



Facultad de Ciencias Económicas y Empresariales

**STUDY OF THE MARKET  
OPPORTUNITY IN SAUDI ARABIA  
FOR SPANISH COMPANIES  
SPECIALIZED IN AGRICULTURE  
FACILITIES**

Autor: Javier Serrat Marín

Director: Javier Morales Mediano

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## **LIST OF ABBREVIATIONS**

FAO → Food and Agriculture Organization of the United Nations

MEWA → Ministry of Environment, Water and Agriculture

KSA → Kingdom of Saudi Arabia

NWC → National Water Company

HS Code → Harmonized Commodity Description and Coding System

## **SUMMARY**

The learning objective of this Final Dissertation is to apply all the theoretical knowledge learned during the degree and use it in a practical project to give national companies the opportunity to learn about the irrigation and greenhouse industry in Saudi Arabia.

In the first place, the concept of globalization and internationalization is analyzed with its drivers, motives, risks and benefits. It also examines the different internationalization strategies and uses a deductive method to check which mode of market entry would be the most convenient where Exporting, Turnkey Projects, Licensing, Franchising, Joint Ventures and Wholly Owned Subsidiary stand out. In addition, the terms irrigation systems and greenhouses are explained.

In the second place, an in-depth study of the Saudi Arabian market is made, which offers a global but at the same time detailed vision of the water market and its resources due to the importance it has in irrigation systems. Subsequently, the supply and demand for irrigation systems and greenhouses in the time period of 2014-2018 is investigated to know what the trend has been and to know the outlook around the market. Finally, it argues the perception of Spanish products in the Arabian country since they stand out thanks to their quality and experience in the sector.

This work contributes to the strategy of any Spanish company in the sector with an internationalization plan based on a realistic and contentious analysis. Moreover, it makes important academic contributions by applying theoretical internationalization models to a real case.

Key words: Internationalization plan, Saudi Arabia, entry method, global marketing plan, irrigation systems and greenhouses, agriculture.

## **INTRODUCTION**

This market study analyzes the situation of irrigation and greenhouse systems in Saudi Arabia. The percentage represented by the agricultural sector in the GDP of a country is not usually so high in recent years, in 2019 in Spain it accounted for 4.9% while in Saudi Arabia it represented 2.23% (ICEX, 2021).

According to Muñoz (2021) the agricultural sector is in full growth since due to the healthy eating craze and the Covid-19 pandemic countries have realized that they have to be self-sufficient to reduce their expenditure on imports.

The Economic and Commercial Office of Spain in Saudi Arabia (2021) explained that the Kingdom of Saudi Arabia after its interest in achieving the Saudi Vision 2030 had committed to make large investments of up to 10.18 billion euros in the agricultural sector and especially in greenhouses; at the same time the Agricultural Development Bank and Saudi Agricultural Fund were going to finance large agricultural development projects with an emphasis on saving water and crops with higher productivity (Alcalá-Galiano, 2015).

In a context of increasing global competition and rapid growth of its industry, Spanish companies should study the feasibility of an internationalization strategy to Saudi Arabia, analyzing the foreign market, evaluating the different entry methods and establishing a marketing and training plan in the destination country.

Consequently, the main objective of this paper is to assess the feasibility of international expansion from a business and operational perspective and to create a realistic internationalization plan.

## **METHODOLOGY**

This Final Dissertation has used a variety of source materials in order to present a realistic internationalization plan.

First of all, it has been necessary to develop an exhaustive analysis of the irrigation systems and greenhouses sector and subsequently in Saudi Arabia. This sector has been analyzed using primary and secondary sources. Regarding the primary sources, an interview was arranged with the Commercial Director of the company Hermisan (a leading company in the sector in Spain), Juan Felipe Muñoz Vizcaíno. This interview provided valuable insight into the company, the sector and the internationalization process of a company in this industry.

On the other hand, secondary sources of information include documents provided by the Economic and Commercial Office of Spain in Saudi Arabia for relevant information on the Arabian country.

The irrigation systems and greenhouses sector has been known through analyses by McKinsey Group, World Bank and National Water Company. In addition, market research and websites have been consulted to learn about the latest developments and trends in the irrigation systems and greenhouses sector.

Secondly, this Final Thesis has used a deductive method. First, it has studied the theoretical framework of globalization and internationalization. Then, it has applied it to the specific business model of the previously mentioned sector in Saudi Arabia.

The theoretical framework of business internationalization has been studied through the literature review of several works. These include *International Marketing* (Cateora, Gilly and Graham, 2014), *Strategic Management* (Hill, Schilling and Jones, 2017) and *Global Marketing. A Decision-Oriented Approach* (Hollensen, 2011). In addition, previous undergraduate lectures on International Business and International Political Economy have been considered to complete the theoretical background.

## **THEORETICAL FRAMEWORK**

Globalization reflects the trend of firms buying, developing producing and selling products and services in most countries and regions of the world (Hollensen, 2011). Fifty years ago, most national markets were isolated from one another by significant barriers to international trade and investment. In those days, all of this now has changed. Barriers to international trade and investment have tumbled, huge global markets for goods and services have been created, and companies from different nations are entering each other's home markets on an unprecedented scale, increasing the intensity of competition (Hill, Schilling and Jones, 2017). The globalization is the shift towards a more integrated and interdependent world economy (Blanco, 2020).

The process has been such that in 2009, Friedman (2009) published the book *The world is Flat* which was a demonstration of what the world was like in the 21st century. According to Hollensen (2011) Friedman described it as a fair trade, because all players and competitors had the same opportunities.

Companies have taken globalization into account and, as a result, have taken their activities to foreign countries. Therefore, Cateora, Gilly and Graham (2011) reason that global companies and global marketing are terms frequently used to describe the scope of operations and marketing management orientation of companies in this stage. Although it should not be forgotten the importance of adaptation to the new market that is what Hollensen (2011) defines as glocalization that means the development and selling of products or services intended for the global market, but adapted to suit local culture and behavior. Related to this, Hill (2008) defines the concept of globalization of markets as the merging of historically distinct and separate national markets into one huge global marketplace.

### **a) Internationalization: Concept definition**

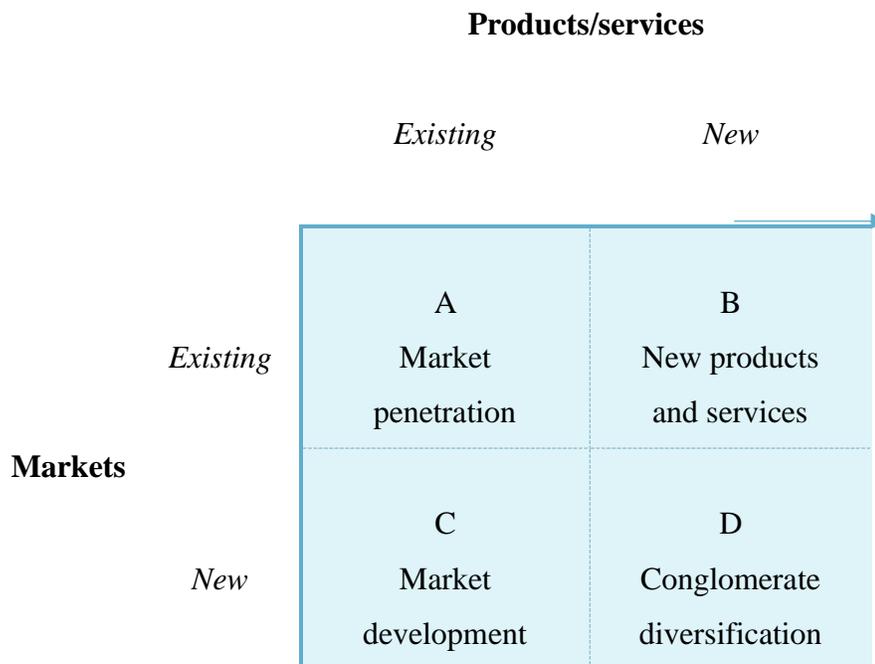
## I. Market development strategy

There are different ways of understanding the term internationalization. According to Hollensen (2011) internationalization is doing business in many countries of the world, but often limited to a certain region. But internationalization may not be successful unless the firm prepares it in advance, because advance planning is important to the success of new international ventures (Knight, 2000).

Moreover, Johanson and Vahlne (1977) consider corporate internationalization as a process in which the company gradually increases its international involvement by expanding its activities abroad in order to obtain a larger number of customers.

Another way to understand the concept is through the Ansoff matrix. The matrix describes alternative corporate strategies that show the four different directions that organizational growth can take.

**Figure 1: Ansoff Matrix**



Source: Own elaboration based on Hollensen (2011)

At the beginning, companies normally position themselves at point A (Market Penetration) in order to grow and diversify later towards a more product/service based point or on the contrary looking more for the interest of the markets.

Apart from point A, the Ansoff matrix has three different points focused on diversification strategies. Point B (Product Development) is the development of new products and services in an existing market. Point C (Market Development) involves bringing previously existing products to new markets. Point D (Diversification) is the entry of new products into entirely new markets.

The explanation of the four strategies depends on the company's interests since each activity or action taken will place the organization at one point or another within the Ansoff matrix. Such strategy implies increasing the range of geographical markets in which a company operates (Angwin, Johnson, Regnér, Scholes and Whittington, 2014).

**II. Internationalization drivers and motives**

Corporate internationalization is an important strategic move that has a significant impact on a company's decisions, its operational and financial structure (Ramirez Amoros, 2020).

The internationalization motives are differentiated into proactive and reactive reasons. Proactive motives are the stimuli for a change in strategy, which are based on the company's interest in exploiting unique competencies in markets with potential. Reactive motives indicate that the company reacts to pressures or threats in its domestic or foreign markets and adapts to them passively by changing its activities over time. (Hollensen, 2011).

**Table 1: Major motives for starting export**

<b>Major motives for starting export</b>	
<b>Proactive motives</b>	<b>Reactive motives</b>
<ul style="list-style-type: none"> <li>• Profit and growth goals</li> </ul>	<ul style="list-style-type: none"> <li>• Competitive pressures</li> </ul>

<ul style="list-style-type: none"> <li>• Managerial urge</li> <li>• Technology competences/unique product</li> <li>• Foreign market opportunities/market information</li> <li>• Economies of scale</li> <li>• Tax benefits</li> </ul>	<ul style="list-style-type: none"> <li>• Domestic market: small and saturated</li> <li>• Overproduction/excess capacity</li> <li>• Unsolicited foreign orders</li> <li>• Extend sales of seasonal products</li> <li>• Proximity to international customers/psychological distance</li> </ul>
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Source: Own elaboration based on Albaum, Strandskov, Duerr and Dowd (1994).

Expanding global allows firms to increase their profitability and rate of profit growth in ways no available to pure domestic enterprises (Blanco, 2020).

- To expand the market for their domestic product offerings by selling them in international markets (levering products and competences) and to diversify risk.
- To realize location economies dispersing value creation activities to locations where can be performed most efficiently.
- To realize experience effects by serving and expanded global market for a central location:
  - Learning effects
  - Economies of scale: (i) spread fixed costs (ii) efficient scale production (iii) bargaining power.
- To earn a greater return by leveraging valuable skills developed in foreign operations and transferring them to other entities within the firm's global network of operations.

Furthermore, a company will become international based on sector, country, and company factors (Sobrino, 2019).

- *Sector factors:* Economic sectors are experiencing a gradual process of overall internationalization, due to the rise of globalization and global competition previously mentioned. An example of this phenomena is standardized worldwide technology: In previous decades, elaborate technological products were developed for defence and government sectors rather than individual consumers. Today, we are seeing an exponential growth of consumer electronics across nations, leading to a global demand and competition.
- *Country factors:* In the first place, a company could be motivated to become international as a response to a saturation or deficiency in the country of origin. For example, due to the saturation in the domestic market of the hotel industry in Spain in the 90s, many companies started expanding their operations and opening hotels in developing areas such as the Caribbean. In the second place, internationalization can also be motivated by the existence of an opportunity in the country of destination. For instance, migrating to areas with lower regulatory restrictions for a specific sector.
- *Company factors:* One of the main company-related factors is global risk reduction since internationalization allows business to diversify into countries with different demand patterns. In addition, many companies have expanded their operations globally because of strategic dependence. This is the case of many professional service companies, that often follow a client when it moves to another country.

### III. Internationalization advantages

There are three types of benefits that an internationalization strategy can generate (Sobrino, 2019):

- *Market development allows a company to expand its market for current products:* Internationalization implies expanding the business activity from a geographical perspective. In addition, the performance of this strategy is higher if the local competitors of the host markets lack comparable products. However, since the newcomer in the sector can be perceived as a threat, local competitors are likely to react through protectionism or competition.

- *Incorporate and exploit international distinctive capabilities*: Internationalization involves a two-way exchange of information, know-how, etc. between the home and the foreign market. Distinctive capabilities are the source of competitive advantage and a company can export them from its home country to the new markets entered. Alternatively, it can exploit subsidiaries skills in foreign markets, and import them to its traditional markets. For this reason, many internationalization strategies are done through takeovers or M&As (external growth) of local companies: The parent company acquires a local business that has resources or capabilities that are attractive to incorporate.
- *Leverage economies of location of the value chain*. Economies of location consist in placing different activities of a company's value chain in strategic places that provide competitive advantages. This allows the company to reach a higher income, a lower cost, or both at the same time, because of the locations where it places its different operations. This enables value maximization of the company.

Expanding globally allows firms to increase their profitability and rate of profit growth in ways no available to purely domestic enterprises. Firms that operate internationally are able to (Hill, Schilling and Jones, 2017):

- Expand the market for their domestic products offerings by selling those products in international markets.
- Realize location economies by dispersing individual value creation activities to those locations around the globe where they can be performed most efficiently and effectively.
- Realize greater cost economies from experience effects by serving an expanded global market from a central location, thereby reducing the costs of value creation.

- Earn a greater return by leveraging any valuable skills developed in foreign operations and transferring them to other entities within the firm's global network of operations.

#### IV. Internationalization barriers and risks

Internationalization has not only positive aspects such as the advantages mentioned in the previous section, but also it has barriers and risks that companies will suffer when they want to export their products or services internationally.

To encourage the development of the domestic industry and protect existing industry, governments may establish such barriers to trade as tariffs and a variety of nontariff barriers including, quotas, boycotts, monetary barriers and market barriers. Barriers are imposed against imports and against foreign businesses (Cateora, Gilly and Graham, 2011).

In addition, with regard to the barriers that companies will encounter when they internationalize, the following stand out: (Hollensen, 2011):

- Insufficient finances and knowledge of new markets
- Lack of foreign market connections and existence of restrictive regulation
- Lack of productive capacity and of foreign channels of distribution.
- Management emphasis on developing domestic markets.
- Cost escalation due to high export manufacturing, distribution and financing expenditure.
- Inadequate information on potential foreign customers, competition, and foreign business practices.

After learning about the barriers that a company may face when going international, it is clear that there are many risks that organizations may encounter once they have made the decision to expand internationally.

These risks can be divided into three main groups. Firstly, general market risks which include competition from rivals in foreign markets, differences in product usage, complexity of shipping services to foreign buyers, language and cultural differences. Commercial risks

include exchange rate fluctuations, delivery delays, damage to export equipment and difficulties in obtaining export financing. Political and regulatory risks include export restrictions and policies of foreign and domestic governments, lack of government assistance, high foreign tariffs and fees, and the complexity of export documentation (Hollensen, 2011).

To avoid these risks and barriers, companies have to make some fundamental decisions before expanding internationally. The company has to decide which foreign country, timing of entry, scale of entry and the entry mode (Blanco, 2020).

Firms that compete in the global marketplace typically face two types of competitive pressures (cost reduction and local responsiveness) that place conflicting demands on the firms (Hill, Schilling and Jones, 2017).

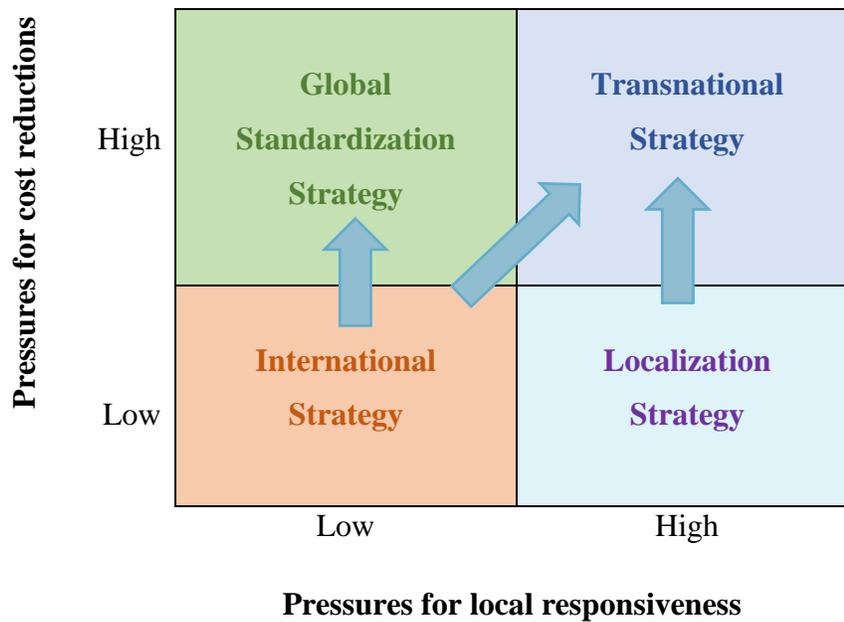
Pressures for cost reduction are greatest in industries that fill universal needs, when major competitors are based in low-cost locations and where there is persistent excess capacity and therefore where consumers are powerful and face low switching costs (Blanco, 2020). To respond to these pressures, firms need to lower the costs of value creation (Hill, Schilling and Jones, 2017).

Pressures due to local responsiveness arise from host government demands and differences in consumer tastes and preferences, traditional practices and infrastructures and distribution channels (Blanco, 2020). Firms facing these pressures need to differentiate their products and marketing strategy in each country (Hill, Schilling and Jones, 2017).

Given the need to balance the cost and differentiation (value) aspects of a company's business model, companies have to choose a strategy to maintain pressures in a stable manner.

Companies typically choose among four main strategic positions when competing internationally: a global standardization strategy, a localization strategy, a transnational strategy and an international strategy.

**Figure 2: Four basic strategies**



Source: Own elaboration based on (Hill, Schilling and Jones, 2017).

Global standardization strategy: it is a business model based on pursuing a low-cost strategy on a global scale (Hill, Schilling and Jones, 2017). Hence, this strategy makes sense when there are strong pressures for cost reductions and demands for local responsiveness are minimal. Their strategic goal is to pursue a low-cost strategy on a global scale (Blanco, 2020).

Transnational strategy: it is a business model that simultaneously achieves low costs, differentiates the product offering across geographic markets, and fosters a flow of skills between different subsidiaries in the company's global network of operations (Hill, Schilling and Jones, 2017). A transnational strategy makes sense when cost pressures are intense, and simultaneously, so are pressures for local responsiveness (Blanco, 2020).

Localization strategy: it is a strategy focused on increasing profitability by customizing a company's goods or services so that they provide a favorable match to tastes and preferences in different national markets (Hill, Schilling and Jones, 2017). Blanco (2020) explains that

localization strategy is most appropriate when there are substantial differences across nations with regard to consumer tastes and preferences, and where cost pressures are too intense.

International strategy: it involves taking products first produced for the domestic market and then selling them internationally with only minimal local customization. This strategy is appropriate when there are low-cost structures and low pressures for local responsiveness (Blanco, 2020).

## V. Entry modes

Any firm contemplating entering a different national market must determine the best mode or vehicle for such entry. There are six primary choices of entry mode: exporting, turnkey projects, licensing, franchising, entering into a joint venture with a host-country company, and setting up a wholly owned subsidiary in the host country (Hill, Schilling and Jones, 2017).

- Exporting

Exporting is often the first method firms used to enter foreign market. This entry mode is attractive because it is relatively low cost and firms may achieve experience curve and location economies. But exporting is not attractive when transport costs and tariff barriers are high, lower-cost manufacturing exist and foreign agents fail into the exporter's best interest (Blanco, 2020). Exporting has two distinct advantages: It avoids the costs of establishing manufacturing operations in the host country, which are often substantial, and it may be consistent with scale economies and location economies (Hill, Schilling and Jones, 2017). According to Blanco (2020) companies that decide to follow this strategy make common mistakes such as poor market analysis, a lack of customization for local markets, underestimation of the need for local expertise, difficulty in dealing with a lot of paperwork due to a poor understanding of competitive conditions.

- Turnkey projects

Turnkey projects involve a contractor that agrees to handle every detail of the project for a foreign client, including the training of operating personnel. This entry mode is interesting because it allows companies to gain greater returns of know-how and initiate a complex technological process and it is also less risky in countries where the political environment is not the most suitable. Although it is true that these projects may not be attractive because competitors may appear unexpectedly, in the long term this country could become an important market for production and technology is a determining factor and a competitive advantage for the company (Blanco, 2020).

- Licensing

International licensing is an arrangement whereby a foreign licensee purchases the rights to produce a company's product in the licensee's country for a negotiated fee. Licensing therefore can be a very attractive option for companies that lack the capital to develop operations overseas (Hill, Schilling and Jones, 2017) because with this entry mode the firm avoids barriers to investment and does not have to bear the development costs and risks associated with opening a foreign market (Blanco, 2020). However, licensing has three serious drawbacks. First, it does not give the tight control over manufacturing, marketing and strategic functions in foreign countries (Hill, Schilling and Jones, 2017). Second, Blanco (2020) states that licensing is unattractive when the firm's ability to coordinate strategic moves across countries by using profits earned in one country to support competitive attacks in another is compromised. Lastly, there is the potential risk for loss of proprietary (or intangible) technology or property (Blanco, 2020) and the technological know-how forms the basis of their competitive advantage, and they want to maintain control over how this competitive advantage is put to use (Hill, Schilling and Jones, 2017).

- Franchising

Franchising is a form of licensing, although franchising tends to involve longer-term commitments (Hill, Schilling and Jones, 2017), in which the franchisor sells intangible property and requires the franchisee agree to abide by strict rules as to how it does business

(Blanco, 2020). The advantages of franchising are similar to those of licensing adding that can avoid costs and risks of opening up a foreign market (Hollensen, 2011). As for the disadvantages, are less than those of licensing, but they still catch the eye because they may inhibit the firm's ability to take profits out of one country to support competitive attacks in another (Blanco, 2020). Another disadvantage of franchising is quality control (Hill, Schilling and Jones, 2017) due to the geographic distance of the firm from its foreign franchisees (Blanco, 2020). To reduce these problems, a company can set up a subsidiary in each country or region in which it is expanding (Hill, Schilling and Jones, 2017).

- Joint Ventures

Joint ventures involve the establishment of a firm that is jointly owned by two or more otherwise independent firms (Blanco, 2020). The most typical form of joint venture is a 50/50 joint venture, in which each party takes a 50% ownership stake and a team of managers from both parent companies shares operating control (Hill, Schilling and Jones, 2017). Joint Ventures is a mechanism for growth and expansion for different types of entities because they have a flexible structure, can adapt quickly and create market opportunities beyond their existing internal capacities (Tayeb, 2005). This entry mode is very attractive because the costs and risks are shared with the partner and can help firms avoid the risk of nationalization because of the firm can benefit from a local partner's knowledge of the host country's conditions (Blanco, 2020). Despite the advantages, Joint Ventures also have a number of disadvantages. Having a partner may result in not having full control over the actions taken and not achieving the company's own objectives, as well as the risk of having to give control of your technology to the partner company (Hill, Schilling and Jones, 2017).

- Wholly owned subsidiary

A wholly owned subsidiary is one in which the parent company owns 100% of the subsidiary's stock (Hill, Schilling and Jones, 2017). In order to establish a wholly owned subsidiary in a foreign market, a company must either set up an operation from scratch in that country or acquire a previously established company in the host country to promote its

products in the host market. As for the advantage over joint ventures, Blanco (2020) argues that they reduce the risk of losing control of core competencies and provide the direct control over operations in foreign countries that is necessary to achieve a coordinated global strategy. Despite the aforementioned, Hill, Schilling and Jones (2017) refute that although it is the best option to integrate in economies of scale it is at the same time the costliest since the company takes over all the risks and costs of all the operations carried out in the countries.

Inevitably, there are different arguments for choosing one strategy or another. The strategy to follow must be influenced by the interest and the objective of internationalization that each company has, since all of them have advantages and disadvantages.

#### **b) Explication of agriculture facilities**

Facility agriculture means land and rights in land, buildings, structures, equipment that is used for modern agriculture, and it played a key role in improving the ecological production, storage, transport and marketing of crops (Guangyong, Xiaoyan, Cuihong and Guohua, 2011).

According to Alcalá-Galiano (2015) agricultural technology is understood as the set of techniques and instruments that help to optimize and improve the performance of farms and crops. Thus, agricultural technology includes irrigation equipment and greenhouses, which are the focus of this study.

Irrigation systems are defined as the set of techniques and instruments that allow an area of land to be cultivated by supplying the crops with the necessary amount of water (Alcalá-Gimeno, 2015). Irrigation is the artificial application of water to the soil through various systems of tubes, pumps, and sprays (CDC, 2021).

There are many different types of irrigation systems, depending on how the water is distributed throughout the field. Some common types of irrigation systems include (CDC, 2021):

- Surface irrigation: water is distributed over and across land by gravity, no mechanical pump involved.
- Localized irrigation: water is distributed under low pressure, through a piped network and applied to each plant.
- Drip irrigation: a type of localized irrigation in which drops of water are delivered at or near the root of plants. In this type of irrigation, evaporation and runoff are minimized.
- Sprinkler irrigation: water is distributed by overhead high-pressure sprinklers or guns from a central location in the field or from sprinklers on moving platforms.
- Center pivot irrigation: water is distributed by a system of sprinklers that move on wheeled towers in a circular pattern. This system is common in flat areas of the United States.
- Lateral move irrigation: water is distributed through a series of pipes, each with a wheel and a set of sprinklers, which are rotated either by hand or with a purpose-built mechanism. The sprinklers move a certain distance across the field and then need to have the water hose reconnected for the next distance. This system tends to be less expensive but requires more labor than others.
- Sub-irrigation: water is distributed across land by raising the water table, through a system of pumping stations, canals, gates, and ditches. This type of irrigation is most effective in areas with high water tables.
- Manual irrigation: water is distributed across land through manual labor and watering cans. This system is very labor intensive.

Although there are not as many varieties as in the irrigation systems, greenhouses are defined as an enclosure in which temperature, humidity and other environmental factors are kept constant to favor the cultivation of plants (Teitel, 2011). Greenhouses thus make it possible to control and improve farm yields.

Greenhouses provide fresh vegetables and ornamentals year-round, worldwide; the type and equipment used in any region generally suit the local weather, construction materials

availability, and type of crop (Teitel, 2011). The efficiency and productivity of a greenhouse operation is largely dependent on the type of growing structure used (Alcalá-Gimeno, 2015). In the interview with Muñoz (2021), commercial director of Hermisan, explained that greenhouses are currently used as a method to irrigate and fertilize all plants equally in a specific area to obtain the same production. In Spain, there are very powerful companies in this sector thanks to the fact that the country's climate is much more suitable for the production and harvesting of certain foods (FAO, 2011) that are subsequently exported mainly to the rest of Europe (Alcalá-Galiano, 2015). Muñoz reasoned the importance of intensive agriculture which is the one that needs that per m<sup>2</sup> of land, it is more efficient to obtain exportable kg and for this, the quality of is essential.

The incentive for Spanish companies that are at the forefront of technological advances and with experience in the industry is to know that if they execute projects with high quality there are very interesting markets (Muñoz, 2021).

According to Muñoz (2021), the Covid-19 pandemic has indicated that agriculture is still in progress and with more development because there are countries that have realized that they have to be self-sufficient in agriculture. The healthy eating trend has led to increased interest in fruit and vegetable agriculture, such as avocados and blueberries. Although Covid-19 has also caused negative aspects in agriculture such as uncertainty when buying land, because there is a psychological fear in the market. There have also been problems in logistical issues when installing projects due to problems in traveling to different countries.

## **MARKET IN SAUDI ARABIA**

### **a) Definition of the market**

#### **I. Geography, climate and population**

The objective of this analysis is to study the situation of agricultural technology in Saudi Arabia; more specifically, irrigation systems and greenhouses.

This study will provide an overview of the sector at present and the opportunities it offers that can be used by Spanish companies.

According to the World Bank, the population of Saudi Arabia in 2019 was approximately 34.27 million inhabitants, although it maintains a low population density, only 16 inhabitants per km<sup>2</sup>.

In addition, as reported by the World Bank, Saudi Arabia has a population growth rate estimated of 1.67%.

The Kingdom of Saudi Arabia, with a total area of about 2.15 million km<sup>2</sup>, is by far the largest country on the Arabian Peninsula (FAO, 2008) occupying about 80% of the Arabian Peninsula.

**Figure 3: Physical map Arabian Peninsula**



Source: FAO (2008)

As can be seen from the map above, the Arabian country has a great scarcity of water resources since the number of rivers and lakes is negligible. In addition, it is a country located in a desert area. Saudi Arabia lies in the tropic and the winds reaching the country are generally dry, and almost all the area is arid (FAO, 2008). Due to this aridity, extreme hot temperatures arise, although there are also variations depending on the regions.

## II. Water Market

Despite its large surface area, being a desert country with no river of its own, it has a greater shortage of water resources than other countries. Historically, Saudi Arabia had surface and subway water resources (Pascual, 2020).

Agricultural development began in the 1970s; currently, the country's water resources are obtained in three different ways: from surface water, from groundwater and from water desalination.

- Surface water, coming from seasonal precipitation and materialized in rivers. This typology is mostly concentrated in the west and southwest, since this is the area with the highest rainfall. It is estimated that about 10% (Zekri, 2020) of the water consumed in the country comes from this type of water.

Surface water resources are becoming increasingly scarce, while groundwater resources, which generally have low quality due to the high salinity levels, are often overexploited (Dhehibi, Salah, Frija, Aw-Hassan, Ouhibi and Raisi, 2018).

- Groundwater. A large percentage of groundwater comes from subway aquifers. It is not known the volume of subway reserves or how long they will be able to continue supplying this resource.

- Desalinated water. Desalination plants are the most widely used resource for water purification in Saudi Arabia. There are currently 35 desalination plants in operation, but the number will increase in the coming years in view of Vision 2030. Of these 35 plants, 28 are operated by the Saline Water Conversion Corporation, accounting for 69% of the country's desalinated water production. The remaining 7 plants are owned by the private sector, with the Saudi Water Partnership Company in charge. Desalination technology has reached a stage of maturity in Saudi Arabia that has enabled it to position itself as the absolute leader in global desalinated water production, producing almost 22% of the world total.

Desalination plants provide about half of the country's drinking water and about 40% comes from groundwater.

Agriculture is the largest consumer of water with about 85% of freshwater used for irrigation (Alzahrani, Muneer, Taha and Baig, 2012).

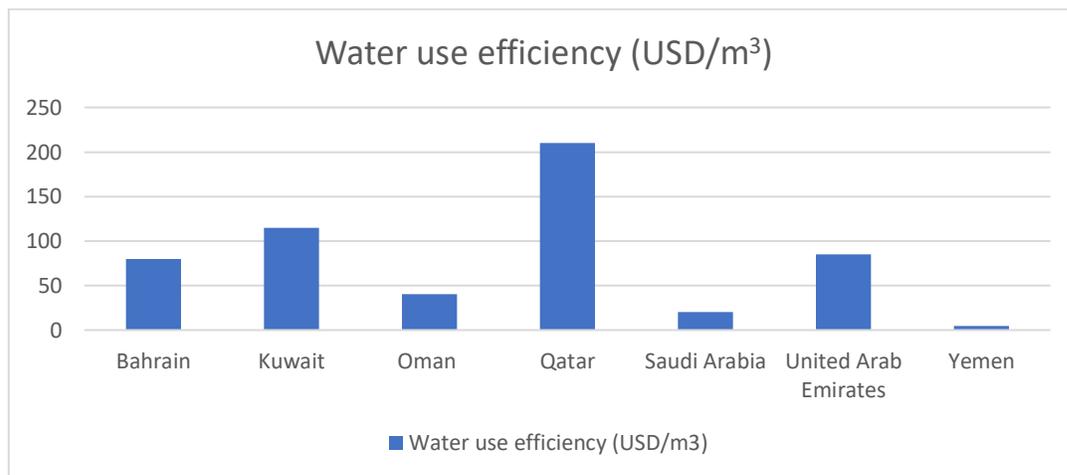
Saudi Arabia is the country that produces the most desalinated water in the world but also generates the most waste in this industry, although this is something that local researchers are trying to solve for future installations.

The world's largest plant is in Al Jubail, the city in the east of the Arabian country. The project of this plant was developed by the Spanish infrastructure and renewable energy company Acciona ("Water in Saudi Arabia: Desalination, Wastewater, and Privatization – USSBC", 2021).

In an October 2020 interview with The Economic Times newspaper, Ahmed al-Amoudi, director of an Arab government-run desalination research institute, said “*The country would benefit from the sea and the treasures it holds that can be found through mineral extraction.*”

The Saudi population stands out as one of the highest per capita water consumers in the world, with an average of 278 liters per day. The increase in population has resulted in a 4.3% growth in water demand. That in turn, causes the kingdom's water requirements to grow annually by 7% and thus a large cost to the country, as in 2017 the cost of one m<sup>3</sup> of water for Saudi Arabia was USD 28.26/m<sup>3</sup>. As shown in the graph below, compared to other countries in the Arabian Peninsula, the cost is lower. It should be noted that the growth in cost has been constant over the years, since in 2000 the price was 17.60 USD/m<sup>3</sup>.

**Graph 1: Water use efficiency (USD/m<sup>3</sup>) in Arabian Peninsula**



Source: (FAO, 2008)

To meet the increasing food and fiber needs of the growing population, Saudi Arabia will need more irrigation water. Further, more water will be required for environmental concerns such as aquatic life, wildlife, recreation, and scenic values (Alzahrani, Muneer, Taha & Baig, 2012).

### III. Water resources in Saudi Arabia

In 2018, according to AQUASTAT there was extreme variability in renewed inland waters which was what is known as renewable water resources. Saudi Arabia is one of the nineteen countries where renewable water resources are less than 500m<sup>3</sup> per capita per year. Thanks to a study conducted by the same agency in 2018, it can be found that Saudi Arabia is one of the 10 poorest countries in terms of water resources in the world, so it has a scarcity in water.

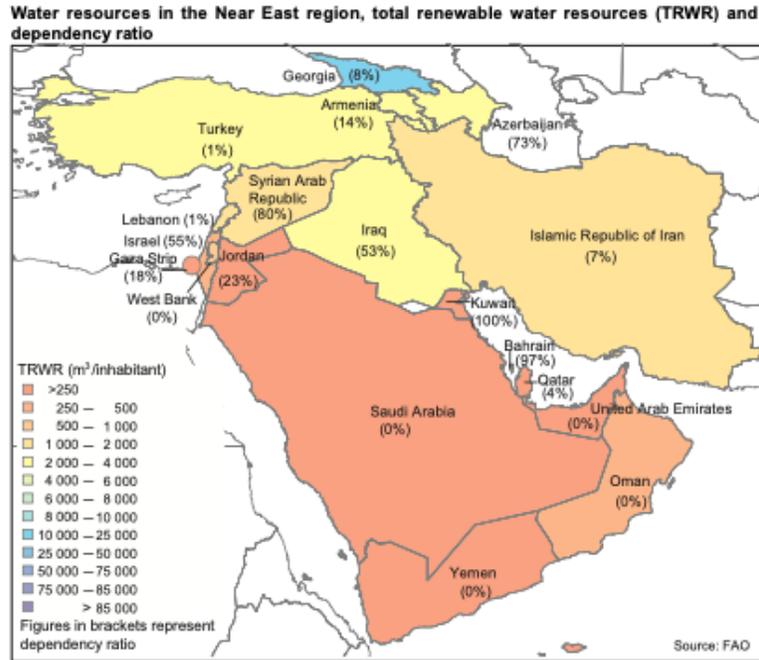
Water is becoming scarce in all regions of the world. Water scarcity can mean scarcity in availability due to physical shortage, or scarcity in access due to the failure of institutions to ensure a regular supply or due to a lack of adequate infrastructure. (UN-Water, 2021)

Scarcity of fresh water resources represents one of the major challenges facing the world in general and Kingdom of Saudi Arabia (KSA) in particular. Population growth, high living standards as well as development plants in KSA will cause ever-increasing demands for good quality water in the municipal and industrial sector. (Alzahrani, Muneer, Taha and Baig, 2012)

Plant development is the process by which structures originate and mature as a plant grows. (Cheung, 2009)

Natural renewable water resources are the total amount of a country's water resources (internal and external resources), both surface water and groundwater, which is generated through the hydrological cycle. Renewable water resources are computed on the basis of the water cycle. (FAO, 2008).

**Figure 4: Water resources in the Near East region**



Source: FAO (2008)

In order to compare how different countries depend on external water resources, the dependency ratio is calculated. The dependency ratio of a country is an indicator expressing the part of the water resources originating outside the country. (FAO, 2008)

$$\text{Dependency ratio} = \frac{IWR}{IRWR + IWR} \times 100 \text{ percent} \quad (\text{Equation 6})$$

$$IWR = SW_{IN}^1 + SW_{IN}^2 + SW_{PR} + SW_{PL} + GW_{IN} \quad (\text{Equation 7})$$

where:

- IWR = total volume of incoming water resources from neighbouring countries,
- IRWR = internal renewable water resources,
- $SW_{IN}^1$  = volume of surface water entering the country which is not submitted to treaties,
- $SW_{IN}^2$  = volume of surface water entering the country which is secured through treaties,
- $SW_{PR}$  = accounted flow of border rivers,
- $SW_{PL}$  = accounted part of shared lakes,
- $GW_{IN}$  = groundwater entering the country.

Source: (FAO, 2008)

#### IV. Water resources management in Saudi Arabia

The management and supervision of water resources in Saudi Arabia is carried out by the State. The government guarantees the accessibility, quality and sanitation of supplies. Although it is true that there is some participation of the private sector to ensure a certain degree of efficiency in the management of resources. (Pascual, 2020)

Since the beginning of the 21st century, the government has been gradually introducing the private sector to operate in water infrastructure and sanitation, mainly from desalination plants and wastewater treatment. In these years the government also involved the private sector by expanding its role in the financing and operation of infrastructure through different projects based on construction, operation and transfer. (Alcalá-Galiano, 2015).

Since June 2016, it is the Ministry of Environment, Water and Agriculture, hereinafter MEWA, who manages all regulatory policies related to water and environmental issues. The ministry is divided into 7 directorates with specific jobs. According to Pascual (2020), the most important for this analysis and their most prominent responsibilities are:

- Environment Directorate: it develops strategies and legislations to preserve biodiversity, sustainably manage national parks, combat desertification, achieve optimal investment of water resources through rationalization.
- Water Directorate: this department is responsible for managing conventional water resources (renewable and non-renewable groundwater and surface water) and non-conventional water resources (reused and treated water). It also carries out projects to improve all the aforementioned water resources and guarantees citizens' legal rights of access to water services.
- Agriculture Directorate: its objective is to provide agricultural extensions and provide the agricultural sector with modern technologies to increase production and reduce costs.

The MEWA is associated with several public companies that play a vital role in this sector and these, in turn, negotiate with private sector companies in order to ensure a certain degree of efficiency and competitiveness. Since then, the responsibility for the provision of water supply services has fallen on the public sector and part on the private sector.

The National Water Company is the public institution responsible for water supply and wastewater management. Prior to the existence of the NWC there was no separation between institutions responsible for policy and regulation and service provision. At that time, all key functions of responsibility in the sector were taken by the former Ministry of Water and Electricity. As a result, the quality and often efficiency of service delivery was hampered by the weaknesses prevalent in the public sector in the country (Pascual, 2020).

#### V. Classification of goods: Tariff code

Since the purpose of this analysis is to establish a plan for the internationalization of irrigation systems and greenhouses, a specific tariff classification that refers to these objects is required. After that, it will be understood how they would affect a possible export activity from Spain.

To classify a good in terms of tariffs is to assign it one of the codes according to the nomenclature annexed to the "International Convention on the Harmonized Commodity Description and Coding System" of the World Customs Organization or to the Common Customs Tariff of the European Union ("Council Regulation (EEC) No. 2658/87 on the tariff and statistical nomenclature and on the Common Customs Tariff" and its amending acts (ICEX tramites generales, 2021).

The tariff classification will inform future sections of the study: Supply-Competitor Analysis and Demand.

The following tariff classification headings contain many more products than those pertaining to agricultural technology, so the interpretation of the statistics presented have been analyzed with this factor in mind (Alcalá-Galiano, 2015).

**Figure 5: Tariff classification**

<b>HS Codes</b>	<b>Description</b>
<b>391721</b>	Rigid pipes of polymers of ethylene, obtained directly in the form and cut to lengths greater than the greatest cross-sectional dimension, whether or not surface-worked, but not otherwise worked.
<b>39172200</b>	Rigid pipes of polymers of propylene (other than straight cut to shape and cut to length, in lengths greater than the longest cross-sectional dimension, surface-worked, but not further worked).
<b>392010</b>	Other plates, sheets, film, foil, tape, strip and sheets, of non-cellular plastics, not reinforced, laminated, laminated or similarly combined with other materials, without backing.
<b>590390</b>	Textile fabrics coated, covered or laminated with preparations of cellulose derivatives or of other plastics, the text matter of which is on the reverse side, other than those of heading 59.02.
<b>760820</b>	Aluminum alloy tubes and pipes (other than welded or simply hot extruded).
<b>76090000</b>	Pipe fittings (e.g. couplings, elbows or sleeves), aluminum.
<b>84248110</b>	Irrigation equipment for agriculture or horticulture.
<b>84248130</b>	Mechanical appliances (whether or not hand-operated), portable, for projecting, dispersing or spraying liquids or powders, for agriculture or horticulture (excluding fire extinguishers, whether or not charged, spray guns and similar apparatus and jetting machines and apparatus; watering apparatus).
<b>84248190</b>	Sprayers and dusters designed to be carried or towed by a tractor, for agriculture or horticulture.
<b>94060031</b>	Prefabricated iron or steel greenhouses.

Source: own elaboration based on Alcalá-Galiano (2015)

## b) Offer- Competitor analysis

### I. Exports and imports

The customs movements of the previously exposed items for the period of 2014-2018 are detailed below. To calculate the variation of exports, imports and trade balance over the 5 years, the Compound Annual Growth Rate (CAGR) formula will be used, which is the rate of return that would be needed for an investment to grow from its initial balance to its final balance.

Code 391721	2014	2015	2016	2017	2018	CAGR
Exports (+)	5,006	5,484	6,209	8,174	11,089	17,24%
Imports (-)	5,200	17,547	25,918	18,754	41,357	51,39%
Trade balance	-194	-12,063	-19,709	-10,400	-30,268	174,56%

Source: Trademap (US Dollar thousand) (2019)

The number of exports of ethylene polymer pipes has grown moderately over the years, also the number of imports has grown dramatically despite a decline in 2017. Most of the imports of this item come from the United Arab Emirates, 53% of the market share (Alcalá-Galiano, 2015).

Code 39172200	2014	2015	2016	2017	2018	CAGR
Exports (+)	2,273	1,336	473	423	604	-23,28%
Imports (-)	12,611	11,187	7,758	7,571	5,733	-14,59%
Trade balance	-10,338	-9,851	-7,285	-7,148	-5,129	-13,08%

Source: Trademap (US Dollar thousand) (2019)

In this case, both exports and imports of rigid propylene polymer tubing have been reduced year on year, although imports are reflected on a larger scale. In terms of imports, Turkey and Germany account for more than 75% of the share, while Spain accounts for only 2% (Alcalá-Galiano, 2015).

Code 392010	2014	2015	2016	2017	2018	CAGR
Exports (+)	142,510	158,202	206,605	195,776	226,434	9,7%
Imports (-)	61,771	59,335	54,820	54,649	57,640	-1,37%
Trade balance	80,739	98,867	151,785	141,127	168,764	15,89%

Source: Trademap (US Dollar thousand) (2019)

Plates, sheets, tapes, strips and foils, of non-cellular plastics exported by Saudi Arabia have grown considerably larger in size than those imported, therefore, at the end of 2014 there was a surplus in the country with this item. Similarly to the previous item, Spain accounts for 2% of the market share although it is noteworthy that in 2013, 900 plates were imported from Spain (Alcalá-Galiano, 2015).

Code 590390	2014	2015	2016	2017	2018	CAGR
Exports (+)	468	74	74	1	55	-34,83%
Imports (-)	25,001	19,611	13,796	16,249	15,997	-8,54%
Trade balance	-24,533	-19,537	-13,722	-16,248	-15,942	-8,26%

Source: Trademap (US Dollar thousand) (2019)

The export of cellulose coatings and cellulose fabrics is very proven in Saudi Arabia, reaching a peak of 468 exported items in 2013. As for imports, Alcalá-Galiano (2015) noted that they have undergone many fluctuations and that China and Japan export to the Arabian country more than 75% of the items received.

Code 760820	2014	2015	2016	2017	2018	CAGR
Exports (+)	58	155	941	101	534	55,89%
Imports (-)	18,739	15,555	7,709	2,504	1,977	-36,22%
Trade balance	-18,321	-15,400	-6,768	-2,403	-1,443	-39,85%

Source: Trademap (US Dollar thousand) (2019)

Tubes and pipes of aluminum alloys have maintained exports with quite a lot of fluctuations as they obtained two high peaks in 2018 and especially in 2016. Imports have been drastically reduced despite being higher than exports.

Code 76090000	2014	2015	2016	2017	2018	CAGR
Exports (+)	0	37	69	341	213	-%
Imports (-)	6,485	6,810	4,121	2,758	2,570	-16,89%
Trade balance	-6,485	-6,773	-4,052	-2,417	-2,357	-18,32%

Source: Trademap (US Dollar thousand) (2019)

Exports of pipe fittings have been minimal over the 5 years although there was a small uptick in 2017. On the other hand, imports have been reduced even though in 2015 they were higher than the previous year.

Code 84248110	2014	2015	2016	2017	2018	CAGR
Exports (+)	13,700	27,652	7,106	1,286	5,233	-17,51%
Imports (-)	743	1,255	530	91	385	-12,32%
Trade balance	12,957	26,397	6,576	1,195	2,378	-28,76%

Source: Trademap (US Dollar thousand) (2019)

Irrigation devices for agriculture in exports have undergone large fluctuations where the highest point reached in 2015 of 27,652 exports stand out. Imports have also varied, although on a smaller scale, with the United States standing out with 52% of the share of imports received (Alcalá-Galiano, 2015).

Code 84248130	2014	2015	2016	2017	2018	CAGR
Exports (+)	99	27	97	226	385	31,21%
Imports (-)	3,522	3,468	3,161	993	1,156	-19,97%
Trade balance	-3,423	-3,441	-3,064	-767	-771	-25,78%

Source: Trademap (US Dollar thousand) (2019)

The export of its portable liquid and powder spraying equipment is a minority. It is true that production is increasing and imports are decreasing, but still without reaching equitable values that are supposed to be achieved in future years. Alcalá-Galiano (2015) highlights that there are three countries that exceed 15% share: the United States (35%), China (16%) and Italy (16%).

Code 84248190	2014	2015	2016	2017	2018	CAGR
Exports (+)	583	419	681	10,234	5,233	55,10%
Imports (-)	25,022	30,722	21,861	1,779	5,415	-26,37%
Trade balance	-24,439	-30,303	-21,180	8,455	-182	-62,47%

Source: Trademap (US Dollar thousand) (2019)

Exports of sprayers and dusters were quite constant but in 2017 a radical change in the number of exports emerged and due to this the number of imports was much lower than previously received. The number of exports in 2017 compared to the previous year was higher by 1403%; on the other hand, imports decreased by 92%.

Code 94060031	2014	2015	2016	2017	2018	CAGR
Exports (+)	122	103	15	0	0	-100%
Imports (-)	9,513	4,909	6,639	5	58	-63,94%
Trade balance	-9,391	-4,806	-6,624	-5	-58	-63,85%

Source: Trademap (US Dollar thousand) (2019)

Both exports and imports of such greenhouses have been reduced. It should be noted that in the last two years, not a single unit has been exported. It should be mentioned that this item refers only to greenhouses manufactured from iron, not to total greenhouses. Imports suffered a big drop from 2016 (6639 items) to 2017 (5 items). As for the exporting countries, Jordan stands out with more than 52%, Spain has 3% of the share of imports received in Saudi Arabia.

## II. Local Production

Saudi Arabia is a country that manufactures its own agricultural technology therefore, it manufactures both irrigation systems and greenhouses. Despite this, it is necessary to mention that the manufactured products are of low quality and with exorbitant prices (Kingdom Saudi Arabia, 2021).

Due to the fact that the production sector of derivatives such as plastic is highly developed in Saudi Arabia, the production of irrigation systems is relevant.

The most important Saudi companies in the irrigation material market are Mais, Al Wassel, Al Jammaz, Citiscape and Al Hussaini (Alcalá-Galiano, 2015).

In order to be able to compare the Spanish companies with the local ones, it is important to know information about these national relevant companies in the sector in Saudi Arabia.

- Mais Irrigation was founded in 1979 in Jordan and established in 1984 in Saudi Arabia to meet the growing demand for more modern equipment and irrigation systems with more powerful technology (Mais Irrigation Co. Jordan, 2021).
- Al Wassel is a company based in Saudi Arabia since 1990. It is committed to having intelligent solutions for water use offering the best possible quality and efficiency, so they have a large number of qualified people, more than 1000 workers (Al Wassel, 2021).
- Al Jammaz Group was founded in 1975 in Riyadh to dedicate itself to the food and agriculture sector. It currently employs more than 4,000 people. Al Jammaz Irrigation was established in 1989 and its main objective is to provide its customers with cost effective, efficient and conservative irrigation systems (Al Jammaz, 2021).
- Citiscape is a company that since 2005 is part of Abunayyan Holding. Citiscape provides construction services and landscape design throughout the Persian Gulf.

The company's products are known to focus on sustainable and environmental landscapes (Abunayyan Holding, 2021).

- Ahmed Alhussaini Trading Co. is a company with more than 35 years of experience in the agricultural sector that has allowed it to position itself as one of the leading companies in the KSA and the countries of the MENA region. A MENA region is a country that is located in the Middle East or North Africa (Pascual, 2020). Its products are characterized by their ability to reduce the cost of pivot irrigation systems (RAI, 2021). As explained in the section on explanations of agricultural facilities, pivot irrigation systems is defined as a technology based on a mobile structure that revolves around a central pivot connected to a water supply (Alhussaini, 2021).

As for greenhouses, they are of poor quality as they have not been renewed and the technology is very old (Al Jammaz, 2021). The technology of these greenhouses is inferior to that provided by European and North American companies (Pascual, 2020). Despite this, there is a high demand because they are cheap and technical knowledge among Saudi entities is scarce (Alcalá-Galiano, 2015).

### III. Saudi Vision 2030 and National Transformation Plan 2020

The Kingdom of Saudi Arabia (KSA) is blessed with many rich assets. Our geographic, cultural, social, demographic and economic advantages have enabled us to take a leading position in the world (Kingdom of Saudi Arabia, 2021). Saudi Arabia has been and is an economy dependent on oil and natural gas production (Pascual, 2020). During the decade of 2003 to 2013, it almost doubled in size on the back of a protracted oil boom (McKinsey Group Institute, 2015).

According to the Spanish Economic and Commercial Office in Saudi Arabia (2021) the Vision 2030 strategy seeks to solve the problem of unemployment and, in addition, to reduce dependence on oil, for which the government is seeking different sources of revenue, such

as the introduction of VAT (initially 5%, but increased from July 1, 2020 to 15%), greater economic diversification, increasing foreign direct investment from 3.8% to 5.7% of GDP and privatizing part of the State's assets (the private sector's contribution to the economy is expected to increase from 40% to 65% of GDP in the short term).

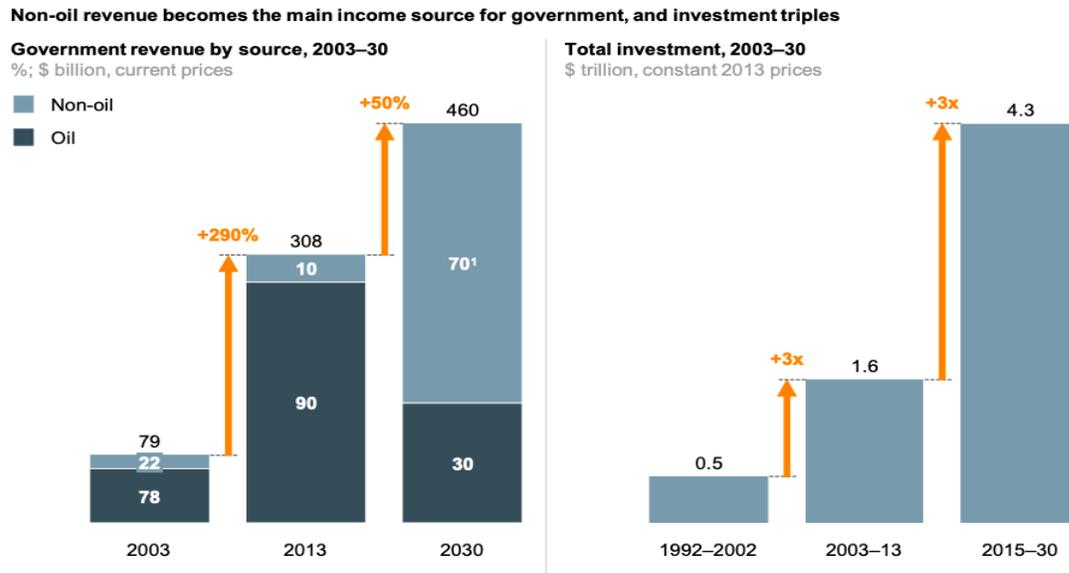
Pascual (2020) reasoned that the Kingdom is home to 15.6% of the world's oil reserves and 4.7% of the world's gas reserves. Saudi Arabia is the world's largest oil exporter, deriving about 90 percent of government revenue from oil (Mckinsey Group Institute, 2015). The heavy reliance on oil as an energy resource by developed economies has favored the nation for decades (Pascual, 2020).

The situation ended in a price crash from 2014 to mid-2017 (Pascual, 2020), which coupled with the high youth unemployment ratio close to 40.5% (FAO, 2008) taking into account that 70% of the population is under 35 years old (Economic and Commercial Office of Spain in Saudi Arabia, 2021) put into question whether the government could maintain the status quo (Pascual, 2020) and therefore made it necessary to create a long-term economic plan to reverse the situation (Mckinsey Group Institute, 2015).

In such a way, the government created the Saudi Vision 2030 in 2016 which has as a milestone to position the country as the 4th world power (Pascual, 2020). In the Vision 2030 document, the words of the Chairman of the Council of Economic and Development Affairs Mohammad Bin Salman Bin Abdulaziz Al-Saud "*Saudi Arabia's vision for the future is an ambitious yet achievable blueprint, which expresses our long-term goals and expectations and reflects our country's strengths and capabilities*".

Due to the interest in reducing dependence on oil, Mckinsey Group International (2015) made an estimate of the total investment and government revenue per source that would have to be produced in Saudi Arabia.

## Graph 2: Investments in oil by Saudi Arabia government



Source: McKinsey Group International, 2015

As demonstrated by McKinsey Group International (2015) there are three basic pillars on which Saudi Arabia's transformation is going to be based.

- A more productive workforce: increasing employment and the participation of local Saudis in the labor force. According to the Kingdom of Saudi Arabia (2021) one of the goals of Vision 2030 is to reduce the unemployment rate from 11.6% to 7%, for this it is also important to increase the participation of women in the workforce from 22% to 30%. Eliminate the gap between skills and labor market needs. The unemployment rate for the Saudi population will be around 12.6% in 2020, with a decreasing trend (Economic and Commercial Office of Spain in Saudi Arabia, 2021). One objective of Vision 2030 is to attract and keep the Arabian talent that leaves every year and offer them what they need McKinsey Group International (2015). The Kingdom will diversify its economy and create dynamic employment opportunities for its citizens through commitments to education, entrepreneurship and innovation,

among others (The Embassy of the Kingdom of Saudi Arabia in Washington DC, 2021).

- Economic reform: more competition and foreign investment operations and trade, therefore the Kingdom (2021) has set the wish to increase foreign direct investment from 3.8% to the international level of 5.7% of GDP. For this, according to Pascual (2020) it has to increase the contribution in the private sector from 40% to 65% of GDP (simpler, speedier processes to remove hurdles to private-sector growth (McKinsey Group International, 2015) and raise the share of non-oil exports in non-oil GDP from 16% to 50%.
- Sustainable fiscal management sustainable fiscal management: Mohammad Bin Salman Bin Abdulaziz Al-Saud said in Vision 2030 that "we will work to achieve our hopes and fulfill our aspirations and responsibilities to our country, our society, our families and ourselves". To further contribute to this aspect, the Kingdom aims to increase non-profit sector's contribution to GDP from less than 1% to 5% (Pascual, 2020).

The National Transformation Plan was established as a measure so that all milestones could be quantified and specified in order to check whether these milestones were being achieved in the short term (Pascual, 2020). The National Transformation Plan will be a wide-ranging privatization and economic reform program to try to position Saudi Arabia's economy away from its dependence on oil exports and government spending (Economic and Commercial Office of Spain in Saudi Arabia, 2021).

According to the Kingdom of Saudi Arabia (2021) the National Transformation Program was launched in 2016 to achieve government operational excellence and establish the necessary infrastructure to improve economic enablers and raise the standard of living through its eight strategic themes, which include transforming healthcare, improving living standards and safety, ensuring the sustainability of vital resources, social empowerment and non-profit sector development, achieving governmental operational excellence, improving labor market accessibility and attractiveness, enabling the private sector and developing the tourism and national heritage sectors.

c) **Demand**

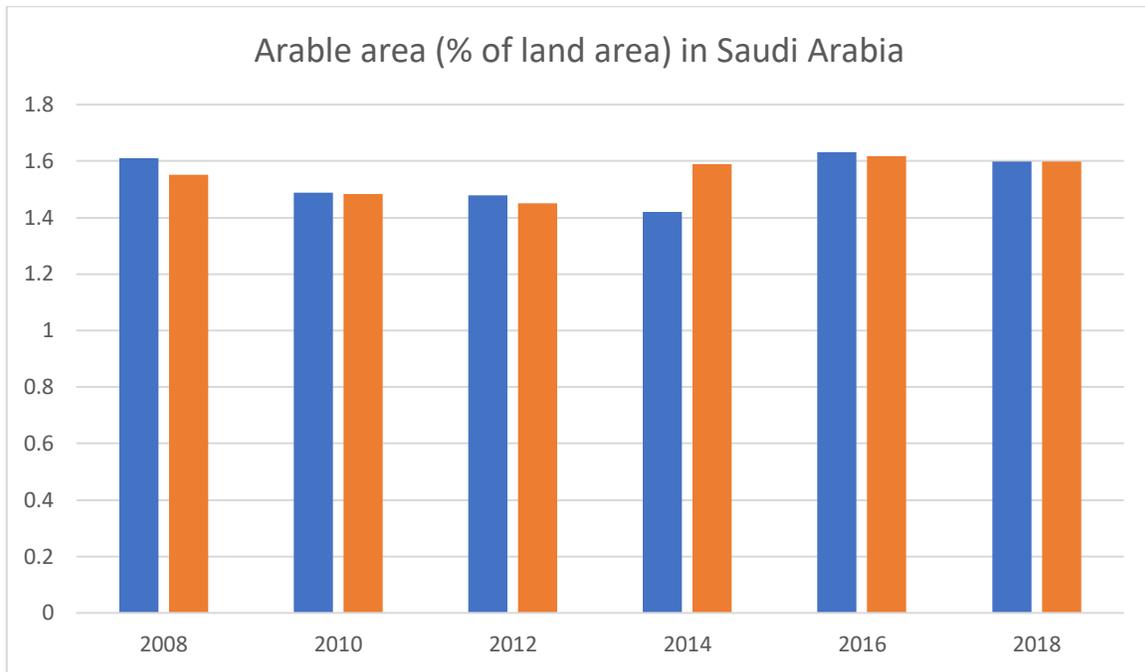
After discussing the supply side of the industry, it is necessary to know if there is really a demand for such facilities in Saudi Arabia, but the demand for irrigation systems and greenhouses depends mainly on the country's agricultural production.

According to the National Water Company (NWC), the population of Saudi Arabia has been ranked as the third (after the United States and Canada) in the world with the highest per capita water consumption. Despite this, Saudi Arabia is a country that is greatly affected by the situation of water stress that affects it, since according to studies it is one of the 15 countries in the world whose ratio between total freshwater withdrawn (Pascual, 2020) and total renewable freshwater resources is the most unfavorable, reaching over 90%.

The Kingdom of Saudi Arabia (2021) defines NWC as a Saudi joint stock company wholly owned by the government (specifically the Public Investment Fund), was established to provide water and wastewater treatment services in accordance with the latest international standards. NWC specializes in providing drinking water of the highest quality, preserving natural water resources and the environment, utilizing treated wastewater effluent with maximum efficiency, and training qualified Saudi employees in accordance with the latest international standards.

Arable land includes land defined by FAO as land under temporary crops, temporary grassland for mowing or grazing, land with orchards or gardens, and temporary fallow land. Land abandoned as a result of shifting cultivation is excluded.

**Graph 3: Arable area (% of land area) in Saudi Arabia**



Source: Own elaboration based on World Bank (2021)

As previously mentioned, the demand for irrigation systems and greenhouses depends mainly on the country's agricultural production and for this reason, it is essential to know the arable area of the country. According to the World Bank, the arable land (% of land area) in Saudi Arabia was reported at 1.599% in 2018, this value represents 34,370 km<sup>2</sup>. The Economic and Commercial Office of Spain in Saudi Arabia (2021) indicates that agriculture and livestock contributed 2.6% of Saudi Arabia's GDP in 2020.

It should also be noted that according to the World Bank (2021) the Arabian country has 34.27 million inhabitants and a young population, which ensures a growth in demand for agricultural products in the medium term. Although in recent years land use has changed, due to the general inefficiency of the system (Economic and Commercial Office of Spain in Saudi Arabia, 2021). Crop production has decreased significantly. Local production of fruits and vegetables is estimated at 5.5 million tons, while about 5 million tons are imported for a

value of 3.2 million dollars in 2014 (Alcala-Galiano, 2015). Thus, Saudi Arabia has invested in the development of various types of farms and has achieved self-sufficiency and even exported dates, tomatoes and melons.

On the other hand, the Kingdom relies on water desalination to meet the growing demand for this commodity. According to the Economic and Commercial Office of Spain in Saudi Arabia (2021) in 2020 the Gulf country had 35 desalination plants supplying the country with a daily production of 6.85 million cubic meters. This figure represents 18% of the world's desalinated water production, positioning Saudi Arabia as the leading country in this field.

The Saudi government is very aware of water scarcity and is encouraging new measures for the use of irrigation systems that improve efficiency and promote savings (Pascual, 2020).

Due to the large size of the country, its enormous topographic variety and the heterogeneity of its climates, cultivation areas are scattered throughout its vast territory (Alzahrani, Muneer, Taha and Baig, 2012), concentrated however in areas where water is closer to the surface, and near rivers or springs, the most important being the regions of Riyadh, Jazan, Qasim and Jouf and Hail (Zekri, 2020). Nowadays, with the help of modern technologies, it has been possible to extract water from deeper areas, which has expanded the possibilities of cultivation areas (Economic and Commercial Office of Spain in Saudi Arabia, 2021). Alcalá-Galiano (2015) mentioned that in reference to consumer preferences, as discussed above, there is a preponderance towards buying irrigation systems and greenhouses from the intermediate segment coming from other Arab countries or India. Since a large part of the agricultural workforce are from those countries (USSBC, 2021). The regions with the most greenhouse areas in the Kingdom are Riyadh, Qasim, Eastern Province, Aseer and Hail, in addition to being the largest agricultural producers (Pascual, 2020). The most widely used greenhouses in Saudi Arabia are mostly made of iron and plastic (Alcalá-Galiano, 2015).

Drip irrigation systems are in increasing demand (USSBC, 2021). Moreover, in Saudi Arabia, the manufacturing of irrigation systems is important. However, the Saudi customer is skeptical to invest in irrigation systems and greenhouses with advanced technology (Economic and Commercial Office of Spain in Saudi Arabia, 2021). According to Zekri (2020) the Ministry of Agriculture and FAO are investing resources in studies and research

center to develop cultivation methods with modern greenhouses and irrigation systems, which can improve the productivity of the agricultural sector (Alcalá-Galiano, 2015).

As the most characteristic example, the Department of Agricultural Engineering at King Saud University was conducting one of the most important studies that aims to estimate the water consumption required for crop development and help calculate the feasibility of the development and growth of this sector (Alcala-Galiano, 2015).

The Economic and Commercial Office of Spain in Saudi Arabia (2021) stated that the organization itself has invested \$288.5 million since 1982 in nearly 50 projects to support agricultural and livestock development in Saudi Arabia. For their part, large Saudi agricultural companies are also researching in agricultural technology (Alcalá-Galiano, 2015). A significant part of the farms have obsolete imported equipment and need modernization to carry out the productivity increases that the government craves (Pascual, 2020). Therefore, the Kingdom of Saudi Arabia (2021) reasoned that one opportunity offered by the sector is the implementation of turnkey projects for local agricultural companies. To perform this work, it is necessary to be present directly or through a distributor, both options require direct contact with the client, allowing the exchange of knowledge and training (Economic and Commercial Office of Spain in Saudi Arabia, 2021).

In the long term, the Saudi government implemented the Development Plans. These five-year plans put in place by the government envisage actions for the development of all economic sectors (Pascual, 2020).

Related to this study, the following agricultural policies are to be carried out under the Ninth Development Plan (2010-2014):

- Encourage efficient use of natural resources for sustainable development.
- Foreign investment program.
- Increase the productivity of the agricultural sector.

In summary, the total investment of the plan was €10.1 billion (Alcalá-Galiano, 2015). According to FAO (2011), this investment resulted in a total vegetable production of 2.8

million tons and 1.6 million tons of fruits in 2009. Furthermore, USSBC (2021) argued that in the same year the sector employed 515,000 workers, 5% of the country's labor force.

The Kingdom assumes a decisive role in the development of the agricultural sector. It offers concessional loans for the start-up of farms through the Agricultural Development Fund (Alcalá-Galiano, 2015). In 2012, according to Zekri (2020) the fund allocated 225.4 million euros for the agricultural sector, mainly small farmers. One of the requirements for granting this type of loan is that the farmer invests in agricultural technology, i.e., that it favors increased crop productivity and the sustainability of the sector (Alcalá-Galiano, 2015). Thus, the implementation of drip irrigation is being encouraged to the detriment of pivot irrigation (Pascual, 2020), which consumes much more water, as well as the implementation of greenhouses, which help increase seed productivity and extend the growing period throughout the year (World Bank, 2021), in addition to favoring the use of more water-efficient seeds (Pascual, 2020). The main purpose of these loans is to encourage farmers to invest in technological advances that help improve the country's agricultural facilities, making them more competitive (Economic and Commercial Office of Spain in Saudi Arabia, 2021). Following entry into the WTO, Saudi Arabia significantly reduced subsidies to agriculture, which in 2012 reached €23 million (Zekri, 2020).

Subsequently, the Tenth Development Plan appeared, which is currently in force and aims to continue with the restructuring process of the agricultural sector, in order to strengthen its role in the economic, social and environmental development of the country (Economic and Commercial Office of Spain in Saudi Arabia, 2021).

The Tenth Development Plan (2015-2019) of Saudi Arabia endows the agricultural sector with investments of about €10.18 billion (World Bank, 2021), 0.8% more than the previous plan (Zekri, 2020). On the other hand, the Agricultural Development Bank and Saudi Agricultural Fund, finance agricultural development projects with an emphasis on water saving (Pascual, 2020) and crops with higher productivity (Alcalá-Galiano, 2015).

## **OPPORTUNITIES AND ENTRY MODES**

### **a. Prices**

Water has been a highly subsidized good by the Saudi government to its citizens, to the point that it was not until 1994 when a small tariff was introduced in the country (Economic and Commercial Office of Spain in Saudi Arabia, 2021). Since that time, increases in water prices have hardly been relevant (Pascual, 2020). Blanco (2020) stated that this situation changed in January 2016 when water tariffs were increased and a sewerage tariff was introduced for the first time.

These measures although necessary, resulted in discontent among the Saudi population who watched as they had to start paying for one of their most precious assets (Pascual, 2020).

The tariff structure currently in force in the Kingdom is shown in the table below, where another of the novelties introduced is the reduction in the cubic meters covered by each of the different water tariffs (Economic and Commercial Office of Spain in Saudi Arabia, 2021).

The prices of the tariffs for agricultural use are referenced against the dollar, as follows:

**Table 2: Water and wastewater rates in Saudi Arabia**

Water and wastewater rates			
Domestic (m <sup>3</sup> /month)	Water tariff (\$/m <sup>3</sup> )	Wastewater tariff (\$/m <sup>3</sup> )	Combined tariff (\$/m <sup>3</sup> )
0-15	0,03	0,01	0,04
16-30	0,27	0,14	0,41
31-45	0,81	0,41	1,22
46-60	1,08	0,54	1,62
+61	1,62	0,81	2,43

Source: Own elaboration based on National Water Company (2021)

In the second step, the price per meter cubic meter is increased by 800% from 0.03 to 0.27. This new tariff chart also introduces the aforementioned new sewerage tariff that did not exist so far in Saudi Arabia (Pascual, 2020).

Despite this price increase, the Ministry of Environment, Water and Electricity stated that most households would not be significantly affected by the increase, as their consumption would remain within the lowest consumption blocks (FAO, 2008). However, commercial, industrial and governmental users would be more significantly affected since they were located in the higher tariff blocks (USSBC, 2021). In contrast, citizens who are not connected to the supply network, who often live in desert areas that have not been reached by basic water supply systems (FAO, 2008), pay up to 40 times more for water than connected households, as the latter have to make use of cisterns or bottled water (Pascual, 2020). Furthermore, related to the topic of agriculture, Muñoz (2021) and Pascual (2020) agree that the agricultural sector gives a higher return than other sectors because despite taking longer to pay off it is much more constant and is a key factor in receiving investments from large customers. The NWC has established new lines to grid tariff of 150 SAR per building and an extra 50 SAR for each additional unit in the building (Pascual, 2020).

#### **b. Market access-barriers**

The government's incipient interest in achieving the objectives framed within the Saudi Vision 2030, which include a diversification of its economy in order to be less dependent on oil and not suffer from fluctuations in the price of crude oil, has allowed the strengthening of other sectors by increasing the entry of new goods into the country and therefore the imposition of trade barriers in the crude oil.

In the opinion of the Economic and Commercial Office of Spain in Saudi Arabia (2021) various programs have been launched in an attempt to develop and promote local industry. However, from the consumer's perspective, the new situation due to Covid-19 and its expectations produce a negative sentiment that will affect domestic consumption.

Pascual (2020) reasons that however, the country's new situation of being less dependent on oil has led to the fact that at the beginning of 2019 the Saudi Standard Metrology and Quality Organization (SASO) launched a new program aimed at guaranteeing minimum safety and quality standards for all products sold in the local market called "Saudi Product Safety Programme" or SALEEM, which is materialized with the SABER computer platform in which importers must register the products to be imported according to whether their products are low risk, medium risk or high risk before entering the Saudi market (Saudi Arabia: certification customs platform SABER, 2021). In addition, some of these products, depending on the HS code under which they fall, must comply with an efficiency label for better use and control. In the case of agricultural technology, the regulations applicable to each product can be determined upon payment of a fee (Alcalá-Gimeno, 2015). In turn, the Ministry of Commerce and Industry of Saudi Arabia has developed the "Product Conformity Program" (Economic and Commercial Office of Spain in Saudi Arabia, 2021), a mechanism aimed at the regulation and homologation of certain products for commercial use (Pascual, 2020) and therefore, according to Ministerial Resolution number 6,386 all shipments of imported products must be accompanied by a Certificate of Conformity (CoC) that can be obtained from any international laboratory (Alcalá-Gimeno, 2015).

To this new method that directly affects imports into the country must be added that although since the creation in 2016 of the Saudi Vision 2030 the VAT in the country was 5%, since July 1, 2020 (Pascual, 2020) the General Authority of Zakat & Tax has introduced 15% VAT in the country which is reflected in any business where the impossible fact is made from within the borders of the country (Economic and Commercial Office of Spain in Saudi Arabia, 2021). The General Authority of Zakat and Tax is a government agency in Saudi Arabia responsible for the assessment and collection of Zakat and taxes including VAT, it defines zakat as an Islamic financial term that refers to the obligation on an individual to donate a certain portion of wealth each year to charitable causes.

**Table 3: Import tariffs for the tariff items studied**

HS Code	Tariff
39172200	5%
590390	
76090000	
8428190	
8428130	
94060031	
392010	6.5%
760820	8%
391721	12%
84248110	

Source: Own elaboration based on data from Market Access Map (2021)

According to Alcalá-Gimeno (2015) the Customs Department reports organically to the Ministry of Finance and is responsible for assessing all goods entering Saudi Arabia. To export to Saudi Arabia, the following will be required: Certificate of Origin, Delivery Order and Chamber of Commerce Authorization to which a copy of the Commercial Register, Packing list, Bill of lading or Airway Bill, Commercial Invoice in triplicate and Insurance Documents are attached.

Pascual (2020) argues that once Spanish companies have been awarded a project in Saudi Arabia they have to face two other situations that may be unfamiliar to them. The first is that in an effort to reduce national unemployment, there is usually an implicit requirement to hire Saudi personnel which, established in previous tenders at 30% (Economic and Commercial Office of Spain in Saudi Arabia, 2021), is expected to continue to increase in the coming years according to the trend that companies in the sector are observing. Government-controlled enterprises in Saudi Arabia are increasingly introducing local content requirements for foreign firms (International Trade Administration, 2021). Secondly, in

another attempt to boost local industry, there is also a requirement to procure domestic material for the projects.

All foreign investment for any purpose must be authorized by the Ministry of Investment (International Trade Administration, 2021). Investment in the private sector, including foreign direct investment, is essential for the diversification of the economy, GDP growth and the creation of employment opportunities in the country (Pascual, 2020). It should be emphasized that all foreign investment projects enjoy the same incentives, privileges and guarantees offered to domestic projects (Pascual, 2020) such as obtaining a license under the Foreign Investment Law that authorizes them to own real estate to carry out the activities covered by the license and to house their personnel (Spanish Economic and Commercial Office in Saudi Arabia, 2021).

### c. Industry perspectives

The outlook for the irrigation and greenhouse sector in Saudi Arabia is very positive, due to the fact that numerous projects are to be carried out that will produce a facelift in the country.

Based on the government of the Kingdom of Saudi Arabia (2021) much emphasis is being placed on the Saudi Vision 2030, which has as its main objective to place several cities in the country among the top 100 cities in the world. The Vision 2030 aims to reduce dependence on oil, diversify the country's economy and develop sectors such as tourism, health, education, infrastructure and recreation.

Within Vision 2030 there are different programs with different objectives: Quality of Life Program, Financial Sector Development Program, Housing Program, Fiscal Balance Program, National Transformation Program, Public Investment Fund Program, Privatization Program, National Companies Promotion Program, National Industrial Development and Logistics Program, Strategic Partnership Program, Hajj and Omrah Program, Human Capital Development Program and National Character Enrichment Program (Economic and Commercial Office of Spain in Saudi Arabia, 2021).

In this market study we are going to focus on the National Transformation Program which aims to transform health, improve living conditions and safety, and ensure the sustainability of natural resources.

According to Pascual (2020) although it is true that due to the global pandemic of Covid-19 the projects included in Saudi Vision 2030 will be slowed down, the current Minister of Finance, Mohammed Al-Jadaan, confirmed at the beginning of May 2020 that the projects would not be postponed or cancelled.

The economic situation the country is going through is complicated as oil prices have suffered a 70% drop over the last year. To remedy this situation, the Minister himself

announced a 5% reduction in public spending, tripled VAT (from 5% to 15%) and cancelled the cost-of-living bonus paid to civil servants (Alcalá-Galiano, 2015).

On the other hand, in 2009, the King Abdullah's Initiative for Saudi Agricultural Investment Abroad program came into effect, which approved different lines of financing to guarantee food security in the country, collaborate internationally with the food security policies of the WTO and the FAO, promote international agreements and encourage Saudi investors to use resources abroad and ensure supply (Pascual, 2020).

## **SPANISH INDUSTRY**

### **a) Perception of the Spanish product**

In order to understand the perception of Spanish products or companies in Saudi Arabia, it is important to highlight the excellent political relations between the two countries, despite the fact that many projects do not materialize. Much of the good diplomatic relations are a consequence of the great deal that exists between the monarchies of both royal houses. (Pascual, 2020). This great relationship, was reinforced after the visit in 2017 to Saudi Arabia of the monarch Felipe VI as King of Spain together with the Ministers of Foreign Affairs and Development and the Secretaries of State for Trade, Infrastructure and Defense (ICEX, Relaciones Bilaterales, 2021).

The great bilateral relationship that both countries have been of great importance in the economic area. Spain has participated in major projects in the Arabian country such as: the design, construction and operation of the first high-speed train between Medina and Mecca; as well as the awarding of three lines of the Riyadh metro (Alcalá-Galiano, 2015).

On the other hand, there is a Spanish-Saudi Joint Commission whose objectives are to continue to support the presence of Spanish companies in the privatizations being carried out in various sectors, to achieve greater development of Saudi mining, to make progress on double taxation agreements to avoid double international taxation, and to cooperate in the promotion of tourism.

The I Spanish-Saudi Joint Commission took place in Madrid in 2014 under the General Cooperation Agreement between Spain and Saudi Arabia, the II Joint Commission took place in Riyadh in 2018 and marked a great leap in bilateral relations (Pascual, 2020). The next Joint Commission was scheduled to take place throughout 2020, but due to the Covid-19 pandemic it has been postponed without exact knowledge of the date (ICEX, Relaciones Bilaterales, 2021).

The good results obtained by Spanish companies located in the energy sector and in the water sector, together with the knowledge of the strengths that Spanish companies have over local companies dedicated to the agricultural sector, have positioned Spanish companies as professional, efficient and innovative (Pascual, 2020).

Despite not having a significant presence, the perception of Spanish irrigation systems and greenhouses is good because the technological level is superior to the local offer (Alcalá-Galiano, 2015). The authorities are promoting the use of irrigation systems and greenhouses to optimize the use of resources and thus increase local knowledge of the advances in technology in this sector.

In 2018, according to the Empresite España business directory, Spain had some 600 greenhouse manufacturing companies and was the country with the second largest greenhouse area (70,000 hectares) in the world in 2017.

Although it is true that, in the greenhouse sector, there are countries that are better positioned than Spain in Saudi Arabia, such as France, Holland, Jordan and Lebanon, the latter two because their prices are more competitive (Alcalá-Gimeno, 2015). It would be ideal to make known in the Arabian country the highest quality and innovative products, to help in the training of the locals and to have a local partner to be able to market the product in Saudi Arabia.

There is no Spanish company specialized in irrigation systems and greenhouses that has built such infrastructure in the Arabian country. However, it is true that there are Spanish companies that, thanks to their efficiency and their ability to face challenges, have participated in projects related to the construction of desalination plants or water treatment:

Abengoa, carried out in 2019 two desalination plants with capacities of 250,000 m<sup>3</sup>/day and 600,000m<sup>3</sup>/day and has just been awarded the construction of another plant with a capacity of 600,000 m<sup>3</sup>/day (Pascual, 2020).

Acciona has carried out the construction of 3 desalination plants with capacities of 100,000 m<sup>3</sup>/day, 210,000 m<sup>3</sup>/day and 450,000 m<sup>3</sup>/day, and will soon start the construction of a fourth plant with a capacity of 600,000 m<sup>3</sup>/day and reverse osmosis technology, which applies pressure to overcome the osmotic pressure and thus eliminate ions, molecules and larger particles in the drinking water (Pascual, 2020).

Aqualia, a company that was voted company of the year in 2016 in the country's water sector and is part of the FCC group, operates and maintains wastewater treatment plants and has optimized Riyadh's water supply network (Pascual, 2020).

Typsa, a company with more than 40 years of experience in the market, has managed projects with different objectives, from strategic consulting supplies to water supply projects and construction of water storage reservoirs. It has also carried out projects for desalination plants and water supply (Pascual, 2020).

## **CONCLUSIONS**

This section will present the main general and specific conclusions reached in this Final Degree Project.

First general conclusion: The irrigation systems and greenhouses sector is a market that has a lot of potential due to the fact that demand is increasing as countries have realized their need for self-sufficiency. Although the market is not very stable and has its ups and downs.

Second general conclusion: The Saudi Arabian government due to Vision 2030 has realized the relative importance that water and therefore irrigation systems and greenhouses can become. In addition, the population growth is constant and therefore, the demand is increasing.

Third general conclusion: The leading companies in this sector are those that are the most flexible to change and have the most advanced technology. Regarding the internationalization process, companies should follow a general approach based on Hollensen's (2011) internationalization plan. The plan consists of five phases. Phase 1: Internationalization decision; Phase 2: Deciding which markets to enter; Phase 3: Market entry; Phase 4: Designing a global marketing plan; Phase 5: Implementation and control of the global marketing plan.

First specific conclusion: In Saudi Arabia they consider Spanish companies dedicated to irrigation and greenhouse systems due to the quality of the different projects they have carried out in other countries of the Persian Gulf. Spanish companies are considered as powerful in the market and with a great technology, but the best valued are the American and Dutch companies.

Second specific conclusion: Based on a thorough analysis, companies should enter the Arabian country through a contact in the country, preferably in the government. Business in Saudi Arabia relies heavily on word-of-mouth recommendations among local companies.

Third specific conclusion: Based on the analysis of their competitive landscape and overall attractiveness, the first niche market they should approach would be irrigation systems for large plant areas as better irrigation is needed in these areas to comply with the National Transformation Plan 2020.

Fourth specific finding: The method of entry will depend on the interests and characteristics of the company entering and the timing of the market.

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