Jessica Taylor
W.B. Saul High School of Agricultural Sciences
Philadelphia, PA
Egypt, Factor 6

Egypt: Desisting Erosion and Desertification with Sustainable Agriculture

The Nile is considered the longest river in the world. It is the only body of water that flows directly through Egypt, splitting the country in two. For thousands of years, it has flooded annually bringing many valued minerals and nutrients to Egyptian Soils. The silt deposits from these floods made the surrounding banks of the Nile exceptionally fertile allowing farmers to grow valuable crops for trade and subsistence farming. There is no doubt that the Nile alone gave the ultimate food security to smallholders in the country. For instance, wheat is one of the most needed crops in the middle east, a place where food insecurity is not uncommon. It must be exposed to full sunlight in a fairly dry climate with adequate, fertile soil. Ancient Egyptians were able to thrive because the combination of the Nile's flooding and the natural climate made their land perfect for this and other varieties of crops. Today, approximately 78.7 million people still live in the Nile valley, leaving the other 2.3 million people in the country living in the otherwise inhabitable surrounding areas.

Though the floods of the Nile are much needed and always have been, the country is so heavily populated that a flood as great as the Nile's could take the lives of millions at its banks. Consequently, the agricultural advantage of these floods was ended in 1970 with the completion of the Aswan Dam. The purpose of the Dam was to regulate flooding while storing water for agriculture. It also provides the country with hydroelectricity. These plans have been extremely counterproductive. The expansion of irrigation in desert areas after the completion of the Dam has increased soil salinity and provoked the spread of waterborne diseases throughout the country. In 1994, U.S. Soil Surveys calculated that over 28 percent of Egyptian land had been damaged by increased salinity, while most waterborne diseases were proven to be a direct result of excessive chemical pesticide and herbicide use. One of the most well known waterborne diseases in Egypt is Schistosomiasis. Schistosomiasis was most prevalent at irrigation sites in standing water, making agricultural workers three times more susceptible than others. The Aswan High Dam provoked the spread of this sickness in Upper Egypt where the Dam permits perennial agriculture and keeps a constant collection of standing water. Furthermore, agricultural land has been lost to desert winds and urbanization.With the average population growth per year at 2 percent, their system of agricultural production is virtually unsustainable. It cannot produce enough food for the population at a lasting duration because it destroys the natural conditions that make sustainable agriculture possible.

One of the most important factors of agricultural production in Egypt is family labor, where 55 percent of all Egyptian families are subsistence farmers and smallholders. The average household has six to ten family members but it is common to include more than one family in a household. This is because most married sons will continue to live with their parents during the first years of their marriage along with any unmarried sons and daughters. These families work an average of ten hours a day or 2,500 to 3,000 hours per year in farm related activities. Women in rural families are most useful in production, processing, and marketing, but the magnitude of their role varies largely with their ethnic group and religion. This is also true for children, who perform many tasks such as bird scaring, weeding, collecting firewood, caring for

livestock, etc.. Rural families rely solely on soil fertility and sustainable agricultural practices to keep afloat. The farm size for the typical rural family stretches from two to ten acres, making Egyptian farms significantly smaller than those in surrounding areas. The area cultivated per farm usually depends on the size and composition of the family labor force.

Machinery is not available in most of the country's rural areas. For that reason, most small farmers use hand tools and human labor to till their land. These include, but are not limited to, metal hoes, machetes, knives, and digging sticks. The shift from hand cultivation to animal traction cultivation has been developing for more than 50 years, but it is still only a small source of farm power in most North African countries. Agricultural expenses are a small portion of the total value of farm production because purchased supplies, such as fertilizer and chemical pesticides, are not commonly used by Egyptian farmers. For instance, most fertilizer is produced in the form of organic manure.

Smallholders use a slim variety of agricultural practices to try and sustain the land. However, these techniques are not modern and with a constant cycle of soil degradation and water contamination, they must be forced to work longer, more excruciating days to supply basic needs for themselves. Only 2 percent of farmers have adapted modern technological advances. Most of them have become used to, or content with practices such as monoculture and intensive tillage. These practices may at first seem effective and profitable. However, these techniques promote excessive pesticide/herbicide use and degrade the soil quality. Also, monoculture lowers the genetic diversity of crops because it specializes in growing only one crop on a large scale.

Some important crops produced are cotton, corn, rice, wheat, vegetables, and fruit as well as clover for livestock feed. Farmers also have a variety of beans and citrus fruits to eat. For financial reasons, most keep a portion of their crops as food for themselves. Egyptian people eat rice, bread, beans, fruits, and vegetables daily. Those with greater incomes may indulge in red meat, and alcoholic beverages. However, the society is mostly Muslim, and many may not consume alcohol or pork.

Diets such as this generally make up typical healthy eating habits. However, other surrounding factors easily affect the health status of all farm families everyday. Public health clinics have been spread evenly throughout the country since the 1980s. However, their services are conventionally insufficient because there are not as many doctors, nurses, and modern medical equipment as is needed to suitably serve the general population. Most medical staff are employed in urban areas. Fewer than 30 percent of doctors and 10 percent of nurses serve rural areas. Rural health care is often usually poorly administrated and late on arrival. For instance, in 1990 unregistered midwives assisted 50 to 80 percent of all births because hospitals are generally too far and some are simply too expensive.

It is my assessment that Egypt faces almost impossible factors that prohibit the increase of agricultural productivity. I am mainly referring to poor soil quality and heavy soil erosion. These necessary agricultural factors slow down the economy and make farming in Egypt more challenging each year. Reducing erosion, soil depletion, and chemical pesticide use is dependent on the effort to implement sustainable practices in agriculture. For example, farmers are trying to farm in deserts using out of date and ineffective farming methods. They are not able to grow a sufficient amount of crops fast enough to support themselves. People are hungry, poor and malnourished. It would become life changing for rural

families if we promoted and demonstrated the value and support of modern, sustainable agricultural methods on their farms.

I believe that it is the responsibility of the Egyptian national government to ensure that low input sustainable agricultural education is taught in the community. Organizations and companies promoting sustainable agriculture, water and soil quality, anti-pollution, and ending world hunger should be appropriately funded by the host country or other interested parties. Egypt may have the resources it requires to grow corps, but farmers must understand how to preserve, use, and maximize the land they possess. Otherwise, problems like erosion and soil fertility do not end on their own.

We must further keep in mind that soil erosion is also susceptible to other limiting factors that encourage its continuation. Climate change, population growth, energy demand, urbanization and pollution are all interconnected and each in their own way degrades the land and its people. For instance, population growth increases the demand for food. Since the climate is not suitable for such amounts of food to be produced, the percentage of people that face food insecurity is greater. Urbanization causes air, water, and oil pollution. Pollution makes farming harder because the natural resources that are needed are contaminated by the ignorance of the people. Now we face a complex web of linked environmental issues blocking the way to a sustainable future. Decades from this day some of these same issues will still exist in the rural areas of Egypt if adequate sustainable agricultural methods are not advocated. The population will never stop growing. People will never stop eating. All families, urban and rural, have to work toward a sustainable future to survive. Preservation is vital. The wise and appropriate use of resources creates more food and the implementation of modern agricultural tools and practices put the soil at the quality it needs to be and saves water. Food insecurity does not have to exist in rural areas when there are more than enough ways to battle it.

Consider the two most prominent types of erosion: wind and water. Water and wind erosion in Egypt only become worse with the passing year. But through simple agricultural innovations, like ditching and hedging, these affects can be controlled and managed. This allows farmers go to from subsistence farming to not only eating what they grow, but having enough left over, in good quality, to sell for maximum profit. This maximization of profit promotes the growth of the economy and poverty reduction. More money is flowing and more people are economically stable. Additionally, farmers can use some of this money for mulch and additional hedging. Hedging will also help to prevent erosion because they prevent run-off by absorbing and reserving water and nutrients for the plant.

I also propose that the increased salinity in the soil can be reduced by limiting the amount of water used and recycling water as much as possible. This is because all water, including rain, has some amount of salt in it. Additionally, non profit organizations (CARE, Peace Corps, USAID, etc.) can input their agricultural knowledge to teach the selection and use of native plants that have high salinity thresholds.

When there are no crops on a field, and a field is fallow, it should always be in a smallholders best interest to keep a vegetative cover, with strong roots, that will hold the soil in place until it is time to plant again. This will help to maintain a good soil structure and reduce erosion. Cover cropping can be an expensive sustainable method but needs to be supported by the host country. Another good way to

maintain and preserve soil structure is to limit the use of practices involving heavy tillage of the soil. Constantly turning large areas of the soil loosen its structure so much that the wind erosion is devastating.

Furthermore, agricultural practices such as crop rotation and grazing help to restore the organic content of the soil. Grazing simulates the growth of native plants and often prevents the development of non-native species. The urine and feces of the grazing animals restores natural minerals to the soil, recycling potassium, phosphorus, nitrogen and other very important components in soil quality. Animal secretion also brings insects and other organisms that aid in water filtration. Likewise, crop rotation is very good for the soil. In crop rotation, a variety of plants are grown each season mostly to prevent the infestation of pests, reducing the need for chemical pest control. Crop rotation puts nitrogen and other nutrients into the soil each season to increase soil fertility. It can also improve the soil structure if the crops that are being plants grow deep roots. This also greatly decreases the effects of water and splash erosion because of the plant residue that is left after a harvest.

Bringing Food security to the people has never been easy, but that does not mean that it cannot be achieved. Frequently using sustainable techniques increases food production dramatically, keeping the soil healthy and the water clean. The people of Egypt need to be empowered appropriately, with a bottom up approach to learn how low input agriculture can ward off the ill effects of soil erosion and the causes of desertification.

The Egyptian world is a beautiful one, full of culture and tradition, but littered with hardships and pollution. The fertility it has always been known for is diminishing and the water of the great Nile river is filthy with silt and disease. Under these conditions, widespread education and implementation of sustainable agriculture is essential and gives people the food security that they need. Smallholders work hard to provide food and shelter for their large families. They eat what manages to grow and sell the rest for little gain. The development of modern sustainable techniques, similar to the ones I’ve mentioned and more, will fight soil erosion, desertification, water contamination, hunger and also boost the economy. The challenge to produce enough food stock in short intervals of time is astonishingly different, but it can be done through sustainable farming and appropriate education.

Works Cited

"ACDI/VOCA." *ACDI/VOCA*. N.p., n.d. Web. 18 Aug. 2010. <http://www.acdivoca.org/site/ID/Egypt-Heinz-USAID-ACDI-VOCA-Innovations-Tomato-Farm-Success>.

"Africa: Egypt." *The World Factbook*. CIA, n.d. Web. 23 Aug. 2010. <https://www.cia.gov/library/publications/the-world-factbook/geos/eg.html>.

Agriculture in Egypt from Pharaonic to Modern Times (Proceedings of the British Academy). London: British Academy, 1999. Print.

"Crop rotation." *Online-Information-Service*. N.p., n.d. Web. 24 Sept. 2010. <http://www.oisat.org/control_methods/cultural__practices/crop_rotation.html>.

"Culture of Egypt - traditional, history, people, clothing, traditions, women, beliefs, food, customs, family, social, dress, marriage, men, life, population, religion, rituals." *Countries and Their Cultures*. N.p., n.d. Web. 18 Aug. 2010. <http://www.everyculture.com/Cr-Ga/Egypt.html>.

Dictionary, Websters. *Webster's New College Dictionary*. 3 New Upd ed. Boston: Houghton Mifflin Company, 2008. Print.

"Egypt - HEALTH AND WELFARE." *Country Studies*. N.p., n.d. Web. 10 Sept. 2010. <http://countrystudies.us/egypt/72.htm>.

"Egypt background." *eTravel.org*. N.p., n.d. Web. 24 Aug. 2010. <http://etravel.org/places/middleeast/egypt/view,background>.

"Environment - Egypt - area, farming." *Encyclopedia of the Nations - Information about countries of the world, United Nations, and World Leaders*. N.p., n.d. Web. 20 Aug. 2010. <http://www.nationsencyclopedia.com/Africa/Egypt-ENVIRONMENT.html>.

Gliessman, Stephen R.. "The Need for Sustainable Food Production Systems." *Agroecology: The Ecology of Sustainable Food Systems, Second Edition*. 2 ed. Boca Raton: CRC, 2006. 3-7. Print.

Merriam-Webster. *Webster's Thesaurus for Students, Third Edition*. 3 ed. Riverside: Federal Street Press, 2010. Print.

Sadek, Adel. *Supply Response In Egyptian Agriculture (St Antony's Middle East Monographs)*. Reading: Ithaca Press (Gb), 1991. Print.

"The Egyptian Farming Practices Technological Development and Its Determinants." *IDEAS: Economics and Finance Research*. N.p., n.d. Web. 22 Sept. 2010. <http://ideas.repec.org/p/ags/ifma05/24278.html>.

"The Egyptian Farming Practices Technological Development and Its Determinants." *IDEAS: Economics and Finance Research*. N.p., n.d. Web. 22 Sept. 2010. <http://ideas.repec.org/p/ags/ifma05/24278.html>.