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Namibia, Factor 6: Sustainable Agriculture

Namibia: Developing and encouraging sustainable agricultural practices.

Introduction

Namibia is a country located in the southern part of Africa. This particular Sub-Saharan country is broken into five general regions with a climate best described as arid. Many factors such as the sustainability of agriculture affect the food security in Namibia. Sustainable agriculture refers to farming while using practices that benefit the environment. Sustainable agriculture allows future generations to have access to soil and land, which, if cared for, will continue to provide for them in years to come. Many Namibian farmers would benefit from implementing sustainable practices to increase soil fertility while decreasing the effects of soil degradation. There are several practices such as introducing new crop varieties or improving irrigation practices that African farmers could also employ in order to ensure food security. Many of these factors are interrelated and one cannot be implemented without addressing others. Through sustainable practices such as proper crop rotation, irrigation techniques and choosing the appropriate varieties in conjunction with education, Namibian farmers will be able to meet their food production needs.

Geography

Namibia is situated between the Namib and Kalahari deserts and as such, is the country with the least amount of rainfall in sub-Saharan Africa. There are five general geographical regions. The first region is known as the Central Plateau, which is home to the highest point in Namibia with most of the arable land in the country, as well as the nation's capital, Windhoek. Next is the Namib Desert, with large areas of hyper-arid gravel plains and dunes that run along the entire coastline. This region has little vegetation with the exception of lichen. The third region is the Great Escarpment, which features land that rises upwards of two thousand meters over a short distance. This region is rocky with poor soils slightly more productive than that of the desert region. A variety of vegetation is found only where there is water. The region known as Bushveld is found in the North-Eastern area of the country. This region receives more precipitation than any other - 400 millimetres throughout the year. The last region is the Kalahari Desert, Namibia's most recognized geographical feature. The Succulent Karoo is found in this region. The Kalahari is home to over 5000 species of plants, the majority of them being native to the area. One third of the world's succulents are found here as well *("Geography").* The heat, in combination with inadequate amounts of rain, creates a more difficult environment for crops to grow, producing low yields. Research done by Kates and Dasgupta in 2007 shows that over the last twenty years, Africans living in the Sub-Saharan regions were the only areas where the population that lived under the global poverty line increased by over 50% and furthermore, one-third of the population on the African continent still suffer from hunger (*Ejeta*).

Population Characteristics

The population in Namibia is estimated to be 2.13 million people. 56.9% of Namibians live in rural areas, the most popular being Khomas, trailed by Ohangwen. The average size of a household is 4.2 people. Those living in rural areas were recorded as having a larger family size (*Namibia Statistics Agency).* The diet of a Namibian varies and is based on factors such as geographical location and lifestyle. Those who practice agriculture have a diet based on millet and sorghum, while beans and greens are eaten with millet occasionally in the North, but otherwise vegetables are scarce. Those who ranch have opportunity for diets based mainly on dairy products. However, a hunting and gathering lifestyle is still very common. A

large worm that feeds on the mopane trees is considered a delicacy by both the rural and the urban population in southern Africa and is known as the mopane worm (*"Namibia In A Nutshell").*

The education system in Namibia is composed of 4 stages: lower primary is grade 1 to grade 4, upper primary is grade 5 to grade 7, junior secondary is grade 8 to grade 10 and senior secondary is grade 11 to grade 12. Attendance is mandatory up until junior secondary or age 16. Once a student finishes grade 12, they receive a certificate called the Namibia Senior Secondary Certificate and they are able to attend a Namibian University. There are two public universities in the country. Polytechnic of Namibia concentrates on skills that the industrial sector demands such as technical and administrative duties while the University of Namibia covers more academic avenues of study. There is an insufficient teacher-student ratio as well as poor quality lessons being taught to the children in the primary system, as many schools require more qualified teachers. The high prevalence of HIV/AIDS has a negative effect on the number of suitable teachers available. The low employment rate is directly related to the education in Namibia, as 20% of employed Namibians have no education for the profession in which they are employed *(Fischer and Stiftung).* If sufficient education were practiced in this country, unemployment would decrease.

Agricultural Issues, Potential Strategies and Significance

Namibia's geographical location is not ideal for producing high yielding crops. A large portion of the country's soil (97%) is less than 5% clay, which results in the soil having a very poor water holding capacity. As well, mean annual rainfall is approximately 270 mm, making Namibia the driest climate in sub-Saharan Africa (*"Namibia In A Nut Shell").* The primary crops grown are millet and maize as well as ground nuts. Wheat and sunflowers are also grown, but not to the same scale. In the past five years, the growing seasons has been negatively affected by drought, floods, locusts, insects and worm invasions. (*"Namibia: Analytical summary")* A potential solution to the insect problem are growing GMO's, or genetically modified organisms, that are resistant to insects and provide improved nutrition as well as higher yielding harvests. There are many varieties that can be implemented in Namibia that have been implemented in other areas of the world such as Kenya, Tanzania, Mozambique and Uganda. In these countries, Monsanto already grows trial crops of genetically modified cotton, sugar cane, tomatoes and bananas (*Shoo).* Currently, there are CFTs (confined field tests) being done in Kenya, Uganda, and South Africa by the national agriculture institutes in those areas. They are evaluating new drought tolerant varieties of maize *("Confined Field Trial: Water Efficient Maize for Africa (WEMA*)"). This would greatly benefit the Namibian farmers considering rainfall is sparse. By genetically modifying crops, the nutritional value has been improved which benefits the person consuming the crop. Genetically modified plants can be resistant to pests and parasites, which helps to lower the amount of crop lost due to these reasons. The use of GMO's will reduce the number of required pesticide applications as well as producing higher yields to help feed larger populations (*Ronald and McWilliams).*

Sustainable agriculture affects the average farm family in Namibia in many ways such as low production of food due to poor quality soil and low production due to lack of precipitation. Agriculture productivity could be improved by applying sustainable agriculture practices, resulting in an increase in the total production of food, allowing the farmer to provide for his or her family. Lack of food production can be because the plant is not receiving enough water, the soil is depleted of required nutrients that allow to plant to have a maximum output, or a pest or disease present in the soil is reducing the plants ability to grow. Implementing the systems used to increase the land's productivity requires education. Teaching the farmers how to use the systems, combined with more ways to increase the sustainability of the land, will greatly enhance the outcome of the project. By working alongside the Namibians in education and practice, they will be more willing and able to carry on the project, instead of doing all the labour for them and not educating them on how to maintain the systems. Crop rotation is a relatively easy concept to introduce into your program. Crop rotation involves planning your fields ahead of time and deciding what

and where you are planting in advance. By doing so, you reduce the risk of soil borne diseases and some soil-dwelling insects while managing soil fertility.

The ability to improve the sustainability of agriculture in Namibia would increase both the amount of food as well as the quality of the food. The use of genetically modified organisms would allow for the reduction of pesticide use and would be easier on the land, lowering pollution rates as well as the degradation of the land. Sustainable agriculture practices such as irrigation, where available, can be implemented and would benefit the crops. Since rainfall is of low frequency in this particular country, alternate ways for plants to receive water is required. As mentioned earlier, there are drought resistant crop varieties available that are being tested in other areas. This is a potential solution to overcome the problem of low precipitation in order to increase yields. More of each crop would allow the farmer to have enough to keep and feed their family and sell to other Namibians to create an income. Agriculture is responsible for 75% of the employment in Sub-Saharan Africa and if this particular variety of crop is made available to grow, it could create an opportunity for other families to plant and grow food and provide them with an income as well as increase the total employment rate (*"Agriculture Overview")*.

Effects of Climate Change

Climate change is a larger issue that will have to be addressed in the future. This affects agriculture as the influence of more frequent wildfires and the expected lower level of biomass production will reduce the amount of plant litter available to replenish the organic matter that resides in the soil. In addition to more wildfires, the extremes of flooding and drought will also be more frequent *(Coetzee).* This could affect families through agriculture that is not only a provider for the family's food but also an income, through destruction by wildfire, drought, or flood and leave the family short on both food and income.

Sustainability and Food Security

In order to improve sustainability, I believe we need to first increase the amount of land and soil that is considered to be fertile. Once the land has the ability to produce crops with above average yields, systems that can increase the sustainability of the land can be implemented. These systems may include crop rotation and irrigation, where practical. If we can help develop and improve the systems, we can provide the farmers with the tools to produce higher yields, enabling them to feed their families as well as others around them by selling their crops. Goal 7 of the Millennium Development goals is a goal that if strived for, could allow the amount of poverty in Namibia to be vastly reduced. Goal 7 refers to ensuring environmental sustainability, which directly relates to the factor I have chosen ("*UN Millennium project").* If the sustainability of the environment can be improved and ensured, then crop production can be improved upon as well. A current project underway in Namibia is the CPP Namibia: Sustainable Land Management Support and Adaptive Management Project (*In Depth).* The focal point of this project is land degradation; a way for it to be scaled up is to increase awareness of the research and communicate with the farmers about the results of the research that is conducted.

In order for this issue to be resolved, we need to first develop a plan. I believe that the plan should start with the locals. Talking to the locals about their main concerns and addressing what they believe needs to be taken care of for the plan to be successfully operated. By talking to the farmers, we can begin to eliminate options that would not work in particular areas. For example, irrigation systems would only be available to farmers that have a body of water near them that has the ability to support the irrigation system. Some farmers may be resistant to trying crop varieties while others may be interested in giving it a test run and seeing the results before fully implementing it into their operation. Education is important when it comes to the crop varieties and showing them why and how these work, as well as how they can be a part of the solution. The creation of an interest group that is able to have discussions with the government regarding their concerns could have several important benefits. This group would create an effective means of communication between the government and the community, which would better inform the government on policy decisions, while also giving the community confidence that their

concerns are being taken seriously by their government. With the funding of a government from a developed country willing to send agriculture experts over to Namibia, these experts can spend time with different farmers and show them how to run these systems and educate them on how it is benefiting themselves as well as the environment. This is a critical component and the most time should be spent on this part of the plan. By working alongside the farmers and not doing the projects for them, but instead helping them, they are more likely to listen and continue the new work they have been taught. Once the experts are sure that there are an adequate number of people who understand the systems and can be considered the community "expert", the locals can then go to these "experts" in their own community for advice. This way, they are involved in the solution in their very own country more than we are. Since systems such as irrigation systems will in time require some maintenance, it would be beneficial to have an organization, or more than one, set up a campaign to raise awareness as well as a donation fund. The assistance of the government may be required to fund the beginning of these projects. From here, farmers could apply for certain grants for maintenance of these new practices as well as a way to purchase the crop varieties without losing too much of their already low income.

Already working in Namibia is the international aid company called USAID. They work alongside the Namibians to increase crop yields. They also provide historically disadvantaged Namibians with a primary education. Looking at utilizing agricultural experts to help educate and teach would be a possibility, as they are already working in the country and helping the farmers by educating them on the use of GMOS and other systems. USAID is currently running a program called pounds of prevention in Namibia. This is a program that helps increase yields by doing things such as applying manure, getting crops in early to take advantage of the first rain, and planting other crops in between their primary crops to increase the fodder as well as creating additional food. They also promote applying mulch or using cover crops like pumpkin, to reduce the growth of weeds as well as increase the moisture retention. By working together with this group, we could integrate more into their programs, things such as introducing GMO's to farmers who are interested. GMOs are a suitable solution because you can develop crops that are resistant to diseases and pests. This technology may also be used to develop new nitrogen fixing crops. Another advantage to these crops is the possibility of using varieties of crops that are familiar to the farmers, instead of learning how to grow a whole new crop.

Conclusion

Despite the many limitations of the African country of Namibia, there are opportunities to improve the state of agriculture by implementing sustainable agriculture practices. Namibia is split into 5 general regions, this particular sub-Saharan regions' land can be best described as arid. The soil in this land lacks clay, which provides the ability to retain water in the soil instead of the water leaking through the soil. This soil is depleted of its nutrients and with little to no fertiliser use; the nutrients are not being replenished fast enough which is leaving the plants with little to no help with nutrients (*Whiteside)*. Sustainable agriculture practices would improve the use of the land and allow the crops to be utilized to their full potential. These practices include crop rotation, irrigation where it is possible to do so and adopting GMO crop varieties that can benefit both the farmer and the environment. GMO's can benefit the farmer in different ways. One example-being a drought resistant variety of Maize that is being tested in other parts of Africa can be implemented in Namibia when proven to be a viable project. This is beneficial because it provides the Namibian farmers with an opportunity to increase their yields while also decreasing the impact on the environment, ensuring that the environment remains sustainable for future generations. Along with drought resistant crop varieties, it would be beneficial to adopt a variety that is less susceptible to pests which decreases the amount of the pesticide applied, lowering pollution levels as well as the cost of fuel and the pesticide itself. These varieties will be of more interest to farmers as the climate makes it increasingly difficult to grow average yields of crops to provide food for their families as well as enough crop production to generate an income. The community as well as the government can work together in an effort to find suitable solutions for this problem. Involving the farmers in the discussions makes the possibility of these practices actually being adopted greater as they

were involved in the process and will take ownership of it so the solutions will be sustainable. Working alongside other organizations such as USAID creates an opportunity to reach greater numbers of farmers more quickly, and reduce the problem of inadequate amounts of food available faster. Sustainable agriculture has the opportunity to reduce and relieve the stress of food security in the developing countries of the world; we just need to take the steps toward assisting with education on what these practices involve and how to implement them in the Namibian country.

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