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Congo, Factor 1: Plant Science

Republic of Congo: Unification Through Modernization

Introduction

Everybody hears the famous "change is good" motto as they grow up. Change occurs all the time: today's weather to tomorrow's weather, summer to autumn, children to teenagers, and obsolete technology to bigger and better technology. Change is inevitable. Naturally, necessities for the well-being of humans evolve also. Well-off people in today's world want: more food, more clothes, more games, and more electronic devices: more luxuries to make their lives more enjoyable. All the while, there are people struggling to survive across the globe who need change. According to Dr. Mutter on the *Talk of the Nation*, "The global number of poverty-related casualties: somewhere between 25,000 and 40,000 human beings daily because they're simply too poor to live" (qtd. in NPR). Different places can define poverty completely different ways; it can be relatively measured in a number of ways: infant mortality rates, education availability, and access to health care. Only 11% of Congolese in rural areas have access to water. Poverty is most severe in the areas with high amounts of secluded people and low amounts of investment (IFAD). Of eight million arable hectares, only 200,000 hectares are actually used for food production ("Republic of Congo Agriculture"). Because of inadequate farming methods, small amounts of crops are grown. Since the Republic of the Congo has such a low amount of domestic trading, the majority of the food consumed is imported causing higher prices in the food market (WFP). If farmers wanted to help improve the economy, they would need to produce more than usual. This is where genetic engineering comes in. Genetic engineering is DNA recombination in order to alter observable form and function (Heaf). With this technology, scientists could intentionally create a new type of plant seed that could solve specific farming problems such as poor yield, meager rainfall, and low nutrient levels. Genetic engineering could definitely modify agricultural practices, but first the Republic of the Congo has to unite as a nation and determine whether this advanced technology would help or hinder their society.

Typical Family

About 37.5% of the Republic of the Congo's population lives in rural areas (Cordell and Bunseki-L). According to the International Monetary Fund, a typical urban household consists of four to five members, while a rural family can be much larger (120). Family includes grandparents, uncles, aunts, cousins, nephews, and nieces. Mothers living on the isolated farms of Congo often give birth to around ten children in their lifetimes. Because women are frowned upon if they do anything but take care of their families, they are commonly keepers of the estates. Their tasks include crop planting and harvesting, preparing meals, gathering water, housework, and raising children. Although men help work the fields and raise children, their main responsibility is hunting for meat to feed their families (Matuskey). Of the people in poverty, females and "pygmies"–people of the Aka, Teke, or forest dweller cultures–are the most discriminated against. Furthermore, the prejudice affects their already minuscule access to basic human rights (Garreau). As a result of being deprived of an education, a right that many people in developed countries take for granted, children in Congo lose countless opportunities to improve their quality of life ("Basic Education and Gender Equality"). Children remain dreaming of an ideal life instead of being able to achieve it. They are forced to live the same way as their parents instead of reaching their full potentials as politicians, doctors, teachers, and many more careers. Only 9% of the people of Congo have access to sanitary health care establishments; even less is available for rural poor because of their remote locations and discrimination (Matuskey). Even the most accessible hospitals or care giving centers do not always have modern technology, qualified staff, or necessary drugs. Many of these centers cannot even guarantee sanitized equipment or pure, disease-free water. This can lead to numerous illnesses that could soon turn into epidemics (UNICEF). As reported by Dr. Mutter, "They pick up diseases and die

from those, diesases that you would not even go to a doctor to have treated. It's the weakened condition that makes them vulnerable to illness, and [they] still die that way" (qtd. in NPR). A common factor measured to evaluate health care is the infant mortality rate; 72.45 deaths occur for every 1,000 live birth as of 2013. This ranks the Republic of the Congo 16th in comparison to the rest of the world for infant mortality ("Republic of the Congo").

Typical Farm

A subsistence farm in the Republic of the Congo ranges between 0.5 and 1.5 hectares of land (International Monetary Fund 101). Small farm owners grow crops such as bananas, plantains, potatoes, peanuts, maize, and various fruits. To stabilize their diets, they can also raise chickens and pigs ("Republic of Congo Agriculture"). Low production is often a result of outdated agricultural techniques. These farmers neglect fertilizer as a tool to improve yield simply because most cannot afford it. In the past, commercial farming has taken over the small-scale cattle ranching market. As a result small-scale cattle ranching declined significantly, but, fortunately the large-scale ranches have failed recently leaving hope for traditional ranchers. Along with cattle, goats and sheep thrive in the green pastures of Congo (International Monetary Fund 103).

Major Barriers

Although the country as a whole could achieve renowned greatness, there are problems that need to be solved in order to rid the Republic of the Congo of poverty. Improved agricultural productivity has a wall around it made of traditional methods of farming. Using improved seeds, planting methods, planting materials, and fertilizers could help bridge the gap between the state the rural farm communities are in now and how they could be doing (IFAD). The barrier for the rural people is, as of 2005, two thirds of the employed Congolese are self-employed as farmers, fishermen, or company owners. This majority usually does not make enough to live with just their job salary because of productivity decreases. They make additional money from separate informal tasks. Rural job seekers often have a difficult burden by looking for employment. Discrimination and inconvenient location only add to the difficulty of securing at least an interview (International Monetary Fund 9). Another problem the Congolese have is lack of access to food and adequate nutrition. The majority of domestic food production is cassava and tubers, root vegetables full of carbohydrates, and not much else. The country has to import over 70% of all the food consumed causing overpriced and unstable food markets and undernourished people (WFP). Additionally, 39% of households consume less than the recommended daily 2,000 to 2,500 calorie intake. The inadequate nourishment commonly results in iron deficiency, iodine deficiency, and vitamin A deficiency. Over one quarter of Congolese children less than five years old suffer from undernourishment (IRIN). All three of these setbacks could be solved or improved by stable and profitable financial situations for both the society and individuals.

Factor 1: Plant Science

By developing and implementing plant science into traditional subsistence farms, agricultural productivity could skyrocket. Currently, the technology used on subsistence farms is undeniably old-fashioned; some subsistence farms have antiquated techniques, they still use their hands and hand tools to harvest and plant. The slow process of planting and harvesting can quickly discourage a farmer from planting more than needed. With having such small crop productivity, it is easy to have less than enough food to feed the family. Like every other field, these ones are naturally vulnerable to environmental threats such as natural disasters or plant diseases; such defenselessness leaves families at risk of losing a staple food source in its entirety. Utilization of plant science is declining because clearing more land sounds more appealing than developing a more efficient seed. Expanding the presence of plant science, specifically genetically modified plants, would open subsistence farmers to a whole new world. Genes could be manipulated to create adaptable, pest-resistant, and large-yielding crops. This brand new species could be grown merely to bring food to the family table, or it could help farmers expand their income source by selling the surplus (GMO Compass).

Effects from other Major Factors

Climate volatility, sustainable agriculture, water scarcity, education, and farm to market affect plant science in different angles. Climate volatility defines what weather conditions a plant has to resist or withstand. Sustainable agriculture is the implementing of putting seeds into the ground and making sure it grows despite the threats from nature. Water scarcity makes agricultural workers establish practices that can supply enough nutrients to fields. Education prepares future scientists and farmers for projects utilizing the life-changing technology of biology. Reforming the infrastructure between rural farms and agricultural markets could diffuse financial struggles of farmers wanting to grow food for more than just themselves. Not only would this would greatly increase the flow of goods from city to city, but it would also create jobs for the surrounding communities. All of these factors affect plant science because future generations could learn to progress plant science research; the goal is make crops adapt, survive, and thrive in rural areas. Internally producing food in the Republic of the Congo would improve the economy by minimizing the percentage of imports and lowering food prices. By seeing success in one country, plant science solutions for world hunger would gain popularity across the world.

Recommendations

One of the most effective elements of enhancing plant science is the development of genetically modified seeds. According to Dr. Pinstrup-Anersen on *Talk of the Nation*, genetic engineering is commonly used in first-world countries for medicinal purposes without controversy, but fortunate people believe agricultural purposes are controversial because they do not experience true hunger like families from third-world countries in poverty. In any case, high-income countries need to assist developing countries with creating a strategy to alleviate their troubles. It is not that genetic engineering is completely uncharted territory, but that it has not been used actively enough in food to know the long term effects (NPR). Genetically modified crops often come with a bad reputation because the process of developing them can sound intimidating. The creation of new seeds is not nearly as scary as it seems though, it can potentially lead to improved crops. “DNA Plant Technology of Oakland, California...was the company responsible for inserting a fish gene into a tomato. In that case, an ‘anti-freeze’ gene that helps flounder survive frigid waters was spliced into tomato cells to enhance the plant’s resistance to cold. The fish-tomato didn’t swim” (Schmidt). Not everybody is against the use of these new seeds though. In the United States, “farmers have embraced GM technology because it saves them time and money” (Schmidt).

Funded by the USAID, the Agricultural Biotechnology Support Project II (referred to as ABSPII) supports developing countries in making “informed decisions about agricultural biotechnology....[It] helps boost food security, economic growth, nutrition and environmental quality in Africa, India, Bangladesh and the Philippines” (Cornell University). This would coincide with Dr. Pinstrup-Anersen's statement of developed countries simply helping developing countries, not taking the reins and making decisions for them.

By collaborating with ABSPII, the Republic of the Congo could come together as a nation and determine the course of action that should be carried out. Communities throughout the entire country, including tribal communities, would assume responsibility of educating their designated district of what exactly genetic engineering is, the advantages, the disadvantages, the risks, and the benefits. Each community would vote on who should be their representative in the government committee for genetic engineering in agriculture and foods. The representative would go to a national congress in Brazzaville, where ABSPII members would be present as moderators, and, if one wishes to, present his or her reasoning to the opposing view. This debate would be broadcasted over radio and television in attempt to reach as many people as possible. After all representatives have met with their communities to decide on which viewpoint to stand behind, one more congress would take place in order to make the decision as a nation. This way the people that make the decision are the ones who would be most affected by it. All a typical

rural family needs to do to become educated on the topic at hand and participate in the democratic decision making.

Conclusion

As children become adults, they realize that not all change is welcome, not all change is fun. Change will not happen effectively if the person does not put effort into it. History has shown that working up the ladder has much longer lasting effects than getting pulled up the ladder. Larger developed countries can provide genetic engineering technology, genetically modified seeds, and up-to-date techniques for farming, but they are powerless in forcing the Republic of the Congo to utilize and continue to develop the resources given. Food insecurity factors of sporadic crop yield, low livestock, increasingly expensive food markets, obsolete agricultural technologies, and plant diseases can easily be reduced to a manageable size (WFP). By taking steps toward modernization together, the Republic of the Congo would become a stronger and eventually developed country. Until developing countries help themselves, no other nations can. Many people believe that we should leave the world in better condition than when we had arrived to preserve the planet, but I believe that we need to leave the world in better condition for future generations and the billions of people to come. The world population is expected to grow up to 9.1 billion by 2050. In order to meet the 70% more food requirement, countries all over the world need to learn how to produce and supply this increase in demand. The most efficient resolution to this challenge is implementing genetically engineered crops into farms. Scientists can generate seeds that would be more resourceful in the conditions of the world in 46 years for farmers; this way the world can minimize the use of traditional soon-to-be-obsolete seeds. Roughly one third of all the food produced in the world is wasted every year. Consequentially, all the water used to produce the 1.3 billion tons of food was wasted. Research has proven that resources used today are going to be insufficient for the amount of the people that will be depending on it (UNDESA). Genetically modified crops could potentially reduce the amount of water needed for growing, maximize the amount of mouths fed per unit, and improve balanced diets around the world by amplifying the nutrients. Too often, people define future as what lies ahead for them and not what lies ahead for humans as an entire race. We need to learn from the mistakes of yesterday to improve today for a better tomorrow for the entire world.

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