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ROLLING OUT OF AGRO-ECOLOGY PRACTICES IN LIKUDZI SECTION, NTCHEU, Malawi - A CASE STUDY

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SUMMARY

This bulletin has been prepared by the Malawi Agro-Ecological Intensification (AEI) hub as a case study to highlight how AEI practices are being rolled out in Chibale Model Village, Likudzi Section, Manjawila Extension planning Area (EPA) in Ntcheu district. The efforts are led by public extension service, using multi-model extension approaches and multi-stakeholder collaboration to harness synergy. FAO (2018) suggested ten elements of agro-ecology as analytical tools to help in identifying important properties of agro-ecological systems and approaches and also relevant considerations in developing enabling environments for agro-ecology. The ten elements also serve as guide to policy makers, practitioners and stakeholders in planning, managing and evaluating agro-ecological transitions. Thus the same FAO's (2018) ten elements have been used as basis for appraisal. The review shows that all ten elements are being promoted in the area, with variation in intensity and scale, and also some more directly and others more indirectly. We identified areas needing more emphasis as market linkages, and responsible local governance to enable protection of resources in the field such as plant material used as cover in CA systems and long duration crops such as pigeon peas and cassava, from uncontrolled fires and free ranging animals. Through farmer field schools farmers are generating evidence of the use of neem leaf powder as organic treatment for notorious fall army worm infestation in maize. This is commendable and is worth scaling out.

1.0 Background to agriculture extension service delivery in Malawi

The mission of the Ministry of Agriculture is to promote productivity and sustainable management of land resources to achieve national food security, increased incomes and ensure sustainable economic growth and development (MOA, 2020b). Agriculture extension services are led by the government's Department of Agriculture Extension Services (DAES) within the Ministry of Agriculture. The DAES is guided by a standing extension policy (MOA, 2020a). The current focus of the policy is for pluralistic, demand-driven, market-led service provision, decentralization and equalization (MOA 2020a & b) and other factors. DAES provides technical back-stopping through the Agricultural Development Divisions (ADDs) and District Agriculture Offices (DAO). The DAO then supports Extension Planning Areas (EPAs) and sections, which are grass root level structures. Other departments in the Ministry of Agriculture include: Department of Crop Development (DCD), Department of Land Resources Conservation (DLRC), Department of Irrigation and Department of Animal Health and Livestock Development (DAHLD) which have personnel up to district level and work hand in hand with DAES. The DAES, along with other departments and stakeholders periodically produce policy guidelines and technical manuals to all stakeholders and farmers on the recommended farming practices including agro-ecological practices. These include: Guide to Agriculture Production and Natural Resource Management (MOA, 2020b), the Farmer Organizational Development Strategy (MoA, 2020c), National Guidelines for Implementing Conservation Agriculture in Malawi (MAIWD, 2016) and National Land Resources Management Policy and Strategy MoAID, 2010).

2.0 Definition of agro-ecology

FAO (2018) defined agro-ecology as 'an integrated approach that simultaneously applies ecological and social concepts and principles to the design and management of food and agricultural systems'. Along with this definition, FAO (2018) also listed ten elements of agro-ecology to facilitate the operationalization of agro-ecology and serve as a guide in planning, managing and evaluating agro-ecological transitions. The 10 elements are diversity; synergies; efficiency; resilience; recycling; co-creation and knowledge sharing; human and social values; culture and food traditions; responsible governance, and circular and solidarity economy. From the definition and 10 elements, it is clear that the concept of agro-ecology does

not only focus on technical aspects of food production, but also social and economic aspects. Other definitions also reflect the same (Gliessman, 2018; Wezzel et al., 2020).

3.0 Partnerships and models of AE dissemination in Chibale Village

The scaling out efforts involve pluralistic partnerships as well as approaches, models, strategies and methodologies.

3.1 Partnerships and Profile of Chibale Model Village and leadership structures. The government Department of Agriculture Extension Service is the frontline extension service provider working in partnership with two project partners which are ASWAP II (Agriculture Sector Wide Approach), MWASIP (Malawi Watershed Services Improvement Project). Ministry of Agriculture has a well structured District Agriculture Extension Services System well described in MoA 2020b. The structure provides for interaction with the Ministry of Local Government. The relevant structures at the section level (including Chibale Village) include Catchment Management Committee (CMC), Village Natural Resources Management Committee (VNRM), Village Development Committee (VDC), Village Agriculture Committee (VAC), lead farmers, village heads farmer field schools (groups) and farmer groups.

Chibale is a designated model village, as such, the key feature is that its subjects are committed to working together with other service providers to achieve their vision (MOA, 2020b). For operational purposes, several villages have been combined in one village called Chibale. In 2021/22 season, the time of this case study reporting, the village had a population of 3197 (1942 are females) and a total of 967 households (498 of them female headed). There were only two projects working in the area, namely MWASIP and ASWAP with no any other NGO working in the area.

3.2 Strategies and extension methods. To reach farmers with messages, the strategies in use include use of farmer groups, lead farmer approach, plant health clinics. The extension methods include strategic campaigns, demonstrations, field days, visits, tours, exhibits and shows (MOA, 2020b).

3.3 Farmers vision: Farmers are assisted to develop a well stated vision of where the family wants to be in next 3 years. The extension service helps them attain such vision. The family are asked evaluate themselves after some time, to ensure the vision becomes a reality.

3.4 Integrated homestead farming. Farmers are encouraged to engage in enterprises which support each other within the household. For example, in the case study model village, farmers are using crop residues for livestock feed or bedding, while the animal manure is used for soil amendment and nutrient source for crops. The livestock units are also a source of household nutrition and cash and provide resilience in the event of low crop yields. The animals being kept include goats, pigs, poultry, rabbits and pigeons. This also includes cash generating enterprises, where enterprises such as egg production can generate cash for fertilizers pesticides for crops. Other farmers have embarked on fruit production and beekeeping.

3.5 Specific roles by public extension and partners in the model village. The public extension system is particularly engaged in providing options and facilitating access eg where and how to source. The public system also provides training to lead farmers, farmer groups, farmer field schools, and supports the visioning process. They also help to organize field days, shows and exchange visits. The ASWAP provides training materials, repair of roads, and starter pack seed for various crops such as potatoes and bananas and goats, and sustainable land management. MWASIP championed the establishment of CMCs and VNRMCS.

4.0 Agroecology technologies being promoted in the area

The overarching messages of the campaign focus on good agricultural practices, such as timely planting, plant populations, variety choice, fertilizer management, plant residue incorporation, timely weeding harvesting and others. We saw fields with crops planted according to recommended ridge and planting spacing, a range crops were in the fields. However, crops performed differently due to the early season drought and other soil, landscape and cropping history practices. As part of integrated homestead and visioning approaches we saw farmers had established fruit trees for nutrition, income and protect soil. Farmers were also doing diversification of enterprises with chicken (layers), pigs, rabbits, pigeons, sweet potato and cassava. Other farmers were growing maize using Conservation Agriculture (CA) to ease labour, conserve water and soil erosion. There were 89 farmers practicing CA on 0.4 hectares (total of 35.6 ha) (Figure 1a). The CA farmers do not receive any material support. However, some farmers diversifying into sweet potato and banana were assisted with planting material from the partner ASWAP SP II. In some fields farmers adopted doubled up legume intercropping (two legumes, one of them pigeon peas, in same field to increase amount of quality crop residues and legume grain). Some farmers were doing rainwater harvesting through swales and storm bands (Figure 1 b). Other interventions included agroforestry, sustainable land management activities (ie contour marker ridge construction, ridge realignment, manure making and application, pit planting, box ridges, mulching and gully reclamation).

5.0 Appraisal of how the interventions in Chibale village ascribe to agro-ecology principles

In boxes 1-3, we describe how the range of interventions and activities in the model village tick to the 10 elements. We have grouped the 10 elements into three classes as suggested by FAO (2018): 1) Elements that describe common characteristics of agro-ecological systems, foundational and innovation practices; 2) elements meeting context features, and 3) elements to do with governance and enabling environments



Plate 1a. Farmer explains the principles, practices and advantages of CA during a field day.



Plate 1b. Swales constructed to store water around a farmer field school plots

Box 1 a. How agro-ecology elements that describe common characteristics of agroecological systems, foundational and innovation practices feature in Chibale Model Village. Part 1: diversity, recycling and synergies.

Diversity: *Through integrated house hold approach farmers are encouraged to diversify into several crops, as well as other enterprises such as small stocking notably rabbits, pigeons, laying chickens, pigs, goats, fruits (bananas and tangerines newly established). The fruits are aimed at proving potential income and nutrition source and diversify from staple food such as maize, cassava and sweet potatoes.*

Recycling: *farmers are growing legumes, intensifying productivity through double up cropping, rearing goats, rabbits and chicken pigs and use the enriched green manure and animal droppings and agroforestry to recycle nutrients and organic matter back in the crop cycle for soil nutrient enrichment and conditioning.*

Synergies: *Synergies are being harnessed through many ways. Through combined use of water conservation structures, fertilizer applications, organic and manure amendments, synergies on nutrient and water use are obtained. Farmers are achieving synergies through group work in FFS where recording of information is shared and discussed for common synthesis and decision making.*

Box 1 b. How agro-ecology elements that describe common characteristics of agroecological systems, foundational and innovation practices feature in Chibale Model Village. Part 2: resource use efficiency, resilience, co-creation and knowledge sharing.

Resource use efficiency. *The recycling of crop residues, use of mulch in CA are one main way in which farmers are using resources efficiently. Also, through mulch, contour bands, tied ridges and swales, water is conserved resulting in potentially high water and nutrient use efficiency.*

Resilience. *Small animals such as goats, pigs, rabbits, chickens and pigeons improve the resilience to shocks that may arise from rainfall variation, family disaster and COVID-19 related price increases and poor market prices. The use of green manure and water conservation measures (CA, box ridges, swales and contours) provide crop resilience to droughts, dry spells and pest attacks.*

Co-creation and knowledge sharing. *The farmers are intensely involved in co-creation and sharing of knowledge most typically through the FFS. In particular, farmers are evaluating effectiveness of chilli pepper and neem (*Azadirachta indica*) for control fall army worm. Through the same FFS farmers have oriented to contour ridges, swales and box ridges for water conservation and some members of the FFS have immediately taken these up in own fields. Field days are used to show-case the approaches and enterprises to other farmers to facilitate the adoption process (Figure 2).*



Plate 2a. Members of farmer field school present results of their findings during a field day.



Plate 2b. A farmer proudly explains about egg production unit to field day participants.

Box 2. The fitting of agro-ecological elements related to context features (Human and social values, culture and food traditions) in Chibale Model Village

Human and social values: Activities in the model involve both men and women village and the youth, thus providing relevant social value with reference to equity for opportunities including income. The diversity of crops, livestock and enterprise provides opportunity for choice that is based on personal, community or faith-based values.

Culture and food traditions: Crops may perpetuate culture in various ways including dress, housing and party foods (beer making). The diversity of food system allows farmers to maintain traditional functions such as wedding and chieftainship parties.

Box 3. Agro-ecology elements that support enabling environments (Responsible governance; circular & solidarity economy)

Responsible governance: There is participation and involvement of local leadership in the various programmes and activities. The leaders belong to various structures, such as catchment management committee (CMC). There are various committees in the area, including those which help in rationalization of decision making. In the CA activities, the problem of free range animals grazing destroying has been raised with local leaders and solutions being weighed up.

Circular and solidarity economy: most of the enterprises discussed under integrated household approach directly contribute to income of farmers and communities. Higher yields expected from CA, rainwater harvesting and nutrient recycling will equally contribute to the higher incomes.

Critical observations and conclusions

Being a case study, this report reflects the extent of agro-ecology scaling out in Malawi, particularly in model villages with pluralistic partners. The report confirms that structures, and knowledge management systems exist to support the efforts at pluralistic levels. However, extent of reach is agreeably low. The number (just two) of partners the area are few compared to other areas. Resource constraints continue to exist to support farmer fields schools, facilitate field days, exchange visit and basic requirements of technology to establish demonstrations. With this in mind then the achievements of public staff and partners in the area are quite commendable. Some elements need immediate attention such as the establishment of effective market linkage to serve as off takers for surplus crop and animal produce. Local governance structures are unable to protect plant material in CA fields or fields in from free grazing animals or wild fires, slowing uptake of CA and crop recycling in general. The road access is poor and almost impossible in the rainy season. The use of neem leaf powder as organic treatment for notorious fall army worm infestation in maize is commendable and worth scaling out as this give positive results note only Likudzi and other published results in Malawi and in the region (eg. Phambala et al., 2020; Ngegba et al.; 2022; Karani et al., 2017)

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