NORWAY SUPPORTS RESEARCH ON CLIMATE CHANGE FOR CAPACITY BUILDING AND COMMUNITY RESILIENCE THROUGH LUANAR

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The challenges associated with climate and weather variability in Malawi have been witnessed, documented, discussed and analysed through many processes and fora. Indeed the country has been affected by climate and weather related challenges including prolonged dry spells, flooding and strong winds. These predicaments have increased the vulnerability of many communities, especially in districts that have been declared "climate hot spots". This withstanding, several interventions have been undertaken by different stakeholders and organisations to improve and increase community resilience. Some of the interventions have raised awareness, contributed to policy production or improvement, and some have created an opportunity for local level autonomous adaptation among many vulnerable communities.

With support from the Government of Norway, Lilongwe University of Agriculture and Natural Resources (LUANAR) is coordinating a national programme called "Capacity Building for Managing Climate Change in Malawi" (CABMACC). The overall goal of the programme is to "enhance innovative responses and capacity for adaptation to climate change in Malawi. This article provides an overview of the interventions that are being implemented by CABMACC and synthesizes some of the development opportunities that can be directly linked to national development perspectives and discourse. It is important to know that CABMACC is supporting seven (7) research projects that are being implemented in specific Extension Planning Areas (EPAs) of Rumphi, Mzimba, Nkhota-kota, Balaka, Dedza and Phalombe districts.

The **first research project**, '*Techno-economic feasibility of decentralised Production of Bio-ethanol using waste from Cassava*' is being coordinated by Industrial Research Centre (IRC) and will promote production of ethanol by communities in Nkhota-kota and assess the potential of ethanol processing effluents as stock feed and organic fertilisers. The policy implications of this project include reduction in dependence on fuel wood and utilisation of waste for livestock and crop production. It will increase the adaptation capacity of communities through creation of employment and increased incomes. This project is also a model that allows partnerships with large commercial firms such as ETHCO. It will build the capacity of communities to operate community based ethanol production plants and promote cassava production as a commercial crop.

The **second research project** is on '*Livestock value chain, food security, and environmental quality: Transforming rural livelihoods through community based resilience indigenous livestock management practice'.* This is led by Professor Leonard Kamwanja of Trustee of Agriculture Promotion Programme (TAPP). Norwegian partner: NMBU, Prof. Olav Reksen, Dept. of Production Animals and Clinical Science (PRODMED). This research project is being implemented in Rumphi district and aim to develop, test and validate community based indigenous livestock management practice guidelines. This tackles community resilience with consideration of the significance of indigenous knowledge as a tool for adaptation to climate change. Outputs of the project will assist in reducing dependence on conventional practices and promote the use of local knowledge. This will allow future generation to have required knowledge for proper livestock management. It is also expected that this will contribute to livestock policy in terms of treatment, care and health related issues.

The **third project** is led by Dr Liveness Banda, an Associate Professor in Animal Science at Lilongwe University of Agriculture and Natural Resource. This project will evaluate feeding and breeding technologies for optimal Dairy Productivity. The idea is to develop animal feeds that will be ideal for local dairy breeds and build the capacity of farmers to reduce carbon emission at farm level. The policy implication of this project is reduced contribution of emission from the livestock sector and increased milk production at farm level. This is directly linked to national food security and nutrition supplementation t goals while combating the negative impacts of malnutrition among children. It is expected that there will also be a direct contribution to crop production through improved manure utilisation.

The **fourth project** is led by Associate Professor Weston Mwanse and Dr Steve Makungwa of Forestry Department at LUANAR. Norwegian partner: NMBU, Prof. Tron Eid, Dept. of Ecology and Natural Resource Management (INA). This will develop allometric model and tools for predicting above and below ground biomass in miombo and agroforestry farmlands. This will directly provide policy directions for making decision on forest management and the type of trees that can be promoted for carbon sequestration. It also contributes to crop production policy in terms of soil carbon management. It is anticipated that estimation of biomass will allow the country to provide intervention for Reduced Emissions from Degradation and Deforestation (REDD).

In the Aquaculture sector, the programme has supported a **fifth research project** that aims to improve incomes and environmental management of fisher folk communities for enhanced resilient to climate change. The project, led by Dr. Fanuel Kapute of Mzuzu University (Norwegian partner: NMBU, Prof. Trond Storebakken, Dept. of Animal and Aquacultural Sciences, IHA) will aim to: (i) develop, test and adopt clean energy and sustainable fish processing technologies (ii) develop and test new fishery products for small-scale fisher folk

entrepreneurship (iii) develop and test a small scale fisher folk entrepreneurial model (iv) develop and test a capacity enhancement model/protocol/tool for the small scale fisher folk and (v) develop a fisher folk governance framework for sustainable ecosystem management.

This has both mitigation and adaptation policy implications including those that are linked to environmental biodiversity conservation. It will also contribute to food security policy interventions especially on protein from fish. It is anticipated that the project will address issues of post- harvest food loses, thereby promoting food security at community level. This project will also provide alternatives to household incomes through commercial initiatives and strengthening of community structures for improved and sustainable livelihoods.

The **sixth project** is addressing gaps and challenges associated with Conservation Agriculture. This is led by Associate Professor Dr Vernon Kabambe of LUANAR with partners from Chitedze Research and Norway (NMBU, Prof. Jens B. Aune, Noragric). The project- "*Scaling- out Integrated Soil Fertility Management (ISFM) approaches for improved crop resilience to climate change*"- will be implemented in Balaka district.

The interventions will include establishing integrated farms (learning centres) as an entry point to climate smart/ISFM technologies. In addition, it will develop/popularize/introduce communication tools for reaching farmers, students and extension agents and improve capacity of district extension frontline staff and farmers to understand climate smart and ISFM packages as a means of facilitating adoption. The research project contributes to both food and climate change policy and promotes the adoption of technologies for resilience agricultural practices and methods. It will build the capacity of farmers and allow them to adopt integrated practices for improved crop productivity.

Last but not least, the Programme is also supporting a **seventh research project** that is hinging on gender and female farmer participation on conservation agriculture. This research project (Enhancing Adaptive Capacity of Female Smallholder Farmers to Climate Change) is led by Dr. Tasokwa Kakota of the Basic Sciences Department of LUANAR. Partner in Norway: NMBU, Dr. Gry Synnevåg, Noragric). The research will document the multiple factors that influence female farmers', adoption or lack of, and spill over effects of Climate Smart Agriculture technologies and describe female smallholder farmers' perceptions and characteristics of effective CSA technologies.

In addition, the study will compare training modules disseminated through different information channels, and analyse the effectiveness of the lead farmer model in increasing adoption and enhancing adaptive capacity of female farmers. This will have far-reaching positive consequences on policy direction as far as

female farmer participation in climate change mitigation and adaptation is concerned.