

BUSINESS
LANDSCAPE

Iraqi Agriculture sector overview



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KAPITA's research team deeply thanks and appreciates its partners who majorly contributed to the completion of this study. We sincerely thank GIZ for being an outstanding enabler for us.



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List of Abbreviations

ADIO	Abu Dhabi Investment Office
CBI	Central Bank of Iraq
CSO	Central Statistical Organization
FAO	Food and Agriculture Organization of the United Nations
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
IDR	Import Dependency Rate
IFAD	International Fund for Agricultural Development
IoT	Internet of Things
IQD	Iraqi Dinar
MENA	Middle East and North Africa region
NDP	The National Developmental Plan
NGO	Non- Governmental Organization
OECD	Organization for Economic Co-operation and Development
OKP	Orange Knowledge Programme
SDGP	Sustainable Development Goals Partnership
UN	United Nations
UNEP	United Nations Environment Programme
USAID	United States Agency for International Development
USD	United States Dollar

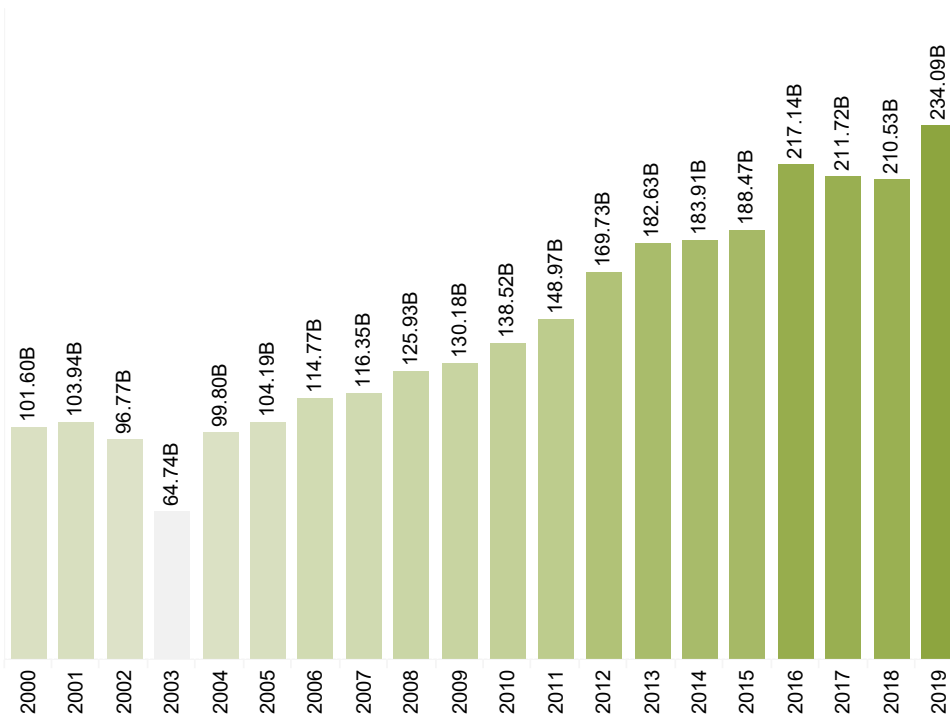
Introduction

The economy of Iraq is mostly oil-dependent as oil revenues contribute to over two-thirds of the GDP and nearly most of the exports and government revenues. Investment in the oil sector has reached 66% of the total expenditure investment in 2017. The GDP of Iraq in 2019 has reached USD 234.09 Billion with an annual growth of 4.401%. The unemployment rate is 10.26% in men while 30.96% in women (World Bank, 2017). However, the decline in oil prices and market demand would have a substantial negative effect on the economy.

The agricultural sector development should be a priority since it plays a role in revitalizing and supporting the economy, achieving social stability, fighting climate change, also providing 18% of employment making it the largest private-sector employer. Investing in this sector and implementing policies and programs to foster its growth and development would help fight the poverty in rural areas which is 30% twice of that in urban areas, it would also increase food security, meet domestic needs, and contribute to the exports.

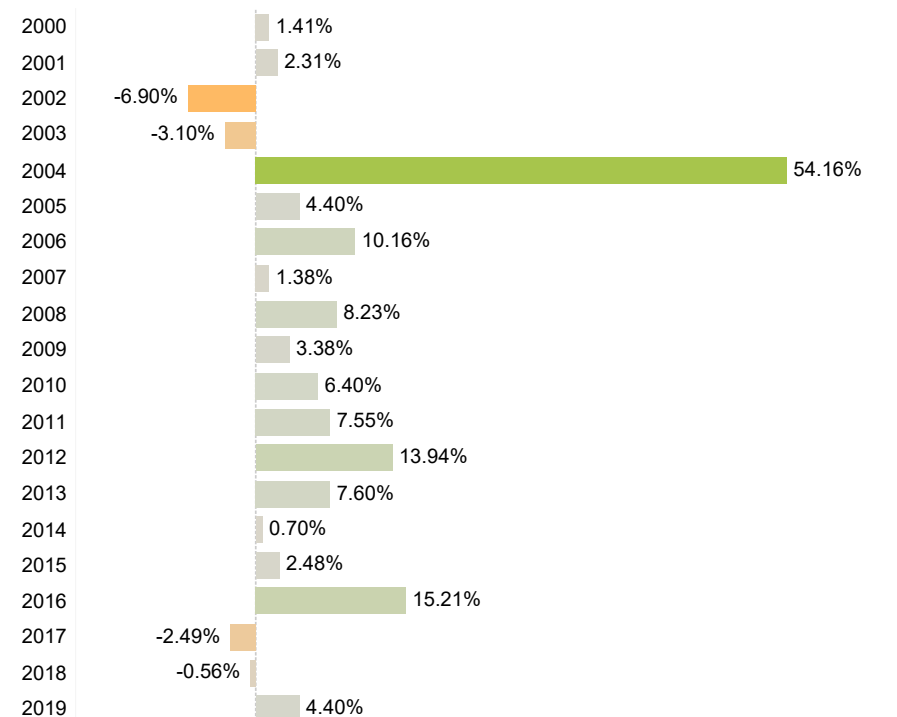
Regardless of the hindering struggles, armed conflict, and lack of long term development plans, agriculture is still a major source of livelihood for the poor and food insecure and is the largest source of rural employment and it is worth mentioning here that agriculture is the second contributor to the GDP after oil revenues and contributes to 5% of the total GDP, and it resides in the middle comparing to other MENA region countries between Sudan, the highest and Qatar, the lowest. Agriculture is a key sector identified for diversifying the economy, accelerating non-oil growth, increasing income, and improving income distribution and gender equality and its growth has been shown to be an important driver of poverty reduction and job creation since it is very labor-intensive, especially among the rural population which is third of the total population with double the poverty rates reaching 30% in rural areas.

GDP throughout the Years



Source: World Development Indicators (World Bank)

Annual Growth of GDP

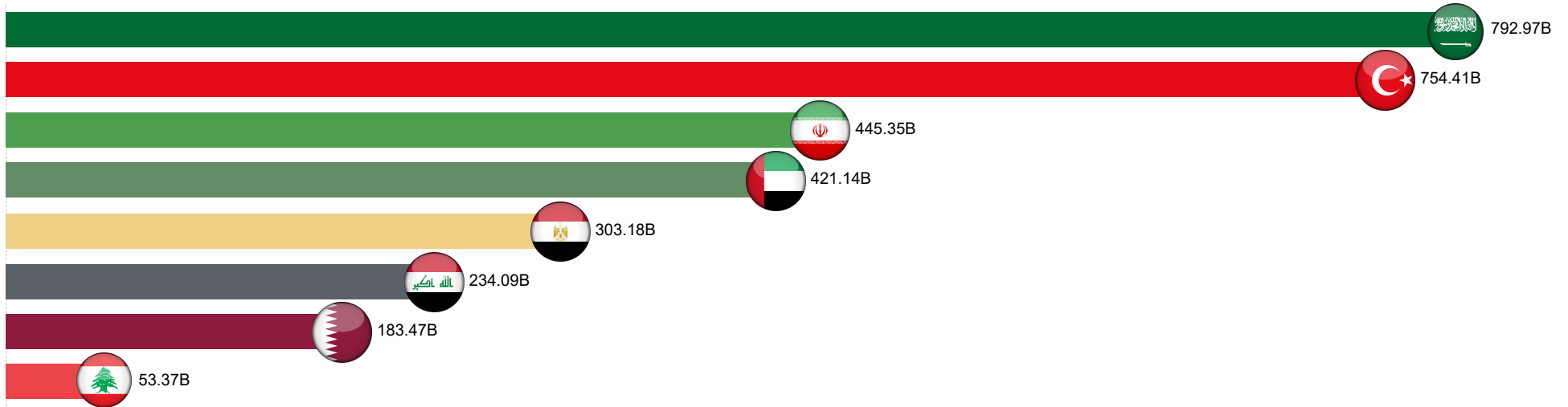


Source: World Development Indicators (World Bank)

The MENA Region

GDP of MENA Region Countries 2019

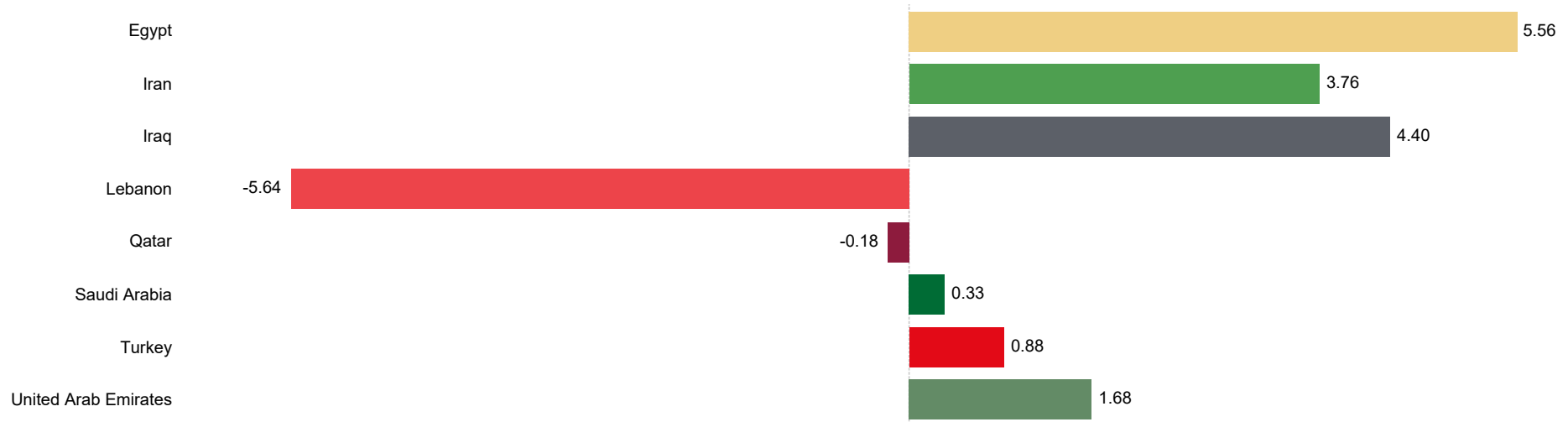
*Iran's GDP is of 2017



Source: World Development Indicators (World Bank)

Annual GDP Growths of MENA Region Countries 2019

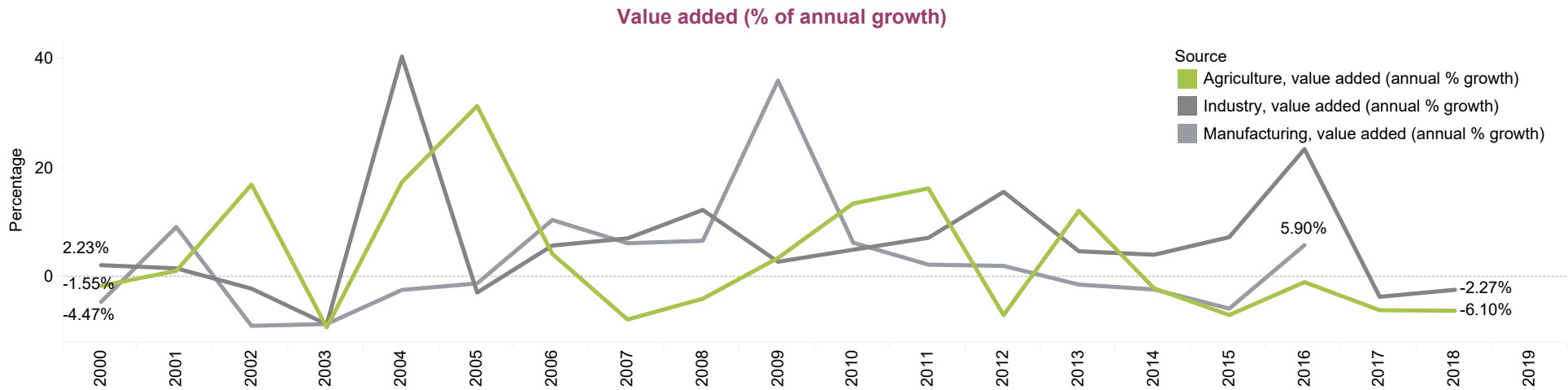
*Iran's GDP Growth is of 2017



Source: World Development Indicators (World Bank)

Agriculture, Value Added (% GDP and Annual Growth)

Agriculture, even though it plays an essential role in the economy, has been neglected in the past years with little investment from the government and an increasing reliance on imports to meet the domestic needs of the growing population instead of developing food sufficiency. In addition, our exports and revenues depend mainly on oil, the agriculture percentage of contribution to the GDP has been decreasing over the past two decades, marking 9% in 2002, 3.6% in 2009, and an all-time low of 2% in 2019.



Source: World Development Indicators (World Bank)



Source: World Development Indicators (World Bank)

Historical Overview

Agriculture was the primary activity in ancient Mesopotamia since the dawn of civilization due to the abundance of freshwater sources from Tigris and Euphrates in the Fertile Crescent where the first civilizations have lived and prospered on crops and livestock. Fast forward to the 20th Century, agriculture has played an essential role in the economy and went through a series of reforms. After the revolution in 1958, land reforms were introduced to centralize the sector and redistribute the lands and reduce the authorities of landlords. However, they proved ineffective to accelerate and foster the growth of agriculture, due to lack of coordination and management.

In 1979 only 22% of imports were agricultural and the country was self-sufficient in many cereal crops, by the 80's the government reduced their intervention and shifted towards privatization of this sector.

The sanctions that the country had to endure in the 1990s and the oil for food program played a role in the deteriorating state of the country's infrastructure and inhibited its growth and development, agriculture also was impacted.

The marshes of Mesopotamia located in the southern and southwest of Iraq in 3 main provinces Missan, Basra, and Nasiriya occupied originally an area of 15,000-20,000 square meters, were a homeland to Marsh Arabs for 5000 years who lived on cultivation and raising water buffalo. The marshes were home to plants like reeds, wildlife and migrating bird flocks and fish. The marshes were drained in 1990s and lost 90% of their original area (UNEP, 2009).

This caused great damage to the ecosystem in the area and caused the weather temperature to go higher, humidity levels were reduced, it diminished the wildlife there and caused damage to the livelihood of the indigenous people, and increased the salinity of the soil. However after 2003, several attempts were made to re-flood the marshes whether systematically or by people, dams and dikes were destroyed.

The programs by the United Nations stated that around 58% of the original area of marshes was reclaimed in 2006 however they suffered a reduction in area due to droughts and the dams projects by the neighboring countries Turkey, Syria, and Iran since they control the flow levels of the Tigris and Euphrates. In addition to the fact that the increased level of salinity impeded the return of wildlife and cultivation to its original state.

The agriculture sector has been stagnated significantly after ISIS occupation of some provinces, worthy of mention that most of these cities that were impacted by the violent conflict like Nineveh and Salah al-din play a huge role in agriculture as they produce over a third of the country production of wheat and barley (World Bank, 2015).

Due to the armed conflict and turmoil, one million tons of grain crops have been confiscated, the land has been destroyed and farmlands have been burnt due to the scorching policy ISIS practiced, the harvest has been damaged. Losses in this sector are estimated by 40% in 2016 (FAO, 2017) and 200 million USD lost in revenue.

Displacement of the population has also contributed to the losses of this sector as most of them are from rural areas, today the internal migration of individuals in Iraq is estimated by 1,555,000 due to violence and conflict according to the World Bank. The revitalization of this sector is really important to the country as a whole to boost the economy and diversify means of revenues. It is also quite important and also for the rural population especially those left suffering from the effects of ISIS, displacement, unemployment, poverty, and the loss of their lands and homes. It is estimated that the investment budget spent on agriculture is only 4% in 2015 rising from 2% which still substantially low as the recommendation of the UN is 10% (World Bank, 2015).

Drained Marshes

Area

(% of original area)

90%

(Throughout 90's)

Reclaimed Marshes Area

(% of original area)

58%

(Year 2006)

Internally Displaced People due to Conflict and Violence

1,555,000

(Year 2015)

Agricultural Losses Due to ISIS Crisis

40%

(Year 2016)

Lost Revenue Due to ISIS Crisis

\$200 Million

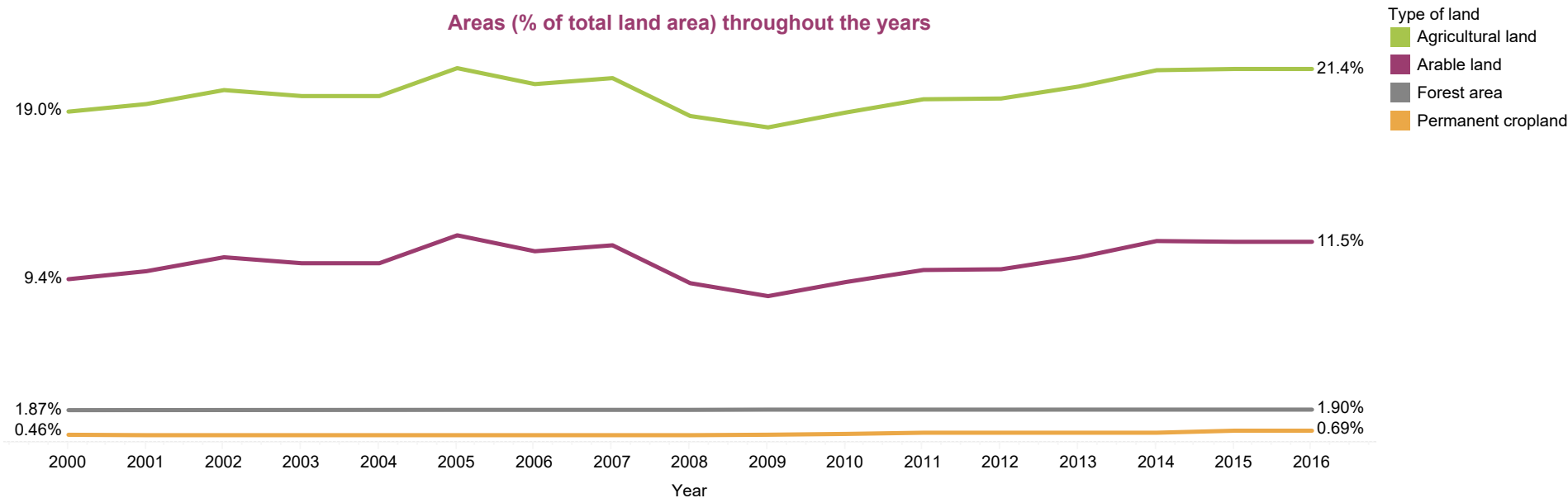
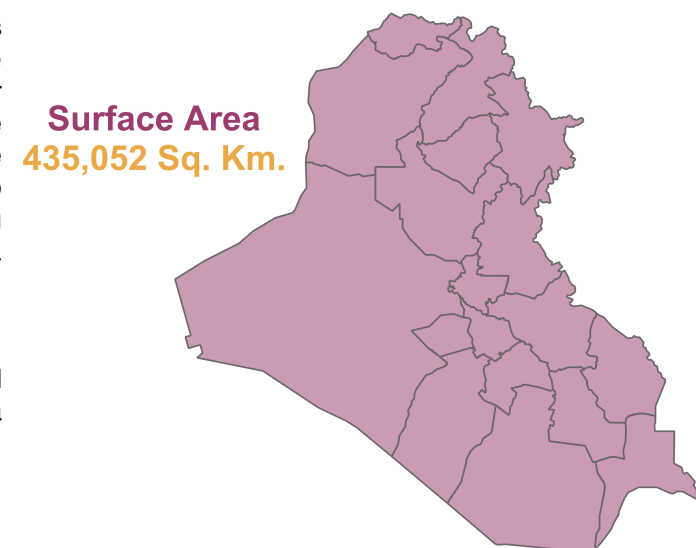
(Year 2016)

Agricultural Land

The agricultural land constitutes 21.4 % of the total surface area of Iraq, and arable land contributes to 11.5%. This provides opportunities to invest in this sector and develop a plan revive this sector with a long term sustainable development that includes developing the weak irrigation systems and old irrigation methods that causes a lot of water waste, investing in personnel, fertilizers, and technological agricultural improvements to support the sector, increase the profit margins and increase the self-dependence on food production to meet the domestic needs. Furthermore provides the opportunity for potential exportation to neighboring countries. Currently, according to FAO, the import dependency ratio (IDR) in Iraq has risen to 76% in 2008 while the rural population tries to heavily cut costs in operations and inputs resulting in a very low output with minimal profit margins. And it also witnessed a drop by 17% in crop production compared to a 25% rise in neighboring countries.

Agricultural land is the total area of land under permanent crops, or permanent animal husbandry, meadows, and pastures (OECD, 2020). Agricultural land is usually defined and assigned legally, hence if the agricultural land is no longer arable due to certain issues like salinity and soil erosion it will still be categorized as agricultural until a change is made in the documentation of the relevant administrative departments.

Arable land is the total area of land under temporary crops and pastures (FAO, 2017) it includes land that is adequate to grow and cultivate crops, land that is not usually used for cultivation but has the potential is excluded.



Source: World Development Indicators (World Bank)

Rural Population

The rural population is almost a third of the total population, compared to 50% in the world and 44% in Arab countries. The lack of attention and development that countryside and rural areas are struggling with caused some migration towards the urban areas in addition to 39% of the rural demographic living in poverty and poor circumstances due to the deteriorating conditions of the countryside and the reduction in resources.

The country needs to implement new policies and invest in this sector to diversify the sources of national income instead of depending on oil and gas especially after the decline this sector is experiencing globally and the shift towards environmental sustainability.

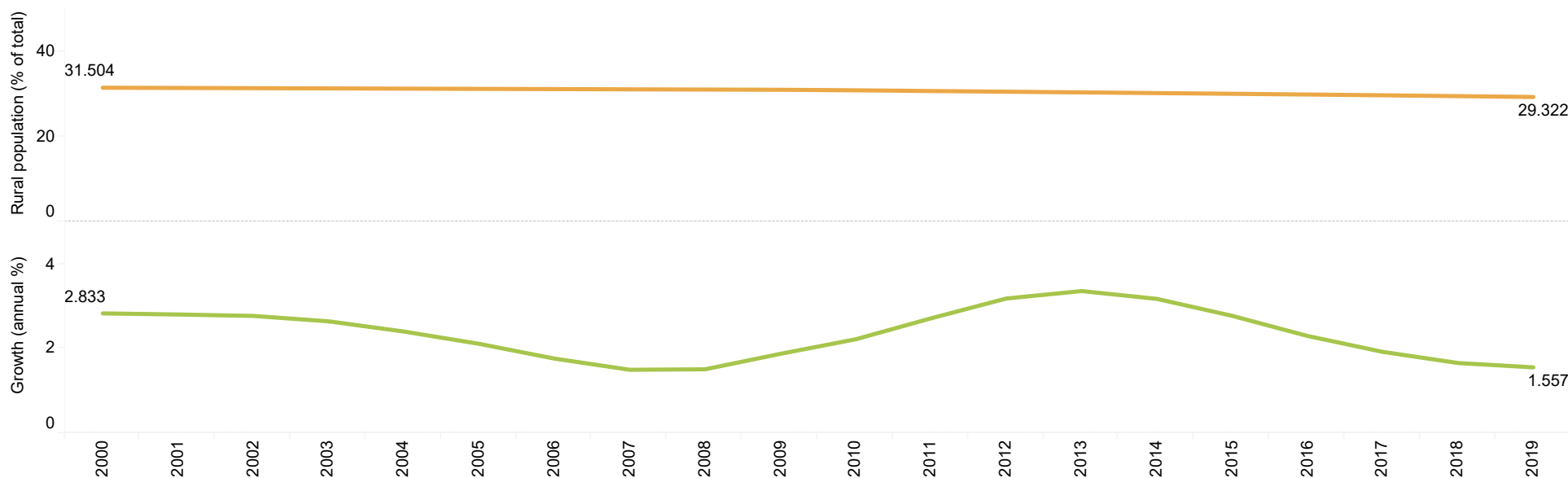
Rural Population

11,526,415

Rural Population (% of total population)

29.32%

Rural Population and Its Growth Throughout the Years



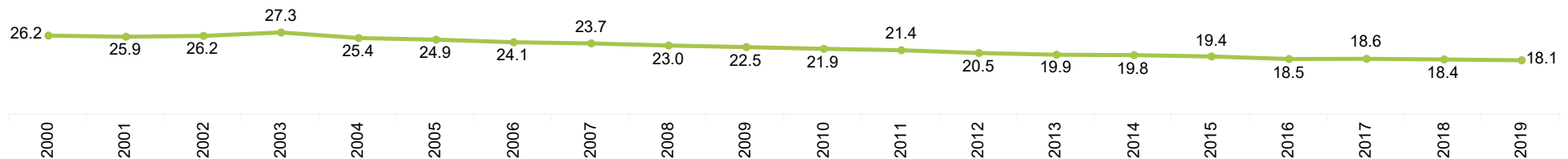
Source: World Development Indicators (World Bank)

Employment in Agriculture

The agriculture sector is vital for employment although it has declined over the past two decades from 26% to 18.1% yet still composes a large fraction. Around 75% of rural working population make their living from their crops mainly wheat and Barley while the rest depend on crops live livestock. The poor conditions of the rural areas have stimulated the drive to migrate to urban areas seeking better livelihood but at the same time resulting in the displaced populations living in poverty.

To mitigate this phenomenon, policies should be implemented in providing better agricultural inputs to the rural population and establishing a more dynamic supply chain and access to the free market, to increase the socio-economic conditions of a great portion of the population that in return would increase the food security to meet local needs. Employment in agriculture provides work opportunities for the population with low levels of skills and education.

Employment in agriculture (% of Total Employment) throughout the years



Source: International Labour Organization, ILOSTAT database

There are 5,673,250 women living in rural areas in 2018 according to the Central Statistical Organization (CSO), contributing to 30.1% of women in the country, with the majority living in Nineveh, Anbar, Diyala, Babylon, and Baghdad. The rural woman plays an essential role in the agricultural sector where they participate in the fieldwork by an estimation of 50% in 2000 according to the FAO as agriculture is considered the main employer of the rural female population. With some of them operating small businesses with no access to funding in order to support their families. However a large portion of women working in agriculture are unpaid and it is estimated that they contribute to 31% of women in the labor market, some women in rural areas still lack proper access to education which leaves 27.3% of them illiterate, and only 26.2% of them end up getting a high school diploma.

Women employed in the agricultural sector has been steadily declining over the past two decades from around 26.174% of total female employment in 2000 to 17.49% in 2019, we also notice a very similar pattern for males employed in the agriculture sector.

Employment in Agriculture by Gender (% of Each Gender Employment Rate)



Source: International Labour Organization, ILOSTAT database

Agricultural Sector: Education

There are 314 vocational schools in Iraq in different fields, industrial, agricultural, trade, computer, and information technology, and art with 50,603 students in total for the year 2018/2019 (CSO, 2019). Agricultural vocational schools are 10 around the country, around 1.5% of students in vocational schools are enrolled in the agricultural field. In which there are 736 already existing students, 704 of them are males, 239 new students, 218 of them are males, and 326 teaching staff for the academic year 2018/2019.

There are also several higher education institutes, mainly The College of Agricultural Engineering Sciences at the University of Baghdad is the first agricultural faculty in Iraq, established in 1952. The faculty includes different departments like animal production, soil sciences and water resources, agricultural machinery, plant protection, food sciences and biotechnology, field crops, gardening and landscaping, agricultural economics. Those departments were also established in other agricultural faculties across the country later on. It includes different research units in palm trees, biological control, medicinal and aromatic plants, and fishery. There are currently 4,124 undergraduate students, 404 postgraduate students, 488 teaching staff, 27,325 undergraduate alumni, and 3,542 postgraduate alumni.

Also, The College of Agriculture and Forestry at the University of Mosul, served as the Higher Institute of Forestry in Baghdad then it was moved to Mosul and developed into a college under the administration of the University of Baghdad, then was transferred to the University of Mosul in 1967 following its establishment. Currently, it has 1,487 undergraduate students, 40 postgraduate students, 300 teaching staff, and 119,008 alumni.

The College of Agriculture at the University of Basra, established in 1971, includes several departments similar to those previously mentioned in addition to the department of fish and marine resources which is considered essential in Basra and the southern region due to its geographical location. The department focuses on research and studies of aquaculture, aquatic environment, and pollution, it also seeks to improve fish farming and combat environmental pollution.

The College of Agriculture at the University of Diyala, established in 2004, with 962 undergraduate students and 71 students for the academic year of 2016/2017. It has four departments currently which are animal resources, soil sciences and water resources, field crop sciences, and gardening and landscaping. Other faculties include the College of Agriculture at the University of Anbar, College of Agriculture at the University of Tikrit, College of Agriculture at the University of Kufa, College of Agriculture at the University of Karbala, College of Agriculture at the University of Kirkuk, College of Agriculture and Marshlands at the University of Thi Qar established in 2006, and College of Agriculture at the University of Qadisiyah.



Image Credit: Rudaw

Major Issues: Water resources, Irrigation and Salinity

Water resources and irrigation

- The irrigation in Iraq is considered one of the persistent issues in the agriculture sector, around only 20% of farmers have access to a fully functioning irrigation system, causing a major loss in the crop yields.
- Surface irrigation or flood irrigation is the common traditional method practiced and covers 81.4% of the irrigated area since it is not capital intensive and requires simple maintenance in addition to the lack of investment in more modern irrigation techniques. This method leads to salinization, water waste due to evaporation, and unequal water distribution, where only 40% of water is actually used by crops. The infrastructure for irrigation networks is in a poor and inadequate state that requires maintenance.
- The freshwater sources are suffering from contamination due to industrial waste and lack of regulations and policies in that area.
- Drought, the increased heat, and the reduction in precipitation had affected the rainfall fed corps and farmlands, as well as the levels of the rivers streams.
- Lack of international treaties and legislation to regulate the water consumption and division of Tigris and Euphrates between Iraq, Turkey, Iran, and Syria. Turkey has been able to reduce the water flow of these rivers in Iraq by a staggering 80% by its dams projects.

Salinity

- Increased Salinity levels have been a critical threat to the agriculture sector, a percentage as high as 70% of cultivable areas and lands have been suffering from this issue.
- Causing around 20% up to 30% of loss in irrigated areas.
- This leads to low productivity of agriculture lands and an increase of sandstorms.
- The increased salt in the soil is a natural phenomenon although it is also caused by the misuse of irrigation methods.
- Introduction of a more technologically advanced irrigation method is essential also improvement of already existing pipes and networks.
- Using crops that are more resilient to dry climate and less water-consuming would also be an alternative solution.



Image Credit: MEE/Sebastian Castelier

Recent Agricultural Projects Overview

Recently the agricultural sector in Iraq has been receiving growing attention led to initiate few projects for the cultivation of cereal crops, fruits, vegetables, and dates. In addition to raising livestock. These projects help meet the local needs, increase food security and self-sufficiency, and increase employment of the rural population. The following is a brief overview of some currently running projects and initiatives:

- The Ministry of Agriculture has included the water mismanagement problem on the priorities of their agricultural initiative, in 2010-2012 the ministry purchased and received a total of 4170 fixed and center pivot sprinklers irrigation systems.

- Imam Hussein agricultural city, established in 2009 and located on the route between Najaf and Karbala, it occupies an area of 1000 Dunam (1 Dunam= 2500 square meter). It is used for producing winter and summer crops like tomatoes, cucumber, pepper, and eggplants, in addition to wheat and livestock (mostly sheep). Salinization is a major issue they are dealing with by using tractors and irrigation by sprinklers using wells water and they are trying to transform the desert soil into fertile soil by plowing and using organic fertilizers and adding elements to the soil. This farmland has met the domestic need for tomatoes crops in Karbala and other cities.

- Abu Al-Ahrar agricultural city in Karbala, extending over 5500 Dunam of land, it is used for cultivation of mainly wheat and barley, in addition to yellow corn, mash, citrus trees, and some fruits. It is also used for raising livestock (sheep and cattle), the land used to be flooded with water and suffering from major salinity issues that they are combating with desalinization of water, sprinklers irrigation, plowing, and tractors.

- Alfirmous (Paradise) farm which extends over 760 Dunam mainly for cultivating wheat, the project is initiated by the Abbasid Holy Shrine in Karbala relying on axial sprinklers for irrigation and wells water.

- Buckthorns farm in Karbala, the project was initiated in 2017 with over 5600 trees over 70 Dunam area surrounded by 230 olive trees.

- Fadak farm in Najaf, about 32 km west of the city, established in 2011 by the Imam Ali Holy Shrine extending over an area of 8000 Dunam, the land also includes 2 fish tanks around 5 Dunam each, crops include wheat, barley, some vegetables, and palm trees. They also raise livestock.

- Al-Kafeel company which is affiliated with the Abbasid-Holy Shrine has initiated several projects in Karbala includes planting and cultivating forage crops, livestock farming, 100 Dunam for greenhouse farming initiated in 2011, Al-Joud for agricultural supplies, fertilizers, and pesticides initiated in 2014, and Al-Fadhil dates factory.

- Fadak farm in Karbala occupying an area of 2000 Dunam used for the cultivation of palm trees with 50 to 60 different types of dates. The project also assigned 40 Dunam for the cultivation different fruits like pomegranate, figs, and grapes since they can withstand the weather conditions, the project has succeeded in creating job opportunities and investing in deserted lands and transforming them into fertile farms. In their next step, Fadak farm will plant over 14000 -16000 palm trees in order to encourage Iraq dates production over an area of 950 Dunam.



Image Credit: imamhussain.org

Government Policies and programs

- Legislation of Law 11 for 2010 to protect Iraqi products and Fighting dumping policies that impact the local goods by selling imports at a lower level in the market, while encouraging the production of local crops and secure their access to market and fair competition.
- The Ministry of Agriculture sealed a deal with the ministry of industry and minerals to purchase all the urea fertilizers in order to improve the quality of soil and production of crops in addition to supporting the public institutes.
- Ministry of Agriculture also provides machinery and supplies at subsidized rates and installments for farmers.
 - Implementing policies and legislation to prevent trespassing and abuse of agricultural areas especially palm trees farms.
 - Encouraging farmers to cultivate their lands and increase the quality of their crops by providing them with premium quality seeds, machinery, and supplies.
 - Initiating a project to plant 2 million trees in the country to combat sand dunes, desertification, and drought.
- The agricultural meteorological network, which provides a database and intensive study of the weather forecast and climate and its effects on the agricultural production in order to eliminate water waste, determine the proper planting and harvest times, prepares studies on the environmental factors causing soil erosion, research alternative energy use projects like solar and wind energy, so far until 2014, there were 46 installed stations all over the country.
 - The reduction of the area assigned for winter crops by 55% for 2018-2019 in efforts to reserve water as most winter crops like wheat consume water in great amounts, this is expected to reduce the production of wheat by 20% according to FAO.



Image Credit: Rudaw

Government Plans

- The National Developmental Plan (NDP): 2018-2022 a framework to draw goals and come up with means to achieve them in order to meet the needs and solve the problems of each sector and level, led by the minister of planning, technical and sectoral higher committees. One of its main interests is the agricultural sector and water resources. They aim to increase the agricultural contribution to GDP from 4.5% in 2015 to 5.2% in 2022 with 8.4% growth in the sector, in addition to increasing food security and sustainable water resources while decreasing the annual demand of water by 500 million m3 per year.

- National Development Plan: 2010-2014 which sought economic stability and growth and strived to empower the private sector, the plan assigned USD 9.7 Billion (FAO, 2012) for the agricultural sector in order to modernize the methods used for agricultural services, create employment, enhance the quality of rural life and implemented policies in order to encourage the private agricultural sector and investment, competitiveness in the market and focused on repairing the irrigation network and tried to come up with solutions to the water resources international conflicts and internal resources management.



Image Credit: AP Photo/ Alaa al-Marjani



Image Credit: Reuters , Marshes- South Iraq

- The plan of Ministry of Agriculture (2009-2015): the plan mainly aimed to restore the agricultural land and soil, reduction of the salinity and improving the irrigation networks, reducing water waste and using resources efficiently, their second priority would be increasing the production of main crops like wheat and dates, and development of livestock, their pastures and vaccinations.

- The Agricultural Initiative in 2007 with 6 funds that allowed farmers to take zero-interest loans from the agricultural bank in order to purchase agricultural supplies and inputs and initiate their projects, it also provided seeds and crops at subsidized rates and encouraged collaboration of the private and public sector. The aim of the initiative was to reach self-sufficiency in food and crops, decrease poverty, increase employment in rural areas, strengthen policies and infrastructure, and irrigation channels.

Partners' Projects

- FAO Country Programming Framework (2018-2022): FAO provided the Iraqi government with partnership in 3 essential areas in support of the objectives of the National Development Plan. The framework focuses on the resilience and restoration of agricultural livelihood in liberated areas of Ninewa, Anbar, Diyala, Kirkuk, and Salah al-Din, restoration of agricultural land, increasing water productivity, increase food security through sustainable agriculture.
- The FAO sub-program is contributing to the United Nation's Recovery and Resilience Program (2018-2010) particularly in the third component that serves the restoration of agriculture and irrigation water systems. The budget of the program is a total of USD 92.95 million (FAO, 2018).
- The main objective of the program is a tangible change in the lives of the rural population in areas that suffered from ISIS, create job opportunities and reduce unemployment and poverty, increase food security and nutrition and sustainable smallholder agriculture, supporting the rural women and youth, and providing training in food processing ventures.
- The program also supports partnerships between the public and private sectors and encourages communication to create strong value chains that facilitate the access of outputs to the market.
 - Key areas include the water resources and the reviving, restoration of the damaged irrigation systems, and management of the water resources efficiency and quality.
- The program works closely with the Ministry of Agriculture, Water Resources, Health, and Environment to make sure the goals, methodology, and approaches align.

- Smallholder agricultural revitalization project with IFAD was approved in 2017 with an 8 years duration and cost of USD 31.84 million. The project expects to impact 140,000 of the rural population in the 4 provinces it covers which are Missan, Thi Qar, Qadisiya, Muthanna. The project aims to improve the lives of the rural population by diversifying their crops, source of income and increase their productivity and activities, strengthening the community by investing in farmers associations, supporting the vulnerable rural youth and women, and most importantly repair and maintain the supply of water using irrigation schemes.

- USAID agribusiness INMA program: the program was initiated in 2007 until 2010 and was extended to 2012, it targets the private agriculture sector and promotes its growth by providing them with training and assistance to promote its development as well as technologies to increase revenues and decrease production costs, create jobs, develop market chains, encourage investors and entrepreneurs in this field, develop fish farms and hatcheries, livestock cross-breeding, enable the youth, women, and people with disabilities. The program was able to make 142 million USD of revenues from agricultural products in addition to providing 14,711 people with jobs.



Food and Agriculture
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Partners' Projects

• Additional financing loan for the emergency development project for the agricultural component, the project covers the cities recently liberated (Nineveh, Diyala, Kirkuk, Salah Al-Din, Anbar) which suffered terrorism and violence. The project loan is provided by the World Bank and of a value of 32 million USD, it covers the operations of 5 years starting 2018 and ending by 2023. It targets the recovery of the agricultural sector in the impacted areas to promote the stability of the area and the public sector and to reverse the damages that have fallen upon the infrastructure in addition to promoting the growth and modernization of the agricultural sector.



• Orange Knowledge Programme (OKP): a program funded by the Netherlands Ministry of Affairs and run by Nuffic; the Dutch Organization for Internationalization in Education, operating in 55 countries for 5 years, it was launched in 2017 and expected to end by 2022 with a funding of 220 million, 2.3 million of which is allocated for the program in Iraq. The program is concerned about two main themes in Iraq which are food and nutrition security, and water management for climate-smart agriculture. The program promotes diversification of the economy and sustainable development of the agriculture sector especially agricultural food and supporting the private sector. The program is also aligned with National Development Plan 2018-2022 to modernize the agriculture system and supporting it by applying the Dutch knowledge and training in agricultural innovation to strengthen the private sector in this field hence providing job opportunities and reduce unemployment among the labor force, support horticulture and set up food quality control and support dairy production. OKP pursue their objectives using different instruments like scholarships, training, and institutional collaboration projects between higher education and technical and vocational education and training.



• Sustainable Development Goals Partnership (SDGP) is a program implemented by the Netherlands through the Netherlands Enterprise Agency to support the 17 sustainable development goals that are set by the United Nations for 2030, the program is implemented almost 60 countries and the main focus is on 3 of these goals which entail ending hunger, food security and sustainable agriculture, sustainable economic growth and inclusive productive employment. In addition to focusing on global partnerships for sustainable growth. The Netherlands has assigned funding to organizations and partnerships of public and private sectors, NGOs, and Knowledge institutes in Iraq that have projects regarding the development of agro-food in certain aspects like sustainable value chains, climate-resilient food production systems. The period of the project should not fall below 3 years or exceed 7 years. Funding ranges from 0.5 to 3 million Euros. The application was open until September 2019.

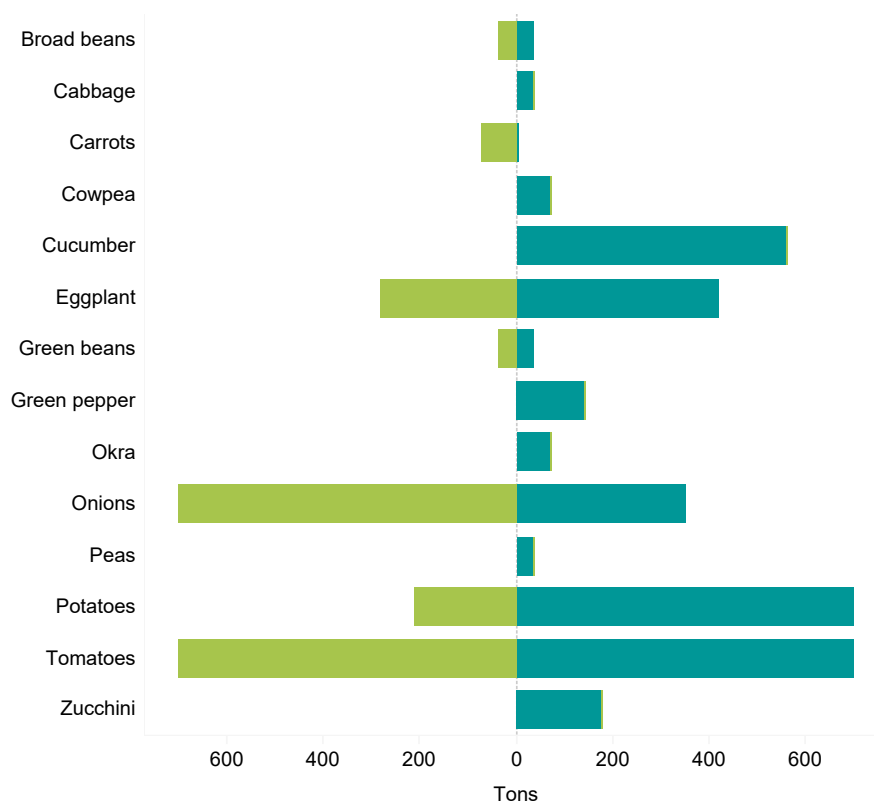


Government Policy to Ban Imports

In 2019 the Ministry of Agriculture issued an imports ban on 25 different agricultural items and also prevented the Kurdistan region to export these items to other provinces, they are seeking to promote local production, support the agricultural sector and the rural population employed in this sector and mainly achieve self-sufficiency in food and increase food security while decreasing the dependence on imports. The ban includes agricultural produce which are wheat, barley, corn, eggplant, cabbage, cauliflower, carrots, buckthorns, potatoes, lettuce, garlic, zucchini, dates, pepper, tomatoes, melon, watermelon, green beans, beets, turnip. It also includes meat products and poultry, eggs, fish, and honey. In addition to forage wheat. The ministry announced that the accomplished self-sufficiency in the production of strategic cereal crops like wheat with 4 million tons and other banned items and produce like tomatoes, cucumber, pepper, eggplants, and potatoes. The ministry also banned importing some production requirement plants like cotton, palm trees, grapes, sugar cane, and olive and stated that there is a demand to export 850,000 tons of barley, and other crops like dates and eggplants.

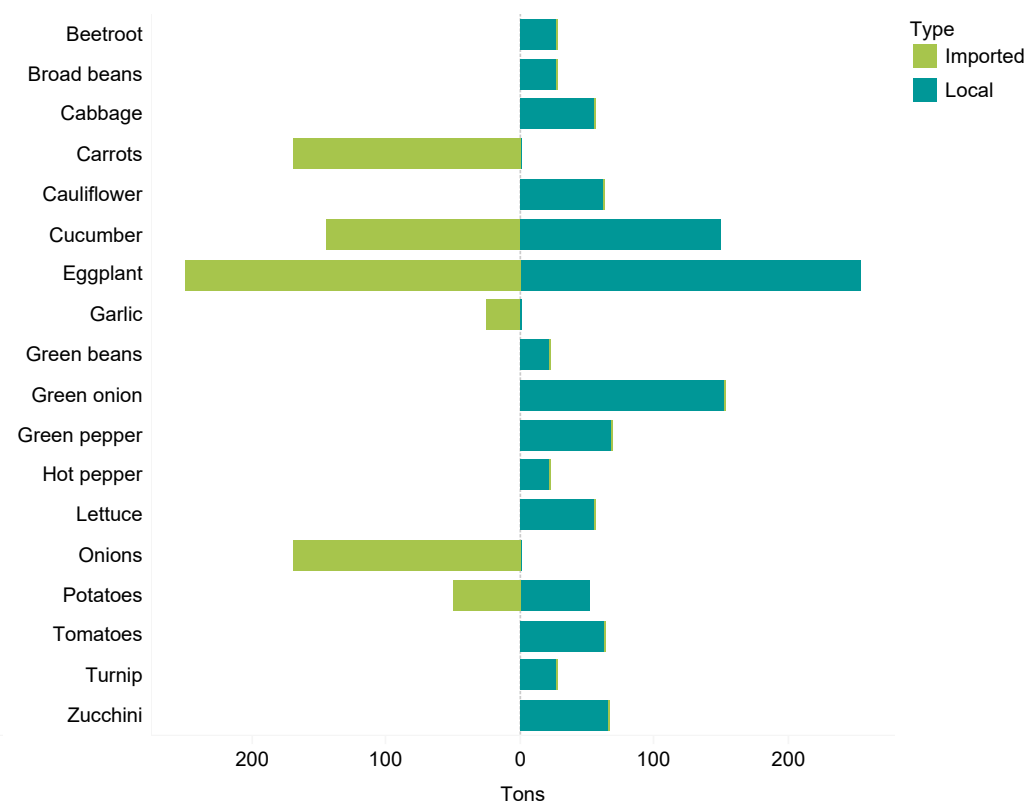
The following graphs demonstrate the prices and amounts of local and imported produce, recorded in Baghdad, Al-Rusafa in May 2020, and in Al-Muthanna in March 2020.

Amount of Local and Imported Produce in Baghdad



Source: Iraqi Ministry of Agriculture, Crops Prices and Amounts in Baghdad, Al-Rusafa, May 14th. 2020

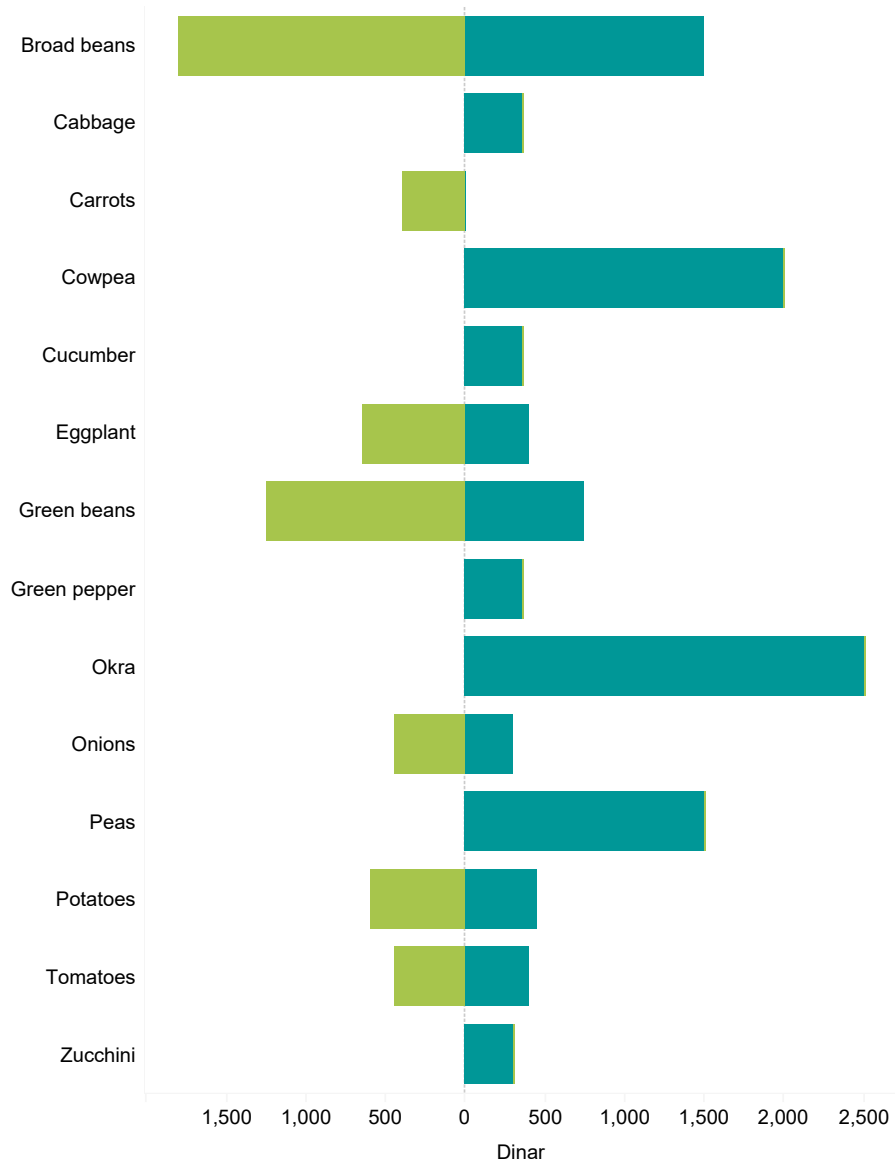
Amount of Local and Imported Produce in Al-Muthanna



Source: Iraqi Ministry of Agriculture, Crops Prices and Amounts in Al-Muthanna, March 12th. 2020

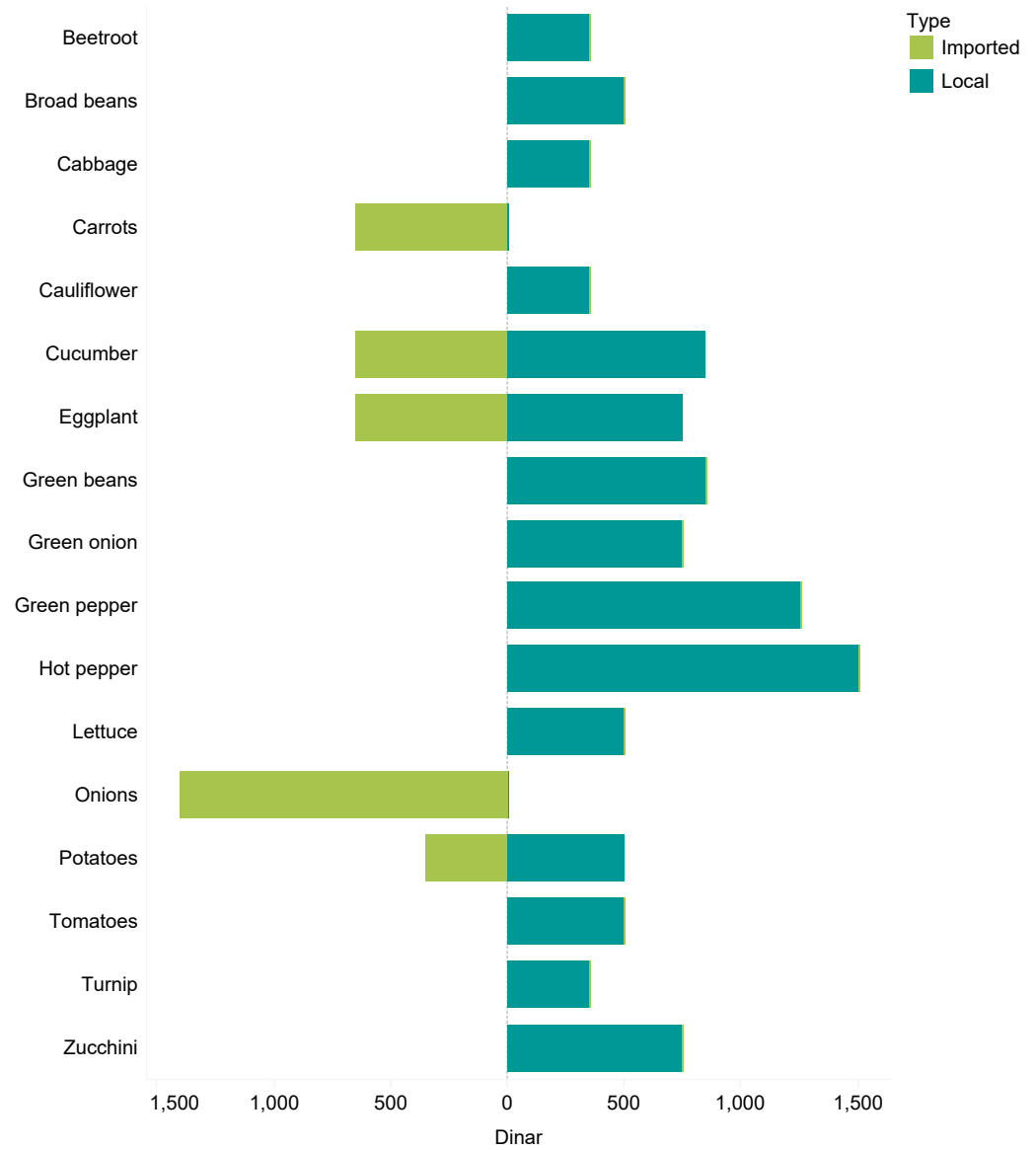
Government Policy to Ban Imports

Prices of Local and Imported Produce in Baghdad



Source: Iraqi Ministry of Agriculture, Crops Prices and Amounts in Baghdad, Al-Rusafa, May 14th. 2020

Prices of Local and Imported Produce in Al-Muthanna

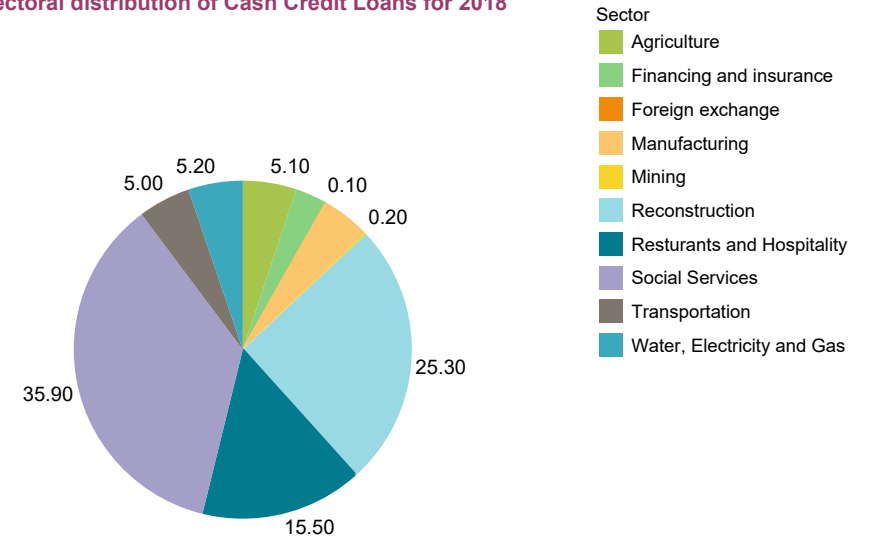


Source: Iraqi Ministry of Agriculture, Crops Prices and Amounts in Al-Muthanna, March 12th. 2020

Sectoral Distribution of Cash Credit Loans

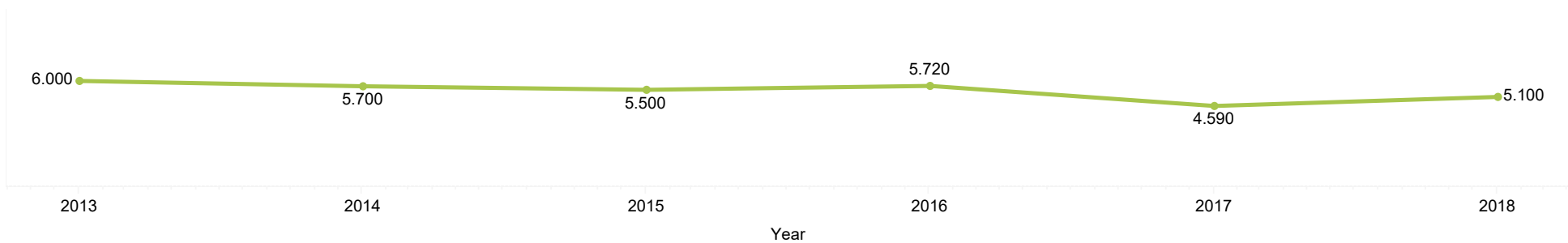
According to the Central Bank of Iraq's annual report, agriculture along with forestry and fishing had relative importance contributed to the GDP growth by 1.9% in 2018, a decline of 25.8% since 2017. The share of cash credit is largely concentrated in sectors like social services with 35.9% in 2018, followed by construction with 25.3% then the trade and hospitality industry with 15.5%. As for agriculture, it is granted only 5.1% in 2018 an increase of 4.59% in 2017 but an overall decline since 6% in 2013. The main reason why the majority of loans are given to these sectors while others are neglected depends on the collateral the sector can offer the bank even though this is limiting the development and growth of important sectors and creating a large gap between the different economic activities. However, the CBI initiative of 1 trillion Iraqi Dinar to stimulate the growth of the Iraqi economy and support small and medium-sized enterprises provided the agricultural sector with IQD 623 million. Also to support liquidity the agricultural bank has obtained a loan of IQD 1666 million. The agricultural sector was also provided with IQD 227.8 billion for investment in 2018 compared with IQD 40.2 billion in 2017 which is a significant growth rate of 452.9%. Yet it still has a share of 1.6% of investment spending in 2018 which is a minimal value compared to the industrial sector that obtained 80.6% of the investment spending total (CBI, 2018). The statistical analysis performed by the CBI has also shown that the share of cash credits provided to the private sector was 52.53% in 2018 while the public sector obtained 47.47%. Mostly going towards the Central Government while the share of other public institutes has declined. The governmental banks currently operating in Iraq are 9,9% of the banks but they still hold the majority of cash credits by 80.93%.

Sectoral distribution of Cash Credit Loans for 2018



Source: Annual Report of Central Bank of Iraq 2018

Agriculture Share of Cash Credit Loans



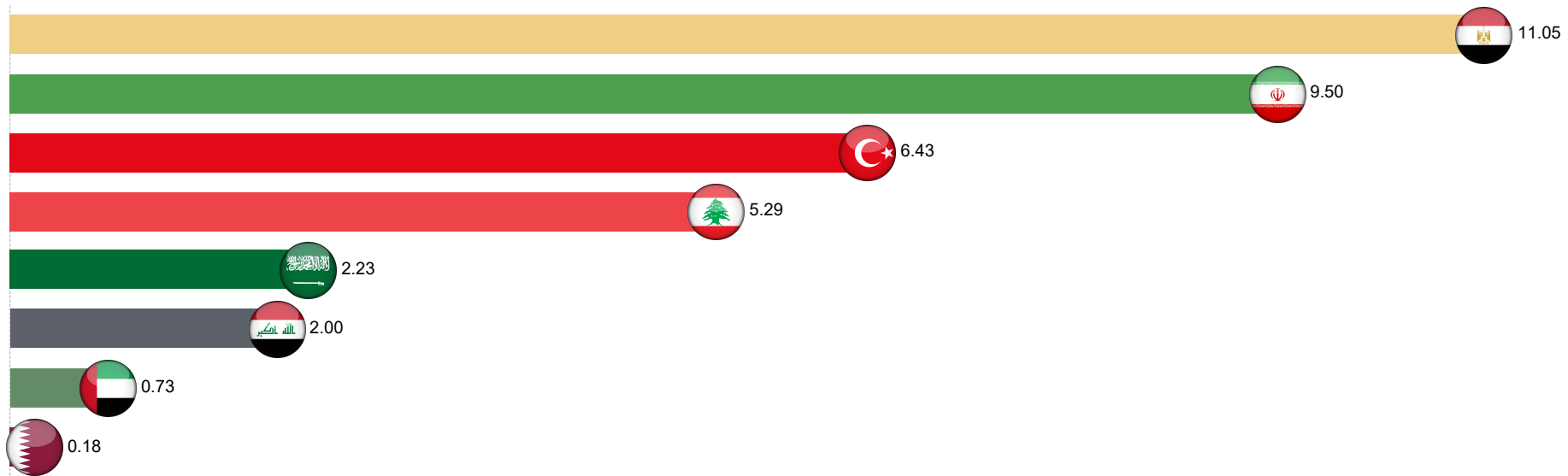
Source: Annual Report of Central Bank of Iraq 2018

MENA Region: Agricultural Sector

- Agriculture contributes to an average 13% of the GDP in the region as a whole, however, two-third of the countries in the region recording percentages below 13% while arable land is only 5% of the total area of the region with 40% of crops requiring irrigation due to hot and dry climate (FAO, 2018).
- Countries in the MENA region show different patterns when it comes to agriculture according to the environment, income, growth, and development of the country however generally the region is reliant on food imports, and is lagging behind in agricultural developments to encounter environmental constraints such as the water scarcity in the region as the annual average renewable freshwater per capita is only 6% of the world average (FAO, 2016), the agricultural sector consumes 85% of the water resources.
- The largest agricultural producers in the region are Egypt and Iran as they produce around 50% of total MENA agricultural production followed by Morocco, Algeria, Sudan with 27%.
- The region lacks policies regulating and managing water sources and maintaining irrigation networks, unsustainable practices have depleted underground water.
- The sector relies heavily on cereal crops especially in lower-income countries, they occupy 60% of harvested lands (OECD, FAO, 2018), cereal crops are high water consumers comparing to other crops with higher revenues but we still observe policies supporting these crops to promote self-sufficiency in food staple especially in countries like Iraq and Egypt where the government regulates the production of these crops.
- A Shift is made to promote more fruits and vegetable production as they consume far less water than cereal crops and supporting horticulture crops promote economic growth and higher returns. Which helps reduce poverty and stimulate rural development. Countries like Lebanon, Jordan, and Palestine have assigned half of the harvested land for horticultural cultivation.
- Saudi Arabia has transformed its agricultural reality by reducing the policies that promote wheat production which was significantly reduced from 2.5 million tons to 30,000 tons in 2015 and instead encourage horticulture crops in addition to integrating drip irrigation systems to protect their water reserve (FAO, 2015).

Value Added of Agriculture (%) to GDP of MENA Region Countries 2019

*Iran's Value Added is of 2017



Source: World Development Indicators (World Bank)

MENA Region: Agricultural Technology

High-income countries like countries of Gulf Cooperation Council (GCC) depend mostly on the revenues from the oil sector, and food imports constitute 90% of their domestic food needs especially with the scarcity of resources and environmental conditions in order to combat these circumstances new innovative solutions have emerged. smart farms, a controlled environment of greenhouses with very advanced agricultural technology that used LED lighting, solar power for heating, robotic harvest system, advanced fertilizers, and pesticides to mimic the perfect environment for cultivation was able to provide the market with 30%-40% cheaper product than imports (OECD, FAO, 2018).

Pure Harvest: an agro-tech startup has landed 100 million USD for Wafra international investment company in Kuwait in order to transform the agricultural reality of the GCC countries. Pure Harvest which is based in the UAE and is one of the lead agro-tech companies in the region has come up with semi-automated greenhouses for horticulture producing vegetables and fruits in a controlled environment for a sustainable local production.



<https://pureharvest.ae/>

AeroFarms: an indoor vertical farms company operating in the states since 2004, aiming to provide the world with plants grown safely in environmentally friendly farms with 95% less water consumption than traditional farming. Their products are distributed through their brand Dream Greens, they provide all year round quality produce and cut on costs by locating their farms near cities. They recently landed an investment along with three other agritech companies of \$100 million from Abu Dhabi Investment Office (ADIO) to start operating in Abu Dhabi along with other companies like Madar Farms to overcome the challenging region conditions and promote sustainable local agriculture. the project will expand over an area of 90,000 square feet with advanced laboratories in seed breeding, machine learning, robotics, drones, phytochemical analysis.



<https://aerofarms.com/>

Madar Farms: an agri-tech company cultivating greens in Abu Dhabi, UAE, using hydroponics and vertical farming methods to grow fresh produce in controlled environments with less water consumption, and regardless of weather conditions in the region. They aim to provide regional food security and sufficiency while offering fresh high-quality local food.



<https://www.madarfarms.co/>

MENA Region: Agricultural Technology

VeggiTech: a company operating in agro-tech is providing vertical indoor farms that employ LED assistance technology and hydroponic farms to combat the challenges of the UAE environment. Their hydroponic farms extended over 60 acres and the indoor vertical farms occupy an area of 45000 square feet. The project is continuing to transform the traditional farms into smart farms that consume 5% less water, and more environmentally friendly.

The logo for VeggiTech features the word "VEGGITECH" in a bold, green, sans-serif font. The letter "V" is significantly larger and more stylized than the other letters.

<https://www.veggitech.com/>

ForFarming: an IoT based agriculture startup in Turkey, launched in 2018. It provides the flexibility of fully controlling the agricultural process through smartphones or tablets as the produce grows in a fully controlled environment consuming 90% Less water and no pesticides. One can obtain their Farmi; a smart farm one can purchase to grow fresh produce compatible with their software Farmino which controls the setting of the smart farm through AI and is provided with features and sensors to monitor and control the process. they offer 30 different options of fresh produce that one can grow through a few taps on the screen and their smart farms like strawberries, lettuce, lavender, chamomile, a variety of herbs, and greens.

The logo for ForFarming consists of a stylized green leaf icon to the left of the word "ForFarming" in a green, sans-serif font. Below the name is the tagline "Soğuklu Gelecek için Akıllı Tarım" in a smaller font.

<https://www.forfarming.co>

Doktar: an agri-tech company founded in 2012 in Turkey, provides services and products empowered by technology and the use of IoT and machine learning aiming to develop the sector and grow produce more efficiently. Doktar provides farmers with access to information like growth protocols and animal breeding protocols, weather forecast and agricultural news, soil analysis, and seeds compatibility with climate and land. They also have agricultural sensors with high accuracy information about soil temperature and humidity, air temperature and humidity, irrigation programs, and disease status. In addition to a digital soil analysis gadget that gives you a full view on what your soil might be lacking in elements and which fertilizers to use. Both mentioned gadgets collect data and uploaded on Doktar's database cloud where you can access through an application on your smartphone. the company also provides corporate services like market analysis, agriculture, and technical support.

The logo for Doktar features a stylized yellow and orange leaf icon to the left of the word "Doktar" in a bold, black, sans-serif font.

<https://www.doktar.com/>

Hassad: an agritech accelerator in Jordan, their program runs three times a year supporting startups and entrepreneurs coming up with innovative ideas and solutions to foster growth in the sector using different technologies and covering many aspects and fields like smart farming, aquaculture, hydroponics, crops protection, agri-food supply chains and more. For the first acceleration program 9 startups have selected, Agriotech one of the startups is concerned about smart farming of greenhouses and its automation using IoT, Green on which create hydroponics and aquaponics walls for home farming.

The logo for Hassad features a stylized green leaf icon to the left of the word "HASSAD" in a bold, black, sans-serif font. Below the name is the tagline "Agritech Accelerator" in a smaller font.

<https://www.hassad.io/>

Conclusions and Recommendations

- Irrigation is one of the most constraining issues facing the Iraqi agricultural sector and impeding its growth. Rehabilitation of the irrigation networks schemes and introducing more advanced irrigation systems like drip irrigation would reduce water waste, regulate its consumption, and promote the efficient use of water resources.
- Flooding agricultural land is a traditional method still used today that causes serious issues like water waste and increased salinity that reduces land productivity. Measures should be taken to Eliminate this practice for better water management.
- Policies to subsidize water support farmers. However in the long term they deplete the water reserve which already suffers from scarcity. Implementing tariffs is recommended to promote the rational consumption of water.
- Tigris and Euphrates are the main renewable water source for Iraq. It is essential to sign International treaties to regulate the water flow of Euphrates and Tigris between Iraq and neighboring countries Iran, Turkey, and Syria. This is important to grant Iraq its right and prevent the loss of its resources.
- The marshes are habitat for plants and wildlife. Flooding them systematically to restore them to their original area would encourage the return of some Marsh Arabs, cultivation, and animal grazing practices.
- Salinity is a major constraint to growing crops. Managing the high salinity issue that threatens the fertility of the soil by adding fertilizers, using trocars, and plowing the soil systematically would lead to better quality yields and crop productivity.
- Understanding that food sufficiency in certain crops does not always promote food security for the population, hence policies to subsidize and regulate cereal crops in order to guarantee the availability of staple crops should not be mistaken for food security of the population. Thus it is essential to support and promote the plantation of other varieties of crops, fruits, and vegetables to increase agricultural diversity and diversify income revenues.
- Arable land that is not yet cultivated provides a potential for agriculture to expand and improve the reality of rural areas by job creation, reducing unemployment, and reducing disparities between urban and rural populations.
- Horticulture provides higher agricultural revenue than that of water-thirsty cereals and consumes less water. To foster agricultural growth, diversifying crops is recommended, as well as improving yields quality and productivity by investing in agricultural supplies, inputs, seeds, and machinery.



Image Credit: Agence France-Presse/ Haidar Hamdani

Conclusions and Recommendations

- Agricultural is also a tool to improve the industrial reality of the country, create job opportunities and employment by using agricultural production in manufactured food and commodities, while at the same time promoting local products.
- In order to combat the environmental factors, the low percentage of arable land, and water scarcity, investing in agricultural technology like greenhouse farming and smart farms would provide shorter agricultural cycles and a variety of crops regardless of the time and season.
- Supporting local production would decrease the dependence on imports and strengthen the economy. Measures should be taken to support the entire supply chain from input to output, provide access to the free market, and create a competitive advantage by establishing agricultural food processing facilities.
- Promoting the cultivation of crops and seeds that tolerate harsh environmental conditions and are salt-resilient to combat the difficult weather conditions especially in the water-stressed regions.
- Improving and developing the education system and the current curricula in the agricultural study fields and departments in universities and vocational schools. In addition to conducting research, studies, and data collection as they are essential for running agricultural projects and initiatives as they would assist in better planning, coordination, and execution.
- Private sector can reduce the budget intensive burden off the public sector and provide employment opportunities, therefore it is recommended to encourage agricultural businesses and startups by investment and incubation programs to modernize the sector. Also benefiting from the partnership programs that are implemented by foreign embassies and international organizations as they have a substantial potential impact on this sector.
- The National development Plan lays out the framework and the instruments that should be utilized to overcome the challenges and meet the objectives that modernize and strengthen the agricultural sector. In addition to mitigating the water resources management struggles, efforts should be exploited to guarantee the successful outcome of the plan and the efficient spending of budget and funding.
- Improving the quality of livelihood in the rural areas by providing access to education, healthcare, facilities, and services for the rural population. As well as supporting the rural women, protecting them, encouraging them to enroll in education, and supporting their small businesses.
- Livestock contributes to the agricultural sector and food security, hence it is recommended to improve pastures, forage crops, vaccinations, and cross-breeding. Also, establishing factories to produce meat, poultry, eggs, and dairy would promote food self-sufficiency, food security, diversify revenues, and increase employment.



Image Credit: Agence France-Presse

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