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The Next Generation: Sustainable Agricultural Practices in Kenya

With a population of nearly 40 million people, 79% of Kenyans live in rural areas and depend on agriculture as their main source of income. Kenya's rural population provides 75% of the total agricultural output of the country, and most Kenyans live in areas that have good to high potential for agriculture. Over 8% of Kenya's total land area is arable, or able to be farmed, with permanent crops taking up about 500,000 hectares. While rural areas account for the majority of Kenya's population, they also account for much of Kenya's poverty. Kenya's rural poor include smallholder farmers, many of which are headed by women, herders, farm laborers, AIDS orphans and people with disabilities. The resources that these people use to make a living are all shared resources: water, soil, crops and livestock. In order to have a lucrative farm, smallholder farms need secure access to land and water, finances to afford equipment and provide for their family, and access to marketplaces and other locations to sell their products ("Food Prices: Smallholder Farmers"). In recent years, rural financial services have been implemented to assist farmers in paying for seeds, tools and fertilizer, as well as services to pay off loans and debt. When it comes to access to soil and water, however, increasing numbers of smallholder farms have reached a setback. The International Fund for Agricultural Development (IFAD) has reported the strong connections between poverty and environmental degradation, particularly poor water management, soil erosion, declining soil fertility and land degradation ("Rural Poverty in Kenya"). Millions of people in Kenya are dependant on agriculture practices that deplete the very resources they need to survive.

World population is expected to grow 50% by 2050, and food production will need to rise by 50% by 2030 to meet growing demand. Large commercial farmers in developed and food-exporting countries are meeting much of the increase demand for food, however, smallholder farms are also efficient in terms of food production and more importantly, have tremendous potential for growth ("Food Prices: Smallholder Farmers"). Though, because they're not using sustainable agricultural practices, both commercial and smallholder farmers put the land at risk for future farming. In places such as rural Kenya, if people cannot make a living on the land, they are often forced to leave it. Agricultural practices such as the heavy use of pesticides and herbicides, monoculture farming, unnecessary water loss through poor irrigation, and being heavily dependant on non-renewable energy sources will render thousands of hectares of land unfertile, reduce air and water quality, and most importantly, it will guarantee that future generations have even less food security. By *not* securing sustainable agricultural practices, smallholder farmers are securing their own demise.

The Millennium Development Goals are a UN initiative, and were officially established following the Millennium Summit in 2000. The Millennium Development Goals are eight goals of successful international development, meant to improve economic and social conditions in the world's poorest countries. These Goals include eradicating poverty, reducing child mortality, combating diseases such as HIV/AIDS, ensuring sustainability, and developing global partnerships. Goal One and Goal Seven are both relevant and crucial in obtaining sustainable agricultural practices. Goal One is to Eradicate Extreme Poverty and Hunger. The UN aims to a) halve, between 1990 and 2015, the proportion of people whose income is less than \$1 a day, b) achieve full and productive employment and decent work for all, including women and young people, and c) halve, between 1990 and 2015, the proportion of people who suffer from hunger. ("Millennium Development Goals Monitor") Goal Seven is to Ensure Environmental Sustainability, and to a) integrate the principles of sustainable development into country policies and programs and reverse the loss of environmental resources, b) reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss, c) halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation, and d) by 2020, to have achieved a significant

improvement in the lives of at least 100 million slum dwellers (“Millennium Development Goals Monitor”).

Almost 20 million Kenyans are considered to be poor, or cannot meet their daily nutritional requirements. In accordance with IFAD, even though in some respects conditions have improved, Kenya’s poverty rate has remained steady at about 48% (“Rural Poverty in Kenya”). In addition, many sustainable practices have yet to take root in sub-Saharan Africa. In order to not only decrease the proportion of Kenyans suffering from hunger, and to reverse the loss of environmental resources, it is essential that sustainable agricultural practices, programs and policies be introduced, integrated and supported in Kenya.

In 2007, the Food and Agriculture Organization (FAO) published a report entitled The State of Food and Agriculture 2007: Paying Farmers for Environmental Services. This report brings to light a versatile term for use when dealing with environmental sustainability: ecosystem services. "Ecosystem services are created by the interactions of living organisms, including humans, with their environment. These services provide the conditions and processes that sustain human life" (“The State of Food and Agriculture” 4). It must be brought up that "many of the world's poorest people live in marginal ecosystems and depend on ecosystem services for their food and livelihoods" (“The State of Food and Agriculture” 5). Much of Kenya's rural poor reside in the northern part of the country, and in the Kenyan Highlands, both of which host a plethora of ecosystem services, which make it one of the most successful agricultural production regions in Africa (“Kenya”). "If poverty is to be reduced, ways must be found to enable these people to increase their productivity and that of the natural resources they depend on" (“The State of Food and Agriculture” 5). Not only does the destruction of ecosystem services reduce food security and quality of life, but The Millennium Ecosystem Assessment makes known the fact that "the degradation of ecosystem services...is a barrier to achieving the Millennium Development Goals" (“The State of Food and Agriculture” 4). By not implementing sustainable agricultural practices, Kenya could not only worsen its poverty situation, but also its developmental situation as well. Sustainable agriculture is not just an environmental problem, but a human problem.

The ecosystem services that are most at risk in Kenya are some of the ones that the rural poor depend on to make a living: water, soil, crops and livestock. Farmers constitute the largest group of natural resource managers on Earth (“The State of Food and Agriculture” 5). These shared resources and services will prevent future food security in Kenya if not addressed with sustainable practices. Soil management is a key component to sustainability. A healthy soil will produce healthy crop plants that have optimum vigor and are less susceptible to pests. As the University of California points out, crop management systems that impair soil quality often result in greater inputs of water, nutrients, pesticides, and/or energy for tillage to maintain yields (“What is Sustainable Agriculture?”). A sustainably healthy soil will include applications to combat soil erosion such as reducing or eliminating tillage, keeping soil covered with plants or cover crops, and managing irrigation to reduce runoff. Soil must be considered to be a "fragile and living medium" that needs to be maintained and protected, in order to ensure its long-term productivity and stability. Sustainable farmers effectively maximize reliance on natural, renewable and on-farm inputs, with a goal in mind to "develop efficient, biological systems which do not need high levels of material inputs" (“What is Sustainable Agriculture?”).

Water is an irreplaceable resource that is consumed in enormous quantities, and is the principal resource that has helped agriculture and society to prosper, and is a major limiting factor when mismanaged. It is extraordinarily water-intensive to produce food, and 70% of world water is used for irrigation. Kenya has 103,000 hectares of irrigated land, and like much of sub-Saharan Africa, is highly susceptible to droughts. "To avoid a water crunch that leads to a food crunch requires a worldwide effort to raise water productivity," writes Lester R. Brown "[and] the first challenge is to raise the efficiency of irrigation water" (Brown 111-112). In Kenya, farmers try to plant near a river or stream so they can easily fetch water for their crops, or simply rely on rain rather than irrigation, which leaves smallholder farms highly

susceptible to both drought and floods. By relying on rain and rivers, smallholder farms have less power over circumstances like soil erosion, contaminated runoff from fields and weather. As an alternative to unaffordable and wasteful irrigation systems such as sprinklers and flood-or-furrow, a drip system can raise yields because it provides a steady supply of water with minimal losses to evaporation. A drip system typically consists of a network of valves, pipes, tubing and emitters that allows water to drip slowly to the roots of plants. "Since drip systems are both labor intensive and water-efficient, they are well suited to countries with underemployment and water shortages. They allow farmers to raise their water productivity by using labor, which is often in surplus in rural communities" (Brown 113). Kenya has a labor force of 17.94 million people, with 75% working in agriculture occupations.

Much of Kenya's smallholder farms profit from growing cash crops, such as tea, coffee, corn, potatoes, bananas, beans and peas. Many farmers practice monoculture, growing one single crop over a wide area, for efficiency and ease of management. However, diversified farms are usually more economically and ecologically resilient. With monoculture farming, "the loss of the crop in any one year could put a farm out of business and/or seriously disrupt the stability of a community dependent on that crop. By growing a variety of crops, farmers spread economic risk and are less susceptible to the radical price fluctuations associated with changes in supply and demand" ("What is Sustainable Agriculture?"). Diverse farming can also provide a biological buffer for a farm. Crop rotation can be used to suppress weeds, pathogens and pests, and cover crops can have stabilizing effects on soil erosion and nutrient and moisture levels.

Sustainable agricultural practices require much thought in an economic, social and political context as well. A key question concerns how society can motivate farmers to reduce negative side-effects while continuing to meet the increasing demand for agricultural produce ("The State of Food and Agriculture" 6). While many sustainable practices are simple in themselves, getting the funding and programs in place to support and implement these practices is not so simple. "Above all, smallholder farmers need a long-term commitment to agriculture from their own governments and the international community, backed up by greater investment" ("Food Prices: Smallholder Farmers"). There are many options for economic, social and political support of sustainable agriculture, however several are more efficient and necessary than others. In order for sustainable practices to be effective in a long-term view, it is essential that:

- Tax and credit policies be modified to encourage a diverse and decentralized system of smallholder farms rather than corporate concentration
- Government and land grant university research policies be modified to emphasize the development of sustainable agricultural alternatives
- Marketing orders and cosmetic standards be modified to encourage reduced use of non-sustainable agricultural products
- Coalitions are created to address policy concerns at the local, regional and national levels, as well as giving bargaining power to smallholder farmers in the marketplace

("What is Sustainable Agriculture?")

One specific method of implementing sustainable agricultural practices is to pay farmers to farm sustainably. In The State of Food and Agriculture 2007, the FAO recognizes the "importance of financial incentives in influencing farmers' decisions concerning production practices that affect the provision of environmental services" ("The State of Food and Agriculture" 7). The transaction occurs between a service provider, such as smallholder farmers, and service beneficiaries, which is expected to result in improved environmental services beyond what would have been without payment. The payment may be monetary or in some other form, involving a range of parties and transaction types. Payment for environmental services (PES) transactions can be sustained if, and only if, private demand supports them, while other approaches depend in part on political criteria ("The State of Food and Agriculture" 7). These sorts of payment transactions have not yet been widely implemented in developing countries. "The impact of a PES approach on the poor is highly dependent on who holds the rights to use resources; this, in turn, depends on the distribution of land ownership. A more even distribution is likely to result in more

of the benefits accruing to the poor" ("The State of Food and Agriculture" 9). While paying farmers for environmental services is promising, it will be more likely to succeed in Kenya when the country has further developed.

The implementation of sustainable agricultural practices requires international support from multiple organizations. The Food and Agriculture Organization (FAO) has been assisting Kenya to improve its food security since 1995 when the Special Programme for Food Security began. Ongoing programs in Kenya include:

- Sustainable livelihood development in the Mau Forest Complex
 - Conservation and management of pollinators for sustainable agriculture through an ecosystem approach
 - Support to vulnerable/food insecure households through promotion of small-scale irrigation and drought tolerant crops in Kenya interventions.
- ("FAO in Kenya")

The International Fund for Agricultural Development (IFAD)'s overarching goal in its development partnership with Kenya is to empower rural women and men to achieve higher incomes and improved food security. IFAD supports government efforts to reduce poverty through an integrated country program approach.

Ongoing programs in Kenya include:

- Smallholder Horticulture marketing Programme, which aims to improve farm productivity, incomes and the health and welfare of rural Kenyans by increasing the quality and consumption of fruit and vegetables
- Programme for Rural Outreach of Financial Innovations and Technologies (PROFIT), whose goal is to contribute to the reform of financial sector policy in Kenya. It supports the development of a range of innovative financial products, and improves the access of poor rural households to these services

Both programs, and those like them, can be applied to bringing more sustainable practices to Kenya's rural poor. ("Food Prices: Smallholder Farmers")

The World Council of Credit Unions (WOCCU)'s approach has been to bring together all local stakeholders in the value chain -- farmers, input suppliers, processors, buyers, and credit unions -- to identify marketable crops and establish beneficial pricing and payment arrangements. By doing so, WOCCU has laid the foundation for future collaboration among these groups that will extend beyond the initial program. Credit Unions can assist in sustainable agriculture by providing financing to smallholder farmers to afford sustainable practices, pay of debts and aid interactions between farmers and buyers. The WOCCU currently has a program in Kenya funded by USDA's Food for Progress Program, which is benefiting nearly 3,000 subsistence-level farmers. The program is increasing agricultural production, feeding their families, and having money left over to pay bills ("Access to Finance").

With such a large population of Kenya involved in agriculture, many of Kenya's environmental services and resources are shared services and resources. Unfortunately, these resources are finite and irreplaceable. By taking the proper steps to sustainable agricultural practices through soil, water and biodiversity management, Kenya's smallholders are ensuring that future farms can be successful in providing food security for themselves and their communities. Sustainable agricultural practices may not provide immediate poverty or hunger relief, and this may cause organizations and populations to turn their attention to programs and opportunities that do provide immediate relief. However, having sustainable agriculture well in place in rural poor communities provides something just as promising as

hunger relief; food security for the future, and future generations. By putting into place a good foundation for sustainable practices and policies, Kenya has the opportunity to develop profitable agricultural revenue not only now, but for years to come.

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