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## **Enhancing Food Security for Subsistence Farmers: Economic Reform and Biofuels Production in Tanzania**

According to the U.S. Census Bureau, the 2007 United States poverty rate was 9.8 percent (Bulkeley 1). In severe contrast, the World Bank reported in 2003 that Tanzania's national poverty rate was 41.6 percent (qtd. in Brookings Paper 1). In a country where "82.9% of the population is involved in sustenance agriculture on land holdings of two hectares or less", reducing poverty is undeniably linked to improving food and agricultural security (Engberg 4). In addition to employing 80% of the work force, agriculture, predominantly subsistence farming, "accounts for almost half of GDP [and] provides 85% of exports" (World Fact Book 5). Thus, the recent rise of biofuels in such an agriculturally based economy poses significant promise and concerns for future food security in Tanzania.

In order to understand the issue of food security in Tanzania, it is important to first consider the local units that make up the overall agricultural economy. These are the subsistence family farms, which represent the vast majority of those involved in agricultural production. Subsistence farmers are "people who grow what they eat, build their own houses, and live without regularly making purchases in the marketplace" (Waters 2). The typical Tanzanian family consists of a single mother raising four or five children, and thus many of the Tanzanian subsistence farmers are women striving to grow enough food to feed their children (World Fact Book 3). This portrait of a typical subsistence farm family can be confirmed by a 2007 study on sweet potato subsistence farming in Tanzania, published in the African Journal of Agricultural Research, which states that "[m]ost of the sweet potato farmers in the surveyed areas were women" (Ndunguru 2). 15% of these rural families are food insecure and 34.4% of children under the age of five are victims of chronic malnutrition; food insecurity is a phenomenon born of insufficient access to safe, nutritious foods that meet dietary needs (UN 1). In 2007, the average daily income of a subsistence family was \$0.75; in order to keep just one child healthy, \$0.68 would be needed to provide for a nutritious diet (UK 1). Needless to say, this is impossible for a family with several children earning less than a dollar. The national literacy rate of the total population was 69.4% in 2002, clearly reflecting the educational problems present in a society where children must stay home and farm to help the family survive (World Fact Book 3).

The Tanzania National Website reports that agriculture "is dominated by smallholder farmers cultivating an average farm size of between 0.9 hectares and 3.0 hectares each", and about 70% of Tanzania's crop-land is cultivated by hand hoe, 20% by ox plough, and 10% by tractor ("Agriculture" 1). The goal of these subsistence farmers is to raise enough to feed their families, and they tend to grow maize, millet, rice, wheat, beans, cassava, and potatoes rather than the cash crops raised by exporters such as coffee and tobacco ("Agriculture" 1). One of the hidden benefits to subsistence farming is that since the family's survival depends on the soil, farmers carefully cultivate the land and rotate crops to avoid soil degradation. The Food and Agriculture Organization reports that, in contrast, cash crop production has led to degradation of the soil and an emphasis on less nutritious foods ("Tanzania: Exports" 1). Thus, a possible backlash of improved subsistence farming conditions is that with the family fed, farmers may turn to cash crops; soil degradation will likely become a concern for Tanzania in the future. There is no formal marketing system as in the West; still, increased competition has opened up new opportunities for farmers. Farmers have the choice of selling crops to cooperatives or private traders, and are no longer confined to a single source for essential inputs for crops and livestock ("Agriculture" 1).

Though Tanzania's relatively stable government and economy make it appear better off than many other African nations, a United Nations World Food Programme Report published February of 2007 and a report from Asha-Rose Migiro, a member of the Tanzanian Parliament and Minister of

Community Development, point out several major barriers to improving agricultural productivity and farm income for subsistence farmers. These barriers include a lack of integrated approach to education about food security within schools, weaknesses in food security indicators and health data, insufficient drought response system, inadequate infrastructure and transportation which would provide better market access, and lack of diet and crop diversification (UN 4). Migiro writes of other crucial barriers that currently exist, such as the dependence of farmers on rainfed agricultural system and hand hoe cultivation that does not allow farmers to cultivate enough land to “guarantee food security for the nation” (Migiro 2). A social problem that Migiro brings up is that though women bear the vast majority of the agricultural workload, the men “spend most of their time on leisure” yet distribute the income from farming, often inefficiently (2). Meanwhile, the women have to care for sick children, prepare food, and are increasingly facing inadequate access to water supplies and fuel. Finally, Migiro brings to attention the “non-existence of incentive structure[s] to encourage agriculture growth”, and takes special note of the lack of financial institutions that invest in agriculture by providing subsidies and loans to small farmers (2). All of these barriers have negative repercussions for food security in Tanzania, yet analysis will be restricted to just a few of these issues: securing property rights and access to finance, improving farm marketing infrastructure and institutions, and addressing problems created by globalization and trade policies are integral to improving the lives of subsistence farmers.

The thesis of Hernando de Soto’s revolutionary work, *The Mystery of Capital*, is that what keeps the third world from benefiting from capitalism is its inability to produce capital, even though the poor already possess the assets necessary to do so. It is because the rights to businesses and homes are not adequately documented that these assets “cannot readily be turned into capital, cannot be traded outside of narrow local circles...cannot be used as collateral for a loan, and cannot be used as a share against an investment” (Soto 6). De Soto’s thesis absolutely applies to Tanzania’s lack of property rights, which in turn leads to the lack of access to finance earlier mentioned by Migiro. Most property rights in Tanzania are not documented or mapped to facilitate land transactions; only 150,000 land parcels are registered (World Bank 8). Land registration processes are slow, costly, and expensive and requires extensive authorization from the bureaucracy. There is no clear system for collection, storage, and retrieval of land ownership information, and the estimated cost for making such a system is \$4.9 million USD (World Bank 8). Consequently, “90% of Tanzanians cannot be located through the property registration system which would allow them to gain access to collateral-based credit and exercise their rights as contracting...citizens” (World Bank 8). According to the Bank of Tanzania, in 2003, less than 6% of Tanzanians had access to credit with the agricultural sector (“Land Reform” 5). Without this access, farmers do not have the ability to use their homes and land as collateral to obtain loans for technological farming assets (such as fertilizers, irrigation systems, or tractors) and must live instead on labor intensive, subsistence farming, with nothing more than prayers to protect their crops from droughts and extreme weather conditions.

Another issue that contributes directly to agricultural productivity is the lack of a farm marketing infrastructure. The Food and Agricultural Organization states that “efficient marketing infrastructure such as wholesale, retail and assembly markets and storage facilities is essential for cost-effective marketing, to minimi[z]e post-harvest losses and to reduce health risks” (FAO 1). Marketing infrastructure is tied to property rights because both require comprehensive land surveying and mapping. Tanzania is not even in the first stages of developing a viable marketing infrastructure; the Tanzanian government has not put significant manpower and money into surveying the land, much less built the infrastructure to allow for efficient transportation and storage of crops (World Bank 10). As discussed earlier, without property rights, subsistence farmers cannot obtain the technology to protect against droughts, and without a marketing infrastructure, they cannot increase their income by marketing the crops that survive the droughts. Despite macroeconomic reforms and market liberalization, Tanzania has experienced only moderate improvement in general social and economic conditions. Tanzania’s economy remains vulnerable to internal and external shock, though Dr. Wobst of the IFPRI suggests that this vulnerability can be offset by “infrastructure investments”, such as in the farm marketing infrastructures, that can

“improve the cost-efficiency of trade” (Wobst 2). An example of current developments in farm marketing infrastructure is the \$61.25 million (USD) loan made in September of 2007 by the African Development Bank Group to help finance Tanzania’s Agricultural Sector Development Programme (ASDP). ASDP’s objective is to “provide farmers better access to agricultural knowledge, technologies, marketing systems and infrastructure, all of which contribute to higher productivity, profitability, and incomes, as well as promote private investment in the sector based on an improved regulatory and policy environment” (African Development Bank 1). The programme is expected to contribute to increased GDP growth, reduce rural poverty and enhance food security, and presents a flame of hope to Tanzanian subsistence farmers.

Globalization and trade policies are important current issues that significantly contribute to the prosperity and health of subsistence families. Dr. Wobst at the International Food Policy Research Center reports that one of the problems created by globalization is the necessity for the gradual elimination of trade deficits (Wobst 2). The World Bank and International Monetary Fund’s recommended program for this is currency devaluation (Wobst 2). Unfortunately, currency devaluation in Tanzania has stimulated export agriculture and put non-export farmers (subsistence farmers) at a disadvantage. Dr. Wobst claims that “farmers producing nonexport crops are not only disfavored in relative terms, but also lost in absolute terms compared with their initial situation” (Wobst 163). In order to improve standard of living and income, subsistence farmers will need to move into the export crop market. Once there, they will face fierce international competition and protectionist policies. Though Tanzania is restricted by the World Trade Organization from implementing protectionist policies, its farmers will be competing against developed countries such as the United States that use tariffs and subsidies to protect its own producers (Pollan 46). Another problem is Tanzania’s outstanding debt to NGOs. Although Tanzania is given more than “\$2.1 billion in economic aid” each year, its outstanding debt to the IMF, World Bank, and other institutions is \$7.3 billion (World Fact Book 5). Just paying the interest on this extraordinary debt dampens the Tanzanian economy and in turn its workers and farmers. Thus, globalization presents a very real challenge to Tanzanian subsistence farmers working towards not only to produce enough crops to provide subsistence diets for family members but also to provide a stream of income to pay for a more diverse diet and agricultural technology to increase productivity. However, a possible benefit for subsistence farmers from globalization is Foreign Direct Investments (FDI). A study by Elibariki Msuya at Kyoto University found that “FDI flow to agriculture is viable and beneficial to smallholders” because it tends to lead to “reliable markets, stable prices and technology development”, which can lead to an increase in subsistence farming productivity (Msuya 9). Nevertheless, it is important for Tanzania to develop strategic plans to attract and retain FDI for purposes other than the sale of public assets by making segments of its economy attractive to investors. FDI associated with the sale of state-owned assets, such as arable land, has tended to be a “one-night stand” (Kiggendu 164-5). This was the case with recipients of large sums of FDI such as Ghana, Zambia, and Angola in the 1990s; the FDI did not continue in later years (Kiggendy 164-5). By creating a more accessible and formalized property system to allow for access to finance and by enhancing farm marketing infrastructures and institutions, globalization may become a benefit to Tanzania.

After studying the trends for each of these factors, a common ground can be reached as to how these trends are measured. In analyzing each of these factors, sources analyzed were primarily from non-governmental organizations such as the World Bank, FAO, and the International Food Policy Research Center. These are the organizations that are cited in reports and by researchers, because they have the credibility and means to provide detailed research on Tanzania’s current economic standing. Thus, the trends are measured by reports and documentation of year-to-year statistical change, and after analyzing the present status and current trends for these factors, it becomes clear that improving each of these conditions would greatly benefit Tanzanian subsistence farmers. The current trends illustrate that although access to property rights and finance are insufficient, improvements to the farm marketing infrastructure are beginning to appear (such as the ASDP effort to create a farm marketing structure). The measurements cited in the last three paragraphs indicate that the situation for farming families is not yet

becoming worse, and actually has a great potential to improve. Though globalization and trade policies are a significant problem that must be addressed, there is a possibility that critical government policies could potentially turn problems into benefits. Improving these factors would have an unprecedented positive impact on the lives of subsistence farmers. By creating an accessible legal property system, subsistence farmers would be able to use their land and farms as collateral to access loans. With loans, they would be able to invest in the technology necessary to increase agricultural productivity, such as crucial irrigation systems needed to alleviate the effects of unpredictable droughts on crops. Increased productivity will allow subsistence farmers to grow crops for profit; marketing will transform from quick cash and food for the family to exporting of crops. Attracting long-term FDI in the agricultural sector and eliminating protectionist trade policies will allow for more profits for the farmers, which will increase subsistence farmers' incomes and allow for the purchase of more nutritious foods for members of the family. The improvement of these factors is thus an undeniably significant part of breaking the "cycle of the hand-hoes" and bringing subsistence farmers out of poverty.

The current situation for the environment is unfavorable, although there are some signs of improvement. Many developing countries are losing their forests faster than they can regenerate; Tanzania is certainly in the forefront of these countries, losing 1,245 square miles annually in deforestation (Kiggendu 321). Yet evidence suggests that this is not so much due to subsistence farmers over-working the land as to global corporations who have "failed to balance short-term economic gains with long-term needs for sustainable development" (Kiggendu 321). However, there are some hopeful elements in the current environmental status of Tanzania. One of these is the African National Achievement Award, which was presented to Tanzanian President Jakaya Mrisho Kikwete in September of 2007 for the country's significant progress in the areas of education and conservation of the environment (African American Institute 1). Other international organizations are also working on raising awareness of Tanzanian conservation issues, such as the Wildlife Conservation Society, which has been collaborating with the Tanzanian government and Wildlife Research Institute for fifty years and sponsored over 130 projects to support and extend the Tarangire, Ruaha, Serengeti and Kitulo National Parks ("Tanzania" WCS 1). However, Professor Roderick P. Neumann of Florida International University brings up a concern for subsistence farmers regarding conservational policies in his book about the "politics of nature conservation". He suggests that the establishment of virtually every national park in Tanzania required in many cases the "outright removal of rural communities", and that from the perspective of political activist, "numerous injustices have been carried out by the state in the name of wildlife conservation" (Neumann 139). Thus, there is a delicate balance that must be attained between protecting the rights of farmers, which would require a formal property system, protecting the environment, and keeping global corporations from consuming Tanzania's natural assets. There are certainly ways to alleviate the negative impacts of globalization on the environment; one of these would be for developed countries to collaborate with developing countries such as Tanzania and provide the technological expertise for sustainable environmental management. The opportunities to positively impact the Tanzanian environment are endless, and one of the first steps is to work on global partnerships.

The present status of women in Tanzania is deplorable. As discussed earlier, Tanzanian women carry most of the burden of subsistence farming. Many are working double or triple work days whilst producing 80 percent of the food for their family (Iheduru 218). The gender bias that is prevalent throughout Africa is a significant problem for Tanzania, where men spend more time on leisure than in the fields (Migiro 2). Studies have shown that in countries such as Kenya, when women were given access to services and had the ability to make decisions on their farms, they adopted innovation more quickly than men (Iheduru 223). Not only this, but in households headed by women, agricultural yields "increased 56% compared to only 15% in households headed by men"; the productivity gain between female-headed and male-headed households was equivalent to "the gain in yield from applying phosphate and nitrogen fertilizer" (Gittinger qtd. in Iheduru 223). In Tanzania, women's ownership of land has also been found to result in greater productivity and higher living standards, because women are more likely to use the increased income on food, education, and basic needs for the family (Iheduru 223). If property

rights and access to finance were made more readily available to women, Tanzania could see an increase in food security as female-headed households became more prevalent.

A relatively new proposal for developing countries with large agricultural sectors is biofuels production. At first glance, biofuels may seem like a viable alternative to coal and oil-based fuel systems. Cars are a major source of carbon dioxide, a greenhouse gas, and the argument is that if plants were to be used as fuels the carbon dioxide produced would be as much as that absorbed by the plant. Unlike oil, biofuels are a renewable resource. However, there are still gray areas as to the efficiency of biofuels; the process of growing the crops requires a lot of energy and land, and production requires a significant amount of coal and natural gas. There is currently limited large-scale biofuels production in Tanzania, although 4 million hectares are potentially available (Janssen 5, 18). The Global Forum for Sustainable Energy of 2006 found the most promising crops for biofuels production in Tanzania to be sugarcane, oil palm, and jatropha (Jansenn 13-4). Biofuels integration would have a great impact on the factors discussed in this paper. Biofuels may provide stimulus for foreign and domestic investment in the agriculture sector, and may create new jobs and income opportunities.

However, there must be a clear awareness of the fine line between food security and biofuels production. There is currently a concern that as more land is allocated to biofuels, less will be available for food production. An extensive study by the German Technical Cooperation found that “large scale bioenergy programmes could indeed lead to such displacement and marginalisation of the poor and to unwanted environmental impacts” (German 86). Yet, if carefully implemented, such bioenergy programmes would “help to address the root causes of low productivity in subsistence agriculture” (German 86). For example, the Indian Biodiesel Programme is promoting the growth of jatropha on degraded lands. Jatropha helps to retain and renew topsoil; once rehabilitated, it may be possible to return some of this land to food production. Bioenergy cropping of this sort can lead to increased productivity of land (German 87). Tanzania is uniquely gifted in its capacity for expansion due to the amount of land and resources it has at its disposal for energy and food production. Currently, there is 55 Mha of land unused for agriculture but capable of producing crops (German 89). It is this land that represents the greatest development opportunity for the government, NGOs, and corporations. The necessity for clear property rights documentation system is integral to successful integration of biofuels production, and it is up to the government to establish a system that is as accessible to investors as to subsistence farmers. The government of Tanzania should also establish a multi-sectoral stakeholder group, stable policies and regulations for biofuels production, and public awareness activities. To this end, the Tanzanian Ministry of Energy established a Biofuels Task Force in April 2006 (Jansenn 17). NGOs such as the UN, World Bank, and FAO must take the initiative to encourage behavioral change of subsistence farmers to allow women to participate and lead in the investment of new biofuels technologies. The government’s role could be to have the Ministry of Energy and Minerals collaborate with the Ministry of Community Development to enhance gender equality when implementing biofuels programmes. And lastly, corporations must adhere to governmental regulations and contracts to produce a win-win situation for both parties. Tanzania has already landed a \$20 million biofuel processing project with Sun Biofuels Tanzania Ltd. The British company has acquired 9,000 hectares of one of the oldest districts in Tanzania, Kisarawe, for planting of jatropha. A thousand of the local villagers residing in the area will be “given expertise and seeds to grow jatropha and sell it to SBC” (“UK Firm” 1). Globalization and trade policies must be oriented towards attracting more of these agricultural investments, and emphasis must be on ensuring that these policies will increase the food security and income of subsistence farmers. Economic policy reform of property rights, access to finance, farm marketing infrastructure and institutions, and trade policies are integral to ensuring food security for the Tanzanian people. The necessary balance must be achieved between food and biofuels production, and the optimum role for biofuels is to revitalize unused land to be shared with food production to encourage security for future Tanzanian farmers.

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