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Sustainability Research in Kenya and Uganda

“Some groups dominate; other groups fall behind. In the end, life is a struggle, and the world today reflects the outcome of that struggle” (Sachs, 327). In the world, there are eight hundred and forty-two million people in developing, transition and developed countries. Twenty-four percent of the total numbers are located in sub-Saharan Africa. Eight hundred forty-two million people live in marginal lands and depend on agriculture for their livelihoods (Benneh). Many of these people live in sub-Saharan Africa and depend on agriculture as their major source of income. In Kenya today, there are about twenty-two million people (Commins, 296), and Uganda has about twenty-six million (Rowe). Agriculture is of central importance in the two countries; it is the main part of the economy and it is how most people make a living. In both countries, there are more small farmers than larger commercial ones. These farms, however, are barely able to support the families that tend to them. “They are impoverished, but they are capable and resourceful” (Sachs, 227). These farmers may have heard, through the grapevine of other farmers, that there are resources and technologies that can help them improve their crops. Even so, they do not have the means to be able to access these resources and technologies. These farmers make due with the resources that they have, the best they can. These farmers are the reason why sustainability research is so important in both countries. Therefore, researchers and scientists need to talk to these farmers to get a feel for the land and the needs of the farmer. Sustainability research needs to put the people first, because the achievement of these practices depends on the farmers and the people who are supporting the research, be it the private or public sector. Sustainability research also needs to focus on gender equality and the fact that women do much of the family farming. Researchers need to make these methods women-friendly, because often times’ women do not have the strength that the men might to get the labor end of the job done. Many Americans today, think that they are donating a lot of money to get these research projects started and to help fight poverty. However, the reality is that the people who need the money and effects from the research the most, are not receiving these things.

In Kenya and Uganda, family is the most important of all groups and the community follows closely. Families depend on their community members for help and support. The typical Kenyan family lives in huts made of earth-brick, mud or bundles of branches as walls in rural situations. They have thatched roofs and a cement or dirt floor. The Ugandan family, on the other hand often lives in houses with corrugated iron roofs and walls of cement, cinder blocks or mud. A Uganda family typically has four to six children per family (Rowe). While in Kenya, each family may have six or more children (Family). Some families may have more children to ensure that some of them survive past infancy and childhood. The husband may have up to three wives, as long as he can ensure the care of each wife and all of his children. Families tend to be extended more than nuclear. Extended families tend to occupy huts close to each other. When children are orphaned, they are often left under the care of their grandparents or extended family members. It is not uncommon to see grandparents caring for grandchildren because their parents have died from AIDS or other disease. “The grandmothers whom we meet are guardians for their orphaned grandchildren. Each woman has her own story of her sons and daughters that have died, leaving her to bear the burden of raising and providing for five or ten, sometimes fifteen, orphaned grandchildren” (Sachs, 6).

Women in both Uganda and Kenya are charged with caring for the children, housekeeping and farm work. Some women even get part-time jobs, to help supplement the family income. The Kenyan government recognizes equality between men and women and encourages women to get an education and high-paying job, but women are too busy with their other work to do so. The most demanding job of

women is to collect water. “It is typically women who collect water from public standpipes, often queuing for long periods in the process and having to get up very early or go late at night to get the water. It is typically women who have to carry heavy water containers over long distances and on slippery slopes. It is typically women, who have to make do with the often-inadequate water supplies to clean the home, prepare the food, wash the utensils, do the laundry and bathe the children. It is also women who have to scrounge, buy or beg for water, particularly when their usual sources run dry. It is important not to underestimate this side of the water burden” (Sachs, 241).

It is the duty of the eldest girl to care for the children and housework while her mother is busy. Children help on the farm, doing whatever they can for their ability. “Attending school now is a hit-and-miss affair. Children are in and out of school with illness. Their attendance depends on how urgently they are needed at home to fetch water and firewood, or to care for siblings or cousins; on whether they can afford to buy supplies, a uniform, and pay local fees; and on the safety of walking several kilometers to the school itself” (Sachs, 7). If it can be afforded, the eldest boys in the family are educated before the girls. In Uganda, almost all children have the chance to go to primary school, but only about one-half of the boys and one-quarter of the girls finish primary school.

Small farms in Uganda and Kenya grow crops and food for their livestock. The basic food grown by these small farmers, in Kenya, is corn. They also grow a few vegetables, when possible. Kenyans will grind the corn into porridge and mix their vegetables in with the porridge. However, often times there are no vegetables or meat to mix with the porridge. In Uganda, small farmers are able to grow more because of their fertile soil. Many small farmers in Uganda are able to grow cassava, sweet potatoes, millet, grains, potatoes and legumes. They are able only to grow enough to feed their families; sometimes, this is not enough. “She reaches into her apron and pulls out a handful of semi-rotten, bug-infested millet, which will be the basis for the gruel she will prepare for the meal that evening. It will be the one meal the children have that day” (Sachs, 6). Few farmers, in Kenya, grow enough to have surplus to export. “Given the farmers’ meager production, farm output must be used almost entirely for the household’s own consumption, rather than for sales in the market. The community has no money for fertilizers, medicines, school fees, or other basic needs that must be purchased from outside of the villages” (Sachs, 232). The incidence of small farmers living in poverty has risen over the past few years. This is because there has been a drastic decline in agriculture due to environmental disaster. This leads to a decline in agriculture production and environmental degradation. These farmers are too poor to adopt simple innovations. They do not have the money to afford organic or inorganic fertilizers or to undertake soil and water conservation practices. “It costs money to introduce the technique and one planting season is lost” (Sachs, 229). The farmer’s are more preoccupied with living day-to-day and surviving on their bit of land, than what their practices are doing to the environment. Often times, farmers will have to take up part-time jobs to add to their income. They work as blacksmiths, carpenters, shoemakers, tailors or on large-estate farms.

Agriculture is the most important economic sector in Sub-Saharan Africa. It employs more than sixty percent of the adult population. Agriculture accounts for more than thirty percent of the gross domestic product and contributes greatly to the countries foreign exchange earnings (Benneh). The people’s quality of life depends on the how well or poorly their agriculture is doing. In most sections of Sub-Saharan Africa, including Kenya and Uganda, there is an alarming decrease in agricultural productivity due to a decline in a quickly deteriorating environment. Today, more and more researchers, international organizations and policy makers have been focusing on the smallholder farms. That is, because, the governments and researchers have generally neglected them. Second, there is great potential for the evolution of farming systems that focuses on these small farmers and their long-term ecological sustainability. Thirdly, the main characteristics and problems of these small farms are often the same although they are speared out across different ecological and cultural zones. Lastly, there is a growing awareness of the high environmental and social costs associated with smallholder farms (Benneh).

Eight hundred forty-two million people live on marginal lands and depend on agriculture for their livelihoods (Benneh). The people living on these lands often face frequent droughts and degraded lands. Food security will come only through increased agricultural production and income. However, Sub-Saharan Africa is the only region in the world where per capita food production has declined over the past twenty years, while the population has grown at about three percent annually. Food production per capita has only been growing less than two percent a year (Benneh). "Given the farmers' meager production, farm output must be used almost entirely for the household's own consumption, rather than for sales in the market. The community has no money for fertilizers, medicines, school fees, or other basic needs that must be purchased from outside of the villages" (Sachs, 232). During the Green Revolution, those countries had or quickly developed a strong national capacity in agricultural research. If one can increase the yields on the lands best suited for agriculture, farmers will be able to leave untouched lands for other purposes.

Smallholder farmers depend almost entirely on natural resources (climate, soil, vegetation, rainfall) when maintaining their farms. Smallholder farmers depend mostly on rainfall, however, because the amount of rain determines the crops that can be grown, the possible farming systems (i.e. irrigation) and the nature and sequence of farming operations are determined by the amount of rainfall. Kenya and Uganda are considered sub-humid and mountainous regions. They have only one rainy season. Grassy steppes cover most of the mountainous areas; many of these areas are unable to be used for farming or are inhabited due to a high population and relative land scarcity.

In order to increase agriculture production, soil resources must be perfect. The soil cannot have shallow depth, poor drainage, or salinity of low fertility; all of these factors make the soil unsuitable for crop production. Many areas have little fertile soil left. Vast areas of soils have become acidic and have low nutrient content because they have been overused. The smallholder farmer used to allow the soil to replenish itself, by not planting crops for a few months in the same field or by switching to a different field for a year before coming back to the other. This, however, is no longer possible. It is because of a high demand for food and lack of adequate land due to a high population growth, that sustainable practices are becoming rarer. Land degradation is resulting from soil erosion or soil loss by wind or water, salinization, and depletion of nutrients and organic matter. Deforestation and conversion of forests to arable lands are helping to speed up the process of degrading the land. The cutting of forests for firewood and other products in rural communities is also contributing to deforestation. Farmer's try to use dung and crop residue as fuel, whenever it can be spared, but when used it deprives the farming system of a valuable input of nutrients. Between soil erosion and deforestation, the natural resource that many people in Kenya and Uganda depend on for survival, will soon be diluted.

The search for sustainability should begin with the farmer because they have been using their traditional methods for hundreds of years. Scientists should confer with these farmers, because it is the farmer that know the land inside and out. Many traditional forms of land management, including intercropping, agro-forestry, no tillage, and mulching have been changed over the years. Policy-makers, researchers, and international organizations have accepted the goal of reaching sustainable agriculture. However, the solutions that these groups have been coming up with introduce single component solutions. All of these solutions could be combined to come up with one strategy. Sustainability needs to put the people first, because the achievement of sustainable agriculture ultimately depends on the motivation, perceptions and attitudes of farmers. The farmers must be made to understand their environment as they exploit it to meet their needs. Labor and time saving technologies must be employed for collecting fuelwood and water, post-harvest storage, and food preparation. Local, national and international researchers must be supported not only by the public sector but also by the private sector. The roles of women need to be acknowledged on the farm. Women play a huge part in their farms. A land resource database should be prepared that will provide the basis for land categories according to their suitability for different uses (Benneh).

Conservation Agriculture (CA) for SARD (Sustainable Agriculture and Rural Development) projects are popping up all over Kenya and Uganda. Conservation agriculture involves using an interacting and complimentary set of agricultural practices to help preserve the environment (Conservation). The three basic principles of CA are to have minimal soil disturbance by using no or reduced tillage methods or by direct planting, keeping a permanent soil cover by using cover crops, residues or mulch, and using suitable and diversified crop rotation through crop sequencing, intercropping, relay cropping and or mixed crops. CA is about combining these three principles to produce new synergetic effects. Conservation agriculture not only contributes to helping preserve environmental stability, through water and soil conservation, it also contributes to the economic and social aspects of sustainable agriculture. Conservation agriculture helps to reduce the workload and time spent on agricultural production, which will free time for other things such as education, family care and community development. CA helps in stabilizing crop yields, by reducing drought sensitivity and dependence on high cost fertilizers by using genetically modified crops. This will also contribute to increased crop production, extra agricultural earnings, enhanced crop biodiversity and a diversified food intake (which will help fight malnutrition). 'CA for SARD' projects aim to facilitate and accelerate the adoption of profitable conservation agriculture practices by small farmers. Past CA for SARD, projects have found that using farmer field schools (FFS) helps with introducing these new agricultural practices. CA for SARD is trying to involve extension staff members, researchers and the private sector in their projects. The private sector being the most important of these because in the end it will be the private sector that funds the projects (Conservation).

In Kenya, agriculture is the backbone of the economy and principal source of livelihood for Kenya's poor. However, only about one-fifth of Kenya's land is arable (Commins). Even in this small amount of land, seven out of ten Kenyans cultivate crops, raise livestock or engage in fishing and forestry (Rural Poverty in Kenya). The country's small-scale farmers are at a disadvantage because of the effects of macroeconomic policies. Drought and low-international commodities have contributed to the farmers disadvantages. Kenya is considered water short by global standards. Only about forty-six percent of rural people have access to clean water. Farmers are often unable to get water to irrigate fields. Their per capita use of water is only one-tenth of that of Uganda (Rural Poverty in Kenya). "The problems of small farm size and drought are compounded by yet another problem: the soil nutrients have been depleted so significantly..." (Sachs, 6). In recent decades, degradation of natural resources has intensified; deforestation, soil erosion, and domestic and industrial pollution. Access to water and soil fertility maintenance are critical for the livelihoods of rural poor and key to the development in Kenya.

Rural and Agricultural Incomes with a Sustainable Environment (RAISE) Plus is one program that can be found in Kenya that supports sustainability research. The Agriculture and Food Security Office, and the Environmental Office of Economic Growth created RAISE. RAISE Plus is designed to provide temporary and long-term technical assistance that will promote the systematic shifts necessary to achieve sustainable agriculture. RAISE focuses on environmental sustainability, the market drive development of food and cash crops, livestock, forests, fisheries, wildlife, and agribusiness. RAISE collaborates with other programs that assist public and private policymakers and aide agencies (Rural and Agriculture). Through these collaborations RAISE ensures food safety, and promotes environmentally sound strategies for economic growth.

Many of Uganda's small farmers are scattered in remote locations. They have little access to the services they need to survive. In Uganda there is about two and a half million smallholder farming families. More than two thirds of country's population that is living in poverty are small farmers. Many of Uganda's small farmers live in pastoral or agro-pastoral lands (Rural Poverty in Uganda). These farmers tend to their farms by relying on ancient farming systems that are highly seasonal. These methods, however, are not sufficiently productive. Ugandan farmers are lucky if they are able to produce enough

food to satisfy their family's needs. Many of these farmers are secluded and are not exposed to other approaches that may help them produce more. However, Uganda is a country of relatively rich soils and abundant natural resources (Uganda).

The Ugandan government launched a Plan for Modernization of Agriculture (PMA) in 2001. PMA plans to turn subsistence agriculture into commercial agriculture. This way, the rural poor will be able to increase their incomes and improve the quality of their lives through increased productivity and increased share of marketed production. There will be better food security for households. PMA aims to provide gainful employment through the secondary benefits. Another goal of PMA is to promote sustainable use and management of natural resources by developing a land use and management policy, and promotion of environmental friendly technologies (Plan). Some of PMA's strategies include making poverty reduction the number one objective of Uganda's agricultural development. Uganda's PMA includes the promotion of the private sector, while they remove direct government involvement in commercial agriculture. PMA focuses on seven different aspects: agriculture research and technology development, agricultural advisory services, rural finance, marketing and agro-processing, agricultural education, sustainable natural resource management, and a supportive physical infrastructure (Plan).

The National Agricultural Research Organization (NARO) is Uganda's largest sector research body in the country. It was established on November 1, 1992, by an act of the Parliament. The purpose of NARO is to undertake, promote and coordinate all agricultural research. The mission of NARO is to improve the welfare of the people by increasing the productivity and utilization of crops, livestock, fisheries and forest resources. They plan to do this by enhancing the scientific knowledge base, generation, adaptation, and transfer of these improved technologies while conserving natural resources. NARO is divided into different programs. The purpose of all of these programs; however, is to increase the availability of improved technologies, enhance sustainability, enhance management effectiveness, and increase the effectiveness of NARO's research program. One program in NARO is Soil Fertility and Soil and Water Conservation. The purpose of this program is to develop improved methods for restoration and maintenance of soil fertility, and soil and water conservation. This project also aims to develop and promote technologies for dealing with the effects of drought and unreliable rainfall.

Uganda, because of a second year plan, has training courses for farmers. At these training/ correspondence courses, farmers are taught new farming methods and techniques. The Ugandan government has also set up cooperatives. Through these cooperatives, farmers have come up with the plan to pull all their small plots together, to create one big plot. This way, they may use the farming techniques for larger farms, and split the profit they may make (Hughes).

Sustainability research in both Kenya and Uganda, plays a huge factor in determining if the family is able to produce enough food, earn sufficient income, purchase other food and dietary supplements, and in creating environmental, gender, and economic policy problems. Without sustainable agriculture, the environment and food production of small farmers will continue to decrease at a rapid rate. If the food production of the farmer decreases, their health declines, as does their ability to hold a second job to earn more income. Without extra income, the farmer is unable to purchase other food and dietary items, and he or she is unable to send all of their children, if any, to school. Without research to discover better ways to develop sustainable agriculture, the fate of all of these factors will continue to decline.

“This village could be rescued, and could achieve the Millennium Development Goals, but not by itself. Survival depends on addressing a series of specific challenges: nutrient-depleted soils, erratic rainfall, holoendemic malaria, pandemic HIV / AIDS, lack of adequate education opportunities, lack of access to safe drinking water and latrines, and communications. All of these challenges can be met, with *known, proven, reliable, and appropriate* technologies and interventions” (Sachs, 232). This quote from

Jeffery Sachs is true. The only way that sustainability research will benefit sustainable agriculture in Kenya and Uganda is by using know, proven, reliable and appropriate technologies and interventions. Unfortunately, Sachs's quote is only now beginning to be followed. Only recently, since the Millennium started, has sustainability research really been given a chance. Only now, are researchers trying to implement this research in sustainable agriculture that can be used for those small farmers. Today, it is better known that the environment is being quickly depleted from these out-of-date farming methods that are used by farmers. However, sustainability research takes time and costs the private and public sectors a lot of money. "The problem for Africa, however, is that African countries on average grow less rapidly than other developing countries at the same level of income and the same quality of governance, but in different parts of the world." (Sachs, 314). This is why Uganda and Kenya are considered 'behind' when it comes to using the newest farming technology or techniques.

When researching sustainable agricultural methods, researchers (who are often funded by the private sector) tend to focus more on large, productive farms that may export their crops. It is thought that because these farms produce more, they need better sustainable agriculture methods; however, it is the small farmers that need these methods. Although it is important for the large farms to use sustainable agriculture methods, there are more small farms located in Kenya and Uganda. The number of these small farms adds up quickly against the large farms. The situation for small farm families in Uganda, is increasingly improving, little by little. In Uganda, there is more sustainability research being done, then in Kenya. The effects of this research are also reaching rural Ugandans faster than rural Kenyans. More small farmers in Uganda have seen an increase in their income. This enables them to receive better health care, eat a variety of foods, own a few luxuries such as blankets, and send their children to school. In Kenya, the situation for farm families is declining rapidly. Kenyans are not receiving as much help in the sustainable agriculture department, as their neighbor Uganda is. "...impoverished villages like them all over the world, can be saved and set on a path of development at a cost that is tiny for the world but too high for the villages themselves and for the Kenyan government on its own" (Sachs, 232). The cost of sustainability research is simply too much for the Kenyan people to fund.

"We can realistically envision a world without extreme poverty by the year 2025 because technological progress enables us to meet basic human needs on a global scale and to achieve a margin above basic needs unprecedented in history" (Sachs, 347). Sustainable agriculture research falls under that technological progress. As the methods for sustainable agriculture increase, so does the living situation these rural farm families. With these improved technologies, more food, better nourishment from that food and a better income will be available to farm families in Kenya and Uganda. The environment and biodiversity will be able to flourish as opposed to diminish. Small farmers will be able to benefit from sustainable agriculture, because they will have a better intake from the above factors. This in turn will help the country, because the Kenyan and Ugandan governments will be able to benefit economically. More farmers will be able to sell their excess in markets. This will generate an economical flow throughout the country. These sustainability methods may help benefit women, because some may not involve as much labor-intensive work and the governments may make it easier for women to run farms with these new methods.

"The key to ending poverty is to create a global network of connections that reach from impoverished communities to the very centers of world power and wealth and back again" (Sachs, 242). National governments, private and public organizations from the centers of world power and wealth, could lend a helping hand to countries like Kenya and Uganda. With help from this power and wealth, these countries will be able to better their research abilities. "Contrary to popular perception, the amount of aid per African per year is really very small, just \$30 per sub-Saharan African in 2002 from the entire world. Of that modest amount, almost \$5 was actually for consultants from the donor countries, more than \$3 was for food aid and other emergency aid, another \$4 went to servicing Africa's debts, and \$5 was for debt relief operations. The rest, \$12, went to Africa. Is it really a surprise that we do not see many traces

of that aid on the ground? If we want to see the impact of aid, we had better offer enough to produce results” (Sachs, 310). Many of the most powerful and wealthy countries give less aid, than countries that are not considered the wealthiest or most powerful. Without the aid, there will be no results of sustainable agriculture. However, just funding a sustainable agriculture project, is not enough. The organizations and governments need help to set up agricultural extensions in the rural areas of Kenya and Uganda. With these extensions, the farmers will be able to ask for help with these new technological farming methods that they may not understand or have the funds to start. These farmers, being new to these practices, are going to need to be educated about how the new practices will help to benefit them and how they work. Without this education, many small farmers may stick to their traditional methods and resist the change. This education can be funded and supplied by the national government and organizations.

“Eliminating poverty at the global scale is a global responsibility that will have global benefits. No single country can do it on its own. The hardest part is for us to think globally, but that is what global society in the twenty-first century requires” (Sachs, 327). Jeffery Sachs really hit the nail on the head when he wrote this. To eliminate poverty, a global problem, there needs to be global responsibility and connections. It will take the work of every country to eliminate food and nutrition insecurity, and to ensure that natural resources can be used in a sustainable way. Who knows what the future holds, but poverty will only worsen as the status of these factors decreases. The most powerful and wealthy countries cannot be put in charge of eliminating food insecurity and degradation of natural resources. It is simply, not possible, and gets the human race nowhere near a positive increase in these factors. It will take the cooperation of every country, to better the situation of food security and natural resource degradation. Every country could collaborate with other countries about different sustainability research options. This way the funding for these projects may flow a little bit easier. Without research, food security and natural resources degradation will never be able to be fixed. It may take many years for this research to occur and be put into actual use; however, its effects will benefit humans for many years to come.

A world where some live in comfort and plenty, while half of the human race lives on less than \$2 a day, is neither just nor stable” (Sachs, 336). Many of these people that live on less than two dollars a day can be found living in Kenya and Uganda. The poor farmers that are living on this meager amount are still making a living by using their traditional farming methods. These traditional farming methods used to be considered part of sustainable farming methods. However, today, they are not, because farmers no longer have the means or land space to carry out these methods properly. This is causing a quick degrade in the amount of a crop the farmer is able to reap, which is causing a decline in the farmer’s standard of living. This is also causing a sharp degrade in the soundness of natural resources. These natural resources are being quickly depleted, and are not given enough time to replenish. Sustainability research varies from country to country. In Uganda, for instance, there are many more research projects and government interventions occurring than in Kenya. Although the needs of the small farmers in each country are relatively similar, Uganda has progressed, economically, quicker than Kenya. Uganda also has naturally fertile soil. Kenya, although it is Uganda’s neighbor and has similar weather and land patterns, has progressed much less than Uganda. “Yes persistent poverty and oppression can lead to hopelessness and despair” (Sachs, 335). However, there is hope in this madness for Kenya and even for parts of Uganda that may be overlooked. Help is on the way. Today, more researchers are coming together to form research groups to find sustainable agricultural practices that are beneficial to small farmers. Their progress, however, has been slow because of a lack of funding from private institutions and the most powerful and wealthy countries. “... American public greatly overestimates the amount of federal funds spent on foreign aid” (Sachs, 329). In 2002, Americans gave a whole six cents to aid Africans. So many unmentioned costs suck up much of the money that is given. To begin using sustainable agricultural practices in Kenya and Uganda, there is going to have to be a global effort. Organizations, private and public sectors, and international governments are going to have to work closely with one another. Cooperation and follow-through is the only way that sustainable agriculture practices are going to be

established. If there is no cooperation and slow or little follow-through, the time spent on sustainability research will be wasted.

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