Chapter 1
Overview of Saudi Arabia Economy: Status Quo and Future Prospects

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Abstract To study and analyze the food security situation and related issues in Saudi Arabia, it is necessary to provide a brief analysis of the country's economy. This chapter gives an overview of the current status and future prospects of Saudi Arabia's economy, covering various factors related to food security such as the country's geographical location and area, population growth and distribution across age and administrative regions, and climate. The chapter provides a detailed assessment of Saudi Arabia's economy, including a discussion of its GDP growth rate and components, exports and imports, and most important trade partners. Additionally, the chapter highlights Saudi Arabia's position in the global economy. The chapter assesses the challenges and opportunities facing the agricultural sector in Saudi Arabia, including crop, livestock, poultry, and fish production, their contribution to achieving food security, and components of agricultural GDP. Other topics include the self-sufficiency ratio for agricultural products, agricultural development programs, and foreign and domestic agricultural investment. The chapter also discusses the role of Saudi Arabia in providing humanitarian aid in disaster and risk situations around the world. The chapter concludes by examining the prospects for the agricultural sector's growth and production in light of the Kingdom of Saudi Arabia's Vision 2030 and its accompanying directives and strategies for achieving food, water, and agricultural security.

Keywords Agriculture · Agricultural loans · Climate · Saudi Arabia economy · Food security · Humanitarian aid · Saudi Arabia 2030 Vision · Self-sufficiency

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1 Saudi Arabia Location and Area

Saudi Arabia is situated in the southwest of the Asian continent. To its west, it shares a border with the Red Sea and to the east, it is bordered by the Arabian Gulf, as well as the states of the United Arab Emirates and Qatar. To its north, it shares borders with Kuwait, Iraq, and Jordan, and to the south, it is bordered by Yemen and Oman. Saudi Arabia occupies around 80% of the Arabian Peninsula's area, which is estimated to be over 2.25 million km^2 (Nawab et al. 2011; Alyoubi and Essalmi 2022).

The total area of Saudi Arabia is more than 2 million km^2, which represents 70% of the semi-Arabian Peninsula, with an area of about 2.8 million km^2. The country is administered via 13 regions that are further divided into 106 governorates and 1377 centers, as indicated in Fig. 1. As per Table 1, the largest region of Saudi Arabia is the eastern region, covering an area of about 672,522 km^2—around 31% of the country's area, followed by the Riyadh region. The smallest region of the Kingdom is Al-Baha region, with a total area of around 10,000 km^2, which represents only 0.5% of the Kingdom's area (Table 1).

2 Climate

The Kingdom of Saudi Arabia has a varied topography due to its large size. The Tihama coastal plain stretches for 1100 km along the Red Sea, with a width of 60 km in the South, gradually narrowing as it heads north until it reaches the Aqaba Gulf. To the east of the Tihama plain lies the Sarawat mountain chain, rising 2743.2 m in the south and gradually declining until it reaches 914.4 m in the north. Many large valleys descend from the Sarawat Mountains towards the east and west, including Najran, Tathleeth, Bisha, Himdh, Rumah, Yanbu, and Fatimah. East of the Sarawat mountain chain lies the Najd plateau, extending to the Samman desert and Al-Dahna dunes eastward and southward to Dwaser Valley. This region runs parallel to the Empty Quarter desert, extending northward to the Najd plains, passing through the Hail region until it reaches the Great Nefud Desert, and then to the Iraqi and Jordanian borders (Mohorjy 1999). The Empty Quarter is located in the southeastern part of Saudi Arabia, covering an area of 640 thousand km and consisting of sand hills and lava fields. The eastern coastline has a length of 610 km and is characterized by large sandy areas and Salinas. According to the World Fact Book (2022), the climate of Saudi Arabia is harsh, dry, and desert-like, with extremely high temperatures. The main parts of Saudi Arabia receive small quantities of rainfall during the winter and spring seasons, but the southwestern mountains receive heavy rainfall in the summer. Almost throughout the year, the western coasts and mountains are characterized by high humidity, which decreases as you move inland. However, the General Authority for Statistics (2022) notes that Saudi Arabia has a diverse climate due to its varied topography, with the subtropical high-pressure system causing hot summers and cold winters, with frequent rainfall.

Fig. 1 Saudi Arabia administrative divisions. *Source* Wikipedia (2023). https://en.wikipedia.org/wiki/Saudi_Arabia

3 Population

The population of Saudi Arabia increased from 22.56 million in 2004 to 35.01 million in 2020 and then decreased to 34.11 million in the first half of 2021. Similarly, the percentage share of the Non-Saudi population out of the total population showed an increasing trend, with only 27.1% (6.12 million) in 2004, increasing to 38.1% (13.1 million) in 2019, and then decreasing to 36.4% (12.42 million).

Table 1 Saudi Arabia's area and population according to regions (2018—census results) and the latest official estimates

Name	Area (1000 km^2)	Population (Million)	Area (%)	Population (%)
Albahah	10	0.487	0.5	1.5
Aseer	77	2.262	4	6.8
Eastern region	673	5.029	31	15.0
Ḥa'il	104	0.716	5	2.1
Jazan	12	1.604	1	4.8
Jawf	100	0.521	5	1.6
Madinah	152	2.188	7	6.5
Makkah	153	8.804	7	26.3
Najran	150	0.596	7	1.8
Northern borders	112	0.375	5	1.1
Qaseem	58	1.456	3	4.4
Riyadh	404	8.447	19	25.3
Tabouk	146	0.931	7	2.8
Total	2150	33.414	100	100

Source Compiled by the author based on data from City Population (2022)

According to the recent analysis by Global Media Insight (GMI) in 2022, the population of Saudi Arabia is estimated to be 35.84 million with a population density of 16.67 people per km^2 and a median age of 32.4 years (Almulhim and Cobbinah 2023). Out of the total population, 20.7 million are male and 15.14 million are female, and 30.36 million reside in urban areas. In terms of age, more than half of the population (51.86%) falls within the age group of 25–54 years, while almost one-fourth of the population is in the age group of 0–14 years. Only 3.81% of the total population is 65 years old or above. In 2021, the annual birth and death rates in Saudi Arabia were recorded as 14.56 and 12.58 per thousand persons, for males, respectively, with a total fertility rate of 1.94 and female death of 17 per 100 thousand live births (Table 2).

The three most populous regions in the Kingdom are Makkah Al-Mukarramah, Riyadh, and the Eastern region, with populations of 8.8, 8.5, and 5 million, respectively. Together, these regions account for more than two-thirds of the total population in Saudi Arabia (Table 1). The least populous region in the Kingdom is the northern border region, with a population of 0.375 billion people, representing ~ 1.1% of the Kingdom's total population as of 2018.

Table 2 Population development in Saudi Arabia since 2004—in million people

Year	Saudi	Non-Saudi	Total population	Saudi (%)	Non-Saudi (%)
2004	16.44	6.12	22.56	72.9	27.1
2005	16.85	6.48	23.33	72.2	27.8
2006	17.27	6.85	24.12	71.6	28.4
2007	17.69	7.25	24.94	70.9	29.1
2008	18.11	7.67	25.79	70.2	29.7
2009	18.54	8.12	26.66	69.5	30.5
2010	18.97	8.59	27.56	68.8	31.2
2011	19.4	8.97	28.38	68.4	31.6
2012	19.84	9.36	29.2	67.9	32.1
2013	20.27	9.72	29.99	67.6	32.4
2014	20.7	10.07	30.77	67.3	32.7
2015	21.12	10.4	31.52	67.0	33.0
2016	20.06	11.68	31.74	63.2	36.8
2017	20.41	12.14	32.55	62.7	37.3
2018 (mid-year)	20.77	12.64	33.41	62.2	37.8
2019 (mid-year)	21.11	13.1	34.21	61.7	38.3
2020 (mid-year)	–	–	35.01	–	–
2021 (mid-year)	21.69	12.42	34.11	63.6	36.4

Distribution of the Saudi population according to age (2018)

Age group	Population (in Million)	Population (%)
0–14 years	8.72	24
15–24 years	4.69	13
25–54 years	18.59	52
55–64 years	2.47	7
65 years and above	1.36	4

Sources Compiled by the author based on data from General Authority for Statistics (2022) and GMI (2022)

4 Economy

The estimated value of natural resources owned by Saudi Arabia is 34.4 trillion USD, with a primary focus on oil (Statista 2021). Additionally, Saudi Arabia possesses other natural resources, including copper, feldspar, phosphates, silver, sulfur, tungsten, and zinc (World Fact Book 2022). Since its discovery in 1938, Saudi Arabia has become one of the main oil exporters in the world, with oil exports representing its primary source of income. According to the U.S. Energy Information Administration (2021), Saudi Arabia owns 15% of the world's proven oil reserves, making it the largest oil exporter in the world, with a production capacity of ~ 12 million barrels per

day. It is also the largest crude oil producer within OPEC and the second-largest producer of total petroleum liquids worldwide, following the United States (U.S. Energy Information Administration 2021; Arafah 2022).

The Saudi Arabian economy is highly dependent on petroleum exports, which account for more than two-thirds (70%) of the country's total exports and 53% of the government's revenue in 2020. The COVID-19 pandemic led to a decline in the country's real GDP by 4.1% in the same year, largely due to a reduction in global demand for oil and voluntary cuts in oil production in compliance with the OPEC + agreement. Between 2018 and 2020, oil revenues in Saudi Arabia declined due to a decrease in both average crude oil prices and export volumes. According to the Energy Information Administration's estimates, net revenues from Saudi oil exports amounted to 202 billion USD in 2018, a decrease of 36 billion USD compared to the previous year. It is expected that the decline in oil prices and production will continue to affect the net oil export revenues of Saudi Arabia. Refining and chemical manufacturing of oil reserves in Saudi Arabia are primarily integrated with Saudi Aramco, owned by Saudi Arabia (U.S. Energy Information Administration 2021).

In 2020 Saudi Arabia's imports amounted to 146 billion USD, according to the Observatory of Economic Complexity (OEC). The top five import commodities for Saudi Arabia, as a percentage of the country's total imports, are cars (7.8%), followed by broadcasting equipment (3.8%), refined petroleum (2.7%), packaged medicaments (2.2%) and telephones (1.7%). Saudi Arabia imports commodities from many countries around the world, with the top five largest countries being China (31.8 billion USD), United Arab Emirates (18 billion USD), the United States of America (10.8 billion USD), Germany (6.79 billion USD) and India (6.37 billion USD), respectively, accounting for 22, 13, 8, 5 and 4% of total import. Each year, the largest and most powerful world economies are determined based on their Gross Domestic Product (GDP). The United Nations and the International Monetary Fund (IMF) prepare and publish an annual report on the GDP of most countries in the world. In 2020, Saudi Arabia ranked 18th based on GDP in current prices with a GDP of 1011 billion USD and ranked 17th when GDP is measured in current international dollars and purchasing power parity (PPP) amounting to 2018 billion USD (Knoema 2022).

It is expected that the Saudi Arabia will be one of the fastest-growing economies in the world in 2022, coinciding with the implementation of comprehensive and pro-business reforms, the sharp rise in oil prices, and the recovery of energy production from the stagnation that occurred as a result of the COVID-19 pandemic in 2020. Expectations indicate that the GDP will expand in 2022 by 7.6% (Mati and Rehman 2022). During the period of 2010–2021, Saudi Arabia's GDP growth rate showed a fluctuating pattern with the highest being 10.99% in 2011 while the lowest was in 2020 at − 4.34%. It then increased to 3.92% in 2021. The lowest growth rate in 2020 could be attributed to the impact of the COVID-19 lockdown (GASTAT 2021, 2022a, 2022b; Saudi Central Bank 2023). The pandemic caused high and increasing human costs worldwide, severely affecting all economic activities. As a result, the global economy was expected to contract by − 3% in 2020, which was much worse than the 2008–2009 financial crisis. However, the pandemic was

Table 3 Saudi Arabia GDP—an annual growth rate

Year	GDP growth rate
2010	4.76
2011	10.99
2012	5.43
2013	2.85
2014	4.03
2015	4.69
2016	2.36
2017	− 0.07
2018	2.76
2019	0.83
2020	− 4.34
2021	3.92

Sources Compiled by the author based on data from IMF (2020 and 2022) and Saudi Central Bank (2023)

expected to gradually fade in 2020, and the global economy would grow by 5.8% in 2021. Based on the report of the IMF, Saudi Arabia witnessed a strong recovery from the recession caused by COVID-19 pandemic. This strong recovery was driven by several factors, including liquidity and fiscal support, reform momentum, and increased oil production coupled with its high prices. The report indicated that the Saudi economy achieved a growth rate of 3.2% in 2021 as a result of the recovery of the non-oil manufacturing, retail, and commercial sectors. Furthermore, the report revealed a decrease in the unemployment rate among Saudis, reaching 11%, with a decrease of 1.6% compared to 2020, owing to a high employment rate of Saudis, especially women, in the private sector (IMF 2022) (Table 3).

Table 4 reveals that Saudi Arabia's exports to China, India, Japan, South Korea, and the USA accounted for almost two-thirds of its total export value of 205,433 million USD in 2019. The total value of Saudi Arabia's imports in 2019 amounted to 103,241 million USD, of which one-quarter came from China (26.2%). The USA followed with a share of 16.5%, UAE with 10%, Germany with 6.8%, and Japan with 6.3%.

Re-exported goods are goods that have been previously imported and have undergone all necessary customs procedures for export without significant modifications. This information comes from the General Authority for Statistics in 2023. Table 5 shows the percentage of goods that were re-exported from GCC states to Saudi Arabia, as well as the percentage of imports from Saudi Arabia to GCC states. The UAE is Saudi Arabia's primary trading partner among GCC states, with 87% of the total value of goods re-exported from GCC states to Saudi Arabia in 2014 and increasing to 95% by 2018. Similarly, UAE imports from Saudi Arabia made up approximately half of the total GCC states' imports from Saudi Arabia in 2014 and about two-thirds in 2018, as shown in Table 5.

Table 4 Saudi Arabia's main imports and exports partner countries (2019)

Country	Import (%)	Country	Export (%)
China	26.2	China	23.3
U.S.A	16.5	India	13.3
United Arab Emirates	10.0	Japan	13.0
Germany	6.8	South Korea	10.1
Japan	6.3	U.S.A	6.5
India	6.3	United Arab Emirates	6.3
France	4.9	Singapore	4.2
Italy	4.2	Netherlands	3.7
South Korea	3.9	Taiwan	3.4
United Kingdom	3.0	Bahrain	3.4
Turkey	2.9	Egypt	3.3
Thailand	2.3	Belgium	2.7
Egypt	2.3	Thailand	2.4
Brazil	2.2	Spain	2.2
Canada	2.2	France	2.1
Total (value Million USD)	103,241	Total (value Million USD)	205,433

Source Compiled by the author based on data from General Authority for Statistics (2023)

5 Agricultural Sector

Agriculture in Saudi Arabia is faced with a number of challenges. These include a dry climate with minimal rainfall, sandy soil that has low fertility and high salinity, which can lead to plant and animal diseases, and a scarcity of water sources for agricultural, residential, and industrial use (MEWA 2019). However, despite these challenges, the agricultural sector plays a crucial role in achieving the Kingdom's Vision 2030. It is the main means of ensuring food security, stabilizing food prices, as well as contributing to rural and economic development. Furthermore, the sector serves as the primary source of raw materials and production inputs for almost one thousand food and beverage factories. Saudi Arabia is one of the largest exporters of dates in the world and a significant regional exporter of shrimp. Agriculture provides an essential source of income for over one million Saudi citizens, particularly those living in rural areas, and contributes 4% to the non-oil GDP or 64 billion riyals of the nominal domestic product (NDP) (MEWA 2018).

Over the past decade, the agricultural sector has made countless advancements. Saudi Arabia has successfully implemented vision programs, while the National Environment Strategy, the National Water Strategy, and the Food Security Strategy have all been adopted. In addition, numerous programs and studies have been approved to achieve the agricultural strategy, notably the Sustainable Agricultural Rural Development Program and the Program for Redirecting Agricultural

Table 5 Goods re-exported from GCC states to Saudi Arabia and imports of GCC states from Saudi Arabia (%)

	Bahrain		Kuwait		Oman		Qatar		U.A.E		GCC (Million USD)	
	Re-exported	Imports	Re-exported	Imports	Re-exported	Imports	Re-exported	Imports	Re-exported	Imports	Re-exported	Imports
2014	9	9	1.8	15	1.3	13	2.3	14	87	49	14,477	9944
2015	17	8	2.2	14	1.4	13	2.5	14	78	52	16,529	10,307
2016	10	8	2.4	14	0.5	8	1.8	13	85	58	11,703	10,761
2017	5	8	2.4	16	1.1	9	0.6	5.4	91	61	11,626	11,301
2018	4	9	1.2	17	0.5	8	0.0	0.1	95	65	13,815	11,672

Source Compiled by the author based on data from General Authority for Statistics (2023)

Subsidies (MEWA 2018). Despite local production only meeting one-third of the Kingdom's total caloric energy requirement, Saudi Arabia has several opportunities to increase the percentage of local production that contributes to the national calories' requirement. These opportunities include expanding the production of commodities in which the Kingdom has a comparative advantage, reducing food waste and loss throughout the food supply chain, increasing productivity, and adopting good agricultural practices.

According to flash estimates by GASTAT, Saudi Arabia achieved the highest GDP growth rate of 8.7% in the year 2022 over the past decade. This increase in growth rate is attributed to both oil and non-oil activities, with increases of 15.4 and 5.4%, respectively (MEP 2023). Furthermore, a recent report released by the Ministry of Environment, Water, and Agriculture in 2021 indicates that agricultural output in Saudi Arabia has increased in size, with a value of 19.26 billion USD and a growth rate of 7.8% compared to the previous year. The gross domestic product has reached about 0.8 trillion USD, recording the highest growth in over five years (MEWA 2022; MEP 2023).

The Ministry of Environment, Water and Agriculture has confirmed that the agricultural sector's growth is a result of plans and strategies that align with the goals of the Kingdom's Vision 2030, as well as the sector's recovery from the Covid-19 crisis. The agricultural output amounted to approximately 17.41 billion USD in 2017, 17.46 billion USD in 2018, 17.65 billion USD in 2019, and 17.88 billion USD in 2020. In 2021, the sector's contribution to the GDP was 2.3%, while its contribution to the non-oil GDP was 3.6%, constituting a 0.2% increase compared to 2020. Moreover, the agricultural output contributed to 3.4% of the economy in 2021 (MEWA 2022).

The Ministry has reported that Saudi Arabia achieved a trade balance surplus of 123.3 billion USD, indicating an increase from 2020's 35.87 billion USD due to an upsurge in exports in 2021, valued at 266.67 billion USD. The report highlights a 3.5 USD billion increase in agricultural exports, with a surge of 110.67 million USD compared to 2020. Furthermore, the agricultural trade balance deficit decreased to 17.22 billion USD in 2021, down from 19.57 billion USD the prior year because of fewer agricultural imports. The Ministry has designed and embraced flexible agricultural plans and strategies to promote local content, boost self-sufficiency rates, and attain food security, including implementing the Food Security Strategy and the Rural Development Program while utilizing innovation and technology to enhance productivity and attain the efficient use of natural resources and agricultural inputs. These initiatives are intended to foster sustainable and comprehensive agricultural and food systems and achieve sustainable growth, aligned with the Kingdom's Vision 2030. The Ministry attributes the progress in the agricultural sector to support programs that target the goals set by the National Strategy for Agriculture and offer investment opportunities to boost productivity and provide food products with a comparative advantage in local markets. This has led to high rates of self-sufficiency in several food products, including animal products such as milk, table eggs, poultry meat, fish, red meat, and plant products such as dates, vegetables, and fruits (MEWA 2022; MEP 2023).

During the Arab-Hellenic Food Conference in 2021, the Undersecretary of the Ministry of Environment, Water, and Agriculture confirmed that Saudi Arabia has taken significant measures to enhance agricultural development and food security. These measures intend to combat climate change and water shortage, foster better food security indications and consumption patterns, decrease waste, and attain high degrees of self-sufficiency for various strategic food items in the local market. Moreover, Saudi Arabia is raising the levels of operation and production for agricultural and food systems (Table 6).

5.1 Saudi Arabia Food Products Self-sufficiency Ratio

The results outlined in Table 7 demonstrate that the agricultural industry has achieved high levels of self-sufficiency ratios (SSR) across various plant products. Specifically, the self-sufficiency rate for dates, eggplant, figs, cauliflower, beans, cucumber, okra, cabbage, and watermelon was almost or above 100%. Additionally, SSR values varied from 99 to 80% for watermelon, melon, pumpkins, and papaya. However, the self-sufficiency rates for citrus fruits, pomegranates, carrots, and most cereals and fodder crops were relatively low, with < 50% due to limited water resources. Consequently, the Ministry opted to reduce the cultivation areas of these crops to increase irrigation water efficiency, reduce waste, and enhance economic efficiency. A recent report from the General Authority for Statistics in 2021 also showed the self-sufficiency rates for crucial animal, poultry, and fish products. Notably, fresh dairy products had the highest self-sufficiency rate among animal products, reaching 121%, followed by table eggs at 112%. Meanwhile, fish's self-sufficiency rate was only 40% during the same period as evidenced by Table 7.

Table 7 indicates that Saudi Arabia targeted specific agricultural commodities for importation to help bridge the gap between total consumption and domestic production. The objective was to ensure food security by optimizing consumption and enhancing agricultural resource efficiency in production. According to Table 8, the total value of agricultural GDP and fishing in Saudi Arabia was a mere 10,571 million USD at current prices in 2005. However, with a rising growth rate, it had reached 17,453 million USD by 2018. Notably, the contribution of plant production to the agricultural GDP and fishing industry decreased from 55% in 2005 to just 28% in 2015, before ultimately increasing and reaching almost one-third in subsequent years. Table 8 additionally showcases the percentage contribution of plant, animal, and fishing production to the agricultural GDP and fishing industry from 2005 to 2018.

Table 9 shows that vegetable production increased from 1239 thousand metric tons in 2018 to ~ 1623 metric tons in 2020. Despite a decrease in vegetable cultivation area from 99,000 ha in 2018 to 74 thousand hectares in 2020, there was an increase in vegetable production. This increase can mainly be attributed to an increase in

Table 6 Water demand by user (percent of the total)

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Residential (%)	13	12	12	12	12	13	13	14	23	26	25
Industrial (%)	4	4	4	4	4	4	4	6	9	12	4
Agriculture (non-renewable water) (%)	83	84	84	84	84	83	82	80	68	62	71
Total (million cubic meters)	19,193	20,884	22,260	23,416	24,833	23,934	23,350	23,828	15,393	13,809	14,264

Source Compiled by the author based on the data from the Saudi Arabia statistical book (2021)

Table 7 Saudi Arabia's self-sufficiency ratio in plant products for the year 2021

	Local production	Imports	Export	SSR (%)
Potato	578,108	48,253	16	92
Tomato	620,866	186,785	553	77
Onion	297,974	274,538	534	52
zucchini	64,650	1631	1549	100
cucumber	188,558	1414	3145	101
Pepper	108,057	29,539	3464	81
Carrot	24,500	43,685	3826	38
Okra	25,327	319	753	102
Watermelon	624,110	7065	57	99
Eggplant	112,000	835	6443	106
Cabbage	14,210	1635	2899	110
Cauliflower	18,500	1308	2548	107
Melon	55,119	11,885	0	82
Pumpkins	62,100	3788	0	94
Beans	10,800	631	1076	104
Dates	1,565,830	19,817	258,098	118
Citrus fruits	116,800	657,896	10,403	15
Mango	88,650	60,049	900	60
Grapes	106,400	71,842	455	60
Banana	22,200	496,683	5440	4
Fig	27,536	258	2036	107
Pomegranate	30,100	62,781	3365	34
Papaya	4717	517	253	95
Animal, fish and poultry products self-sufficiency Ratio (2021) (1000 Mt)				
	Local production	Consumption	SSR (%)	
Red meat	178	414	43	
Poultry meat	930	1409	66	
Milk	2600	2149	121	
Eggs	359	321	112	
Fish	99	246	40	
Shrimp	78	53	149	

Production, export and import in thousand mt

Source Compiled by the author based on the data from Ministry of Environment, Irrigation, and Agriculture (2023)

Table 8 Percent contribution of plant and animal production and fishing to agricultural GDP and fishing (2005–2018)

Year	Plant	Animal	Agricultural	Fish	Agricultural GDP and fishing (million USD)
2005	55	25	80	20	10,571
2006	55	27	82	18	11,098
2007	54	29	83	17	11,515
2008	55	33	88	12	12,043
2009	57	34	91	9	12,247
2010	47	34	81	19	13,946
2011	46	32	78	22	14,575
2012	45	29	74	26	15,303
2013	45	34	79	21	16,107
2014	29	31	60	40	16,844
2015	28	32	59	41	17,138
2016	30	33	63	37	17,321
2017	31	33	64	36	17,411
2018	32	34	66	34	17,453
Average	43	31	75	25	14,541

Source Compiled by the author based on the data from General Authority for Statistics (2022) and Saudi Central Bank (2022)
Saudi Central Bank (2022). Statistical Report https://www.sama.gov.sa/en-US/EconomicReports/Pages/report.aspx?cid=123
https://www.stats.gov.sa/en/823

productivity. However, during the same period, the area used for wheat and barley production declined. Wheat cultivation decreased from 95,000 ha in 2018 to 87 thousand hectares in 2020. On the other hand, green fodder production increased more than threefold in 2020, with 207 thousand hectares in comparison to 2018.

The number of cattle and buffalo slaughtered increased from 271 in 2018 to 312 thousand in 2019, but then decreased to only 210 thousand in 2020. In contrast, the number of goats and sheep slaughtered increased by more than a quarter in 2020 compared to 2018. The production of sheep and goat meat also increased by more than a fifth in 2020 (210 thousand) compared to 270 thousand in 2018. Moreover, fish production increased from 141 in 2018 to 162 thousand metric tons in 2020, representing a growth rate of roughly 15% compared to 2018 (see Table 10).

Table 10 displays an increase in the number of livestock in Saudi Arabia from roughly 13.5 million in 2018 to 16.05 million, resulting in a 19% growth rate. From 2018 to 2020, this increase was observed in goats, cows, and camels, with growth rates of 67, 47, and 2.5%, respectively. Different types of meat production echoed this upward trend, with red meat increasing by 7.2%, poultry by 27%, milk by 23%, and fish by 15% in comparison to 2018. However, there was also a 5.4% decrease in camel meat production in 2020. In total, sheep represented 60%, goats a third, camels

Table 9 Plant production area and productivity (area: 1000 ha, yield: kg/ha production: 1000 mt trees: 1000)

Products	2018			2019			2020		
	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity	Area
Total cereals	1200	4845	248	1345	5497	245	1181	4860	243
Wheat	518	5464	95	534	6068	88	555	6376	87
Barley	505	5588	90	628	6854	92	438	5374	82
Maize	45	5677	8	48	6077	8	59	4471	13
Sorghum and millet	132	2424	55	135	2365	57	129	2109	61
Roots and tubers	425	235	18	472	24,768	19	561	28,804	19
Potatoes	425	23,549	18	472	24,768	19	561	28,804	19
Total pulses	16	3453	5	17	3566	5	15	3029	5
Oil seeds and olives	5	5927	2	6	2811	2	371	17,160	35
Vegetables	1239	12,572	99	1469	16,748	88	1623	22,038	74
protected agriculture	2648		111	2648		111	2648		111
Green fodder	1390	16,466	84				4557		207

	Production	Fruiting trees	Area	Production	Fruiting trees	Area	Production	Fruiting trees	Area
Fruits	2234	–	154	2462	–	157	2342	–	213
Dates	1428		116	1540		118	1542		153
Citruses	40		4	35		4	57		3

Table 10 Saudi Arabia livestock, poultry, and fish production

	2018	2019	2020
Total livestock	13,492	14,191	16,047
Cattle	477	567	700
Sheep	9396	9420	9447
Goats	3608	3711	6100
Camels	488	493	500
Slaughtered Cattle and Buffaloes	271	312	210
Slaughtered goats and sheep	6505	6565	8167
Slaughtered camels	480	493	490
Cattle and Buffalo meat production	42	43	42
Sheep and goat meat production	121	122	146
Camels meat production	106	109	100
Red meat production	269	274	288
Poultry meat production	710	800	901
Chickens numbers	194	197	202
Milk production	2361	2683	2911
Egg production	345	382	350
Fish production	141	143	162

Animals and slaughtered animals:1000 heads, production:1000 mt, birds: million
Source Compiled by the author based on the data from Arab organization for agricultural development (2022)

4%, and cows only 3% of the total livestock population of 16.04 million in Saudi Arabia in 2020. According to GASTAT's latest report (2023), the value of exported goods is computed by adding the value of agricultural commodities to other delivery costs or export office expenses, while the cost of imported goods is determined by adding the product cost to other expenses, such as insurance, transportation, and freight costs, until their arrival at the importing countries' ports. As evidenced in Table 11, both agricultural imports and exports in Saudi Arabia decreased from 2016 to 2021. In 2021, imports and exports fell to 18.9 and 3.1 million USD, respectively, from 22.7 and 3.6 million USD in 2016.

The term 'value of agricultural loans' refers to loans given to finance the cultivation of various crops and orchards, the purchase of fishing equipment, the promotion of agricultural tourism, the establishment of veterinary clinics, the provision of vegetable carts, and the support of apiaries. According to the Agricultural Statistics Bulletin Tables (2023), the amount of loans distributed to stakeholders increased by more than fourfold between 2016 and 2021, from 121 million USD in 2016 to 539 million USD in 2021.

Table 11 The total quantity and value of imports of agricultural crops and livestock, 2016–2021 (Quantity: Million MT, Value: Million USD, Area 1000 ha)

KPIs	Unit	2016	2017	2018	2019	2020	2021
Self-sufficiency ratio of dairy products	%	–	–	–	126	121	121
Self-sufficiency rate of dates	%	–	–	–	–	111	118
The total amount of import of agricultural crops and livestock	mt	28.72	29.67	28.35	24.83	29.1	20.0
The total amount of export of agricultural crops and livestock	Million mt	3.24	3.03	2.99	3.08	4.42	2.65
Total value of import of agricultural crops and livestock	Million USD	22.7	21.8	21.4	21.7	22.9	18.9
Total value of export of agricultural crops and livestock	Million USD	3.6	3.5	3.5	3.5	3.4	3.1
Organic cultivation area for agricultural crops	Thousand ha	16.22	16.98	18.64	24.52	26.63	27.1
Production of organic cultivation for agricultural crops	Thousand mt	56.26	52.84	44.63	61.44	98.56	98.8
Amount of loans distributed to the stakeholders' sectors	Million USD	121	165	205	488	475	539
Bank credit granted by a bank (agriculture and fishing)	Million USD	3407	3266	3941	3907	4363	3723

Source Compiled by the author based on the data from Agricultural Statistics Bulletin (2023a, b)

5.2 Saudi Arabia Agricultural Investment

The Saudi Agricultural and Livestock Investment Company (SALIC) is a joint-stock company located in Saudi Arabia. It is owned by the Public Investment Fund and was established by a royal decree in 2009 with the aim of contributing to the country's food security strategy. SALIC's investment activity is focused domestically and abroad in order to stabilize prices and provide food products. This is achieved through the formation of subsidiary companies or partnerships at the national, regional, and international levels (SALIC 2023a). SALIC began investing in 2012 and has partnered with various international companies in agriculture and trade across several countries including Ukraine, Canada, India, Australia, Brazil, Singapore, and Britain. On the local side, SALIC has invested in companies such as Grain Companies, Almarai,

Nadec, and Fisheries. To achieve long-term food security, SALIC has identified 12 strategic commodities in Saudi Arabia and other regions. These commodities include wheat, barley, rice, corn, soybean, fodder, red meat, poultry, aquaculture, edible oil, sugar, and dairy products (SALIC 2023b).

One of the objectives of the Food Security Initiative in Saudi Arabia is to implement a program for foreign agricultural investment. The goal is to diversify and stabilize food supplies, establish strategic partnerships with host countries, and support private sector participation in agricultural investment abroad. The Agricultural Development Fund (ADF) provides loans for foreign agricultural investment as part of this initiative. The loans can cover up to 60% of the project cost for a period of 10 years with a 2-year grace period, and can be disbursed in either Saudi riyals or US dollars. Repayments can be made according to the cash flow of each project (ADF 2023a, 2020). The program primarily targets crops such as alfalfa, corn, and wheat, and secondary crops include sugar, rice, soybeans, edible oil, and barley.

The ideal loan amount is between 30 and 75 million USD. To be eligible for this loan, the applicant's company must have Saudi ownership, which requires more than 50% of the company's shares to belong to a Saudi entity or individual. The applicant must also have experience in international agricultural investment and export at least 50% of the crop produced to the Kingdom to contribute to achieving food security in Saudi Arabia.

It should be noted that the first step in this initiative was the approval of the Foreign Agricultural Investment Program, which granted loans totaling 172 million USD during the first year of the program's launch. The intention was to cultivate and supply barley, wheat, corn grain, oilseeds, and soybeans from the Republic of Ukraine. Additionally, a project for a national company specializing in agricultural investment and animal production was approved to invest in Sudan (ADF 2020). In October 2022, the Saudi Agricultural Investment and Livestock Production Company, SALIC, provided the initial batch of 250 thousand metric tons of wheat purchased from Saudi investors abroad, which constituted only 20% of the planned total quantity. The ADF had signed numerous financing contracts with selected firms with a total value exceeding 411 million USD under the initiative of funding the import of targeted agricultural items to achieve food security in Saudi Arabia. Specifically, the ADF's financing was earmarked for yellow corn, soybeans, and barley (ADF 2023b). In 2023, the ADF granted financing loans and credit facilities amounting to 579 million USD as a development loan for small farmers. The loans were allocated to vegetable production in greenhouses, broiler poultry production, fish breeding, and production, and date manufacturing in different areas of the country. The funds aimed to enhance the strategic stock, ensure the stability of food supply chains, and offset any shortages that may occur in the supply of agricultural commodities and products (ADF 2023c).

Table 12 presents the various types of agricultural, poultry, and animal projects that received funding from the fund, along with the number of loans granted to each project from 2016 to 2021. The number of projects funded by the ADF increased from 27 in 2016 to 60 in 2021. Similarly, the total amount allocated for financing these projects increased more than eightfold, from 52 million USD in 2016 to 433 million USD in 2019. In total, the ADF funded 271 projects between 2016 and 2019. Regarding

the agricultural, poultry, and animal-funded projects, broiler chicken represented 33.1% of the total number of projects, followed by greenhouse projects at 19% and agricultural products marketing centers at 14%. In terms of the total amount of funding allocated to these projects between 2016 and 2021, marketing centers for agricultural products received the highest amount, with 379 million USD (29%), followed by greenhouses at 279 million USD (23%), and broiler chicken at 247 million USD (19%).

6 Saudi Arabia Humanitarian Aids Under Disaster and Risk Situation

Saudi Arabia plays a significant and innovative role with regard to all nations worldwide. In an effort to alleviate human suffering and promote decent and healthy living conditions, the King Salman Humanitarian Aid and Relief Centre (KSHARC) was established in 2015. The centre has become an international hub that specializes in relief and humanitarian efforts. It operates under the guidance and patronage of the Custodian of the Two Holy Mosques, King Salman bin Abdulaziz. The centre's work aims to provide assistance and relief to those in need across the globe. The KSHARC uses advanced monitoring mechanisms and efficient transportation methods and works closely with United Nations organizations as well as international and local non-profit organizations in the countries that require intervention. The centre tailors projects and programs to the specific needs and conditions of the beneficiaries. Their aid covers various sectors, including relief security, camps management, shelter, early recovery, protection, education, water and sanitation, nutrition, health, humanitarian and emergency relief coordination, logistics, and emergency telecommunication (KSHARC 2023). The center operates on various principles, which demonstrate the Kingdom's commitment to aiding the less fortunate with humanitarian motives. This is achieved by collaborating with recognized organizations, groups, and internal efforts to offer professional and efficient relief programs to all centre employees. It ensures that high-quality assistance reaches its intended recipients (KSHARC 2023). The KSHARC has completed 2246 initiatives in 12 sectors and 90 countries, costing a total of 6053 million USD by the end of last year (2022). Two-thirds of the projects focused on food security and health plans, which accounted for over half of the overall expenses across various sectors (Table 13).

The Center has allocated food security projects to Africa and Asia, which are the top two continents receiving the projects. These continents account for 95% of the total number of food security projects. On the other hand, Arab countries have secured a portion of the food security projects from KSHARC Center. They are responsible for 445 out of the total projects. The Arab countries' share of the food security projects provided by KSHARC amounts to 44% of the total, with Yemen leading with 130 projects, followed by Syria with 96, Somalia with 44, Jordan with 20, Lebanon with 18%, and Sudan with 17%.

Table 12 Agricultural development fund contribution financing agricultural, poultry, and livestock projects during the period 2016–2021(amount of loan: million USD)

	2016		2017		2018		2019		2020		2021		Total	
	No. of projects	Amount of loan	No. of projects	Amount of loan	No. of projects	Amount of loan	No. of projects	Amount of loan	No. of projects	Amount of loan	No. of projects	Amount of loan	Total number	Total amount of loan
Broilers	14	18.84	11	29	9	16	30	74	13	22	22	88	99	247
Mothers of broiler chickens:	2	9.27	2	9	2	16	2	14	1	12	1	17	10	76
Laying hens	1	5.33	5	11	2	4	3	13	3	3	2	9	16	45
Hatcheries	0	0.00	2	10	1	2	1	10	0	0	2	8	6	29
Poultry slaughterhouse	0	0.00	1	0	0	0	0	0	1	3	2	19	4	22
Green houses	5	6.00	5	15	8	39	5	33	15	102	14	102	52	297
Date factories	2	5.60	3	4	2	6	5	7	3	9	3	5	18	37
Fattening Calves	0	0.00	2	2	2	1	1	1	1	3	2	2	8	9
Milk production	2	6.59	1	11	0	0	0	0	9	48	1	3	13	68
Agricultural products marketing center	1	0.18	1	1	9	43	17	266	1	18	8	50	37	379
Shrimp Breeding	0	0.00	1	6	0	0	0	0	1	33	1	2	3	41
Fish farming with enclosures	0	0.00	1	34	1	16	0	0	1	0	2	6	5	57
Total	27	51.8	35	133	36	143	64	417	49	253	60	311	271	1308

Source Compiled by the author based on the data from Agricultural Statistics Bulletin Tables (2023)

Table 13 KSHARC projects (completed-ongoing) by sector

Project sector	No. of projects	Cost (M USD)	No. of projects%	Cost M USD%
Food security	734	1917	32.7	31.7
Health	764	1131	34.0	18.7
Humanitarian and emergency relief coordination	53	860	2.4	14.3
Protection	52	211	2.3	3.5
Nutrition	23	177	1.0	2.9
Camp coordination	204	529	9.1	8.8
Multi-cluster	104	381	4.6	6.3
Water, sanitation, and hygiene	77	256	3.4	4.2
Education	113	212	5.0	3.5
Logistics	16	60	0.7	1.0
Early recovery	58	296	2.6	4.9
Charitable assistance	47	8	2.1	0.1
Emergency telecommunications	1	16	0.04	0.3
Total	2246	6053	360.0	6053

Food security projects	Number of projects	Number of projects (%)	Costs (%)
Africa	252	34	31
Asia	448	61	68
Europe	21	3	0.05
North America	13	2	2
Total	734		100
Arab Countries	347		

Source Compiled by the author based on the data from KSHARC 2023

7 Saudi Arabia's Directives for the Main Agricultural Products

The Saudi economy is expected to flourish due to the increase in oil prices, the expansion of private investment, and the implementation of economic reform programs based on the Kingdom's Vision 2030. The Saudi current account has achieved its highest surplus in the past ten years and Saudi Arabia has managed to keep inflation under control. Given the current state of global economic uncertainty and its impact on financial conditions and oil prices, Saudi Arabia has been making efforts to increase financial margins and diversify its sources of income rather than relying solely on oil. It is anticipated that financial reforms, which are ongoing and regularly

renewed, will promote investment in various sectors by carefully calibrating investment programs, improving financial and external sustainability, and implementing structural reform programs that foster strong, inclusive, and sustainable economic growth. According to a report titled "Mission Concluding Statement" (2023) from the World Bank, the Kingdom of Saudi Arabia has been identified as the fastest-growing economy within the G20 in 2022. This growth can be attributed to an increase in oil production, resulting in a growth rate of about 8.7%. Non-oil total increased by 4.8% and is expected to exceed 5% by 2023. Saudi Arabia has also achieved a record-low unemployment rate of 4.8%, with a 50% reduction in youth unemployment to 16% compared to 2020–2021. Additionally, female participation in the labor force exceeded the target percentage of 30% set in Vision 2030, achieving a 6% increase. Inflation in Saudi Arabia has declined, reaching an annual rate of 2.7% in April 2023 compared to 3.4% at the beginning of the year. The report recommends several financial policies to strengthen and prosper the Saudi economy, including energy price reforms, the development of an asset and liability management framework, and monetary policies that ease liquidity pressures. Furthermore, structural reforms are suggested to achieve strong, sustainable, and environmentally friendly growth, reducing the Kingdom's dependency on oil through targeted interventions and incentives. Investment programs should be improved to introduce changes in the selection of government projects and evaluation methods, increasing investment efficiency in the Kingdom, and reducing emissions. The report acknowledges that fiscal adjustment in the medium term 2023–2030 will be necessary to ensure justice between generations. This includes collecting non-oil revenues, strengthening the management of tax expenditures, and rationalizing their spending (IMF 2023).

Saudi Arabia has launched a comprehensive plan for the country called "Saudi Arabia Vision 2030." The plan consists of three pillars: vibrant society, thriving economy, and ambitious nation (Brans 2023). Each pillar has six overarching objectives, further broken down into 27 branch objectives. These branch objectives are then subdivided into 96 strategic goals. The vision will be implemented through various vision programs. Saudi Vision 2030 has multiple strategic goals and commitments, including increasing non-oil exports to make up 50% of the non-oil GDP, ranking Saudi Arabia 15th in the world's largest economy, advancing from 49 to 25th in the logistics performance index, increasing the Public Investment Fund's assets from 160 billion USD to ~ 1.88 trillion USD, increasing foreign direct investment to 5.7% GDP, and augmenting non-oil government revenues to 266 billion USD (Saudi Vision 2023). It is essential to mention that the vision has many transformational programs to pave the way for its strategic goals, like strategic partnerships, government restructuring, improving public sector governance and privatization, ensuring financial stability, project management, reviewing regulations, measuring performance, restructuring the Public Investment Fund, human capital development, and national transformation. One of the top commitments of the vision is to preserve vital resources by establishing strategic food reserves that could be used during emergencies securely. To reach this purpose, the vision proposes promoting aquaculture, cooperating with countries with natural resources like fertile land and abundant water, prioritizing water utilization by areas with renewable water sources, and

coalescing with consumers, food producers, and distributors to conserve resources and diminish waste. All these endeavors and commitments are connected to the agricultural sector, food systems, and the food security pillars embracing availability, accessibility, utilization, and stability.

Since the implementation of Saudi Arabia's Vision 2030, there have been several achievements that have supported economic growth and empowered citizens, with numerous future opportunities planned. Eleven programs have been created to bring this vision to life by transforming them into action plans, resulting in many successes across the three primary pillars of the Saudi Vision 2030 The Ministry of Environment, Water, and Agriculture (2017) developed the National Strategy for Agriculture 2030, which led to specific directives for the future of agricultural products in the Kingdom of Saudi Arabia. These products include grains, vegetables, dates, fruits, red meat, poultry meat, fish, milk, and eggs. The Saudi Grains Organization (SAGO) has directed the purchase of wheat from farmers between 2019 and 2024 as an alternative for fodder, at a maximum of 700 thousand mt (~ 20% of self-sufficiency). In terms of vegetables, the directives aim to increase the current self-sufficiency rate from 70 to 100%, adopt recommendations of comparative advantage and modern methods to improve productivity, encourage promising crops and organic agriculture, and continue to encourage protected agriculture and improve its production efficiency. Regarding dates, the directives include maintaining a high level of self-sufficiency (115%), developing value-added exports, encouraging the use of modern methods to improve productivity, and focusing on preventing and controlling the red palm weevil. The value of dates in the Kingdom of Saudi Arabia amounts to 2 billion USD, contributing about 12% of the agricultural GDP and 0.4% of the non-oil GDP. The Kingdom of Saudi Arabia ranked first in the value of date exports in 2021, amounting to 320 million USD, which reflects the high production capacity and enhances the contribution of agricultural production in increasing non-oil exports. This is subsequently reflected in the improvement of production and exports of dates in the future (IOFS 2022).

Regarding green fodder, the instructions were to decrease domestic production to less than a quarter of the current need for green fodder and to develop foreign investments and storage capacity for green fodder. Similarly, for fruit products, efforts will be made to increase the current self-sufficiency rate from 25 to 40% by adopting recommendations based on comparative advantage and modern methods to enhance productivity and encourage the cultivation of promising crops and organic fruit crops. Concerning red meat and poultry meat, directives have been given to maintaining the current self-sufficiency ratio of 25–30% for red meat, while also reducing the number of livestock heads by 40%. The focus will be on organizing the sector, doubling current productivity, and cutting waste. For poultry meat, the goal is to raise the current self-sufficiency rate from 47% to at least 65%.

On the other hand, there are specific directives in place regarding fish, milk, and egg products. These directives aim to increase the percentage of fish production from 110 to 600 thousand metric tons from the aquaculture and fisheries sector. This increase in production is accompanied by the development of exports and it contributes towards maintaining the current self-sufficiency ratio for both fresh milk (122%) and eggs (115%).

Saudi Arabia has invested 24.8 billion USD to boost food production and exports and achieve food security. This investment is part of a larger plan to strengthen the agricultural sector, increase domestic production and export, and enhance food supply. Approximately 25 billion USD have been allocated towards the development of industries, while 2 billion USD have been directed towards loans provided by the Saudi Agricultural Development Fund to support the different agricultural sectors. In 2017, the Ministry of Environment, Water, and Agriculture developed the National Strategy for Agriculture 2030, which included specific directives for different types of agricultural products, such as grains, vegetables, dates, fruits, red meat, poultry meat, fish, milk, and eggs. The Saudi Grains Organization (SAGO) aims to purchase up to 700 thousand mt of wheat from farmers between 2019 and 2024, which represents about 20% of self-sufficiency. The goal for vegetables is to increase self-sufficiency from 70 to 100%, adopt recommendations of comparative advantage and modern methods to improve productivity and encourage promising crops and organic agriculture. Dates are another important agricultural product for Saudi Arabia, and efforts are being made to maintain a high level of self-sufficiency (115%), develop value-added exports, and prevent and control the red palm weevil.

Regarding green fodder, the plan is to reduce domestic production to less than one-quarter of the current demand and develop foreign investments and storage capacity. For fruit products, efforts will be made to increase the self-sufficiency rate from 25 to 40%, adopt recommendations to improve productivity, and encourage promising crops and organic cultivation. Production of red meat and poultry meat will be organized to boost productivity and reduce waste. The aim is to maintain the current self-sufficiency rate for red meat (25–30%) and increase it to at least 65% for poultry meat. Saudi Arabia also plans to increase fish production to 600 thousand metric tons from the aquaculture and fisheries sector while maintaining current self-sufficiency rates for fresh milk (122%) and eggs (115%). To achieve food security, the country has allocated 24.8 billion USD and has a plan to strengthen the agricultural sector, increase domestic production, and exports with a 25 billion USD investment in industries. Additionally, the Saudi Agricultural Development Fund offers loans worth 2 billion USD to support the agricultural sectors.

8 Conclusion and Prospects

The Saudi economy is the largest in the Middle East and North Africa region and is a member of the G20. Saudi Economy heavily relies on oil revenues. However, the Kingdom has been implementing the 2030 Vision which aims to diversify its

economy by developing various strategies, plans, and programs. The aim is to include multiple sectors and sources of income, reducing the heavy reliance on oil revenues, which are greatly influenced by external factors. Additionally, the population of the Kingdom is steadily increasing and efforts are being made to provide job opportunities for Saudi citizens, with the goal of reducing dependence on foreign workers, except in cases where their expertise is required on a limited scale. They are also striving to make many professions accessible to Saudi individuals. Taking a holistic perspective, the agricultural sector in Saudi Arabia exhibits favorable prospects. The government has dedicated efforts towards developing strategies and programs to address agriculture, water, and food security, with the aim of promoting investment and adopting modern technologies to enhance production and achieve self-reliance in various food commodities. Nevertheless, the Saudi agricultural sector encounters significant challenges linked to limited water availability, climate change, and the implications of agricultural arable land, ultimately affecting the country's pursuit of food security.

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