Scaling Climate-Smart Irrigation through Strategic Partnerships to Enhance Food Security in Southern Africa

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Introduction

Southern Africa has a relatively low percentage of irrigated land compared to its potential, with only about 3.5% of arable land currently under irrigation. The SADC region employs a mix of irrigation systems, including large-scale schemes for commercial agriculture and smallholder farmer-led systems prevalent among rural communities.

In the quest to enhance food security and agricultural productivity, CCARDESA and other partners has established innovative irrigation activities through the Global Climate Change Alliance Plus (GCCA+) Programme https://www.ccardesa.org/intra-acp-global-climate-change-alliance-plus-gcca. The efforts have made significant strides in climate-smart technologies across seven countries in the Southern African Development Community (SADC) https://www.sadc.int/project-portfolio/gcca-intra-acp-programme. region—Botswana, Eswatini, Malawi, Mozambique, Namibia, Zambia, and Zimbabwe. The project was implemented in two phases of 18 and 24 months respectively and was aimed at establishing climate-smart irrigation facilities, improving access to nutritious vegetables, and facilitating better post-harvest handling and market access. The activities and lessons are being scaled through partnership with the Accelerating Impacts of CGIAR Climate Research for Africa (AICCRA) https://aiccra.cgiar.org/ and the Food Systems Resilience Programme (FSRP) https://www.ccardesa.org/food-systems-resilience-programme-fsrp-eastern-and-southern-africa.

/;Stage 1: Establishment of Climate-Smart Irrigation Facilities

The foundation of this project lay in the successful establishment of climate-smart irrigation facilities. After identifying suitable partners and specific sites, the project embarked on creating efficient irrigation systems in each of the seven countries.

Figure 1: A Technician explaining to the project beneficiaries how to service and manage water pipes at Katapazi in Zambia

Key Initiatives:

- **Solar-Powered Pumps**: Boreholes were drilled in Eswatini, Zambia, and Zimbabwe, each equipped with solar-powered submersible pumps. These pumps deliver water to overhead storage tanks, ensuring a consistent water supply for irrigation.

- **Drip Irrigation Systems**: From the storage tanks, water is distributed to the fields through drip irrigation systems. This method is highly efficient, minimizing water waste and ensuring crops receive the necessary hydration.

The use of solar power and drip irrigation systems represents a climate-smart approach. Solar energy is renewable and carbon-neutral, while drip irrigation conserves water and supports sustainable agriculture. Through these efforts, over 20 hectares of land have been made available for production. Although not all this land is currently under cultivation, functional irrigation systems in six of the seven countries enable year-round crop production, including during dry seasons and dry spells, thereby increasing crop diversity and yields.

Stage 2: Providing Access to Nutritious Vegetables and Inputs

The project also focused on improving access to fast-growing, high-value, and nutritious vegetables. By establishing horticultural fields and distributing seeds, the project empowered communities to cultivate a variety of crops.

Key Initiatives:

- **Crop Diversity**: In Botswana, Malawi, Mozambique, Namibia, Eswatini, Zambia, and Zimbabwe, a range of vegetables, including butternut, maize, cucumbers, onions, cabbage, tomatoes, rape, green peppers, and fruit trees, were grown. In Eswatini, mushrooms were also cultivated while Namibia included poultry production, and rice in Malawi.
- **Climate-Smart Practices**: Techniques such as mulching, organic fertilization, greenhouses, and smart water pumping mechanisms were implemented to enhance productivity sustainably.

A standout achievement was the creation of a model climate-smart village in Zimbabwe's Rushinga district. This village demonstrated various climate-smart technologies, including solar-powered irrigation systems, bio-gas production, aquaponics, energy-efficient cookstoves, beekeeping, and more. These innovations not only boosted agricultural productivity but also served as a national learning centre for climate-smart interventions.

In Mozambique, the project provided starter packs of seeds to farmers, including onion, cucumber, maize, cabbage, and tomato, enabling them to kickstart their production and eventually sustain it through generated income.

Stage 3: Training of Beneficiaries

Training was a crucial component of the project, ensuring that beneficiary communities could effectively manage their new resources.

Key Initiatives:

- **Comprehensive Training**: More than 220 households received training on financial literacy, sustainable pest management, water management, climate-smart practices, horticultural crop production, pest and disease control, agro-processing, and marketing.

- **Training of Trainers on climate smart technologies**: Selected partners from Botswana, Malawi, Namibia, Zambia and Zimbabwe were trained on climate smart technologies, who further trained the farmers.

Stage 4: Facilitating Post-Harvest Handling, Distribution, and Market Access

Improving post-harvest handling and market access was vital to ensuring the economic sustainability of the project. However, due to resource and time limitations, the project activities concentrated on facilitating partnerships for providing marketing services.

Key Initiatives:

- **Market Linkages**: The project facilitated direct market access by enabling buyers to purchase produce directly from the fields, thus minimizing transportation challenges for farmers. Additionally, efforts were made to explore better market opportunities for higher returns.
- **Community Companies**: In Zimbabwe, a community company was registered to streamline the selling and distribution of produce, enhancing market efficiency.

Figure 2: Women beneficiaries packaging green pepper at Habu Trust, in Botswana

Overall Project Achievement

The project achieved an impressive success rate of 70.3% despite its short span. While the target was to reach 650 households (approximately 2,870 family members), the project successfully impacted 457 households, benefiting around 2,580 family members.

The project's success in establishing irrigation facilities, creating vegetable gardens, and distributing inputs has had a profound impact on the beneficiary communities. High-value and nutritious horticultural crops such as green vegetables, onions, eggplants, tomatoes, and okra are now being cultivated, leading to improved food security and community resilience.

Conclusion

The irrigation project in the SADC region stands as a testament to the transformative power of climate-smart agricultural practices. By leveraging solar-powered irrigation, diversifying crop production, and improving market access, the project has made substantial strides towards achieving food security and enhancing the livelihoods of farming communities in Botswana, Eswatini, Malawi, Mozambique, Namibia, Zambia, and Zimbabwe. As the region continues to

face climate-induced uncertainties, such initiatives offer a blueprint for sustainable agricultural development and resilience.