Saudi Arabia's land grabs: self-sufficiency by proxy or failed strategy? An assessment of the initative for Saudi Agricultural Investments Abroad

Lee, Loïs van der

SAUDI ARABIA'S LAND GRABS: SELF-SUFFICIENCY BY PROXY OR FAILED STRATEGY?

AN ASSESSMENT OF THE INITIATIVE FOR SAUDI AGRICULTURAL INVESTMENTS ABROAD

L.M. VAN DER LEE

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Abstract

The world food crisis of 2007–2008 reaffirmed the volatility of international commodity markets and led many countries questioning their reliance on food imports. In a quest for new strategies to ensure food supplies in the future, many richer countries resorted to the large-scale acquisition of foreign land, often referred to as land grabs, including the Kingdom of Saudi Arabia. In this thesis, I examine the Saudi Agricultural Investments Abroad initiative and attempt to identify what role this initiative plays within the Kingdom's larger food security policy. Moreover, against the backdrop of the global climate crisis and the importance of moving towards a sustainable global food system, this thesis examines the sustainability of this strategy in the long term. The research question formulated for this is: *What role do Saudi Arabia's large-scale land investments abroad play in their food security strategy and how sustainable is this strategy?* Building on an alternative definition of food security that adopts a food systems approach, this thesis proposes that the use of large-scale land investments as a food security strategy does not fit the sustainable path that is so needed.

Keywords: land acquisitions, agro-investments, food security, food systems, Saudi Agricultural Investments Abroad

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While it wasn't my original planning, it has taken me over a year to write this thesis, and I'm so relieved that it's finished. The completion of this work would not have been possible without a number of people, to whom I would like to express my sincere gratitude to.

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List of abbreviations

FAO	Food and Agriculture Organization (of the United Nations)
FDI	Foreign Direct Investment
GCC	Gulf Cooperation Council
GFSI	Global Food Security Index
GRC	Gulf Research Center
IPCC	Intergovernmental Panel on Climate Change
KSA	Kingdom of Saudi Arabia
LCLAs	Large-scale land acquisitions
LCLIs	Large-scale land investments
LSAIs	Large-scale agro-investments
MENA	Middle East and North Africa
MEWA	(Saudi) Ministry of Environment, Water & Agriculture
NGO	Non-governmental organization
NTP	National Transformation Program
PIF	Public Investment Fund (of the KSA)
RCP	Representative Concentration Pathway
SDGs	Sustainable Development Goals
UN	United Nations
VRPs	Vision Realization Programs

1. Introduction

In 2007, the world saw a dramatic increase in the international prices of food products, precipitating a global food crisis. Food riots and other social unrest erupted across low and middle income countries and global poverty rates increased significantly (Berezneva 2013). Research has identified a number of causes, among them increased demand for cereal foods and biofuel crops, rising oil and fertilizer prices together with export restrictions in over 30 major food-producing countries to secure food for domestic consumption (Bailey and Willoughby 2013; Headey and Fan 2010).

As a result of global trade, food systems have become increasingly interconnected and interdependent. The food crisis of 2007–2008 reaffirmed the volatility of international commodity markets and led many countries questioning their reliance on this global market, including the Kingdom of Saudi Arabia (KSA). With less than 2% of its land being arable and a serious freshwater shortage, the KSA imports up to 75% of its food products (Mousa 2022). As Saudi Arabia's population is expected to grow to around 45 million by 2050, a 36% increase from 2017, this will put additional pressure on the Kingdom's ability to feed its population (UN 2017). Moreover, climate change is expected to change precipitation patterns and make extreme weather events more common. This will negatively affect agricultural production worldwide, increasing the likelihood of disrupted international flows of trade. While the Kingdom of Saudi Arabia did not face difficulties in securing enough food during the 2007-2008 crisis (Chatham House 2013), it does seem to have been a wake-up call to come up with strategies to ensure food security in the future. One of these is King Abdullah's Initiative for Agricultural Investment Abroad – also referred to as the Saudi Agricultural Investment Abroad initiative - launched by King Abdullah Al Saud in 2009 (Multsch et al. 2017).

1.1. Saudi Agricultural Investments Abroad

Saudi Agricultural Investments Abroad refers to the cross-border acquisition or long-term lease of large pieces of arable land – also specified as large-scale land acquisitions (LCLAs), large-scale agro-investments (LSAIs), land deals or referred to by critical scholars as land grabs – in low-income countries, that are generally initiated by governments or transnational corporations. The produce is then imported to Saudi Arabia's domestic market. In a meeting on Achieving Food Security in Member Countries in Post-crisis World, hosted by the Islamic Development Bank in 2010, Deputy Minister for Agricultural Research Dr. Al-Obaid laid out the objectives and components of this initiative. Saudi investors would be provided funds, credit and logistics by the government, who would then start an agricultural investment project in one of the targeted countries. Targeted countries include Egypt, Sudan, Ethiopia, Argentina and Ukraine (Land Matrix 2021). Additionally, it would be the investor's right to choose the cultivated crops. These would mostly be staple foods like wheat, rice and corn, crops for biofuel, but also livestock and oil seeds

are mentioned. The foreign produce will then be used to establish “a strategic reserve for basic food commodities, to meet the Saudi needs for food and to avoid future food crisis” (Al-Obaid 2010, slide 9). Reportedly, these agricultural investments would not only be beneficial to Saudi Arabia, but also have a “humanitarian impact”, as knowledge and experience of the Saudi private sector would be shared with farmers in the targeted country and they would benefit from the “availability of capital and technology” (Al-Obaid 2010, slide 16).

1.2. Research gap

The 2007-2008 global food crisis instigated a quest for food security, generating a race for the world’s farmland. The years after 2008 saw a surge in large-scale land investments worldwide. This “led to a number of publications by scholars and activists to document causes, trends, scope and impact of this relatively new phenomenon, often termed “land-grabbing”” (Hules and Singh 2017, 343). This research, however, tends to focus on the host states. Land grabs often leave host states with issues of displacement, environmental degradation and brings about the risk of jeopardizing local food security. The main concern of these scholarly debates is then whether these investments produce opportunities for agricultural development and employment for the local population or whether they have an overwhelmingly negative impact (Cotula et al. 2009; Choi 2018; Haralambous et al. 2009).

Often referred to as the most defining crisis of our time, climate change will put growing pressures on enhancing food security for many regions in the world. According to the Food Insecurity & Climate Change Vulnerability Index by the Met Office, the Middle East and North Africa are especially vulnerable to food insecurity in the future (n.d.). Given the importance of feeding the world’s growing population while minimize the effects of climate change, developing sustainable food security policies is crucial. Research on strengthening the food security of the Kingdom of Saudi Arabia’s, however, tends to focus on increasing domestic agricultural production in the most sustainable way (Fiaz et al. 2018; Multsch et al. 2017).

This thesis is an attempt to bridge the gap between these topics. Taking into account the development of Saudi Agricultural Investments Abroad initiative, this research sets out to explore to what extent large-scale land investments abroad contribute to Saudi Arabia's food security strategy and how these investments fit into a larger debate on achieving food security sustainability. The scope of this thesis is not to engage with the host countries of LCLA’s primarily, but to determine whether such a food security strategy could be a sustainable way of ensuring food security for the Kingdom of Saudi Arabia in the future. As climate change has a direct influence on food systems, food security and will likely further increase competition over agricultural resources, research into food security strategies is essential. This can help countries put in place the accurate policies needed to adapt and ensure food security in the future.

1.3. Research question

The research question for this thesis will be as follows:

What role do Saudi Arabia's large-scale land investments abroad play in their food security strategy and how sustainable is this strategy?

In order to answer this question, this thesis starts by defining the concept of food security, engaging with the academic debate on the implications of this definition and how to move towards a more sustainable, inclusive concept of food security. Then, it will examine how food security is measured, as well as the food security status of the Kingdom of Saudi Arabia. Chapter three will address Saudi's domestic agricultural sector and its food security, plus how this sector is expected to be impacted by climate change the coming decades. Additionally, the chapter will discuss the current policies the country has instated with regards to food security. English government documents are used for this. Chapter three will also give a detailed examination of the Saudi Agricultural Investments Abroad initiative, including available data on the size and scope of the strategy. An overview of the targeted countries and current major investment projects as conducted by Saudi investors can be found in Appendix A. Chapter four will place this initiative within the context of a larger, global rush for farmland. It will describe how land deals after the 2007-2008 food crisis are characterized. Furthermore, it will analyze and engage with the current debate on the sustainability of large-scale land acquisitions, both for investor countries using the concept of resilience and targeted countries. The concluding chapter will reflect upon the above findings and an answer will be given to the main research question. The central argument in this thesis is that while the large-scale land acquisitions do contribute in some way in Saudi Arabia's quest to secure food, the strategy is highly contested and should generally be moved away from.

Sub-questions that will be used to answer the main question are the following:

I. What is food security and food security sustainability?

II. What policies does the Kingdom of Saudi Arabia in place with regards to food security?

III. In what way does the Saudi Agricultural Investment Abroad initiative contribute to Saudi Arabia's food security?

IV. How sustainable are land acquisitions as a strategy to ensure food security?

1.4. Methodology

This thesis uses existing academic research as a building block. A semi-systematic literature review was conducted in order to collect relevant information and data to answer the research questions. Using an interdisciplinary approach, semi-systematic literature reviews combine perspectives and findings from diverse disciplines and integrates them into a single research (Snyder 2019). First, some overarching themes were defined, such as food security, food security sustainability and food security in Saudi Arabia specifically, agricultural policies of the country and large-scale land

investments and its synonyms. These themes are reflected in the different headings and subheadings of this thesis. The second step was then to collect relevant articles and books on these topics via different online search engines like Google Scholar, Leiden University Catalogue and Web of Science. This was done by combining the key terms from the research questions into a search query. Additionally, the snowball method was used by consulting the bibliography of certain articles to find more relevant titles.

Webpages were also used, for example Saudi government websites such as ministry websites (e.g. https://www.mewa.gov.sa/en) and Saudi Vision 2030, a strategic reform framework (https://www.vision2030.gov.sa/). When not available in English, Arabic documents where translated using machine translators such as Aspose and Google Translate. Other webpages that were used were that of international organizations and NGO's dealing with the topic of large-scale land acquisitions, food security and so on. The most important ones here are https://landmatrix.org/ and the website of the Food and Agriculture Organization of the United Nations (FAO), https://www.fao.org/faostat/en/#home. After selecting the final articles, books and websites, the relevant information from each work was analyzed and used to write the main bodies of this thesis.

Relevant databases and indices were also taken into account, such as the Global Food Security Index, Land Matrix Portal, World Bank database and data from the Kingdom of Saudi Arabia's Ministry of Environment, Water and Agriculture (MEWA). This allowed for an assessment of what role land investments abroad play in Saudi agricultural policy, and what implications this has for the Kingdom's food security in the future.

2. Theoretical framework

This chapter aims to lay out the theoretical framework behind the concept of food security. It will start with an historical overview of how the concept developed, including its multiple redefinitions over time. It will analyze its current widely-used definition, the implications this definition brings about and its critiques. Moreover, this chapter will examine the concept of food security within a wider debate on food systems and food security sustainability. It will move on to explore how food security is measured the most important food security index, the Global Food Security Index, followed by an analysis of the food security status in the Kingdom of Saudi Arabia.

2.1. Food security: definition and key concepts

Food security as a concept originated in the mid 1970's, after scarcity in the global grain market let prices to skyrocket, causing a wave of famine through parts of South Asia and Africa (Gerlach 2015). What followed was the first World Food Conference organized by the United Nations (UN). This summit was attended by over 130 country delegations and hundreds of inter-governmental organizations, non-governmental organizations (NGO's) and multinationals. The goal, as written on the first page of the report that followed, was to "take specific action to resolve the world food problem within the broader context of development and international co-operation" (UN 1975, 1). This conference also laid out the first definition of the concept of food security, describing it as the "availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices" (FAO 2006, 1). In other words, food security was understood in terms of a continuous food supply and stable food prices, something that was believed to be achieved if the flow of products from the world's food producers was in line with population growth. National and international food policies,were based on guaranteeing the availability of food through increasing agricultural productivity with technological innovations, import and export quotas, creating national food reserves and food aid (Gibson 2012).

Although the world saw a remarkable increase in agricultural production as a result of the Green Revolution and its technological advances, the problem of famines and the number of undernourished people did not dramatically decrease. It was when Indian economist Amartya Sen published his book *Poverty and Famines: An Essay on Entitlement and Deprivation* in 1981 that the traditional idea of food insecurity as a problem of food supply was challenged. Using a number of case studies from recent famines, Sen argued that starvation was not caused by a lack of food, but rather by inadequate access to food, either due to economic factors or distributional issues. The rising prices of staple foods during the 2007-2008 food crisis and the subsequent riots that broke out in over twenty countries highlight again how monetary resources and access are at the heart of the food security issue (Allouche 2011). However, it was this "simple and somewhat obvious deduction" by Amartya Sen that sparked a fundamental shift in thinking, reorienting the focus from supply side variables to issues of income distribution and allocation of resources,

including land and social safety net systems (Gibson 2012, 490). This was reflected in the FAO's redefinition of food security in 1983, which read "[E]nsuring that all people at all times have both physical and economic access to the basic food that they need" (FAO 1983, as cited in FAO 2006, 1).

This fundamental shift in thinking also brought about a shift in the approach of how the UN and governments were tackling hunger. The first decades after its creation, the United Nations Food and Agriculture Organization had an approach centered on raising production as the primary solution to underconsumption and hunger. Amartya Sen's added economic perspective marked the beginning of a shift of understanding food security as a more complex, multi-focused concept that included economic and social perspectives (Land and Barling 2012, 313). Food aid and import/export quotas made space for economic policies focused on improving purchasing power, strengthening economic growth and food-based social assistance programs for vulnerable groups of people (World Bank 1986). Furthermore, the 1980's saw a wave of reform and liberalization in global trade. Import tariffs and barriers to foreign investment were removed, as well as taxes on export, especially in developing countries. The argument by developed countries held that openness to (agricultural) trade contributed to economic growth, which can in turn could be beneficial for poverty reduction and food security. At the same time these countries pressed for further opening of markets in developing countries, governments in the global North continued to give out subsidies for their own farmers. Cheap food flooded world markets as a result of these substantial agricultural support payments in industrialized countries, and was frequently sold at prices below the cost of production (Clapp 2020, 67). This influx of underpriced food onto world markets was in turn harmful for farmers in developing countries, whose own production couldn't compete with the sudden availability of cheap imported food (Clapp 2020, 67). This uneven set of rules that advantages rich countries' subsidies to large-scale farmers and agribusinesses over small-scale farmers in developing countries is still a point of tension among governments at the Doha Development Round, the trade-negotiation round of the World Trade Organization (Clapp 2020, 67).

The food security as a complex system paradigm that emerged in the beginning of the 1980s further developed in the decades that followed. By the mid-1990's, the UN World Food Programme had seen a number of cases where people had sufficient physical availability and economic access to food, but were still suffering from malnutrition because the food was of bad quality or not nutritious enough. This was when the component of food utilization was introduced. Next to availability and access, the acquired food should be of good quality, safe to eat and nutritionally balanced. This dimension does not only relate to nutrition, but also to the use of food, that is how food is prepared, stored and the access to sanitation and clean water. In addition, dietary preferences and traditional socio-cultural food habits were recognized. This added dimension of food utilization resulted in another redefinition. The adaption made at the 1996 World

Food Summit in Rome encompasses the definition of food security that remains the most commonly accepted definition used today. It states that

> [F]ood security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO 1996).

This definition thus encompasses four dimensions, that of availability (sufficiency), access (both physical and economic), utilization (safe and nutritious food that meets dietary needs and food preferences) and stability (at all times), which are commonly referred to as the four pillars of food security. Different indicators that make up these dimensions can be found in Figure 1.

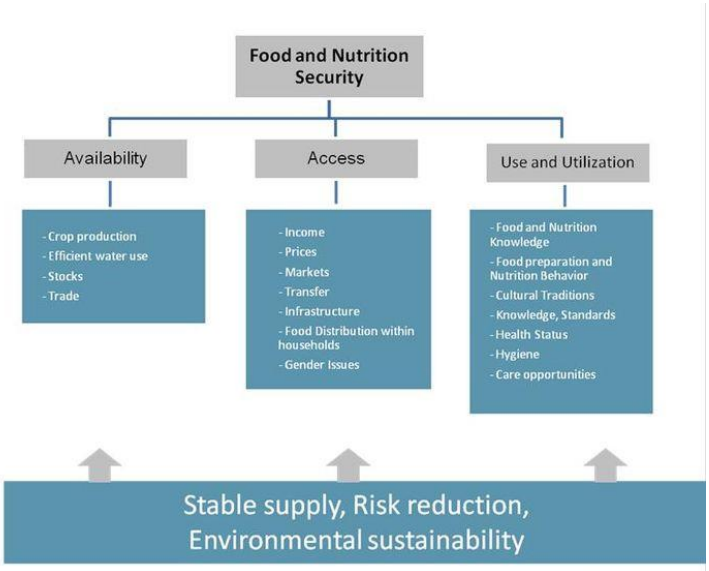

Figure 1: *Dimensions of Food and Nutrition Security*. World Overview of Conservation Approaches and Technologies (modified after FAO), n.d. Retrieved from https://wocatpedia.net/wiki/Definition_and_Dimensions_of_Food_Security

The absence of one of these four pillars indicates a state of food insecurity, which is defined as

> [A] situation that exists when people lack secure access to sufficient amounts of safe and nutritious food for normal growth and development and an active and healthy life (FAO 2015, 53).

For this, the FAO differentiates between chronic food insecurity, seasonal food insecurity and transitory food insecurity (2008a).

2.2. Reframing food security: towards a food systems approach

According to Shepherd (2012), the widespread definition discussed above has a serious fundamental flaw: just like food is treated as a commodity that is produced and sold for profit, food security in its essence in this definition is seen as an economic issue involving supply (of sufficient, safe and nutritious food), demand (meeting dietary needs and food preferences of all people, at all times) and "making supply meet demand (by physical, social and economic means of access)" (197). It is much more focused on the availability dimension of food. This framing becomes problematic when food-security language is used by actors to justify competition over increasingly scarce food-production resources, at the exclusion and deprivation of others (Shepherd 2012, 197). This type of language is exactly what is used in justifying the securing of rights over foreign agricultural lands under the Saudi Agricultural Investments Abroad initiative (Alshareef 2009). This justification of land grabs after 2007-2008 is the perfect example of how "food security has instead become a game for powerful actors competing for advantage (profit or scarce resources such as agricultural land) in an increasingly resource-constrained world" (Shepherd 2012, 198). Moreover, the definition used by the FAO lacks defined agents and a call to action (Shepherd 2012, 197). Neither actors responsible for providing food security or actors who are at risk of experiencing food insecurity and should be the recipients of such food security strategies or actions are defined. As Shaw (2007) put it, "[W]ith so many multilateral, bilateral and non-governmental organizations and international institutions involved, food security has tended to become everybody's concern and so, in reality, no one's concern" (384). Shepherd's proposal is then that the definition of food security must be reframed in such a way that an actor with agency must be prepared to act, and challenged by others, in terms of how its policies, behaviors, or actions help those who are hungry or vulnerable to hunger (2012, 206). In other words, actions within this framing are able to be measured and evaluated, as well as actors can be held accountable for their food security policies. Applied to practical situations, such as the acquisition of land in developing countries by richer ones in pursuit of securing food supplies, questions of how this strategy helps improve the food security situation of those in Saudi Arabia and the targeted country should be asked.

Next to a lack of defined agents or actions, the current definition of food security does not connect to a food systems approach. Many food security and nutrition challenges are complex issues that arise as a result of interactions at many dimensions and levels in increasingly globalized food systems (FAO 2018, 2). Transcending disciplinary, divisional, and institutional boundaries, they require actions taken across different scales, sectors and levels by both public and private actors, far beyond just economic or agricultural policies – think infrastructure and transport, women's empowerment, education, environment and health (FAO 2018, 2). The benefits of this holistic approach hold that it addresses "the limitations of many traditional approaches to improving food security and nutrition, which tend to be sectoral with [either] a narrowly defined focus" (FAO 2018, 2). Instead, while the decades before had seen a shift from a

production-oriented approach or paradigm towards this food systems approach, the 2007-2008 food price crisis sparked a revived international focus on primary production and added additional competition over the agricultural resources needed for this (Lang and Barling 2012). Put differently, the world after 2008 saw a step away from the holistic food system approach. The advice for policy makers, then, is to explore at different levels "how policy forums could better include [these] ecological and social considerations into a discourse that is still shrouded by neo-Malthusian assumptions that production and demography are the key factors and that the solutions lie in producing more food" (Lang and Barling 2012, 323).

To ensure food security for all, our food system should be organized so that it is capable of mitigating climate change impacts, that it uses resources sustainably and that it is fair and equitable for all people, moving opposite of this renewed focus on just increasing production (WUR, n.d.). How we can organize the food system in such a way that it is both resilient and sustainable should be a key question in the debate on food security. Subsection 2.1. has shown that while the same widespread definition of food security has been in use since 1996, this definition lacks inclusivity, defined actors and actions, and a connection to a food systems approach. Critical literature calls for alternative approaches that move towards holistic and integrated policy responses.

2.3. Food security: how it's measured

While the paragraphs above have defined food security as a concept and made calls for an alternative approach, the question of how food security is currently measured is still unclear. Because of its immense impact on society, food security is a subject of great interest to intergovernmental organizations, NGO's, national governments and academics worldwide. The 2007-2008 food crisis and the subsequent food riots that broke out illustrate the critical role food security can play in preserving political stability (Jones et al. 2013). Furthermore, Jones et al. illustrate that current measures and future estimates of food (in)security are an important factor for governmental policy and economic aid decisions, such as the United Nations World Food Programme, the US Government Feed the Future Initiative and the Global Agriculture and Food Security Program. The following paragraphs will attempt to illustrate how food security is measured, starting from its first definition that was focused on availability to the most common indicators used today.

As the definition of food security changed over the period of time, so did its measurement. During the time food (in)security was seen as a matter of food availability, the majority of the debate focused on changes in domestic food supplies, the effect of natural disasters and pricing implications of economic policies (Webb 2006). A country's food security was measured with national food balance sheets, where the total quantity of available food for a population, either imported or produced locally and minus the quantities exported was calculated. Data on per capita food supply was then expressed in quantity and in nutritional value, expressed in terms of on caloric value, protein and fat content. Naturally, this approach has some limitations as distribution among

different regions or groups of people is not considered. With Amartya Sen's added dimension of access in the early 1980s, scholars added indicators such as household income and expenditure in order to measure food security. Additionally, the discovery of micronutrient undernutrition, that is undernutrition beyond the scope of calories and protein needs, parameters like micronutrient availability and diet diversification were included.

Since its latest redefinition in 1996, numerous food (in)security indices and annual reports have emerged. Defined by multiple dimensions encompassing various elements, the measurement of food security poses several challenges. The indicators that are used in an index or report can draw data from national or regional level, but also on a household or individual level, using time and resource intensive data collection methods such as surveys and interviews. No specific single indicator can encompass the entire prevalence or scope of the concept of food security. When using multiple indicators to measure food security, there seems to be no consensus on the best choice of indicators, resulting in indices that use only a few indicators to very complex ones (Pérez-Escamilla et al. 2017). Examples include the Global Hunger Index (GHI) which consists of four indicators, the Global Food Security Index (GFSI) which includes 59 indicators and the Ending Rural Hunger Index, which considers as many as 80 indicators (Caccavale and Giuffrida 2020; FAO 2019; Jones et al. 2013).

On country-level, one of the most important indices seems to be the Global Food Security Index (GFSI). Designed by the Economist Intelligence Unit, the GFSI publishes annual assessment reports monitoring food security at country level for 113 countries in the world. Using the definition of the 1996 World Food Summit, the 59 indicators used by GFSI are based on the four dimensions or pillars of food security as defined by the FAO, that is affordability, availability, quality and safety metrics, alongside natural resources and resilience. Data for all categories are mostly gathered from the FAO, World Bank, United Nations Development Programme and Global Nutrient Database, next to calculations from the Economist Intelligence Unit itself. The category 'natural resources and resilience', first introduced in 2017, seems to be rather unique in the field of food security measurements. It assesses a country's vulnerability to the impacts of a changing climate and natural resource risks, as well as policies committed to adaptation (GFSI 2021). For this, the category is divided into seven categories: exposure; water; land; oceans, rivers and lakes; sensitivity; political commitment to adaptation; and demographic stress. Metrics that are important for this are for example the prevalence of drought or flooding, agricultural water risk, land degradation, eutrophication, food import dependency, disaster risk management and projected population growth. For each category, underlying indicator scores are scaled from 0 to 100, with 100 corresponding to the most favorable food security situation. The overall GFSI score is then the weighted average of the category scores.

2.4. Food security: Saudi Arabia's score

How does the Kingdom of Saudi Arabia score on the GFSI index? With a score of 69.5, Saudi Arabia ranks at place 38 out of the 113 countries assessed in the 2020[1] index, down four places compared to 2019. While for affordability, availability and quality and safety the country has a combined score of 73 or higher for each of these categories, the score for the indicators in the category natural resources is very weak. Figure 2 shows that the KSA is especially lacking in the categories 4.2) water, 4.5) sensitivity and 4.6) political commitment to adaptation. The latter category, however, does not include political commitment to agricultural policies aimed at strengthening food production and supply, whether that be domestically or via imports. Metrics of this category can be found in Table 1. In sum, while the added category of natural resources and resilience seems like a step towards the inclusion of sustainability and a systems approach, the Global Food Security Index seems to be of little relevance to determine whether the strategy of large-scale land investments can help strengthen Saudi Arabia's food security.

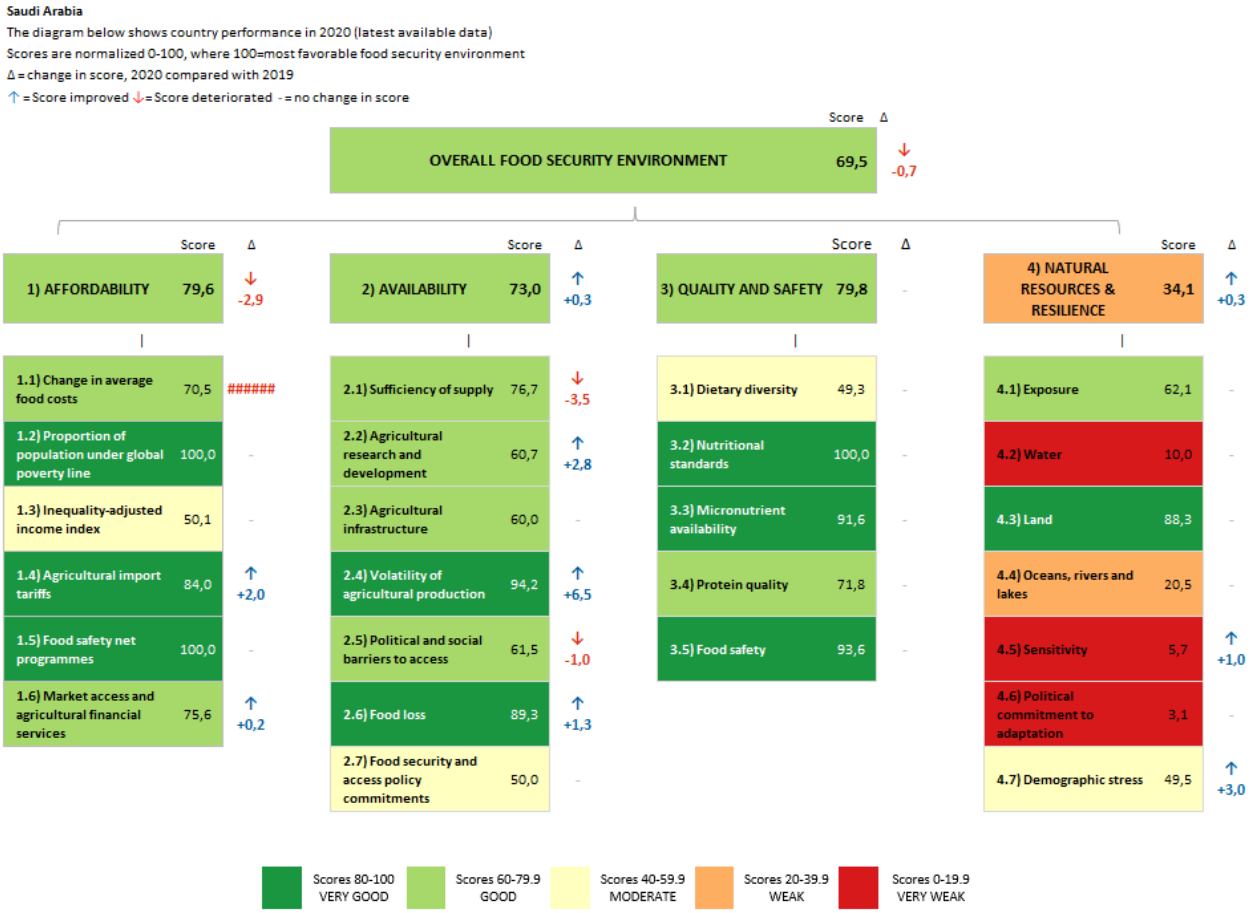

Figure 2: *GFSI Model 2020, country profile Saudi Arabia*. The Economist Intelligence Unit 2020. GFSI 2020 Model. https://foodsecurityindex.eiu.com/.

[1] At the time of writing, the GFSI 2021 was not yet released.

Series	Unit	2018	2019	2020	Source
4.6.1) Early-warning measures / climate-smart Agriculture	Qualitative rating 0-2	0	0	0	CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS)
4.6.2) Commitment to managing exposure	Qualitative rating 0-13, where 0 = No commitments to 13 = Full commitment	2	2	2	CCAFS
4.6.3) National agricultural adaptation policy	Qualitative rating 0-2	0	0	0	Qualitative scoring by EIU analysts based on WHO, FAO and national health ministry documents
4.6.4) Disaster risk management	% local governments that adopt and implement local disaster risk reduction strategies in line with national disaster risk reduction strategies	0	0	0	United Nations

Table 1: *Metrics of category 4.6, Political commitment to adaptation.* The Economist Intelligence Unit 2020. GFSI 2020 Model. Retrieved from https://foodsecurityindex.eiu.com/.

3. Agricultural sector and food security policy in the Kingdom of Saudi Arabia

Following the above definition of food security, this chapter aims to determine what the agricultural sector of the Kingdom of Saudi Arabia looks like and what food security policies it has in place. What is the state of the Saudi agricultural sector and is this sector self-sufficient or food secure? Moreover, this chapter will also discuss the possible impacts of climate change on this sector. The next part deals with Saudi policies concerning agriculture and food security. Furthermore, it analyses the role of the Saudi Agricultural Investments Abroad initiative within the larger Saudi food security policy framework. Lastly, it will provide an overview of the data available on the large-scale land acquisitions conducted under the name of the Saudi Agricultural Investments Abroad initiative. What countries are targeted and why?

3.1. Agricultural sector of the Kingdom of Saudi Arabia

While Saudi Arabia's "landscape is unmistakably desert and hardly looks promising for farming" (Lippman 2010, 90), the Kingdom's domestic agricultural sector is extensive. Following a world food crisis in the early 1970's that led food prices to skyrocket and the subsequent steady increase in Saudi Arabia's crude oil revenue after the October 1973 Yom Kippur War, the Kingdom initiated a massive agricultural-sector development programme aimed at achieving self-sufficiency (Ouda 2014). As a result of decades of supportive government subsidies, interest free loans, free seeds and fertilizers and the adoption of modern irrigation technologies, large areas of deserts were turned into agricultural fields (Al-Shayaa et al. 2012). Irrigated crop area covered around 400,000 hectares in 1971, increasing to approximately 1.6 million ha in 1992 (Ouda 2014). Agricultural production increased so substantially that the Kingdom reached self-sufficiency in commodities such as cereals, eggs, dates and some vegetables, as well as it was able to start exporting the surplus (Baig and Straquadine 2014). The GDP share of agriculture was steadily on the rise throughout 1980's, peaking at around 6% for much of the 1990's (The Global Economy n.d.). However, the government soon realized that this rapid agricultural development in light of its self-sufficiency policy was harming the country's already limited natural resources, especially the overexploitation of water resources (Al-Shayaa et al., 2012). With average annual rainfall at less than 120 millimeters for most of the country, Saudi Arabia extracts up to 90% most of its water from aquifers, and a smaller percentage from desalination plants (FAO 2008). With virtually no rains and thus a poor replenishment of the aquifers, these are doomed to have a limited lifespan. Upon this realization, the government immediately prohibited the export of several water-intensive agricultural commodities, including corn, green fodder for livestock and a variety of vegetables cultivated in open fields (Karam 2008). The cultivation of wheat was gradually discouraged from 1993 onwards by ending subsidies to wheat farmers, followed by a complete export ban (Figure 3).

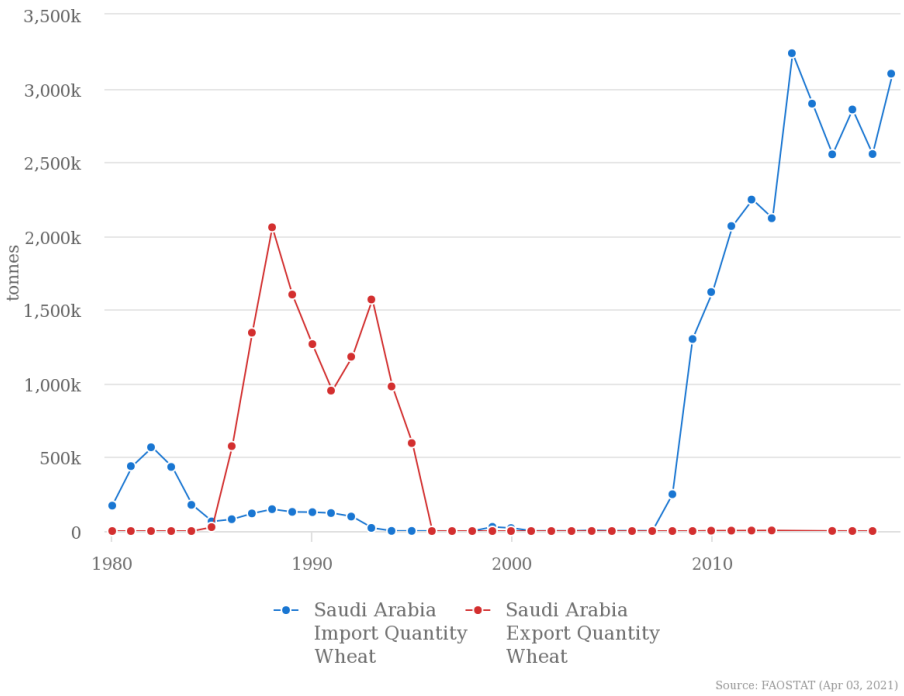

Figure 3: *Import and export quantity of wheat in Saudi Arabia, years 1980-2019*. Made by the author after FAOSTAT 2021. Retrieved from http://www.fao.org/faostat/en/#compare

After the 2007-2008 food crisis the Saudi government announced to halt support for domestic wheat cultivation completely by reducing wheat purchase from local farmers by 12.5 percent per year, relying solely on imports by 2016 (Karam 2008; Ouda 2014). Rather, the Saudi government stimulated the idea of crop diversification to save water resources, helping wheat farmers to switch to fruit trees and other crops (FAO 2008; Karam 2008). This was done by way of giving out subsidies to drought-resistant and least water-intensive crops. The effects of this policy were soon visible. By 2010, wheat self-sufficiency had dropped to around 50%, fruit and vegetable production slightly increased, while irrigation water demand showed a slight decline (Ouda 2014). Saudi Arabia's GDP share of agriculture declined to just 2.08% in 2011, down from 5% in the years leading up to the global food crisis (World Bank n.d.).

In November 2018, the Saudi government partially reintroduced the subsidy for wheat farmers over the same water conservation concerns (Mousa 2022). Alfalfa, the main green fodder crop cultivated in the KSA, is even more water extensive than wheat, and by bringing back the wheat subsidy the government hoped that alfalfa producers would switch to wheat cultivation. Since alfalfa is more profitable than wheat in spite of its subsidy, this effort has produced little result (Mousa 2022). However, wheat, alfalfa and the other aforementioned food commodities remain on the list of banned products to export to this day (Saudi Exports Development Authority 2021).

To summarize, by encouraging low-water intensive fruits and vegetables whilst phasing out water-intensive cereals, the Kingdom of Saudi Arabia is able to keep increasing agricultural production (Fig. 4) and reach self-sufficiency levels in food products like sorghum, grapes, dates and a variety of vegetables, despite concerns over water resources (Fiaz et al. 2018).

Crop	2018 *		2017 *		2016 *		2015 *	
	الإنتاج Production	المساحة Area	الإنتاج Production	المساحة Area	الإنتاج Production	المساحة Area	الإنتاج Production	المساحة Area
Cereals (Total)	1459663	268584	1509231	277948	1524832	291446	1630083	305856
Wheat	586413	89756	620923	96517	618653	104414	693776	112956
Millet (Grains)	8320	4907	8055	4726	7539	4467	7309	4222
Broom-corn	144038	54866	147353	56279	152341	58467	157764	60740
Maize	15394	2471	15079	2471	14768	2463	13040	2456
Barley	624702	93861	637612	95166	648620	97157	677964	99190
Sesame	3085	1663	3258	1729	2639	1833	3839	1943
Other	77711	21060	76951	21060	80272	22645	76391	24349
Vegetables (Open Field) (Total)	1714935	82726	1687287	81759	1666217	80785	1615943	80234
Tomato	210650	12175	207096	12084	207524	11949	196791	11816
Potato	482305	19149	476418	18755	466402	18180	459186	17622
Marrow	38460	2151	39107	2218	44672	2483	52986	2780
Eggplant	25384	1453	23850	1549	25844	1704	27372	1875
Okra	18731	1401	20084	1517	21499	1710	23004	1927
Carrot	17024	1020	15617	937	13750	825	12796	727
Dry Onion	71581	2730	70992	2716	68896	2694	66141	2673
Cucumber	43717	2420	39876	2251	36755	2020	30262	1812
Melon	39360	2053	45051	2299	49933	2725	67553	3230
Watermelon	634491	30981	606186	29699	574653	27874	505722	26162
Other	133233	7194	143010	7734	156289	8621	174130	9610
Vegetables(green houses) (Total)	260014	3265	252073	3216	258376	3145	231151	3080
Tomato	101693	1253	99293	1233	97679	1204	91826	1176
Cucumber	71900	858	71556	855	71795	865	70401	875
Marrow	11864	146	11504	144	12231	151	11911	159
Other	74556	1008	69720	984	76671	925	57013	870

Figure 4: *Production by Type of Crop, 2015-2018.* The joint technical team from the Ministry of Environment, Water and Agriculture and the General Authority for Statistics 2018.

The odd one out in this approach, however, are the country's remarkably high self-sufficiency rates for certain resource-intensive animal products such as eggs, milk, cheese and butter, with a surplus being exported mostly to other Gulf states (Fiaz et al., 2018; MEWA, 2020). Virtually eliminating wheat production under the pretext of its heavy toll on water supplies, one cannot help but wonder what the largest dairy farm of the Gulf is doing in the Saudi Arabian desert. Capitalizing on the increased demand for dairy products domestically and in the Middle East, Saudi Arabia has developed itself as one of the largest dairy products exporters of the region (Sadi 2014). Dairy products offer more possibilities for product differentiation, such as yoghurt, powdered milk, ice cream, fermented dairy products, etc. These value-added dairy food products have the potential to generate more profit when exported than unprocessed foods such as wheat. In the case of dairy then, the Kingdom of Saudi Arabia seems to choose economic profit over water resource conservation – and possibly food security with it – in the long run.

3.2. Agricultural production in the KSA and climate change

As climate is the main factor determining agricultural production, climate change will greatly affect agriculture across the world. In fact, research by the Intergovernmental Panel on Climate Change (IPCC), an intergovernmental body of the United Nations, has shown that climate change is already impacting food security (2019). Altered precipitation patterns and higher frequency of extreme

weather events have started to negatively affect yields of some crops, and this is expected to intensify in the future. For Saudi Arabia specifically, studies show an increase in temperature and evaporation, a decrease in the already limited precipitation and an increase in agricultural water demand (Al-Zawad 2008; Chowdhury and Al-Zahrani 2013). Lack of replenishment of aquifers and valley basins, on which current agricultural production heavily relies, could cause them to dry up and further reduce agricultural productions (Chowdhury and Al-Zahrani 2013).

Given the size of the Saudi dairy industry, the above could be problematic for the quantity and quality of animal feed. More importantly, increased temperatures could impair livestock production (milk yield and quality, egg yield), reproductive performance and health status (Nardone et al. 2010). In fact, heat stress has already been identified to be a major source of production loss in the dairy sector in Saudi Arabia (Nardone et al. 2010; Al-Hassan 2018). Unless extensive heat mitigation strategies and technologies are implemented within this sector, Saudi Arabia's self-sufficiency rates could fall down, further increasing their dependency on imports (Fiaz et al. 2018).

While specific numbers are hard to find, the Food Insecurity and Climate Change Vulnerability Index by the Met Office and World Food Programme (https://www.metoffice.gov.uk/food-insecurity-index/) provides insight into future vulnerability to food insecurity using different scenarios. Future projections of food insecurity are based on three global greenhouse gas emission scenarios that correspond with the IPCC's Representative Concentration Pathway (RCP) trajectories (low/RCP 2.6, medium/RCP 4.5, high/RCP 8.5) and three adaptation levels (none, low, high). Adaptation levels are based on agricultural sensitivity (% of rainfed agriculture, crop yield) , exposure to climate-related hazards (average length of droughts based on meteorological data) and adaptive capacity (socio-economic indicators relevant to the food security system). The Kingdom of Saudi Arabia is excluded from this index because there is too little agricultural production to make predictions for. While not one-on-one comparable, neighboring countries (Iran, Iraq, Yemen, Jordan, Egypt) all show a 13-22% increase in food insecurity in a medium emissions, high adaptation scenario for 2050. These figures highlight the significance of better agro-food policies to assure food security in the face of global climate change.

3.3. Saudi Agricultural Investments Abroad initiative

In May 2008, just after the height of the global food crisis, Dubai-based policy institute Gulf Research Center (GRC) published a paper titled *Food Inflation in the GCC* (Gulf Cooperation Council) *Countries*. Warning for the recent food price spikes and the threat this poses to political stability, the institute stated that "[T]he GCC countries are highly dependent on food imports and particularly exposed to global food inflation. […], self-sufficiency is not an option for the arid and increasingly populous GCC countries" (Woertz et al., 2008, 20). One of its major policy recommendations then, was to enhance "[D]ialogue with food exporter nations and large-scale infrastructure investments for cultivation of new land in Africa, South East Asia and Eastern Europe" (21)

In January 2009, the Initiative for Saudi Agricultural Investment Abroad was launched by

King Abdullah Al Saud. Since the 1970s, Saudi Arabia's key economic decisions are laid out in five-year national development plans, but no mentioning of this initiative can be found in the Eight Development Plan (2005-2009) or Ninth Development Plan (2010–2014) by the Saudi Ministry of Economy & Planning. Rather, the initiative seems to have been a direct response to the world food crisis in mid-2007 up to mid-2008, as was laid out during the Expert Group Meeting on "Achieving Food Security in Member Countries in Post- crisis World", hosted by the Islamic Development Bank in May 2010. Saudi investors would be provided funds and logistics to establish a strategic food reserve, strengthen Saudi Arabia's food security and provide an example of responsible international investment in agriculture. Specifically, the Saudi private sector would be the main investors, not the Saudi government (Al-Obaid 2010, slide 11).

In reality however, more often than not, state-owned enterprises and/or the Saudi government have a share in or are involved with the land deals. An example of this is the Saudi Agriculture and Livestock Investment Company (SALIC), established shortly after the strategy's announcement in 2009. Owned by the Public Investment Fund (PIF), a government-owned sovereign wealth fund, SALIC seeks to contribute to the Kingdom's food security strategy "through various local and foreign investments that guarantee sustainability and growth" (Government of KSA 2021, 24). More concretely, it supplies large quantities of basic food products "from the production of its investments", such as a shipment of 64.000 tons of wheat from Ukraine in 2020. The chairman of the board of directors of SALIC is Abdulrahman bin who is also the Saudi minister of Environment, Water and Agriculture (SALIC, n.d.). A third example of the Saudi government's role is the company Al Mutamayiza for Vegetables and Agricultural Crops Production, involved as an operating company with land deals in Sudan. Although classified as a private company, further research shows that the Government of Saudi Arabia owns 12.5% of its shares, together with the Arab Authority for Agricultural Investment and Development and several other Gulf states (Land Matrix 2022; Arab Authority for Agricultural Investment and Development 2022). In other cases, the Saudi government does not own a share of a company but does provide private companies with the vast majority of funding for overseas land deals, such as the case with Hail Agricultural Development Corporation (Smaller & Mann 2009).

In sum, the Saudi government seems to play a larger role in large-scale land investments as initially stated, either through state-owned enterprises or a smaller share the government holds in private companies. But what role does the initiative play within the KSA's larger food security policy?

3.4. Saudi Agricultural Investments Abroad: the data

According to data provided by the Land Matrix, as of April 2022, Saudi Arabia has land deals in 10 countries, with size ranging from 1000 hectares in Morocco to 300695 hectares in Ukraine (Appendix A, figure A1). Appendix A also shows a web of the transnational land acquisitions with all outbound investments for Saudi Arabia in orange (figure A2). With the exception of Argentina and Ukraine, all investment countries are in Northwest/West Africa and Northeast Africa (figure A3). But why are these specific countries targeted?

Often called Europe's breadbasket, Ukraine is rich in fertile, arable land and also a major producer and exporter of wheat. Since the global financial crisis of 2007-2008, Ukrainian oligarchs have turned to agriculture as a new profitable business opportunity, attracting foreign capital to invest in the country's agricultural sector (Plank and Plank 2014, 63). Through privatization and the leasing or buying up of agricultural land from small-scale land owners, large agroholdings have started produce crops primarily targeted at export such as vegetable oils, wheat and corn. Both this internationalization and financialization of farmland makes Ukraine a very suitable investment country for the Saudi Agricultural Investments Abroad Initiative.

While Ukraine seems to be primarily selected as an investment country for its wheat production, Argentina appears to be targeted for its soybean and other cattle feed production, as most land grabs in Latin America are associated with (ELLA 2014). This corresponds with a 2012 news article by news agency MercoPress, stating that the Saudi dairy company Almarai had purchased the agribusiness Fondomonte S.A. that owns and operates a small number of farms in Argentina (Januari 2nd, 2012). The deal in the northern province of Chaco totaled little over 12000 hectares. A 2017 mapping by the Environmental Justice Atlas, a platform that documents and catalogues social conflict around environmental issues, shows a 2011 land deal by the Saudi company Al-Khorayef Group. The allocation of 200 000 hectares of farmland to the Saudi company for soy and other large-scale mono crops would allegedly displace several indigenous communities and put an end to their traditional practices. Displacement and land dispossession appear to be a frequent feature of large-scale land acquisitions, and for that reason LCLA's are often referred to as land grabs (Lunstrum 2016). Such cases often lead to resistance from local communities and pressures from human rights organizations, but in the case of Al-Khorayef in Chaco demands from numerous NGO's were not enough to bring the deal to a halt.

The African continent, on the other hand, has been at the center of the global rush for land since 2008. Often described as an underdeveloped region, many studies and reports have highlighted Africa's potential for large-scale commercial agriculture (World Bank 2009; World Bank 2013). During a 2018 speech at the FAO Head Office the President of the African Development Bank, Akinwumi Adesina, stressed Africa's importance in fighting global food insecurity, stating "Africa must become a breadbasket for the world. Unlocking this enormous potential of Africa's agriculture must be at the top of global food security agenda." (African Development Bank Group 2018). To prevent land grabbing and community rights violations, however, Adesina stressed that

“[T]here must be responsible agribusiness investing” (African Development Bank Group 2018). This seems easier said than done, as reportedly over 70% of all land deals conducted in the first years after the global food crisis took place in sub-Saharan Africa (Deininger et al. 2011, XIV). These deals generally failed to respect local land rights or make any significant contribution to poverty reduction and economic growth, while investors often do claim their deals will have some sort of beneficial impact for the local population (Deininger et al. 2011, 49). Nevertheless, this perceived abundance of cheap and empty arable land is a key reason to explain the strong interest in African land after 2008 (Cotula et al. 2009, 59). Weak documentation of land (use) rights due to lack of legitimate political institutions and/or effective administration makes it easy for governments to sign away land rights of perceived ‘wastelands’ to investors (Cortula et al. 2009, 62; Häberli and Smith 2014, 192; Schoneveld 2017, 124). This at the expense of local rural communities or indigenous people’s, jeopardizing their own livelihood and/or food security.

In addition to the above reasons for targeting specific countries, Cotula et al. argue that relative geographical and cultural proximity to the investor country often contribute to the choice of recipient countries (2009, 34). These seem plausible explanations for the countries in Northeast Africa that Saudi Arabia has invested in, as well as Morocco and Mauritania.

3.5. Saudi Agricultural Investments Abroad within the larger food security policy

In April 2016, Crown Prince Mohammed bin Salman presented Saudi Arabia’s vision for the future, marking the first step in transforming the country's economy. ‘Saudi Vision 2030’, as the strategic framework was named, is the current blueprint for the Kingdom's economic and development efforts. It outlines the general directions and policies of the Kingdom, as well as its goals and objectives. The overall goal of this strategic framework is to reduce Saudi Arabia’s dependency on oil and diversify its economy.

To enable effective implementation, Vision 2030 is divided into three overarching pillars and numerous strategic objectives. To meet these objectives, eleven so-called ‘Vision Realization Programs’ (VRPs) were established, such as the Housing Program and Financial Sector Development Program. The framework of Vision 2030 and its programs is depicted in Figure 5.

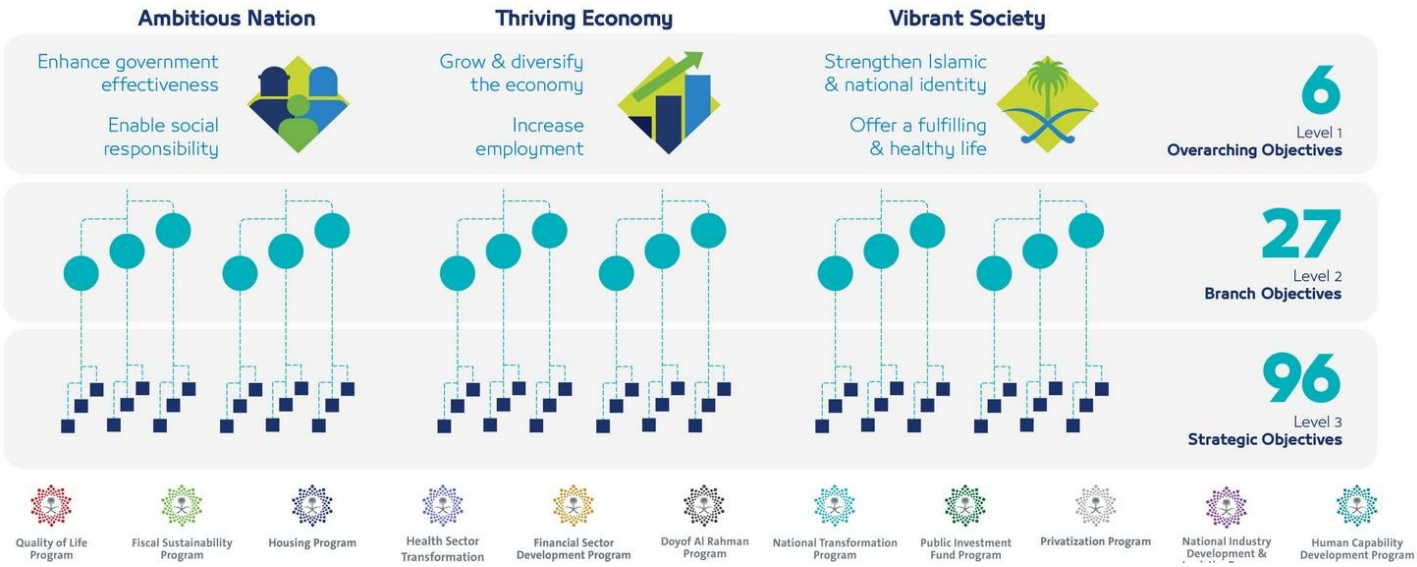

Figure 5: *Vision 2030 Overview, with the three overarching pillars and eleven Vision Realization Programs* Saudi government website for Vision 2030, accessed 10/3/2022 from https://www.vision2030.gov.sa/v2030/overview/

At first glance, agriculture or food security do not seem to be major topics in Saudi Arabia's Vision 2030. They are not mentioned in one of the three overarching pillars and neither do they have their own VRP. The official English Vision 2030 overview document, retrieved from the English Vision 2030 government website, only briefly mentions the building of strategic food reserves and forming strategic partnerships with countries rich in fertile soil and water reserves (Kingdom of Saudi Arabia n.d., 65). The latter could possibly refer to the Saudi Agricultural Investments Abroad Initiative, but more details aren't provided. However, food security and agriculture do play a larger role in the first VRPs that was developed, the National Transformation Program (NTP).

Launched in 2016, the National Transformation Program aims to build the required infrastructure and establish an environment that allows the public, private and non-profit sectors to achieve the Vision 2030 goals. In other words, the NTP essentially supports the goals of Vision 2030 by setting additional strategic objectives and creating initiatives based on indicators, while measuring and monitoring their performance. The NTP was divided into two phases, with phase 1 running from 2016-2020 and phase two starting in 2021 and lasting until 2025. During phase 2, the strategic objectives and initiatives were revised and modified. Figure 6 shows an incomplete list of the strategic objectives for clarity. As seen, the objectives are short and very broad, each only briefly described in a few sentences further in the *National Transformation Program Delivery Plan 2021-2025.* They span across 24 participating government bodies, with the Ministry of Environment, Water and Agriculture as a leading entity. Moreover, the objectives are spread out over 7 themes, of which one is of relevance to food security: Ensure Sustainability of Vital Resources. The five strategic objectives related to this theme are: reduce all types of pollution; protect and rehabilitate natural landscapes; safeguard the environment from natural threats; ensure development and food security, and ensure sustainable use of water resources.

Figure 6: NTP Strategic Objectives (20121-2025). Saudi Government website for Vision 2030, accessed 28/5/2022 via https://www.vision2030.gov.sa/v2030/vrps/ntp/

In the National Transformation Program Delivery Plan 2021-2025, 49 key initiatives under 'Ensure Sustainability of Vital Resources' are described. They are not divided under the five themes, and range from increasing the capacity of strategic water storage to the rehabilitation of national parks and the development of a management system for plant diseases. With regards to food security specifically, the Kingdom has the following initiatives in place:

- The development and application of 'Agricultural Best Practices', to ensure sustainable agricultural growth through development and technology;
- Enhancing sustainable animal production, by selecting and developing the best domestic livestock breeds;
- The development of an Effective Food Strategic-Reserve Program that Includes a warning and information system for agricultural markets;
- Strengthening applied agricultural research, specifically to enhance the productivity of the Kingdom's fish resources;
- Establishing irrigation networks on dams, to increase the utilization of dam water for agricultural purposes;
- A national program to reduce food loss and food waste;
- Application of rainwater harvesting techniques on strategic crops in the southwestern region;
- Implementation of the Saudi Foreign Agricultural Investment Program, to prevent the planting of certain major grains and crops domestically in order to safeguard water resources;
- Maximizing the use of treated wastewater in agriculture.

Many of these initiatives are related increasing agricultural production and lack the holistic approach as described in section 2.1. Moreover, the initiatives lack detailed separate policy documents and are only briefly summarized in a few sentences. Hence, it is unclear to what extent these initiatives have already been implemented, possible evaluations and outcomes, and so on.

To summarize, the Saudi Agricultural Investments Abroad initiative is part of the policy theme 'Ensure Sustainability of Vital Resources', a much broader set of policies focused on environmental protection and resource sustainability in the Kingdom. Divided among five objectives, food security is one of them. Official policy documents or the government website, in English at least, do not mention the initiative extensively, but neither are other initiatives with regards to food security. For this reason, a detailed assessment is complicated.

4. Large-scale land acquisitions

The above chapter has described the Kingdom of Saudi Arabia's food security strategy, of which Saudi Agricultural Investments Abroad is a smaller component. This chapter will illustrate that this initiative fits a larger, global rush for farmland and need for water resources that emerged immediately after the global food crisis of 2007-2008. How are large-scale land acquisitions after 2008 characterized? What else drives contemporary land grabs other than the hunger for food security? Following these questions, this chapter will engage with the current academic debate on land grabs as a sustainable strategy for food security. in an attempt to answer sub question four: How sustainable are land acquisitions as a strategy to ensure food security?

4.1. Land grabs after 2008: the characteristics

Land grabbing is nothing new. The millennia old phenomenon holds countless of examples, from the conquering of the Americas in the 1500s to collectivization in the USSR merely a century ago. From the 1980s onwards, when liberalization policies fundamentally changed in the international trade system, LCLAs were largely driven by "the profit-making motives of the private sector" (von Braun & Meinzen-Dick 2009, 1). The last two decades, however, have seen a shift to land acquisitions through state-owned enterprises or public-private partnerships focused on staple foods, bio-fuels or non-food agricultural commodities. The world food crisis of 2007-2008 marked the starting point of this so-called new 'wave' of land grabbing (GRAIN 2008; Franco et al. 2013). No longer being able to rely on market-sourcing of food, countries rich in capital started looking to outsource their domestic food production while remaining in direct control of their food supply. The global quest for agricultural land also coincided with a global surge in Foreign Direct Investment (FDI) in the first decade of the 2000's. While traditionally, the flow of FDI was mostly directed from and to advanced economies, in the early 2000s emerging market economies became an important destination for FDI (Carril-Caccia and Pavlova 2018). Market potential and economic growth, but mostly access to new natural resources in the case of foreign land acquisitions were the key drivers

of the substantial growth in FDI after 2000. On the other hand, governments of developing countries often welcomed investors via attractive legislation, as the attraction of foreign capital was seen as an easy route to economic growth (Zoomers 2010, 433).

According to GRAIN, a small-scale international non-profit organization advocating smallholder farmers rights, specific to the land grab strategy by Gulf countries are their visions for a long-term strategy, “a strong rhetorical attachment to “win-win” outcomes”, government funding and food-for-energy swaps (2008, 5). Written the year before the official launch of the Saudi Agricultural Investments Abroad, this analysis by GRAIN seems to be spot-on. Chapter 3.2 has shown that more often than not, the Saudi government is somehow involved in the acquisition of foreign land. Furthermore, Saudi government documents reveal that “[I]nvestments in recipient countries are in long term”, as well as that the investments have a humanitarian aspect without political objectives (Al-Obaid 2010, slide 11). The same document states that Saudi investors can provide “a good example for a responsible investment in agriculture” (Al-Obaid 2010, slide 8). In other words, governments claim that by making investments in the agricultural sector in developing countries, they will be helping the local population by providing them with advanced agricultural technologies, job opportunities and other resources. Although in theory this sounds promising, chapter 3.3 has shown that these opportunities are often short-lived and large-scale investments regularly result in dispossession of native populations, such as the Saudi case in Argentina (Cotula et al. 2009). Moreover, these deals are often described as “asymmetrical large-scale land transactions between capital-rich investors and institutionally and politically weak host countries” that are surrounded by secrecy and lack of transparency, making them a breeding ground for corruption (Schlimmer 2018, 85; Häberli and Smith 2014).

What further distinguishes the rush for land after 2008 are its scale and scope (Franco et al. 2013). Deals often entail thousands of hectares of land, such as a deal by the Saudi Public Investment Fund (PIF) involving 46000 hectares of land in western Ukraine (El Dahan 2018). While the African continent is certainly a hotspot for large-scale land investments, research shows it is also happening on other continents, even in the Global North. In 2014, the Saudi food giant Almarai purchased 4000 hectares of land in Arizona, USA, although this deal doesn’t seem to be included in datasets by the Land Matrix (Arab News, 2014).

The global food crisis of 2007-2008 generated a new type of land grab, where not only private investors but national and local governments are key players (Zoomers 2010, 434). These land grabs are characterized by the demand for biofuel, cattle feed and other non-food agricultural commodities such as oil seeds and sugar, all products targeted by the Saudi Agricultural Investments Abroad initiative (Alshareef 2009, slide 14). Foreign investment is often welcomed by governments in 'host' countries, even though their own population is not always food secure, such as the case in Sudan, Mauritania and Ethiopia (Zoomers 2010, 434). The result of this global land rush is a significant shift in the use and ownership of land, with a strong rise in worldwide

landownership by foreigners contributing to the 'foreignisation of space', often at the expense of the local population (Zoomers, 2010).

4.2. Land grabs: a rush for water

The above paragraph has highlighted the demand for cheap staple crops and biofuel as a key driver for modern land grabs. In recent years, however, scholars have investigated an alternative hypothesis in the field of land grabs: what if the fundamental motivation of the global land rush was the need for water rather than land itself (Dell'Angelo 2018, 276)? Indeed, the problem in the Kingdom of Saudi Arabia is not lack of land. With a surface of around 2,149,690 square kilometers, Saudi Arabia ranks 13th of the largest countries in the world. The arid climate and lack of any permanent rivers, however, leaves merely 1.6% of the Saudi land as arable, and this in turn becomes problematic for agricultural practices (World Bank n.d).

While Saudi Arabia's underground water supply is vast, the aquifers are depleting rapidly as total water withdrawal is higher than renewal (World Bank 2017, 65). These conditions make that the country is prescribed to either low water-intensive agriculture or making use of desalination plants. While the desalination of seawater might seem a silver bullet to a complex problem, desalination plants are highly expensive and require vast amounts of energy. While this doesn't have to be a problem in the oil-rich kingdom, desalination plants do carry another important consequence. They are known to have negative environmental effects, as desalination produces salt-concentrated brine as a by-product. Often discharged directly into the sea, this brine negatively impacts coastal marine ecosystems (Hosseini et al. 2021).

Lack of adequate water resources is then a key contributor to large-scale land acquisitions, and for this reason "land grabbing goes hand-in-hand with a process of water appropriation" (Rulli and D'Ocordio, 2013, 6130). In fact, according to calculations by Breu et al., Saudi Arabia is "disproportionately externalizing crop water consumption through their international land investments" (2016, 1). While other Gulf States seem to invest in low water-intensive crops for their agricultural activities abroad, Saudi Arabia seems to be deliberately targeting water-consuming crops, accounting for almost 11% of all LSLA-related water consumption (Breu et al. 2016, 9). This strategy is most likely connected to the water saving regulations in the Kingdom's domestic agricultural sector as described in section 3.2. Hence, Saudi Arabia increases its water supply by importing it through virtual water trading (Alamri and Reed, 2019). First introduced by Allen (1993), the concept of virtual water refers to hidden flow of water in food or other commodities. The volume of freshwater (surface water, rainfall and groundwater) consumed for the production of a particular commodity is what is referred to as virtual water. Through the international trade of these commodities, countries can virtually import or export water use, allowing to alleviate water scarcity in virtual water importing countries and vice versa. Estimations by Alamri and Reed show that for the period 2000-2016, Saudi Arabia received 42.5% of its agricultural water from imports, which contributes considerably to preserving local water resources (2019, 21). Most virtual water import was for cereals, a very water-intensive food commodity group of which domestic production was

discouraged by the Saudi government.

In other words, water is often a crucial component of land deals. In some cases on the African continent, investors are looking to secure water rights alongside their land deals (Skinner and Cotula 2011, 1). In other cases, large-scale land acquisitions are driving major irrigation infrastructure projects such as the building of dams, such as the construction of dams by Saudi investors in Eastern Sudan (Dabanga 2016). According to the Sudanese news outlet Dabanga, the dams, funded by Saudi investors, would provide electricity and irrigation water to cultivate over 4150 square kilometers of land leased to Saudi Arabia. Generally speaking, these major dam projects come with considerable implications for the environment and communities up and downstream of these dams (Skinner and Cotula 2011), and in the case of Eastern Sudan specifically would put local communities at risk of water shortages (Dabanga 2016).

To conclude, Saudi Arabia largely relies on virtual water trade via agricultural imports to supplement its scarce water supply. Their large-scale land acquisitions abroad tend to be focused on the cultivation of water-intensive crops, aligning with their domestic agricultural policy to save water resources within the Kingdom. To secure sufficient water for irrigation, water rights are sometimes purchased alongside land deals, or major infrastructure projects are set up. For host countries, however, this has the potential to jeopardize water security of local communities and have detrimental effects on local ecosystems.

4.3. Land grabs: resilience for whom?

The food crisis of 2007-2008 and the subsequent riots that broke out show that relying on the international food market comes with a high degree of uncertainty and unpredictability. Changing precipitation patterns and more frequent extreme weather events, also called ‘shocks’, have the potential to negatively impact crop yields, increasing the possibility of trade flow disruptions (Dellink et al., 2017). As a response to this exacerbating sense of unpredictability, the concept of resilience has increasingly gained attention among academia, policy-makers and non-state actors (Davoudi et al. 2012). Although the concept has not one stipulated definition, within the context of social or socio-ecological systems it means so much as the absorptive and adaptive capacity of “[…] a system to adjust to climate change (including climate variability and extremes) to moderate potential damages, to take advantage of opportunities, or to cope with the consequences” (IPCC 2001, 6). In other words, resilience represents the capacity to respond, restructure and adapt to disruptions without the system losing its function throughout the change. Resilience has become a key concept in international climate mitigation/adaptation frameworks such as the UN Sustainable Development Goals (SDGs) and the 2015 Paris Agreement.

For the Saudi Agricultural Investments Abroad strategy, a key question is then whether large-scale land investments are resilient against future climate and economic shocks, more so than relying on food imports coming via trade. Literature on land grabs and its resilience to price shocks and trade disruption is scarce, as most of the literature dealing with resilience and land grabs focuses on the so-called ‘resilience grabbing’ experienced by local communities in host

countries (Haller et al. 2020). Stated as the “most frequent and most immediate impact of land deals”, local people and communities are often losing access to and control over land and land-related resources (European Union, 2016). Consequently, this form of resource grabbing also reduces local people’s capacity for resilience, hence the term ‘resilience grabbing’ (Haller et al. 2021, 1).

With regards to investor countries, large-scale land acquisitions do have an advantage advantages over import via trade. In organizing the land deals, investors are able to negotiate specific bilateral policy agreements, such as getting food export restrictions specially waived (GRAIN 2008, 5). Food export restrictions specifically played a major role in trade shocks on the price of grain commodities during the 2007-2008 food crisis. Bilateral contracts where the land is formally leased or sold to the investor country for a specific time period will ensure a stable food supply to the investor state in case of new worldwide trade restrictions. On the other hand, such land deals will not be resilient to weather shocks or other sudden shocks such as for example the war and following blockade of the Black Sea in Ukraine (Ahmed et al. 2022). While Saudi Arabia has major land deals in Ukraine, Russian blockade on Ukrainian ports makes it unlikely that Saudi investors are still able to export wheat back to the Kingdom.

Ultimately, in the case of a new global food crisis, the result of the land grab strategy will mostly be the same: net loss to national and local food security and increased food shortages in host states, while investor countries will have increased infrastructure to ensure food supply via this leased or bought foreign land. If food security strategies aim for sustainable, resilient and inclusive food systems, the resilience of local communities in countries targeted for these land deals cannot be dismissed. Moving towards such food systems approach, ethical, socio-economic and environmental impacts of large-scale land acquisitions must be taken into account to determine the sustainability of such strategy. The following subsection will concern these impacts.

4.4. Land grabs and sustainable food systems

Since the 2007-2008 food crisis and the following global surge in the quest for fertile land, much research has been done on the impacts of large-scale land acquisitions in host countries. Proponents of these land deals argue that these land deals bring about large opportunities for development and modernization in developing countries, for example by closing yield gaps in the often underdeveloped agrarian sectors (Deininger et al. 2011; FAO 2009). The same type of argument is used for the Saudi Agricultural Investment Abroad initiative, as farmers in the targeted country would benefit from the “availability of capital and technology” shared by the Saudi private sector that would be carrying out the land deals (Al-Obaid 2010, slide 16; Alshareef 2009). By contrast, the media, NGOs and critical researchers often argue against this narrative, citing concerns of ethical, socio-economical and environmental nature (Dell’Angelo et al. 2017; Neudert and Voget-Kleschin 2021; Toft 2013).

To start, the most significant negative effect of LSLAs on local people is the loss of access to land and natural resources (European Commision 2022). Naturally, this goes hand in hand with

loss of traditional livelihoods, net loss in national employment in agriculture, reduced local food security and reduction of productive assets such as cattle (European Commision 2022). Promised employment creation by investors are often of seasonal nature and insufficient to compensate for the loss of livelihoods (Neudert and Voget-Kleschin 2021, 33).

Furthermore, LSLAs lead to a loss of commons, specifically for poor and marginalized group (Dell'Angelo et al. 2017). Commons refer to natural resources accessible to all members of a society, such as forests or groundwater resources. LSLA preferentially target common land or land perceived as having no owners. This is problematic since land rights for marginalized people in developing countries are often weak or even undocumented. This 'common' land is then converted into private exclusive to the investors' use (Dell'Angelo et al. 2017, 8). Again, this leads to loss of traditional livelihoods and all negative implications this brings with it.

With regards to the environment, land grabs are a major driver of land-use change. Common land previously used as forests or other hinterland is often turned into farmland for large-scale mono crops. If previously used for small-scale farming, land leased to foreign actors often leads to large-scale industrialization of agriculture, given the size and nature of actors involved in these land deals. Large-scale industrialized farming and/or monocropping, in its turn, often have a damaging impact on ecology and contribute heavily to increased erosion, soil degradation and biodiversity loss (Schoneveld 2017).

Concerning positive outcomes of LSLAs are generally related to creation of infrastructure, such as irrigation channels or roads (Neudert and Voget-Kleschin 2021). However, the extent to which local communities benefit varies, relying on the location and type of infrastructure built. As seen in the case of the construction of dams by Saudi investors in Eastern Sudan, infrastructure creation can also have negative implications to the local communities, such as negative environmental impacts. In other cases, infrastructure creation was promised but not realized. Second, spillover of agricultural knowledge and technology are observed, albeit to a lesser extent than expected (Neudert and Voget-Kleschin 2021). Interestingly, this contribution to the development of the agrarian sector in the host country is a major advertising component of the Saudi Agricultural Investment Abroad initiative.

In light of moving towards food systems approach, impacts of LSLAs in host countries cannot be ignored. This subsection has showed that while LSLAs generate some benefits, the extent of these vary case by case and are not consistent. The negative consequences, however, are vast and span across multiple dimensions: social, economic and environmental.

5. Conclusion

The global food crisis in 2007-2008, when oil and agricultural commodity prices skyrocketed, sparked a shift away from a food systems approach towards a renewed international focus on increasing agricultural production. The quest for land for this renewed interest in agricultural production came much at the expense of low-income countries. In light of the most defining crisis of the 21st century, the climate crisis, the fundamental question that must be asked is what sort of food system is environmentally, socially and economically sustainable. After all, as Lang and Barling (2012) put it, "the only food system to be secure is that which is sustainable" (322). Moreover, what perspective of food security fits in this mission to create a sustainable food system, and what policies are accompanied by it? The answer, according to critics, lies in a transformation towards a holistic food systems approach that considers social, economic as well as environmental indicators into an integrated policy response (Land and Barling 2020, 313).

This thesis has aimed to analyze the role of large-scale land acquisitions within Saudi Arabia's food security strategy. Furthermore, it has examined the position of large-scale land acquisitions within a larger debate on achieving food security sustainably. This thesis has showed that while large-scale land acquisitions have the potential to contribute to increased agricultural production and thus increased food security, they fit a broader trend that shifts away from a multi-focused food systems approach. Confined to a single sector, a focus on increasing agricultural production, which the overall food security strategy of the KSA is largely concerned with, does not allow policymakers to see the bigger picture. Ultimately, food security is part of a much larger food system that deals with many interlinked activities and feedbacks on a variety of levels and dimensions. Encouraging policymakers to take on a food systems approach will help multi-stakeholder collaboration and can help identify all social, environmental, and economic impacts of the strategies considered (FAO 2019, 2). When these impacts on the local population are taken into account, the conclusion is that large-scale land acquisitions should be moved away from out of environmental, social and economic concerns.

With regards to its limitations, however, this research has only made use of English policy documents made available on Saudi government websites in its assessment of the Saudi food security strategy. Arabic documents were not taken into account. To make a complete assessment of the role of the Saudi Agricultural Investments Abroad initiative within the larger Saudi food security strategy, further research could take this into consideration.

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Appendix A

Countries Saudi Arabia invests in	
Argentina	2 deals 212306.00 ha
Ethiopia	12 deals 322974.00 ha
Kenya	1 deals 40468.00 ha
Mauritania	1 deals 2000.00 ha
Morocco	1 deals 1000.00 ha
Senegal	2 deals 20250.00 ha
South Sudan	1 deals 105000.00 ha
Sudan	9 deals 184687.00 ha
Ukraine	12 deals 300695.00 ha
Egypt, Arab Rep.	1 deals 42000.00 ha

Figure A1: *Size of the land deals that Saudi Arabia invests in*. Land Matrix 2022. https://landmatrix.org/charts/web-of-transnational-deals

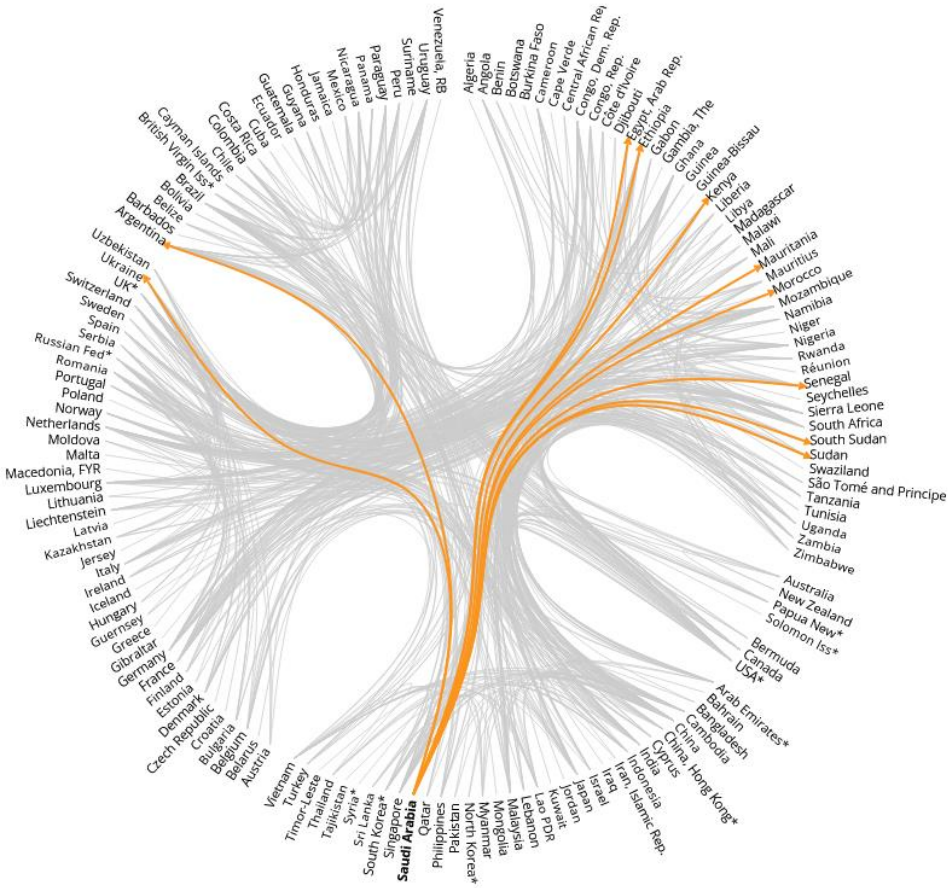

Figure A2: *Global flow of transnational land acquisitions with Saudi Arabia's investments highlighted*. Land Matrix 2022. Web of Transnational Deals. https://landmatrix.org/charts/web-of-transnational-deals

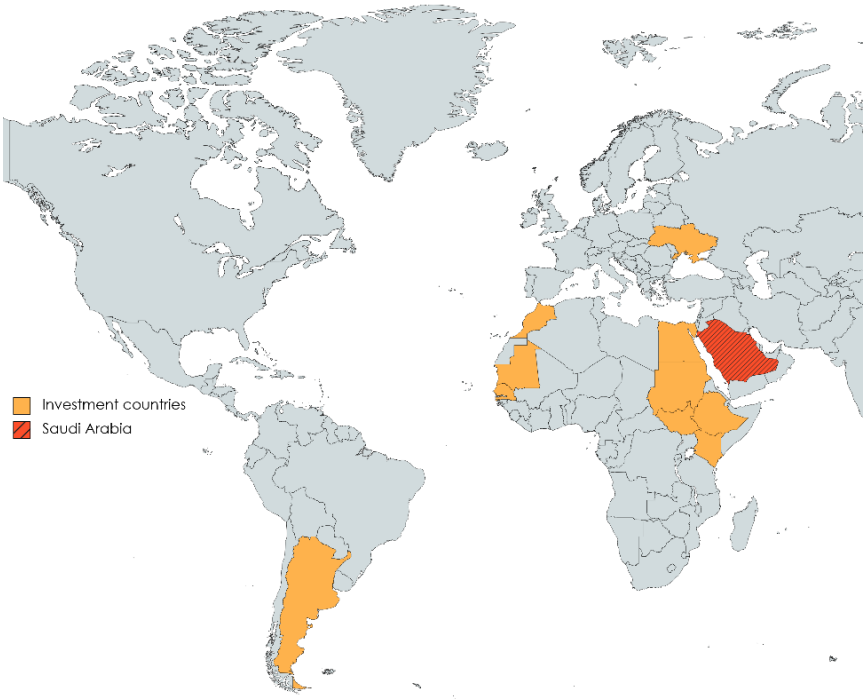

Figure 7: *Map of investment countries relative to Saudi Arabia*. Made by the author with mapchart.net