

Erica Kim
Colts Neck High School
Colts Neck, NJ
Democratic Republic of Congo, Factor 6: Sustainable Agriculture

Democratic Republic of Congo: An impoverished country with tremendous agricultural potential

The Democratic Republic of Congo (DRC) has undergone extreme turmoil over the past few decades, which qualifies them to be categorized as one of the most inchoate countries, in need of much assistance and support. Being the second largest country in Africa, with a population nearing 70 million, they have the opportunity to become a powerhouse in African development. The country's primary infrastructure has been obliterated due to the civil conflict they have been engaged in. The political environment has been extremely tenuous in the wake of the years since fighting erupted. This political unrest has caused the government to withdraw many medical and educational services so that more resources could be directed towards national security. The result is an unstable country in chaos. Brimming with potential, this country underutilizes their land and farmers which, with new methods of farming, could help support the nation and provide economic reform. Agriculture in the DRC is a key sector, employing 70% of their active population, but contributes little to the financial stability of the country, just 40% of their Gross Domestic Product (GDP). Only 25 million acres of arable land, of the country's almost 200 million, is being utilized to its full potential (Rural Poverty Portal). The Congolese culture and history complicate their ability to easily and efficiently modernize traditional farming methods. The goal for the DRC is to develop sustainable agriculture, which integrates three goals: environmental health, economic profitability, and social and economic equity ("What is Sustainable Agriculture"). If the DRC honed in on their farming potential, advancements in agriculture could stimulate the economic reform the country needs. Since the majority of the workforce is employed in agriculture, it would be to the benefit of the nation, and the citizens overall wellbeing, to modify their farming practices to a more successful and efficient type.

Domestic life in the DRC is highly survival based. Families often have 6 or more children ("Africa: Congo, Democratic Republic of the") who contribute greatly to maintaining fields and harvesting crops. Families that have more children can produce more crops, i.e., more workers that are not required to be paid. For this reason, it is not uncommon for men to have multiple wives in order to produce more offspring. Additionally, the pressure to produce more children is high because the infant mortality rate is approximately 10% (Wiese 3). The family diet usually revolves around "fufu", manioc tubers that are pounded to the consistency of oatmeal, and is accompanied by a side dish depending on the season and availability. Sweet potatoes, perch, and bananas are common additions to the fufu. Their diet also includes products from commonly grown crops from their region; these include cassava, maize, palm products, and coffee ("Countries and Their Cultures"). It is difficult and costly to import non-local foods, which results in a lack of biodiversity in their diets, leading to malnourishment and nutrient deficiencies. The Congolese have severe deficiencies in zinc, iron, and vitamin B12 which can have significant health repercussions. The majority of people living in rural areas engaged in agriculture are moderately to severely food insecure which is one primary factor that affects their life expectancy, 47 years old for men and 51 years old for women, (Encyclopedia Britannica) and their quality of life.

Another prevalent issue affecting life expectancy is the lack of access to healthcare. The number of hospitals is extremely low with only about 5 major hospitals across the whole country, which is approximately the size of the United States east of the Mississippi River (CIA). The hazardous and near impossible travel across the neglected roads to the few hospitals is very difficult, so even if the distance is manageable, the trip is not. Medical physicians are often unavailable due to their scarcity; one doctor per 10,000 people, which when compared to the United States' 242 doctors per 10,000 people (CIA) is extremely low. Additionally, medical practitioners are supported by the government, but due to conflict

and instability in the economy, they often go without payment which decreases the already small number of physicians available. An unhealthy environment also contributes to their health issues. It is normal for all village members to bathe, wash clothes, defecate, and drink from the same river which has led to only 14% of the population having access to safe drinking water (UNICEF). This, in combination with a poor diet, leads to substantial amounts of illness among the people. These people, most likely working in agriculture, are no longer fit to work and provide for their family.

Within the DRC women and children are particularly disadvantaged due to traditional values and strict gender roles. Often viewed as inferior to men, women have an even more difficult time securing food, staying healthy, and receiving an education. When eating, men are always given the opportunity to eat first, once they are satisfied, the women and children are then permitted to share the remainders (“Countries and their cultures”). This often leads to higher rates of malnourishment among children and mothers. In addition, girls are less likely to attend school when compared to boys, due to the fact that females are often required to assist their mothers in domestic chores and in the field. According to the United Nations Children’s Fund, 7.4 million children aged 5-17 are not enrolled in school, and of this 7.4 million, 4 million are females. Attendance at school is three times less likely in rural areas compared to urban. In a country where 87% of the people are living in poverty, earning less than \$1.25 per day, (“Africa: Congo, Democratic Republic of the”) it is especially difficult for women prosper.

For the rural Congolese education is a second tier priority since survival surmounts learning. According to UNICEF statistics, only approximately half of females and three quarters of males are literate. A primary education is neither free nor easily available; a monthly minerval fee of 4500 francs, or five dollars, must be paid per child in order to attend. This fee covers the cost of teachers, uniforms, and learning materials, but this fee is unable to completely support the necessary teachers. The government is supposed to pay the difference for their cost of living, but due to civil unrest, teachers often receive little compensation from the government, forcing them to threaten students for money in exchange for a good grade. The desire to exceed in school is propelled by the need to help their family rise above poverty. The result of expensive schooling is that few can afford it; the population of the DRC is mainly uneducated and unable to run their farm differently than previous successors. The lack of agricultural ingenuity and knowledge inhibits the productivity of the DRC, causing it to be low and unable to support the community. This in turn hinders the physical and intellectual growth of the youth.

Due to the fact that that the Congolese have limited knowledge on modern agricultural practices, they have resorted to a less productive method of farming known as Slash and Burn Agriculture (SBA). This agricultural practice, common among the Congolese, is also known as shifting cultivation, which can be defined as “an agricultural system characterized by a rotation of fields rather than crops, by short period of crops (1-3 years) alternated with long fallow periods (up to 20 years, but often as short as 6-8 years); and by clearing by means of slash and burn” (Pelzer, 1957). Subsistence farmers in the Democratic Republic of the Congo consist of four million families on plots of land averaging 1.5 hectares, or 4 acres (“Encyclopedia of Nations”). The farmer clears 1or more- hectares of land in the forest or savanna by chopping down tall trees for timber and burning the remaining organic matter, leaving the ashes to fertilize the soil. It is then cropped until the fertility of the soil declines, and then this is repeated in another area. After leaving the plot of land to regenerate to the same point it was when it was first cropped, the farmers return to the land and repeat the process. SBA is often affiliated with deforestation and air pollution. Each acre of land subjected to slash-and-burn deforestation releases 180 metric tons of carbon into the atmosphere. This carbon eventually reaches the Earth’s ozone layer, where it contributes to the greenhouse effect and global warming. The World Agroforestry Organization estimated that 18% of global warming is related to the clearing of tropical rainforests (Bandy 3). The trends for this factor are increasingly getting worse based on deforestation amounts for the DRC. After this initial carbon release, slash-and-burn deforestation then has a secondary consequence. Burning trees reduces the amount available to convert carbon into oxygen through photosynthesis (Dickenson 1). The deforestation related

to SBA is responsible for destroying over 2 acres of forest per second (the equivalent of 2 U.S. football fields) (Dickenson 1).

Not only is SBA inefficient and harmful to the environment, the Congolese misuse this system which yields even more negative consequences. In the DRC each farmer does not have a sufficient amount of land to allow for the necessary regeneration period, therefore not sufficient time for the fallows. The result of this is premature cropping and a lower yield, inadequate for subsistence and/or sale. The farmers are aware of how ineffective this technique is, but with no access and knowledge of any alternatives they are forced to follow what their ancestors did. Driven by the need to provide for their families each farmer often plants on only two different plots, instead of four or more, therefore rotating back to the original field too quickly. This doesn't allow for adequate time for it to regain the nutrients and the trees to regrow. Unproductive and unnecessary as it is, they are offered no means of escape from this vicious cycle.

In association with sustainable agriculture, population growth is a rising issue that will largely impact food security. The demand for higher yields becomes increasingly apparent as the population increases. The more people there are to feed, the more food the DRC needs to produce. In order to even maintain the current levels of poverty and malnourishment, harvests need to be improved. Therefore if one wishes to be food secure, they must grow even greater amounts of crops than would be usually necessary to feed the increasing population: "During 2005–2050, nine countries are expected to account for half of the world's projected population increase: India, Pakistan, Nigeria, Democratic Republic of the Congo, Bangladesh, Uganda, United States, Ethiopia, and China, listed according to the size of their contribution to population growth" (Zlotnik 1). Considering the fact that the Democratic Republic of Congo is expected to be inhabited by substantially more people in the coming years puts a lot of pressure on the farmers and the government to provide for their people. The population of the DRC is approximately 75 million currently and has an annual growth rate of 2.68% ("Africa: Congo, Democratic Republic of the"). Therefore the population should increase by an estimated 2 million people a year, causing the farmers of the region to need to yield larger harvests to have enough food for them too, making their already difficult job even harder. It is imperative that the agricultural system be improved before they receive the large *influx* of people.

Additional prevalent issues impacting the agricultural production and the lack of sustainable methods would be the presence of violence and conflict within the region. The DRC is rich in natural resources, including diamonds, copper, gold, cobalt, and uranium. Each nearby country is attempting to gain access to the plentiful resources which contributes to the ongoing African war. Uganda, Rwanda, and mining multinationals fuel the conflict by trading food, money, and military hardware to the local militias as a form of payment for the smuggled resource riches. The government is not dependable and uninvolved, restricting the nation from improving. The lack of governmental funding doesn't allow for enough peacekeepers to successfully enforce the ceasefire agreement (Shah 1). The Congolese government should hone in on the valuable natural resources, already in their possession, that are the main source of the conflict. If the riches were exported to demanding countries, it could increase the national economic stability; therefore the amount that can be invested into converting to new agricultural practices could also increase.

If another method of farming were to be implanted in the DRC, the smaller independent farmers would experience the majority of the benefit. By converting to a different method of farming, yields will increase allowing for a larger harvest and a possible surplus for sale. The agricultural sector productivity of the country is directly related to their economic development because as the amount of impoverished and uneducated people decreases more citizens are able to contribute to their country. Therefore the entirety of the country would receive a dividend, in terms of both being able to now purchase food at a lower cost and an increase in the economic stability within their country.

The implementation of alley cropping as an alternative to the destructive slash and burn will dramatically increase their harvest yield, as well as money and overall quality of life. Without the need for SBA, the amounts of pollution to the environment, erosion, and deforestation rates will slow, preserving their biologically diverse home. Alley cropping is “the planting of trees or shrubs in two or more sets of single or multiple rows with agronomic, horticultural, or forage crops cultivated in the alleys between the rows of woody plants” (“5.2 Forage Tree Legumes in Alley Cropping Systems.”). Once the Congolese farms are transitioned to alley cropping, one can expect that crop performance will increase due to the addition of nutrients and organic matter to the soil/plant system. The farmers will also experience an improvement in the physical nature of the soil environment. The addition of mulch can lower soil temperatures, reduce evaporation, and improve soil structure resulting in better infiltration, reduced runoff and improved water use efficiency (“5.2 Forage Tree Legumes in Alley Cropping Systems”). The use of trees on sloping land is necessary because the deep roots and rows of trees act as a physical barrier to soil and water movement, resulting in significant reductions in erosion losses. Improvement in weed growth is also assumed with the introduction of trees. During the fallow periods, the interspaces are shaded and may reduce weed growth, while in the cropping phase; the mulch may inhibit germination and establishment of weeds. The trees are considered a long term investment because they are of little use in the early stages of life, but once they are mature, depending on the tree, fruits, nuts, or timber can be collected for a supplementary income to the main crop. When the trees have matured and the foliage has extended into the “alley” containing the cash crops, the trees should be trimmed, after the harvest, and the trimmings can be left in the alley to decompose as a type of green fertilizer. The benefits of the shift in methods will significantly benefit the farmers of the Democratic Republic of the Congo.

In order to successfully adopt this new form of farming, a series of changes will be required over time which will ultimately allow the DRC to transition into modern, productive methods of sustainable agriculture. Given the economic, social, and political issues, the steps would need to be put into effect to sequentially arrive at alley cropping. To start, it is necessary to establish a timeline and understand realistic goals for the nation. The whole transition cannot be completed overnight; therefore the entirety of the project should be laid out to then be executed. Chronologically, the next logical step would be to inform and educate the Congolese population. In order to have the desired effect, agriculture experts should be brought in from the universities within the country and foreign countries to teach the Congolese people. This should be completed using investments from global establishments. By giving the farmers insight and knowledge about the farm they will be better suited to make scientifically sound decisions at field level. This is especially necessary due to the fact that all the knowledge the people possess about farming will be passed down through the generations. This is beneficial because once a single generation is taught, it would no longer be necessary to continue the education because families and communities will continue to pass this new information down to their offspring. It is necessary for the farmer to comply and assist in the transition to alley cropping by attending informational sessions and informing those who are uneducated in relation to the method of agriculture. Additionally the government should offer farmer incentives to each family who transitions to the newer more environmentally sustainable method. Despite the exceeding amount of advantages alley cropping has, some farmers may be reluctant to change the way they have been farming for generations. Farmer incentives would encourage them to invest in this new agricultural method. As farming communities switch from shifting cultivation to alley cropping they should receive a deduction in their tax payments as a reward for helping to maintain the environment. Finally, government officials must regulate family farms yearly. They are expected to inspect and check the maintenance of the system to ensure effectivity and provide the farmer with information on any new modern equipment available. The introduction of farmer incentives and education, relevant to alley cropping, is a temporary investment for the country because all the money and resources put into the transition will be received once the yields increase and more money is earned.

To achieve the goal of sustainable agriculture, all participants in the system, including the farmers, policy makers, researchers, retailers, and consumers, have the responsibility of promoting and encouraging environmentally safe practices. The consumers play a critical role in converting and maintaining a sustainable food system. Underutilized, the consumer's role in convincing the government to solve the issues is essential to the success. Ordinary citizens influence what the government supports simply by their purchases. If an increase in food production and decrease in grocery prices is desirable, they should only buy food grown on farms that have converted their methods of farming. When few people are willing to pay for food that, through production, is degrading the environment, both the farmers and the government will follow the money and provide the consumers with what they desire.

To attempt to start implementing this plan before 2015, it is essential to increase the average growth of the small to medium size farms. The government cannot be solely responsible for providing farmers with incentives and knowledge due to the fact that there are many other pressing issues throughout the country that also requires the resources and time of the Congolese government. The World Bank is a needed critical partner in order to implement alley cropping because their mission is to invest in countries and programs such as this to decrease the world poverty level to fewer than 3% in a decade ("About"). With their support, the pressure is not all on the government to produce the resources for educating the farmers, plus, the additional money could also be used to provide technologically improved machinery to the Congolese such as spading and pruning blades which would assist the workers.

Transitioning to sustainable agriculture is to ensure that the needs of the present are met without compromising the stability of the future generations. In order for the transition to be truly successful, it is also necessary to involve the United States' government. Our government has the ability to convince major corporations to invest in African Countries. As of now there are few investors because they are reluctant to assist in countries at war or those that are unstable. If the UN peace keepers continue to keep peace among the nation, the US can promote additional investments from US companies ultimately providing the DRC with more money and mean to implement sustainable agriculture ("African Leaders Coming to Talk Business").

Through altering the agricultural process, Millennium Development goals number one and seven, to eradicate hunger/poverty and ensure environmental sustainability, respectively, are being currently addressed. The United Methodist's Committee on Relief has recently been integrating a three year program, 2013-2016, in and around Kamina, DRC that highlights the importance of agriculture, water, and sanitation, therefore working to better these societal factors. Volunteers receive training in crop and pest management, construct wells and latrines, participate in health trainings, and engage in behavioral-change messaging. This program has effectively trained approximately 360 people to improve poverty levels in rural, farming communities in the DRC ("UMCOR"). Due to the success already exhibited by this program, it would be beneficial to provide similar services across the DRC.

The Democratic Republic of Congo is a paradox because the country's potential is extraordinary but little has been done to capitalize on it. Their 173 million acres of unused arable land and their trillions of dollars in resources remain untouched and yet the people remain impoverished, on small plots of land, struggling to survive. Their limited access to healthcare has allowed for many treatable sicknesses to claim innocent lives, leaving the agricultural work force with less healthy laborers. The lack of education and knowledge available to the Congolese farmers has left their farming methods stagnant as the rest of the world perseveres technologically. Given their situation involving recent war and ongoing conflict, the nation has been in disarray and this new agricultural process should provide assistance in establishing economic stability. The transition to alley cropping is necessary and realistic as an alternative to the destructive slash and burn, common in the country. With substantially less environmental risks and increased yields, Alley Cropping will increase the country's agricultural output, providing some necessary solidity

among the Congolese. The transformation will yield a country with the power to capitalize on the natural opportunities and riches the nation has to offer.

Works Cited

- "5.2 Forage Tree Legumes in Alley Cropping Systems." *5.2 Forage Tree Legumes in Alley Cropping Systems*. N.p., n.d. Web. 16 July 2014.
- "About." *World Bank*. N.p., n.d. Web. 01 July 2014.
- "Africa: Congo, Democratic Republic of the." *Central Intelligence Agency*. Central Intelligence Agency, n.d. Web. 19 July 2014.
- Bandy, Dale. "Alternatives to Slash and Burn." *World Agroforestry*. International Center Research and Agroforestry, n.d. Web. 15 July 2014.
- "Countries and Their Cultures." *Culture of Democratic Republic of the Congo*. Every Culture, n.d. Web. 19 July 2014.
- Dickenson, Robert E. "Project Amazonia: Threats- Deforestation." *Deforestation*. N.p., n.d. Web. 21 July 2014.
- "Encyclopedia of the Nations." *Agriculture*. N.p., 2011. Web. 21 July 2014.
- "Feeding the World without Consuming the Planet." *News Office*. Massachusetts Institute of Technology, n.d. Web. 22 July 2014.
- Johnson, Gordon. "Flooding Waterlogged Soils and Vegetables." *Vegetable Crops* (2013): n. pag. *Cooperative Extension*. University of Delaware, 7 June 2013. Web. 22 July 2014.
- Kang, B.T. "Potential for Sustainable Agroforestry and Alley Farming in Tropical Africa." *Soil Tillage in Africa*. National Resources Management and Environmental Department, n.d. Web. June-July 2014.
- Pelzer, K.J. *Proceedings Ninth Pacific Science Congress*. Land Utilization in the Humid Tropics. Vol. 20. N.p.: n.p., 1957. Print.
- "Rural Poverty Portal." *Rural Poverty Portal*. IFAD, n.d. Web. 18 July 2014.
- Shah, Anup. "The Democratic Republic of Congo." *-Global Issues*. N.p., 21 Aug. 2010. Web. 31 July 2014.
- "Statistics." *Democratic Republic of the Congo*. UNICEF, n.d. Web. 18 July 2014.
- Ulimwengu, John, Cleo Roberts, and Josee Randriamamonjy. *Curbing Food Nutrient Deficiency: A Search For Cost Effective Diets*. Dounia. N.p., n.d. Web. 19 July 2014.
- "UMCOR." *Alleviating Food Insecurity in Southern Congo*. United Methodist's Committee on Relief, n.d. Web. 01 Aug. 2014.

Wiese, Bernd Michael. "Drainage and Soils." *Encyclopedia Britannica Online*. Encyclopedia Britannica, May-June 2014. Web. 16 July 2014.

Zlotnik, Hania. "World Population to Increase." *UN News Center*. UN, 24 Feb. 2005. Web. 21 July 2014