



Title: TATRO On-farm and Eco-school Adaptation to Climate Change Initiatives

Target Audience: Farmers, youth and extension agents

Introduction

Technology Adoption through Research and Organisation (TATRO) is a community based Non-governmental organization working in Siaya County, Kenya. The organisation provides extension services to farmers through different channels such as Farmers Field Schools (FFS) and field days. The Organization started activities in 1996 with promotion of use of indigenous vegetables and seed production. For effective delivery of information, TATRO works closely with various government organizations such as; Kenya Agricultural and Livestock Research Organisation (KALRO), Kenyatta University, KEFRI, Maseno University and other line government ministries and departments.

At on-farm level, TATRO links with community groups involved in projects on climate change mitigation and adaptation, as well as and food security. TATRO also works closely with schools such as TATRO Primary School, where field demonstrations on Eco-school technologies are sited. The Eco schools programme encourages pupils to care for their school and local environment as they are educated and empowered to become change makers for an environmentally sustainable world. The programme there aims to expand what is learnt in the school to the community by engaging the next generation in action-based learning, by developing environmentally conscious people.

In the schools, Eco school activities introduced under TATRO are maintained through the 4K Clubs, which in Kiswahili stand for (*Kuungana (team work), Kufanya (to work), Kusaidia (to help), Kenya*). The 4K clubs aim to grow students to become successors of local agricultural activities implementers as well as equip them with skills on farming as a business. The clubs have a membership of both teachers and pupils.

TATRO Primary School is situated within a wetland whereby drainage pattern limits the land's potential for farming. However, with TATRO's intervention through tree planting, the land has been reclaimed and more farming technologies initiated. By reclaiming the land, sustainability in food production for feeding the school children has been achieved.

Objectives

- Introduce and promote eco-friendly technologies to the community.
- Improve food security through own innovative initiatives.
- Adapt to climate change through innovative farming practices.
- Reclaim wasteland and spring water source.
- Promote sustainable wetland management
- Promote soil fertility improvement and maintenance technologies.
- Capacity building and nurturing of youth and children in schools.

Approach

Over the years, food security has been a challenge in Anyiko Sub-location of Siaya County, mainly due to lack of knowledge and skills to implement climate change mitigation and adaptation measures. TATRO NGO is currently changing this narrative through introduction of ecologically friendly and sustainable farming technologies to communities and schools through Eco-school projects.

An outstanding TATRO Eco-school activity at TATRO Primary school is fish farming, whose key components include rearing fish to maturity in fish ponds and hatcheries for production of fingerlings. Activities are implemented by the teacher in-charge of the 4K club and pupils. Poultry units were also incorporated alongside sections of fish pond edges to diversify activities and income sources. The integrated activities serve to conserve the environment, sustain fish production, complement school feeding programme, and promote income generation for the school and the community.

The fish farm was introduced and is managed through the following procedure:

- Site identification and demarcation.
- Land reclamation and excavation of fish ponds.
- Registration with relevant authority.
- Sourcing fingerlings.
- Training on fish farm management for teachers and 4K Club members.
- Breeding of fish especially Tilapia and Catfish fingerlings.
- Fish harvesting.
- Distribution and marketing of fish.
- Artificial insemination to allow the fish to produce especially males for better weight and market worthiness.
- Guarding against predators.
- Training the communities to ensure project sustainability.
- Charge an entry fee for visitors on educational tours as an additional income that can be ploughed back to the activities.

Other activities being promoted by TATRO within the community include:

- Planting of indigenous vegetables such as *managu* (African Nightshade), croton, Ethiopian kales, *Murenda*, cow peas and *muchicha*.
- Piloting indigenous seed production in the community.
- Indigenous vegetables seed harvesting, processing and bulking
- Promoting nitrogen fixing plants for soil fertility improvement.
- Empowering the community to undertake afforestation and sustainable forest resource management.
- Promoting establishment of multi-purpose tree/plant species such giant bamboo, *Moringa oliefera*, *Markhamia platycalyx*, *Terminalia brownie*, *Prunus africana*.
- Beekeeping projects at community and family level.

Impact

Fish farming as a measure to curb food insecurity has resulted into:

- Income generation for the community.
- Demonstration for educational purposes.
- Promotes social interaction between the school and adjacent community.
- Proper use of wetlands to control water borne diseases and undesirable pests.
- Support to the school feeding programme leading to sustainable feeding programme for its pupils.

Innovations and Success Factors

- TATRO has linked with, and provided extension services to many farming groups involved in climate change mitigation and adaptation projects thereby promoting food security, tree growing, and reclamation of land through afforestation.
- Sustainable land management has been achieved through adoption of different activities that ensure crop diversity, land productivity and animal production.
- Construction of chicken pens in the ponds as fish feed on chicken droppings.
- Pond water is used as fertilizer water and is applied on crops such as vegetables, or Napier grass.
- Dissemination strategies that include use of print materials such brochures, leaflets and posters designed with the relevant information.
- Capacity building, especially empowering women and youth to undertake afforestation programme as community members are trained on forest resource management and leadership skill

Constraints

Some of the constraints experienced include:

- Fish farm enterprise is labour intensive, hence the need for the teachers in-charge to balance their time between the core duties of teaching and 4K Club activities.

- The technique of fish farming is capital intensive and also requires specialized expertise to successful implement.
- Soil erosion and fertility problems.
- The area at TATRO School is a wetland and therefore the water table is high, limiting other land use.
- Massive soil erosion resulting in the siltation of the water bodies.
- Low adoption rate of new technology by the farmers.
- Invasive striga weed in the farms leading to low crop production despite introduction of climate smart technologies

Lessons Learnt

Some lessons learnt include:

- Sustainable land management can be achieved through different enterprises to ensure crop diversity and land productivity.
- Success of Eco-schools in the community has been enhanced by use of pupils as agents of dissemination as they duplicate technologies learnt through eco-schools.
- Need to follow up and monitor communities who have bought fingerlings to enhance success in fish farming.
- Capacity building of the youth on climate change measures and sustainable farming promotes success of future farmers.
- Adoption of technology by rural communities can be enhanced once they see the advantages of the technology being introduced, a process that can be achieved through establishment of demonstration plots.
- Gender mainstreaming is important for success of afforestation and reforestation activities.
- Food security can be attained through integrated farming activities.
- Collaboration between NGOs and government departments in provision of advisory services leads to great synergies for implementation and adoption of technologies.

Conclusion

Commitment to intentions, internal organisation, and the desire to link, learn and share result-oriented objectives are key to enhancing community adoption of measure to adapt to climate change.

Acknowledgement

The authors acknowledge Mr. Paul Okong'o of TATRO and Mr. Michael Hadulo of TATRO Primary School in Anyiko Sub-location, Siaya County for providing much of the information on the eco-school activities, which enabled the compilation of this manuscript.



Community members take part in fishing



Officers from Sub-Saharan Africa make an educational tour in TATRO Eco-school



Fish pond integrated with poultry farming



Fish ponds constructed on-farm

Compiled by: M. Mukolwe, J. Wanjiku and E. Njenga