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Tanzania: Sustainable Agricultural: A multifaceted approach to curbing hunger

Agriculture employs nearly 75% of Tanzania's population and makes up over one third of the country's GDP (Agriculture and Food Security). Agriculture improves the living conditions in rural areas which account for 65% of the country's inhabited areas. Of that area, cotton is the largest agricultural contributor to Tanzania's economy and supports over 18 million people (Agriculture and Food Security). Those people include the average family which is estimated to be five people per household. The family is predominantly run by men. Family size varies depending upon location: a rural family will consist of approximately five people per household while an urban family will consist of four. Regardless of the location, agriculture plays a role in the life of every Tanzanian.

The typical family consumes maize, cassava, sorghum, beans, rice, chickpeas, groundnuts, and sweet potatoes. Additionally, livestock such as goats, cattle, sheep, and donkeys are also commonly found on rural farms. Less than half of farmers in Tanzania use machinery such as tractors to tend to their farms; on the other hand, 80% use hand hoes and 52% use plows (Cotton and It's By-Products in Tanzania). Once food crops are harvested, the job of preparation tends to fall on the women of the household.

Food insecurity affects approximately 20% of the population in Tanzania. The Integrated Phase Classification (IPC) is a phase three and four three being in crisis and four in a state of emergency (Tanzania; Nearly 1 Million People Are Severely Food Insecure). IPC's goal is to improve food security along with nutrition analysis and decision making. IPC approaches food insecurity through governments as well as civil societies. IPC which was developed in 2004 for use in Somalia has grown to partner with 15 organizations and is leading the implementation of food security at regional through global levels. IPC phases range from one being minimally food insecure to level five which is people in catastrophe. These conditions are caused by factors including dry spells and pests, such as fall armyworm. These effects have resulted in Tanzania's market of food to be greatly affected and plummeting nearly one million citizens into food insecurity.

Compared to crops such as maize or rice, cotton is a fairly young crop in Tanzania; in fact, 33.7% of cotton farmers have been farming it for less than six years. Twenty-three percent have been farming it for 20 or more years (Cotton and It's By-Products in Tanzania). Cotton production is a specialized process with several different jobs within the business and has many variables that greatly affect the yields. For example, rainfall. Cotton requires a large amount of rainfall to grow without large quantities of rain cotton will become a useless crop. Cotton is grown in two main areas: the Eastern Cotton Growing Area (ECGA) which includes Hakara, Hanza, and Morogoro and in the Western Cotton Growing Area (WCGA) which includes Mwanza, Nzeaa, and Shinyanga (Cotton and It's By-Products in Tanzania). Each of these areas are primarily rural and lower income but that could change with the power of cotton.

The cotton industry has the potential to pull Tanzanians out of food insecurity. For example, the cotton fibers only make up a small amount of the total product options; cotton's by-products including cotton oil, cottonseed meal, cotton seed cakes, and seeds can be used as an additional source of revenue (Cotton and It's By-Products in Tanzania). Additional by-products such as husks are used to burn. Cotton fibers can be sold to ginneries who then process the lint and have a leftover seed. This seed can be turned into seed oil and cakes which are a high protein feed for ruminant livestock. The oil is an effective alternative to other seed oils with added health benefits and nutrients. Although cotton is of large economic value it holds

greater power in both the economy and everyday lives of Tanzanian citizens by increasing profit with minimal change in the work input. The problem lies within the lack of education on cotton and its potential.

Shinyanga, which is located in northern Tanzania, with a population of about 93,000, has experienced a net change of -13% in just 20 years (Vizzuality). Over one fourth of Shinyanga's population are in IPC phase two, and fifteen percent in IPC phase three or more (Vizzuality). The Shinyanga province has an estimated 117 kha of tree cover while 1.52 Mha of non-forested land (Vizzuality). Shinyanga which was once covered in miombo and acacia woodlands; after decades of deforestation however, it became known as the Desert of Tanzania. In the 1920's, a program was authorized to pay locals to cut down large areas of woodlands in an attempt to remove the parasite spreading tsetse fly. The fly was successfully removed and new grazing land was opened but at the cost of the vast woodlands of Shinyanga (Tanzania: Forest Restoration in the Shinyanga Region) however, the deforestation continues today. To compound the problem of deforestation, animal agriculture is being affected as new areas for grazing were opened. This, in turn led to overgrazing and depletion of the soil to the point of infertility and uninhabitable. With lack of fertilization in the soil in Shinyanga the fertility and productivity of the soil is vastly reduced thus limiting the farmers in that area to grow a decent crop.

President Julius Nyerere visited the site of the deforestation in 1984 and was in awe of the damage done to the forested areas (Tanzania: Forest Restoration in the Shinyanga Region). He promptly initiated the Shinyanga Soil Conservation Programme more commonly known by its Swahili acronym HASHI. The HASHI Programme worked to restore the previously deforested area by working closely with both the locals and the Division of Forestry and Beekeeping along with the Ministry of Natural Resources and Tourism. The HASHI programme enlisted help from locals of Shinyanga by encouraging them to plant woodlots and practice ngitili. These practices which were rooted in tradition resulted in the success of HASHI. Ngitili is the practice of maintaining standing fodder during the dry season. This system, which was used by the indigenous Sukuma peoples, was brought to near extinction due to the forced abandonment of homesteads from President Nyerere's villagisation programme which had families move into newly created settlements.

HASHI incentivized these woodlots by educating locals on the economic benefits of the practice. Another supporter of the project is the Norwegian Agency of Development Cooperation (NORAD), as well as the World Agroforestry Centre (ICRAF). Both of the supporters provided a majority of funding along with providing information on woodlots and sustainable practices. HASHI is doing more than revitalizing just the woodlands it also helped rebirth the native practice of Ngitili. By the 1900s, ngitili was documented to cover only 600ha of land however, because of HASHI, over 350,000 ha were in place by 2004. The ICRAF reports that ngitili could cover up to 500,000ha of land which would increase carbon sequestration, similar to that of a modern-day cover crop, ensure feed availability for livestock during the lean season and maintain soil aggregates.

HASHI's influence has the potential to be scaled up out of Shinyanga and be used for national benefit. Using the influence of ngitili and woodlots, Tanzania's soil for cotton production, food production, environment and quality of life can be improved through education and native practices. Ngitili has the ability to reduce soil erosion with the fodder's roots along with preventing shortage of livestock feed due to drought. It also has the ability to expand cotton production providing greater economic growth. Along with ngitili, HASHI will be able to increase tree cover nationally as well as providing Tanzanian citizens with new opportunities and sources of income. In the end, better soil, more trees, and more income equate to fewer hungry people.

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## IPC OVERVIEW AND CLASSIFICATION SYSTEM

<https://www.ipcinfo.org/ipcinfo-website/ipc-overview-and-classification-system/en/>