Sustaining Vulnerable Indigenous Livelihood in Tanzania: The Maasai's Resilience in the Face of Climate Change

The indigenous pastoralist and hunter-gatherer communities in Northern Tanzania have been embodying the practice of sustainable living for 40,000 years, according to the 2016 Goldman Prize and an advocate for indigenous land rights in Tanzania, Edward Loure (United Nations, n.d.). Tanzania accommodates between 125 and 130 distinct ethnic groups, and they are organized into four separate groups: the Bantu, the Cushite, the NiloHamite, and the San. Further, they are represented among the Barabaig and Maasai (pastoralists) and the Akie and Hadzabe (hunter-gatherers). Yet, the Maasai are the largest tribe at approximately 430,000 (Clinical Survival, 2021).

The Maasai, in particular, represent a distinct culture and have managed to preserve traditional customs and culture in Tanzania despite increasing pressure to assimilate into Westernized societies. The Maasai people's way of life and status revolves nearly entirely around their cattle, their primary means of sustenance, and they are regarded as a semi-nomadic pastoralist group. Their ability to access grazing areas during rainy and dry seasons significantly impacts the ecosystem's overall functioning. The tribe is primarily located in the Loliondo region, which spans the northern Tanzanian-southern Kenyan border, and the predominant area where the communities are located is in the Ololosokwan village (Burgoyne & Mearns, 2017).

Rain-fed Agriculture

Nearly all food production and industrial crops like cotton, tobacco, and wood in Tanzania and other Sub-Saharan African nations with minimal irrigation rely on rainfall (Rockström & Falkenmark, 2000). In these nations, rain-fed agriculture has a very high relative importance, and socioeconomic development depends on its effective management.

Additionally, maize is the primary staple food in Tanzania. In rural and urban regions, it is the traditional food source, with trading production surpluses that can transform it into a viable cash crop during prosperous years. Tanzania possesses favorable agroecological conditions that are habitable for maize cultivation, surpassing those of neighboring nations (Arce & Caballero, 2015).

However, variable precipitation conditions in Tanzania pose extreme dangers to maize, with rain-fed agriculture products decreasing yield. Between 2000 and 2007, the increase in maize production was 2%, which was comparatively weaker than the 3% growth rate of the overall population (Arce & Caballero, 2015). Dry periods often affect the rain-fed maize production. According to estimates, there is a minimum probability of 0.2–0.3 in semi-arid locations in Kenya and Tanzania for a dry spell to last longer than ten days at any point during the crop's growing season and a probability of 0.7 for such a dry spell to occur during the crop's delicate flowering stage (Dept, 2023). This is due to the effects of climate change on tropical areas such as Tanzania, as more than 70% of Tanzania's disasters are connected to climate change and are associated with frequent droughts and floods (South African Institute of International Affairs, 2024).

Due to the pastoral residence of the majority, or 76% of the Tanzanian population, they are economically dependent on agriculture or access to natural resources, predominantly as indigenous populations (Arndt et al., 2012). Notably, a study found that numerous low-income nations are regarded as the most susceptible to climate change because of their heavy dependence on rain-fed agriculture for sustenance and consumption (Arndt et al., 2012). In this regard, Tanzania stands out as a country whose food security is most likely to be adversely affected by this phenomenon.

Women's Inequality in Rural Settings

Given the economic dependence on agriculture and livestock in rural areas, it is foreseeable that socioeconomically disadvantaged individuals are especially vulnerable to the effects of climate change (Paavola, 2008). Women, in particular, residing in rural and tribal areas are often subjected to a patriarchal society and engage in activities such as foraging for food and fetching water. These activities would negatively impact most rural areas due to climate change effects, as they depend on ecosystem services that would decrease production and ecological damage (Barbieri-Mas, 2009). Thus, it is clear that women are vulnerable to the deterioration of natural resources, which stems from their responsibility to guarantee food security for families and their limited participation in decision-making procedures with the nature of patriarchal African Indigenous rural communities.

Furthermore, Maanda Ngoitiko, one of the founders and the Executive Director of the Pastoral Women's Council (PWC), highlights that while both male and female pastoralists encounter comparable risks and obstacles resulting from climatic concerns and stress within communities and environments, women have restricted access to and authority over productive resources (Wu, 2023).

Multiphase Solution

Long-term solutions based on alleviating water scarcity as a product of climate change have not been effective. Tanzania's administration attempted this through the 20-year Rural Water Supply Program in 1971, the National Water Policy in 1991, and most recently, the 2003 implementation of the company, Biwater, which took over the country's water system (Shore, 2019). Unfortunately, Biwater's leadership exacerbated Tanzania's water challenges as these initiatives failed to address the need for a better understanding and integration of the cultural aspects of the affected communities. While further government assessment and accountability are necessary for comprehensive water scarcity solutions, starting with the promising outcomes of green infrastructure in urban African cities (Fox & Resnick, 2022), other solutions are required to address impacts in rural areas, especially for tribal communities where previous technological solutions may challenge cultural traditions and practices.

Economic marginalization, in particular, has become a frequent failure of past development interventions in indigenous communities of rural southern Africa, and there is a necessity to ensure this economic survival in efforts to maintain food security and community well-being and development (Illgner et al., 1998). In conjunction with regional economic restrictions and self-reliance strategies that place a greater emphasis on local knowledge and skills, beekeeping has the potential to be a short-term supplement to incomes in rural southern Africa, especially as a short-term alternative.

Although beekeeping can seldom replace other sources of revenue and subsistence for people in developing nations, it nevertheless plays a vital role in providing food, employment, and additional money. Because beekeeping encourages rural diversification, it is a viable alternative for jobs and income, especially in places where arable land is limited and population expansion renders landholding inadequately profitable. Beekeeping activity is already prevalent in Tanzania, as the sector is projected to earn around US $ 1.7 million annually by selling honey and beeswax (Mdoe, 2022).

Beekeeping cooperatives around the world have resulted in a decrease in food insecurity and increased economic sustainability. For example, the Senegal Peace Corps established a beekeeping initiative within the Environment Program due to its role of ensuring food security as well as sustainable natural resources management and environmental conservation, as rural households were experiencing low crop yields, reliance on rain-fed agriculture, and unstable income streams which contributed to food insecurity (Peace Corps Senegal, 2021).

Integrating beekeeping activity into vulnerable populations, particularly the women groups of Tanzanian ethnic populations, is a critical approach to increasing equality within communities. As such, there has been a rise in the women's empowerment movement in Tanzanian villages, which has intertwined beekeeping, entrepreneurship, and leadership into a cooperative. Prominent examples include the Maasai Honey and African People and Wildlife organization, which mentors and supports marginalized women.

Both cooperatives focus on specific rural villages of Tanzania, such as the Ololosokwan Village.
The success of these organizations stems from the mentorship experience, which involves applicable actions for enrolled participants in a three-step process: training in an interactive beekeeping setting, establishing and operating a community apiary, and selling honey products to global partners for distribution.

Caveat

When introducing technological solutions to vulnerable populations, it is essential to consider the cultural impact of the rich traditions present. Unlike other solutions, trust and collaboration with tribal leaders must be established first to gain wide acceptance within the community. For example, in the Maasai Honey program, a survey questionnaire was distributed to selected participants (tribal members enrolled in the Ololosokwan Village cooperative) to assess the initial community perceptions for the purposes of this research paper. The survey revealed that half of the respondents were recommended or selected by the village leader to participate in the program with Maasai Honey. Furthermore, beekeeping as an alternative economic activity was well-known among tribe members, with 83.3% expressing great familiarity with the practice, which continues to pave the way for program operations.

Community Connection

In addition to the survey, leader representatives from Maasai Honey (Interviewee #1) and African People and Wildlife (Interviewee #2) were consulted to further verify the conditions of Tanzanian food systems and the viability of this solution.

In reference to the challenge of water scarcity and agriculture, both interviews noted that the tribes within Ololosokwan Village raise cows, goats, and sheep and roam with them. Animals also need water, so they must walk longer distances to get water when there is a lack thereof. During severe drought, both organizations have seen a significant amount of livestock die as a result of an eight-month drought period.

Another challenge faced in the community is women's rights: "A challenge in general for the tribe is women's rights because it's a male-dominated culture, and the village leaders and the people in power are generally male. This cooperative has helped the women gain empowerment and a voice in the village. Since the program, the village has recognized the leadership capacity and power that the women possess (Interviewee #1, personal communication, Feb. 1, 2024) ." Additionally, from the survey, 83.33% of participants suggested that there has been a drastic increase in women's leadership roles and effectiveness since the program started in the village.

The representative from Maasai Honey describes their program as " a 2-week long training program, usually 10-20 participants. Each participant receives a beekeeping suit, smoker, hive tool, … in the remote villages that we work in, they can't pay for the program, so it is a free outreach program for those in need." In tandem with being an entrepreneurial initiative, other primary goals are "teaching them how to make it a sustainable business so that when they get income from honey, they can buy new lives for themselves in the future, or new equipment that they need so they can reinvest." Thus, this solution provides vulnerable populations with the entrepreneurial skills needed to create a different future for themselves. This concept is essential as the female participants in training are those in economic hardship, particularly widows. Considering the average farmer in Tanzania makes 135,628 Tanzanian Shillings or US $53.71 per month (FinScope Tanzania, 2017), " for a woman to beekeeping, harvest and sell the honey, they can get a large amount of money at once, and they can get a decent amount of income, and it helps to support their family, send their kids to school, and allows them to buy food." In fact, more than 80% of survey respondents claimed that their main reason for beekeeping involvement is for economic income, with more than half suggesting that beekeeping activities make up a significant amount of their income since the cooperative was established.

Solution Limitations

However, areas of limitations within these solutions were identified. Firstly, funds are a challenge in any nonprofit initiative, especially for this mission, due to Tanzania's lack of governmental support and regulations, as suggested by the majority of survey responses. "Funds are a challenge because it's expensive to do business in Tanzania. The government places a lot of rules and regulations on recordkeeping. We don't get any support from the government; they make it much harder for people to do business here." The most recent sponsorship for the organization came from the US Forest Service, as they sponsored beekeeping training last year (Interviewee #1, personal communication, Feb. 1, 2024). Often, these nonprofits who manage multiple programs, in addition to beekeeping cooperatives, may not have the funds to continue with the project and make it sustainable. Therefore, organizations may discontinue the cooperative, yet these organizations must ensure "they're [the women are] in a position of stability and still have the business to rely on, even if we no longer have funding and have relocated (Interviewee #2, personal communication, Feb. 5, 2024) ." Thus, this points to a need for targeted partnerships and awareness of such organizations by members of international communities.

Regarding the variability of climate in drought and flood periods, when Interviewee # 1 was asked if beekeeping is more reliable than rain-fed agriculture: “Maybe beekeeping can be a little bit more reliable, but it's also very variable. Rain also affects beekeeping”; this was often noted by half of the survey participants regarding the effects of climate-related disasters and water scarcity on their lifestyle. Additionally, Interviewee #2 said, “If there's no rain, it means there's no flowers. It's hard to make honey. Sometimes, your beehive is not producing as much honey as you need. So you're getting maybe five buckets of honey, which is insufficient if this is their only income.”

Nonetheless, these limitations and barriers cannot compare to the successes of the two cooperatives. The interviews shared success stories, resulting in the same themes of long-term tribal women's leadership, empowering young girls and daughters to engage in beekeeping education, and a support system for entrepreneurial women.

Expanding such missions into other indigenous tribes of Tanzania, like other pastoralist groups, is crucial, as ethnic women continue to face challenges to their fundamental rights, such as decision-making, property ownership, education, and autonomy. The Bunda, Musoma Rural, and Geita regions of Tanzania are also prevalent rural areas where more than 60% of households have incomes below the poverty line (PHDR, 2005) and could benefit from the economic income streams of nonprofit beekeeping cooperatives during climatic disasters. Thus, community empowerment at a local level for vulnerable representative groups is critical to local food system security, particularly in light of the limited institutional ability of communities to prepare for, react to, and take action against the consequences of climate change.

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