Aquaculture in Saudi Arabia

Prepared by NordOest
Innovation Norway representative in the UAE
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1. Saudi Arabia Overview
1.1 Key facts & figures

<table>
<thead>
<tr>
<th>Capital</th>
<th>Riyadh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area</td>
<td>2.15 million km²</td>
</tr>
<tr>
<td>Location</td>
<td>The Middle East, bordering Iraq 814 km, Jordan 744 km, Kuwait 222 km, Oman 676 km, Qatar 60 km, UAE 457 km, Yemen 1,458 km</td>
</tr>
<tr>
<td>Government</td>
<td>Unitary Islamic Absolute Monarchy</td>
</tr>
<tr>
<td>Head of the Kingdom</td>
<td>Salman Bin Abdulaziz al-Saud</td>
</tr>
<tr>
<td>Languages</td>
<td>Arabic-official</td>
</tr>
<tr>
<td></td>
<td>English-widely spoken</td>
</tr>
<tr>
<td></td>
<td>Urdu, Farsi and Turkish</td>
</tr>
<tr>
<td>Population</td>
<td>31.5m (2015 estimate)</td>
</tr>
<tr>
<td>Working days</td>
<td>Sunday-Thursday</td>
</tr>
<tr>
<td>Religion</td>
<td>Muslim</td>
</tr>
<tr>
<td>Currency</td>
<td>Saudi Riyal -SAR</td>
</tr>
<tr>
<td></td>
<td>Pegged to the dollar at a rate of 1 USD=3.75105 SAR</td>
</tr>
</tbody>
</table>

There is no god but God; Muhammad is the messenger of God.
1.2 Climate

Saudi Arabia has a harsh, dry desert with great temperature extremes. The average summer temperatures range from 45°C to 54°C. Winter temperatures range from 12°C at night to 27°C in the daytime.
1.3 Geography

- The Kingdom of Saudi Arabia occupies 80% of the Arabian Peninsula and is surrounded on two sides by water, the Red Sea to the west and the Persian Gulf to the east.
- Neighboring countries are Jordan, Iraq, Kuwait, Qatar, the United Arab Emirates, Oman, Yemen, and Bahrain, connected to the Saudi mainland by a causeway.
- Saudi Arabia contains the world's largest continuous sand desert, the Rub Al-Khali, or Empty Quarter which occupies 647,500 km².
- The Kingdom of Saudi Arabia has a unique geographical location, with the length of its coastal belt along the Red Sea and the Gulf exceeding 2,400 km.
- Saudi Arabia with an area of 2.15 million km² is a water deficit country, with limited freshwater-supplies. There are virtually no lakes or rivers.
- The country’s water supply and sanitation comes from desalination, groundwater and a smaller percentage from surface water.
- Its oil region lies primarily in the eastern province along the Arabian Gulf.
2. Economy

Saudi Arabia has an oil-based economy with strong government control over major economic activities.

• Saudi Arabia possesses 18% of the world's proven petroleum reserves, ranks as the largest exporter of petroleum.

• The petroleum sector accounts for almost all of Saudi government revenues, and export earnings.

• The current planning strategy involves a program of diversification away from oil by investing in infrastructure and human resource development.

• Labor policy promotes the employment of nationals rather than expatriate workers.

• Partly in response to the Arab Spring, the government launched social support packages, with additional state spending to boost the economy over a seven-year period (from 2011) that includes measures to increase housing and job prospects.
2.1 Saudi Arabia Imports

- The value of imports in Saudi Arabia for 2015 reached $173.8bn

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount in USD</th>
<th>% of total imports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicles</td>
<td>22.6b</td>
<td>14.9%</td>
</tr>
<tr>
<td>Machines, engines, pumps</td>
<td>22.0b</td>
<td>14.5%</td>
</tr>
<tr>
<td>Electronic Equipment</td>
<td>12.4b</td>
<td>8.2%</td>
</tr>
<tr>
<td>Oil</td>
<td>11.4b</td>
<td>7.5%</td>
</tr>
<tr>
<td>Iron or steel products</td>
<td>6.0b</td>
<td>4.0%</td>
</tr>
<tr>
<td>Aircraft/spacecraft</td>
<td>4.9b</td>
<td>3.2%</td>
</tr>
<tr>
<td>Iron and steel</td>
<td>4.6b</td>
<td>3.1%</td>
</tr>
<tr>
<td>Cereals</td>
<td>4.6b</td>
<td>3.0%</td>
</tr>
<tr>
<td>Pharmaceuticals</td>
<td>4.3b</td>
<td>2.8%</td>
</tr>
<tr>
<td>Medical/technical equipment</td>
<td>3.8b</td>
<td>2.5%</td>
</tr>
</tbody>
</table>
Saudi Arabia main import partners in 2014

Data Source: CIA Statista 2015

www.innovasjonnorge.no
2.2 Saudi Arabia Exports

- Saudi Arabia’s exports for 2014 were $347.9 billion
- This is an increase of 38.5% since 2010. Its top 10 exports accounted for 97.6% of the overall value of its global shipments.

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount in USD</th>
<th>% of total exports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil</td>
<td>296.2b</td>
<td>85.1%</td>
</tr>
<tr>
<td>Plastics</td>
<td>19.8b</td>
<td>5.7%</td>
</tr>
<tr>
<td>Organic chemicals</td>
<td>16.2b</td>
<td>4.6%</td>
</tr>
<tr>
<td>Fertilisers</td>
<td>2.1b</td>
<td>0.6%</td>
</tr>
<tr>
<td>Aluminum</td>
<td>1.4b</td>
<td>0.4%</td>
</tr>
<tr>
<td>Gems, precious metals, coins</td>
<td>970.6m</td>
<td>0.3%</td>
</tr>
<tr>
<td>Inorganic chemicals</td>
<td>967.0m</td>
<td>0.3%</td>
</tr>
<tr>
<td>Dairy, eggs, honey</td>
<td>700.7m</td>
<td>0.2%</td>
</tr>
<tr>
<td>Copper</td>
<td>671.4m</td>
<td>0.2%</td>
</tr>
<tr>
<td>Iron or steel products</td>
<td>650.2m</td>
<td>0.2%</td>
</tr>
</tbody>
</table>
3. Saudi Arabia Food supply

- **Saudi Arabia imports approximately 80% of its food needs.** The remaining 20% is produced locally.
- Desert farming was encouraged in the 1980s by providing substantial subsidies. This resulted in consuming non-renewable groundwater to the point that by 2012 four fifths of the total groundwater reserves were depleted.
- Poor soil conditions, water scarcity and bad weather conditions have raised wheat production costs.
- Saudi authorities have been forced to abandon the policy of increasing domestic production. Production began to decline from 2008 and is expected to cease fully by 2016.
- As developing a local agriculture sector has proved to be highly ineffective and costly, alternatives to provide food security are being evaluated.
- Alternatives for most GCC countries including Saudi Arabia include storing food products and acquisition of lands suitable for agriculture outside the region.
- For example, GCC investors overall purchased more than 2 million hectares of lands in the Sudan between 2006 and 2012. Smaller sizes of land have also been bought in Australia, the second largest recipient of Gulf investments.
- The Fisheries sector provides an alternative, however due to overfishing Aquaculture is seen as a good possibility for sustainable food production locally.
4. Fisheries in Saudi Arabia

4.1 Overview

• The fisheries sector is characterized by a large number of small scale fishers. Traditional fisheries as well as industrial fisheries operate in both the Red Sea and the Arabian Gulf.

• The industrial sector in the Arabian Gulf is solely concerned with shrimp production while the artisanal sector uses fish traps, gillnets, handlines, trolling and small shrimp trawl nets.

• There are approximately 8,000-10,000 fishing boats operating along the red sea coast and over 600 in the Arabian Gulf

• In the Red Sea, artisanal fisheries production is almost entirely from handline and gillnet methods, while the industrial sector utilizes fish and shrimp trawl nets.

• The industrial vessels operating in the Red Sea utilize trawl nets to target both demersal fish stocks and shrimp, with the majority of these vessels belonging to Saudi Fisheries Company and operating out of Jizan on the southern Red Sea coast.

• In addition to commercial food production, the fishery resource also supports a significant recreational fishery, particularly on the Red Sea coast
4.2 The Red Sea

- The Red Sea has over 2,000km of coral reef found along its coastline that provides shelter and food to over 1200 species of fish. 10% of these cannot be found in any other part of the world.
- It has a high salinity level of about 36‰ in the South and 41‰ in the North.
- This is due to the countries that borders the Red Sea are mainly desert countries, i.e. Saudi Arabia, Yemen, Egypt, Sudan, Eritrea and Djibouti, and do not produce significant rivers that run into the sea.
- These desert countries also experience extremely hot weather that resulted in high evaporation rate combined with little rain.
- The geographical shape of the sea offers restricted access to the neighboring sea, which are the Gulf of Aden\Indian Ocean and the Mediterranean Sea, which can help to lower the salinity level.
4.3 The Arabian Gulf

- Saudi Arabia has 580km of coastline along the Persian Gulf
- Although this is approximately 4 times less than the Red Sea, fish production contributes a significant amount to the total fish production of the country
- The salinity level is approximately 45‰
- High temperatures, especially during the summer months water temperatures can reach 40 degrees
- Ballast water from tankers may carry foreign species of aquatic organisms including algae which when emptying the tank are released into the Gulf Sea
  - The warm waters of the Gulf Sea are a perfect ground for these organisms to grow and multiply
  - These organisms may be harmful for and overtake indigenous species
  - This would have a very negative effect in the case of cage farming
### 4.4 Main species exploited by fisheries

<table>
<thead>
<tr>
<th>Native Species</th>
<th>Migratory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shrimps</td>
<td>Spanish Mackerel</td>
</tr>
<tr>
<td>Emperors</td>
<td>Indian Mackerel</td>
</tr>
<tr>
<td>Scads</td>
<td>Longtail Tuna</td>
</tr>
<tr>
<td>Jacks</td>
<td>Kawakawa</td>
</tr>
<tr>
<td>Groupers</td>
<td></td>
</tr>
<tr>
<td>Sea Breams</td>
<td></td>
</tr>
<tr>
<td>Snappers</td>
<td></td>
</tr>
</tbody>
</table>
4.5 Fishing industry crisis

• The Cooperative Society of Fishermen in Makkah has said that fish hauls along the coast of the Red Sea have been dropping dramatically and warn of further decline if no measure is taken.

• Production of fish from the Red Sea dropped by 70% in 2013.

• The drop is attributed to factors including pollution of the sea by sewage waters, coastal erosion, migration of fish, global warming and the lack of rain and floods.

• Statistics by the Ministry of Agriculture show it is possible that fish may be disappearing from the Red Sea over the next decade.

• As a result, despite having one of the largest coastal areas in the world suitable for fishing, Saudi Arabia remains extremely dependent on imports.

• Figures for 2012 show Saudi Arabia’s seafood imports amounted to 91% of domestic demand.
4.6 Fishery sector: Employment

- While Saudi citizens own and operate traditional and industrial vessels, the sector is heavily dependent on immigrant workers.
- Figures for 2013 show there were approximately 20,000 fishermen with just 30-40% of these being Saudis.
- The rest are expatriates from Bangladesh, Egypt, India and Yemen.
- Due to the promotion of Saudisation employment of expatriates is becoming more restricted to encourage employment of more Saudi citizens.
- The fishing profession however is witnessing a decline as fishing is an unpopular job particularly for younger generations who seek employment in other business areas.
5. Seafood demand in Saudi Arabia

- Figures for 2012 show Saudi Arabia’s fish production was around **100,471 tonnes**
- Domestic demand for the same year exceeded **200,000 tonnes** - the surplus in demand was met by imports
- Demand is being driven by the high per capita income and changing lifestyle and diet that demands high quality food products
- Fish demand is expected to soar to an all-time high of around **286,000 tonnes** in 2025 due to the steady population growth.
- The reliance on imports comes from overexploitation, the rapid growth in consumption and lack of investment in the farming and fishing sectors
- New investments in fish and fish products however are expected to create an average growth of 9% per year between 2013-2018 as the government provides more support
- The growth however is limited by pollution of the Red Sea and overfishing
5.1 Imports of Seafood in Saudi Arabia

Imported fish and fish products currently account for around 50-60% of total supply in Saudi Arabia.

5.2 Exports of Seafood in Saudi Arabia

Weight (1000 tons)

Value (Million USD)

6. Aquaculture in Saudi Arabia

6.1 Overview

• Saudi Arabia is one of the main aquaculture producers in the Middle East along with Egypt and The Islamic Republic of Iran.
• In 2011, 41% of all seafood production in Saudi Arabia was from aquaculture.
• Aquaculture production is mainly used for domestic consumption.
6.2 Is aquaculture feasible in Saudi Arabia?

- Saudi Arabia is a vast landmass. Wide tracts of land are available along the two coasts and in agriculture belts where non-arable lands could be used for aquaculture.
- There is a wide range of climatic conditions that allow culture of suitable subtropical and tropical species.
- Scarcity of freshwater means that mariculture especially from the Red Sea, is Saudi Arabia’s best option for developing a self-sustained locally produced fish supply to satisfy the country’s increasing seafood demands.
6.3 Aquaculture in Saudi Arabia: History

- Studies during 1970 by the Ministry of Agriculture in cooperation with FAO and the White Fish Authority (WFA) of the UK were made to identify the potential of aquaculture development providing a list of potential species suitable in fresh and marine waters in the Kingdom.
- The first aquaculture farm in Saudi Arabia was established in 1983, when the first license to operate this kind of business venture was granted.
- During that time tilapia was reared in inland water bodies.
- There were less than 20 fish farms in Saudi Arabia during the 80s, this number increased significantly to 109 in 2002 and more than doubled in just 2 years to 227 in 2008.
- King Abdulaziz City for Science and Technology (KACST) established a tilapia and common carp hatchery in Riyadh in 1980. Since then a substantial number of fingerlings were produced and distributed to fish farmers.
• The sector started to move toward shrimp aquaculture - giant tiger prawn first and Indian white shrimp after.
• Shrimp and marine fish farms are concentrated along the Arabian Gulf and the Red Sea, notable in which are the long coastline of suitable environment where climatic conditions are generally stable.
• From a mainly freshwater aquaculture-oriented activity, it became a highly successful marine aquaculture venture dominated by only two aquaculture commodities, Tilapia for freshwater and white shrimp for marine aquaculture.
• Shrimp became the major seafood produced by aquaculture in 2000 when it began to be produced in large quantities and it overtook Nile tilapia.
Initially, the activities on shrimp culture were mainly on giant tiger prawn (*Penaeus monodon*) based on breeding and culture technologies developed in Southeast Asia.

However due to the high saline waters around the country culture was not successful and it was replaced by the Indian white shrimp (*Penaeus indicus*), which was found to survive and grow well in the country’s high saline waters.

Due to indications of White Spot Syndrome Virus, shrimp farming projects were closed.

Shrimp farming was revived in 2012 with the culture of SPF Vannamei sourced from specialized facilities in the Americas.

Some of the shrimp production is exported in many countries like Japan, European and North American markets, once domestic demand has been satisfied.
• Studies by the Jeddah Fisheries Research Centre have identified a selection of fish that are suitable for farming
• Culture trials of Asian Seabass started at the Jeddah Fisheries Research Center in Jeddah in 1998
• Commercial production started in 2006 with culture of the species growing from 2011 reaching 5,000 tonnes in 2014
• Asian Seabass is farmed in a number of culture systems, including tanks, earthen ponds and floating cages
• It was introduced in 2008 with commercial production taking place in one of the large farms with floating cages.
• It is currently produced in three cage farms with over 2,000 tonnes produced in 2013
6.4 Cultured species

- Sobaity seabream
- Nile tilapia
- Gilthead seabream
- Barramundi or Asian seabass
- Catfish
- Indian white prawn
- Rabbit fish
- Ornamental fish
- Mullet fish
6.5 Current situation

With seafood consumption likely to continue to rise, aquaculture has become the most realistic way to meet demand. Like other GCC countries such as Oman and the UAE, Saudi Arabia is investing in aquaculture projects to meet the rising seafood consumption. The FAO reports that the aquaculture sector in Saudi Arabia has been witnessing rapid development in the last 5 years as the number of fish farms has been increasing and recent government initiatives have been set to enhance domestic production.

The Saudi Arabian Ministry of Agriculture has invested $10.6 billion into aquaculture projects with the purpose to produce 600,000 of fish in the next 15 years.

According to the FAO, total aquaculture production in 2014 reached 23,870 tonnes which included:

- Shrimp 54%
- Freshwater fish 20%
- Marine fish 26%
6.6 Future plans

According to a report by the Food and Agricultural Organization (FAO), the Saudi Arabian Ministry of Agriculture invested an additional $10.6 billion into aquaculture projects to produce one million tons of fish in the next 16 years:

- An annual production target of 600,000 tonnes by 2030 has been set, starting from current levels of less than 30,000 tonnes per year.
- The government aims to increase production for seafood from 12kg per capita to reach the world average of 19kg.

- Seafood production is on the agenda of most GCC countries; the overall per capita average seafood consumption is expected to increase year-on-year in-line with Gulf countries’ population growth - the Economist Intelligence Unit (EIU) forecasts the GCC population will reach 53.5 million by 2020.
- To meet the increasing regional demand for seafood, the GCC governments have already implemented developmental initiatives designed to foster greater domestic production.
• There are a number of applications for new licenses that are currently being processed however no new licenses have been issued yet as of Q1 of 2016

• One of these license applications includes a facility that aims to create a smooth process for almost anyone to start a fish farm business; the concept is along the lines of a one-stop-shop for starting a fish farm, where all procedures would be set in place and easy to follow

• The existing big shrimp farms are planning to expand, acquiring more areas intended for production and with plans to go into marine fish culture, especially the highly priced marine fish species such as groupers, seabreams and seabass reared in floating cages in the Red Sea

• However, the current political situation in the region is expected to have an effect in the development of the sector; progress is expected to begin from Q2-Q3 of 2016

• With other commercial ventures, continuing research and development of cost-effective techniques to enhance production and screening of local species for future development are necessary
6.7 Preferred methods

- From the two coasts Saudi Arabia has access to, the Red Sea has been chosen as the most suitable to focus investments on.
- Farming in ponds and land based open farms are being discontinued.
- The favored methods for farming are:
  - Open cage systems that will be located as a minimum 5km away from the shore.
  - Closed systems for land based farms.
7. The institutional framework

• The main agency tasked to regulate and supervise aquaculture development in Saudi Arabia is the Department of Aquaculture, an agency under the Office of the Deputy Ministry of Fisheries Affairs within the Ministry of Agriculture.

• Based in the capital city of Riyadh, the main task of the department is to control, regulate and supervise aquaculture operations in coastal and inland regions, as well as, to support research projects which focus on aquaculture and suitable fish and shrimp species for fish farming purposes in fresh and marine waters.
7.1 The Department of Aquaculture’s objectives and specifications

1. Supporting and supervising activities dealing with site selection of coastal areas suitable for setting up aquaculture projects.
2. Design and approval of short and long-term plans for updating current and future aquaculture performance in Saudi Arabia.
5. Applying the principles and practices of Aquaculture Biosecurity through the adoption of a documented code of conduct for regulation, implementation and validation through the Aquaculture Department of the Ministry of Agriculture (ADMA), the ministerial body for related governance.
7.2 Governing regulations

- Although there have been aquaculture operations for the past 30 years Aquaculture in the form of a sector is relatively new in the country, clear regulations governing the sector are not yet in place.
- The law regulating fishing, investment and protection of living aquatic fisheries resources has been issued by the Royal Decree on 18 November 1987, entrusting the Ministry of Agriculture with the responsibility of regulating fishing and investment.
- The Kingdom has eased the regulations governing freeing investment by endorsing the Foreign Investment law. Under this law, investment projects, including aquaculture, can be either fully-owned by foreign investors or owned jointly by Saudi and foreign investors.
- Under a scheme by the Saudi Arabian Agricultural Bank, loans are provided to farmers for the development of aquaculture projects, purchase of production requirements, equipment & other facilities.
- These loans are normally with very low interest and payable within a period of up to 25 years.
- These reforms have been put in place to encourage foreign investors:
  - No excise duty is imposed for the import of farm equipment, fish feeds, instruments and chemicals related to the farming activities.
  - An investor shall also have the right to transfer his share of profits outside the Kingdom as well as his entire share if the project is sold.
7.3 Issuing an aquaculture project license

The steps below have been established to obtain an Aquaculture project license. License applications are evaluated on a case by case basis additional steps and documentation may be required, not outlined below:

1. Submission of the application and the initial rehabilitation
2. Provision of technical and economic feasibility study for the initial project
3. Presentation to the committee to obtain their agreement
4. Obtain approval of the border security projects marine guards
5. Issuance of initial approval for the sites tests (Marine projects)
6. Provision of environmental feasibility study of the project to get the environmental approval. In case the project needs a port, the committee should give approval on dredging and reclamation
7. Provision of technical and economic feasibility study for the final project
8. Approving the final project and issuance of licenses for the construction and operational project
7.4 Documents needed for obtaining a license

Any investor who applies for the license should provide the following documents;

1. Technical description of the proposed project.
2. A copy of:
   • ID document if the applicant is a Saudi citizen or/and,
   • If the applicant is a foreign investor, passport (approval by the General Authority for Investment must be sought first)
   • The commercial registration of the companies and institutions
3. Proof of solvency in the form of a certificate from the bank
4. Signature of a pledge to comply with all administrative and technical requirements related to the project, in case the request is approved

In cases where the aquaculture project is inland, these additional documents should be added;

• A copy of ownership of land or certified copy of a lease for a period of not less than 10 years
8. The Saudi Aquaculture Society

Vision, Mission & Objectives

The Saudi Aquaculture Society works under the supervision of the Ministry of Agriculture and it's headquartered is Jeddah.

1. Vision:
   • To contribute to the development of a sustainable and competitive global aquaculture industry in the Kingdom of Saudi Arabia.
   • To ensure the industry is capable of producing safe and high quality products with competitive prices.

2. Mission:
   • Work to enhance the role of sustainable aquaculture industry as one of the main elements in the development of the Kingdom of Saudi Arabia.

3. Objectives:
   • Work side by side with the Ministry of Fisheries Affairs to develop the necessary plans & regulations
   • Work with the stakeholders to establish an aquaculture industry to achieve the SAS’s vision, undertake studies, consultations, services, establish business entities and enter into appropriate investments with third parties in order to develop its financial resources
   • Work with the stakeholders to promote the industry
9. Fish Farm companies in Saudi Arabia

9.1 National Aquaculture Group - NAQUA

- National Aquaculture Group - NAQUA is one of the largest aquaculture operations of its type in the world with fully integrated marine farms and 16 shrimp farms.
- Its farms are strategically located by the coast of the Red Sea, 180km south of the historic port of Jeddah.
- They employ more than 2,500 people from 32 different nations.
- **Products:** They breed different marine species ranging from red sea fish, red sea barramundi and red sea shrimp to marine algae and sea cucumber.
- They also produce their own shrimp feed.
9.2 Saudi Fisheries company

- Saudi Fisheries Company was established in 1980 as a joint stock company.
- They established the first shrimp farm in the Kingdom in 1997.
- Production reached the original maximum capacity of 1,500 tons/year so expansions took place in 2011 to increase capacity to 4,500t/y.
- Additional Farms are:
  - **Oumg Farm**: Based 7 km from the city of Oumg, it covers an area of 13.3 million m².
  - **Aanak Fish Farm**: Based in the Eastern Province in the city of Qatif, it covers an area of 50,000m² for farming Bulti fish.
- In addition to aquaculture operations, they own factories and industrial facilities for preparation of fresh, frozen and value added products including shrimp tempura, breaded shrimp, fish fingers and burgers.
9.3 Arabian Shrimp company - ASCO

- Arabian Shrimp company came to existence in 2005 after successful establishment of a shrimp farming operation in Oman
- AQUA Farms Corporation was founded with the purpose to promote and invest in aquaculture and is a cooperation
- In cooperation with the Authority for Agriculture Investment and Development, Arabian Shrimp Farm was founded
- In May, 2004, the Saudi Ministry of Agriculture and Arabian Shrimp Company signed a 20-year lease agreement for a 7500 hectare plot on the coast north of Jizan
- Upon establishment, the aim of the farm was to produce 25,000 tons of shrimp a year
9.4 National Prawn Company – NPC

- NPC is based along the Red Sea coast in Al-lith, 150 km south of Jeddah city
- Owned by Al-Rajhi Group, a holding the company with operations in Real Estate
- The company reports that it exports around 15,000 metric tons of seafood every year
- NPC does not use any antibiotics at any stage of production and has a policy of low-density stocking and partial harvests to prevent overcrowding
- National Prawn Company is a founding member of the Global Aquaculture Alliance (GAA).
Google Earth view of National Prawn Company’s shrimp farming facilities
9.5 Asmak

- Asmak’s main operations are based in Saudi Arabia with one farm in Kebbe City and a second one under approval. They also own the majority share in an off-shore cage farming facility located at Umm Lajj in the Kingdom of Saudi Arabia.
- The products from these farms are distributed in KSA, Jordan, Egypt and the UAE.
- Products include farmed fresh sea bream, subaiti, tilapia, and barramundi.
- The equipment used in the Saudi fish farms where purchased by a Norwegian company around 20 years ago.
- Feed is purchased by Arasco, a Saudi fish feed producer.
- Medication is rarely used.
- They have no need for genetic manipulation as they purchase juveniles form Greece and Turkey.
9.6 Tabuk Fisheries Co - TFC

- Tabuk Fisheries Co is owned by Jazan Development Company which has investments in fisheries, agricultural, industrial, and real estate areas
- They include hatcheries onshore and floating cages of 60m and 40m diameter
- Its fish farm operations are based off the coast of Duba in the region of Tabuk
- Fish farmed include seabream, seabass and cuttlefish

Tabuk fish Farm
9.8 Jazan development company - JAZADCO

- In addition to owning Tabuk Fisheries, Jazan Development company also owns one shrimp farm

Part of the company's production of shrimp will be marketing in the local market and in Gulf.

- Feed is sourced from a Saudi based producer
- Chemicals for the farm: Some are from the US
10 Aquaculture research institutions in Saudi Arabia

10.1 Faculty of Marine Sciences

- The faculty of Marine Science at the King Abdulaziz University was established to keep up the pace with the development in marine science and technology, particularly the active role played by the seas and oceans for food, security and provision of safe drinking water.
- Initially, in 1975 it started as Department of Marine Science in the Faculty of Science later in 1978 it was changed to the Institute for Marine Sciences with four scientific departments.
- It is the only place in the country where some form of vocational aquaculture training takes place.
10.2 Fish Farming center

- The Fish Farming Centre was established in cooperation between the Ministry of Agriculture and the FAO in 1982 on the Red Sea coast, 50km North of Jeddah.
- The purpose of the project is to create a center of technical expertise for fish and prawn culture within the Ministry of Agriculture and Water which can direct and support the development of aquaculture in the Kingdom with research and development projects.
- Its work includes identifying the most suitable fish and shrimp species for culture and the optimal culture systems that are suitable to the conditions found in the Kingdom.
- Among its accomplishments, the Fish Farming Centre has been successful in establishing a commercial technique for the culture of Tilapia in seawater in fish cages, fish pens and fish tanks.
- Research by the Centre has proven the feasibility of the different culture systems in the Red Sea where fish and shrimp have been successfully grown in floating cages, fixed fish pens, fiberglass tanks and plastic lined ponds.
10.3 Jeddah Fisheries Research Center - JFRC

- Based on the Red Sea coast, 60km North of Jeddah and run by the Ministry of Agriculture in cooperation with the FAO, the Jeddah Fisheries Research Center was established in 1982 with its main focus being research and training in aquaculture.
- Research is concentrated on identifying the suitability of both local and foreign marine fish and shrimp species for fish farming in Saudi Arabia’s local environmental conditions, diseases, water quality control and developing feed formulas using locally available ingredients.
- Its purpose is also to select and advise on the most suitable methods and coastal areas for farming with commercial applications.
- In addition to research, JFRC’s purpose is to provide training programmes and publish educational material and guides on all aspects of aquaculture operational techniques.
- JFRC forms a support mechanism for startup aquaculture projects by providing larvae and fingerlings.
- Furthermore, JFRC conducts feasibility studies of aquaculture projects.
10.4 King Abdullah University for Science and Technology

- KAUST was founded in 2009 as a graduate research university.
- It is located on Thuwal by the Red Sea on a 36m$^2$ campus which includes a marine sanctuary and research facility.
- One of the main topics of research within the Water Desalination and Reuse Center at KAUST revolves around sustainable water technologies in industry and agriculture/aquaculture.
- In this topic methods for the removal of nutrients and microbial contaminants from water in recycling aquaculture systems are investigated.
- Additionally, KAUST’s Red Sea Research Center (founded in 2011) works on understanding the Red Sea’s reef ecosystems and environment and monitoring stresses arising from natural and human caused factors such as pollution, overfishing, coastal development, and global climate change.
11. Opportunities for Norwegian companies

• The Investment Opportunities in Aquaculture in Saudi Arabia Forum took place in Yanbu on 27-28\textsuperscript{th} January 2016 - organized by the Ministry of Agriculture and FAO
• The Forum highlighted the opportunities for the private sector in investing in marine aquaculture, raising the awareness on the possible technologies available and increasing the level of confidence in investing in a business relatively new for Saudi
• The Norwegian Embassy and Innovation Norway participated at the Forum and with the help of the Saudi Aquaculture Society - SAS hosted a networking dinner, which was attended by many Saudi CEO’s members of SAS, KAUST and FAO
• Although there was a relatively small participation from the Norwegian side, the desire for a close cooperation with Norway and Norwegian entities has been expressed by the Saudi side both on private and governmental levels to develop the Aquaculture sector and transfer of know-how.
• Norwegians are encouraged to concentrate and focus on this market and to intensify contacts with the Saudi parties to express real interest to reach stronger cooperation.
### 11.1 SWOT analysis for Norwegian companies

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Perceived as professional</td>
<td>• Sector is not well developed yet</td>
</tr>
<tr>
<td>• High quality products</td>
<td>• Market is price sensitive</td>
</tr>
<tr>
<td>• Focused on R&amp;D</td>
<td>• Negotiations require flexibility</td>
</tr>
<tr>
<td>• Trustworthy</td>
<td>• Must dedicate time in cultivating relationships locally</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Utilise local expertise and knowledge (local ecological conditions are extremely important)</td>
<td>• Strong competition from Europe both in terms of price and quality</td>
</tr>
<tr>
<td>• Research and Development</td>
<td>• Some elements could be manufactured/copied locally at much lower prices</td>
</tr>
<tr>
<td>• Saudi Aquaculture Society keen on a cooperation with Norway</td>
<td>• Market entry requires a long term commitment</td>
</tr>
</tbody>
</table>
11.2 Recommendations for market entry

• Market potential for Norwegian companies is high but with some challenges
• Norwegian companies are regarded as experienced and professional
• However it is a price sensitive market so flexibility in negotiations is a must especially due to competition with Europe and Eastern countries
• Few market players, there is still a lot of work to be done to educate the market
• A pilot project with a local partner and marketing through the appropriate channels could create awareness and prove future success
• A consistent knowledge and technology transfer program could open a pathway to a long term cooperation where Norwegian companies work with Saudi authorities to establish a solid aquaculture industry
• Business success in the region is based on cultivating relationships
• Local partner must have the right local expertise and knowledge in aquaculture & local environmental conditions
For further information contact:

Matteo Chiesa
Matteo.Chiesa@innovationnorway.no
+971 056 601 8336

Maritsa Kissamitaki
maritsa@nordoest.com
+971 50 907 1490