

John Cole  
Oberlin High School  
Oberlin, OH  
Ethiopia, Factor 2

### **Ethiopia: Water Conserving Farm Practices Help Sustain Agribusiness and Economy**

One of the oldest known civilizations of the world (Doressse), The Federal Democratic Republic of Ethiopia is a landlocked, mountainous country located in the North-Eastern Horn of Africa. Ethiopia is a struggling nation in which the economy has improved over recent years, yet the country still contends with wide-spread poverty, malnutrition, and drought. The numerous problems of the nation could be alleviated however, through a combination of government policies and funding, foreign aid, and economic stimulation through the implementation of innovative trade practices such as the Ethiopian Commodities Exchange, and involvement of private sector partners in the emerging, exotic floriculture industry. With the funds gained through those means, the water conserving farm practice of drip irrigation could be applied nationally and farmers throughout the country could save water they would have used on crops, while still increasing crop yield. The water could go towards potable water, and the crops gained through drip irrigation would help feed the farmers themselves, with more left-over for profit to buy more crop seeds. Thus creating a sustainable environment for even the poorest of smallholder farmers. This would end the unacceptable cyclic poverty of Ethiopian farmers, and be a major step into turning Ethiopia into a prosperous country.

Food insecurity is an unsettling concept. While it seems to not be a huge problem, as not many people in first world countries have to deal with it, in reality food insecurity is an issue millions of people around the world deal with on a daily basis. For those aware of numerous situations in other countries, the question often arises “how can I help?” and is followed by commercials showcasing starving children who could be fed by just a dollar a day donation. While organizations prompting donations are noble and do help, foreign aid is no permanent step towards eradicating food insecurity, not on it’s own at any rate. Foreign aid has been used as a mechanism to speed up development in poorer countries that struggle to finance domestic investments needed to fuel economic growth. However, aid assistance has not met its intended purpose if it is solely relied upon to alleviate a country’s strife. Trends in aid have been decreasing over the years, poverty levels are still at record highs and many developing countries seem worse off than before in their effort to end the vicious cycle of borrowing more to pay off their debt (Rural Poverty Portal).

Ethiopia, which is the second most populated country in Sub-Saharan Africa, is experiencing rapid population growth. The population is very young and is one of the least urbanized in the world. Ethiopia is the tenth largest country in Africa, home to nearly 85 million people, over 50% of which are under the age of 18. Ethiopia is also one of the poorest countries in the world, where many citizens earn less than one US dollar a day, not enough to feed their families or even themselves (World Factbook).

While the level of education in Ethiopia is very low, most Ethiopians are literate and know how to read and write. About 49% of males attend primary school while only 28% of females do. Households headed by women are particularly vulnerable to poverty. Women are much less likely than men to receive an education or health benefits, or to have a voice in decisions affecting their lives. For women, poverty means higher infant mortality rates, undernourished families with micronutrient deficiencies, limited opportunities for education for children and other deprivations (Rural Poverty Portal).

Ethiopia has close historical ties with all three of the world's major Abrahamic religions. In the 4th century, the region is one of the first in the world to officially adopt Christianity as the state religion. While no longer distinguished as a state religion, it remains the majority faith. There is also a substantial

Muslim demographic, representing about a third of the population. Surprisingly, the religious diversity in Ethiopia has not led to widespread conflict. In Ethiopian culture it is common practice for two families to join when a man and woman are married, making the household size usually upwards of 12 people. This includes children, grandparents, and other extended family. In rural areas family planning is not common due to religious reasons and couples normally have children soon after marriage. This lack of population control has caused the Ethiopian population to skyrocket, almost tripling over the last thirty years. The Ethiopian diet is mainly composed of cereals (maize, sorghum, teff), tubers and root crops (ensete, potatoes, sweet potatoes), pulses and oil seeds. Despite a large livestock population, the food supply of animal products is very limited, and consumption of these products is especially low in rural areas, except in nomadic areas where milk is a major component of the diet. Environmental and man-made factors cause widespread and severe food insecurity. The dietary energy supply is not sufficient to meet population energy requirements and almost half of the population is undernourished (Food and Agriculture Organization).

Besides being quantitatively insufficient, food supplies also lack diversity. High incidence of infectious diseases and nutritional deficiencies, low immunization coverage, and very low access to improved water sources and sanitation are the major factors contributing to high morbidity. Due to a shortage of skilled health personnel and health facilities, access to basic health care is still very limited. According to the head of the World Bank's Global HIV/AIDS Program, Ethiopia has only 1 medical doctor per one hundred thousand people. However, the World Health Organization's 2006 World Health Report gives a figure of one thousand nine hundred and thirty six physicians (for 2003) which comes to about 2.6 per one hundred thousand. Globalization is said to affect the country, with many educated professionals leaving Ethiopia for a better economic opportunity in the West. Consequently, infant and under-five mortality rates in Ethiopia remain very high. The maternal mortality ratio also remains unacceptably high. Comparatively, the US is estimated at three physicians for every one thousand people, which means that one thousand Americans have access to better medical care than one hundred thousand Ethiopians.

The majority of the Ethiopian population is rural and agrarian. Agriculture provides for 46.6% of the gross domestic product (GDP) and 85% of total employment in Ethiopia. Ethiopia has enormous potential for agricultural development. At present only about 25 per cent of its arable land is cultivated, and agriculture is dominated by subsistence rain-fed farming, using few inputs and characterized by low productivity. Rain-fed farming is a practice of farming when the farmer relies on rain as a water source to hydrate his crops. It is an infrequent and inefficient method which cuts crop yield down significantly. The vast majority of farmers are smallholders.

A smallholder farmer is a farmer who has a very small farm, and doesn't cultivate much income from that farm. Smallholder farmers form the largest group of poor people in Ethiopia. More than half cultivate plots of 1 hectare or less and struggle to produce enough food to feed their households. One hectare of land is equivalent to only two acres or 10,000 square meters. A large number of poor households face a prolonged hunger season during the pre-harvest period. The main types of livestock kept in Ethiopia are cattle, sheep, and goats. Herders, like farmers, are vulnerable to increasingly frequent drought, which can wipe out their livestock and assets and bring on severe poverty.

High population growth has forced farmers onto smaller and smaller plots of land with each generation, even as forests disappear to accommodate more land for farming and grazing. Declining forests and grazing area contributes to soil degradation on croplands, as households are forced to burn animal dung as fuel and graze all available crop residues, rather than returning such materials to the soil. Over time, this affects both crop yield and the environment negatively.

In terms of its infrastructure the Ethiopian agricultural system is lacking in several areas: an ineffective and inefficient agricultural marketing system, an underdeveloped transportation and communications

network, lack of participation by rural poor people in decision-making that affects their livelihoods, and environmental degradation (Rural Poverty Portal). Add to this list of flaws the fact that in the agricultural sector there are not enough edible crops being produced. For a country relying on agriculture, having an inadequate system to sustain its own population is not an ideal situation for the Ethiopian people and their quality of life.

In terms of marketing, Ethiopian farmers are not able to attain the proper value of their crops, because market access is limited and volatile. Farmers in remote areas find it difficult and costly to transport their crops and livestock over long distances on bad roads. In northern Ethiopia, for example, the average distance to the nearest market town is nearly 40 kilometers. Ethiopian farmers do not have access to trucks or vehicles to transport their crop, so instead they trade with other poor farmers or undersell their crop at a closer market for less of a profit. Water shortage and having no way to transport crops over longer distances means farmers cannot go as far to sell their crop, furthering their profit reduction. Even if many farmers were able to load their crops onto a truck to be exported for maximum profit, getting the harvest out of Ethiopia to another country or to a trade barge is near impossible, and very costly. Ethiopia's mountainous, landlocked terrain makes exporting and importing goods a problematic task, and prices of items that are imported are extremely high to cover transportation costs. In the same way, crops and items that are exported relinquish profit to cover the exorbitant shipping expenses.

In recent years however, Ethiopia has seen economic growth in the agricultural sector, in two areas. Firstly, the floriculture industry in Ethiopia has bloomed rapidly. Flowers are luxury products with high social and economic value in most societies. Global demand reached US \$40 billion in 2008. The floriculture industry is an example of a successful diversification into non-traditional markets. The industry emerged in the late 1990s, and despite being a late-comer, Ethiopia has become the second largest flower exporter in Africa (after Kenya) with speculations of increased future growth. Export value earned is expected to increase to US \$550 million by 2016. Climate conditions have made Ethiopia a favorable cultivation site for such products as it is situated in the tropics, with its diverse range of altitudes. Additionally, the Ethiopian Government, the Ethiopian Horticulture Producers and Exporters Association (EHPEA), and international investment played key roles in Ethiopia's floriculture industry development. The EHPEA, which included private sector entrepreneurs, has been instrumental in gaining government support in the sector. The organization's aim was to promote the sector. The floriculture industry has stimulated the Ethiopian economy most by creating over 100,000 jobs and helping to decrease poverty in some areas (Consultancy Africa Intelligence).

The second cause of Ethiopia's newfound economic prosperity is the creation of the Ethiopian Commodity Exchange (ECX) in 2008. Founded by Stanford-educated economist Eleni Gabre-Madhin, the ECX provided a reliable interface for buyers and sellers to meet was established, prompting other underdeveloped African countries to follow suit (Everitt). As the first commodity exchange in Africa, the ECX has created a way for buyers and sellers of agricultural products to more easily create and honor contracts for better prices, eliminating the middle-men and increasing farmers' profit margins, creating a pool of wealth which could in time form a reliable tax base that funds their own basic services (BBC).

While such developments have greatly improved the quality of life for some farmers and distributors in Ethiopia, the problem arises in that not every farmer has access to the commodity exchange. Ethiopia has one of the most underdeveloped telecommunications networks in the world, leaving most people without telephones, let alone internet access. This presents a huge problem for farmers who live across the country from the ECX, and would have to cross the Great Rift Valley or the Ethiopian highlands, to be able to trade their crop. As this is not an option, other means would have to be devised for the entire country to prosper as the cities and villages in proximity with the ECX do.

Agriculture is dependent upon water. Water scarcity is a realistic situation for all of Ethiopia, not just water for use in farming, but access to potable drinking water is also severely limited. Ethiopia is a drought-prone country and the country's predominant farming practices rely on the rainy season for hydration. Irrigation systems are not commonly used and water conservation techniques are not adequately used to increase crop production and preserve this precious resource. With climate change, erratic weather and increasingly common droughts, which affect crop yield across the country, Ethiopian farmers are put into an unfortunate predicament. Issues such as climate change and poverty only make water more scarce in Ethiopia, so the problems are worsening. Currently, the water supply of Ethiopia is among the lowest in Sub-Saharan Africa. Ethiopia already has an extremely fast growing population, and if population growth continues at a steady rate, energy and water demands will exceed the country's available supply. In this case, Ethiopia would likely have to rely on foreign aid and incur millions, if not billions of dollars in debt, as they did in attempting to respond to other great famines the country has had in the past.

If farming practices were adapted to conserve and regulate water usage through sustainable methods however, there would be enough water for both food production and human consumption. Specifically, if the practice of drip irrigation was implemented nation-wide, the water conserved could be used in other ways, and crop yield would be significantly larger. If government policies in Ethiopia would encourage the adoption of drip irrigation technologies, and partially fund installation of regional water transport and irrigation systems, farmers would have even more incentive to adopt these improved agricultural methods.

Drip irrigation is an irrigation method that saves water and fertilizer by allowing water to drip slowly to the roots of plants, either onto the soil surface or directly onto the root zone, through a network of valves, pipes, tubing, and emitters. It is done through narrow tubes that deliver water directly to the base of the plant. Rather than flooding the land at infrequent intervals, crops are exposed to small amounts of water in frequent or continuous doses. The result is a much more efficient use of a tight water supply in arid climates. Created by Daniel Hillel, an Israeli-American scientist who helped develop and spread the idea of micro-irrigation agriculture, or drip irrigation. The system was first implemented in the Middle East, but today has spread to many different countries around the world including India and the United States. Daniel Hillel won the 2012 World Food Prize for his breakthrough in crop irrigation (Rai).

A project as immense as a nation wide irrigation distribution would easily require millions of dollars. To fund the project, public sector investments from the Ethiopian government and the market stimulation that the floriculture industry and ECX brings could be used. Private corporations involved in the floriculture industry could make donations or investments in the project. Young Ethiopian entrepreneurs are keen to invest in their country's future with infrastructure projects like this. Many of these young people are making money off of the ECX and abroad, and they could easily be shown the benefit of having a drip irrigation system across Ethiopia's farmlands, and would invest in that. While foreign aid is not a permanent solution by any means, money provided for this venture would surely speed up the development process and Ethiopia would be able to pay back any debt accrued. The World Bank, IMF, and other international organizations could distribute loans to the Ethiopian government to allow them to undertake the project. Once the system is in effect, crop yields are raised, and water is saved, the consequent prosperity would allow the government to pay back any such loans.

Farm families could even play a role in implementing the irrigation system and stimulating agribusiness and therefore, the Ethiopian economy. The farmers will need to be educated and convinced that the new system will be profitable due to the fact that it is designed specifically for the arid conditions of the local environment. Researchers, teachers, and farmers will need to work together in order to develop and implement the most optimal sustainable methods of growing crops.

Currently, there are several local Ethiopian programs that try to aid malnutrition and water scarcity, such as The Water Project (Shore), and a community based nutrition program that educates mothers the proper way to feed their infants in order to prevent child malnutrition. Thanks to community programs such as this, and a range of other interventions, child malnutrition in Ethiopia has dropped from 57% in 2000 to 44% in 2010 (World Bank). The adoption of drip irrigation technologies will conserve scarce water supplies and improve crop yields, reducing malnutrition, increasing household income, and stimulating local economies. In effect, it has the potential to improve the livelihoods of millions of Ethiopians.

The average Ethiopian family may not get enough to eat, or enough water to drink, but with a drip irrigation system, thousands of gallons of water could be saved nationwide and distributed throughout the population to supplement what already is available. Averting food crises in the future requires increasing the incomes of the vast majority of the population. With the increased crop yield from this amazing system, there would be more food to sustain the population, or more commodity crops to be sold to provide farmers' with disposable income. This would support the creation of a thriving middle class, create more jobs, and spur economic growth. By saving water, not only will more be available for consumption, but it will also not deplete the country's water tables. In other countries, like the United States, over-farming has been so prevalent in some areas that natural, underground stores of water which have been there for millions of years have gone completely dry (Brown). If Ethiopia, an already water deprived nation had no water tables left, the agribusiness that the country so heavily relies on would perish. Water is the foundation of the Ethiopian economy, and creating a more efficient system for conserving it will help the entire country flourish.

## Works Cited

- Alaigh, George. "How British Aid Is Helping Ethiopia's Economy to Grow." *BBC News*. BBC, 20 May 2013. Web. 22 Aug. 2013. <<http://www.bbc.co.uk/news/world-africa-22596218>>.
- Brown, Lester. "Water Tables Falling." *TreeHugger*. N.p., 2 Aug. 2007. Web. 22 Aug. 2013. <<http://www.treehugger.com/natural-sciences/water-tables-falling.html>>.
- "Desert Agriculture and Agroforestry." *Mission 2014: Feeding the World*. N.p., n.d. Web. 22 Aug. 2013. <<http://12.000.scripts.mit.edu/mission2014/solutions/desert-agriculture-and-agroforestry>>.
- Doresse, A. Jean. "North East Africa's Ancient Civilizations." *OROMOCENTRE*. N.p., n.d. Web. 22 Aug. 2013. <<http://oromocentre.org/oromian-story/special-report-on-the-long-history-of-north-east-africa/>>.
- "Ethiopia." *Central Intelligence Agency World Factbook*. N.p., n.d. Web. 21 Aug. 2013. <<https://www.cia.gov/library/publications/the-world-factbook/geos/et.html>>.
- "Ethiopia Community-Based Nutrition Program Helps Reduce Child Malnutrition." *The World Bank*. N.p., 16 Oct. 2012. Web. 22 Aug. 2013. <<http://www.worldbank.org/en/news/feature/2012/10/16/ethiopia-community-based-nutrition-program-helps-reduce-child-malnutrition>>.
- Everitt, Lauren. "How Africa's First Commodity Exchange Revolutionised Ethiopia's Economy." *The Guardian*. The Bill & Melinda Gates Foundation, 13 Dec. 2012. Web. 22 Aug. 2013. <<http://www.theguardian.com/global-development/2012/dec/13/africa-commodity-exchange-ethiopia-economy>>.
- "Nutrition Country Profiles: Ethiopia Summary." *Food and Agriculture Organization*. N.p., n.d. Web. 22 Aug. 2013. <[http://www.fao.org/ag/agn/nutrition/eth\\_en.stm](http://www.fao.org/ag/agn/nutrition/eth_en.stm)>.
- Oboite, Nanya. "Ethiopia's Answer to Aid Dependency: The Flower Export Industry." *Consultancy Africa Intelligence*. N.p., 16 Apr. 2013. Web. 20 Aug. 2013. <[http://www.consultancyafrica.com/index.php?option=com\\_content&view=article&id=1273:ethiopian-answer-to-aid-dependency-the-flower-export-industry&catid=90:optimistic-africa&Itemid=295](http://www.consultancyafrica.com/index.php?option=com_content&view=article&id=1273:ethiopian-answer-to-aid-dependency-the-flower-export-industry&catid=90:optimistic-africa&Itemid=295)>.
- Rai, Neena. "Drip, Drip, Drip." *The Wall Street Journal U.S. Edition*. The Wall Street Journal, 15 Oct. 2012. Web. 21 Aug. 2013. <<http://online.wsj.com/article/SB10000872396390443855804577602930583558076.html>>.
- "Rural Poverty in Ethiopia - Rural Poverty Portal." *Rural Poverty Portal*. N.p., n.d. Web. 22 Aug. 2013. <<http://www.ruralpovertyportal.org/country/home/tags/ethiopia>>.
- Shore, Rebecca. "Water in Crisis - Ethiopia." *The Water Project*. N.p., n.d. Web. 22 Aug. 2013. <<http://thewaterproject.org/water-in-crisis-ethiopia.php>>.