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Status of Agricultural Innovations, Innovation Platforms and Innovations Investment in

Malawi

PARI

Program of Accompanying Research for Agricultural Innovation

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FARA
Forum for Agricultural Research in Africa

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University of Bonn

Status of Agricultural Innovations, Innovation Platforms and Innovations Investment

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List of Acronyms

ADD	Agricultural Development Divisions
AEDC	Agricultural Extension Development Coordinator
BMZ	Germany Federal Ministry for Economic Cooperation and Development
CA	Conservation Agriculture
CAADP	Comprehensive African Agriculture Development Program
CCARDESA	Centre for Coordination of Agricultural Research and Development for South Africa
CGIAR	Consultative Group on International Agricultural Research
CIAT	International Centre for Tropical Agriculture
CIMMYT	International Maize and Wheat Improvement Centre
CPAR	Canadian Physicians for Aid and Relief
CSO	Civil Society Organisations
DADO	District Agriculture Development Officer
DARS	Department of Agricultural Research Services
EPA	Extension Planning Areas
FARA	Forum for Agricultural Research in Africa
FFS	Farmer Field Schools
IAR4D	Integrated Agricultural Research for Development
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IP	Innovation Platform
JFFLS	Junior Farmer Field and Life Skills Schools
LUANAR	Lilongwe University of Agriculture and Natural Resources
MAICC	Mponela AIDS Information and Counselling Centre
MARDEF	Malawi Rural Development Fund
MoAFS	Ministry of Agriculture and Food Security
MVP	Mwandama Millennium Village Project
NASFAM	National Association of Smallholder Famers
NGO	Non-governmental Organisations
OFSP	Orange Flesh Sweet Potatoes
PARI	Programme for Accompanying Research in Innovation Project
PPS	Probability Proportionate to Size
SAFI	School of Agriculture for Family Independence
SDGs	Sustainable Development Goals
SSA CP	Sub-Saharan Africa Challenge Programme
STI	Science, Technology and Innovation
ZEF	Centre for Development Research

STUDY BACKGROUND

Science and technology remains the fulcrum for development over the ages. There is hardly any national development in contemporary history that is not based on consistent efforts from the science and technology sector. The spate of development in agriculture follow suit; the state of efficiency in science and technology generation correlates highly with the development of agriculture. In Africa, agriculture is considered as the sector with the best potential to lead the socioeconomic development of countries on the continent. However, the sector is bedevilled with many constraints that could be categorized as technological, socio-cultural, institutional, infrastructural, and economical. The poor productivity of the enterprise stream in the sector is clearly seen from its contribution to a country's GDP versus the number of active workers engaged in the sector. Africa's agriculture currently engages about 65% of the working population and its average contribution to GDP still stands at 22.9%.

The crave to develop Africa has received good attention in recent years, starting with the political will of the heads of states, under the auspices of the Africa Union Commission, to develop and implement the Comprehensive Africa Agricultural Development Programme (CAADP), the Science Technology and Innovation Strategy (STISA). The Forum for Agricultural Research in Africa (FARA) also came up with a handful of continental initiatives, such as the Sub-Saharan Africa Challenge Programme (SSA CP), *Strengthening Capacity for Agricultural Research and Development in Africa* (*SCARDA*), Dissemination of New Agricultural Technologies in Africa (DONATA) and several others. The different initiatives aim to foster change by addressing specific issues that constitute constraints in the path of progress in Africa agriculture. The notion that African agricultural research system has generated a lot of technologies with great potentials, but which are not realized due to different institutional and organizational constraints—more specifically, the way agricultural research and development systems is organized and operated—is prevalent among stakeholders in the sector. Indeed, this notion appeals to reasoning. However, there is no known cataloguing or documentation of existing technologies and their veracity in delivering broad-based outcomes. The possibility of finding some documentation in annual reports of research institutes, journal articles and thesis in the universities is known, but this will not meet an urgent need.

Thus, the Programme of Accompanying Research for Agricultural Innovation (PARI) commissioned the three studies reported in this volume to provide a

compressive analysis of the state of agricultural technology generation, innovation, and investment in innovations in the last 20 years in selected countries in Africa.

Study 1 is the "situation analysis of agricultural innovations in the country" and provides succinct background on the spate of agricultural innovation in the last 30 years. It provides useable data on the different government, international and private sector agricultural research and development interventions and collates information on commodities of interest and technologies generated over the years. It also conducted an assessment of the different interventions so as to highlight lessons learnt from such interventions, with regard to brilliant successes and failures.

Study 2 concerns a "scoping studies of existing agricultural innovation platforms in the country". It carried out an identification of all the existing Innovation Platforms (IP) in the country, including identification of commodity focus, system configuration, and partnership model. The study provides an innovation summary for each IP for use in the electronic IP monitor platform. It further synthesises the lessons learnt from the agricultural IPs established through different initiatives in the country in the last ten years.

Study 3 was an "Assessment of the national and international investment in agricultural innovation". It is an exhaustive assessment of investments in innovation for agricultural development, food and nutrition security in the country. It collates updated data on investment levels in the past and present, including a projection for the next decade requirement to assure food and nutritional security in the country.

The three studies form the comprehensive collation on the state of agricultural innovation in the 12 countries where the PARI project is being implemented. It is expected that these studies will benefit all stakeholders in Africa's agricultural research and development, including the users of technologies, research stakeholders, extension system actors and, more importantly, the policymakers.

PART ONE

Inventory and Characterisation of Agricultural Innovations and Innovation Platforms

INTRODUCTION

In sub-Saharan Africa, agriculture remains the backbone of economy and food and nutrition security. About 63 per cent of the incomes of the rural households come from agriculture. Most of the agriculture is practised in smallholder farms of less than 2 hectares. A large proportion of these smallholders are women who produce about 80 per cent of the food in the rural households. Opportunities to boost the agriculture sector are available – governments and their development partners are putting huge investments and policy frameworks to provide an enabling environment. There have been calls for paradigm shift and policy changes in the agricultural sector. For a more meaningful agricultural development to take place, for example, some stakeholders advocate the integration of economic development with entrepreneurship. This entails formulating deliberate policies to encourage private entrepreneurs' investment in African agriculture to increase productivity, create employment, enhance livelihoods and promote growth. It also means more leveraging of resources and the application of science, technology and innovation (STI) to revolutionize agriculture.

Notwithstanding these efforts, the sector remains poorly developed, with persistent food shortages associated with climate change, prolonged droughts and erratic rains. These problems vary across the region and countries by virtue of different social, cultural and economic factors. Biophysical and socioeconomic studies are needed to generate new research-based knowledge that various actors can apply to making Africa's agriculture more effective and competitive.

In cognizance of this, the Forum for Agricultural Research in Africa (FARA) in partnership with the German government represented by the Centre for Development Research (ZEF) of the University of Bonn under its 'One World No Hunger' initiative is implementing the *"Programme of Accompanying Research for Agricultural Innovations (PARI)".* The ultimate goal is to support and address issues that affect food security, agrarian livelihood as well as sustainable value chain development through scaling up of agricultural innovations. FARA commissioned three research studies in the 12 countries targeted by the PARI project to generate science-based evidence and inform programming in the agricultural sector. The countries are Benin, Burkina Faso, Cameroun, Ethiopia, Ghana, Kenya, Malawi, Mali, Nigeria, Togo, Tunisia and Zambia.

In Malawi, FARA involved the Department of Agricultural Research Services (DARS) that engaged an external consultant to undertake the following studies:

1. A situation analysis of agricultural innovations

2. A scoping study of existing agricultural innovation platforms
3. A study on National and international investment initiatives on innovation for agricultural development and food and nutrition security

This report presents key findings and lessons from studies 1 and 2. The conclusions and recommendations from the studies suggest appropriate measures or steps for positioning BMZ initiative for agricultural innovation centres in the local context of Malawi.

Key Research Questions

1. What has been happening with agricultural innovations in Malawi?
2. Have innovations reached the intended users – women farmers, rural smallholders, etc?
3. Has there been any deliberate investment or policies to promote agricultural innovations? If not, why and if yes, in what contexts and how has Malawian agriculture profited from such investments – why do we still have food shortages?

An agricultural innovation platform is a space for learning and change. It is a way of bringing together different stakeholders – farmers, traders, researchers, government officials, NGOs, input suppliers, service providers and processors- to identify solutions to common problems or to achieve common goals. Innovation platforms tackle challenges and opportunities at various levels: in a village, community and district or throughout a value chain or economic sector.

Innovation platforms (IPs) are particularly useful in agriculture because agricultural issues tend to be complex. They involve different biophysical, socioeconomic and political factors, and concern various formal and informal institutions. By bringing together stakeholders in various sectors and from different levels, IPs are able to identify and address common concerns more effectively. IPs can be used to explore strategies for boosting productivity, managing natural resources, improving value chains, and adapting to climate change. Some IPs focus on single issues; others deal with multiple topics. An agricultural innovation is considered a technology that has been widely adopted, with huge benefits to farmers.

Benefits of Innovation Platforms

1. Innovation platforms facilitate dialogue and understanding among stakeholders and provide a space for them to create a common vision and mutual trust. They offer a neutral space to air disagreements and conflicts, and for members to state their needs and requirements.

2. They enable partners to identify the bottlenecks in a given innovation, and develop solutions beyond what individual actors can achieve—for example, in infrastructure, institutional change and policy development.
3. They help create motivation and a feeling of ownership of the solutions that they develop: People readily buy into solutions they have been involved in developing.
4. They facilitate upward communication. They enable weaker actors (such as small-scale farmers) to express their views on an equal basis with powerful actors (such as processors or the government). They empower communities to demand and negotiate for services from the government and support organizations.
5. They lead to better-informed decisions. Innovation platforms enable joint learning and cooperation among diverse actors to solving problems and reducing uncertainties. Farmers learn how to sell their products, while policymakers gain evidence to use in creating a more enabling environment where innovations can thrive.
6. They contribute to capacity development. By improving communication, learning and exposure to new people and ideas, innovation platforms help members clarify their roles, organize themselves and adapt to new opportunities.

Innovation platforms are not the solution to all problems; because they are not rigid or predictable, they can lead a research or development programme in unexpected directions (which may be a good thing, but can be hard to justify to senior managers and donors). Depending on the circumstances, other approaches, such as more traditional research coordination meetings, stakeholder consultations or participatory research methods may be more appropriate. These methods can be used in conjunction with innovation platforms.

METHODOLOGY

Malawi followed strictly the research design and methodology agreed upon during the inception meeting in Addis Ababa, for the three studies.

Figure 1: Main methods of data collection for this study

Methods of data collection and analysis

- Literature review: There was in-depth review of the relevant literature and up to date performance reports on agricultural innovation.
- Consultations with key innovation stakeholders from government ministries and departments, research institutions, universities, faith and community-based organizations, local and international NGOs, private companies, etc.
- In-depth individual interviews with smallholder farmers, intended primary users of innovations and innovation platforms.

The qualitative data from stakeholder consultations and individual interviews were manually content-analyzed and presented as anecdotes to contextualize the quantitative data from the literature and routine monitoring exercises. Hence, the report contains graphs, photos and direct quotes from respondents as illustrations.

RESULTS

Agricultural Innovation Generation in Malawi

Generation of agricultural innovations is carried out by public and international research institutions in the country. The work is coordinated through DARS. At the moment, most of the innovations focus on cereal commodity group. A total of 64 technologies have been developed for cereals in this regard, representing 44% of available innovations. The least numbers of innovation breakthroughs were recorded for soil and agricultural engineering and livestock and pastures. Consultations with experts at LUANAR showed that, with respect to livestock, there were several

promising technologies with high potential of adoption among farmers, although they were yet to be disseminated. The level to which various innovations have been disseminated and adopted by farmers was not well documented and quantified in the country.

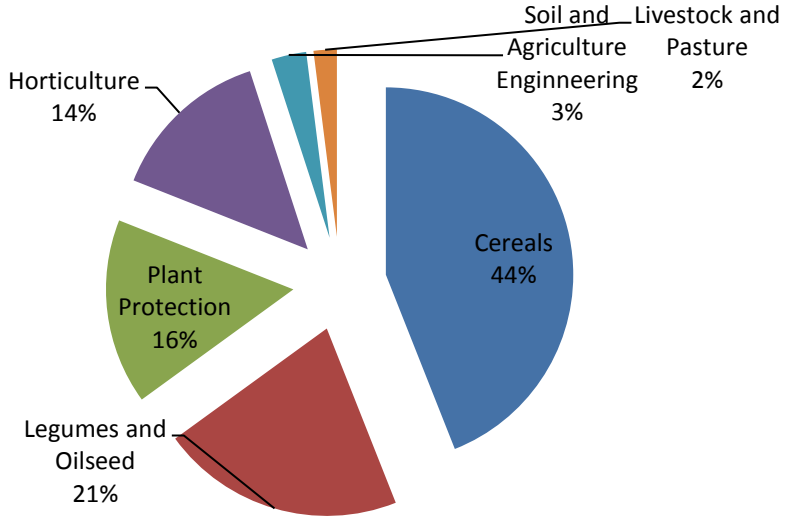


Figure 2: Agricultural Technologies Released by Commodity (%)
Source: DARS (2015)

Within the cereal and legume commodities, DARS had tested and released a number of varieties to suit the current weather patterns that are characterized by erratic rainfall and prolonged dry spells. A total of 33 new cereal varieties have been released and adopted by farmers over the past seven years (27 for maize, 3 for wheat, 2 rice and 1 millet). DARS also released 27 varieties of roots and tubers, 24 varieties for legumes and 11 new varieties for horticultural crops.

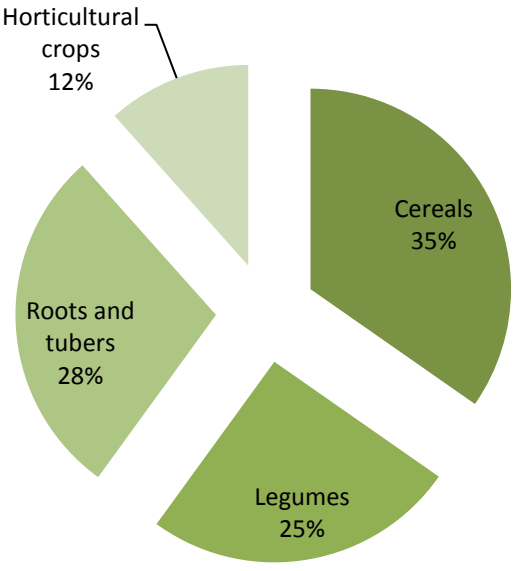


Figure 3: New Seed Varieties Released by DARS

Dissemination of Innovations

Dissemination of agricultural innovations is done through various innovation platforms by MoAFS departments in collaboration with their partners. The 5 platforms used in scaling up innovation diffusion in Malawi were:

1. Model villages
2. Demonstrations plots by MoAFS, private seed companies and lead farmers
3. Agricultural fairs and events;
4. Research institutions, and
5. Farmer field schools

This report describes a few examples of successful innovation platforms, detailing users, stakeholders, benefits, challenges and lessons for organizational learning. It also covers the innovations learned under these platforms, the main successful ones being:

1. Compost manure
2. Conservation agriculture
3. Plant breeding
4. Crop management and storage to reduce postharvest loses (PHL)
5. Sasakawa's planting of one seed per station. There was some wide-scale failure due to land limitation and trade-off for intercropping.

In Malawi, the delivery of agriculture messages to farmers followed a comprehensive structure, comprising: 8 Agricultural Development Divisions (ADDs) demarcated

based on agro-ecological characteristics; 28 districts, each headed by a District Agriculture Development Officer (DADO); and more than 200 Extension Planning Areas (EPAs), each managed by an Agricultural Extension Development Coordinator (AEDC). There were 2880 sections each manned by an Agricultural Extension Development Officer (AEDO) who is the frontline extension officer and the one to translate agriculture messages to the farmer.

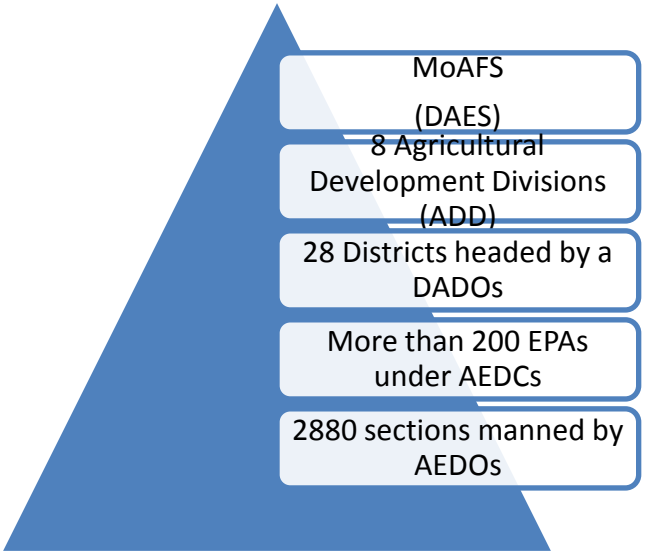


Figure 4. MoAFS agricultural extension structure

Improving Food, Nutrition and Livelihood Security of Smallholder Farmers through Innovation Platform Systems in Balaka District, South Region of Malawi

Conservation Agriculture IP in Balaka District

Bvumbwe Research Station, International Maize and Wheat Improvement Centre (CIMMYT) and International Centre for Tropical Agriculture (CITA) use conservation agriculture (CA) innovation platforms to address problems of poor soil fertility and water management in Balaka district. The CA innovation platform (IP) has shown to be impactful and sustainable for smallholder farmers in the district. Over the past few years, the IP was operated under FARA's 5-year Integrated Agricultural Research for Development (IAR4D) concept that was implemented as a project – the sub-Saharan African Challenge Programme (SSACP). It tested zero tillage, residue retention, fertilization and the use of herbicides in staple maize, legumes, cassava and vegetables. Control trials were done in 5 villages of Blantyre rural, 125km from Balaka, where experiments were taking place.

Figure 5a. Differences in soil colour on CA plots (back) and conventional control plot

Figure 5b. Differences in maize grain yield on Treatment 1 (conventional control plot) and Treatment 6 (CA with fertilizer and residue retention), Balaka 2009/2010

> Conservation agriculture innovation platform is relevant in the context of Malawi to mitigate effects of climate change, thanks to FARA for funding the IP…. Smallholder farmers continue to benefit from IAR4D CA innovation platform concept, although the SSP CA project phased out way back. They continue to see positive changes in their lives owing to knowledge acquired from the CA innovation platform…
> *Mphatso Gama, the Principal Research Officer at Machinga Agricultural Development Division (ADD).*

According to Mpatso Gama, the Principal Research Officer at Machinga Agricultural Development Division, over the years the IP has improved loan and market access for poor smallholder farmers through collaboration with relevant local actors, including Malawi Rural Development Fund (MARDEF), Mulanje Peak, that has been purchasing tomatoes from the IP farmers for processing, and Export Trading Group and Trans Globe, involved in legume sales to Asian markets. Other key stakeholders for the IP were Balaka District Assembly, the Ministry of Agriculture, members of the media, National Association of Smallholder Famers (NASFAM), Department of Agricultural Research Services (DARS) and Agriculture Commodity Exchange (ACE).

Challenges

1. Zero-tillage, fertilizer, residues and herbicides have shown to increase yields. However, ever increasing costs of fertilisers and herbicides continue to pose production burden for the majority of poor farmers.

2. Most of the smallholder farmers were peasants that needed to change their mind-sets and begin to practise agriculture as a business; thus taking entrepreneurship approach to improve productivity.
3. Famers culturally till land in Malawi. The CA's concept of zero tillage needs continuous promotion to gain full adoption.

Mwandama Millennium Village in Zomba

Soil Fertility, Water Management and Crop Production IP

Mwandama Millennium Village Project (MVP) is a two-phase multidisciplinary project that started in 2006 to contribute toward the attainment of the Millennium Development Goals (MDGs) in the country. MVP focuses on areas of agriculture, health, infrastructure development related to water, sanitation and hygiene (WASH), ICT, roads and bridges, and education (school blocks and learning materials). The project was pre-tested at Makoka Research Station in Thyolo District. The United Nations Development Programme (UNDP) implemented the first phase (2006-2011) in Mwandama and a few surrounding villages in the district. Mwandama was already a model village as regards agriculture, especially in compost manure making.

In the first phase, in terms of agriculture, MVP provided starter packs of fertilizer (50kg 23:21:0 and 50kg urea) and 10kg maize seeds to each household in the targeted areas to boost agricultural production. The starter packs helped increase maize yields and household incomes in the area. For example, smallholder farmers realized 700-1050 metric tons of surplus maize in 2008/2009 and 2009/2010 agricultural seasons and earned more than 20 million kwacha after sale in each year. The farmers then started to purchase fertilizers and hybrid seeds on their own. As a result, the project implemented the second phase as a self-sustaining phase (2012 till date). This phase has scaled up promotion of key agricultural innovations to 114 villages, with Mwandama as the administration centre. The innovations promoted were highly impactful and cost-effective.

The main partners in the second phase include Millennium Promise, Ministry of Trade and Industry and World Food Programme (WFP). Millennium Promise trains lead farmers in key agricultural innovations who, in turn, train other farmers. In 2015, there were 2 lead farmers per village and 228 for the whole project area. WFP purchases agricultural produce from the farmers every year, while the Ministry of Trade and Industry helps the farmers meet WFP standards.

Key project achievements

1. MVP provides school feeding programme at 6 out of 14 primary schools in the area. The rest of the schools are supported by WFP.
2. MVP farmers have constructed a grain bank/warehouse for storage of surplus crops at Mwandama and purchased another warehouse at Nathenje in Lilongwe.
3. MVP farmers have formed and registered a cooperative and a union to help in the marketing of produce from smallholder farmers.
4. Purchase of two maize mills and a grocery store to increase income generation.
5. Purchase of a 7 ton lorry for transporting agricultural inputs and products to the market.
6. Construction of an office and recruitment of staff to do different activities for the project.

Mwandama Fertilizer

Mwandama fertilizer is the most successful agricultural innovation for the Millennium Village Project. The fertilizer is basically compost manure made from locally available materials as substitute for inorganic fertilizers that the majority of farmers cannot afford. The manure consists of 20kg (1 pail) chicken or pig manure, 15kg maize husks, 5kg ash,10kg urea or 23:21:0:4S (depending on the use of the compost manure), and 10-15kg water. These ingredients are mixed up well on a sheet of heavy plastic paper and kept in a bag with a plastic sheet inside for 21 days before being dried for 3-4 days under a shade. After drying, the manure is sealed in a bag, ready for application using the recommended application rates for inorganic fertilizers. The use of Mwandama fertilizer reported additional benefits over the use of commercial inorganic fertilizers.

Benefits of Mwandama fertilizer

1. Extended period of harvesting of produce – at least two months for vegetables, instead of the usual one month harvesting time
2. Increased size of produce, e.g. tomatoes and fruits
3. Higher yields for maize

> We used to apply inorganic fertilizers here, but now the prices have skyrocketed and most of us cannot afford them anymore. Compost and manure making is a way of improving soil fertility at no cost and hence suitable for us. It only requires us to collect crop residues and other organic materials that decompose easily…
> *A farmer at Mwandama*

Farmers can make 5 bags of the fertilizer in a day at the cost of K4000-K5000 per bag. In the 2014/15 agricultural season, farmers with excess of Mwandama fertilizer sold it at K10,000 per bag. Nevertheless, MVP has not yet undertaken a thorough economic analysis and nutrient composition of the fertilizer to inform the scientific community.

Sasakawa

Sasakawa entails the planting of 1 seed per station. By using this method of growing crops, farmers use lower seed quantities and fertilizer per hectare and obtain healthy plants and higher yields. MVP has been promoting Sasakawa to maximize yields in the project area. The majority of farmers grow a local-hybrid composite variety (Nthawa June) and have realized high yields.

Figure 6. A farmer applies fertilizer to maize planted using Sasakawa method. Ministry of Agriculture and Food Security recommend planting spacing of 25 cm and fertilizer application between stations.

Sasakawa farming is constrained by shortage of land, as the population continues to grow. To address this, MVP promotes intercropping. With intercropping, farmers don't rely on one crop even if they have a very small land; this reduces the risks – if one crop fails, the other one may do better. The combination of some crops is also profitable on the part of farmers. For example, maize-legume intercropping helps improve soil fertility and promotes crop and diet diversification. However, I must mention that intercropping does not enable our farmers to produce high yields like pure stands allows…

Davlin Chomboto, Extension Officer from Millennium Promise.

Orange flesh sweet potatoes (OFSP)

Fifty seven in every 100 women of reproductive age (15-49 years) suffer vitamin A deficiency in Malawi (Nutrition Policy, 2008). Vitamin A deficiency is associated with stunted growth, high risk of infection, skin and eye diseases, night blindness, low birth weight and miscarriage. Only 42% have access to vitamin A supplements, making other sources of vitamin A, such as OFSP and other orange fruits and vegetables all the more important. In cognizance of this, MVP promotes the cultivation and consumption of Zondeni, OFSP variety with high B-carotene level (13.93mg/100g). Five additional varieties have already been tested and are yet to be grown by farmers in the 2015/2016 cropping season.

In terms of total production, sweet potato is the third most important food crop in Malawi but most varieties grown in Malawi are white or yellow-fleshed. The dominant variety, "Kenya", is yellow-fleshed but its colour is due to other carotenoids. It has no significant amounts beta-carotene nor do white-fleshed varieties.

We have established Chisomo Orange Flesh Sweet Potato Group of Women Farmers to engage in making juices, cakes and snacks from OFSP to improve food and nutrition in the area… *Violet Mwandama*

Empowering Smallholder Farmers through Farmer Field Schools in Ntchisi and Lilongwe

Farmer Field Schools IPs

Farmer field schools are plots where farmers conduct experiments on different crops and learn best practices in farming. A group of farmers get together in one of their own fields to learn about their crops and things that affect them. They learn how to farm better by observing, analysing and trying out new ideas on their own fields.

Farmers themselves decide on the experiments to be conducted with different crops. Unlike traditional approaches to agricultural extension, which rely on extension workers providing advice to farmers, farmer field schools enable groups of farmers to find out the answers for themselves. That means the farmers can develop solutions to their own problems. The farmers meet every week, from planting to harvest, to check on how the crops are growing, look at the amount of moisture in the soil, count the numbers of pests and beneficial creatures, such as earthworms and spiders. They do experiments in the field.

The facilitator of a farmer field school is normally an extension worker or another farmer who has graduated from a field school. The facilitator guides the group, helps them decide what they want to learn and think of possible solutions, and advises them if there is any question. The farmers draw on their own experience and observations, and make decisions about how to manage the crop. The group must hold two or more field days to show other farmers what they are doing.

Since the early 1990s, Food and Agriculture Organisation (FAO), World Vision, Concern Universal, Canadian Physicians for Aid and Relief (CPAR), CARE Malawi and other humanitarian organisations have been promoting famer field schools to enhance food security in the country. The emphasis is on stimulating local innovation for sustainable agriculture and empowering farmers to implement their own decisions in their own fields.

Figure 6a. Divason Phiri displays the tomatoes he produced with skills from CPAR Farmer Field School (FFS) innovation platform. Through FFS, smallholder farmers have learned new and improved agricultural methods crop production and shared useful experiences in groups to make the most of their agricultural potential.

Figure 6b. Smallholder farmers stand in a garden that serves as the Farmer Field School at Chiweza Village in Ntchisi. Experiments demonstrated and learned include number of plants per station, distance between planting stations, contour and box ridges, and the use of manure and fertilizer application.

More evidence on the successes of FFS innovation platform can be seen from CPAR's intervention areas in Traditional Authorities (TA) Chinzu and Kabudula, where farmers proudly discussed the benefits.

> When CPAR introduced the Farmer Field School concept, we formed Tiyanjane FFS in my village. We started our FFS with 25 members, comprising 14 men and 11 women. After establishing the group, we were trained in new and improved agricultural practices, such as conservation agriculture, intercropping, irrigation farming, village savings and loans, by experienced agricultural extension workers. I was particularly impressed with irrigation farming because with irrigation you can grow crops throughout the year. The good thing about the Farmer Field School is that learning is both theoretical and practical. This makes a lot of farmers enthusiastic and willing to adopt a variety of skills… *Divason Phiri, a 38-year old CPAR beneficiary from Masinja Village, TA Chinzu in Lilongwe.*

> In the FFS, we established our own plot in order to learn through practice. CPAR provided us with start-up vegetable seeds like rape, cabbage, mustard, onion and tomato. My main interest was on tomato. I was wondering if tomatoes could be grown any time throughout the year. After sowing tomatoes on our learning field, I did the same at my home garden. I followed the good practices that we learned until harvest time. I was so amazed that from my small plot of 0.2 hectare I was able to harvest 300kg from one cropping cycle. I sold about 100kg and generated about K5,000 ($50). It was easy to sell my tomatoes because they were of high quality. I used the remaining amount of tomatoes for home consumption and also sold some of the excess on the market and was able to buy soap, sugar and school supplies for my girls. I also bought shares at my village savings and loan group to help boost my sources of income… *A CPAR beneficiary from Masinja Village*

Farmer field schools have helped other vulnerable rural farmers from Phiri's village learn better ways to produce high quality crops and boost family diets and incomes.

Seed Multiplication and Banking

Farmer Field Schools have shown to work better where there is seed multiplication and banking that enables farmers to put FFS lessons into practice. Seed multiplication and banking is a seed revolving fund concept in which farmers form seed groups and plant high yielding, nutritious and drought tolerant crops. Humanitarian organisation involved provide the initial seed and train the seed groups taking positive deviant farmers (e.g. lead farmers) as the model to promote. Farmers receive high yielding varieties of groundnuts, soy, pigeon peas, cassava and sweet potato seed/planting material, multiply them and repay or 'bank' after harvesting. For example, a farmer who receives 2 kg of high-yielding maize seed repays 4 kg after harvesting to be provided to fellow farmers for production in the next cropping season. That is to say, individual farmers in the group multiply the seed by planting and harvesting the yield. The yield does not only provide residual seed for next growing season and consumption, but also repayment to the seed keeper chosen by the group members for revolving thereafter. After a period of three years, seed groups purchase new seeds as yield may begin to diminish. Seed multiplication and banking allows sharing of seeds across the community leading to greater diversification of crops and food within the areas. Group members need post-harvest training to minimize crop losses, in particular for perishables such as fruits, vegetables and roots and tubers.

School of Agriculture for Family Independence (SAFI)

Agriculture IP

SAFI serves as an IP, since it trains smallholder farmers in agriculture. The school equips smallholder farmers with knowledge and skills for improving agricultural productivity to attain nutritional and income self-reliance. It offers a three year training that covers different areas of agriculture, including crop and livestock production, agribusiness, fish farming, irrigation, forestry and horticulture, and nutrition. Each farmer is allocated 2 acres of land for cultivation: 1 acre for maize, ¼ acre cowpea, ¼ acre groundnut and ½ acre soybean. The school has continued to scale up and has drawn student farmers from various districts in the country, including Lilongwe, Kasungu, Ntchisi, Dowa and Blantyre.

In the first year of the training, each farmer receives the following as starter inputs: 4 bags of fertilizer (2 bags 23:21:0:4S and 2 bags of urea), certified 10kg maize seed, 10kg bean seeds and 16kg soybean seed. They receive the same inputs in the 2nd year

as a loan and 3rd year, after graduation, as a grant. SAFI trains recipient farmers in proper ridge and plant spacing and fertilizer application to maximize yields.

Innovation	Crop	SAFI Recommendation
Plant spacing	Maize	Sasakawa (1 seed per station; stations spaced 30cm apart)
	Beans	Sasakawa (1 seed spaced 10 cm apart; two rows on a ridge spaced 30cm)
	Soybeans	Inoculation and broadcast method of planting
	Groundnuts	Sasakawa at 15 cm apart
Fertilizer Application	Maize	Basal Dressing:
		Mixture: 1 pail compost manure + 3 pails 23:21:0 + 1 pail Urea to increase uptake of nitrogen (a tablespoon is used for application)
		Top Dressing
		Mixture: 1 pail compost manure + 3 pails Urea + 1 pail 23:21:0 + 1 pail (a tablespoon is used for application on the planting station)

The mode of teaching here includes class work, demonstrations and farm work. Our farmers' yields are always very high, ranging from 73-90 bags of maize from one acre of land due to good agricultural practices. For example, farmers soak seeds before planting to allow easy, early and high germination rate, apply fertilizer early -1 day after germination for basal dressing and three weeks after planting for Urea- and weed gardens on time…

Crops Training Officer, Ms Immaculate Huwa

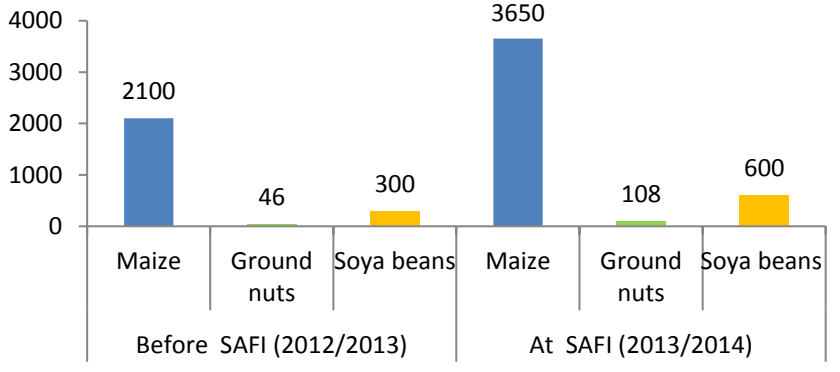


Figure 7: Comparison data on farmers' harvest (in kgs) at SAFI and the year before enrolment with SAFI, 2012/2013 cropping season

According to Huwa, after graduation and provisions of inputs as grants SAFI offers extension services regularly to the graduates to mentor them and ensure long term success. As result farmers continue to follow modern methods of farming and get bumper harvests. SAFI has also been training farmers in irrigation farming, growing a variety of vegetables, including onion, tomatoes, dark green leafy vegetables and egg plants. Rainfall in Malawi is becoming increasingly erratic. Irrigation offers the potential to help smallholder farmers plant two or three times a year to supplement rainfed farming.

Graduating Year	No of Farming Families
2009	40
2011	30
2012	30
2013	30
2014	42

A Success Story of Loti Mwale

Loti Mwale is a 31 year old man from Kachisache village in Kasungu District. Mwale studied up to Form 2 and couldn't continue with his education due lack of school fees. He married his wife, Dalesi, in 2004 and together they have three children, Agata (9), Leonard (7) and Innocent (4). Mwale enrolled at SAFI in 2012 and graduated in 2013. When he left SAFI he continued with farming and followed all good agricultural practices he learned. He grows maize, groundnuts, tobacco and potatoes.

"I also practice irrigation farming where I grow sugarcane and tomatoes. I make 5,000MK/day from the sales of tomatoes and MK3000/day from the sale of sugarcane. My family is able to buy basic household needs, send children to school, pay for hired labour and buy farm inputs. I have also been able to purchase a bicycle and livestock - 2 goats, 7 chickens, 6 rabbits and 4 pigs," says Mwale.

Mwale has been mentoring other farmers in his village who have also benefited from farming. The majority of them have embraced a paradigm shift from being peasant farmers to practicing agriculture as a business. They continue to increase land for cultivation and follow good crop husbandry practices to increase yields.

Figure 8. Loti and Dalesi in their maize and groundnut garden after they had graduated from SAFI. This shows the sustainability and impact of the training. Loti and Dalesi have become self-reliant with respect to food, income and agricultural inputs. Scaling up of the programme to other districts can help the majority of rural poor farmers achieve food security in the country.

Livestock Production

At SAFI, through the livestock department, farmers are trained in the production of livestock, including chickens, rabbits, goats, pigs and cattle. The majority of them are keeping livestock after graduation from the school and have improved diets and incomes. As regard SAFI, many achievements have been made over the years through sales of livestock and livestock products such as milk and eggs. For example, the school has managed to buy two work oxen and a dairy cows (Jersey) in addition to constructing a chicken brooder and two chicken houses using burnt bricks and cement. The school has now more than 5,000 broilers and 500 layers. In 2013, it distributed more than 310 black australorp chickens to second year students, which began laying eggs towards the end of 2014.


Figure 9. Types of cows and chickens raised at SAFI that the majority of farmers have adopted and are rearing at home after graduation.

Fish Farming

Under fish farming, farmers were trained on how to construct fish ponds, fertilize the ponds and stock them with fish. One main challenge facing fish farming both at the school and community is the drying of ponds due to inadequate rains received in recent years. Despite this, fish farming shows to be profitable— for instance, through the fisheries department in 2014, SAFI made huge fish sales and profits. The fish is also seen to contribute hugely to diets and rural incomes.

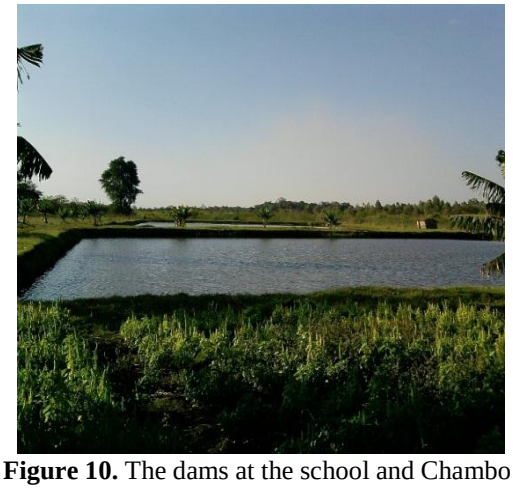



Figure 10. The dams at the school and Chambo fish from the dams. In the absence of own fish production, majority of smallholder farmers cannot purchase and consume fish on a regular basis as part of their diet.

Key Partners of SAFI

- **Local leaders:** They help with identification of farmers for training
- **Ministry of Agriculture (MOA):** Identifies and AEDO (Agriculture Extension Development Officers) in consultation with CBF (Child Bright Future) branch of SAFI for training

- **Lilongwe University of Agriculture and Natural Resources (LUANAR)** works with SAFI to train Ministry of Agriculture's AEDOs.
- **Church of the Latter Day Saints** from Blantyre recruits smallholder farmers for training at SAFI
- **Farmers Organization Limited** are the suppliers of vegetable seed, maize seed and different types of pesticides

Challenges and Lessons

The agriculture IP at SAFI is relevant in the context of Malawi. The IP is empowering poor farmers to take a leading role in addressing food and nutrition problems affecting their communities and households. The training is practical-based and institutionalized into the routine agricultural system having involved MOA, local leaders and community-based structures. Graduates from the school become lead farmers and train other farmers wherever they are located, which widens the coverage. To reduce postharvest losses, SAFI encourages timely harvesting, drying of crops as part of aflatoxin management, and storage in bags fumigated with *shumba* dust.

Figure 11. Maize fields at SAFI, belonging to student farmers, which became flooded/ waterlogged. In such a situation, the CA mulch and soil nutrient are washed away and aeration is poor, leading to yellowing of crops and poor harvests.

In Malawi, postharvest losses are estimated at 30% of the total food grains harvested and as high as 50% for perishable crops, such as fruits, vegetables and root and tubers. Postharvest crop losses occur at five stages in the farm-to-fork chain: 1) during

harvesting, such as from mechanical damage and/or spillage; 2) during postharvest handling, such as drying, winnowing, and storage (insect pests, rodents, rotting); 3) during processing; 4) during distribution and marketing (wholesale, supermarkets, retail and wet markets); and 5) during consumption (e.g. good quality food fit for consumption being discarded).

One key challenge is the low enrolment capacity of SAFI, being the only school of its kind in the country. More so, clay soils at the school become waterlogged during rainy season and, as a result, conservation agriculture was difficult to practise. However, farmers still learnt the concept and were encouraged to use it at home or where applicable.

Junior Farmer Field and Life Skills Schools

Vegetable and Fruit Production IP for Primary School Pupils as Potential Future Farmers

The JFFLS schools are an initiative that was initially developed in 2003 by the Food and Agricultural Organization (FAO) and the World Food Programme (WFP) to help address a growing number of orphan and vulnerable children. Malawi piloted the JFFLS project in 2006 with eight sites in two districts, before expanding to 41 sites in other districts: Mchinji; Lilongwe rural east; Ntcheu; Mangochi and Machinga.

The goal of a JFFLS is to empower orphans and vulnerable children and youth aged 12 to 18 years, by offering them livelihood options and gender-sensitive skills needed for long-term food security, while minimizing their vulnerability to destitution and risk-coping behaviours.

Children and youth in a JFFLS learn agricultural and life skills. The agriculture component covers both traditional and modern agricultural practices for field preparation, sowing and transplanting, weeding, irrigation, pest control, use and conservation of available resources, use and processing of food crops, harvesting, storage and marketing skills. These schools also help recover or sustain traditional knowledge about indigenous crops, medicinal plants, biodiversity, and so forth, and can be useful in finding innovative solutions to current agricultural labour constraints, such as low-input agricultural production activities and labour-saving technologies and

practices. Issues addressed in the life skills component include HIV/AIDS awareness and prevention, gender sensitivity, child protection, psycho-social support, nutrition education and business skills.

A JFFLS schools are run by a small group of local facilitators, often including an agricultural field assistant, a teacher, and/or a community organizer. JFFLS uses a learning approach that is based on facilitation and learning by doing, rather than on conventional instruction-based learning. According to FAO and WFP, experience from JFFLS has shown that this type of school provides a safe social space for both girls and boys, where peer support and community care allow youths to develop their self-esteem and confidence.

> The JFFLS approach is an adaptation of two participatory training programmes for adult farmers: the farmer field school (FFS) and farmer life skills. The underlying principle behind the field school is that farmers can become experts in their own field. A group of farmers meet regularly to study particular topics, ranging from integrated pest management and animal and soil husbandry, to income-generating activities…
> *Caesar Kachale, FAO Project Officer*

The guiding principles for the operation of JFFLS are drawn primarily from the Convention on the Rights of the Child (1990). The principles include child protection and security, gender equality, participation, addressing vulnerability, removing stigmatization, and the right to food.

Husbandry practices for growing selected vegetables

JFFLS trains children in a number of husbandry practices for different crops, such as tomatoes, garlic, leafy vegetables like mustard and cabbage, onions, carrots, egg plants, okra (Hibiscus esculentus), amaranthus and pumpkins. Children also learn how to prepare vegetable gardens, transplant seedlings, weed and harvest the produce.

Box 1. Example of husbandry practices children learn at JFFLS

Amaranthus

Amaranthus is better in sandy loam soils, which are slightly acidic. It requires an optimum pH of 6.4; it is easy to grow and has high levels of protein, vitamins, carbohydrates and minerals.

Land preparation

Amarunthus requires deep ploughing to about 25 to 30cm in order to improve drainage and root proliferation. Ten (10) kg of compost manure per square metre should be added to improve soil structure and nutrient availability where soils are poor.

Sowing and Transplanting
The recommended sowing spacing is 5cm within row spacing and 15cm between the rows. Transplant at 20cm by 45cm. The length of the beds depends on the size of your garden and also the slope of the land.

Weeding
Weed the amaranthus garden to reduce competition for soil nutrients, space, light for photosynthesis and other growth factors.

Harvesting
Amaranthus is ready for harvesting after 5 to 6 weeks from the day of planting. Delay in harvesting renders the leaves more fibrous and less palatable. Fresh weight yields of 12 tons per hectare can be attained with proper management.

Fruit Tree Nurseries

Young farmers under JFFLS are also trained in managing fruit tree nurseries. When selecting a site for a nursery, farmers are trained to consider soil texture, depth and fertility, labour issues, water availability and access to markets.

Figure 12. Staking in one of the JFFLS banana gardens in Phalombe. Staking helps young trees grow in the desired direction and protects branches from breaking. The stake should be inserted deep into the ground in the opposite direction from which the tree is tilting, preferably in the windward side, and should be placed 15cm from the tree to avoid root damage.

Mulching

At JFFLS, young farmers are taught to mulch indigenous vegetables and fruit seedlings by applying at least 5cm thick grass mulch at planting to shock weeds and conserve soil moisture.

Key Partners

- Food and Agricultural Organization of the United Nations (FAO)
- World Food Programme (WFP)
- Ministries of Agriculture and Education
- United Nations Children's Fund (UNICEF)

The JFFLS innovation platform has shown to be beneficial in a number of ways. It is contributing to the attainment of Sustainable Development Goals (SDGs). For example, the programme addresses the need to eradicate extreme poverty and hunger, promote gender equality and empower women, as well as develop a global partnership for development and cooperate with developing countries to develop and implement strategies for decent and productive work for the youth. The IP also contributes to achieving universal education and reducing child mortality.

Mponela AIDS Information and Counselling Centre (MAICC)

Maize and Legume Value Chains

MAICC was established in 1992 at the District Health Office, with the aim of sensitizing the public and preventing STIs (sexually transmitted infections), including HIV/AIDS in traditional authority Mponela, Dowa District. It received funding from Action Aid, Fire Light from USA, Feed the Future and Foundation for Farming. The project has scaled up to other TAs in the district: Dzoole, Msakambewa, Chakhadza and Kayembe. Currently, it is offering services in: health, adherence to ART, support and care for PLWHA, and scholastic support for OVC.

MAICC has also started to offer nutrition services to PLWHA, providing them with food materials, namely soya, cooking oil and agricultural inputs to enable people eat foods from six food groups. From 2009, MAICC received funding from the Foundation for Farming—a faith-based organization in Blantyre—and started implementing conservation agriculture (CA) as a component of the livelihood project. MAICC trained its staff in three CA technologies: minimum soil disturbance, crop rotation, and mulching for promotion in targeted communities.

MAICC Conservation Agriculture Messages: Do not waste time and energy tilling all the land when you only require planting stations. Do not till the soil as it disturbs decomposition of residues. Practice all the three components of conservation agriculture to maximize yields.

Initially, MAICC trained 60 farmers as lead farmers. Each lead farmer was responsible to train at least 15 farmers from their villages. MAICC provided the lead farmers with

hoes, lines, measuring tapes and hammers for plot layout. It also distributed 3kg hybrid seeds, 2kg groundnut seed, 5kg soybean seed, and 10kg 23:21:0 and 10 kg urea for maize. Farmers also received same inputs to use on control plots, following traditional methods of farming.

MAICC conservation agriculture on maize trials

No of lead farmers	Trials	Size of Field	Trials
10	Foundation for Farming Trials based on lessons from Zambia and Zimbabwe	25x50m	**Ridge spacing:** 60cm **Planting:** 3 seeds following Sasakawa on planting stations spaced 60cm apart
50	Trials based on Ministry of Agriculture Recommendations	25x50m	**Ridge spacing:** 75cm **Planting:** Sasakawa planted 25cm between stations (fertilizer applied between stations)

At the onset of the project in October 2010, Concern Worldwide trained extension workers and managers in CA concept. The project initially started with sixty (60) lead farmers: 20 from Mponela, 10 Madisi, 15 Bowe, 10 Mndolera and 5 from Chisepo in the district. Each lead farmer had a demonstration plot and 15 other farmers to mentor, translating to 900 farmers in total (both lead and beneficiary farmers). Total land under conservation agriculture was 86.31ha. In the 2009/2010 cropping season, 900 farmers were involved, comprising of 60 lead farmers and 840 followers. Every farmer was given inputs in year two of the project to grow.

> In year two of the project, even project staff and not just the farmers evidenced the huge impact of CA on agriculture productivity. Farmers had strong stands of maize on CA plots, compared to the control plots, although the inputs were the same. Control plots that used Sasakawa produced much better yields than their counterpart traditional fields… In general, conservation agriculture has shown to be beneficial and cost-effective. As an example, on 25x25m plot of maize our farmers harvest 18-20 fifty kg bags, figures that are higher than those for traditional farming at 7-12 bags using same resources…*George Kaunda, MAICC Project Manager*

Benefits of Conservation Agriculture to Farmers

1) It reduces time for tilling, weeding and harvesting. Smaller plots for CA give higher yields that would be obtained from a larger piece of land if traditional methods were used.

2) CA improves soil fertility, aeration and moisture retention.
3) Yields are always higher in subsequent years even when no fertilizer or only top dressing fertilizer is used

Figure 13. MAICC member of staff (in white top) visits his farmers in Dowa for extension services. The project promotes crop rotation of maize and legumes, as part of conservation agriculture, to help prevent crop diseases and improve soil fertility.

Sustainability of CA in Dowa

Despite the phasing out of Foundation for Farming funding in 2012, the majority of smallholder farmers have adopted CA in Dowa. MAICC is repeating best lessons learned from CA in other areas where it is implementing new projects. These include WERISE (Women Empowerment, Improving Resilience, Income and Security), a 5-year (2011-2016) project funded by Australian Aid, and MAZIKO Nutrition Project funded by CIDA from 2012-2015.

> Women are not lagging behind Khongo II village as regards conservation agriculture. We are continuing with conservation agriculture and have already mulched our fields. We have made a number of achievements from CA, including achieving food security, purchasing household items and iron sheets, and livestock. Most of us here have goats, chickens and pigs purchased with proceeds from conservation agriculture…
> *Collings Lamuel, a lead farmer of MAICC at Khongo II village, TA Dzoole*

Figure 14. Collings Lamuel (far left), from Khongo II village TA Dzoole, is one of the lead farmers trained by MAICC who continues to practise conservation agriculture. Over the years, Lamuel has realized better crop yields and managed to feed his family throughout the year. Lamuel has already burnt bricks and purchased 26 iron sheets in readiness to construct a new house.

Key challenges

Conservation agriculture is not without challenges:

1. It is not conducive in areas with heavy rains and clay soils.
2. The fact that the soils remain mulch helps it host mice that eat fresh and drying produce
3. There seems to be a dissemination of contradictory messages, as the concept is still new. For example, the use of mulch vs herbicides to shock weeds, which confuses farmers
4. Agricultural information also tends to be short-lived. For example, in the past few years, farmers were encouraged to till land and make ridges, which they adopted to enhance soil aeration and easy germination of seeds. Following the effects of climate change, emphasis is now on zero tillage; some farmers find this confusing, hence, the still have not adopted the technique.

Main Partners for MAICC

- Catholic Development Commission in Malawi (CADECOM)
- Concern Worldwide
- Total Land Care
- Ministry of Agriculture

FARA Sub-Saharan Africa Challenge Programme

Indigenous Vegetables IP in Thyolo

The SSA Challenge Programme also had vegetable IP in Thyolo district. The aim was to use modern technologies and promote production and consumption of indigenous vegetables in the district. It emphasized the proper use of manure, construction of

sunken garden beds to conserve moisture, plant population on the beds and empowering farmers to conduct market research for their produce. It also provided a motorized pump for irrigation, as well as start-up inputs such as seeds and fertilizer. To successfully establish a vegetable garden, one needs to have the following materials:

- Panga knife or axe
- Watering can
- Hoe
- Wheelbarrow or any carrier bucket
- Measuring tape or string
- Ropes or any tying strings
- Garden fork or hand trowel
- Shovel
- Rake
- Hand Sprayer

The project promoted two types of vegetable beds: sunken and raised beds. Sunken beds are more suitable for dry season use to conserve moisture - they accommodate enough moisture, help regulate soil temperature and improve soil structure. Raised beds are more suitable for the rainy season because of their capacity to drain excess water. The indigenous vegetable IP in Thyolo has established and sustained a culture of vegetable-growing in the area. Farmers continue to produce amaranthus, cabbage and tomato, which they sell at Luchenza and Golomoti in the district. Some of them have used the profits from the venture to buy livestock and household items.

> Farmers can now do a market research on their own. This involves exploring new markets in Blantyre, the commercial city for the country, looking at types of vegetables on the market, main customers and prices…
> *Nickson Phiri, the AEDC of the area*

One key challenge is the ever-increasing demand for vegetables, which exerts pressure on the existing water and land resources. Unavailability of land and scarcity of water for irrigation thus limit this project in the district. Key stakeholders for the IP are Bvumbwe Research Station and Ministry of Agriculture.

Figure 15. A woman farmer stands in her backyard garden of vegetables. The variety of vegetables in her garden provide relish for her family, thanks to FARA's vegetable innovation platform.

International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)

Cereal and Legume Seed Systems IP

ICRISAT is a non-profit, international organization devoted to science-based agricultural development. It is one of the 16 Consultative Group on International Agricultural Research (CGIAR) organizations which is entrusted with the conservation and management of seeds of five crops crucial to the diets of the poor: sorghum, millet, groundnut, chickpea and pigeon pea. ICRISAT's gene bank conserves the seeds of over 113,500 lines of these crops and breeds them for higher productivity and resistance to pests, diseases and other stresses.

In Malawi, the major seed multiplied by ICRISAT is groundnut, which is the most important legume and oilseed crop in the country, both in terms of the total area cultivated and production. It thrives under low rainfall and poor soils, and can be grown with minimum capital investment. The average annual cultivated area is 171 thousand hectares, accounting for 27% of the total land grown to legumes. Annual groundnut production is 28% of Malawi's total legume production. It has huge untapped potential for contributing to the socioeconomic development of the country. It serves as source of both protein (generally between 12-36%) and vegetable oil (generally between 35-54%), as well as source of minerals (calcium, phosphorus, iron, zinc, boron and vitamin

E and B complex) for the rural households that have difficulty in accessing other forms of nutritious foods. Over 25% of the agricultural cash income among smallholder farmers is realized from groundnut. However, due to numerous constraints, its productivity remained low.

Groundnut Production Technologies

From the 1980s, groundnut production in Malawi and the SADC region as a whole declined. The decline was due to a number of constraints, ranging from biotic (rosette epidemics) to abiotic (harsh weather), marketing problems and poor pricing policies. In response to the declining trend, SADC heads of state invited ICRISAT to start a groundnut project in 1982. ICRISAT was mandated to develop a groundnut breeding programme; to develop germplasm lines with characteristics that could help stabilize groundnut production in the region. With funding from GTZ, the legume improvement programme was started and implemented for 15 years. The project developed and distributed germplasm lines to SADC breeders; it produced a number of groundnut varieties.

Table: Groundnut varieties released in Malawi and their adoption

Variety	*Market type*	*Year released*	*Adoption (%)*	*Attributes and use*
CG7	VB*	1990	30.0	High yield, wide adaption, confectionery, oil
Nsinjiro	VB	2000	20.0	High yield, rosette resistant, confectionery
Chalimbana	VB	2005	0.1	High yield, rosette resistant, confectionery
Kakoma	SB	2000	7.0	High yield, confectionery
Baka	SB	2001	0.5	High yield, rosette resistant, confectionery
Chitala	SB	2005	0.2	High yield, rosette resistant, confectionery
Chalimbana	VB	1968	39.0	High yield, rosette resistant, confectionery
Chitembana	VR	1982	3.2	High yield, rosette resistant, confectionery,
Mawanga	VR	1982		Oil
Mani Pintar	VR	1969		Oil
RG1	VR	1975		Confectionery

Seed Systems

Legume seed availability is quite often a constraint to increasing production, and groundnut is no exception. ICRISAT has developed a seed revolving fund and community seed banks to make groundnut seeds readily available. The seed revolving fund makes seeds to be available through contract seed production and the seed is sold to NGOs and the general public. The community seed banks make seeds to be available to smallholder farmers through seed loans paid back in kind. The repayment rate is double the amount of seed taken. As an example, the seed banks in Salima provided seeds to many farmers in the target EPAs, with funding from the Development Fund (DF) of Norway. The seeds continued to increase annually and, over the years, the banks have proved to be effective in the dissemination of new varieties.

The Success Story of Ms Mary Kumwenda

Mary Kumwenda, a single mother of three children aged 5, 9 and 13, is a role model for other women in the surrounding villages.

"I have been a member of Madede seed multiplication club in Mzimba District for three years now. I joined the club in 2012 and was given 20kg of groundnut seeds for further seed multiplication under the Malawi Seed Industry Development Project. After harvest, I sold the basic seeds back to the project and realized MK78,000 (US$177). Before I joined the groundnut seed multiplication club, my only source of income was through piece work in other people's gardens. In 2013, with increased area under seed multiplication, I realized about MK321,000 (US$728). I then reinvested the proceeds from my seed sales into other small businesses, which included making fritters and selling them within my village. I also used the money to buy fertilizer for my maize field.

"The business also gave me additional income and kept my family food secure throughout the year. Besides, I used the maize harvest which, had been boosted up from proceeds of the groundnut seed sales, to hire labour for my groundnut field. I have been able to fulfil my dream of building a new house, well cemented and with an iron sheet roof. Currently, I am planning to buy window panes using proceeds from last year's crop. Before long, my children and I would have moved from our present small thatch house to a beautiful house, which is plastered and floored with cement and roofed with iron sheets."

Mary now lives peacefully as the head of her family. All her three children attend primary school and are performing well in class. This is indeed an inspiring transformation from a casual labourer in a fellow farmer's field to an independent owner of a good house and a female head of a happy family.

Challenges

Some of the constraints in groundnuts production are:

1. Poor access to improved seeds and inadequate crop management practices.
2. Low yields due to the use of traditional varieties and recycling of seeds, especially in very remote areas of the country
3. Yields are poor because of the low, unreliable rainfall, often characterised with midseason drought
4. Declining soil fertility through poor crop management and low nutrient application
5. Inadequate support services, such as extension and credit facilities
6. Pests and diseases that affect yields
7. A clash in labour demand and competition with other crops – maize, tobacco, soybeans, etc
8. Lack of viable markets and low prices

Agriculture Field Days in Malawi

Agricultural field days act as a forum for farmers and stakeholders to interact and learn from each other on the crops that have been demonstrated. Field days target demonstration plots by lead farmers; but in other places, the plots of members of a group are also visited as support to the technologies being showcased. Field days aim at providing feedback on the technologies that organizations are implementing with farmers. They also aim at imparting more skills and knowledge to farmers on good agriculture practices (GAP) and to learn from the farmers on agriculture practices they find easy to adopt, as well as the challenges associated with each technology and location.

Land O'Lakes Field Days

On Tuesday, 3rd June 2015, Land O'Lakes held a farmer field day training event at one of their signature Answer Plot sites, known locally as Yankho Plot in Salima district. On that day, farmers came to see Kilombero and Funwe rice varieties right before harvesting and to hear from lead farmers (trained by Land O'Lakes staff) and Ministry of Agriculture field extension agents the characteristics of the two varieties.

In addition, farmers were taken through rice trials done on site in collaboration with the Government of Malawi's (GOM) Ministry of Agriculture, the CCARDESA

(Centre for Coordination of Agricultural Research and Development for South Africa) and the World Bank. Under this USDA-funded food for progress project, Land O'Lakes used the Yankho plots as learning platforms where complementary information is given out on goat production, animal welfare, best animal feed practices and animal health.

Land O'Lakes nutrition staff worked with Ministry of Agriculture's nutritionists and staff of the Ministry of Health to share nutritional information and to conduct cooking demonstrations for participants at the field day. At the event, more than 150 USDA-funded water sanitation and hygiene (WASH) handbooks were distributed by Land O'Lakes to the female heads of community-based nutrition groups in order to assist with their community education efforts.

Land O'Lakes also invited many agricultural suppliers and service organizations in order to facilitate farmers networking with other providers of services and products. For example, Demeter Agriculture Limited and CABI Plantwise had tables on which they displayed information to help smallholder farmers become better producers. More than 350 male and female farmers from Salima participated in the field day training event. Agricultural constraints cited by the farmers included inadequate chemicals against pests, the lack of inoculants and poor markets.

Lilongwe University of Agriculture and Natural Resources (LUANAR) Aquaculture Innovation Platform

Lilongwe University of Agriculture and Natural Resources (LUANAR) has an aquacu lture innovation platform constructed way back in 1999 with a grant from the Govern ment of Japan (JICA). LUANAR's aquaculture IP serves as a local and regional traini ng centre in freshwater aquaculture for the Southern African Development Communit y (SADC) region. The IP also provides financial assistance and training in fish farmin g to farmers across the country. The trainees become lead fish farmers and serve as m odel farmers in their respective districts and communities.

LUANAR finances its own on-campus research through revenues from the fishponds establishment, which has recently been transformed into a fish farm. The farm breeds and sales Tilapia fish (Oreochonis shiranus) to farmers for production and consumption. The revenues cover the maintenance costs of the ponds, the costs of research, and payments of workers at the farm. The University has a building complex with improved facilities, such as tanks and laboratories. Research on the Tilapia fish focuses on the following areas: breeding, sex reversal of fish, relationship between protein levels in feed and water temperature, and salinity, which deals with the level of salt tolerance of Tilapia and other species of fish.

Key Partners

LUANAR has links with the following partners

1. **Pennsylvania State University** - conducting a joint project on breeding of a loca l fish (*Trematocranus placadon*), which eats snails that transmit bilharzia.
2. **CIDA:** Sponsoring a project in Dowa, testing feed produced on-farm (maize bran and soya bean) as diet for fish in aquaculture.
3. **JICA** supports infrastructure development and research activities

5. CONCLUSION

Agricultural innovation and innovation platforms have a great potential in eradicating poverty and hunger in Malawi. But there is the need to replicate and scale up most of the innovations identified in all the value chains to accelerate impact. More research is also needed to provide science-based solutions to certain challenges. These include:

1. Biophysical and socioeconomic research to generate new knowledge that innovation value chain actors can apply to making Malawi's agriculture more effective and competitive.
2. Value chain and market research to map linkages among key actors, sequence of activities, and enabling and disabling environments associated with current agricultural innovations and innovation platforms.
3. Gender-based research to elaborate on the different roles of men and women in these sectors and identify potential opportunities for expanding the role of women, who are the majority of smallholder farmers in the country.

PART TWO

Investments in Agricultural Innovations for Development and Food and Nutrition Security

INTRODUCTION

Agriculture is the backbone of Malawi's economy. It accounts for about 93% of the total export earnings, provides more than 80% of the total employment, and contributes about 27% of the country GDP. It also contributes 63.7% of the total income of the rural poor. In total, agriculture occupies about 56% of the land area, covering 5.3 million hectares of the country's 9.4 million hectares, and supplies at least 65% of the manufacturing sector's raw material requirements

Land in Malawi can be divided into three main basic tenure categories: (i) public land, (ii) private land, and (iii) customary land. Over 70% of the cultivated area in Malawi is under the customary land tenure system and is utilized by 3.5 million smallholder farming families, with land holdings ranging from 0.5 to 2.5 hectares. The smallholder farm type occupies about 76.4 percent of the total land by zone, while the commercial farm type (estate) occupies about 23.6%. Smallholder farmers produce numerous crops, with the main focus on food crops. The main crops grown by smallholder farmers are: tobacco, maize, Irish potatoes, groundnuts, pulses, sweet potato, cassava, sorghum, rice, sunflower, wheat, vegetables, fruits, coffee, macadamia, cashew and spices. Maize, as the staple food, is the most important crop to the Malawian population and occupies 65% of the total land cultivated by smallholder farm types. Smallholder farmers also keep some livestock with the main ones being cattle, sheep, poultry, goats, rabbits and pigs. The estate sub-sector comprises 14,700 estates, occupying about 850,000 hectares of privately owned land under leasehold title. The commercial farm type primarily produces cash crops: burley and flue cured tobacco, sugar, coffee, tea and tree nuts.

This brief describes the level of investment and expenditure in the agriculture sector in Malawi. The analysis is limited to recorded investments and expenditures by the government. This includes resources put towards agricultural development through the Ministry of Agriculture and Food Security (MoAFS), Ministry of Irrigation and Water Development (MoIWD), devolved resources to district councils (DCs), and expenditures in other ministries with small pockets of agriculture, such as the Greenbelt Initiative in the Office of President and Cabinet (OPC). Off-budget support to the sector by NGOs is not channelled through the normal government systems and therefore difficult to sum up together in view of the large numbers of these organizations in the country.

Agricultural Policies in Malawi

The government of Malawi has developed various national development strategies, agricultural strategies and agricultural-related legislation and policies to ensure the promotion of the economy. These include the 2010-2016 National Agricultural Policy (NAP), the National Irrigation Policy and Development Strategy (2010), National Nutrition Policy and Strategic Plan (2007-2012), the Cooperative Development Policy, National Nutrition Policy and Strategic Plan, ASWAp, and the MGDS I and II (which provide the national policy context). ASWAp is based on the priority agricultural elements of the MGDS (now called the Sustainable Development Goals) and is consistent with the CAADP, under the umbrella of the New Partnership for Africa's Development (NEPAD). The CAADP provides the regional context of achieving sustainable agricultural growth and development when translated into actions at the national level. The Development Assistance Strategy (DAS) provides a global framework on aid harmonization.

Trends in the Agricultural and Food Sector in Malawi

Cassava is the main crop produced in Malawi in terms of volume, followed by maize and potatoes. Between 1994 and 2013, cassava production increased by 692.3%, maize production by 41.6%, and potato production by more than 86%. The increase in crop yields (in particular maize) is due to the government Farm Input Subsidy Programme (FISP) implemented during the 2005/2006 cropping season, coupled with a relatively favourable rainfall pattern. From 1998, the government was implementing a similar programme, the Targeted Input Programme (TIP), for poor smallholder farmers in the country.

While agricultural subsidies have enabled Malawi to produce surplus food, they have shown to exert huge pressure on the meagre government resources. There are also heightened concerns regarding the sustainability of the programme as the majority of smallholder farmers are yet to become self-reliant. Aside from cassava, maize and potatoes, tobacco and tea are the main export crops in terms of value in Malawi. In addition, the 2015-2017 National Export Strategy recognizes oilseeds and sugar as potential crops for regional and international markets (EU thorough Fair Trade). Trends for some major crops are shown below.

Table 1: Yield of major commodities

Year	Commodity							
	Maize		*Cassava*		*G/nuts*		*Soya*	
	Hg/Ha	*Kg/Ha*	*Hg/Ha*	*Kg/Ha*	*Hg/Ha*	*Kg/Ha*	*Hg/Ha*	*Kg/Ha*
1993	15327	1532.7	28781	2878.1	9017	901.7	-	-
1994	9209	920.9	34660	3466.0	3216	321.6	-	-
1995	13517	1351.7	34669	3466.9	3550	355.0	-	-
1996	14433	1443.3	45875	4587.5	5633	563.3	-	-
1997	10959	1095.9	57249	5724.9	7075	707.5	-	-
1998	13711	1371.1	54939	5493.9	7203	720.3	-	-
1999	18109	1810.9	54563	5456.3	7714	771.4	-	-
2000	17428	1742.8	154605	15460.5	7232	723.2	-	-
2001	11845	1184.5	169416	16941.6	8558	855.8	-	-
2002	10460	1046.0	149635	14963.5	7674	767.4	-	-
2003	12259	1225.9	157453	15745.3	8266	826.6	7593	759.3
2004	10460	1046.0	161644	16164.4	7036	703.6	6447	644.7
2005	8093	809.3	142995	14299.5	5682	568.2	5797	579.7
2006	14814	1481.4	173116	17311.6	8303	830.3	7639	763.9
2007	26547	2654.7	187722	18772.2	10143	1014.3	8972	897.2
2008	16498	1649.8	190760	19076.0	9139	913.9	8722	872.2
2009	22265	2226.5	202912	20291.2	10308	1030.8	9804	980.4
2010	20158	2015.6	204311	20431.1	10076	1007.6	9757	975.7
2011	22079	2207.9	215408	21540.8	10556	1055.6	9977	997.7
2012	21932	2193.2	223883	22388.3	10422	1042.2	10433	1043.3
2013	21708	2170.8	228041	22804.1	10495	1049.5	9791	979.1

*Source***:** FAOSTAT (In most of the cases yield data are not recorded but obtained by dividing the production data by the data on area harvested)

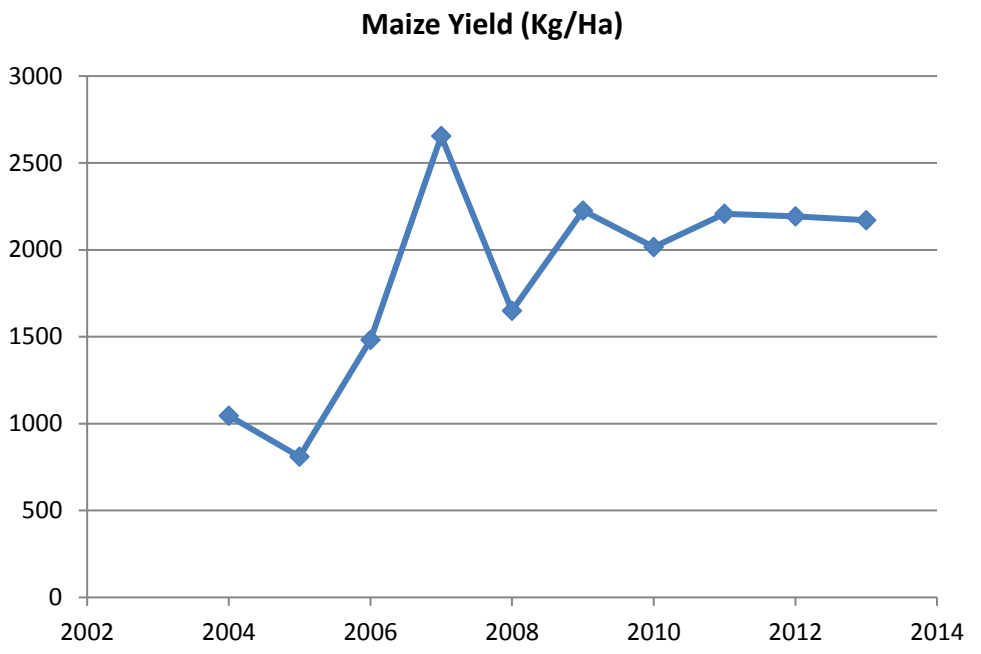


Figure 1. Malawi is number 109 in the world ranking of maize production

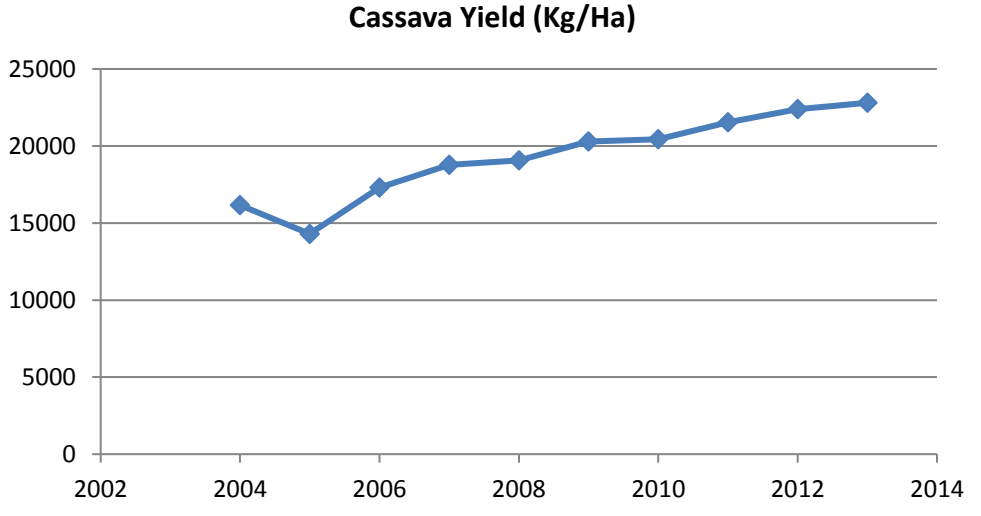


Figure 2. Malawi is number 7 in the world ranking of cassava production

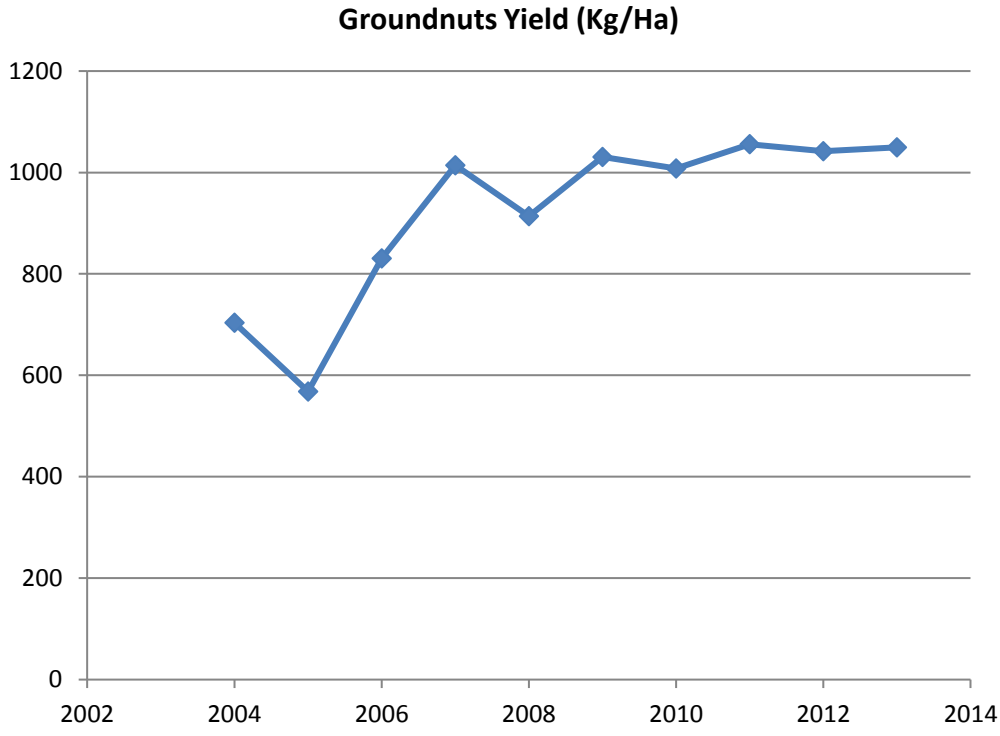


Figure 3: Malawi is number 71 in the world ranking of groundnut production

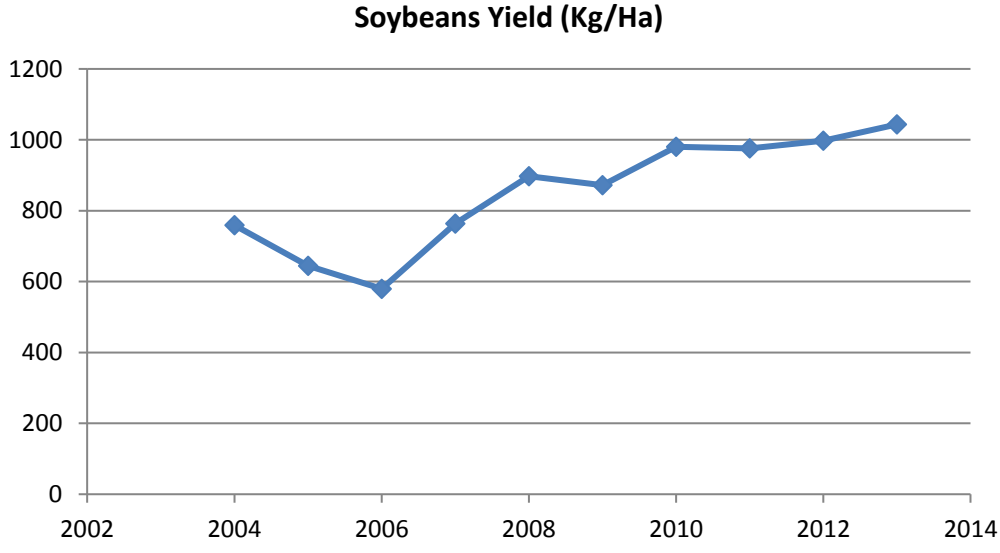


Figure 4. Malawi is number 83 in the world ranking of soybeans production

Table 2 shows the overall agricultural growth in Malawi from 1994 to 2014 and the contribution of agriculture to the national GDP.

Table 2: Contribution of agriculture to the national GDP

Year	*National GDP (Billion U.S. Dollars)*	*Agricultural GDP (Billion U.S. Dollars)*	*Contribution of Agriculture to GDP (%)*
1994	1.18	0.296	25.1
1995	1.40	0.426	30.4
1996	2.28	0.791	34.7
1997	2.66	0.867	32.6
1998	1.75	0.623	35.6
1999	1.78	0.674	37.8
2000	1.74	0.688	39.5
2001	1.72	0.667	38.8
2002	2.67	0.981	36.7
2003	2.42	0.852	35.2
2004	2.63	0.919	34.9
2005	2.75	0.911	33.1
2006	3.12	0.985	31.6
2007	3.65	1.153	31.6
2008	4.28	1.272	29.7
2009	5.03	1.569	31.2
2010	5.40	1.599	29.61
2011	5.63	1.750	31.1
2012	4.24	1.293	30.5
2013	3.71	1.232	33.2
2014	4.26	1.419	33.3

*Source***:** The World Bank

National Investment in Agriculture and CAADP Performance

In 2003, under the Comprehensive African Agriculture Development Programme (CAADP) framework, African governments (Malawi inclusive) committed to achieving agricultural growth of at least 6%. To achieve this, they signed the AU Maputo Declaration, in which they agreed to increase national budgetary resources to the agriculture sector to at least 10% of their respective national budget. The CAADP's goal is to use agriculture-led growth to achieve the first MDG of halving poverty and hunger by 2015. Malawi remains one of the only nine African countries that have invested 10% of their national budgets on agriculture. Being dependent of agriculture, the budget for the sector started rising way back in 1998, when the government with support from bilateral donors introduced the Targeted Input Subsidy Program (TIP) for resource poor smallholder farmers. The budget allocation for agriculture rose to 10.9% from 4.7% allocated in the previous financial year (1997/1998).Over the years, government limited the subsidy programme to the poorest of the poor and focused on

food crops only to enhance food security, with the budgetary allocation ranging from 6.5-7.8% from 1999/2000 to 2004/05 cropping season.The country has performed favourably well, in particular between 2005/06 and 2015/16 financial years, with budgetary allocations to agriculture ranging from 12.7to 14.8% (table 2). The government made the highest investment in agriculture in the 2013/2014 financial year (18.6%) and 2014/15 financial year (18.8%). With this increased government spending, the sector's average growth reached 6.4% in 2011, and was estimated to reach 7.3% in 2012. The government is expected to continue its strong commitment to financing agriculture over the next years in this regard.

Table 3: Malawi's national investment in agriculture and CAADP performance

Financial Year	*Government Budget ('000,000)*	*Budget Allocated for Agriculture ('000,000)*	*Agriculture Budgetary Allocation (%)*
1994/95	2,045	90	4.4
1995/96	5,446	162	2.97
1996/97	6,797	389	5.7
1997/98	12,524	590	4.7
1998/99	16,685	1,818	10.9
1999/2000	23,042	1,495	6.5
2000/01	32,825	1,675	5.1
2001/02	40,912	2,542	6.2
2002/03	45,263	2,526	5.6
2003/04	58,081	2,588	4.5
2004/05	89,888	7,027	7.8
2005/06	119,499	15,171	12.7
2006/07	139,896	18,537	13.3
2007/08	172,839	20,970	12.1
2008/09	229,524	30,803	13.4
2009/10	256,769	32,127	12.5
2010/11	297,084	33,537	11.3
2011/12	303,714	37,715	12.4
2012/13	408,390	65,021	15.9
2013/14	638,151	118,674	18.6
2014/15	748,129	140,665	18.8
2015/16	901,594	133,687	14.8

*Source***:** All data were compiled by The Budget Section of the Ministry of Finance, Economic Planning & Development (September 2015)

*Note***:** These amounts are in millions of Malawi Kwacha. For instance, in 1994/95 financial year, the total government budget was K2.04 billion (K2,045,000,000) and K90 million was allocated for agriculture.

Farm Inputs Subsidy Programme (FISP)

The FISP is in its eleventh year of implementation, aims to enhance food security and raise smallholder's income through increased maize and legume production. In the recent agricultural seasons, the government FISP packages include subsidies of fertilizer for maize, improved maize and legume seeds. The programme takes up to 6% of the country's GDP and about 60% of the budget of the Ministry of Agriculture and Food Security. The programme continues to be successful as regards food and livelihood security.

Level of Expenditure

This section looks at investment in agriculture for the past ten years and draws lessons through matching of investment in the sector and its subsequent contribution to the economy and poverty reduction. Despite lack of information on the off-budget contribution the sector, the resources channelled to the sector have been steadily growing in nominal terms. The level of expenditure has increased more than 20 times over a decade since 2004/05 financial year (FY), as shown in figure 5.

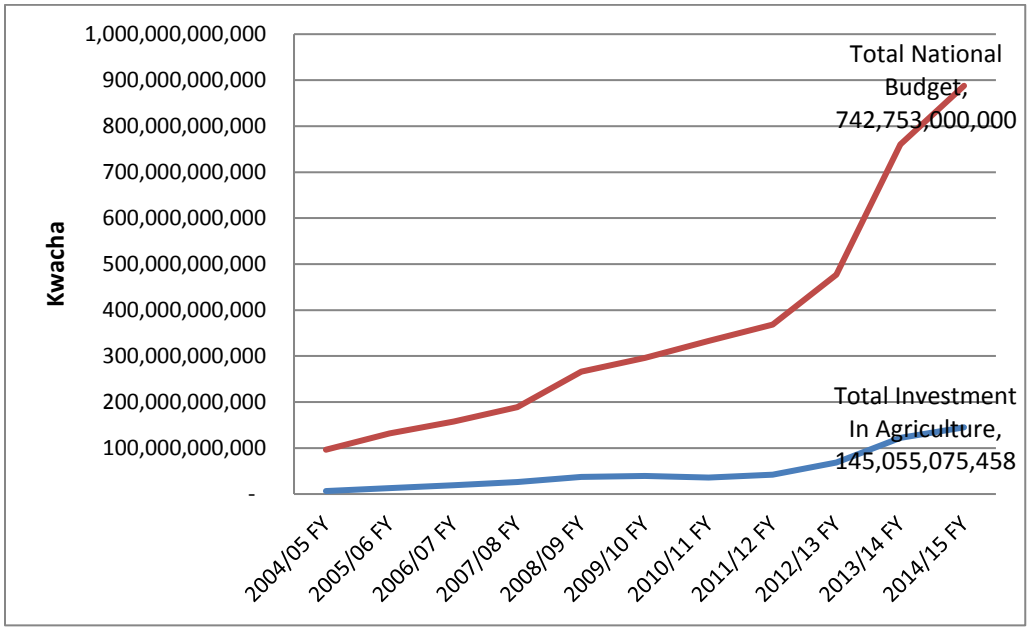


Figure 5: Trend of total investment in agriculture and the national budget from 2004 to 2014
Source: Ministry of Finance

In terms of contribution, MoAFS contributed 91% to the sector over the past 10 years and MoIWD contributed 5%. Transfers to district councils and expenditures in other ministries accounted for the remaining 4%. Agriculture is basically rural-based in Malawi. With the decentralization policy the country has been implementing, it is

expected that much of the expenditure in the sector would be recorded in the district councils. Unfortunately, until now, little investment has been channelled towards the implementation of the decentralization policy. Table 4 shows that on the average, district councils are allocated only 1% of the total investment in the sector from 2004/05 FY to 2014/15 FY. Agricultural expenditure in other ministries, in this case, the Greenbelt Initiative under the Office of the President and Cabinet (OPC) and Rural Livelihood Programme in the Ministry of Local Government and Rural Development, was 2% of the total investment in the sector.

The development component of the expenditure is the capital investment part of the budget. However, this area is predominantly externally financed. The data in table 5, part I (depicting donor resources) shows that 88% of the capital expenditure and 12% of the projects were financed by domestically-generated resources.

Allocative Efficiency

This section looks at the expenditure by budget type: personal emoluments which are personnel remuneration, other recurrent transactions (ORT) which categorizes all operational costs in the sector, and development which is the investment component of the budget. The investment in agricultural sector is predominantly recurrent in nature. For example, 67% of the expenditure is for operations of the agricultural institutions, disaggregated by personal emoluments and other recurrent expenses at 6% and 61%, respectively (figure 6).

Personal Emoluments

Wages and salaries in the sector have been rising sharply in Malawi Kwacha terms over the years (figure 7). This sharp rise in salaries is however consistent with the Government of Malawi's policies in the decade under review, to improve civil servants' salaries and become comparable with counterparts in the private sector as a motivation. In Malawi Kwacha terms, personal emoluments have gone up more than 7 times since 2004/05 financial year and, in dollar terms, the trend shows erosion in the real value of the salaries. This trend is also consistent with the large appetite for travel allowances in the sector and government-wide.

Table 4: Institutional contribution towards agricultural investment and their share of the national budget from 2004/05 FY to 2014/15 FY

MDA	Budget	2004/ 2005	2005/ 2006	2006/ 2007	2007/ 2008	2008/ 2009	2009/ 2010	2010/ 2011	2011/ 2012	2012/ 2013	2013/ 2014	2014/ 2015	Total	%
US Dollar 'million														
	Recurrent	120	171	147	371	272	202	187	178	308	224	168	2,347	66
Agriculture	Development	22	40	86	108	79	36	33	72	87	133	186	882	25
	Total budget	142	211	233	479	351	238	220	250	395	357	354	3,230	91
	Recurrent	-	-	1	1	1	0	1	1	1	1	-	7	0
Irrigation	Development	-	-	20	54	39	36	6	20	7	1	0	182	5
	Total budget	-	-	21	55	40	36	7	21	8	2	0	189	5
DCs	Transfers	-	7	6	7	5	4	4	3	3	3	3	45	1
OM														
OPC - Greenbelt	Development	-	-	-	-	-	-	14	1	6	3	5	29	1
MoLG - **r**ural **l**ivelihood	Development		3	4	7	5	1	2	5	6	3	3	44	1
	Total OM	5	3	4	7	5	1	16	6	12	6	8	73	2
Investment In Agriculture		147	220	264	548	402	279	247	280	418	368	365	3,537	100
National Budget		2,039	1,995	1,921	3,406	2,497	1,820	2,035	2,164	2,479	1,922	1,868	24,146	
Agriculture share in Total		7%	11%	14%	16%	16%	15%	12%	13%	17%	19%	20%	15%	

Source: 2004-2014 Government of Malawi Financial Statements

Table 6: Level of capital expenditure from 2004/05 FY to 2014/15 FY

	2004/2005	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015	Total	%
US **d**ollar 'million													
Part I	25	38	95	150	110	63	34	81	92	130	180	997	87.6
Part II	2	5	15	19	14	10	21	17	14	10	14	141	12.4
Total	27	43	110	169	124	73	55	98	106	140	194	1,138	100.0

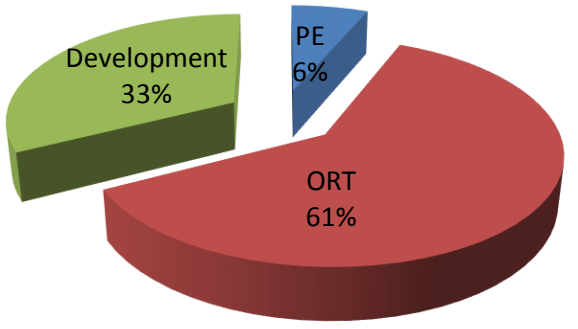


Figure 6. Distribution of expenditures by budget type

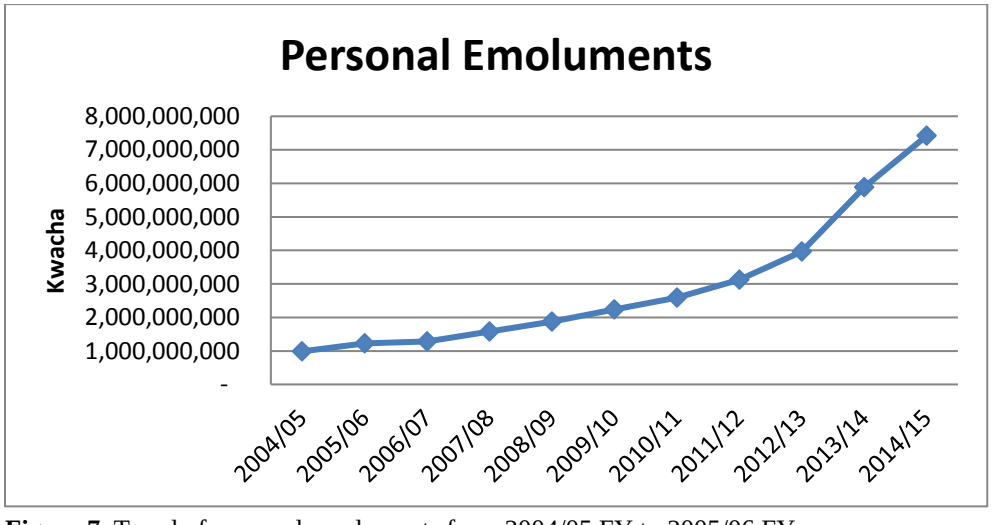


Figure 7. Trend of personal emoluments from 2004/05 FY to 2005/06 FY

Other Recurrent Transactions (ORT)

This is a budget line for operations. Expenses on this line more than doubled in the sector till the revelation of pilferage of resources in public services in 2012/13 Financial Year, which saw development partners holding their budgetary support. After that, resources to the sector for operations drastically dwindled. However, despite the downward trend, resources for operations still account for more 60% of the total investment. The capital investment in the sector has been lower than the operational costs. However, it has been going up over the years, with much resources coming from development partners.

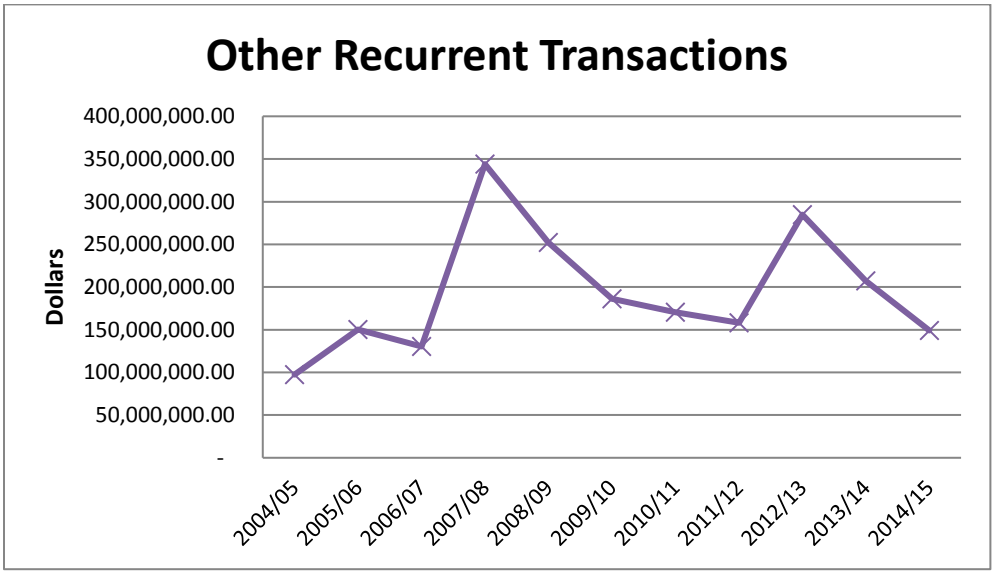
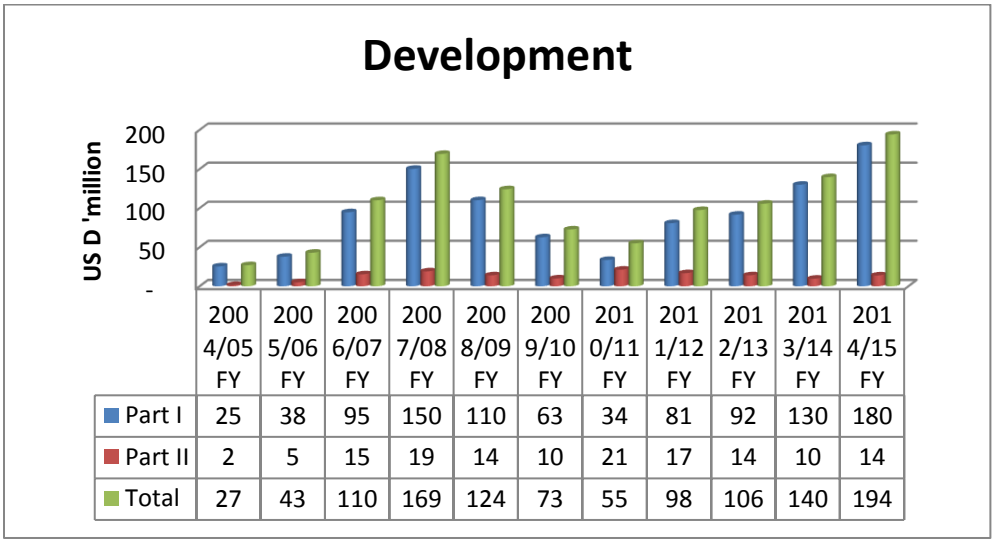


Figure 8. Trend of ORT from 2004/05 FY to 2014/15 FY



	2004/05 FY	2005/06 FY	2006/07 FY	2007/08 FY	2008/09 FY	2009/10 FY	2010/11 FY	2011/12 FY	2012/13 FY	2013/14 FY	2014/15 FY
Part I	25	38	95	150	110	63	34	81	92	130	180
Part II	2	5	15	19	14	10	21	17	14	10	14
Total	27	43	110	169	124	73	55	98	106	140	194

Figure 9. Trend of development budget from 2004/05 FY to 2014/15 FY

Conclusion

Much as resources to the agricultural sector have been rising over time, little has gone into substantial investment, as most of the resources are used for operations. It is also revealing in the brief that the investment component of the resources channelled towards the sector is predominantly donor-driven. This poses a huge risk in the light of the current trends, especially with regard to donor-fatigue.

APPENDICES

Appendix 1: Innovation Platform Summaries

School of Agriculture for Family Independence (SAFI)

Agriculture IP

IP Name	*School of Agriculture for Family Independence (SAFI)*
Entry Point or VC	Crop and livestock production, vegetable, fisheries
Innovations (technical or social and economic innovations)	• Sasakawa • Crop rotation • Application of fertiliser (Spacing) • Planting spacing
Location (name and GPS coordinates in UTM or degrees)	Mponela, Dowa district
Intervention areas (regional/province/district /…)	Central Region of Malawi
IP webpage:	N/A
Participating villages	• T/A Maliri • T/A Chadza • T/A Masunga nkhunda
Date IP establishment	2007
Institutions setting up the IP	
Funding agents	• Nu Skin Force for Good Foundation • Brigham Young University (BYU)
Number of years activities on the ground	8
IP is still active or not	Active
Facilitators (names and contacts)	• Immaculate Huwa • Mr Kamanga
IP members (regrouped by VC actors and sectors)	Over 180 families
Opportunities addressed	1. Availability of funding 2. Availability of local markets e.g. SAFI won a contract to be supplying 24,000 fruit seed trees to Feed the Children annually
Achievements to date	1. Over 180 families trained 2. An outlet shop was opened at Mponela where produce such as chickens (dressed and live), tomatoes, soya, groundnuts are being sold. 3. Donors bought two cars for the institution to ease transportation – an Isuzu 3 toner and a Toyota twin cab 4. With the help of the donors, SAFI has acquired 40.25 acres of land for cultivation

Challenges	1. Lack of better markets for the produce 2. It is difficult to practice CA due to poor soils which are clay and results in waterlog 3. Drying up of the dam; this negatively has affected the tree nursery, irrigation and fisheries department.
Sustainability issues	1. Provision of grants to farmers (by SAFI) enables them to continue with agriculture in their respective communities. 2. Farmers trained at SAFI become Lead Farmers and train other farmer, which increases coverage and impact. 3. Farmers pay fees in kind after they harvest they crops and this make the whole program attractive and user friendly.
Phase in IP process (initial, maturity, independent)	Maturity

Appendix 2: Mwandama Millennium Village

Soil Fertility Management IP (Maize, Legumes and Sweet potato Value Chains)

IP Name	*Mwandama Millennium Village Project (MVP)*
Entry Point or VC	Maize, Legumes and Orange Flesh Sweet Potatoes (OFSP)
Innovations (technical or social and economic innovations)	• Sasakawa • Production of biofortified sweet potatoes (OFSP) • Mwandama Fertilizer which is made of compost manure and organic fertiliser • Mulching
Location (name and GPS coordinates in UTM or degrees)	Mwandama Village, TA Mulumbe, Thondwe, Zomba South
Intervention areas (regional/province/district/…)	Zomba district
IP webpage:	Milleniumvillages.org/tag/Mwandama-Malawi/
Participating villages	114 villages (7000 farmers)
Date IP establishment	2006
Institutions setting up the IP	▪ Millennium Promise ▪ Bvumbwe Research Station ▪ Ministry of Trade and Industry ▪ World Food Programme (WFP)
Funding agents	• United Nations Development Programme (UNDP) • Earth Institute at Columbia University
Number of years activities on the ground	9
IP is still active or not	Active
Facilitators (names and contacts)	Davlin Mchomboto (Mobile: +265 999 624 486) Francis Mpeketula (Mobile: +265 888 553 242 or +265 998 665 070)
IP members (regrouped by VC actors and sectors)	7,000 Beneficiaries
Opportunities addressed	It is close to Zomba town; hence, the market is readily available for the farm produce and transportation is easy
Achievements to date	1. MVP Provides School feeding programme at six out of 14 primary schools in the area. 2. Farmers have constructed a Grain Bank / Warehouse for storage of surplus crops at Mwandama and purchased another warehouse at Nathenje in Lilongwe 3. MVP farmers have formed and registered a Cooperative and a Union hence it is easy to sell their produce, buy inputs and bargain for prices through the bodies.

	4. MVP has purchased two maize mills and a grocery store to facilitate processing of maize produce and increase access to groceries. 5. MVP has purchased a 7 ton lorry to facilitate transportation of agricultural inputs and products to and from the market 6. MVP has constructed an office and recruited some staff to do different activities hence contributing to reduction in unemployment in the area. 7. MVP has established Chisomo Orange Flesh Sweet Potato Group of Women Farmers to engage in making juices, cakes and snacks from OFSP
Challenges	1. Farmers sell produce at low prices due to lack of viable markets 2. High cases of Malaria and HIV/AIDS that affect attainment of MVP goals
Sustainability issues	1. MVP trains lead farmers who in turn train other farmers in the area thereby reaching out to a high number of people. 2. Farmers have already started doing all the activities without donor support
Phase in IP process (initial, maturity, independent)	Maturity

Appendix 3: Mponela AIDS Information and Counselling Centre (MAICC)

Conservation Agriculture IP

IP Name	*Mponela AIDS Information and Counselling Centre (MAICC)*
Entry Point or VC	HIV/AIDS Prevention and Food security
Innovations (technical or social and economic innovations)	Technical (Conservation Agriculture - Minimal tilling, Crop rotation and Mulching)
Location (name and GPS coordinates in UTM or degrees)	Dowa West
Intervention areas (regional/province /district/…)	District
IP webpage:	N/A
Participating villages	The project is in all villages in the following traditional authorities (TAs): 1. T/A Dzoole 2. T/A Msakambewa 3. T/A Chakhaza 4. T/A Kayembe 5. T/A Mponela
Date IP establishment	1992
Institutions setting up the IP	None
Funding agents	▪ Action Aid ▪ Fire light ▪ Feed the Children ▪ Swedish Organization for Individual Relief
Number of years activities on the ground	13
IP is still active or not	Active
Facilitators (names and contacts)	George Kaunda (+265) 888 364 345
IP members (regrouped by VC actors and sectors)	The project works with more than 2000 smallholder farmers on conservation agriculture, growing maize, groundnuts, beans and soybeans
Opportunities addressed	1. The project work with smallholder farmers who rely on agriculture to earn a living 2. A number of stakeholders and donors continue to show interest in MAICC's work

	3. Farmers have seen the benefits of following good agricultural practices; hence high adoption rates
Achievements to date	1. Over 2000 smallholder farmers have been trained in conservation agriculture 2. More additional famers adopted CA in the area
Challenges	1. Some areas have sandy soils which make CA difficult 2. Dissemination of contradictory messages as the CA concept is still new. For example, the use of mulch vs herbicides to shock weeds that confuses farmers 3. Agriculture messages also tend to be short lived. For example, in the past few years farmers were encouraged to till land and make ridges, which they adopted to enhance soil aeration and easy germination of seeds. Following effects of climate change, emphasis is now on zero tillage and some farmers that some farmers are yet to adopt.
Sustainability issues	1. Lead farmers have been trained and continue to train other fellow local farmers on the ground 2. MAICC introduced a seed multiplication and banking under which each farmer identifies a needy family and share the planting seeds with it. 3. MAICC is repeating best lessons learned from CA in other areas where it is implementing new projects.
Phase in IP process (initial, maturity, independent)	Maturity

Appendix 4: International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)
Groundnut, Pigeon Peas and Rice IP

IP Name	*International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)*
Entry Point or VC	Ground nuts, Pigeon peas and Rice
Innovations (technical or social and economic innovations)	Technical - Improving seed systems
Location (name and GPS coordinates in UTM or degrees)	Chitedze (Lilongwe)
Intervention areas (regional/province/district/…)	Nationwide
IP webpage:	www.icrisat.org
Participating villages	All 28 districts in Malawi
Date IP establishment	1982
Institutions setting up the IP	None
Funding agents	GTZ
Number of years activities on the ground	33
IP is still active or not	Active
Facilitators (names and contacts)	
IP members (regrouped by VC actors and sectors)	Chitedze Research Station, NASFAM, SEED Companies
Opportunities addressed	1. Government's commitment to developing new seeds 2. Communities' willingness to adopt the new varieties 3. Identification of groundnuts and other oilseeds as potential export crops by the Malawi National Export Strategy (NES) 4. Value addition of groundnuts by Cooking Oil, Peanut Butter and Snack companies in the country.
Achievements to date	1. Improved seed quality 2. Receipt of awards for developing high yielding and disease resistant seeds. 3. ICRISAT has trained National Smallholder Farmers Association of Malawi (NASFAM) field officers, Government Extension Officers, and Lead Farmers on various aspects of ground nut production. This is necessary for sustainability of groundnut production, marketing and value addition in the country.

Challenges	1. Lack of commitment by the private sector to invest and adopt seed production 2. Poor access to improved seed and inadequate crop management practices by smallholder farmers. 3. Low yields due to the use of traditional varieties and recycling of seed, especially in remotest areas of the country 4. Yields are also poor because of the low, unreliable rainfall, often characterised with midseason drought. 5. Declining soil fertility through poor crop management and low nutrient application 6. Inadequate support services such as extension services and credit facilities 7. Pests and diseases that affect yields 8. A clash in labour demand and competition with other crops – maize, tobacco, soybeans etc. 9. Lack of viable markets and low prices
Sustainability issues	1. Seed revolving fund (seed multiplication and banking) among farmers ensures availability and scale up of groundnut production in the country. 2. Availability of established local markets for the commodity
Phase in IP process (initial, maturity, independent)	Maturity Independent

Appendix 5: Indigenous Vegetable IP

IP Name :	*Indigenous Vegetables IP in Thyolo*
Entry Point or VC:	Vegetables
Innovations (technical or social and economic innovations)	Technical
Location (name and GPS coordinates in UTM or degrees)	Thyolo, Malawi
Intervention areas (regional/province/district/…)	Thyolo
IP webpage:	N/A
Participating villages:	10
Date IP establishment:	14 June 2008
Institutions setting up the IP :	Farmers, World Vision, Chopi Agrodealers, Thyolo District Hospital, CARD, Bvumbwe Research Station, Farmers, Thyolo District Planning Department.
Funding agents:	FARA.
Number of years activities on the ground :	10 Years.
IP is still active or not:	Active
Facilitators (names and contacts) :	Bvumbwe Research Station
IP members (regrouped by VC actors and sectors)	Extension Inputs suppliers Microfinance Research Buyers Farmers Policy makers
Opportunities addressed:	High demand for vegetables especially in the city of Blantyre Achievements to date: Released 2 tomato varieties rich in vitamin A, Establish contract marketing, developed a vegetable pack
Challenges:	Unreliable rains, prevalence of pests and diseases
Sustainability issues:	Contract marketing, IP run by the locals
Phase in IP process (initial, maturity, independent):	Maturity