



Centre for Environmental
Policy and Advocacy

Case Study Report

Farmers' Organizations, Plant Breeding and Seed Industry in Malawi

Acronyms and Abbreviations

ABS	Access and Benefit Sharing
ADD	Agricultural Development Division
ASSMAG	Association of Smallholder Seed Multiplication Action Group
ATCC	Agricultural Technology Clearing Committee
CIMMYT	Maize and Wheat Improvement Centre
DARS	Department of Agricultural Research Services
EU	European Union
FAO	Food and Agriculture Organization
FUM	Farmers Union of Malawi
GNP	Gross National Product
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
MGDS	Malawi Growth and Development Strategy
MOAFS	Ministry of Agriculture and Food Security
NASFAM	National Smallholder Farmers' Association of Malawi
PPP	Purchasing Power Parity
PVS	Participatory Variety Selection
SMAG	Seed Multiplication Action Group

Executive Summary

Farmers' organizations, plant breeding and the seed industry are key drivers to achieving, in Malawi, agricultural sector-driven economic growth, food security, and poverty reduction. Various policy and legislation instruments have been enacted in the country in order to enhance the performance of these key sectors and ensure seed security. By definition, seed security entails access by farming households to adequate quantities of quality seeds and plant materials of adapted crop varieties at all times. Increased efficiency in the performance of the three sectors coupled with the harmonized implementation of appropriate and sound policy and legislation affords seed security, both in the formal and informal seed sectors. A case study was conducted in order to evaluate current trends in farmers' organizations, plant breeding and the seed industry in achieving seed and food security and the sustainable conservation of agro-biodiversity for the benefit of current and future generations. The study intended to identify key gaps as opportunities for enhancing seed and food security and agro-biodiversity conservation by specifically investigating following issues:

- i. Existing legislative and policy instruments that are relevant to farmers' organizations, plant breeding and the seed industry;
- ii. Existing gaps;
- iii. Opportunities and challenges;
- iv. Niche for improved crop varieties, say hybrids and composites: in terms of whether they are in competition or complementary to realizing food security at smallholder household levels; and
- v. Extent of smallholder farmer consultation and participation in the farmers organizations, plant breeding and the seed industry respectively.

The case study observed that there was congruence among the three sectors in terms of their stated niches which may be summed up as increasing the performance and sustainability of the smallholder agro-ecosystem to improve livelihoods of smallholder farmers. The study further analyzed existing relevant national policy and legislative instruments. A key challenge that emerged was the fact that key instruments such as the revised Environmental Management Bill, Malawi Variety Protection Bill, revised and the National Nutrition Policy have remained in draft form for a quite sometime now. It was recommended that the Ministry of Agriculture and Food Security, Environmental Affairs Department and the Department of Nutrition and HIV/AIDS under the Office of the President and Cabinet together with the Centre for Environmental Policy and Advocacy and other relevant civil society organizations should jointly lobby for the speedy enactment and implementation of these crucial draft instruments.

A critical gap to achieving seed security was further identified as the lack of sufficient basic/foundation and certified seed, especially for other crops than maize. It was recommended that the commercial seed industry should be invited, with the support of an appropriate policy instrument, to bridge this gap. The lack of benefit sharing agreements between farmers, the Gene Bank and plant breeders and the lack of guiding instruments was also identified as a major drawback to the conservation and sustainable use of the country's agro-biodiversity.

The study highlighted challenges that include changing the mindset among smallholder farmers from the subsistence farming focus to farming as a business, the prevailing low levels of adoption of improved crop varieties, the world food crisis and the associated sky-rocketing of prices, adaptation to climate change and the quest for agro-biodiversity conservation. It was concluded that these challenges actually offer opportunities to innovatively enhance the performance of the agricultural sector in Malawi.

Introduction

Malawi is an agro-based economy and as such, agricultural production, in particular crop production, is a critical driver to the realization of national development objectives of achieving food security, poverty reduction, livelihoods improvement and overall economic growth. Plant breeders have for sometime now been engaged in the development of improved crop varieties, usually using local varieties and landraces obtained from smallholder farmers. Following completion of a plant breeding cycle which usually runs over several stages and seasons, breeders' seed of plant varieties with socially and economically acceptable traits are then made available to the seed industry for further multiplication and commercially availing certified seed to farmers in the country. The seed industry also imports seed of crop varieties that have not necessarily been bred in the country but have been tested at agricultural research station sites, sometimes including on-farm, for at least three cropping seasons and have been approved by the Government of Malawi's variety release committee. Through plant breeding efforts and the operation of the seed industry, seed security is availed to the farming community, albeit at commercial values. Seed security may be defined as access by farming households to adequate quantities of quality seeds and plant materials of adapted crop varieties at all times. From this definition, "Access" implies that the source of these seeds should be within an acceptable distance, and supplies delivered in a timely manner and at affordable prices. "At all times" refers to the availability of appropriate seed stocks in time for each and every growing season, and in rapid response to natural or man-made disasters. It is worth noting that in the current context, seed includes both sexual and vegetative propagation materials.

According the Food and Agriculture Organization (FAO) (see: http://www.fao.org/ag/portal/index_en/en/), basic components of an effective seed security strategy include:

- *Protection and conservation of crop genetic diversity*: This entails action to conserve locally adapted varieties and genetic resources at the farm and local community level, as well as in national and regional gene banks, and expanding stocks of the main varieties of food crops to ensure rapid seed multiplication and exchange during disasters. Also important to achieve this are early warning systems to monitor changes in the status of genetic diversity in locally adapted crop genetic resources.
- *Robust seed supply systems*: This aspect depends on national and regional seed policies as well as government and international support. Practical measures to strengthen seed supply systems include empowering on-farm and community seed production - after disasters such as droughts and floods, farmers and their communities are frequently the key players in re-establishing local seed supply and seed distribution systems. There is also need for appropriate seed multiplication technology, including low cost, rapid biotechnology-based multiplication methods, strategic cost-effective seed

reserves of the important food crops, and "sensible standards" to ensure production of high quality seed.

- *Sound national and regional seed policies:* Among measures recommended by FAO are national plant improvement programmes with focus on locally adapted varieties and landraces, a system to facilitate crop variety evaluation, registration and release, and informal, on-farm seed production and rural community distribution systems. At regional level, policies should facilitate movement and exchange of seed across borders. This calls for regional seed security networks with databases on varieties grown within the southern African region, harmonization of seed standards and regulations, and uniform regulations to encourage fair and equitable trade.

A programme to develop Malawi's capacity to multiply and certify seeds of all crops was initiated by the Ministry of Agriculture and Food Security in the mid 1970's. Between the initiation of the programme and present, several other initiatives by the ministry, non-governmental organizations, smallholder farmers associations and farmer organizations have played a significant roles to guarantee seed security. During this period, several multi-national seed companies including SEED-CO, PANNAR and MONSANTO also became major players in seed security in Malawi. A greater demand for good quality cereals, legumes, root and tuber crops and vegetable seeds quickly resulted with the Government of Malawi's drive to promote crop diversification. In order to address this increased demand, major policy and regulatory review were undertaken in the early 1990s which resulted into the amendment in 1996 of the Malawi Seed Act of 1988 and the Malawi Plant Breeders' Rights Bill (which still remains a draft bill to-date). A national seed policy was also developed which led to the liberalization of the seed sector and the coming on board of more actors. Most recently, the Ministry of Agriculture and Food Security has rolled-out a Food Security Policy (July 2008) whose long-term goal is to improve food security at both household and national levels, through increased productivity, diversification and sustainable agricultural growth and development. In this policy, one of the strategies to achieve this goal is to increase access to agricultural inputs (Section 3.1.3) by promoting the establishment of community seed banks for easy access and sustainability. Experience shows that while such initiative can be effective mechanisms for facilitating wide adoption of new crop varieties (Ng'ambe & Maliro, 2004), they also offer opportunities for maintaining agro-biodiversity at the community level.

Productivity of the smallholder sector has major significance to food security in Malawi. This sector strongly relies on the informal seed supply system. Typically, the informal seed sector suffers from a host of problems that include:

- Lack of appropriate isolation distances for the multiplication plots and proper storage, leading to lack of seed purity;
- Inadequate pest and disease management in the field and in storage;

- Insufficient know-how in seed production;
- Inadequate seed processing methods;
- Poor marketing opportunities;
- Absence of appropriate policy support; and
- Weak extension backup due largely to lack of knowledge on the sector as well as insufficient logistic support to reach the farmers with relevant messages.

Farmers' organizations, plant breeding and seed industry related legislation and policies, and practices should be reviewed, and also in relation to the Malawi Food Security Policy, to address the problems highlighted above to enable seed supply systems to effectively contribute to improving food sovereignty and security in Malawi, and to the overall national goal of poverty reduction. Through facilitating improvements in efficiency of smallholder production, processing, packaging and marketing of seed, the informal seed sector also has a potential to significantly contribute to seed security and agro-biodiversity conservation in Malawi.

A study was conducted with the overall objective of evaluating current trends in farmers' organizations, plant breeding and the seed industry in achieving seed and food security and conservation of agro-biodiversity for the benefit of the current and future generations.

Methodology

Consultations were conducted with various key stakeholders in farmers' organizations, plant breeding and the seed industry in order to develop a synthesis report which will provide insight into existing government legislation and policy instruments that are relevant to seed and food security in Malawi. The consultations also sought to study current practices in the conservation of indigenous crop varieties and landraces and their importance in food security and food sovereignty in the light of the prevailing strong drive for improved crop varieties. These varieties are believed to offer the silver-bullet solution to the incessant problem of food insecurity in the country. The study also intended to contextualize the importance of indigenous crop varieties and landraces. Following specific issues were investigated in the context of farmers' organizations, plant breeding and the seed industry in Malawi's food security goals:

- vi. Existing legislative and policy instruments that are relevant to the farmers' organizations, plant breeding and the seed industry;
- vii. Existing gaps;
- viii. Opportunities and challenges;

- ix. Niche for improved crop varieties, say hybrids and composites: are they in competition or complementary in realizing food security at smallholder household levels; and
- x. Extent of smallholder farmer consultation and participation in the farmers' organizations, plant breeding and the seed industry respectively.

Key Findings

Niche/role of farmers' organizations, plant breeders and the seed industry in seed security and food security

Consultations on the study showed that all farmers' organizations, plant breeders/Gene Bank and the seed industry perceived their niche as uplifting rural livelihoods. This perception varied however as some farmers organizations fulfilled this niche through:

- Improved crop productivity and quality – by ensuring seed security in major cereal and legume crops, capacity building and providing synergy to agricultural extension services;
- Enhanced performance of their member-farmers and/or farmer-groups;
- Increased revenue and profits in paradigm-shift scenarios from subsistence farming to farming as a business;
- Enhanced agro-ecosystem performance and increased sustainability; and
- Lobbying and advocacy: on behalf of smallholder farmers in order to influence national agricultural development-related legislation and policies, strategies, programmes and plans, and ensure fair practices.

The farmers' organizations that were consulted in the study further enhance the livelihoods of smallholder farmer households by promoting farming diversification through the promotion of livestock production (including small animals such as goats, pigs and rabbits) and production of seedlings of agro-forestry plant species. Other farmers' organizations prioritize the enhancement of the livelihoods of the communities they work with by expanding options available in order to integrate them into their programmes, initiatives to mitigate the impact of HIV/AIDS. Such programmes include components such as awareness raising, prevention of infection, nutrition and food security improvement, and the use of labour-saving crop production practices. It has to be pointed out that while HIV/AIDS is a major constraint to agricultural productivity, the impact of the disease is exacerbated by food and nutrition insecurity.

Plant breeders fulfill their niche of contributing towards seed security and food security in Malawi through the development of varieties of major crops that are adaptive to local

environmental conditions such as early to medium maturity, pest and disease resistance and tolerance, and availing them to farmers, processors and to consumers. In summary, maize plant breeders' core interests are to develop maize varieties with the following traits:

- High yielding
- Tolerance to abiotic stresses (including low soil nitrogen, changing soil pH and drought); and
- Resistance to biotic stresses (including maize diseases such as grey leaf spot, downy mildew and maize streak virus).

After crop genotypes have completed several years in a breeding programme cycle, those that are approved by the Agricultural Technology Clearing Committee (ATCC) are multiplied for seed producers. Plant breeders are also involved in an up-scaling initiative by government to increase the availability of seed nationally. Apart from maize, this initiative also includes other crops such as cowpea, field beans and soybean. The breeding programme in the Department of Agricultural Research Services (DARS) within the Ministry of Agriculture and Food Security (MOAFS) has played its role over several decades. For instance, the maize breeding programme started in the early 1950s and the groundnut breeding programme started around 1963 respectively. Over the years, the breeding programmes have collaborated with international research centres (such as the Maize and Wheat Improvement Centre (CIMMYT) for maize, and the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) for groundnut). Through this collaboration, internationally available genetic resources are availed locally for breeders to improve crop traits of particular interest.

The niche for the Gene Bank, which has operated since 1992 and housed within the MOAFS' DARS, is maintenance of planting materials of local crop varieties for the purpose of conservation and supply to breeders and other stakeholders who need them. It also distributes seed for crop varieties of interest to farmers, especially local crops such as finger millet, bambara nuts, yams and plantains. In order to play these roles, the Gene Bank engages in following core activities:

- Collections from farmers of local crop varieties;
- Multiplication of local crop varieties (albeit at a small scale); and
- Public awareness on the existence of the Gene Bank

Core interests of the Gene Bank are ensuring the maintenance of crop diversity for future research programmes and promoting the utilization of neglected crops.

Most seed companies have operated in Malawi within the past 10 years-or-so. They indicated that their niche in seed security and food security being to ensure that

smallholder farmers in the country have access to improved maize seed, especially in the context of rain-fed agriculture which has increasingly been impacted by climate change. A number of these companies have expanded the range of seed types they avail to the seed market from maize, to include vegetables, legumes (beans and soybeans) and oil seeds (such as sunflower) in order to address the problem of low seed supply.

While seed companies as private investments may be construed to have corporate commercial interests (that is, to make money), those consulted indicated that part of their core interest lies in uplifting and improving the livelihoods of smallholder farming families. It may further be argued that this would automatically expand business through the broadening of the proportion of farming families that can afford purchased seed, giving an impression of a win-win situation between seed companies and the farmers. One of the seed companies further indicated that it previously engaged in charity work during the 2005 seed crisis in Malawi by donating 700 metric tonnes seed of an early maturing maize variety. Another company has recently participated in the government-driven greenbelt initiative in Henga Valley, Mzuzu Agricultural Development Division (ADD) by providing maize seed that was planted over a 10 km stretch.

Adoption of improved maize varieties in Malawi is currently estimated to be within the range of 25-30 per cent with the rest of the farmers solely depending on farm-saved seed. The interest of the seed companies is to increase this level, say by at least another 10-15 per cent.

Existing legislative and policy instruments relevant farmers' organizations, plant breeding and the seed industry

The Government of Malawi has promulgated a number of legislative instruments and developed a number of policies and strategies that were reported during the consultations to be relevant to farmers' organizations, plant breeding and the seed industry (Table 1). It must be stated at this point that it was not within the scope of the current study to investigate the extent to which the three sectors were familiar with the relevant legislative and policy instruments. There are a number of instruments relevant to the national development aspirations of the country and others that are specific to livelihoods, agriculture, food security and seed security that were hardly mentioned during the consultations. For instance, the National Science and Technology Policy of 2002 puts in place strategies for achieving socio-economic development through the harnessing and application of scientific and technological capabilities, including in spheres such as the three sectors in the current study. It is often claimed that the inability to add value to primary agricultural produce and to biodiversity products from the country's natural resources largely explains why Malawi's ranking has stagnated among the seven poorest countries of the world. Measured by World Bank defined indicators of Gross National Product (GNP), the country is pegged on the seventh position, and in terms of GNP per capita based on global purchasing power parity (PPP) it is one of the bottom two.

Table 1. Existing legislative and policy instruments mentioned to be relevant to farmers' organizations, plant breeding and the seed industry

Organization/Institution	Legislative and Policy Instrument
Farmers Organization	<ul style="list-style-type: none"> • Biosafety Act of 2002 • Cooperative Societies Act of 1998 • Malawi Food Security Policy 2008 • Malawi Growth and Development Strategy (2006-2011) • Malawi National Land Policy 2002 • Malawi Nutrition Policy (still in draft form) • Malawi Plant Breeders' Rights (still a draft bill) • National Biotechnology and Biosafety Policy 2008 (still in draft form) • New Agricultural Extension Policy • Revised Environmental Management Act (still a bill) • Seed Act 1988, Amended 1996 • Trade-related policies (issues of domestic and external trade and investment)
Plant Breeders/Gene Bank	<ul style="list-style-type: none"> • Malawi Food Security Policy 2008 • Malawi Plant Breeders' Rights (still a draft bill) • Plant Protection Act (still a draft bill) • Revised Environmental Management Act (still a bill; housed in the Environmental Affairs Department but with provisions that are relevant to the Ministry of Agriculture and Food Security) • Seed Act 1988, Amended 1996
Seed Industry	<ul style="list-style-type: none"> • Biosafety Act of 2002 • Malawi Food Security Policy 2008 • Malawi Growth and Development Strategy (2006-2011) • National Biotechnology and Biosafety Policy 2008 (still in draft form) • Other Legislation and Policy pertaining to transacting business in Malawi • Pesticide Act of 2000 • Seed Act 1988, Amended 1996

Notwithstanding the foregoing, a number of existing legislative and policy instruments were said to have had cross-cutting relevance to farmers' organizations, plant breeding and the seed industry. The Malawi Growth and Development Strategy (MGDS) (2006-2011) currently being implemented by the Government of Malawi to achieve poverty reduction through economic growth clearly identifies 'Agriculture and Food Security' among its six key priority areas. It is thus expected that this strategy should be relevant to all the three sectors consulted.

The Seed Act of 1988 (amended in 1996) and the Malawi Food Security Policy of 2008 were mentioned to be relevant to all the three sectors. Promulgation of the Seed Act (and its subsequent amendment) coupled with the National Seed Policy 1993 led to the recognition of seed as a major constraint to agricultural production, liberalization of the seed market, strengthening of the Seed Services Unit within DARS and the increase in the number of players in the seed industry. These legislative and policy reforms thus represented major strides towards seed security as a major element to the attainment of food security. It is thus necessary to review seed related legislation and policy with the view to strengthen and harmonize them with the Malawi Food Security and draft Nutrition Policy and current government development strategies in order to ensure synergy.

During consultations, the Biosafety Act of 2002 and the draft National Biotechnology and Biosafety Policy 2008 (approved but the document is still in draft form), the draft Malawi Plant Breeders' Rights and the Farmer' Rights provisions contained in the Revised Environmental Management Act (which is still a bill) were also mentioned to have cross-cutting relevance to farmers' organizations, plant breeding and the seed industry. It is further expected that access and benefit sharing (ABS) provisions in the draft Revised Environmental Management Act, as they pertain to genetic resources for food and agriculture, should also have a cross-cutting relevance to the three sectors that participated in the current case study.

Participants in the consultations further mentioned several legislative and policy instruments whose relevance can be expected to be cross-cutting although this is not reflected in their respective perceptions. For instance, several instruments that were mentioned by farmers' organizations such as the National Land Policy and trade related policies that regulate issues of domestic and external trade and investment were hardly cited by the seed industry and plant breeders and the gene bank. This indicated the lack of linkages among the various instruments as they pertain to the three sectors. Given the patent problems of legislation and policy implementation, synergy among the instruments can never be achieved within the context of seed and food security respectively unless such linkages are recognized and considered.

It was particularly striking to note that the Gene Bank considers the ABS and farmers' rights provisions in the draft Revised Environmental Management Act to be of extreme relevance to its mission, niche and activities. In actual fact, the existence of the Gene Bank within the MOAFS was clearly not anchored to any legislation or policy instrument

that regulates the conservation of genetic resources that are used for food and agriculture. On the other hand, the relevant instrument is housed in the Environmental Affairs Department within the Ministry of Lands and Natural Resources. This poses a major institutional arrangement gap that is glaring and should be addressed as a matter of urgency.

Extent of smallholder farmer consultation and participation in the farmers' organizations, plant breeding and the seed industry

By their nature, farmers' organizations that participated in the study are owned by smallholder farmers as members. According to the National Smallholder Farmers' Association of Malawi (NASFAM), its average member "*holds a farmland that is less than one hectare to support a family of six people*" which corresponds to the mean size of a smallholder household in the country. In general however, variations exist in the way the different organizations that participated in the study are organized and operated. The Association of Smallholder Seed Multiplication Action Group (ASSMAG) plays coordinating roles for all seed activities by smallholder farmers, including quality control, pre-season training, land history assessment, sourcing of foundation seed, marketing and processing. Office bearers are elected at an annual general meeting of Seed Multiplication Action Groups (SMAGs), mainly premised on democratic principles and good governance. The office bearers are allowed up to two-three year terms of office with no room for extension. Member farmers support ASSMAG activities through a cess of MK2.00 per kg of seed marketed. On the other hand, the Farmers Union of Malawi (FUM) is an umbrella organization for at least 21 farmers' organizations that include ASSMAG and NASFAM. Its structure comprises of the FUM General Assembly as the main decision making body, the FUM Board of Trustees appointed by the Executive Committee and plays custodial roles, the FUM Executive Committee which provides policy direction, and the FUM Secretariat which supports and coordinates the day today activities of the Union. Unlike ASSMAG and FUM, the basic operational unit under NASFAM is the Club comprising of 10-15 smallholder farmers. Clubs combine to form Action Groups which are the key points in a network of extension for the purposes of information and technology dissemination. Individual Action Groups combine to form NASFAM Associations which are legally registered entities that are governed by farmer Boards. The Associations are in turn grouped according to geographical location under Association Management Centres and receive support from the NASFAM regional and head office structures. Smallholder farmers exercise their right through General and National Assemblies respectively.

Plant breeders normally work with smallholder farmers in Malawi when they are conducting on-farm and "mother-baby" trials for participatory selection of crop varieties. The role of the farmers in these trials is to assist the breeders in participatory variety selection (PVS) of those types that have the traits that meet their preferences and demand, as a process of increasing the chances for the adoption of new varieties. In addition to conducting PVS, they also conduct local varieties collections. In comparison, the Gene Bank solely relies on smallholder farmers as sources of local crop varieties when they

conduct local collections, sometimes in collaboration with plant breeders. Both plant breeders and the Gene Bank, who sometimes collaborate, have no benefit sharing arrangements with smallholder farmers to compensate for their traditional knowledge-based intellectual input to PVS nor material transfer agreements when their varieties are collected from them.

All seed companies who participated in the study indicated that they work with smallholder farmers and were aware that they comprise at least 80 per cent of the agricultural industry in Malawi. The companies perceived the roles of the farmers largely as their main seed customers while some engaged medium scale farmers in seed multiplication. They work with the farmers during technologies' testing and demonstrations aimed at creating awareness of available maize varieties and their characteristics in terms of yields and period to maturity. Just like plant breeders and the gene bank, none of the seed companies had any ABS agreements with smallholder farmers. Part of the explanation to the lack of benefit sharing agreements is the fact that companies do not collect plant materials directly from farmers. Whenever traits that meet local requirements are to be incorporated into the varieties they sell, the companies' plant breeders who are offshore-based rely on obtaining materials with such traits, say flint types of maize, from sources such as gene banks. Interestingly, one of the major seed companies has a corporate pledge that goes: "*Transparency, Dialogue, Benefits, Sharing, Respect*". This implied existence of space for developing formal ABS agreements.

Are improved crop varieties in competition or complementary to realizing seed and food security, and protection and conservation of crop genetic diversity?

Farmers' organizations generally support the maintenance of a broader crop gene pool and the social values of local crop varieties as main basis for developing variety improvement programmes. As part of the recognition of the importance of conserving crop varieties that have been developed by smallholder farmers over generations, NASFAM has actually developed a map of areas in Malawi where the popular groundnut variety Chalimbana is found. Some of the organizations actually participate in regional and global networks engaged in advocacy for on-farm agro-biodiversity conservation, encourage conservation agriculture and support their members' participation in international workshops on conservation-related agricultural technologies. In general, farmers' organizations advocate for integrated seed improvement programmes that protect local crop varieties and support the need for the implementation of farmers' rights in Malawi.

The core business of the Gene Bank is to prevent the loss of crop genetic diversity in Malawi through on-farm conservation, local collections, and also regulation of the transfer of plant genetic materials, notwithstanding the lack of ABS agreements with smallholder farmers earlier discussed. Making operational of such agreements would increase its ability to track the transfer of plant genetic resources and ensure that benefits accrue to smallholder farmers who are the custodians of the concerned crops and related

traditional knowledge. Plant breeders collaborate with the Gene Bank and also with international research centres such as CIMMYT and ICRISAT in conducting national collections of local crop varieties. Within the maize breeding programme, such collections are important sources of flint grain types and for the tight sheath-tip that confers resistance to storage pests such as weevils. Within the groundnut breeding programme, some plant materials have been sourced from the Gene Bank that confer traits of drought tolerance and disease resistance in improved varieties.

Seed companies that were consulted have mainly focused on maize and recently diversified to vegetable seed. Some have the aspiration of becoming a one-stop-seed shop that would also provide seed of legumes and commercial crops such as wheat and cotton. Like plant breeders, they value the importance of crop genetic diversity as a useful resource for genes that confer traits in improved varieties that enable adaptation to climate change. Some companies however indicated that although they maintained a strong position in maintaining crop genetic diversity as a source of flint types of maize, they however were not in the business of pirating local varieties.

Challenges and Opportunities

Several policy, technical, financial and capacity challenges and opportunities were cited by farmers' organization, plant breeders and the seed industry in addressing seed and food security (Table 2). One of the challenges that appeared to cut across, perhaps with the exception of the seed companies is financial constraints. For sometime, farmers' organizations have been developed and supported by donor funds and this puts into question the extent to which sustainability is incorporated as an exit strategy for the phasing out of the support. A typical illustration is the stoppage of European Union (EU) funding to ASSMAG in 2005 which significantly affect operations to-date. Another cross-cutting challenge was cited as the perception of smallholder farmers, firstly in terms of their view of farming for subsistence rather than farming as a business. The spin-off challenge to this perception is the initial skepticism on the cost of new varieties when they are exposed to them, which slows uptake till they are convinced beyond doubt about their monetary benefits.

The Gene Bank cited the lack, within the MOAFS, of anchoring agro-biodiversity conservation-related legislation and policy to justify its existence. This coupled with the lack of any form of benefit sharing agreements for smallholder farmers' crop technologies and traditional knowledge as highlighted above, fosters expropriations by unscrupulous operators. Moreover, although the Seed Act of 1988 (amended in 1996) and the Seed Policy 1993 are being implemented, their immediate application to seed systems involving the majority of crop varieties it deals with and are grown by smallholder farmers has largely been peripheral and abstract.

Despite the prevalence of numerous challenges, farmers' organizations, plant breeders and the seed industry perceived a lot of opportunities to the realization of seed and food security and contribution to broader national development aspirations of poverty

Table 2. Major challenges and opportunities for farmers' organizations, plant breeders, gene bank and the seed industry in Malawi

Organization/Institution	Challenges	Opportunities
Farmers Organization	<ul style="list-style-type: none"> i) Financial constraints: operations of all farmers organizations depended on donor funding ii) Inadequate inspection by the Seed Services Unit – due to wide geographical coverage and transport constraints iii) Farmers' perception: of subsistence farming rather than farming as business iv) Farmers' skepticism about cost of seed for new crop varieties v) Lack of sufficient basic/foundation and certified seed, especially for other crops than maize vi) Inadequate facilities – such as for storage and processing vii) Limited access to external markets viii) Isolation distances as stipulated in the Seed Act of 1988 (amended in 1996 not compatible with the land holding sizes among smallholder farmers) ix) The fuel price crisis – increases the cost of moving seed 	<ul style="list-style-type: none"> i) The prevailing world food crisis offers an opportunity to produce more; ii) Prevalence of the political will to support farmers' organizations iii) According to ASSMAG, warehouses at ADMARC¹ are not fully utilized, could be used for bulking as they negotiate with buyers iv) The organizations have a comparative advantage for creating more partnerships v) Climate change adaptation offers opportunity for more innovations
Plant Breeders	<ul style="list-style-type: none"> i) Funding limitations and lack of sustainability ii) Poor infrastructure such as greenhouses and cold rooms for seed storage iii) Shortage of professional and technical staff 	<ul style="list-style-type: none"> i) Greater potential to release new varieties due to high demand – but largely through donor funding for regional programmes (developed by regional research centres) ii) Most problems raised by stakeholders are not yet addressed.
Gene Bank	<ul style="list-style-type: none"> i) Lack of conservation-related legislation and policy instrument in the MOAFS to anchor its existence ii) Funding limitation (at present, the bank is only allocated MK30,000 per month for its operations) 	<ul style="list-style-type: none"> i) Development of the Gene Bank into a national centre for conservation of crop genetic resources in collaboration with other stakeholder (such as non-governmental organizations, farmers' organizations, Forestry Research Institute of Malawi and the National Herbarium and Botanic Gardens)
Seed Industry	<ul style="list-style-type: none"> i) Competition from farm-saved seed ii) Pricing policy for farm produce do not stimulate production iii) Up to 90% of production is still rain-fed and prone to the impacts of climate change iv) Centralization of breeding programmes v) Lack of proprietary protection which subject elite plant materials to piracy 	<ul style="list-style-type: none"> i) The low adoption offers opportunities to expand the marketing of improved maize varieties ii) Freedom to operate without government and political interference iii) Seed market for other crops such as legumes is not yet exploited iv) Government and NGO programmes on food security

¹ ADMARC is Agricultural Development and Marketing

reduction through economic growth. Interestingly, most of these opportunities arise from some of the key constraints such as the prevailing low adoption of improved varieties of maize which offers an opportunity to raise productivity by increasing the levels. The current world food crisis and climate change adaptation also afford opportunities to increase production and avail to smallholder farmers innovatively developed crop varieties that enhance adaptation.

Conclusion

Seed security is a key driver to food security as availability and quality of seed determines the potential to crop production and productivity. Although a lot of effort has been invested in liberalizing and supporting the seed system in Malawi, good quality seed of improved varieties is not always available to smallholder farmers who are responsible for ensuring household and national food security. Impacts of climate change such as increased frequency of droughts, floods and cyclones exacerbate seed, and thus the food insecurity situation in Malawi. The conservation and sustainable use of agro-biodiversity perhaps offers a significant part of the solution to these impacts. The study showed a glaring gap in legislation, policy and institutional arrangements that would enhance agro-biodiversity and must be addressed. As part of an integrated solution to this should be the development of a National Agro-biodiversity Policy – to regulate issues of conservation and sustainable use of crop genetic resources for food and agriculture.

The study showed that the niches of all the players who were consulted among farmers' organizations, plant breeders and the seed industry converged at uplifting the livelihood of smallholder farming families. This perception is squarely aligned with the thrust of the MGDS which seeks to reduce poverty in Malawi through economic growth with agriculture as one of its central thrusts. It is critical that this *status quo* is sustained to ensure that development and implementation of programmes in the plant breeding, gene bank, seed industry and farmers' organizations is motivated by implementation of this overarching strategy. Several pieces of legislative and policy instruments were cited as being relevant to the programmes in these three sectors. A few of these instruments appeared to be cross-cutting in nature as they were cited by all the three sectors. It is critical that all the instruments highlighted here, including those not mentioned by the three sectors consulted for this study, are comprehensively reviewed and harmonized with the view of ensuring that they at least are implemented in a complementary manner focusing on achieving synergy in exploring the existing opportunities for increasing the production and productivity of the Malawian agro-ecosystem.

Finally, shifting the mind-set of smallholder farmers in Malawi from subsistence farming to farming as a business was frequently mentioned as a critical challenge to increasing seed and food security and agricultural production and productivity for economic growth. This also poses an opportunity to facilitate this process by, among other priorities, ensuring the effective flow of breeder – basic/foundation – certified seed to reach the farmers who are multiplying seed, supporting crop diversification and on-farm conservation and availing smallholder farmers with the opportunity to make informed choices of crop varieties that best fit their varying interests. The lack of benefit sharing

agreements such as ABS and material transfer, involving the farmers and those who collect and use their materials and associated traditional knowledge for commercial interests would impede achievement of mind-set shift. It is thus critical that the farmers are brought on-board as partners whose input is valued, respected and dully compensated for. A regulatory system of a new genre such as an effective *sui generis* system for intellectual property protection that protects smallholder farmers from capitalization of their apparent ignorance coupled with their desperation for increased crop variety choices to address their perennial quest for food security and poverty reduction should be part of the mind-set shift drive. Support should also focus on quality assurance mechanisms for a broader range of crops coupled with facilitation of an efficient, vibrant and responsible seed system.

References

Ng'ambi, F. & M.F.A. Maliro. 2004. Seed Security in Malawi with Emphasis on Food Crops. A draft report prepared for submission to Africa Biodiversity Network (ABN) by the Malawi Economic Justice Network.

Appendix 1. Key Sector Representative Met

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Mr. Peter D.Y. Mbulo

Farmers Union of Malawi

Mr. Prince Kapondamgaga

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