

From Seed to Soap

– A study of seaweed farming on Zanzibar and how foreign investments can create employment opportunities for independent female seaweed farmers

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- A study of seaweed farming on Zanzibar and how foreign investments can create employment opportunities for independent female seaweed farmers

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Abstract

Zanzibar is the world's third biggest exporter of seaweed but the industry is currently facing challenges such as rising sea temperatures and falling market prices. Today, independent female seaweed farmers live on the border of the extreme poverty line and are struggling with hazardous working conditions. The Seaweed Center in Paje village on the southeast coast of Zanzibar was established in 2011 by a foreign investor called the Rylander Foundation to create employment opportunities for independent female seaweed farmers. Instead of exclusively producing raw dried seaweed the center has provided the employees with material necessary to produce value-added products, such as soap, for export. Humanitarian investments with a people-over-profit approach has resulted in a holistic business model where identifying the capitals and capabilities of people living in the area of implementation has resulted in responsible investments, both socially and environmentally. More innovative investments like these are needed in order to keep the seaweed industry alive and flourish.

Keywords: Zanzibar, seaweed farming, foreign investments, humanitarian investments, rural development, sustainable livelihood.

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1 Introduction

Zanzibar, an idyllic archipelago off the coast of Tanzania in eastern Africa, known for its white beaches and turquoise water is the world's third largest exporter of seaweed (Khawaja 2016). Introduced from the Philippines, Zanzibar has been farming and exporting seaweed to Europe, Asia and North America since the late 1980s. Women in rural Zanzibar saw the opportunity with seaweed farming and quickly entered the industry where approximately 80 per cent of 25.000 farmers are women, as most men did not believe seaweed farming to generate as much income as, for instance, fishing (BBC News 2017). The future for women within seaweed farming is however uncertain as many have been forced to leave the industry as the price for seaweed from Zanzibar has been reduced with almost 50 per cent in the last 5 years and rising ocean temperatures, due to increased CO₂ in the atmosphere, is causing the seaweed to die (McHugh 2003). There are several actors with diverse interests involved in rural development (both private and public) that see opportunities to invest in untapped rural markets (Prahalad & Hammond 2002). There are also various actors with different sort of investment approaches that serve a specific purpose, where some invest for the potential profits and some invest for altruistic reasons. The thesis will present a

different kind of investment in rural development where non-governmental organizations (NGOs) choose to invest for humanitarian and altruistic purposes.

An example of an investment with humanitarian purpose is the Seaweed Center (SC) in Paje village, on southeast Zanzibar, which was established in 2011 by the Rylander Foundation, an NGO and foreign investor from Sweden, with the aim to promote social entrepreneurship in developing countries (Rylander Foundation 2017). The original project in Paje involved educating women to develop their seaweed business from exclusively selling dried seaweed to producing body oils, soaps and scrubs to be sold on local and global markets. However, due to failure in analyzing the capital and capabilities of the independent female seaweed farmers (IFSFs) there was little progress and the NGO had to reassess the situation in order to achieve its original objective (Morgan 2017).

Due to the recent boom in seaweed demand, as an effect of scientific research on the biological features of seaweed (Lewin 2017), opportunities have developed for foreign investments (FAO 2017a). Many MNCs view rural markets as too risky for investments and are therefore reluctant to invest in such areas (Prahalad & Hammond 2002). The multiple function of seaweed has however lately caught several MNCs attention. Like other plants, as seaweed grows it absorbs carbon dioxide. One of the most impressive features of seaweed is its growth rate which is 30 to 60 times the rate of land-based plants that not only works as a natural carbon sink but is also ideal for mass-scale production (Climate Council 2017). On top of this, some species of seaweed is outstandingly stable and do not break

down easily, meaning they have high potential for long-term carbon storage (Deakin University 2015). The oils and algae that seaweed contains can in addition be used to produce biofuels, reducing the global need for fossil fuels and hence have a positive impact on climate change. These recent discoveries regarding seaweed have resulted in MNCs to invest in biofuels in geographically favorable countries, where, for instance, Zanzibar is located (Duarte et. al 2017).

This thesis situates itself within the context of foreign investments in aquaculture for rural development in Zanzibar. It explores the role of foreign investors in rural development from a political ecology perspective. The study is an independent research project that has been planned, structured and carried out by the researcher in Paje village.

1.1 Thesis Outline

Following this chapter will be 2. *Previous Research* which, presents arguments from researchers and organizations regarding altruistic investments and corporate investments for rural development and the current state of seaweed farming on Zanzibar. Chapter 3. *Theory & Concepts* presents the framework on which the analysis will be based on. Chapter 4. *Methods* will consist of the methodological choices made for the field study and for the literature used in this thesis. Chapter 5 will present the results from the fieldwork and discuss what can be drawn from the literature used to explain the phenomenon investigated. Chapter 6 will be the concluding remarks.

1.2 Objectives

The main objectives with this thesis is to contribute to the evolving discussion on the role of foreign investors, in this case the Rylander Foundation, and its impact on the seaweed farming industry on rural Zanzibar. The thesis also aims to present how this investment has been implemented in an environmentally and socially sustainable manner. Finally, it aims to examine the importance of capital and capabilities to understand what investments could be carried out where and when.

1.3 Research Question

- I) How has the investments made by the Rylander Foundation contributed to employment opportunities for IFSFs in Paje village on Zanzibar?

2 Previous Research

This chapter will present some previous research on the topics of investments within seaweed farming. To initiate this chapter, a definition of sustainable livelihoods is in order. Sustainable livelihoods will refer to the ability to cope with and recover from stress and shocks, maintain and enhance its capabilities and assets, and provide sustainable livelihood opportunities for future generations that contribute to the social and ecological benefits on a local and global scale (Krantz 2001; 6-7).

The general agreement among various authors and organizations when it comes to rural development is that innovation is needed in all aspects from policies, production techniques, social structures and management of natural resources. There are however some disagreement of how to carry out such innovations in order to protect the rights of the people while not degrading the environment. The chapter will start presenting various literatures on investment and innovation and how these can unleash the potential of untapped rural markets.

2.1 Investment approaches

In order to understand the difference between the sorts of investment the Rylander Foundation has adopted a short chapter on foreign direct investments (FDIs), multinational companies (MNCs) and large-scale investments will be provided. This is to provide a more comprehensive comparison between investments that are expected to result in some sort of revenue while the investment that the Rylander has chosen is for humanitarian and altruistic reasons. The chapter will present the many positive and negative views on FDIs and also explain how humanitarian investments can potentially lead to positive results for the people involved.

2.1.1 FDIs, MNCs & Large-Scale Investments

FDIs and state interventions in aquaculture can create both opportunities and constraints on people's livelihoods and the environment. If implemented correctly, and responsibly, investments can create employment opportunities, contribute to poverty alleviation and overall sustainable livelihoods that can be less restraining on fragile natural resources (SDSN 2013). The opportunities are many and similar to traditional development strategies and project, carried out by aid agencies and multinational institutions, private and corporate investments can also have effective and positive outcomes on some of the world's most challenging issues of sustainable development. For example, Prahalad & Hammond (2002) argue the following for FDIs:

“Improving the livelihoods of poor people does not require multinationals to spearhead global social development initiatives for charitable purposes. They need only to act in their own self-interest, for there are enormous business benefits to be gained by entering developing markets. The willingness of multinational companies to invest in the world’s poorest markets can have significant impact on rural development” (Prahalad & Hammond 2002; 4).

This is one of the multiple explanations that Prahalad & Hammond (2002) at the Harvard Business Review provide as to why external actors choose to invest in rural development in their 2002 publication *Serving the World’s Poor, Profitably*. They further conclude that MNCs are not going to solve the economic challenges of developing countries by themselves but have to cooperate with financial aid from the developing nations.

Another rather interesting aspect of FDIs is the role in information and communication technology (ICT) that has become especially appealing to MNCs, as it will create openness between global, urban and rural markets (Endeva 2006). The most recent estimation from the World Bank (WB) concludes that 766 million people, roughly 10 per cent of the world’s entire population live under the extreme poverty line (1,90USD/day) where approximately 390 million are located in Sub-Saharan Africa (SSA) (World Bank Group 2016; 4). Companies that operate in these areas will have access to millions of potential new consumers, who together have billions of dollars to spend. The concluding remarks are thus, employing some of these

people into the service sector, moving them from the agricultural sector, can also be beneficial for their livelihoods and the overall national economy (Prahalad & Hammond 2002; 5).

The Organization for Economic Co-operation and Development (OECD) presents issues regarding constraints and opportunities of investments in rural areas. Rural areas are increasingly looked upon as heterogeneous entities of regions where “one size fits all” policies are no longer suitable to capture the diversity of rural needs and opportunities. If context is not taken into account there can be profound negative implications for rural development initiatives. In order to make informed, strategic decisions on investment in rural innovation, the OECD argues that some distinctions must be made. Firstly, unlike Prahalad & Hammond (2002) the OECD argue that innovation is not just about new products, but is also about processes. By carrying out traditional activities in a new and innovative way production can be more effective. Secondly, the OECD argues that institutional change is essential in rural development and that innovative institutional frameworks can contribute to development in rural areas. It is however unclear what tools the OECD proposes governments to use. Thirdly, investment in human capital, especially education and training of local capacity can be an effective method in creating a ripple effect of spreading knowledge. Rather than having a set business idea to implement, there is a greater need to identify what capitals and capabilities there are in a given geographical setting where the business will be established. The OECD is stating that the success rate of projects in rural areas is much greater if implemented this way rather than the other way around (OECD 2006; 2-4).

FDIs have become an important alternative in developing finance processes where it has played a significant role of capital inflows, including employment creation, technological support and increased competitiveness on a global scale (Adams 2009; 934). A key question is however, if FDIs and MNCs are contributing to an overall improvement of rural livelihoods or becoming a constraint on rural investment opportunities (Agosin & Machado 2005; 149). A study from 69 developing countries during the 1980s to late 1990s showed that FDI flows is an important driver for the transfer of technology and is contributing to relatively more growth than domestic investments. However, this is only the case when the developing host nation has a certain quantity of human capital that can adopt the advance technology (Borensztein et.al 1998; 115).

So far, some of the more positive aspects of FDIs have been presented. Some researchers have however discovered multiple downsides with FDIs, one of the more severe ones being the threat of land acquisitions. In many cases, not only in Africa but worldwide, people's rights have been violated due to irresponsible investments that have had significant negative impact on the environment, livelihoods and food security. These outcomes are most common in large-scale land acquisitions and have been exceptionally evident in Sub-Saharan Africa (Cotula et. al 2009; 3).

2.1.2. Humanitarian Investments, NGOs and Small-Scale Investments

The size of an investment can play a significant role as we will see from small-scale investments such as the Rylander Foundation on Zanzibar. These sorts of investments have resulted in employment opportunities and improved working conditions as well as higher economic income for women working at the SC in Paje. One explanation to this result may be the altruistic and holistic approach that the foundation adopted while investing in seaweed farming for rural development. Heierli (2011) argues that inclusive business models can contribute to the reduction of some of the most critical issues that developing countries are facing today, in particular poverty (Heierly 2011; 5). By creating the SC and establishing an business model for domestic and international export there are five ways in which a developing country such as Zanzibar can gain by entering the global markets: 1) access to larger import and export markets, 2) access to higher level of technology, 3) provides capital for future national economic growth, 4) provides infrastructure necessary for economic growth and 5) encourages states to follow practical economic policies (Griswold 2000). MNCs and NGOs can both successfully invest in innovation in bottom of the pyramid (BoP) markets by collaborating with local businesses to learn about the market needs and opportunities.

Small-scale farming in Africa, is currently underrepresented and agriculture action to support rural development and poverty reduction is vital. Meanwhile, there is a growing support for large-scale investments in agriculture where the main argument is the contribution to stimulating development and capital growth in rural

areas. With proper investments and interventions concerned with the capital and capabilities of rural areas, poorer households can adopt farming techniques to produce value-added products that are market oriented which could improve their livelihoods while contributing to the national economic growth (Baumert & Nhantumbo 2017). For this to function, it is particularly important that local capacities to invest are strengthened and secured and to recognize that farmers are key contributors to food security and important investors in the agricultural sector (Pimbert 2009; 5). Agricultural investments can have extended effects on other sectors, such as the service and manufacturing sector, and contribute to the overall economic development of Zanzibar. In order for this to function, sustainable natural resource management is essential. Finally, investing successfully means taking a holistic approach in terms of human, environmental, economic, and political capital and capabilities (CFS 2017; 4-5).

Some concluding remarks for this chapter is that regardless of investment there are several factors that are crucial to consider prior implementation. The Food and Agricultural Organization of the United Nations (FAO) has identified, from earlier project implementations, that surveys and feasibility studies should be part of the preparatory stages to guarantee that there is a politically, socially and economically appealing market where there have adequate management, technology and supporting government institutions. Investments and development aid within the seaweed farming industry has thus far been driven by an increasing global market demand (FAO 2017b).

2.2 The Rylander Foundation

The Rylander Foundation was established in 2006 by a Swedish family with the aim to provide IFSFs in Paje village with training in how to produce value-added products instead of raw dried seaweed in order to increase their monthly income. The purpose with the Rylander Foundation is not to profit from exporting the products. They are merely investors in rural development for humanitarian reasons as opposed to MNC and FDIIs that have been introduced in this thesis.

When the NGO followed up the progress a few months after initiating the project it turned out the women did not have enough capacity or capital to purchase and invest in the material necessary for the value-added production. As a result the NGO established the center with help from other foreign investors and the government of Zanzibar. When the center was ready to open, the management hired Mamas (swahili for female seaweed farmers) who had already been in the seaweed industry for about 20 years. The Mamas at the center were provided with items necessary to protect their health when working in the shallow waters of the Indian Ocean and during the production, equipment such as gas masks is provided to maintain secure standard working conditions for the employees. Eventually, the business was doing so well that no foreign investors or government had to be part of the business. Today SC is running completely independently from all external help. The profit from the business goes to helping women in Paje who are not employees at the center. The NGO helps both financially and with material necessary for their health such as shoes, gloves, and other protective gear against the sun and ocean. The SC is

exporting the exclusive products to countries like Hungary and Denmark (Morgan 2017). Unfortunately, there is limited information regarding the implementation process where the Rylander Foundation's webpage only consists of explaining what the SC is and not specifically how they carried out the project. The government of Zanzibar does not contribute with any further information on their public websites than what has been stated in this section.

2.3 Seaweed Farming on Zanzibar

Seaweed farming was first introduced to the main land Unguja and Pemba Island of Zanzibar in 1988 from the Philippines. Today about 25,000 people are independent seaweed farmers and the majority are women living in rural areas. Most men did not believe seaweed farming to be as economically beneficial as, for instance, fishing and were therefore reluctant to abandon their traditional activities. However, in recent years more men have entered the industry and are now positive to the potential of seaweed farming but women are still the majority of the workforce. Simultaneously, several challenges remain, where the repeated failures to produce higher-value seaweed (spinosum seaweed instead of carrageenan seaweed) on Zanzibar, has discouraged farmers, where men in particular have returned to low paying activities and to fishing (Msuya 2013; 119). Seaweed is the third largest export product on Zanzibar and government departments have been investigating alternative ways to create opportunities for the production of value added products to generate higher income for farmers and to benefit the overall economic growth of Zanzibar (COSTECH 2015; 20). According to employees at the SC one of the biggest challenges today for IFSFs is the lack of capital to improve

the working conditions while making production more efficient. With no assets to buy material (such as shoes, gloves, and other protective gear) necessary for continuing seaweed farming, many women have been forced to leave the industry, as it is no longer a sustainable livelihood (Morgan 2017).

Seaweed, also called *mwani* in Swahili, is a marine plant with many functions and has been used in everyday products such as toothpaste, skin-care products and cosmetics because of its binding agent called emulsifier (NOAA, 2014). It has also received international recognition of being a superfood and it has been part of Asian food culture for thousands of years. The increased interest for investments in seaweed farming and the booming demand is due to recent medical discoveries claiming that the nutrients in seaweed can lower blood pressure and prevent heart diseases, and its potential to be a substitute to fossil fuels (Lewin, 2017). However, one of the most extensive services that seaweed provides is job opportunity in rural coastal areas in underdeveloped countries such as Zanzibar, Indonesia and the Philippines where employment opportunities are few (European Union, 2015). According to Braun (2016) seaweed farming is identified as one of the most environmentally benign types of aquacultural practices compared to for instance fisheries where in recent years dynamite fishing has been adopted as a fishing method in Paje (Morgan 2017). One of the arguments for increasing seaweed farming and decrease traditional agriculture practices is that seaweed does not require any fertilizers and can in turn contribute to a reduction in over-fishing (Braun, 2016).

Several major constraints in seaweed farming on Zanzibar have been identified where climate change plays a leading role. The increasing sea temperature has forced farmers to move the cultivation to deeper and cooler water to produce the higher-value variety (*spinosum*) of seaweed. Another issue still remains, as women in rural areas generally cannot swim it creates an obstacle for farming in deeper waters. In addition, damaging bacteria thrive in warm waters and contribute further to seaweed mortality. Finally, fixed-rate agreements with distributors and the falling price of seaweed in recent years have had negative impacts on the industry in the shape of lost workforce (Farm Africa 2017). The government of Zanzibar together with researchers are currently investigating the exact cause of seaweed mortality and what strategies that can prevent the seaweed from dying as a plant and industry (BBC News, 2014).

2.3.1 Benefits of Seaweed

There are several benefits with seaweed farming where one of them is the impressive growth rate and its ability to absorb CO₂ and therefore working as a natural CO₂ sink. Recent developments within biofuels have revealed its potential to replace fossil fuels and produce methane for electricity production (Flannery 2015). Today, seaweed aquaculture is the fastest-growing unit of the global food production and in the heat of today's debate of potential complement to traditional agriculture; seaweed farming has become a method that many are advocating for. Unlike traditional agriculture, seaweed farming does not require any fertilizer, heavy machinery or other industrial material to grow and works as a natural protection of shorelines together with coral reefs and mangroves. The main

constraint with seaweed farming has been the lack of suitable and available areas for production. Researchers do however advocate for the continuation of seaweed farming and argues that if practiced correctly the environmental benefits can be maximized which can in turn result in fair economic compensation for the seaweed farmers (Duarte et. al 2017). Seaweed farming as a solution to climate change can be explained in several ways. The increased CO₂ levels in the atmosphere are mostly a result to fossil fuel combustion. The level of CO₂ in the atmosphere also affected the level of CO₂ in the oceans and in order to absorb the CO₂ there has to be a plant with this ability. Not only does seaweed grow 30 to 60 times faster than land-based plants, making it an ideal carbon sink but it also becomes the ideal crop for multiple purpose mass scale production (Climate Council 2016). Thus, seaweed and other algae are increasingly looking like a reasonable alternative to fossil fuels. Finally, approximately 50 percent of seaweed's weight is oil, which can be used for biofuel production (Smith 2011).

2.3.2 Working Conditions

Other challenges for IFSFs have been identified, by Stockholm Resilience Centre (SRC) from a report published earlier this year (2017) that relates to the work environment in the seaweed industry. Health related issues, such as back pain, respiratory problems, impaired sight and injuries from hazardous marine animals among others. Long work hours and exposure to the sun and high temperatures have also forced seaweed farmers to leave the industry. The report revealed that the seaweed farmers perceived the workload to be too high and the monthly income too low for seaweed farming

to be a sustainable livelihood. In several cases flu symptoms such as fever and coughing is a result from the toxic fumes that emerge from the drying process of seaweed in the home. SRC want women to be able to continue their work as seaweed farmers but point out the necessity to improve the working conditions (SRC, 2017). EU Delegation to Tanzania & Volunteer Services Overseas (VSO) believes in applying innovative techniques to increase efficiency and income to reduce workplace related health issues. One proposal to increase production while lowering the workload is to invest in dryer machines. However, these machines are expensive and not always a feasible investment for seaweed farmers to be part of. Government interventions and foreign investors could be the solution but it is still discussed on who should invest, where and who would be using it, and most importantly who would be excluded (EU Delegation to Tanzania & VSO, 2015).

3 Theory & Concepts

This thesis aligns itself with theories on political ecology (PE) and the concepts of capital and capabilities to explain the opportunities in investing in seaweed farming for sustainable rural development on Zanzibar. It relies on frameworks by Bryant & Bailey (1997), Robbins (2012), Alarcón Ferrari (2015) and Scoones (2015). Furthermore the concepts of capital and capabilities are used to explain how a contextual understanding of poverty in rural areas can influence the shape of development projects and investments. This relies on material provided by Bebbington (1999), Ellis (2000), Scoones (2015) and Chambers & Conway (1991).

3.1 Political Ecology

Foreign investments in rural development have sometimes resulted in external actors having excluded marginalized and vulnerable groups by investing irresponsibly and not properly considered the many aspects of investments that could have impacts on rural livelihoods. The logics of actors and state regarding an investment opportunity may not always be socially or environmentally sustainable to the people that are directly and indirectly affected. Political ecology (PE)

is a field of critical research based on the assumption that any change in the global web of socio-ecological connections affects the system as a whole, politically and economically (Bryant & Bailey 1997). For instance, ocean pollution has brought much attention to the climate change agenda and one strategy to reduce pollution, conserve the oceans and preserve the marine habitats have been to invest in biofuels based on algae from seaweed to produce ethanol with the aim to replace the current dependence on fossil fuels. MNCs have sought out locations appropriate for producing this biofuel, which has sometimes had negative impacts on local livelihoods as many projects have involved land-grabbing where weak government institutions have failed to do a responsible appraisal and assessment of the investment (Cotula et. al. 2009; 90). These investments can result in people being internally misplaced, usually those depending on the natural resource for their livelihoods, such as seaweed farmers and fishermen (COSTECH 2015; 23). The analytical framework of PE will help explain the relationship between economics, politics, society and the environment in order to understand how a change in for instance the global demand for seaweed can have certain impacts on IFSFs on Zanzibar (Alarcón Ferrari 2015; 47). Researchers advocate fundamental change in the management of nature and the rights of people, directly or indirectly working with state and NGOs to challenge current conditions (Robbins 2012; 19). PE will be used to investigate the correlation between ecosystems and social processes with emphasize on global markets and investments. New market relationships (such as supply and demand of a certain commodity, in this case seaweed) will have impacts on rural lives, which require development interventions to take into account certain dynamics of the livelihoods and its global connection. Creating markets and

therefore value, has far-reaching impacts on the politics of sustainability. If the FAOs predictions regarding the global seaweed demand (an annual increase in demand by 5 per cent) will be accurate then the political incentive to invest in IFSFs and provide better terms and conditions for trade might become a priority (McHugh 2003).

3.2 Capital & Capabilities

This thesis uses the concepts of capitals and capabilities to examine important reasons why development investments have failed and more importantly what can be modified in development strategies and investments for better implementation. ‘Capability’ refers to ‘being able to perform certain basic functionings, to what a person is capable of doing and being’. The concept has a diverse definition and is mainly dependent on context (Chambers & Conway 1991; 4). One of the major challenges with development investments has been the misperception of the way people get by and do things. Much literature derives from the 1990s and aims to explain a large part of the problem which is that external actors and governments continuously see poor people as heterogeneous entities that are exclusively dependent on agriculture and natural resources for making a living (Bebbington 1999; 2021). People’s livelihoods are based on a range of assets, different sources of income and labor markets which requires researchers, policymakers and external actors to be contextually aware of in order to understand what actions will be feasible for rural development, sustainable livelihoods and poverty alleviation (Bebbington 1999; 2022). According to Bebbington (1999) we must understand the way people choose to deal with poverty in a material sense and also understand their capacities and

perception of well-being and poverty related to their livelihood choices and strategies. Scoones (2015) argues that there is a ‘mismatch between ground realities and policy regimes’, which has too often resulted in conflict that is not environmental or social sustainability (Scoones 2015; 67).

Ellis (2000) presents five types of capital; natural (water, trees, soil etc.), human capital (health, education), economic capital (savings, credit), physical capital (tools, machines etc.) and social capital (community organizations, network committees etc.) that can all contribute to individual and household livelihood strategies (Ellis 2000; 9). These capitals can furthermore give people the capability to act and engage more effectively and are resources for changing current conditions. There are three ways in which these assets can be used: 1) to make a living, 2) to make the living meaningful and, 3) to challenge current structures in the context where one is making a living. For investments to make sense and contribute to poverty alleviation one must identify the most important assets available for different people in a specific place and time while identifying the most useful and damaging investment possible. Bebbington (1999) provides an example from the Andes where poverty reduction strategies were carried out through investments in agricultural technology, erosion control and other projects related to natural resources. What the implementers failed to identify was that the livelihoods of the people living in this community were primary dependent on migrant remittances. A more feasible investment could therefore have been to create more productive ways of using the remittances in rural areas by strengthening rural financial institutions and village banks as a way to increase the return on remittances and

for people to possibly further invest in more productive rural activities (Bebbington 1999; 2023).

4 Methodology

This chapter will present the methodological choices made for writing this thesis. It will introduce the selection of study area, the data collection method and what advantages and disadvantages there are with this method. Furthermore, it will present how the data has been analyzed and what the scope and limits are of the study.

4.1 Study Area

Fieldwork for this thesis took place in Paje village on the main island of Unguja in Zanzibar, between the 4th of March and 2nd of April 2017. Zanzibar was originally chosen for a different project involving marine protected areas (MPAs) in Fumba, Chumbe Island and Pemba Island where the original plan was to write a thesis on MPAs and its impacts on local livelihoods on Zanzibar. This project was cancelled due to difficulties with local authorities after the arrival to Zanzibar. The project was supposed to investigate how protected areas (which includes regulations such as no-take zones against fishing to conserve and preserve marine habitats) would affect the livelihoods of the people living in these coastal rural areas. However, from earlier experiences in eastern Africa I was aware of the potential challenges that can occur with authorities especially when carrying out research.

Therefore, I was prepared with a second project plan and aware of other potential topics that could contribute to the making of a thesis. After 10 days in the field with no progress I had to cancel my original project plan and found the Seaweed Center in Paje village, in southeastern Zanzibar. With limited time and resources I chose to only collect my data in Paje at the SC and to carry out a project independently from other organization and authorities. The SC became especially interesting for this study after visiting the business during my first day in the field of the new project. The history and purpose with the center and the Rylander Foundation became the ideal example of how foreign investments into rural development can have difficulties implementing projects if the context, especially when capitals and capabilities are not carefully identified and analyzed. The SC became an even more suitable and obvious choice for the study, as it was located less than 15 minutes from where I was stationed in Paje.

4.2 Participant Observations

Throughout the field research I was accompanied by two of the staff at the center that introduced me to other employees and was my main contacts while researching. To respect the integrity of these people I will use the names “Morgan” and “Akila” when referencing the sources. As the *Mamas* (Swahili name for female seaweed farmers) were rather busy with production (due to the rainy season arriving shortly after my departure) only limited time could be spent directly with them in the field while harvesting and planting seaweed. As the *Mamas* only speak Swahili there was a language barrier, which made other methods such as interviews unfeasible for this study. Some

opportunities and constraints with the chosen method will be presented in the following sections.

Participant observation (PO) is a qualitative method with the purpose to understand a specific phenomenon studied (Duke University 2017; 14) in this case foreign investments in the shape of the SC. By using this method the research was approaching the individuals (employees at the SC) in their own environments rather than the other way around. The strategy was to gain information about the establishment of the center and the history behind the project that started off as an attempt to provide IFSFs with education and training to produce and sell value-added products rather than raw dried seaweed. This information was drawn from informal conversations and interactions with the employees at the SC. Data collection about the production process was carried out through observations from the seaweed farms in the oceans and at the production facilities. By shadowing Morgan and Akila, I was allowed to participate in the farming process and understand the many dynamics of the crop. Morgan explained the growing and harvesting process and everything from planting new seeds to the production of soap. I was allowed to assist and follow the journey of the seaweed and understand how every person at the center, and how every ingredient, play a role in the making of value-added products. At the production facility it was possible to conclude that one of the main objectives with the center is to remain as environmentally sustainable as possible. The center is constantly looking for new and creative ways to produce more products and is determined to supply what is demanded on the market. More about this in chapter 5 *Result & Analysis*.

4.2.1 Advantages & Disadvantages with PO

The advantages with using PO were that it uncovered factors (Duke University 2017; 14) (for instance, opportunities and constraints of investments in rural development in Paje village) important for a thorough understanding of the research problem, which were unknown prior the research design. As there is limited information about the SC on the Internet, this method was essential to collect all information and data necessary to draw conclusions about seaweed farming and investments.

As with all research designs and choices of method there were disadvantages. The main disadvantage with PO is that it was time consuming. For field research, such as this one, with limited time and resources, PO may not always be the most suitable method. This research was merely 3 weeks long, which may not be enough to uncover all contextual features of Paje village. However, since semi-structured open-ended interviews were not an option, PO became the most suitable replacing method. A second and significantly disadvantage was documenting the data. The only documentation tools allowed were cameras and notebooks (no video camera or recorder). The observations were only recorded in a field notebook and pictures were taken during the farming and production process. It was difficult to write down everything of importance while participating and observing which means high reliance is put on the memory of me as a researcher. A third, and often criticized aspect of PO is the disadvantage of subjectivity (Duke University 2017, 14). A requirement of me as a researcher was to remain as objective as possible and it was important to understand the difference between

reporting and describing what has been observed as subjective interpretations can easily interfere with the result. Using more than a single researcher in field could have been a good remedy for this research (Duke University 2017; 13-15). This way field notes could have been exchange to identify objective and subjective observations. However, due to limited resources this was not a feasible option for the timeframe given.

4.3 Data Analysis

This thesis adopted the political ecology framework provided by Bryant & Bailey (1997), Robbins (2012), Alarcón Ferrari (2015) and Scoones (2015) to analyze how foreign investors in seaweed farming can contribute to rural development and sustainable livelihoods. The approach focuses on the ways through which actors choose to invest in certain natural resources and how these investments produces social and environmental outcomes.

The framework adopted is modified in line with my research objective by looking at how foreign investments are problematized, assumptions behind the possible outcomes and effects on aquaculture in rural development. The analysis focuses on both field notes from POs on Zanzibar and literature on foreign investments. It provides explanations that evaluate the influence of actors at a number of scales, each nested within another, with local decisions influences by regional politics, which are in turn directed by global politics and economics. The framework is directed at finding causes including poverty, and the more general and damaging conditions where some actors exploit other people and environments for limited gain and collective cost. PE contributes by critically explaining what is wrong

with dominant accounts of environmental change, while exploring alternatives, adaptations and creative human action in the face of mismanagement and exploitation (Robbins 2012; 19-21). Furthermore it defines the issue of interest of specific research projects and identifies to whom the environmental problems apply to (Scoones 2015; 114-115).

4.4 Limits & Scope of the Study

There were several limits to this study where some of the major ones were the lack of financial resources, language barriers, limited knowledge regarding Paje as study site, limited previous research on investments in seaweed farming on Zanzibar and multiple challenges with retrieving information from state agencies. However, a little over 2 weeks turned out to suffice in order to understand the topic. An extended stay would have resulted in a more complex understanding of Paje as a community but not contributed much to the information regarding the SC. In total only three employees were able to communicate in English during my visits but it was not any notable sense of distrust after we established the terms and conditions with the study visits. These three employees shared their experiences, both within the SC and their personal everyday life. As I kept coming back throughout these 3 weeks the Mamas started to recognize me and greeted me but not much more interaction than that was possible due to the language barriers. However, I did spend a significant amount of time in the seaweed farm with the Mamas but in this particular case verbal communication was not necessary to understand each other as they showed me how to plant the crop and how to harvest. Due to financial restraints I could only afford a stay of maximum 4 weeks, as

this study was self-funded. I did not have sufficient funds to employ a translator but on the other hand the Mamas were reluctant to participate in interviews, as their workload was higher during this period than during other parts of the season.

The Rylander Foundation's homepage has very limited information about the process of the SC. The SC's webpage is under development, which meant that in order to find information about the history of the project one has to visit the center in Paje. There is however, peer-reviewed journal articles in general regarding investments in rural development, which is what the previous research chapter and analysis is based on. There is more research of foreign investments in other SSA-countries such as mainland Tanzania, Kenya and Uganda as the natural resources have played a major role in foreign investment initiatives and their national economic growth. Obtaining specific information regarding the SC from the Revolutionary Government of Zanzibar and its departments was difficult.

5 Result & Analysis

This chapter will present the empirical results from the field study in Zanzibar at the SC. The analysis will deal with the research question and a discussion around the constraints and opportunities with investments in aquaculture in rural development settings will be provided. This chapter will start by presenting the SC and the production process. Afterwards, there will be a short briefing of why the Rylander Foundation's original project failed and how the SC became the final result. The forth section will discuss actors, demands and innovations that are market driven. Section five will discuss what technological investments can contribute to the economic growth on Zanzibar. Section six will discuss the future investment prospects in seaweed farming where algae biofuel technology has come to play a significant role. Section seven will discuss the potential of small-scale development investments and how a holistic approach can benefit investors and the livelihoods of people living in rural area. The final section will provide some future research that is needed within this field.

All information stated in sections 5.2. *Production Process* and in section 5.4 *Rylander Foundation* is empirical data collected from field research in Paje. As there is limited information regarding these topics, the field research was necessary to understand the importance of capturing the opportunities, needs and diversity of a specific site before implementing projects and investing in rural development. The third section will discuss the many benefits with seaweed farming and how these can open up new doors for investment in Zanzibar.

The aim with this chapter is to answer the research question: How have the investments made by the Rylander Foundation contributed to employment opportunities within the seaweed industry for IFSFs in Paje village on Zanzibar?

5.1 Case Study: Seaweed Center

As already introduced, the SC is a business in Paje with a main focus of producing high-quality skin care products from seaweed. The Mamas have everything they need on-site for production such as a spice garden, production facility and the farms less than 500 meters from the center. All Mamas were prior employment at the SC IFSFs in Paje village and have brought their knowledge of traditional seaweed farming to the center. Their working conditions have been significantly improved as the center has provided gear for the farming and production process. All Mamas have been educated and trained in how to produce the trademark products of the SC. As IFSFs the monthly income would be approx. 60USD, which is barely above the extreme poverty line and today they are making approximately

240USD and sometimes even more as they receive commission for every product sold at the SC.

The major contribution to the livelihoods of these women is their ability to pay for their children's school fees and build better houses for their families while having a small economic buffer in case of unpredictable events such as extreme weather events (Akida 2017). The employed Mamas have been able to invest in themselves and some of these women have even started their own small business where they make value-added products outside the center. As their properties and homes are very close to the ocean, and are therefore constantly at risk of weather, they have been able to build walls, more stable homes and prepare for potential shocks. As their income improves, they can choose to further invest in themselves or use the money as savings for future needs. According to the employees at SC the main investment is educating their children to make sure they can work in other sectors that pay even better and provides opportunities for advancement. This conclusion can however not be drawn yet as the center has only been active for 6 years but there is hope for a better future for the generations to come (Morgan 2017).

The employees are continuously educating and training IFSFs that are not employed by the SC with the idea to help them produce value-added products. As the center (not the Rylander Foundation) is profiting from the export and domestic sales it is now possible to provide the unemployed women with material necessary for this kind of value-added production. The employees are also informing fishers regarding the environmental impacts of dynamite fishing and how it affects the reefs, seaweed farming and overall marine environments.

The aim is to bring more awareness to the community. Without someone sharing this information it may not be obvious to the fishers that it has a negative impact on the marine ecosystems and what impacts it can have on the coastal communities (Morgan 2017).

Morgan (2017) says that as most fishers are men and using dynamite as a fishing method, the employees are encouraging the men to become seaweed farmers. As seaweed has gained more recognition for contributing to sustainable livelihoods, there is a chance that men will enter the industry as well. Not only would this enhance the workforce in seaweed farming in Paje but it would also have several benefits on the environment and coastal area. If men would become seaweed farmers they could help their spouse in the field and unload some of the work burden. This in itself could streamline seaweed farming, as the women would not have to work all by themselves. Another possible outcome would be that children, especially girls, would not have to help out in the field and could perhaps go to school instead and receive proper education. This is one of the objectives with the employees informing and educating the people of Paje. Akila (2017) believes that more humanitarian investments like this are needed as many people are still living in extreme poverty on Zanzibar. He also adds that there has to be a holistic approach where the people are the center of discussion and where investors choose people over profit (Akila 2017). In addition to this, there are plans to expand the business and establish another center with the same production and employment capacity to further improve the livelihoods of the IFSFs in Paje (Morgan 2017).

5.1.1 Production Process

This section will explain how a seed becomes soap and how exporting these products may result in further employment opportunities for other independent seaweed farmers in Paje.



Figure 5.1.1 Seaweed Center



Figure 5.1.2 Seaweed farm



Figure 5.1.3 Mama harvesting seaweed

To grow seaweed, chunks of already adult seaweed (the seeds are in the stem of adult seaweed) is taken from the plantation and tied with nylon ropes. A row of about 2 meters is formed with 20cm between each chunk of seaweed. The nylon rope is tied to two wooden sticks that are pierced into the bottom of the ocean. In order for the seaweed to grow it has to fully submerge each day and in order to harvest the seaweed the tide has to be low. The adult plants attach to the bottom of the ocean and expand and creates more seaweed. A common issue with seaweed farming today is the rising water temperature due to global warming. To make sure the seaweed does not die the plantations have to be moved further out to deeper waters, which is where the problem arises. Most women cannot swim or afford boats to get to the plantations. However in Paje, thanks to the tide and reef women are able to walk approximately 2km to the plantation and it is only ankle deep when the tide is low. Hence, there is no need to invest in swimming lessons, boats or other transportation material. Paje is therefore the ideal location to expand similar businesses. When the seaweed is harvested it has to dry and the seaweed is not allowed to get wet from the rain. If it rains on the seaweed it will rot. However, the seaweed is not

wasted. Rotten seaweed is a natural fertilizer for agriculture on Zanzibar. Once the seaweed has dried, it will be turned into powder. The products sold by SC only contain local organic material to maintain the exclusive high quality while being environmentally sustainable. When the powder is created it will be mixed with natural scents such as ginger, coffee and ylang ylang. Together with virgin coconut oil it creates a porridge that will soon become the soap. When the porridge is properly mixed it will be put in trays that will be put in a cooling room for several days.



Figure 5.1.4 Adult seaweed tied to nylon string



Figure 5.1.5 Wooden sticks are put in the bottom of the ocean to attach a string of seaweed



Figure 5.1.6 Special occasions order for wedding



Figure 5.1.7 Seaweed Center shop on site

When solid enough, one of the Mamas will inspect the soap and put the SC logo on the soap. The only non-environmentally friendly material used in the production is plastic that is wrapped around the soap. Banana leaf is used to make a paper wrap with the SC logo on. Orders usually consist of 7.000 soaps. When the soaps, scrubs and polish is made it will be delivered to the costumers abroad and also sold on Zanzibar and at the center in Paje.

5.1.2 Actors & Innovations

Collaboration between states, international bodies and NGOs can bring more foreign investment to the local seaweed industry, thus providing more jobs and opening up many business opportunities. Foreign investors could provide advanced technical knowledge and financial means to develop local seaweed-based production for the global market. This could benefit many stakeholders including farmers, suppliers and local entrepreneurs similar to the SC (Bhat 2017). With high demand on dried seaweed globally (where the supply is 6 million tonnes per year covering 90 per cent of the current global market demand) (FAO 2017), companies could explore the potential to build more collection centers and downstream processing facilities to produce semi-processed seaweed and seaweed-derived ingredients. Innovation for farming and processing applications are still key to successful, robust and sustainable business models for the fast growing industry. Seaweed farming is the most rapidly expanding food-producing sector and is a significant component in meeting the global demand while reducing the overexploitation of natural resources (Bhat 2017).

5.2 Further Research

To conclude whether the humanitarian investment made by the Rylander Foundation will continue contributing to even more employment opportunities it would be interesting to introduce a long-term project to monitor and evaluate the progress. Also, an in-depth analysis of the dynamics and features of Paje village could have contributed to a better understanding of what investments are

necessary for further human development. There are possibly more potential in this village than only seaweed and it would be interesting to know what those potentials are and how they can be used to contribute to more employment opportunities.

Some focus has been put on the technologies that could make seaweed farming more efficient. However, the discussion on whether technology replaces the human workforce is further to be investigated (Hannon 2010). Including more focus on the institutional frameworks used to ensure responsible investments could contribute to the discussion on what investments should be allowed and what should be prohibited. Also, in recent years it has become increasingly clear that there is a direct correlation between technology advancement and the permanent exclusion of high numbers of workers from employment in both rural and urban areas which also opens up subjects for future research (Pimbert 2009; 5).

By comparing other similar contexts, perhaps the Philippines and Indonesia, it could be useful to investigate what opportunities and constraints there are in these environments when it comes to rural development and seaweed farming. For instance, who has invested and for what purpose? Are the majority of the investments made for humanitarian reasons or for the purpose of profit? Are they large-scale or small-scale and what impacts does this have on the rural livelihoods and the environment? It is difficult to predict the future and trends of the seaweed industry and there is a need to monitor the progress in order to determine what needs to be done and more importantly by whom and through what means.

Looking back at the field study, it would be of great value to interview the Mamas to understand why they were chosen as employees at the center and what they think of their current employment. Are they satisfied with their current situation or are there any areas that should be improved? Throughout this thesis it has been argued that there should be a holistic approach when it comes to investments in rural development and therefore there should be more voices from the people that are directly or indirectly affected by these investments and interventions.

These are some of the many questions that need to be answered in regards to the current and future trends of seaweed farming and the industry. The international recognition of seaweed has created a momentum for many parties involved: political institutions, domestic investors and private investors. The ways that seaweed can be exploited to benefit all parties involved will be an interesting development to follow within the next 10-20 years. It will also be interesting to see whether the predictions of organizations such as the OECD, IFAD and FAO are accurate in the near future.

6 Conclusion

In seaweed farming on Zanzibar, humanitarian investments such as the Rylander Foundation has resulted in employment opportunities, creation of production facilities and provided material needed for the production of value-added products for export. While the original project may have failed, adopting a holistic approach during the early stages of the implementation process, the NGO went from educating women to building a center that has employed 10 mamas in Paje. The employees (Morgan and Akila) conclude that as long as the people are the focus in a project the right investments can be made which could benefit everyone involved. In this particular instance, small-scale investments made by NGO with people in focus over profit could be used as a success story, but only under these circumstances and context. The ambition to establish an identical center on Zanzibar to be able to employ more IFSFs will hopefully become reality if the SC continues to do well. Today, the Revolutionary state of Zanzibar is primarily advocating for domestic investment and small-scale projects and wishes for foreign investments to function as complements to domestic investments.

References

- Alarcón Ferrari, C. (2015). *Forests at the Limits – Forestry, Land Use and Climate Change from Political Ecology and Environmental Communication Perspectives – The Case of Chile & Sweden*. Retrieved from http://pub.epsilon.slu.se/11926/1/alarcon_ferrari_c_150223.pdf on 2017 May 16.
- Adams, S. (2009). *Foreign Direct investments, domestic investment, and economic growth in Sub-Saharan Africa*. Retrieved from http://ac.els-cdn.com/S0161893809000179/1-s2.0-S0161893809000179-main.pdf?_tid=0ea549a2-3998-11e7-8488-00000aab0f27&acdnat=1494871270_d8355698222d52a8cac2c567dd76b680 on 2017 May 15.
- Agosin, M.R., Machado, R. (2005). *Foreign Investment in Developing Countries: Does it Crowd in Domestic Investment*. Retrieved from <http://www.tandfonline.com/doi/pdf/10.1080/13600810500137749?needAccess=true> on 2017 May 15.
- Akila. (2017). Personal conversation. Location: Zanzibar. 2017 Mar 25.
- Baumert, S., Nhantumbo, I. (2017). *Small-scale soya farming can outperform large-scale agricultural investments*. Retrieved from <http://pubs.iied.org/pdfs/17417IIED.pdf> on 2017 May 17.
- BBC News. (2017). *Seaweed – Zanzibar’s ‘gift from the ocean’*. Retrieved from <http://www.bbc.com/news/world-africa-26770151> on 2017 May 15.
- Bebbington, A. (1999). *Capitals and Capabilities: A Framework for analyzing Peasant Viability, Rural Livelihoods and Poverty*. Retrieved from http://ac.els-cdn.com/S0305750X99001047/1-s2.0-S0305750X99001047-main.pdf?_tid=c07b19a2-3a1c-11e7-ad18-00000aab0f6c&acdnat=1494928262_0013979b2a37b155bf06951336200179 on 2017 May 16.
- Bertucci, G., Alberti, A. (2017). *Globalization and the Role of the State: Challenges and Perspectives*. Retrieved from

<http://unpan1.un.org/intradoc/groups/public/documents/un/unpan006225.pdf> on 2017 May 17.

Bhat, R. (2017). *Sustainability Challenges in the Agrofood Sector*. Retrieved from <https://books.google.se/books?id=tPIIDgAAQBAJ&pg=PT514&lpq=PT514&dq=This+would+benefit+many+stakeholders+including+farmers,+suppliers+and+local+entrepreneurs&source=bl&ots=dyX4rP56v3&sig=QSrf8IgcFcXGXP7XVGTiJqUzB7A&hl=sv&sa=X&ved=0ahUKEwiD4YOktPTTAhXDa5oKHWFoC1QQ6AEIizAA#v=onepage&q=This%20would%20benefit%20many%20stakeholders%20including%20farmers%20suppliers%20and%20local%20entrepreneurs&f=false> on 2017 May 16.

Borenstein, E., De Gregorio, J., Lee, J-W. (1997). *How does foreign direct investment affect economic growth?*. Retrieved from http://ac.els-cdn.com/S0022199697000330/1-s2.0-S0022199697000330-main.pdf?_tid=b52d8d84-3998-11e7-a484-00000aacb35d&acdnat=1494871549_7d873bb8678e6b34e54acbf50df9dd63 on 2017 May 15.

Bryant, R.L., Bailey, S. (1997). *Third World Political Ecology*. London: Routledge.

Chambers, R., Conway, G.R. (1991). *Sustainable rural livelihoods: a practical concept for the 21st century*. Retrieved from http://publications.iwmi.org/pdf/H_32821.pdf on 2017 May 16.

Climate Council. (2016). *How seaweed can help us tackle climate change*. Retrieved from <https://www.climatecouncil.org.au/seaweed-climate-change> on 2017 May 16.

Committee on World Food Security (CFS). (2017). *Responsible investments in agriculture and food systems*. Retrieved from <http://www.fao.org/cfs/en/> on 2017 May 16.

Cotula, L., Vermeulen, S., Leonard, R., Keeley, J. (2009). *Land grab or development opportunity? Agricultural investment and international land deals in Africa*. Retrieved from https://books.google.se/books?hl=sv&lr=&id=j51n1Fjt_CsC&oi=fnd&pg=PA63&dq=landgrabbing+biofuel+investment&ots=qVIEHsg4Mu&sig=Nr5j6kqO9O0e143pzCGCaUU33jg&redir_esc=y#v=onepage&q=landgrabbing%20biofuel%20investment&f=false on 2017 May 16.

Deakin University. (2015). *Seaweed could help counter effects of climate change: Deakin research*. Retrieved from <http://www.deakin.edu.au/about-deakin/media-releases/articles/seaweed-could-help-counter-effects-of-climate-change-deakin-research> on 2017 May 15.

Duarte, C.M., Wu, J., Xiao, X., Bruhn, A., Krause-Jensen, D. (2017). *Can Seaweed Farming Play a Role in Climate Change Mitigation and Adaptation?* Retrieved from <file:///Users/lindajonsson/Downloads/fmars-04-00100.pdf> on 2017 May 15.

Duke University. (2017). *Qualitative Research Methods: A Data Collector's Field Guide*. Retrieved from

<https://assessment.trinity.duke.edu/documents/ParticipantObservationFieldGuide.pdf> on 2017 May 16.

Ellis, F. (2000). *Rural Livelihoods and Diversity in Developing Countries*. Oxford: Oxford University Press.

Endeva (2016). *How companies can invest in innovations at the BoP*. Retrieved from <http://www.endeva.org/news/corporates-venturing-into-inclusive-businesses-how-companies-can-invest-in-innovations-at-the-bop> on 2017 May 15.

Endres, C.H., Roth, A., Brück, T.B. (2016). *Thermal Reactor Model for Large-Scale Algae Cultivation in Vertical Flat Panel Photobioreactors*. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/26950078> on 2017 May 17.

EU Delegation to Tanzania & VSO. (2015). *Low cost, locally designed innovations can improve lives of seaweed farmers in Zanzibar*. Retrieved from <https://europa.eu/eyd2015/en/european-union/stories/low-cost-locally-designed-innovations-can-improve-lives-seaweed-farmers> on 2017 May 16.

European Commission. (2013). *Assessing the impact of biofuels production on developing countries from the point of view of Policy Coherence for Development*. Retrieved from https://ec.europa.eu/europeaid/sites/devco/files/study-impact-assesment-biofuels-production-on-development-pcd-201302_en_2.pdf on 2017 May 17.

Flannery, T. (2015). *Climate crisis: seaweed, coffee and cement could save the planet*. Retrieved from <https://www.theguardian.com/books/2015/nov/20/climate-crisis-future-brighter-tim-flannery> on 2017 May 16.

Food and Agricultural Organization of the United Nations (FAO). (2017a). *Prospects for seaweed production in developing countries*. Retrieved from <http://www.fao.org/docrep/004/y3550e/Y3550E06.htm> on 2017 May 15.

Food and Agricultural Organization of the United Nations (FAO). (2017b). *Future Prospects for the Seaweed Industry*. Retrieved from <http://www.fao.org/docrep/004/y3550e/Y3550E05.htm> on 2017 May 16.

Griswold, D. (2000). *The Blessing and Challenges of Globalization*. Retrieved from <https://www.cato.org/publications/commentary/blessings-challenges-globalization> on 2017 May 16.

Hannon, M., Gimpel, J., Tran, M., Mayfield, S. (2010). *Biofuels from algae: challenges and potential*. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3152439/> 2017 May 17.

Heierli, U. (2011). *Taking the Bus Out of Poverty – Inclusive Business*. Retrieved from <http://www.msdcconsult.ch/documents/2011/Praxisprojekt%20-%20Inclusive%20Business.pdf?d8d70d15c6d9d3055465bbd884ad9677=abde71f745705319a2d4e1547971c77d> on 2017 May 15.

Khawaja, N. (2016). *Zanzibar's Seaweed Farming Industry Provides Livelihood for Women*. Retrieved from <http://akomanet.com/zanzibars-seaweed-farming-industry-provides-livelihood-for-women/> on 2017 May 15.

Krantz, L. (2001). *The Sustainable Livelihoods Approach to Poverty Reduction: An Introduction*. Retrieved from http://www.sida.se/contentassets/bd474c210163447c9a7963d77c64148a/the-sustainable-livelihood-approach-to-poverty-reduction_2656.pdf on 2017 May 16.

Kurtishi-Kastrati, S. (2013). *The Effects of Foreign Direct Investments for Host Country's Economy*. Retrieved from <http://www.ejist.ro/files/pdf/369.pdf> 2017 May 17.

Lewin, J. (2017). *The health benefits of...seaweed*. Retrieved from <https://www.bbcgoodfood.com/howto/guide/health-benefits-seaweed> on 2017 May 15.

McHugh, D.J. (2003). *A guide to the seaweed industry*. Retrieved from <http://www.fao.org/3/a-y4765e.pdf> on 2017 May 15.

Morgan. (2017). Personal conversation. Location: Paje, Zanzibar. Date 2017 Mar 22.

Organization for Economic Co-operation and Development (OECD). (2006). *Investment Priorities for Development*. Retrieved from <https://www.oecd.org/cfe/regional-policy/Investment-Priorities-for-Rural-Development.pdf> on 2017 May 16.

Pimbert, M. (2009). *Towards Food Sovereignty*. Retrieved from <http://pubs.iied.org/pdfs/14585IIED.pdf> on 2017 May 17.

Prahalad, C.K., Hammond, A. (2002). *Serving the world's poor profitably*.

Robbins, P. (2012). *Political Ecology*. Sussex: Blackwell Publishing Ltd.

Scoones, I. (2015). *Sustainable Livelihoods and Rural Development: Agrarian Change & Peasant studies*. Warwickshire: Practical Action Publishing.

Smith, B. (2011). *The Coming Green Wave: Ocean Farming to Fight Climate Change*. Retrieved from <https://www.theatlantic.com/international/archive/2011/11/the-coming-green-wave-ocean-farming-to-fight-climate-change/248750/> on 2017 May 16.

Stockholm Resilience Centre (SRC). (2017). *Seaweed farming: challenge and benefits*. Retrieved from <http://www.stockholmresilience.org/research/research-videos/2012-09-06-seaweed-farming-challenges-and-benefits.html> on 2017 May 16.

Sustainable Development Solution Network (SDSN). (2013). *Solutions for Sustainable Agriculture and Food Systems: Technical Report for the Post-2015 Development Agenda*. Retrieved from <http://unsdsn.org/wp->

content/uploads/2014/02/130919-TG07-Agriculture-Report-WEB.pdf on 2017 May 16.

Tanzania Commission for Science and Technology (COSTECH). (2015). *Zanzibar Research Agenda 2015-2020*. Retrieved from <http://www.costech.or.tz/wp-content/uploads/2015/03/Zanzibar-research-agenda1.pdf> on 2017 May 16.

World Energy Council. (2013). *Bioenergy*. Retrieved from https://www.worldenergy.org/wp-content/uploads/2013/10/WER_2013_7_Bioenergy.pdf on 2017 May 17.

World Bank Group (WBG). (2016). *Taking on Inequality*. Retrieved from <http://www.worldbank.org/en/topic/poverty/overview> on 2017 May 15