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Benin, Factor 6: Sustainable Agriculture

Benin: The Importance of Sustainable Agriculture

The Neolithic Agricultural Revolution, otherwise known as the First Agricultural Revolution, is the collective first instances of agriculture around the globe. This revolution permitted humans to evolve from hunter-gatherer groups into more sophisticated civilizations. Moreover, this revolution allowed for the growth and development of humans in different subjects, such as: philosophy, science, trade, and many other industries which are essential in today's world. Since this revolution, there have been two others known as the Second Agricultural Revolution and the Green Revolution. The Second Agricultural Revolution was remarkable due to the introduction of machinery to agriculture. This decreased the demand for labor in agriculture and permitted higher crop yields per acre of land. Finally, the most recent revolution, the Green Revolution, is known for its broadening of the agricultural spectrum and an increase in farming technology in the 20th Century (Muneeeruddin, "The Three Agricultural Revolutions," Lewis Historical Society). With the developments made during these revolutions agriculture has allowed humanity to improve in amazing ways. Agriculture, however, is most important to humanity because it provides the basis for food security. Food security is essential when it comes to having a healthy, growing population, and there are several factors that come into play when ensuring food security. A country cannot have food security without the proper quality, quantity, or availability of food. Food security issues are faced by many countries throughout the world. The focus of this paper is placed upon Benin, a developing country in West Africa, who struggles with the subject. This country has an approximate and increasing population of 11,493,218 people and a land mass of 112,795 km squared (Benin Population, Worldometers). Benin is a very agriculturally based country, 31.3% of its land is used for agriculture and 40% of the land is forested. Therefore, most of the land within the country is uninhabited or used for agriculture. Leaving a mere 28.7% of the land to be used for the remainder of the industries. Benin's number one export is cotton, and the country also engages in trade on a regional level to receive other essential items the country may need (TheFactFile Staff, "43 Interesting Facts About Benin," TheFactFile). However, Benin is struggling with major factors in food security, which have been the leading cause for the country's high death rate (The Worldatlas Staff, "Leading Causes of Death in Benin," World Atlas). Struggles to create sustainable agriculture, limited knowledge on plant science, poor water quality, and human diseases are the major factors that are threatening the country. Benin is a small country with a large population who relies upon agriculture for a living, it is important to have a well-developed, sustainable agricultural practice, but this is a factor where the developing country is struggling. If the land of Benin is not properly cared for and used wisely, the country will be unable to achieve sustainable agriculture.

Eighty percent of Benin's population depends on agriculture for a source of income (FAO GM Foods Platform Editors, "Benin," Integrated Production and Pest Management Programme in Africa). A typical household uses subsistence agriculture to feed their families. These farms are on small plots of land near the family's home. Maize, millet, and beans are among the most popular food items grown on a subsistence farm in Benin (Aregheore, Eroarome, "The Republic of Benin," Food and Agriculture Organization). Despite most families growing crops on these plots of land and supporting themselves,

their agriculture is sporadic. Crops are likely to be washed away by flood, the nutrients in the soil are depleted after constant crop plantings, and the yield for the crop is not beneficial even once the crop is grown properly. Many families, whose crops have failed, do not have the income to purchase more. Thus, leading to inadequate nutrition which hurts the economy and decreases the work force. These characteristics of the country lead to the explanation of the country's extremely low median age of approximately nineteen years old (Benin Population, Worldometers). The problem of sustainable agriculture is a problem that is becoming much more prevalent as the world evolves.

Sustainable agriculture is one of the largest problems the country of Benin faces. Due to unsustainable agricultural practices desertification is a major problem harming the environment. The land of this country is decreasing in fertility, thereby, decreasing the total amount of arable land that can be used to grow crops and raise livestock. Not only is Benin struggling with a decreasing amount of fertile land, they also have a ban on genetically modified organisms (FAO GM Foods Platform Editors, "Food Safety and Quality," FAO GM Foods Platform). On the continent of Africa there are many skeptics about the use of GMOs for consumption, therefore, many countries in this region have bans or restrictions on GMOs. Genetically modified organisms would have a tremendously positive impact on developing countries like Benin. GMOs have been modified to increase crop yield on a smaller area of land as well as be more resistant to pests and diseases (Meilan, Rick, "The Story on GMOs," Purdue Agriculture – Purdue University). GMOs decrease the need for use of pesticides and fertilizers, thus, decreasing the harm to the environment that may come from the chemicals and create a far more sustainable version of agriculture in developing countries.

The situation of sustainable agriculture in Benin is unstable. This factor is measured by the total acreage of arable land available in which to practice forms of agriculture. There seems to have been a decrease in the arable land. However, there are currently programs initiated in Benin to help with improving the trends of this factor of food security. These programs have helped some, but the process of desertification has already begun in many of these areas. Therefore, the trends of the factor are staying relatively the same due to the counteractant of the programs and the environmental degradation that is already occurring. Sustainable agriculture is a factor that is essential to food security. Without sustainability, it becomes very difficult to support a growing population, such as the one in Benin. Ergo, action should quickly be taken to save the population from the consequences that may be faced from these actions.

If sustainable agriculture was achieved in Benin the quality, quantity, and availability of food would be more feasible. Families would be able to grow their own food with the proper knowledge of how to properly treat and sustain their land. By doing so, the environment would also benefit by preserving its forest, keeping the soil fertile and benefit wildlife in the area by preventing desertification. Moreover, if sustainable agriculture were to be achieved the agricultural industry would have greater stability, hence improving the agricultural economy which would open doors for a greater number of commercial farms and fewer subsistence farmers in the Benin population. Therefore, the entire population would benefit because more people would be provided the freedom to engage in a pursuit in which they wish to participate, as well as allow more people to feed their families and decrease the cases of malnutrition within the developing country, allowing Benin to take more steps towards becoming a developed country.

Sustainable agriculture is an extremely influential factor of food security. Climate volatility in Benin is common due to the tropical climate of the country. Benin experiences two rainy and two dry seasons. Flooding of agriculture land may occur during the rainy seasons and sometimes during the dry seasons water scarcity becomes a larger threat to sustainability in agriculture. Continuing, the population growth

of Benin is rapidly increasing and is projected to double in size by 2050 A.D. (Benin Population, Worldometers). Thus, sustainable agriculture will be significantly harder to achieve when having to feed more and more people on smaller plots of land. The lack of knowledge on plant science and genetically modified organisms is another major issue that may affect sustainable agriculture. If plant science is not incorporated, the large, increasing population of Benin will no longer be able to prosper due to limitations such as: malnutrition, poor environmental surroundings, and a declining economy.

To solve the food security factor of sustainable agriculture it is recommended to create local and national laws to preserve the environment used for agricultural practices. For example, if Benin were to pass a Fertile Land Act, which specifies what may and may not be done with the agricultural land, preservation and sustainable agriculture would be more reasonable. Thus, these policies and laws would help guide the commercial or subsistence farmer in the right direction for their farming practices.

One local project that is already put into place by Benin is the Integrated Production and Pest Management Program (IPPM Program). The IPPM Program is put in place to assist farmers in sustainably growing and producing diverse agricultural crops in both subsistence and commercial forms of agriculture. This program offers farmer field school to aid farmers in improving agricultural practices by increasing productivity and efficiency as well as decreasing the harm that is brought by agriculture to the human and the environment (FAO GM Foods Platform Editors, "Benin," Integrated Production and Pest Management Programme in Africa, Food and Agriculture Organization of the United Nations). To scale up this program, the country of Benin should create an outreach program to a greater number of subsistence farmers, who are not aware of the potential threats they are imposing on the environment. Only, 9,590 farmers have been trained in this program (FAO GM Foods Platform Editors, "Benin," Integrated Production and Pest Management Programme in Africa) which has significantly helped. Reaching out to a greater number of family farms that makes up most the Benin population, the IPPM Program will have much larger effect on farmers within the developing country. This can be achieved by holding the farmer field schools in more isolated areas to preserve the maximum acreage of land. The program can also use farmers who have attended the field school as an outreach within their communities to allow the benefits and information gained through this program to continue to spread into more rural areas than what are reached with just the government program. Sending these individuals back to their communities with supplies and articles on how to grow their crops more effectively will allow the program to make a more significant impact throughout the country. While this will require additional funding, the long-term money saved and a boost to the economy the government will receive should be well worth the cost. If fully implemented effectively the government will save on decreased imports to feed their population as well as to create a stable economy and increase human nutrition.

Finally, to assist all countries, especially developing countries, an international research agency on plant science could be formed to share with different countries the findings they have made. By doing so, the agency could send out representatives to share the truth about agricultural technologies, such as genetically modified organisms; rather than countries having a misunderstanding of the possible benefits of biotechnology. If an international research agency were to send out a member of their study team to share their findings of the benefits that GMOs provide, sustainable agriculture in countries like Benin would be more greatly attainable. Hundreds of new graduates from land-grant universities who have participated and majored in research on plant science, as well as participated in study abroad programs within French speaking countries would be ideal candidates for this program. Partnering with universities and spreading research throughout the world, in coordination with applying for grants the funding for this project will be made possible in the most cost-effective way.

Genetically modified organisms play key roles in sustainable agriculture throughout the world. They also decrease the need for harmful chemical sprays and more fertilizers which may negatively impact the environment (Meilan, Rick, "The Story on GMOs," Purdue Agriculture – Purdue University). Despite the benefits, we have recognized within the United States of America, Benin's government is still skeptical of this technology. One approach to overcoming this is to not only have our representatives give a presentation on how they have increased yields and decreased pesticide use in our country, but compare them to other developing countries who have implemented programs with GMOs and have seen a positive effect. Once the ban upon GMOs has been lifted, (which will be a lengthy government process) other issues will arise. With this advanced technology also comes an increased upfront cost to the farmers within this country. To overcome this issue, government budgeting must be performed to allow GMOs to initially enter the country. However, the decreased input to the crop with an increased output will not only increase the farmers' revenue, but boost the country's economy and sustainability as a long-term goal.

Advanced technologies are a major step for globalization within the modern world (Cackler, Joe, Gu, Emily, and Rodgers, Mike, "Technology in Developing Economies," Stanford University). However, in present time, not all technologies are feasible for the farmers of Benin. For example, most farms in developed countries own at least one tractor or piece of harvesting equipment. These machines are very expensive and with four-fifths of the country being involved in agriculture, there would not be enough cash-flow to allow this benefit until simpler steps within the agricultural community are made. On the other hand, simple technologies that can be reached within the community through programs such as the IPPM or an International Research Group, education and proper farm management can be achieved. The ordinary citizens of Benin can make a greater impact with their farming career. The people of Benin should encourage and spread the word of what they have learned to start a chain-reaction of correctly managed farms. Such action will lead to bigger and better steps into the world of technology and development.

Rural and urban families alike can play a key role in creating sustainable agriculture in Benin. By attending the farmer field schools implemented by the IPPM Program they will gain greater knowledge of the industry and will be more precise with decision making to benefit the human population and the environment. These families should also educate themselves on the agricultural topic to make a greater difference in the agricultural industry. Much of Benin's population are farmers and by properly educating all members, everyone will be able to make responsible decisions regarding sustainable agricultural practices.

Agriculture is the fundamental basis for life world-wide. Without agricultural advancements, we would still live in a hunter-gatherer society in which humans moved from place to place with their food source. However, the domestication of plants and animals permitted for permanent settlements. This allowed people to develop new skills in other industries which is what makes us as humans diverse and unique. Each human has their own craft or job, but this is only possible due to advancements made in the agricultural field. Food security is essential to have a healthy population, but most developing and even developed countries struggle with at least one factor of food security. By educating the general population about agriculture and the role the industry plays in the economy of each country it will be easier to achieve sustainable agriculture with a great food security. Sustainable agriculture is important in all aspects, including, land fertility, water quality, and clean air. These forms of sustainable agriculture affect us each day. By following simple procedures, the environment and humanity will be more prosperous and food security throughout the world will be within a closer grasp. Without food security, the world population would not be able to grow and technological and industrial advancements would not be able to be made. To continue improving the world and hopefully achieve more agricultural revolutions, it is necessary to create an educated public. The world population is expected to reach 9.7 billion people by 2050 A.D. (United Nations Department of Economic and Social Affairs Editors, "World population

projected to reach 9.7 billion by 2050,” United Nations Department of Economic and Social Affairs). By that time agriculture and food security will be more important than ever. Agriculturists will be required to make enough food to provide for billions of people on an even smaller area of land. Therefore, plant sciences, technology and research will be very important in the years leading up to this massive increase in population. Most of the world’s farmers are in developing countries, thus, by educating them, the future of agriculture will be more hopeful than ever. Only 40% of the world’s population are farmers, but 100% of the world’s population rely on agriculture for food security.

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