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Agricultural investment activities in the Beira Corridor, Mozambique: Threats and opportunities for small-scale farmers

October 2015



kaleidoscopio
Research in Public Policy and Culture



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We remain committed to dismantling inequalities in the food and agriculture system in Africa and in our belief in peoples' right to healthy and culturally appropriate food, produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems.

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Design and layout: Adam Rumball, Sharkbouys Designs, Johannesburg

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The African Centre for Biodiversity (ACB) acknowledges the generous support of the Swiss Agency for Development and Cooperation (SDC). The views and opinions expressed in this report are those of the authors and do not necessarily reflect the official policy or position of the SDC.



EXECUTIVE SUMMARY

Introduction

The research is part of a three year multi-country programme looking at the impacts of the Green Revolution on small-scale farmers in southern Africa with a particular focus on seed and soil fertility. The research focuses on the Beira Corridor, in particular Manica and Sofala provinces. This was selected as a key focus area for Green Revolution interventions in Mozambique where limited civil society research has been conducted to date.

ACB conducted the research in partnership with the national farmers' union *União Nacional de Camponeses* (UNAC) and its provincial unions *União Provincial de Camponeses de Manica* (UCAMA) and *União Provincial de Camponeses de Sofala* (UPC Sofala), and Kaleidosopio, an independent research organisation based in Maputo.

The research consisted of interviews with key stakeholders in Maputo, Chimoio and Beira and focus group discussions with local farmer associations affiliated to UNAC in Manica and Barue (Manica province) and Dondo (Sofala province).

Background to agriculture and land in Mozambique

Mozambique's economy was severely disrupted during the internal war, which erupted in 1977 and ended in 1992. At the end of the war, donor money was contingent on structural adjustment and agricultural liberalisation. Today agriculture accounts for around 24% of GDP, with average real annual growth of nearly 8% from 2002 to 2011. Around 77% of the total population rely on agriculture for their livelihoods.

Mozambique can be broadly categorised into three agro-ecological zones: arid and semi-arid in the south and south-west; sub-humid mostly in the centre and North; and humid highlands mostly in the central provinces. Most agricultural production takes place in the North, which is the most fertile region.

Potential arable land and pasture is around 40% of the total area, although only around 10% of this is currently under productive use.

There are approximately 3.7m farms, with the vast majority (98%) being small farms. The average size of family holdings is around 1.2 ha divided into two or more plots. It is estimated that 97% of the area occupied by these farms is not covered by a DUAT (legal title for the use and enjoyment of land). The land is owned by the state, with 50 year leases available for commercial production which can be renewed for another 49 years (Article 17 of the Mozambique Land Law). Given that the land is the property of the state, the proof of use and enjoyment of land can be made by: presentation of title (DUAT); testimonial evidence presented by members, men and women from local communities, experts and other means (Article 15 of the Mozambique Land Law).

Maize, cassava and beans occupy about 60% of the area under cultivation. Rice is an important food crop in some parts of the country, including Sofala. National production of maize is insufficient to cover domestic demand, and maize is imported to meet the shortfalls. The main cash crops for export are cotton, tobacco, cashew nuts and sugar cane.

The Green Revolution in Mozambique

Mozambique has adopted a Green Revolution approach to agricultural development. The method for realising food security and improved farmer livelihoods is explicitly understood to be agricultural modernisation and commercialisation, including the expansion of Green Revolution technologies (certified seed, synthetic fertiliser, irrigation, credit).

The government of Mozambique has signed on to the G8 New Alliance for Food Security and Nutrition (NAFSN). NAFSN advances a private sector, corporate agenda in implementing the African Union's Comprehensive African Agricultural Development Programme (CAADP) and Mozambique government agricultural plans. Policy commitments include promoting competitive private sector input markets; reforming land use rights to promote private



sector investment; liberalising agricultural marketing and trade; increasing farmer access to credit; and nutrition. The main NAFSN funders in Mozambique are the US and Japan with the UK, EU and Italy also providing funds.

The United States Agency for International Development (USAID) has for long been involved in constructing the agricultural sector in Mozambique to favour private, commercial interests. One channel is the Feed the Future (FtF) programme, which focuses on the Beira and Nacala corridors. Priority value chains are oilseeds (groundnut, sesame, soya); pulses (beans, cowpeas, pigeon peas); cashews; and fruit (banana, mango and pineapple).

More recently USAID launched the Strengthening Agribusiness and Fostering Rural Alimentation (SAFRA) programme as its primary implementing mechanism for FtF. Contractors are currently being finalised. SAFRA emphasises a private sector driven approach, promotion of profitability and farming as a business, with the aim of increasing productivity and competitiveness of farmers and agro-enterprises.

As in other countries, the Alliance for a Green Revolution in Africa (AGRA) interventions in Mozambique are not stand-alone but are integrated with broader Green Revolution initiatives. Total AGRA grants in Mozambique came to US\$12.6m in the period 2007-2012 for which grant information is available. The biggest allocations during that period were to the Programme for Africa's Seed Systems (PASS) with 40.5% of total value of grants, and the Soil Health Programme (SHP) with 33.3%. Additional funds were directed towards institutional support for the Beira Corridor initiative as part of AGRA's breadbasket strategy. Forty-five percent of AGRA grants in this period went to three recipients: *Instituto de Investigação Agrária de Moçambique* (IIAM, the national agricultural research institute) with US\$2.68m; International Fertiliser Development Centre (IFDC) with US\$1.51m and *Agência de Desenvolvimento Económico da Província de Manica* (ADEM, the Manica Economic Development Agency) with US\$1.5m.

AGRA is contracted to manage NAFSN's Scaling Seeds and Technologies Partnership

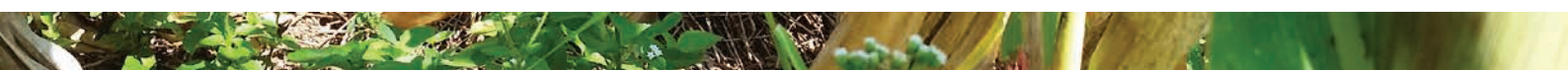
(SSTP), which is also operating in Tanzania, Malawi, Ghana and Senegal. The objective of SSTP is to improve public and private sector capacity to deliver improved seeds and related technologies (e.g. synthetic fertiliser) and increasing take-up by small-scale farmers. SSTP in Mozambique operates in the Beira, Nacala and Limpopo Corridors and in the Zambeze Valley, focusing on improved seed, extension services and agro-processing.

The Beira Agricultural Growth Corridor (BAGC) initiative

The Beira Corridor is one of six development corridors highlighted in Mozambique's strategic investment plan. The corridor is one of Southern Africa's main transport routes; a road and rail network linking large parts of Zambia, Malawi, Zimbabwe and Mozambique to the port of Beira on the Indian Ocean. The corridor incorporates the three central Mozambique provinces of Tete, Manica and Sofala, with links into Zambezia to the North.

The corridor has a mainly tropical savannah climate with a rainy season from November to April, and average annual rainfall of 1,200mm (moderate to good). Total land area is 23m ha, of which 10m ha is arable land, with 300,000 ha suitable for irrigation. 15 % of the arable land (1.47m ha) is under smallholder farming, with 25,000 ha of commercial farming, of which 88% is sugar. 80% of sugar is irrigated. Main crops currently produced in the Beira Corridor are maize, sweet potato, sorghum, rice (only in Sofala), groundnuts, cowpeas, sesame, cassava, beans and soya.

The BAGC initiative is a partnership between the government of Mozambique, private investors, farmer organisations and international agencies. It was launched in 2010 with the aim of promoting increased investments in commercial agriculture and agribusiness in the Beira Corridor. Membership includes MASA, Centre for the Promotion of Agriculture (CEPAGRI); AGRA, DFID, SNV, World Bank; Standard Bank, Tongaat Hulett, Yara as well as a number of banks and mining multinationals; UNAC and its provincial union in Manica, UCAMA, and the General Union of Cooperatives (UGC).



The growth corridor as a whole is driven by mining investments, especially coal in Tete. Commercial agriculture typically follows mining and energy investments. Transport infrastructure anchors investments in the corridor. At the moment there is a stuttering in energy investment in light of uncertainty about the future of the global economy and demand, and hence in investments throughout the corridor. At the same time, these investments take a long time to mature, and there will no doubt be investors who see a lucrative market beyond the next ten years.

The overall objective is to 'catalyse' private sector investment, integrate smallholder farmers into commercial value chains and increase economies of scale. The initiative is based on a PPP mechanism to co-ordinate activities, with a secretariat. The BAGC initially targeted 190,000 ha for commercial production. Just over a third of this targeted smallholder farmers on irrigated plots (5-50 ha), with the rest for large estates (over 10,000 ha) and medium-sized farms (300-3,000 ha). In practice it does not look like there has been much development on these projects, and it appears that commercial investment is fairly limited to date.

The BAGC essentially coordinates agricultural and agriculture-related investments in the corridor, while also operating a revolving fund to make some of its own investments. The BAGC Catalytic Fund (an investment company registered in Mozambique) was established to invest in early-stage farming and agro-processing businesses which incorporate smallholder and emergent farmers. UK-based AgDevCo is the fund manager "on a cost recovery basis". The Catalytic Fund was initially set up as a revolving loan facility providing loans of US\$50,000-500,000 with the aim of making a financial return of 5-10% overall. The total value of the fund is US\$17m mainly sponsored by DFID, Norway and the Dutch. In practice the fund operates as an equity investor, taking a share of the enterprise's ownership in exchange for investment. This is finance capital at work, and it is surprising that public funds can be channelled into equity investments in the name of a private enterprise, which is what is happening here. AgDevCo currently has 14 active investments

in agriculture in Mozambique, valued between US\$200,000 and US\$1.5m.

There are some apparent tensions between BAGC and AgDevCo. AgDevCo was meant to set up the institution and then hand the fund over to BAGC. Some respondents argued that AgDevCo prioritises medium-scale commercial farmers, who also tend to be foreign farmers. Respondents went on to say that while such an approach may be justified from an economic and rational point of view, it is more problematic from a development and political point of view. The suggestion is that donor money could more usefully be targeted at the commercial development of small-scale farmers.

USAID, AGRA and World Bank investments in the Beira Corridor

USAID has 23 recent and current projects operating in Sofala and Manica provinces, of which five deal with agriculture and food security. AGRA has provided direct support to establishing the institutional architecture for the Beira corridor, and had granted around US\$4m to projects in the corridor from 2007 to 2012. The major World Bank activity in the corridor is the large PROIRRI Sustainable Irrigation Development Project which focuses on supporting the growth of small-scale irrigation in Manica, Sofala and Zambezia, linked to commercial markets. The project was approved in 2011 with funding from the International Development Association (IDA), part of the World Bank, and the Government of Japan under the Coalition for African Rice Development (CARD) initiative, with a combined total of around US\$90m. Currently around 700 ha is being supported through PROIRRI, out of a planned total of 5,500 ha. BAGC operates as a service provider. It designs an irrigation scheme, government finds a builder, and BAGC monitors construction. A requirement for participation is that farmers pay about 10% on inputs. Government pays 85% of ploughing costs, and irrigation is provided for free. Farmers are trained on management and irrigation, including the formation of irrigation committees with support from extension workers.



Investments in agriculture will have contradictory outcomes. Plans and investments are oriented to favour small-scale farming households over large commercial producers. However, at the same time as such investments can open up opportunities for small-scale farming households, they also allow corporate penetration into previously inaccessible areas, including the extraction of value and wealth created locally. The best route is to work with farmer associations to identify spaces to negotiate about what kinds of investments favour their members and are in line with their principles as democratic organisations.

Seed: Domination, co-existence or some other alternative?

Mozambique's seed¹ sector can be divided roughly into three categories: i) the predominant farmer-managed system that produces and circulates mainly local varieties of food crops; ii) an 'intermediate' system which covers mainly food crops but also some vegetative crops and emerging cash crops, and incorporates community-based, NGO, emergency relief and some public activity; and iii) the commercial system which mainly looks at cash crops and incorporates private companies, public sector and closed value chains for specific crops (e.g. sugar cane, cashew, tobacco and cotton).

By far most seed in Mozambique is produced and distributed through **farmer-managed systems**. All the processes from selection, through testing, multiplication and storage are carried out, mostly by individual farmers sometimes in interaction with neighbours and others. Farmer-saved seed currently constitutes an estimated 70% of total seed used, with 20% from informal exchange and no more than 10% of seed through the commercial sector (public and private).

Farmers we spoke to have come with a verdict on the next steps for enhancing the varieties to suit their local needs, looking for increased

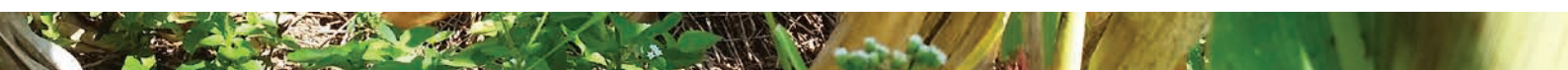
yields and hardiness traits already present in different varieties they use. They want to conduct this research on their own land, under their control with advice and resources from outside. Overall, farmers have got some capacity to do local experimentation and are interested in working on participatory *in situ* seed enhancement. They are also interested in increasing their knowledge about techniques to improve the preservation of seed.

The commercial seed sector only began with the initiation of a national seed programme in 1978, resulting in the establishment of the government-owned *Sementes de Moçambique Lda* (Semoc) to produce and disseminate improved seed. Seed laws and regulations were put in place in the early 1990s following the end of the internal war. The main law was the Seed Act (Decree 41/1994), which regulated the approval and registration of new varieties and defined the rules for seed production, inspection and commercialisation. The Act did not mention the informal or farmer-managed seed system despite the overwhelming importance of this system in Mozambique. Regulations in 2001 created an exclusive seed market for certified, improved, commercial varieties of seed, excluded farmers' varieties from the market, and made it impossible for these varieties to be officially recognised and registered.

The National Directorate on Agriculture and *Silviculture at Ministério da Agricultura e Segurança Alimentar* (MASA)² is responsible for general coordination of the seed sector in Mozambique. A Seed Platform was established in 2013 to bring stakeholders together, including government, private sector and civil society. UNAC is represented on the Platform, though it feels the agenda and composition of the Platform is heavily biased towards commercial interests.

For most of the time that a commercial seed sector has existed, the public sector was responsible for **plant breeding**, in collaboration

1. Seed is taken to incorporate germplasm for vegetable crops (e.g. sweet potatoes).
2. Following the formation of a new government in 2015, the Ministry of Agriculture has a new designation: *Ministério da Agricultura e Segurança Alimentar* (MASA) / Ministry of Agriculture and Food Security



with the international agricultural research centres (IARCs). Otherwise private companies imported seed varieties bred outside Mozambique. Germplasm inside Mozambique is mostly held by the state in collaboration with the IARCs. More recently, efforts are being oriented towards opening up breeding to the private sector. Since 2000, seed companies also became involved in breeding, mainly in maize. A draft Decree from 2013 lays out regulations on the protection of new plant varieties, which is seen as a key private sector requirement for investment. The Decree is based on the protection of private ownership through intellectual property (IP) protection for breeders. Plant breeders' rights (PBRs) are granted on the basis of a technical assessment of new, distinct, uniform and stable (NDUS) varieties, with NDUS criteria defined in Articles 8-11 of the regulations. The scope of protection includes production, multiplication or packaging of a protected variety - or any 'essentially derived' variety - without the consent of the rights holder. Anyone producing or multiplying protected varieties without a valid licence may be warned, fined, material may be seized and they may be open to being sued by the rights holder.

PBRs do not extend to the use of a protected variety in a programme of improvement of new varieties, unless it is repeatedly used in experiments or research activities; any private and non-commercial activities; and activities carried out by small-scale farmers for purposes of propagation and planting in their own fields (up to a certain extent which has to be defined by the government). This provides for farmers' privilege and limits farmers' rights. It allows small-scale farmers to recycle and adapt even protected varieties in their own fields and for any private and non-commercial activity. On the other hand, it prohibits farmers from multiplying seeds to be shared with other farmers or sold and selling seed from a protected variety without the consent of the rights holder.

The recently-concluded Arusha Protocol for the Protection of New Varieties of Plants (Arusha PVP Protocol) of the African Regional Intellectual Property Organisation (ARIPO) has imposed a regional PVP policy and framework onto all countries signing on to the agreement, based on UPOV 1991,³ in which PBRs take precedence over farmers' rights. Mozambique was one of four member countries that signed the Protocol on adoption in July 2015.

IIAM has the primary responsibility for the production of breeder and pre-basic seed, but also produces basic seed through *Unidade de Semente Básica* (USEBA). USEBA supplies seed to private companies and others mainly involved in producing certified seed. IIAM Central Region works with Dengo, Nzara Yapera, Semente Perfeita and other companies for certified maize, beans and soya. IIAM also multiplies certified seed through outgrowers to raise income. IIAM is also open to work with private companies to produce basic seed, but few have taken the opportunity so far.

IIAM does work with small farmers, mostly on OPVs. Improved varieties are mostly OPVs but IIAM is trying to promote hybrid. Farmers we spoke to are interested in trying out new varieties on their own terms, bringing them in slowly and experimenting to see how well they perform. Farmers are doing their own value for cultivation and use (VCU) testing here, in field conditions, not on demo plots with all the inputs that the formal VCU test is based on.

Once breeders have registered seed, it is tested before **certification** for purity (properly cleaned), humidity and germination. The Department of Seeds carries out certification and quality control. Typically, certified seed should be seed of a consistently high and known quality (genetically and physically), produced according to the rules and regulations of an official Seed Certification Scheme (*Programa Nacional de Fortalecimento da Cadeia de Sementes*) and for which proof of certification is available. In practice, farmers we spoke to did use certified seed but it is by no means their first choice

3. The International Union for the Protection of New Varieties of Plants (UPOV) is an inter-governmental organisation established by the International Convention for the Protection of New Varieties of Plants. The Convention was adopted in Paris in 1961 and was last revised in 1991.



even when available. We repeatedly heard that certified seed often did not perform well, and suspicion is cast on agro-dealers and other seed traders who are said to repackage seed or otherwise hoodwink buyers. The certification process thus does not necessarily meet its objectives of ensuring good quality seed that buyers can trust to perform as specified.

Once the seed is certified, it can be **multiplied** for branding and sale. Seed laws and regulations establish the requirements for labelling, storage and sale of certified seed. Historically Semoc was responsible for multiplying seed it got from IIAM which was then provided to government for subsidised or free distribution. The regulatory system is undergoing changes. Decree 12/2013 repealed all previous seed decisions, and aims at guaranteeing the production and commercialisation of quality seeds and planting material.

From a commercial point of view, irregularity of demand is a major obstacle to planning and implementation of seed production. Actual production of bean, rice and maize certified seed was between 3% and 13% of planned production in 2013/14. Producers themselves do not necessarily know what their demand for the next year will be, even just for commercial varieties. This makes it very difficult for companies to know how much seed to multiply, and in turn for IIAM to plan two years in advance to allow for the certification process.

The usual obstacles stand in the way of increasing demand for certified seed: high price, with grain seed up to 30 times more expensive than grain retained by farmers; lack of complementary inputs such as fertiliser, irrigation and pesticides which means farmers cannot realise the genetic potential of the seed; lack of timely availability of certified seed; and lack of credit to purchase seed.

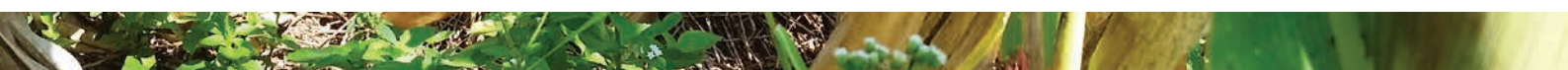
Seed companies are not yet meeting demand for certified seed in Mozambique, and the country still imports most certified seed. Regional seed harmonisation processes aim to construct a regional list where varieties listed in two or more countries can be freely imported into any country in the region who has agreed to the regional protocols.

Semoc was the only seed company to operate in Mozambique until 1999 after which the sector was liberalised. Demand was driven by government and NGOs working on emergency distribution during the internal war. Maize seed constituted 70% of seed production. Semoc relied on the free distribution services during this era and struggled to establish its own distribution networks after the relief programmes were phased out.

With liberalisation in the 2000s, Semoc's monopoly came to an end and there was an expansion of seed traders importing seed into the country for distribution. In mid-2013 there were 41 registered seed companies in Mozambique. Pannar and Semoc are the two main companies at the moment, but there are a number of other regional and multinational corporations as well as domestic seed enterprises, including farmer collectives.

Establishing **domestic commercial seed enterprises** is an objective of AGRA's Seed Production for Africa (SEPA) sub-programme within PASS. Key concerns for the seed industry identified by AGRA were shortage of foundation seed simultaneous with surpluses at IIAM stations that are not distributed; lack of financing for seed enterprises; rudimentary processing facilities; and lack of technical and business skills. Semente Perfeita, Insumos Agricultura, Ikuru Seeds and Lozane Farms all received sponsorship from AGRA, as has Nzara Yapera. One of the biggest domestic companies is Phoenix Seeds, and Nzara Yapera is a rising star. Nzara Yapera contracts small-scale farmers as outgrowers for certified seed. Its founder, Peter Waziweyi, represents small-scale farmers in the Central Region on the Seed Platform.

Over the past 15 years there have been some efforts by government, ICRISAT and NGOs (e.g. CARE, Concern) to support 'semi-formal' local seed production. Seed legislation accommodates 'guaranteed' seed for both improved and local varieties. Guaranteed seed is defined as any seed which was tested for good germination, purity and moisture content in the laboratory (quality declared) but which was not field inspected during the growing period. The Integrated Seed Sector Development (ISSD) programme, established by the Gates Foundation and the Dutch



government, operates in Zambezia province to support small-scale farmer production of certified seed .

Extension services, agro-dealers and transfer of technology

Distribution of seed and related inputs is a major challenge for the expansion of a commercial seed sector. Distribution channels are very similar for both seed and soil fertility from the point of view of the commercial sector. In contrast, in existing farming systems seed and soil fertility inputs are accessed from different places and therefore the access and distribution methodologies will vary.

Extension services and agro-dealers have distinct but somewhat overlapping functions, and there are interventions by Green Revolution practitioners to replace public sector extension services with private enterprise agro-dealers. This limits the role of extension workers to conduits for commercial products and services. Essentially they are both about transferring technical knowledge and resources. Extension workers are meant to offer technical knowledge and support to farmers. There is a long history of top-down extension methodologies, like transfer-of-technology (ToT), where 'experts' from outside develop the technologies under controlled conditions and then bring them to farmers and teach farmers how to use it.

Agro-dealer networks fall very much into this ToT model. Essentially, agro-dealer models are about setting up access points for the delivery of defined technologies, especially improved seed, synthetic fertiliser and pesticides, and to a lesser extent machinery and implements. The agro-dealer model favoured by Green Revolution proponents is also a private enterprise model, where the aim is for the agro-dealer to become a financially self-sustaining business over time.

A related private sector model is the closed extension network, where only users of the commercial product receive support and training in techniques related to the technologies being sold. A similar model applies to participants in donor programmes

who adopt the technologies the programmes are designed to support. In both these cases, a popular model is the 'lead farmer' model, where outside technicians hired by the company or for the project train a set of lead farmers who then share the information in their farming communities or associations, and provide ongoing support especially related to the introduced technologies.

Demo plots are a key methodology, and these are usually run by farmers with extension support. The demos are provided with the necessary inputs to make the demo a success. The idea is that the technologies will spread when neighbours see how well they produce. However, demo plots provided with the full Green Revolution package (sometimes including irrigation) are not a good reflection of actual field conditions for the majority of farmers, who either will not have irrigation, or will not have access to synthetic fertiliser, or who may face numerous other obstacles to realising a perfect production process. The demos therefore may flatter to deceive. The demo plots can also be driven from outside, not by farmers themselves, but by commercial interests that aim to introduce their products to farmers. So the demos may not really be doing experiments driven by farmers' own stated priorities. This is not to say that demo plots have no role, but they should be closer to farmers' democratic associations and driven by the priorities of farmers in their specific localities. Farmers do experiment and are interested in experimentation on their own land, but under their control, since they are the ones who must carry the consequences.

AGRA works both with public sector extension and private agro-dealers. Public sector extension support focuses on production practices, especially on integrated soil fertility management (ISFM) which focuses on grain-legume intercropping. US\$1.51m was granted to the IFDC under the Agro-Dealer Programme (ADP) in PASS to construct an agro-dealer network. The network covers 7 districts in Manica and 6 in Tete, and built on previous work with USAID funding in the Agricultural Input Market Strengthening Programme (AIMS) I and II (2006-2012) to promote private sector investment in modern agro-inputs and



marketing in the Beira and Nacala corridors of Mozambique, and to improve access to these inputs through agro-dealer networks .

A widely recognised problem is that NGOs and donors set up their own agro-dealer networks which are not always adequately trained, and are then left on their own once the project comes to an end. This result is a very unevenly trained set of agro-dealers who are not organised and who are oriented towards looking for paid work.

Soil fertility and synthetic fertiliser

In Mozambique, especially in the Central Region, shifting cultivation, where land lies fallow for a time before being cropped again, is still widely practiced and as a result fertiliser use does not feature much in production practices. Green Revolution proponents have two primary arguments for increasing synthetic fertiliser use. The first is that while farmers practice shifting cultivation at the moment, land will become limited in future. While this is not currently a problem, farmers must prepare for the time when they can't move anymore, and that there is a long-term necessity to use fertiliser . The second is that, in order to increase productivity, certain missing nutrients required for healthy plant production should be supplied. These may not occur naturally in some areas, or otherwise they have been mined out through repeated extraction without replenishment .

Fertiliser use is very low in Mozambique, with an average of only 4.4kg/ha over the period 2002-2009. Currently commercial tobacco (60%) and sugar cane (30%) constitute the bulk of total fertiliser consumption in Mozambique. The standard type of fertiliser used by small-scale farmers is NPK 12:24:12, despite the fact that the blend does not bring much of a yield increase. MASA has recognised the "abusive use of 12:24:12 formulation". The direction of development at this stage is towards prescription blended fertilisers adapted to more localised requirements.

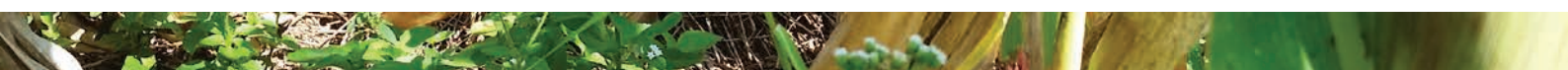
USAID and NAFSN are pushing a strong free market private sector line, including reducing tariffs and taxes for fertiliser imports, and

opening the way for the free flow of fertiliser into the region. The national fertiliser strategy builds on the Abuja Declaration, which set the goal of increasing average fertiliser use across Africa from 8kg/ha to 50kg/ha by 2015. Because use is so low in Mozambique, the strategy is to piggy-back on economies of scale for export into the region with a small amount channelled for use in Mozambique. Otherwise, the private sector is not interested in bringing such small volumes into Mozambique. Therefore ease of re-export is crucial to the whole plan. The Beira port is recognised as a strategic entry point for fertiliser into the region.

The national fertilizer strategy proposed to develop and implement a fertilizer subsidy programme to stimulate demand, with a goal of reaching 200,000 farmers by 2016. A voucher programme for subsidised fertiliser was piloted in 2009-2011 in the central provinces, targeting medium-scale and commercialising farmers. The scheme is still based on the discredited 12:24:12 standard blend.

Imports mainly go through private companies, with tobacco, especially Mozambique Leaf Tobacco Company (MLT), and sugar companies importing their own fertiliser supplies, and constituting about 75-80% of imports between them. Beira and Nacala ports are entry points for fertiliser imports, which come mainly from Middle East, East Asia, Europe and South Africa. An estimated 70% of the imports that go through Mozambique's ports are in transit to Malawi, Zambia and Zimbabwe.

There are two domestic blending factories – MozFert in Manica and Greenbelt in Sofala – using imported raw materials. Greenbelt Fertilisers is a Zambian company that started operations in Mozambique with a factory in Beira in 2011. Greenbelt's initial focus was on commercial farmers (>100 ha) in Mozambique but the large estates import their own fertiliser and there were not enough medium-scale commercial farmers to constitute a market. Greenbelt then decided to turn to demand creation amongst small-scale farmers, starting in the Beira Corridor. Today Greenbelt is part of many large initiatives to provide synthetic fertiliser to small-scale farmers



across Mozambique, and says the share of its production used in Mozambique has risen from 5% to 15%.

Greenbelt has its own system and approach to synthetic fertiliser. At the core is prescription blending of fertilisers to suit specific soil conditions. The first step is to do soil mapping at a district level across the country. This takes the form of a cross section across an area because plots are small and it is not feasible to do tests on every plot. The idea is to map nutrient lacks and then develop a prescribed blend for each area. Greenbelt says while not perfect, it is better to start with accurate district level information on soils and a prescription blend than a uniform blend across the country. The company is opposed to the standard NPK 12:24:12 application and emphasises the micro-nutrients - especially zinc, boron and sulphur - that are not found in these standard blends. The company recognises the importance of organic content and promotes conservation agriculture (CA), defined as no till, permanent cover and intercropping, to ensure organic content in conjunction with micro-dosing (125-185kg/ha, placed rather than broadcast).

AGRA's Soil Health Programme (SHP) is essentially on ISFM, which focuses on grain-legume integration for nitrogen fixing. It also includes micro-dosing of synthetic fertiliser. Top grantees are public and parastatal institutions, with IIAM, the Netherlands Development Organisation (SNV) and ADEM receiving 80% of SHP grants. In Beira, extension workers were trained on demonstration plots and to train farmers in ISFM techniques. These included fertilizer application rates, correct crop spacing, intercropping and rotation of maize and pigeon pea, incorporation of crop residues, and pest and disease management.

Conclusion

Farmers are interested in experimenting with new technologies. Some of the risks and threats as well as any potential benefits of public-farmer partnerships should be raised with farmers. Some basic principles will allow farmer associations to determine whether to adopt a critical engagement or oppositional stance to particular interventions. These

may include active farmer participation and informed consent, public and shared genetic resources, no to privatisation, no to criminalisation of production of non-certified seed or reuse of any seed on the farm, regardless of private claims of ownership, but these should be developed together with farmers and their democratic organisations.

On *seed*, there is a general agreement that variety enhancement or improvement can be of value to farmers, and that it can widen choice. However, at the outset we have to note that the entire orientation of government and Green Revolution interventions in the seed sector is oriented towards the expansion of a commercial seed sector in Mozambique. This is based on the assumption that only private, commercial entities have the capacity and motivation to generate improvements. The farmer-managed system is largely ignored. Within farmer-managed seed systems, the main concern is that public resources are being channelled into supporting Green Revolution improvements and distribution and farmers are being left on the margins to do what they can with the resources available to them.

On plant breeding research and development (R&D), trials and registration there are a number of problems. PVP laws could open the door to the wholesale privatisation of germplasm that is held in the public sphere (CGIAR and public sector institutions) on behalf of society. Privatisation means the transfer of this germplasm that was selected and developed over a long period, mainly through in-field selection and saving by farmers themselves, to private interests who get exclusive rights to use that germplasm or to charge others for its use. It is clear that this is unjust. Once germplasm is put into private hands, it will no longer be available to farmers to use for their own enhancements, thereby diminishing their choices, not expanding them. The orientation to plant breeding focuses on the commercial sector, and breeders' rights trump farmers' rights.

DUS tests are onerous and not appropriate for farmers' needs. These tests are designed specifically to allow private interests to claim a variety as their property. We do not believe the DUS test has any value for the majority



of farmers, for whom the distinctiveness of the variety from other varieties is irrelevant. Uniformity and stability are characteristics of simplified, standardised systems of production and are not appropriate for the complex, dynamic conditions farmers face.

Programmes of technical support, germplasm access and advice driven by farmer priorities and closely linked to democratic farmer organisation should be an explicit and funded part of public sector activities in the seed sector. Farmers do conduct experiments on their own land and the main support required is public access to germplasm they can use to cross with their own varieties, together with technical support from the public sector or other not-for profit ventures. This applies to the many species and varieties that are not of interest to commercial breeders. Farmers may also want to use improvements from protected varieties to bolster their own reserves.

Generally speaking, we should make a distinction between the commercial and the farmer-managed systems. In the commercial system, rules and regulations should apply and be enforced to ensure that farmers receive what is being promised. The aim of regulations governing seed standards should be to ensure farmers are not abused by unscrupulous seed suppliers. At the same time, regulations should not limit the production and distribution of quality seed by farmers even outside this formal framework.

Small-scale farmers can play a role at the level of defining decentralised R&D priorities, breeding and in-situ testing of new varieties, and multiplication and distribution of seed. These activities can apply to both commercial and farmer-managed seed systems.

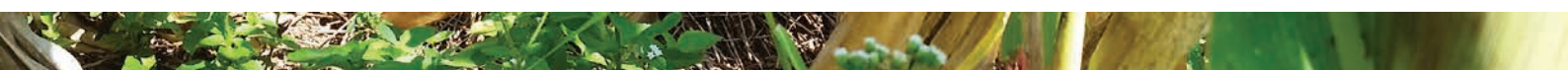
If farmers want to produce certified seed for commercial sale in the market, they will need to follow procedures for that system. However, several issues can be raised with regard to the applicability of certain of those procedures, in particular restrictions on use of protected varieties and NDUS testing on the breeding and R&D side; and certification costs, and unnecessarily restrictive labelling and packaging requirements on the production and storage side. It may be that good or

recommended practice, with technical support to build these practices, could replace inflexible procedures in regard to labelling and packaging. An intermediate system, such as QDS or guaranteed seed, could offer flexibility to farmers who want to produce certified seed for sale on the market.

On **soil fertility**, is synthetic fertiliser necessary? This is an empirical rather than an ideological question, but we need more information and this is expensive to obtain. What nutrients are missing and what nutrients are required for different crops and to ensure soil health? We also need technical capacity to interpret such data even where it is available? In some places farmers indicate they do not need fertiliser because the soil is fertile and yields are good. The counter is that as farmers have to do continuous rather than shifting cultivation, the soil will be mined of nutrients more quickly and hence will require more inputs.

Nutrient mapping can be beneficial because it potentially makes more information available to farmers. But the information must be in the public sector, otherwise it creates an unequal playing field where private businesses have information they can act on that others do not have. Farmers may be able to identify when plants are not performing well as a result of a lack of nutrients, but their knowledge may not necessarily extend to knowing what the causes are. In some cases it may be that the missing nutrients are not locally available.

There is a question of the negative ecological impact of synthetic fertiliser use. Runoff of excess nitrogen is a major problem for waterways and soil life, but this may also be true for overuse of manure which can also cause a build-up of excess nitrogen. A key weakness of the Green Revolution approach to soil fertility is that soil life is not measured or considered. The main focus is on impacts on crop yield. The result is that soil may become an inert carrier of synthetically produced chemicals to feed the plant from one year to the next, not a living system itself. This is not sustainable in the long term. At the very least, we must ensure moisture content and soil life measures (macro and micro fauna and flora, especially earthworms and mycorrhizal fungi) as a central component of soil testing.



Methodologies to bring testing closer to farmers should also be identified and shared with farmers.

The same set of issues as with seed arise on who will benefit most from public sector channelling of resources to support private sector fertiliser products. This is likely to be a thin layer of farmers who are seeking to expand commercial (mostly mono-cropping) operations, and the companies. Alternatives

that can be explored further and supported through public sector programme include farmer experimentation with manure, compost, and CA in its basic form (permanent ground cover, intercropping or crop rotation, no till, without the addition of synthetic fertilisers or pesticides). This can be based on the same public sector extension working with farmers and their associations, introducing a menu of options but not channelling farmers to accept a single, predetermined path.





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