

Climate Change Adaptation Best Practices

Towards Enhancing Smallholder Farmers' Livelihood



About CEPA

CEPA is a public interest policy think tank on sustainable environment and natural resources management. The vision of Centre for Environmental Policy and Advocacy (CEPA) is to create a just and equitable society that promotes development. The core business of CEPA is to facilitate policy dialogue and formulation, analysis and implementation of sustainable environment and natural resources management to increase the resilience of rural communities to adverse impacts such as climate change.

This publication is funded by Christian Aid (CA) under the project Influencing Policy and Practice in Climate Change Adaptation¹ in Malawi – in this project CEPA carries out activities which enhance the capacity of civil society organizations in influencing policy and practice in climate change adaptation in Malawi. Among others the specific activities include conducting pilot case studies on community climate change analysis to promote responsiveness to the needs of vulnerable communities; documenting and disseminating best practices in climate change adaptation in Malawi in order to develop and promote community driven approaches to climate change policy development.

Developed and Designed

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¹ **Adapting** involves: reducing exposure , reducing sensitivity and increasing adaptive capacity; **Adaptations** are actions taken to help communities and ecosystems moderate, cope with, or take advantage of actual or expected changes climatic conditions.

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List of Acronyms

CEPA	Centre for Environmental Policy and Advocacy
CARD	Churches Action in Relief and Development
CA	Christian Aid
CA	Conservation Agriculture
CBAM	Community Based Agro-biodiversity Management
DAO	District Agriculture Office
DF	Development Fund of Norway
EAM	Evangelical Association of Malawi
EPA	Extension Planning Area
FYF	Find Your Feet
KATC	Kasisi Agricultural Training Centre-Zambia
MEET	Malawi Environmental Endowment Trust
MALEZA	Malawi Enterprise Zone Associations
RFSP	Rumphi Food Security Project
TAPP	Trustees of Agricultural Promotion
UNFCCC	United Nations Framework Convention on Climate Change

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Churches Action in Relief and Development (CARD)

Development Fund of Norway (DF)

Evangelical Association of Malawi (EAM)

Find Your Feet (FYF)

Kasisi Agricultural Training Centre-Zambia (KATC)

Malawi Environmental Endowment Trust (MEET)

Malawi Enterprise Zone Associations (MALEZA)

Senga Bay Baptist Mission

Trustees of Agricultural Promotion (TAPP)

A handwritten signature in black ink, consisting of a large, stylized 'W' followed by a series of loops and a final downward stroke.

WILLIAM CHADZA

Executive Director

Executive Summary

The United Nations Framework Convention on Climate Change (UNFCCC) provides that all Parties must formulate and implement national or regional programmes containing measures to facilitate adequate adaptation to climate change hence an increase in the interventions relating to climate change adaptation amongst stakeholders. This was the case because the communities are progressively being exposed to threats from increased climatic variability and in the longer run, to climate change. Abnormal changes in air temperature and rainfall and resulting increases in frequency and intensity of drought and flood events have long-term implications for the viability of these ecosystems. As climatic patterns change, so also do the spatial distribution of agro ecological zones, habitats, distribution patterns of plant diseases and pests, fish populations and ocean circulation patterns which can have significant impacts on agriculture and food production increasing levels of vulnerability.

Through both stakeholder and community consultation, this report analyses that there are opportunities that would enhance community resilience to climate change effects through the implementation of the various climate change adaptation strategies. Most importantly is to build the capacity of these communities to reduce the dependency syndrome on implementing partners. Some of these practices include soil fertility improvement, soil and water conservation, sustainable wetland management, agro-biodiversity, capacity building through knowledge sharing and small stock production.

This documentation therefore, compiles the selected adaptation best practices from the interventions implemented by different stakeholders in various districts declared vulnerable. The main purpose of this documentation is that out of the best practices compiled, CEPA together with stakeholders should be able to develop and promote community driven approaches to climate change policy development.

Finally, the documentation points out some policy recommendation including there is need for all stakeholders to take lead in building the capacity of communities through different forums to enhance their representation at national level during policy development, this is followed with dissemination of best practices that are implemented across the nation. And most importantly is to integrate these climate change relate developments into projects and national policies which would enhance implantation of community driven approaches.

1.0 Overview of Climate Change in Malawi

A growing number of communities across the country are now experiencing the effects of climate change which are posing immediate and far-reaching threats which also seem to be out of the ordinary. These effects include unpredictable rainfall patterns and temperatures, dry spells, strange diseases, heavy thunderstorms and hailstorms resulting in more devastating damage to staple food crop and livestock yields whose



Figure 1: Scorched maize in Nsanje-CARD

implications are more pronounced in rural communities whose livelihood is directly linked to agricultural production. Thus, 90% of the rural populations rely on rain-fed subsistence farming to survive. Evidence strongly suggests that increased droughts and floods may be exacerbating poverty levels, leaving many rural farmers trapped in a cycle of poverty and vulnerability. The situation in Malawi illustrates the drastic increases in hunger and food insecurity being caused by global warming worldwide. With the assistance of government, civil society organizations and private sector, communities are doing their best to adapt to the changing environment by building on local knowledge and diversifying their livelihoods. Apart from adaptation strategies, communities are also doing their best to cope and mitigate these effects. Climate change creates both risks and opportunities hence important to take advantage of opportunities and reduce risks.

Most of the coping mechanisms being practiced have the potential to erode households off their resources while adaptation mechanisms if well implemented improves the welfare of households by increasing their resilience to the effects. Most of the adaptation practices are closely linked to agriculture because this is the sector the majority of Malawians depend on and is also heavily affected by the climate change effects. Although Malawi contributes very small amount of global greenhouse gas emissions which are regarded as main drivers of climate change, to global production, mitigation measures are still being encouraged to be implemented although there is

little that can be done to slow or stop climate change in general. The fact that there is little we can do to stop or slow the climate change; most communities are encouraged to prioritize adaptation practices. However Malawi could also join in global mitigation efforts, mostly those related to carbon sequestration considering that Malawi is also a net emitter of green house gases, where incentives to increase carbon storage in soils and vegetation in Malawi could facilitate actions at local level and create useful additions to nature capital, in addition to potential financial gains for the participating communities and individuals. Furthermore, most of the mitigation measures are closely linked to forestry sector because of its function as a carbon sink.

2.0 Adaptation practices and case studies

2.1 Restoring lost soil fertility through Manure making

Most soils in Malawi have lost their fertility levels, to the point that the production has been going down over time. The main cause of this fertility loss is soil erosion which is caused by heavy rainfall, deforestation, poor agricultural practices among the others. The loss in soil nutrients has forced many Malawians to resolve to use of inorganic fertilizers, but in today's world, of climate change and poverty, inorganic fertilizers are no longer the solution because the majority cannot afford the cost of these inorganic fertilizers. At the same time the inorganic fertilizers are hazardous to soils when used in excessive amounts and over a long period of time. The excessive amounts and long time usage of these fertilizers result in saturation of the soils. Experts have resolved to use of different types of manure supplement the inorganic fertilizers. Manures are organic fertilizers which restore the soil structures, improving moisture retention



Figure 2: Solid Manure making in Rumphi, under Rumphi Food Security Project-Find Your Feet



Figure 3: Liquid manure at Kasisi Agricultural Training Center farm in Zambia

and increase the biological activities in the soil resulting in improved soils.

Find Your Feet (FYF), under Rumphu Food Security Project (RFSP) modeled different types of manures, one of which is compost manure in *figure 1*. This type of heap manure involves combination of different types of residues and is kept for some time to decompose ready for application. While *figure 2* is Liquid manure, which involves filling 25kg of goat/cattle/chicken dung in a sack and suspend it in water, then after some time, the concentrated water is sprayed in the field using a knapsack. Other methods of spraying could also be used to achieve the same results. The usage of these manures, has enabled rural communities cultivate even in the hardest dry spells because the soils are always with residue moisture thereby increasing communities' resilience to climate change. To show that climate change is not only affecting Malawi, *figure 2* was captured in Zambia where farmers are trying their best to adapt to the changing climate.

2.2 Fighting dry spells through Conservation Farming



Figure 4: Conservation Farming in Thyolo under CARD projects

Development (CARD), Malawi Environmental Endowment Trust (MEET), Evangelical Association of Malawi (EAM), Malawi Environmental Endowment Trust (MALEZA), Find Your Feet (FYF), Senga Bay Baptist Mission are implementing this type of farming in their respective target areas. Although the farming is not uniform, the concept is the same. That is others are using this practice in pit planting and others on flat field. The main idea is to conserve moisture and improve soil fertility.

The process of conservation farming involves laying dead grass or maize stalks on the ground to suppress the weeds and conserve moisture. Herbicides such as Harness and Bullet/Round up are applied to help suppress the weeds below the laid marches. The herbicides are applied at intervals and later a crop such as

Conservation farming has become the talk of the day in most communities with the recurrence of dry spells. Conservation farming which is interchangeably used with conservation agriculture (CA) follows three main principles: maximum soil cover, minimized tillage (to avoid soil disturbances) and crop rotation and its associates.

Government, Civil society including Churches Action in Relief and



Figure 5: Mathipa Gondwe and Rumphu District Agriculture Office (DAO), proud of the Gondwe's produce

maize is planted, often following the sasakawa technology. Because of saturated soils, manure and fertilizers are applied too. In some communities this type of farming is called *Ntaya khasu²/Mlera Nthaka*. Furthermore this type of farming has been favorable in communities of vulnerable beneficiaries, where the affected (sick person) or the care taker does not spend much energy and time on the farm. Besides its advantages, farmers have complained of expensive herbicides and fertilizer and also the competition of maize stalks for conservation farming and livestock feed.

Good stories of conservation farming

- ✓ *Zione Njoka of Senga Bay, under Senga Bay Baptist Mission, has managed to produce 4 bags from her 20 ridges of 6 meters in the previous 2010/11 farming season.*
- ✓ *A retired soldier, Mr Sineki has produced 33 bags of maize from his 1.5 hectares*
- ✓ *Mathipa Gondwe, the Lead farmer in Bolero Extension Planning Area (EPA), Rumphu, has never run out of food in his household since the introduction of conservation farming, he is the originator of Mzuzu pit planting.*

2.3 Resolving to Small stock production

Organizations are exploring every opportunity to fight the effects of climate change, apart from making sure that communities have nsima in the plate, they have gone a mile encouraging livestock farming especially small stocks like pigs, poultry, goats among others. These are being encouraged because of scarce feeding resources, dry spells and food insecurity reach and they reach weaning period within a short time and can either be consumed or be sold for income generation within a shortest time. For instance other breeds of goats get weaned within 8 to 12



Figure 6: Parent pig and piglets under pass on arrangement- CARD's project in Nsanje



Figure 7: Improved breeds of goats under pass on arrangement - TAPP's project in Mvera EPA

² Because there is minimized use of the a hoe

weeks compared to calves that take 7 to 8 months. In most projects especially for TAPP, CARD, EAM and FYF, farmers are provided with the stock and after reproducing, the parent stock is transferred to other farmers depending on the arrangement of that particular project. This type of arrangement is called pass on. Some small stocks have also proven to reproduce more than one young ones, like pigs, chickens can go up to 15 depending on the breed.

2.4 Agricultural Biodiversity role in climate change adaptation

Agricultural biodiversity (agro-biodiversity) includes all the components of biological diversity relevant to food and agriculture and constitutes the variety of animals, plants and microorganisms at the genetic, species and ecosystem levels with certain functions, structure and processes such as crop species, livestock, trees, fish, microbes, pollinators, production environments, soils among others. It also includes associated traditional knowledge systems.

The majority of agro-biodiversity remains neglected and underutilized including Orchids (*chinaka*), finger millet, yams, various indigenous vegetables e.g. *Amaranths*, *Chinyolonyolo*, various edible insects. The RFSP and Community Based Agro-biodiversity Management (CBAM) in Mvera and Dowa, funded by Development Fund of Norway (DF) have emphasis on neglected and underutilized agro-biodiversity. Their main aim is to bring back (conserve) these orphaned varieties and breeds. The effect of climate change on agro-biodiversity includes shifts of plant and animal range, shifts in usable land for agriculture, changes in morphology, physiology and behavior in many species, changes in timing of biological events like flowering, breeding and migration and increased loss of species (genetic erosion). But considering its role in climate change adaptation, DF and its partners are encouraging farmers to conserve and increase production of local land races. Their role in climate change adaptation include withstanding stress conditions, ensuring food security, improving nutrition, low production costs, source of traits for crop and animal breeding,



Figure 8: Genetic conservation of land races to increase food and nutrition diversity – Rumphi Food Security project under FYF



Figure 9: Local fruits called Matowo, Bwemba (far left)



Figure 10: Local fruits called Mahuhu, very rare to find these days

increasing incomes, improving soil fertility, stabilizing ecosystems, enhancing biodiversity, occupying important ecological niches and creating new markets. Agrobiodiversity is an insurance/buffer against climate change effects and contributes to improved livelihoods of the rural communities by enabling them reduce risks and become resilient to a changing climate.

2.5 Clean Technology initiatives in fighting dry spells



Figure 11: Solar Irrigation in Thyolo - CARD



Figure 12: Sosola rainwater harvesting - MEET

Climate change has been caused by green house gas emissions from different equipments including motorized pumps for irrigation. This is why the use of clean technologies in development is being encouraged to reduce emissions. Although the contribution might be insignificant, the use of clean technologies to pump water from underground such as solar, wind and gravity are the best practices to adapt. Apart from CARD, Senga Bay Baptist Mission is also among the organizations who have established solar irrigation schemes to benefit a number of farmers. These above mentioned three systems use canals to channel water to fields. These technologies are very essential in times of dry spells. For instance, in rain water



Figure 13: Mpotola Windmill - MEET

harvesting, during rains, through a pipe, water is collected to the concrete tank and stored. When there are dry spells, through small pipes and canals, water is channeled to the main field. To save water, soil and water conservation technologies such as swalleys, check dams, vertivar, box ridges and marker ridges among others are used to conserve the limited water. Although these systems have high initial capital requirements, they are among the best adaptation practices to climate change effects.

2.6 Knowledge and learning, a key to sustainable adaptation strategies



Figure 14: Participants at a climate change panel discussion in Senga-bay - CEPA and Baptist Mission

Among other initiatives CEPA facilitates local policy dialogue and panel discussions to identify issues requiring policy response, share knowledge and equip beneficiaries with updated information on issues and climate change and its associated instruments. Awareness and sensitization meetings to increase levels of knowledge in climate change adaptation strategies and other policy related issues. The organization has observed that learning and sharing knowledge is one of the important tools for activities sustainability because it builds ones capacity to implement activities on their own and also take part in influencing policy making. CEPA also appreciated that behavioral dynamics are very

difficult to satisfy hence should try its best to equip these communities with knowledge to complement the different interventions implemented by stakeholders. Beneficiaries that have no capacity remain perpetually dependent on the project and the results of the project are not seen and that particular community remains poor. Some of the issues CEPA involve communities and technocrats in discussions include climate change and environment policies, farmer's rights issues, advocacy processes etc.

2.7 Using forgotten resources like wetlands during climate change times

Life is never the same with some of the communities surrounding the Simulemba *Dambo* (Wetlands). At least villagers in the nearby communities can testify the benefits of conserving the few existing wetlands that are eroding in Malawi. Although Simulemba was also at crossroads with biodiversity loss, three organizations such as MALEZA, DF and CEPA, realizing that wetlands are critical in supporting the livelihoods of



Figure 15: Turning back to wetlands in times of Climate change – Simulemba - Kasungu

local communities as they provide water resources for agriculture and domestic use especially in these times of climate change made an effort to support the local communities. These organizations also considered that the degradation and loss of wetlands in Malawi is more rapid than that of other ecosystems. The communities especially surrounding the valuable resource will not forget scarcity of water, firewood, natural tubers and fruits within a stone throw away because of unsustainable management of the whole ecosystem exacerbated with climate change which caused large scale soil and water loss. Simulemba communities have been sensitized on how to manage the seasonal wetlands and the forests in the catchment to reduce erosion, different ploughing skills and techniques, using crops with less water requirement, wells maintenance among others. Just like Simulemba wetland, all wetlands need to employ the use of Functional Landscape Approach (FLA)³ to revive the dead wetlands, because such well managed wetlands do not run out of water and are used to produce food throughout the year.

2.8 Resting farming fields to bring back lost fertility



Figure 16: Community woodlot at Maseya-Chikwawa - EAM



Figure 17: Fallowing with Sesbania Sesban-KATC - ZAMBIA

Although the chances of leaving farm land to complete fallowing period is very rare because of increasing population growth, the fruits of such activities are realized with time especially in terms of fertility improvements. Specifically some trees fix nitrogen through symbiotic interaction, improve soil structure and have the ability to stabilize soil. Apart from nutrient fixing trees, there are other trees such as *Mlombwa*, which is hard wood and act as a carbon sink.

Fallowing, agro-forestry and tree planting should be encouraged considering that Malawi is a net emitter of carbon dioxide. Trees can also be planted along the river banks to reduce flooding.

³ Functional Landscape Approach is a model that ensures management of both wetland and its catchment area, because the two interact through hydrological flows and socio-economic relations

3.0 Conclusion

Resultant effects of climate change and variability are manageable and community can become resilient to its effects if the practices/approaches are implemented effectively. The documentation shows that the effects of climate change have not only affected Malawi but the whole globe. The best practices are defined best in this context depending on their beneficial results to the community and their continued contribution to climate change. There is still need for continued support to communities to enhance their resilience to the effect to reduce the dependency syndrome in future. And we therefore conclude that there is need for adaptation related clear policies in line with the stakeholders and communities autonomous response to climate change.



Lets fight climate change effects together through enhancing community resilience for a better Malawi