farms, a home-grown UAE firm, will build the world's first commercial-scale indoor tomato farm using only LED lights in Dubai
- The company is also set to scale up the commercialisation of micro-green growing to help provide a consistent local food supply that responsibly uses the region's natural resources
- Madar farms has receive close support from Dutch firm Certhon Greenhouse Solutions, which installed more that 5,000 ultra-efficient green power LED by Signify Netherlands.

- Madar Farms | Vertical Farming - Fresh Produce In UAE

RDI

RDI is developing an innovative irrigation system to transform water usage in UAE agriculture and conducting research trials to increase crop yields in sandy soils and non-arable land. Growstream ™ is the world's first irrigation system that allows plants to self-regulate their own water delivery.

The patented RDI system responds and interacts with these root exudates, allowing water and nutrients to be released out of the billions of "smart micropores" in the GrowStream™ tubing. GrowStream's™ plant-responsive system provides a slow-release delivery of water flow that matches the roots' absorption capacity.

When the plant is satisfied, it stops producing root exudates- and GrowStream™ stops releasing water.

RDI Home - Responsive Drip Irrigation | Introducing plant-responsive irrigation

RNZ

- RNZ International is a professionally managed company which has emerged as a lead supplier of agri inputs to South & South East Asia, Africa and MENA region.
- It produces over 400 Plus different NPK grades of water solubles, granular, suspension & liquid grades at its state-of-art facility. In addition to production, RNZ is an asset based supplier of full range of straight solubles/ granular & organic fertilizers, being sourced from its own facilities & partner companies worldwide.
- RNZ envisions to provide affordable innovative products to farmers for increasing yield, thereby reducing cultivation costs without compromising food health, soil, water and environment.

RNZ (rnz-group.com)

Pure Harvest

Pure Harvest is a home-grown, tech-enabled farming venture that uses cutting-edge food production systems to grow fresh fruits and vegetables in a climate-controlled environment, enabling year-round production anywhere, while using seven times less water compared to traditional farming methods.

Pure Harvest invests in smart farming and infrastructure technologies at its new farms in Al Ain, Abu Dhabi, to optimise growing conditions through hardware design innovations, artificial intelligence, autonomous growing and robotics, plant science research and desert-optimised machines.

The company will also progress R&D and deployment of a commercial-scale algae bioreactor production facility that will grow higher quality, healthier Omega-3 fatty acids without the limitations and challenges of traditional animal sources.

Pure Harvest – Year-round, premium quality produce, grown here.

FreshToHome

FreshToHome is an e-grocery platform for fresh, chemical-free produce.

The company maintains complete control over its supply chain, inventory and logistics by obtaining produce directly from the source through an AI-powered auction process.

ADIO's partnership will aid the expansion of FreshToHome's land and sea operational and processing capabilities in the UAE, bringing expertise in aquaculture, contract farming for marine and freshwater fish species and precision agriculture to Abu Dhabi.

FreshToHome Home - Buy Fresh Fish, Chicken and Mutton Online.

Nanoracks

US-based Nanoracks is the single largest commercial user of the International Space Station.

Nanoracks' 'StarLab Space Farming Center' in Abu Dhabi will be a commercial space research facility focused on advancing knowledge and technology for organisms and food produced in space and in equally extreme climates on Earth.

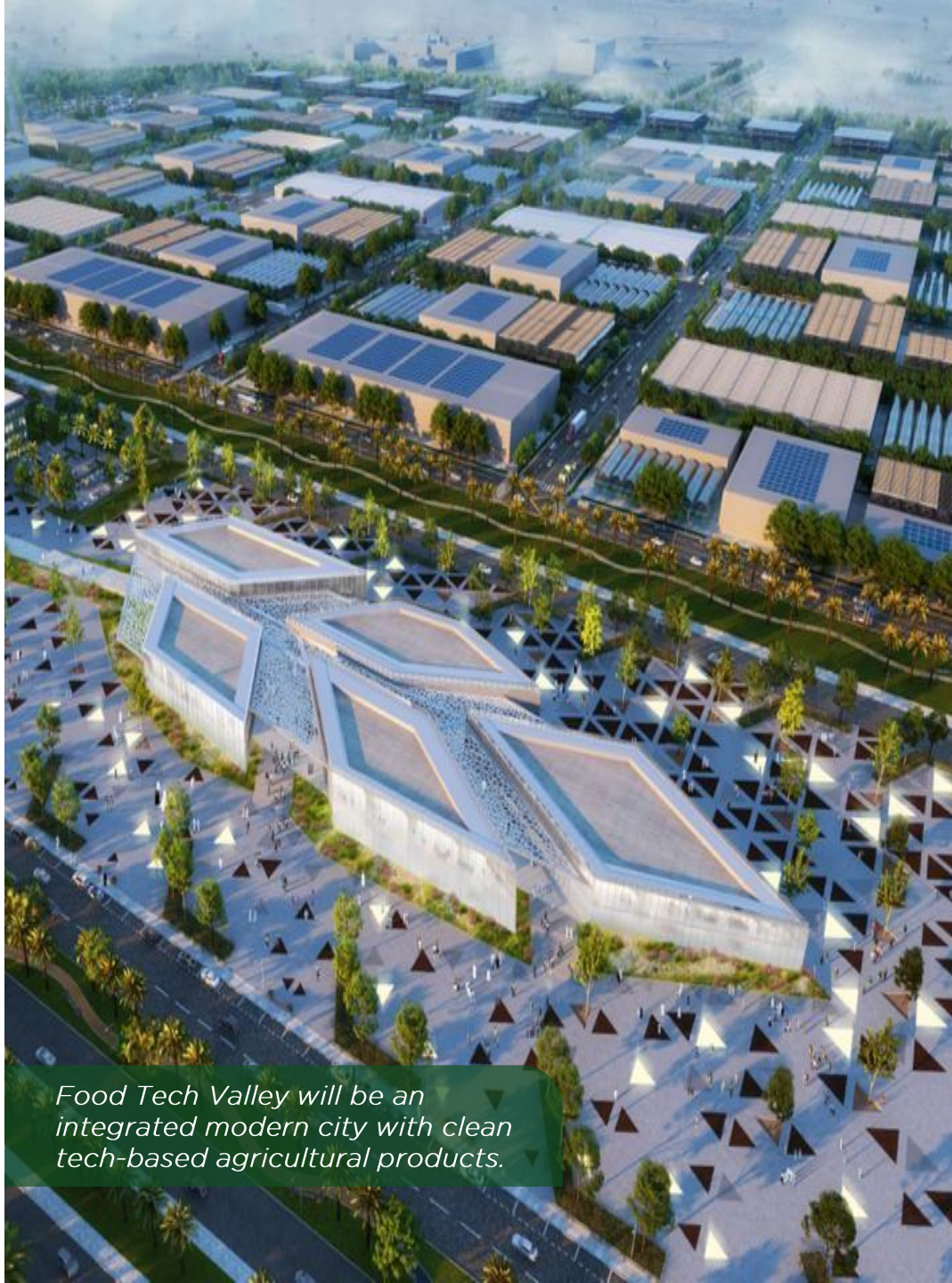
Nanoracks - Your Portal to Space

FOOD TECH VALLEY

In April 2021, Dubai unveiled plans for an integrated modern city that will serve as a hub for clean tech-based food and agriculture products.

It will be based around four main clusters:

- Agtech and engineering.
- Food innovation center.
- R&D facilities.
- Advanced smart food logistics hub.



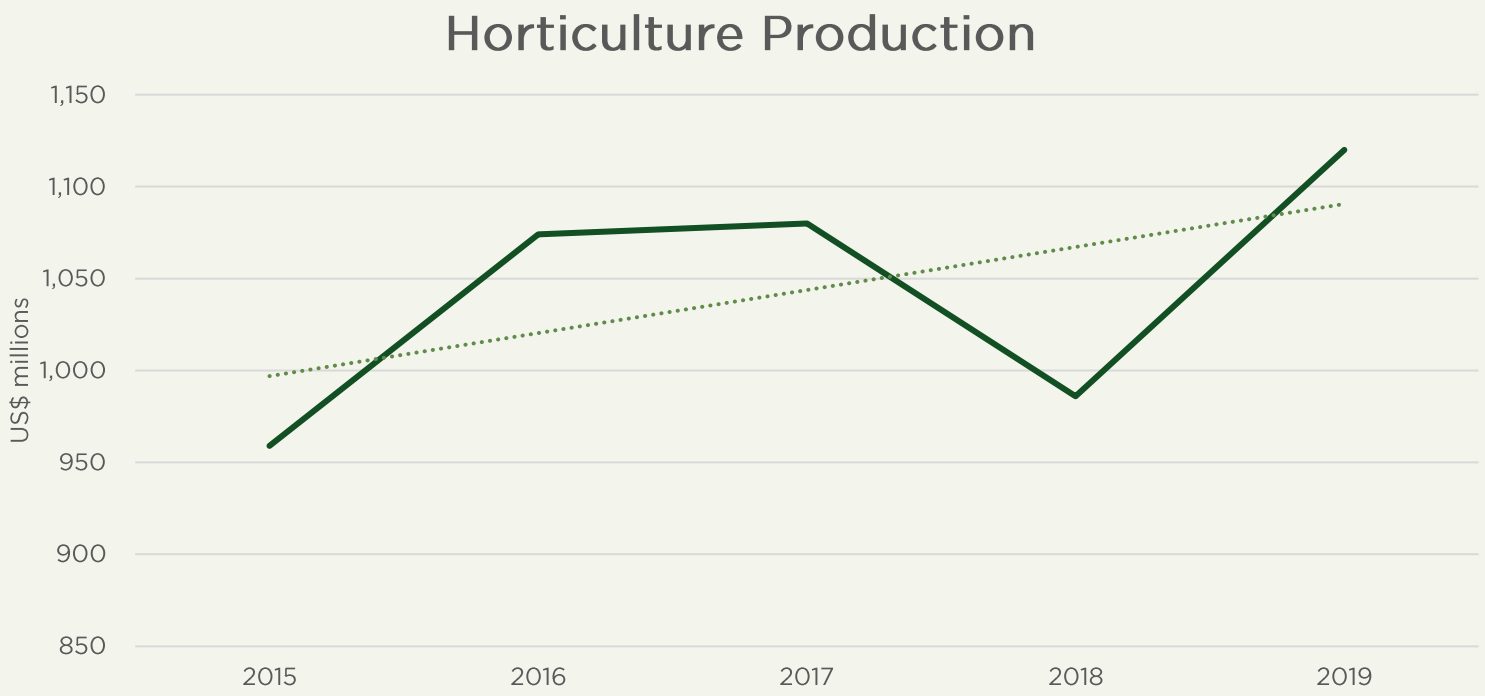
Food Tech Valley will be an integrated modern city with clean tech-based agricultural products.

TARGET SEGMENT ANALYSIS –

(A) HORTICULTURE

HORTICULTURE PRODUCTION IS GROWING STEADILY AT 4% CAGR (2015-2019)

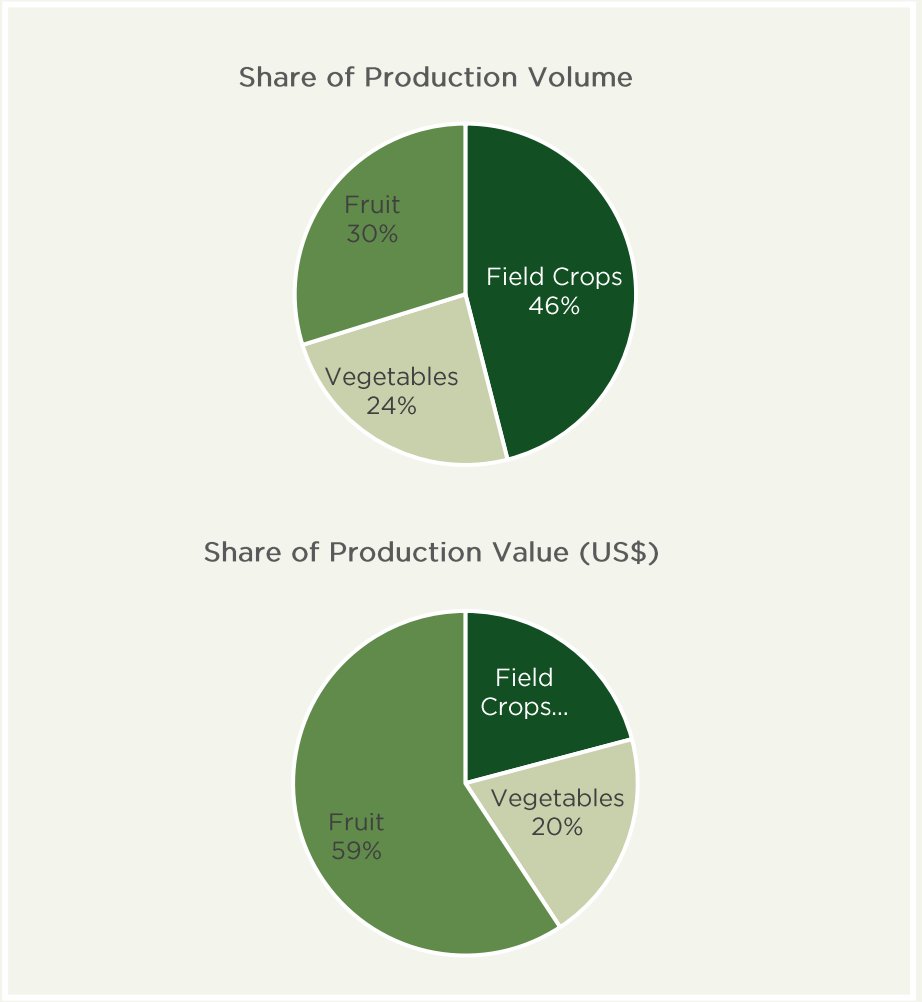
- With further expansion of climate-controlled greenhouses scheduled over the next two years, the vegetable segment is poised for further growth.



Source: Federal Competitiveness and Statistics Centre, UAE.

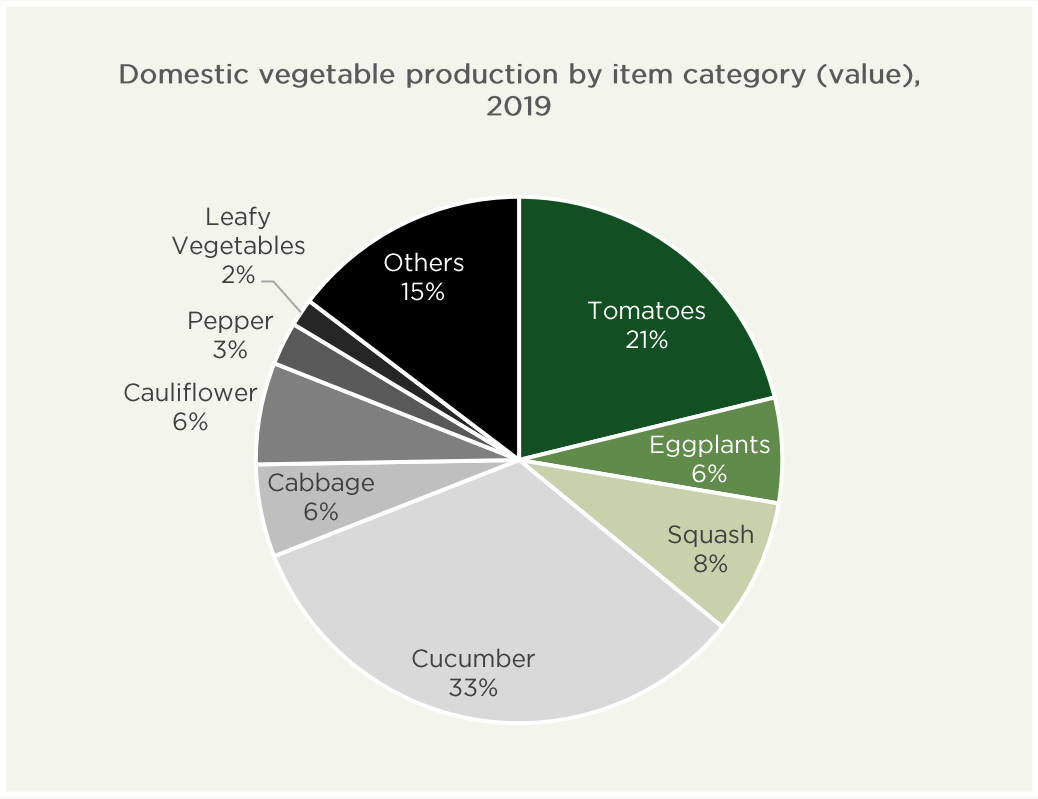
HORTICULTURE PRODUCTION STILL OVERWEIGHTED TOWARDS FIELD CROPS

- Field crops make up the largest share of horticulture produced by volume but are a much smaller share of production value.
- Although expensive to produce, production of field crops is consolidated amongst 2-3 companies who produce crops mainly for the traditional livestock rearing sector and play an important role in traditional Emirati culture.
- As urban demand for water increases, the government is increasingly considering initiatives to tilt the balance towards higher-value crops such as fruit or vegetables.



VEGETABLE PRODUCTION LOOKING TOWARDS PROFITS

A wider variety of vegetables reflects a drive towards profitability and increases the attractiveness of employing higher technology solutions especially in the greenhouse and controlled environment settings

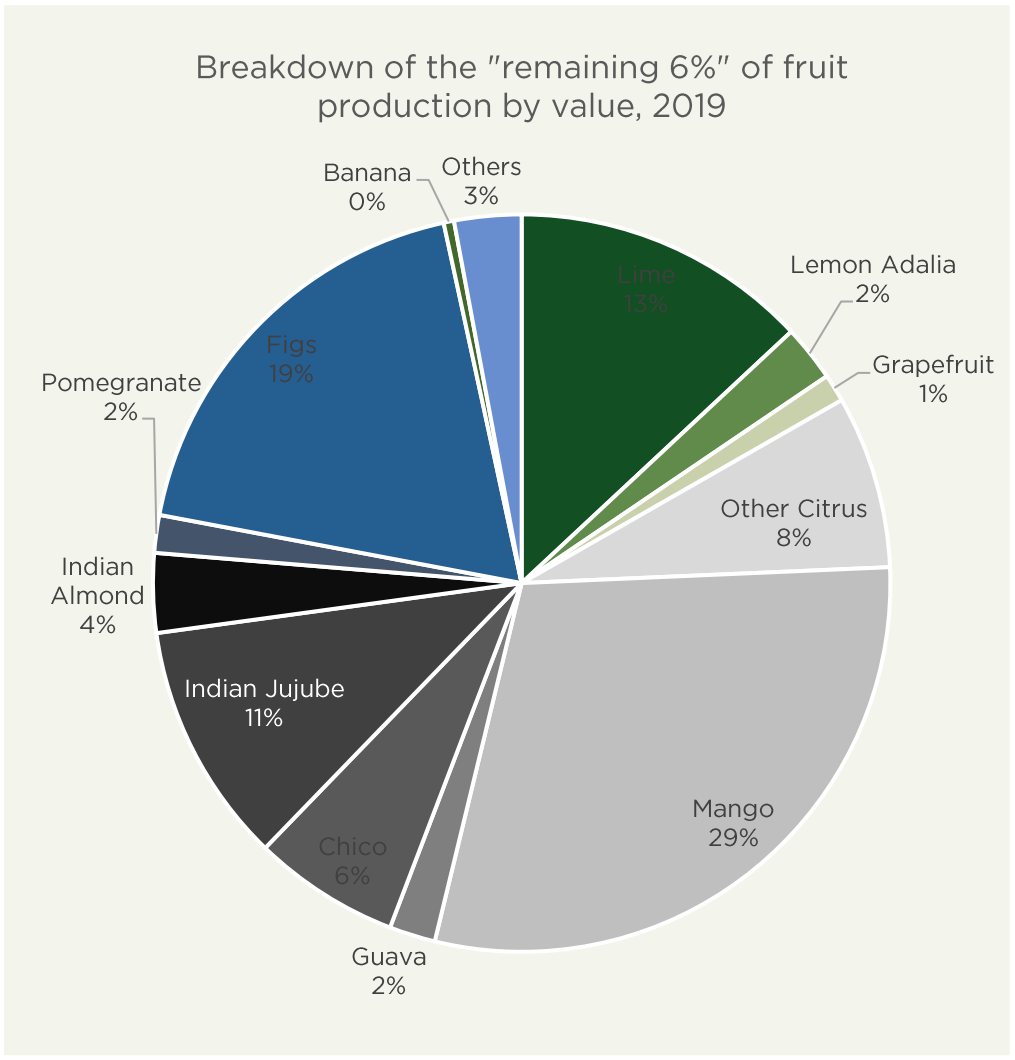


	Open field vegetables	Facility vegetables
Value added (productivity perspective)	Value added per 1 Hectare of total area (2019): US$ 33,503/ha	Value added per 1 Hectare of total area (2019): US$ 111,064/ha
Value added (productivity perspective)	Value added per 1 Hectare of total area (2019): • Cucumber US$ 113,062 • Tomatoes US$ 52,532 • Peppers US$ 48,719 • Pumpkin US$ 40,051 • Cabbage US$ 28,792 • Cantaloupe US$ 27,123	Value added per 1 Hectare of total area (2019): • Cucumber US$ 134,261 • Tomatoes US$ 79,892 • Peppers US$ 64,840 • Green Peas US$ 129,600 • Okra US$ 129,600 • Squash US$ 80,003

OPPORTUNITIES TO IMPROVE FRUIT PRODUCTION

Fruit production to date has been relatively low-tech however expansion into citrus and berries may provide opportunities for New Zealand expertise and supply chain technology.

- Date production reached US$617 million in 2019 and accounted for 94% of the fruit production value in the UAE.
- Dates are the main agricultural export for the UAE.
- However, over the last three years a wider variety of fruit has been produced. Figs, Chico and Mango have seen substantial growth over the last three years (1,500%, 488% and 304% respectively).
- Production of citrus fruits showing continued growth and is of increasing interest to fruit farmers.
- Berry production is considered high margin and is increasingly receiving investor attention, especially blue berries and raspberries. Currently they make up a small portion of the UAE's fruit production but are highly visible within UAE supermarkets.



GENERAL PRODUCER PROFILES

- Medium and large size agriculture management entities have a greater risk appetite for embracing new technologies and a driven by profitability pressures.
- Smaller famers are generally more conservative and prefer to hire cheap foreign labour than invest in capital intensive technologies.
- Younger farmers more inclined to adopt new technologies.
- Market access for small farmers can be a challenge. Purchasing power typically sits with middlemen and larger traders.

	Medium and large scale growers	Small scale growers
Demographics and Trends	• Hire external employees for management and operation. • Medium to high skilled management with low-skilled workforce. • Larger pieces of land often owned to Royal or large trading families.	• Family owned with low skilled migrant labour work force. • Part time management. • Land sizes are typically small: 2- 4 hectares on average.
Key factors related to technology investment	• Focused on profitability and efficiency. • Open to new technologies. • Have scale and resources to maximise the benefits of new technologies.	• Prefer hiring part time or cheaper foreign resources for labor intensive tasks, rather than seeking out automation technologies due to the small land sizes and limited budgets.
Current approach to smart farming	• Record material application data such as fertilizers and pesticides usage, harvest timing information etc. to help analyse and inform cultivation activities. • Interested in technologies to reduce the cost of inputs. • Cultivation management tools for data recording, review, and forecasting would likely be areas of interest • Interested in precision farming and automation technologies.	• Low incentive to improve management efficiency. • Don't actively collect and analyse data. • Potentially open to lower-cost, semi-automated solutions that complements their current agriculture practices • Small land sizes mean they require confidence in the yield. Little incentive to try new crops.
Other considerations	• Management staff will speak English, farm staff may have limited English preferring to speak in South Asian languages. • Tend to make use of government subsidy and support programmes for the roll out of new	• Farm owners and staff may not speak English and may face digital literacy challenges. • May have difficulty accessing profitable markets.

Source: Semi-structured interviews with farmers during the market research (Mar-Apr 2021).

KEY PLAYERS

Elite Agro

- Produce a wide range of vegetables in green house environments, including an organic range
- Operate the largest network of pivot irrigators (approx.42) to produce field crops
- Has two large holding holdings offshore (Morocco and Serbia) for the production of berries.

Emirates Bio Farm

- UAEs largest organic farm.
- Produces certified organic vegetables, fruits, and eggs through the use of sustainable farming practices
- Sells B2B and B@C (Online portal)
- Created a fully integrated tourism center to allow visitors to experience farming in a safe and fun environment, overlooking the farm and open desert dunes.

Badia Farms

- First vertical farm in the GCC.
- Specialise in growing micro-greens and herbs.
- Capacity to 3,500kg of vegetables and fruit per day.
- Historically sold primarily to restaurants and hotels, started selling to major distributor Kibsons as a result of the covid-19 pandemic.

Pure Harvest

- Will build two “high-tech hybrid greenhouses” in the United Arab Emirates to produce tomatoes, currently the firm’s main product, and leafy greens in year-round warmth and sunshine.
- Retrofit an existing facility for berry production in the UAE
- Build a tomato production facility in Saudi Arabia

COMMON PAIN POINTS

PAIN POINTS	POTENTIAL SOLUTIONS
• Lack of quality soil requires high level of inputs to be productive	• Climate resilient crop varieties (Plant Science) • Improved fertilizers (Inputs) • Variable Rate Technologies (Sensors, Applicators) to target applications (Input Management) • Soil regeneration technologies including synthetic polymers and nano-clay particles (inputs)
• Controlled-environment horticulture results in high cost for electricity	• Efficient lighting for plant production (Indoor Agriculture) • Efficient temperature control systems (Indoor Agriculture)
• Lack of ground water results in high cost of desalinated water	• Variable Rate Technologies (Sensors, Applicators) to reduce water use • Water retentive soil composites (Inputs)
• Reliant on low skilled workforce	• Intelligent crop management (machine vision, drone platforms) • Robotic Harvesting (Robotics) • Traceability and Assurance software (Applications)
• High level of waste throughout the value chain • Challenges for small holders to get fair market prices due to the role played by intermediaries.	• Market place applications to match supply and demand (Applications)

SUMMARY - HORTICULTURE

	HORTICULTURE (Open Fields and Green Houses)	FRUIT	LIVESTOCK	AQUACULTURE
Agritech Market Size[1]	~$16 Million[2]	~$20 Million	~$14 Million	~$0.8 Million
Domestic Output (USD)	$537 Million	$664 Million	$470 Million	$25.3 Million
Potential Solutions	• Intelligent crop monitoring • Soil regeneration products including • Robotic crop husbandry and harvesters • Nutrient sensors and variable rate applicators • Smart Irrigation • Direct to market applications • Climate tolerant crops • Efficient climate control • Market place applications • Traceability and quality	• Improved genetics • Smart fruit management • Robotic harvesting • Smart Irrigation • Post harvest management • Grading and sorting • Temperature controlled logistics solutions • Pest and disease control	• Heat tolerant genetics • Smart animal monitoring • Efficient cooling and watering systems. • Improved feed additives. • Quality feed supplements • Farm management software • Process automation and animal husbandry • E-Learning and extension	• Precision monitoring of nutrient and temperature levels • Smart Pumps and biofilters • Smart supply chain platforms • Automatic harvesting. • Cost effective and efficient feeds • Data management • Movable fish cages

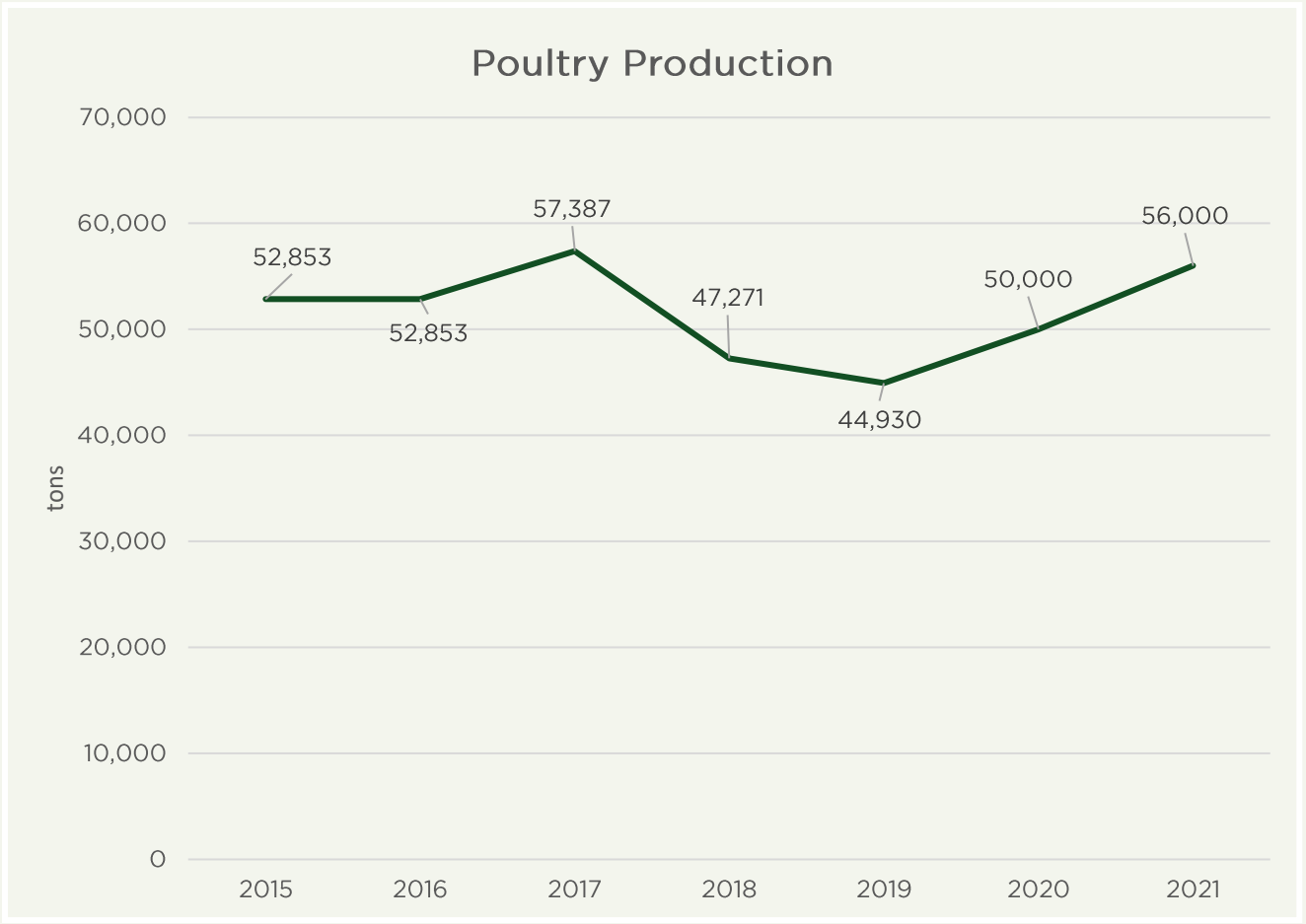
[1]Analysis of revenue rates in each sector x multiplied by the typical annual agritech investment rate
[2] Does not include new investments into Controlled Environment Agriculture (US$ 250 million last 5 years).

TARGET SEGMENT ANALYSIS – (B) LIVESTOCK

SECTOR OVERVIEW

Poultry

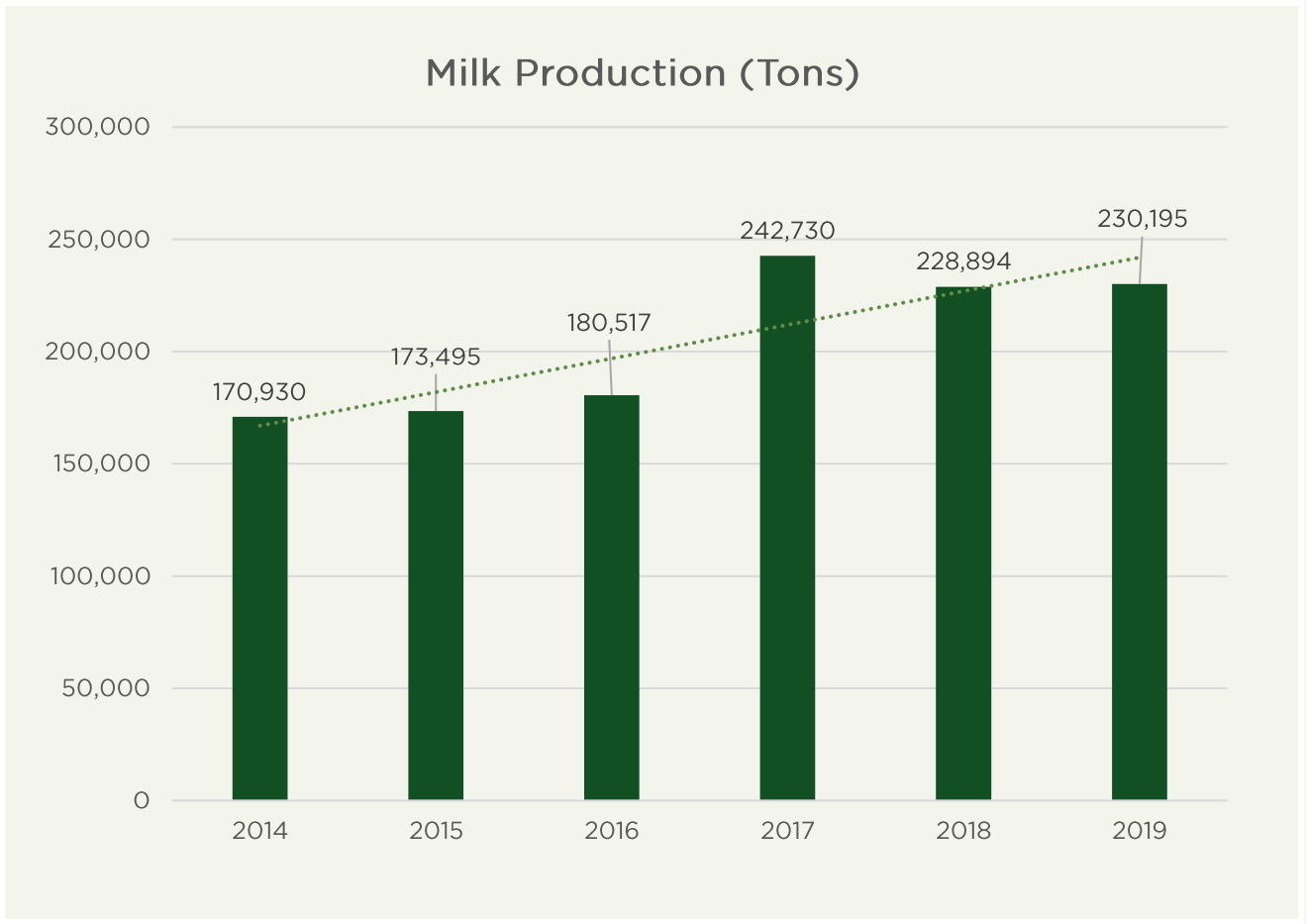
- Poultry production is set to grow, forecast at 56,000 mt in 2021, a 12% increase from the 50,000 mt estimate for 2020 due to higher demand for UAE chicken meat products and increasing government support.
- This follow a period of relative decline due to increased competition from Saudi Arabian products.
- The exception being table eggs which have increased at 2% CAGR over the last five years.
- Organic manure is an increasingly important byproduct from the farms – with most of it going into fertilizer for landscaping in the UAE.



SECTOR OVERVIEW

Dairy

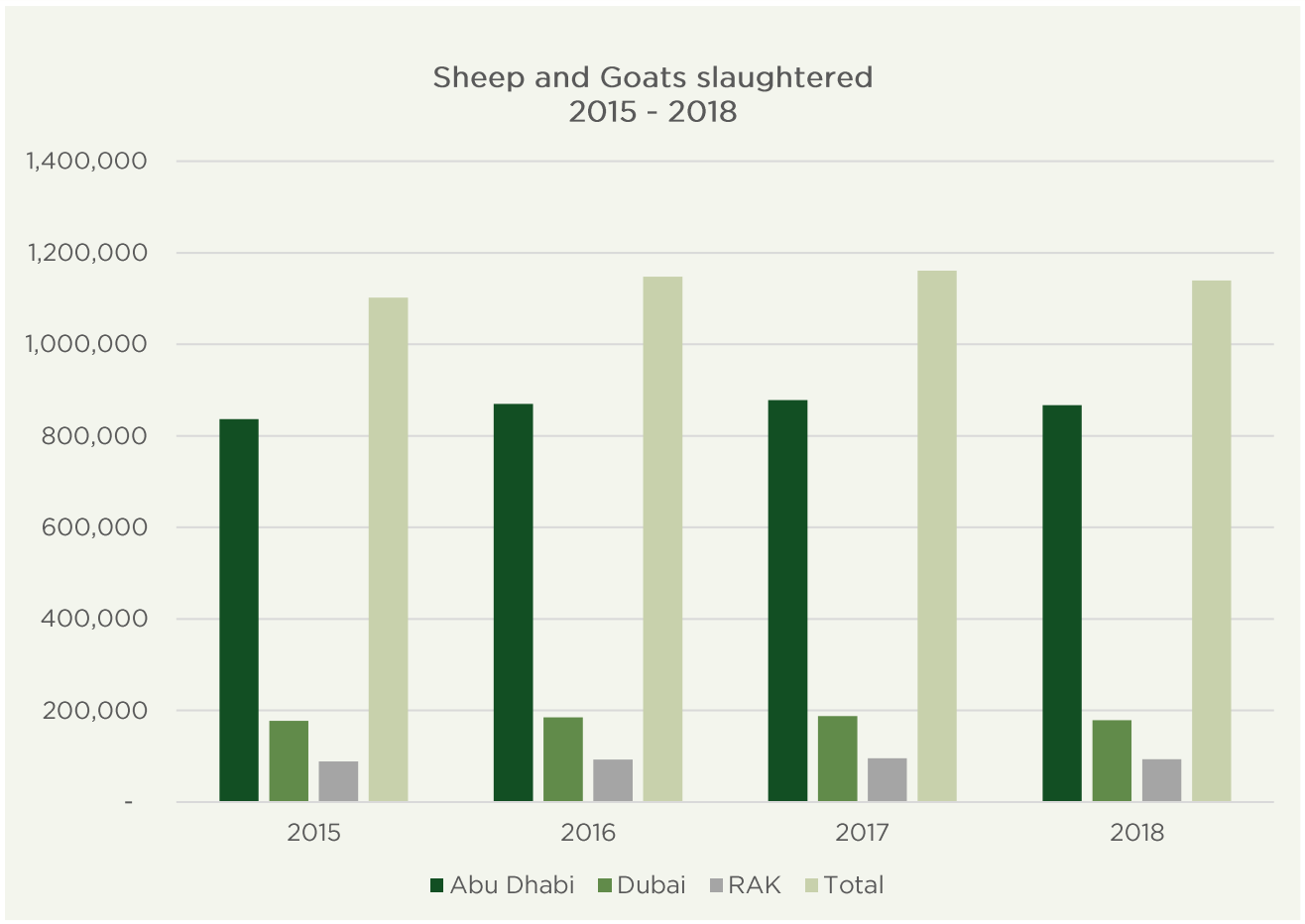
- Milk production is increasing at 6% CAGR over the last five years.
- Focus on milk quantity rather than fat composition therefore Holstein-Friesian herds with American genetics are the most common variety of cows in the UAE.
- Fat supplements are a key ration component in these heat-challenged areas with the low metabolic heat production offering a nutritional method of reducing internal body heat generation. Higher fat diets are critical for production of the progesterone hormone – essential for fertility.



SECTOR OVERVIEW

Red Meat

- Sheep and goats are the main red meat products produced in the UAE. Domestic numbers have remained relatively stable over the last five years.
- The is also a significant import and fattening segment with this segment however most sheep and goats are kept in small farms and sold directly to aggregators and traders who then sell-on to retail chains.
- Sheep and Goats are typically kept outdoors in partially shaded feedlots.
- Number of animals slaughtered per year has remained relatively flat.

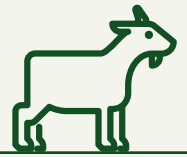
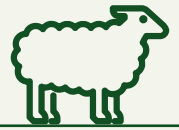
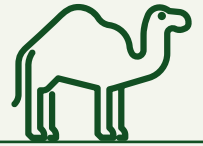
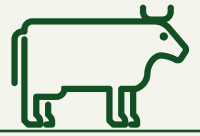


COMMERCIAL LIVESTOCK FARMS

Despite a sizable national herd there is a small number of commercial farms

- Commercial Farming is focused on poultry and dairy production to meet national production objectives.
- Abu Dhabi is the main hub for livestock farming in the UAE, especially around Al Ain.
- Most Commercial farms have been established in the last 10 years with most farm workers originating from south asian countries. Many with a little formal animal husbandry training.
- Substantial competitive pressure due lower cost imports of poultry, dairy milk and red meat products = focus on quantity produced.

National Herd Size

	2,350,145
	2,043,993
	494,536
	100,914

Number of Commercial Farms

Activity	Abu Dhabi	Dubai	Sharjah	Ajman	Umm Al Quwain	Ras Al Khaimah	Fujairah	Total
Cattles Farms	16	1	0	0	0	1	1	**19**
Broiler Farms	11	1	1	1	3	3	2	**22**
Layer & Parents Farms	11	2	2	1	0	3	1	**20**
Sheep / Goat	1	1	1			1		4
Total	37	5	4	2	3	8	4	65

KEY PLAYERS

Poultry

Al Rawdah

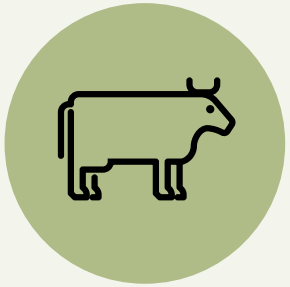
- Largest broiler company in the UAE responsible for over 23% of total domestic production.
- Farm is spread over 538 hectares and processes 45,000 brids daily onsite.
- Currently utilizes B2B and B2C sales channels including an e-commerce channel.
- Offers poultry and processed meat products.

Al Jazira Poultry Farm

- Largest table egg producer in the UAE.
- Established in Dubai in 1991.
- Produces a number of health focused egg products including enrichment with with Folate, DHA Omega3, Organic Selenium, Omega3 Eggs and Lutein Enriched Eggs
- Has its own distribution network.

KEY PLAYERS

Dairy



Al Rawabi

- The largest of all farms in the UAE. Currently has a >14,000 head unit with onsite processing and manufacturing plant.
- Based in Dubai but recently inaugurated a large storage facility in Dubai as it looks to compete directly with Al Ain dairy.
- Currently constructing a biogas facility to offset electricity costs.

Al Ain Dairy

- Currently has a 12,000 head unit based in Al Ain.
- Recently added a 2,000 head camel unit producing for the growing camel milk market.
- First dairy company in the UAE to introduce recyclable PET packaging.
- Full Control of its distribution chain supplying direct to retailers.

Mamum

- Currently has around 4,200 cows based in Al Ain.
- Uses on-site desalination for water requirements on a fully integrated site.

National Dairy

- 5,000 cows across two farms located in Al Ain
- Owned by Emirates Food Industries a leading agri- holding company that produces feed, flour, dairy and juice
- Currently building another fully integrated farm in Al Ain that will make it the largest group of farms in the UAE

KEY PLAYERS

Red Meat

Green Island Livestock

- Importer of sheep and manager of feedlots and processing facilities in the UAE.
- Has an e-commerce app “Zabeyah Al Jazeera” for provision of slaughter and processing services for livestock aggregators and smaller livestock farmers.
- Located in Abu Dhabi.

Maraie Al Khaleej

- Established in 2013, it is one of the largest farms in the UAE.
- Specializes in breeding premium Nai’mi breed sheep.
- Produces more than 5,000 lambs a year.
- Sheep are housed in semi-shaded paddock. Plan to build a new fully integrated modern farm with capacity for 20,000 heads.

COMMON PAIN POINTS

PAIN POINTS	OPPORTUNITIES FOR NEW ZEALAND COMPANIES
• Intensive farming system reliant on imported fodder results in high production costs.	• Climate tolerant crops (Plant Science) • Quality Feed Supplements (Plant Science)
• High cost of electricity due to temperature control, watering and lighting requirements	• Efficient temperature control systems (Indoor Agriculture) • Efficient animal watering systems (Irrigation)
• Low technical knowledge base at the farm worker level	• E-Learning extension services (Education) • Farm and Animal Management Software (Smart Farm Equipment) • Process Automation for feeding and animal husbandry (Animal Technologies and Smart Farm Equipment)
• Challenges maintaining health of the animals in a high-temperature environment	• Animal Management Systems (IoT) • Cooling systems (Sensors and Smart Farm Equipment) • Improved animal genetics (Heat tolerance)

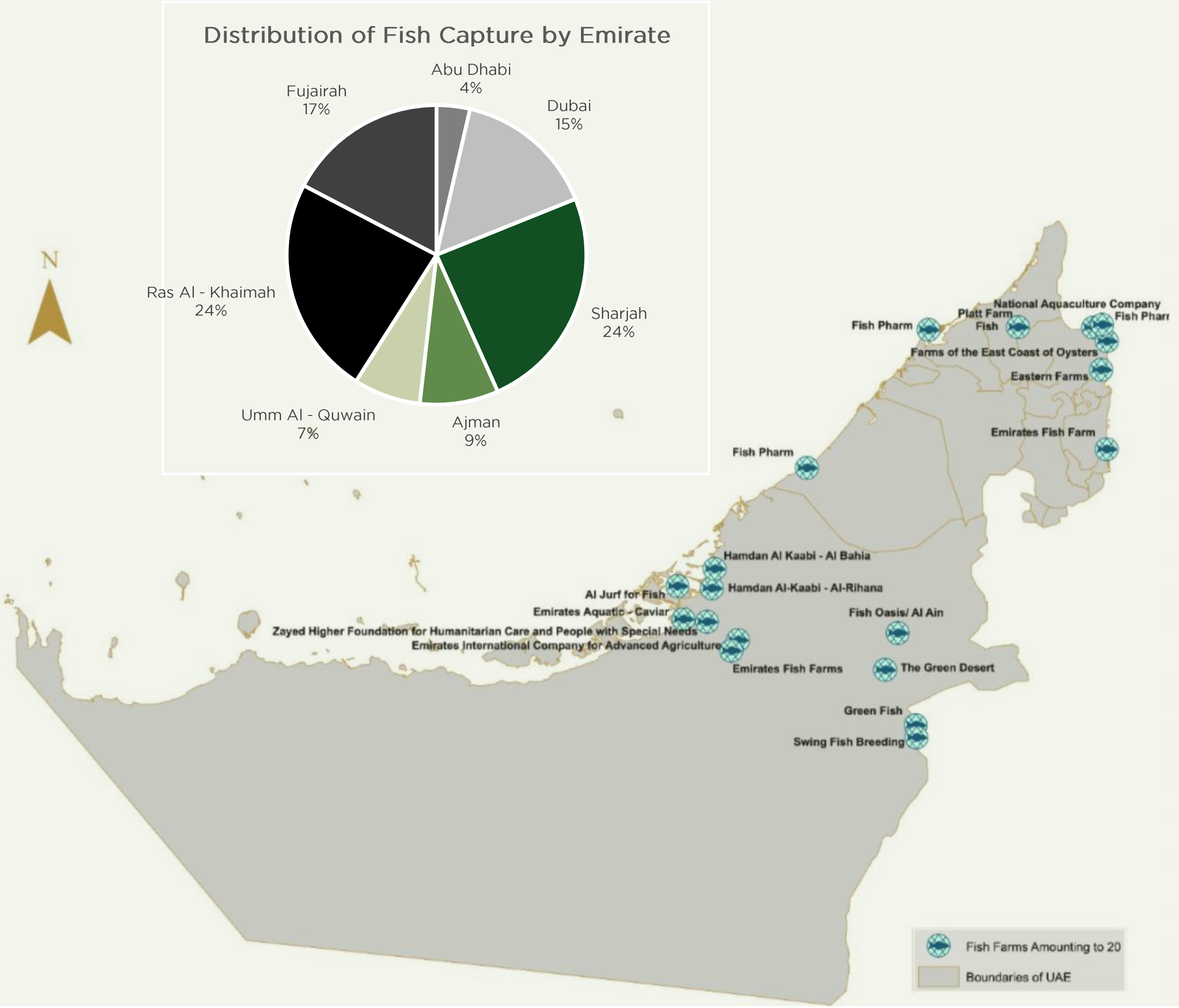
TARGET SEGMENT ANALYSIS –

(C) AQUACULTURE

FOCUSED EFFORT TO INCREASE DOMESTIC FISH PRODUCTION

Fish production is an emerging sector in the UAE.

- Aquaculture represents a central component of the UAE's National Food Security Strategy.
- The government has been encouraging foreign and local investments in aquaculture developments by providing several incentives for the sector, as well as providing fingerlings of local species, creating aquaculture frameworks, relaxing institutional and investment constraints and mapping out suitable sites for development.
- Domestic Fish Production in 2019 was only 4,000 tons compared to Fish Capture – 72,000 tons.
- Fishing is focused in the northern emirates, while inland fish farming is more widely spread across the country.
- The UAE consumes about 220,000 tones of seafood annually, with imports covering 75% of this figure. The government has already invested more than 200 Million Dirhams in the last two years to develop hatcheries and fish farms. Government aims to increase domestic production to 30,000 tons annually.
- Fish Farm LLC is the country's largest aquaculture operation and the only one producing multiple species. Fish Farm LLC hatchery in Umm al-Quwain uses recirculating aquaculture system (RAS), is a closed water treatment system in a controlled environment. Its main advantage is the reduction of water use as water can be reused after treatment.



KEY PLAYERS

Fish Farm

- Established over three sites:
  - Caged fish farming in Dibba.
  - Hatchery in Umm Al Quwain.
  - Inland Farming at Jebel Ali.
- The largest facility in the UAE.
- Utilizes Marine RAS Technology.
- Produces Salmon, Shrimp, Hamour, Sea Bass and Sea Bream.
- Currently produces 3,000 tons per year. Expansion underway to add another 10,000 tons capacity.

Al Jarf Fish Farm

- Established in Abu Dhabi
- Produces 1,000 tonnes of fish and shrimp annually

Emirates Fish Farms

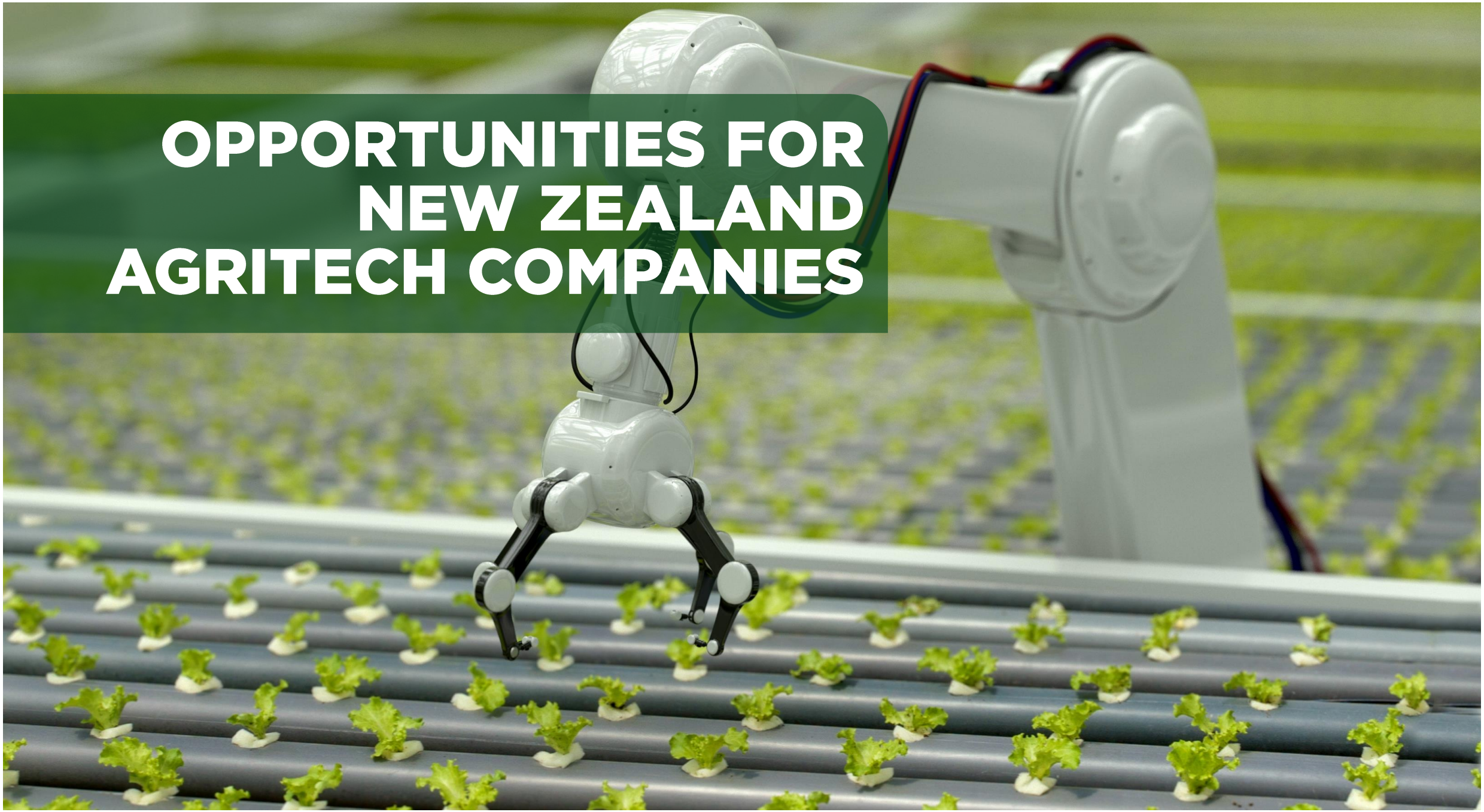
- Established in Abu Dhabi.
- Utilizes Marine RAS Technology.
- Focuses on production of Hamour (Brown Cod).
- Produces 120 tones of fish per year with expansion plans underway.

EMIRATES FISH FARMS

Bader Bin Mubarak, CEO of Fish Farm with Dubai raised salmon. Image: The Nationa

COMMON PAIN POINTS

PAIN POINTS	OPPORTUNITY FOR NEW ZEALAND COMPANIES
• Need for accurate measurement of environmental conditions to improve production and reduce feed costs	• Climatic sensors and underwater drones (Smart Farm Equipment) • Data Management Solutions including digital feeding(IOT) • Movable fish cages (Smart Farm Equipment)
• Products are fragile and require careful harvest and supply chain management	• Temperature controlled logistic technologies (High-tech manufacturing) • Automated harvesting solutions (Automated harvesting) • Smart supply chain platforms (IOT)
• Desire to explore alternative ocean based products to meet changing health tends	• Algae and Seaweed production Expertise (Education and Smart Farm Equipment) • Diversification of fish species into Grouper and Kingfish (Genetics)
• Cost of production is very high compared to imported fish	• Mechanical Pumps, UV Filters and Bio Filters that can compete on Price with European products (High Tech Manufacturing • Cost effective and efficient feeds (Biotechnology and Smart Farming System



OPPORTUNITIES FOR NEW ZEALAND AGRITECH COMPANIES

NZ COMPETITIVE ADVANTAGE

NZ's Value Proposition when entering the UAE market:

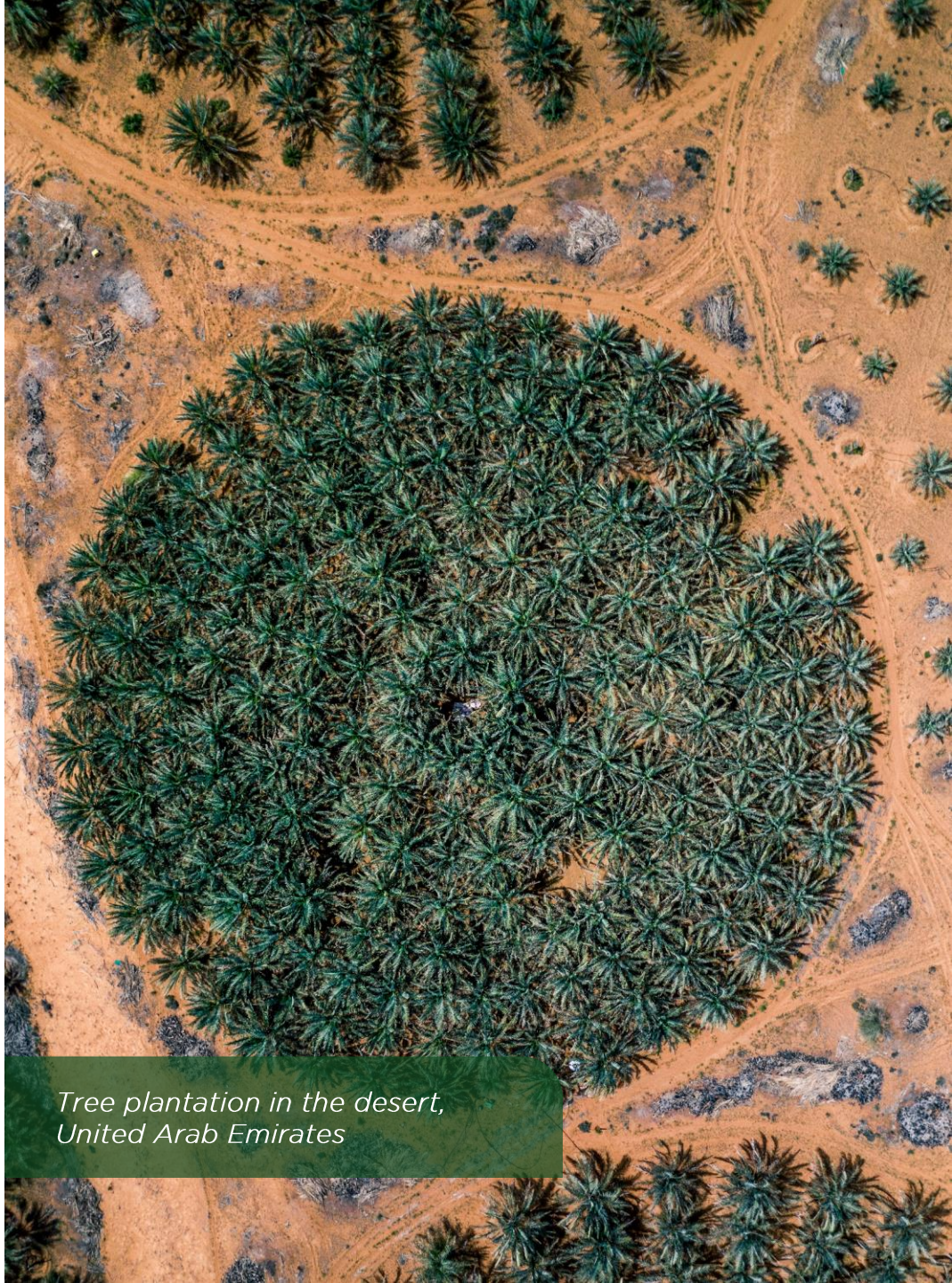
- Reputation for premium, green products
- Advanced research and development capability
- Innovation is market driven
- Reputation as Tier 1 Agriculture Producer
- Established relationships at the government to government level

Microgreens being grown under UV light at Badia Farms in Al Quoz, Dubai

WHAT IS THE OPPORTUNITY FOR NEW ZEALAND AGRITECH?

- 51 million dollar (Estimated market size[1])
- Forecasted to grow at CAGR 15.7% 2019-2027[2]
- Springboard into the wider GGC market estimated at 170 million
- Additionally, over US$140m of new investments have been made into CEA (Controlled Environment Agriculture) and US$1.5billion has been committed to agritech over the next five years

[1]Not including new investments into Controlled Environment Agriculture
[2]GMI Research Report April 2021



Tree plantation in the desert, United Arab Emirates

OPPORTUNITIES AREAS – IDENTIFIED MARKET SEGMENTS

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EMERGING OPPORTUNITIES

Supplying high-tech products and biotech into the production wave:

- Vertical farming
- High-value crops
- Aquaculture

Farm inputs to support soil regeneration and crop productivity:

- Precision agriculture
- Improving soil composition

Farm management and training software:

- Improving efficiencies and reducing workforce costs

Research and development:

- US$1.5Bn committed over 5 years to agriculture and agritech focused incubators and research initiatives
- Abu Dhabi Investment Office
- Accelerator Programme

KEY BUYERS OF AGRITECH IN THE UAE

DISTRIBUTORS	Overseas agritech is imported into the UAE either by **representatives** from the agritech vendor themselves or via **trading companies** specialising in overseas agritech solutions. These distributors will then sell the agritech products to the end users. Distributors take responsibility for the aftersales support however this area is not a priority for most distributors.
COMMERCIAL FARMS	Large commercial farms have the ability to import overseas agritech directly for the manufacturer or will purchase from local distributors. Commercial farms tend to purchase in bulk and require efficient set up, service and support. Commercial farms actively seek out appropriate agritech for their farms and are regularly prospected by new agritech vendors.
INDIVIDUAL FARMERS	Individual farmers are the end-users of agritech and can be divided into two groups and have a high reliance on foreign labour: Older farming households (>49 years old, mainly Arabic speaking, lower digital literacy, lower risk appetite for agritech). Younger farming households (<49 years old, English and Arabic speaking, higher digital literacy, higher risk appetite for agritech).

MARKET ENTRY HYPOTHESIS

POTENTIAL BARRIERS AND MITIGATION STRATEGIES

POTENTIAL BARRIERS	MITIGATION STRATEGIES
• New Zealand is not considered an arid agriculture specialist	• Partnership with established research agencies like ICBA • Use of demonstration plots
• New Zealand is geographically far, and customers prefer an in-market presence	• Selection of quality partners-distributors/agents. • Formation of an association or integrator company for initial market entry.
• New Zealand companies have had limited exposure to the Middle East and the cultural differences	• Participation in a market awareness programme. • NZTE support to market entry
• Firms from Ireland and Netherlands have strong market presence. Countries like Israel are actively entering the market	• Competition between Netherlands and Israel may create opportunities for NZ companies.

MARKET ENTRY STRATEGY

DISTRIBUTORS

- Identify distributors with large consumer base
- Ideally focused on narrow segment (eg: irrigation)
- Strong technical support capability.
- Can be difficult to exit distribution agreements

INDIVIDUAL FARMS

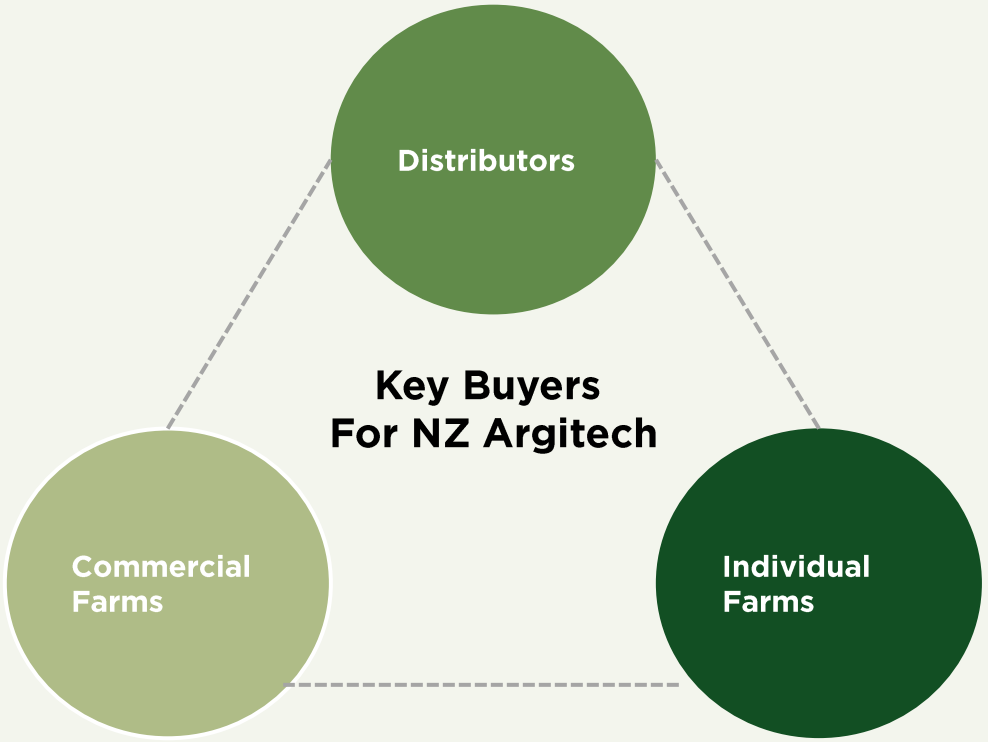
- Needs a company representative to build relationships
- Requirement for quick service support
- Need Arabic speakers
- Small individual sales value but large number of farms

COMMERCIAL FARMS

- Buy in bulk but don't buy often
- Needs a company representative to build relationships
- Requirement for quick service support
- Opportunity to enter with investors farm-design stage.

STRATEGIC PARTNERSHIPS

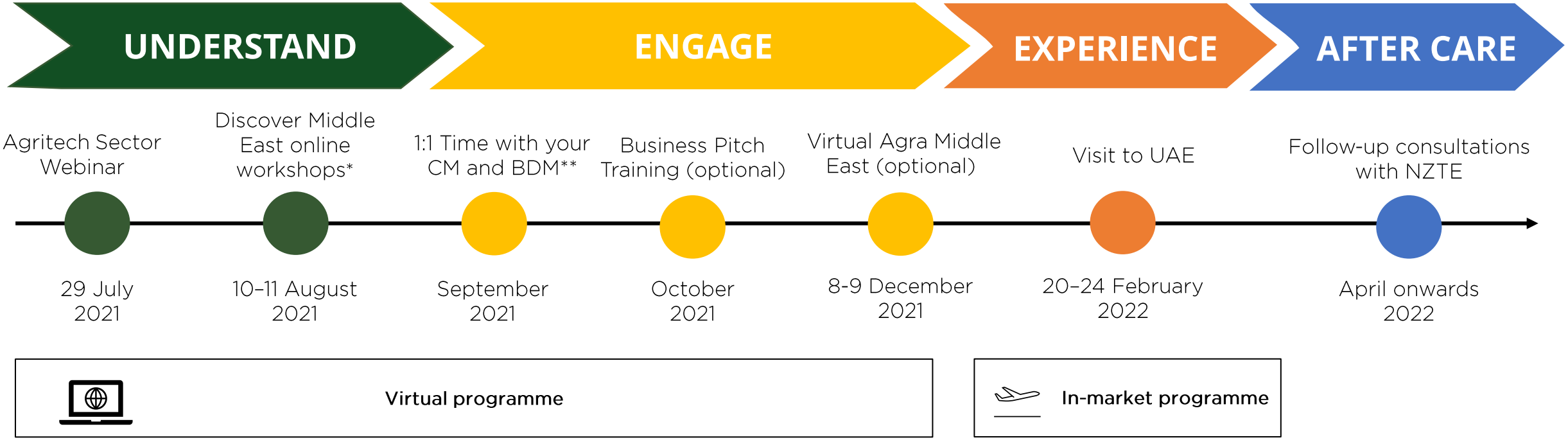
- Strategic partnerships with research organisations such as the International Center for Biosaline Agriculture offer and opportunity to demonstrate capability in an arid environment.
- It is also possible to have the research centre act as a sales agent.
- Research organisations are well connected across the country



NEXT STEPS

DISCOVER AGRITECH UAE

What to expect from the programme?



* For those unable to join in August, the Discover Middle East Workshops will be repeated in October.
** This 1:1 time will be an opportunity to work closely with your Customer Manager and BDM in-market to build your market strategy.

DISCOVER UAE AGRITECH

MARKET VISIT FROM 20 - 24 February 2022

Day 1

The Agritech sector in the UAE – overview and structure

- UAE regulatory environment
- Building your brand in market
- Presentations from relevant Govt depts

Day 2

Navigating the Agritech Landscape

- Hear from agritech companies
- Visits to relevant farms e.g. AeroFarms, Madar Farms
- Networking function

Day 3

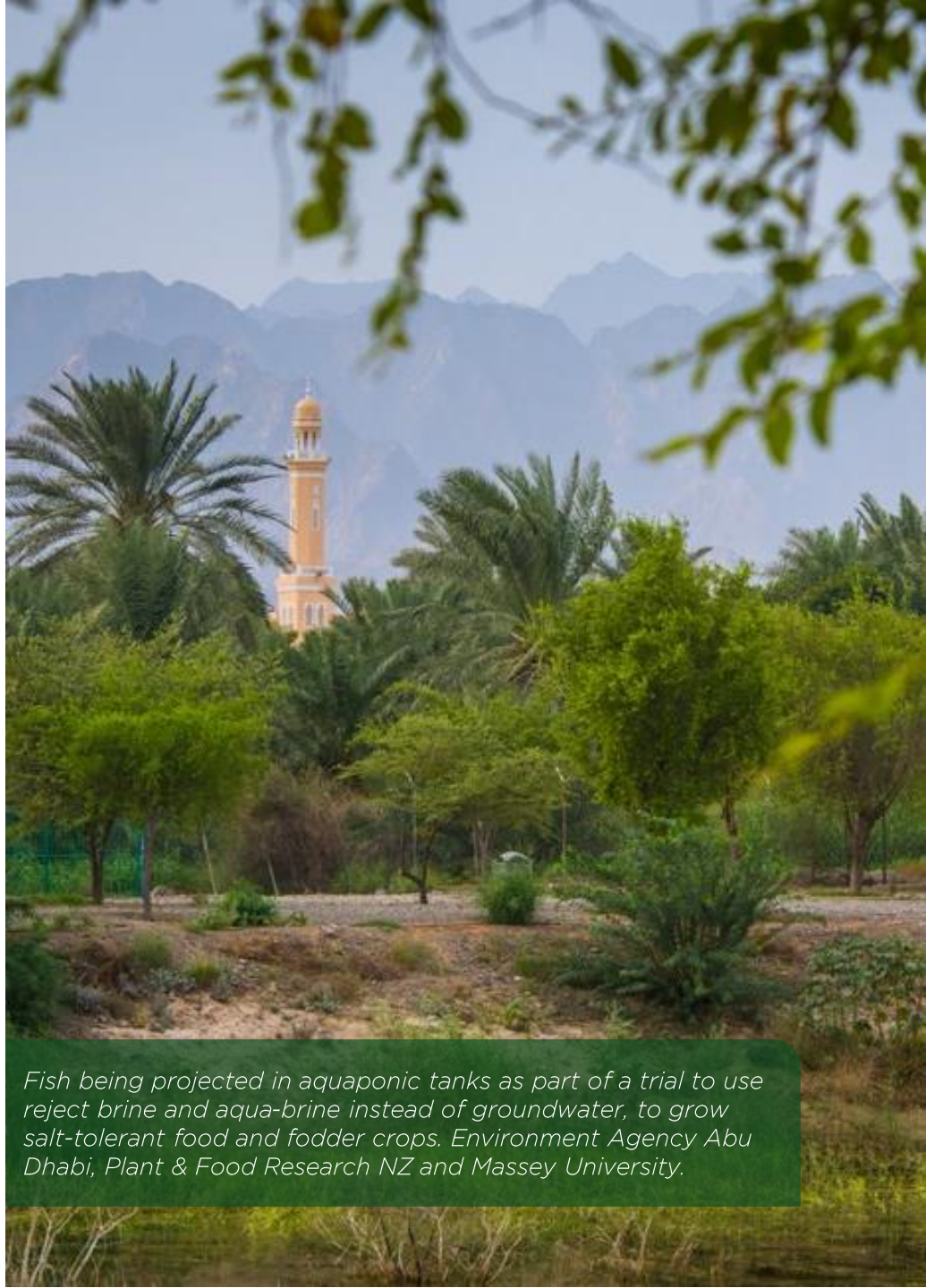
Visit to Food For Future Summit

- Visit this summit, which is part of EXPO's Food, Agriculture and Livelihoods Week.
- Visits to relevant UAE research institutes e.g. International Centre for Biosaline Agriculture (ICBA)

Day 4

1:1 sessions with NZTE Beachhead advisors and BDM's

- Feedback on your proposed in-market strategy and work on next steps



Fish being projected in aquaponic tanks as part of a trial to use reject brine and aqua-brine instead of groundwater, to grow salt-tolerant food and fodder crops. Environment Agency Abu Dhabi, Plant & Food Research NZ and Massey University.