



Engineers Without Borders  
Cornell University

## Ilagala, Tanzania Agriculture Project

### NGO Partner

Umoja wa wawezeshaji KIOO (<http://kioo.org/>) is a voluntary NGO based in Kigoma, Tanzania. They have already established farming/field/vocational schools in Ilagala, Mwakizega, and Karago. Their objectives are:

1. To raise awareness on HIV/AIDS, malaria and other pandemic disease.
2. To promote and defend human rights.
3. To raise public awareness on the hazards of drug abuse and life skills.
4. To develop and support programs that creates awareness and induces people to develop the culture of self employment as means of eradicating poverty.
5. To promote improvement, protection and preservation of the environmental and development of natural resources.
6. To raise awareness on human rights and responsibility of the government (Good governance and accountability).
7. To provide vocational training to the vulnerable groups in the community.
8. To promote and protect children's rights.

### Project Summary

Ilagala's primary economy is agriculture and they grow crops such as cashews, coffee, tea, pyrethrum, tobacco, sisal, cocoa and other food staples. Currently, the community in Ilagala is facing rainwater shortage during the dry season due to climate change and human-induced land degradation. As a result of this, their crops and livestock are severely impacted, and the prevalence of crop pests and diseases has increased. The community has proposed the following potential solutions:

1. Conservation agriculture (irrigation)
2. Water lifting and application (pumps and drip irrigation)
3. Small reservoirs (charco dam technology)

### Mentor Requirements

EWB-Cornell is looking for a professional with 3 years of direct professional experience (post bachelor's degree) in design and construction of infrastructure similar to that proposed in the project. The responsible engineer in charge (REIC) provides technical guidance on the designs, ensures all reports are submitted to EWB-USA on time, and provides interim internal review and approval of final designs (with signature and date). The REIC may travel on assessment, implementation, and monitoring trips or can designate an alternative Professional Mentor to travel on their behalf. The ideal mentor will be located near Ithaca, NY for in-person advisory meetings and/or be able to communicate frequently with students via email and Skype.



The following information was provided in the community's program application to EWB-USA.

## **Community Challenges**

The livelihoods of the majority of communities living in the rural areas of Tanzania depend on agriculture production where a wide range of both annual and perennial food and cash crops predominate. Livestock and crop production continue to dominate the national economy through export of agricultural commodities and products, in particular cashews, coffee, tea, pyrethrum, tobacco, sisal, cocoa and staple food crops. Agriculture is mainly rain fed and production is currently threatened by several factors including climate change and variability as well as progressive land degradation associated with human-induced activities. This poses a serious challenge to agricultural, irrigation and water sectors, which requires specific interventions to increase and sustain productivity. The proposed project intends to address some of these agricultural challenges, including lack of water for crop production in support of rain fed agriculture. The main constraints to development include: unreliable and low rainfall; low and declining soil fertility; crop pests and diseases; prevalence of livestock diseases, tsetse infestation and limited marketing of both crops and livestock. Lack of water for livestock during the dry season is a major constraint to livestock production. Water is highly important to livelihoods especially for crop production, livestock keeping and domestic consumption. Use of irrigation for farming is uncommon. Soil and water conservation should focus on harvesting rainwater including deep tillage, tie ridges, contours and terraces on slopes as well as valley bottom water harvesting and conservation.

## **Need Identification Process**

As a way to deal with the problematic of skills and knowledge, we started Farmers field schools in 3 villages of Ilagala, Mwakizega and Karago. We did it as a way of dealing with the challenge of getting knowledge, skills and community awareness on best practices of modern agriculture, the aim was that this farmers field schools in every villages may act as a center where community members could meet and learn better farming techniques. Yet it was hard to come off as even the field Farmers School they relied on rainy season means that every summer all activities which currently stood up we take as a big challenge that we want to deal with it.

## **Potential Solutions**

Conservation agriculture: water lifting and application technologies, communal irrigation schemes and small reservoirs. Conservation agriculture includes contour farming, deep tillage, minimum tillage, and ripping and pit cultivation. Farmers usually use different combinations of conservation agriculture practices. The adopted conservation agriculture practices are agro ecological conservation.

Water lifting and application technologies: including treadle, motorized pumps and drip irrigation. The money making treadle pump is a manual pump that can be owned, operated and managed



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by a household or an individual. The cost-benefit analysis for a pump owner growing onion shows a positive net benefit. The increased income can allow a farmer to properly feed and clothe the family. Apart from the pump being used for irrigation it can be used for other purposes such as domestic and livestock water supply without change in design. Drip irrigation is described as a water delivery system that involves application of water into the soil through a small opening directly on the soil surface. Although this technology seems to be expensive for the small-scale farmer, the cost benefit analysis shows the investment is viable for onion production. The technology has other advantages such as the small amount of water used for production (suitable for semi-arid areas) and its convenience of operation.

Small reservoirs: The charco dam technology is suitable in semi-arid areas where farmers keep livestock. Promotion of this technology will result in minimizing shortage and unreliable water sources, which creates permanent stress to livestock, especially during the dry season. It will also minimize deforestation and accelerated soil erosion resulting from semi-nomadic animal husbandry practiced in response to water shortage. However, in promoting this technology the respective community will be involved from the beginning, to encourage a sense of ownership. Something that seems to be proposed by this category is currently available for water infrastructure that enables used for various applications homes with irrigation in the villages mentioned.