

MARKET SYSTEMS ANALYSIS

MASAP – Market and Seeds Access Project in Zambia and Zimbabwe, first phase: 01.12.2021 – 30.11.2025

Swiss Agency for Development and Cooperation (SDC)

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List of Abbreviations

CA	Conservation Agriculture
CBI	Crop Breeding Institute
COEs	Community Owned Enterprises
COMESA	Common Market for Eastern and Southern Africa
CGIAR	Consultative Group on International Agricultural Research.
DR&SS	Department of Research and Specialist Services
EGS	Early Generation Seeds
FAO	Food and Agriculture Organisation
FGD	Focus Group Discussion
GHG	Green House Gas
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
MASAP	Markets and Seeds Access Project
M&E	Monitoring and Evaluation
MEL	Monitoring, Evaluation and Learning
MSA	Market Systems Analysis
MSD	Market Systems Development
NGO	Non-Governmental Organisation
PAR	Participatory Action Research
PVE	Participatory Varietal Evaluation
PVS	Participatory Variety Selection
QDS	Quality Declared Seed
OPV	Open Pollinated Variety
SACCO	Savings and Credit Cooperative
SADC	Southern African Development Community
SCCI	Seed Control and Certification Institute
SDC	Swiss Agency for Development and Cooperation
SHFs	Smallholder Farmers
UN	United Nations
UNDP	United Nations Development Programme
WTO	World Trade Organisation
VfM	Value for Money
ZAMSEED	Zambia Seed Company
ZARI	Zambia Agriculture Research Institute
ZSPA	Zambia Seed Production Association

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A. EXECUTIVE SUMMARY

A high market potential exists in Zambia and Zimbabwe for small grains (sorghum and millet) and legumes (cowpeas and groundnuts), to improve food security, nutrition, and income, especially for women and youth. Nonetheless, the formal seed sector is focusing on hybrids resulting in unavailability of Early Generation Seed (EGS) for Open Pollinated Varieties (OPVs). As a result, smallholder farmers, particularly women and youth, are lacking access to more diverse, affordable, and adapted seeds that meet their diverse food, nutrition, and income needs. In both countries, requirements for diverse seed varieties, adapted to local conditions (agro-ecological, rain-fed, economic etc.) at community level, are not being met by private seed companies. Open Pollinated Varieties (OPVs) have the advantages of being a cheaper source of seed, can be recycled with little or no yield depression and possess the desirable characteristics of greater yield stability, particularly under semi-arid conditions where most of smallholder farmers (SHFs) grow crops. Large seed companies lack interest in OPVs, and so the small emerging seed companies have entered the market. However, they face various challenges: they have little or no budgets for extension and promotion and they are not visible in the marketplace, because they are crowded out by the hybrid seeds of large companies.

Challenges

The legal framework that currently exists does not incorporate the informal seed systems leading to sidelining of smallholder farmers, who for a long period of time have been collecting, selecting, crossing, testing, multiplying, and storing their seed without formalized quality control. Smallholder farmers' indigenous knowledge system relating to seed varieties is not adequately protected despite the countries' accession to the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) and the WTO TRIPS Agreement and other regional instruments which emphasize the importance/ need of formulation of national policies and legislation to support the activities of smallholder farmers. Current seed laws may hinder farmers from acquiring seeds to the extent that only registered and/or certified seeds may be offered in the market by registered sellers. Formal registration and public marketing of farmers' varieties may be very difficult if requirements are the same as in the formal sector. Registration of farmers' varieties is difficult given the legal requirements regarding DUS/VCU testing and seed certification. Farmer seed enterprises find it difficult to register since the laws require compliance with seed certification standards. The rights of SHFs are not recognized in the current PVP law, resulting in communities not receiving recognition for their innovations.

Along the value chain, key challenges identified in the seed commodity chain include low funding to public research institutions such as ZARI and CBI, affecting breeding and release of new varieties, lack of breeding facilities by small seed houses, and risk of contracting small holder farmers without irrigation infrastructure in seed production or multiplication. Small seed companies and other SMEs processors in the value chains do not have robust business plans, management and governance structures to attract investment for growth. Dominance of large multinationals in the hybrid seed weaken the competitiveness of small seed companies with very small or no marketing budgets. SMEs processors lack appropriate technologies to compete with established companies. Large processing companies prefer to contract large scale and organised groups of farmers with irrigation facilities into seed multiplication, leaving out the marginalised smallholder farmers targeted by MASAP. Financiers do not have adequate knowledge and understanding of these value chains to develop appropriate products.

Smallholder farmers (SHF) are loosely organised and do not have irrigation facilities to support commercial seed production. Hence, the established commercial seed companies shun SHFs for seed production and focus on the large-scale commercial farmers with requisite requirements. Therefore, the SHFs remain excluded and incapacitated. Adoption rates for seeds of improved varieties have remained low amongst SHFs as governments and the seed industry have promoted hybrid breeding and production of staple food maize, ignoring the needs of SHFs to access high quality seed of more diverse agricultural crops to

improve their crop rotation and food security. The existing Community Based Enterprises (COEs) are faced with many constraints which include poor business development & management skills, weak organisational structures, poor governance systems, lack of access to finance & farming inputs and lastly inability to penetrate the market and compete with other companies within similar value chains. Most of these constraints are a result of low financial literacy, poor appreciation of governance and business management ethics and poor member cohesion. Other constraints facing SHFs include low productivity and aggregation, low consumer demand, limited markets, and poor access to markets. All these constraints are a result of several causes which include lack of access to and affordability of quality seed, poor soil and water management practices, high drudgery during processing. However, there are various opportunities for enhanced production which include the high nutritional values of these crops compared to the common crops on the market, adaptability of the crops to climate change, a local market that is currently importing groundnuts. To ease the post-harvest processing drudgery, there are processing technologies that have already been developed, and others could be adapted for the target crops.

Proposed solutions

The MASAP intervention strategy strives to develop commercial oriented, purpose driven partnerships that deliver a meaningful inclusive impact to the SHFs engaged in the three MASAP value chains. Through Community engagement, strategically positioned and competitive COEs on the small grains, cowpea and groundnut seed and commodity markets will be strengthened ensuring increased utilisation of improved and diverse seed varieties of small grains and legumes contributing to resilient livelihoods of smallholder farmers in Zimbabwe and Zambia especially women and youth.

MASAP's focus on creation of new COEs, strengthening and revamping the already existing ones will help increase adoption and utilisation of the small grain and legume seeds and commodities. The project will not create new structures but will work within the already existing community and government structures, creating dialogue with relevant stakeholders for the strengthening of and sustainability of the existing structures. COEs will form the required infrastructure for the increased and improved production and utilisation of small grains and legumes (cowpea and groundnuts) as they have a greater bargaining voice and aggregation muscle. MASAP in partnership with intervention partners from the private and public sectors will work with COEs in sustainable OPV seed production and multiplication initiatives resulting in affordable access to seed by small holder farmers. Soil improvement and management initiatives will be promoted including soil testing and soil correction measures. Farmer field schools will be initiated where most of the interventions will be demonstrated for future uptake by the seed producers and surrounding communities.

MASAP through private sector engagement intends to develop interventions that invest into pro-poor innovative business models that aggregate demand and supply and drive down transaction costs and, this progress is expected to change the agricultural seed and commodity markets effectively and sustainably. The project proposes the following.

- Provision of technical assistance and catalytic funding- mobilise and support private sector involvement and provide catalytic funding, facilitate PPPs, as well as partnerships confirmed by concrete contracts.
- Innovation grants- Facilitating design of innovative technologies for production and value addition which will be adopted by farmer groups and other small-scale value chain actors (mainly women and youth), incentivised through the awarding of small-scale innovation grants.
- Development of inclusive business models through direct engagements with private sector value chain actors to improve their outreach and strengthen their business planning, focusing on those with a potential for scaling up or out during the subsequent phases of the project.

- Facilitating concrete contract arrangements between farmers and seed houses/ off-takers, mobilise farmer groups and associations, and promote stakeholder engagement, including the food processing sector and commodity buyers
- Engage with financial institutions to design appropriate products for all value chain actors

Despite significant constraining political, economic and social factors, Zambia and Zimbabwe have seen an encouraging but slow shift in the approach of commercial input and output markets towards the smallholder sector. Traditional views that smallholders lacked buying power, required credit to function, have a poor credit culture and are an unreliable supply base, and have been given way to a positive realisation that engaging smallholders can be commercially viable and represents a major long term growth opportunity. These factors all represent a coincidence of opportunities to facilitate more constructive and commercial relationships between commercial and smallholder markets. It is into this environment, in which the foundations of inclusive market development will be largely set, that MASAP will operate to make markets system development work for the smallholder farmers.

In the view of creating an enabling environment in the development of the MASAP value chains, the following policy and action research areas of intervention are proposed;

- **A standalone seed policy:** There is need to increase advocacy to push for the drafting and adoption of a separate standalone national seed policy that is comprehensive and addresses the interests of all key stakeholders. Such a policy should aim at promoting both formal and informal seed systems. This should involve a consultative process involving a broader range of stakeholders, including on-going processes such as by ACB through the SKI project.
- **Farmer varieties registration system:** This would entail development and adoption of a legislative framework that allows for registration of farmers varieties and the integration of the formal and informal seed systems. Ultimately this would lead to an increase in the use of farmers' varieties and increased access by smallholder farmers to seeds of their locally preferred varieties. This would build upon efforts currently being undertaken to develop the farmer varieties registration system in Zambia being spearheaded by the Community Technology Development Trust, Zambia (CTDT-Zambia).
- **Capacity building among smallholder farmers:** This would include enhancing the capacity of smallholder farmers to conserve seed of their local landraces in community genebanks and multiply it to make it more accessible. Additionally, MASAP will enhance the capacity of smallholder farmer groups and organisations to enable their effective participation in policy reform processes. An organized and strong farmer movement is necessary to facilitate more effective farmer consultations and engagement.
- **National efforts to realise farmers' rights:** The realization of farmers' rights and its impact on the conservation of local crop genetic diversity could be achieved by bringing the Protection of Traditional Knowledge, Genetic Resources, and the expression of folklore Act of 2016 into effect. This could also be used to implement the provision of Article 8 (j) under the CBD.
- **Review of PVP legislation:** Review the current PVP legislation with a view of making amendments that take into account the interests of both Breeder's and Farmers' rights
- **Awareness raising and promoting the resilience and nutritional/health benefits of small grains and legumes:** Taking advantage of national and global developments related to small grains in order to highlight and bolster the importance of small grains and legumes.
- **Innovations into smallholder seed production practices, and commodity production:** These may include participatory plant breeding and selections as well as multiplication of farmers' landraces; integrated soil fertility management incorporating livestock manure, compost, agroforestry practices and other strategies; water harvesting and conservation techniques; integrated pest and disease

management and control practices with the aim of reducing the use of potentially harmful agrochemicals during production and storage and other postharvest stages of the grains and legumes; climate-smart storage and packaging practices; innovations in local level product development and marketing at various levels.

- **Capacity development among relevant institutions including greater networking:** To strengthen their action research role and exploration of development of adapted farmer varieties through capacity development of the identified institutions. Participatory evaluation of existing hybrids and OPVs with communities and other end users will generate information and evidence to guide acceptance and uptake. Innovations for greater collaboration and cross-sharing and learning will be facilitated among the players to leverage on the limited resources and to increase the reach by MASAP.
- **Evaluation of the socio-economic benefits and trade-offs arising from the interventions:** For a more comprehensive picture of the intended and unintended synergies and benefits, as well as potential negative impacts of the MASAP interventions, sustainability assessments and evaluations will be conducted to generate objective data and evidence that quantify the immediate, intermediate and long-term impacts. Trade-offs may arise from competition for crop residues between soil and livestock, greenhouse gas emissions from certain soil fertility management techniques, overgrazing and soil degradation due to potential increase in livestock production to meet manure needs, loss of jobs arising from mechanization, and other possible causes.

B. POTENTIAL FOR SIZEABLE AND SUSTAINABLE PRO-POOR CHANGE

In this section, the current position of the three components of MASAP are discussed regarding their overall relevance to the poor. In other words, how the components are contributing to improving Markets and Seed/commodity access of legume and small grains.

1. The role of Community Seed/commodity production in Poverty reduction

Zambia and Zimbabwe's economically active population of about 68% -70% are engaged in smallholder agriculture (UNDP, 2019) and have a potential to meet the demand for poverty reduction through the cultivation of the small grains and legumes once community owned enterprises/Associations are revamped or established. Zambia and Zimbabwe, like most developing countries, is facing serious challenges in its efforts to reduce poverty. Small holder farmers have been in agriculture production from time immemorial as the mainstay of household survival and for national economic development. In Zimbabwe seventy percent of the national agricultural breadbasket lay with the small holder farmers with however agriculture in general contributing 9.9% to the national GDP between 2012 and 2012 (Zimstats, 2019). However, the deteriorating economy, climate change effects and poor agricultural practices have led to a downturn to the productivity of the small holder farmers both in Zambia and Zimbabwe. Arable land in both Zambia and Zimbabwe has been abandoned due to the unaffordability of agricultural inputs, leaving farmers with no option but to reduce land under production.

MASAP has recognised the many challenges faced by small holder farmers which have led to reduced productivity, therefore seek to play a facilitatory role in enhancing access to affordable improved OPV seed, capacity enhancement of the communities through innovative extension, technological and group governance support and information dissemination. Reliable market access is also critical. Market failures are stemming from several factors ranging from too low amounts of basic seed of improved varieties to, poor commodity aggregation at community level, low consumer demand due to low preferences especially of small grains, poor access to market information on demand and commodity prices.

The potential for yield improvement in small holder production leveraging on the small holder strengths, promoting Open Pollinated Varieties (OPV) seed development and commodity enhancement within the communities is very high in achieving poverty reduction. The Promotion of small grain and legume OPV seed considering climate change adaptation and leveraging on the knowledge, experience and interest inherent within the small holder farmers where varieties to be developed are based on farmer interests, already existing varieties and preferences exhibit a high potential to boost production of these crops. Improved crop varieties and adoption of agroecological practices supported by improved and privatized agricultural extension will result in increased yields and potentially opening of abandoned lands, thereby also increasing land under production. Adoption of agroecological practices will result in soil nutrition improvement translating to reduced external input requirement leading to farm profitability. Small grains (sorghum and millet) and legumes (cowpea and groundnuts) constitute a central component of the households' nutritious diet and play an important role in the diets of children and reproductive mothers and in diets of people living with non-communicable diseases such as diabetes and hypertension. Nutrition extension support, cooking demonstrations and nutrition information dissemination will enhance household dietary diversity as households take up more small grains in their agriculture portfolio and in the household, diets thereby reducing child malnutrition and stunting and improving production of small grains and legumes.

Groundnut has already been noted as a household income earner for Mudzi and Chipata farmers (MASAP baseline study, 2021). Through Market linkages, groundnut producers can be supported to produce the

market preferred groundnut varieties which will then have a ready market, hence ensuring a ready income for the seed producers and commodity producers as well. Aflatoxin contamination remains the major concern which has resulted in health issues and poor market growth for local produce turning the local manufacturing market to imports. MASAP will undertake action research to determine the best control methods of the causal agent *Aspergillus flavus* (a soil borne fungus) to ensure that it is kept in check hence improve the hygiene and quality of the locally produced groundnut, thereby improving on local marketability and ultimately penetrate regional and international markets. Farmers will also be capacitated on aflatoxin testing at farm level to ensure that all groundnuts sent out to the market are within acceptable aflatoxin levels.

Despite there being a history of failure in performance of cooperatives in Zimbabwe and Zambia, the SACCO (Savings and Credit Cooperative) concept has been identified to be successful in Tsholotsho (Zimbabwe) and some cooperatives have been successful in Zambia. The project expects to leverage on the SACCO and cooperatives & farmer organisations' successes in the districts to develop and strengthen Community Owned Enterprises (COEs) and Associations. The effective and sustainable COEs will provide an opportunity to not only strengthen the capacity of small holder farmers, but also help reduce poverty. The COE will enhance the voice of the small holder farmers as there is bargaining power in numbers. This will enhance production potential as each farmer within the COE becomes each brother's keeper. Procurement of inputs and marketing of produce will be done collectively which gives the communities a greater bargaining power (for input procurement and for better pricing of produce on the offtake market).

1. Role of Private sector engagement in Poverty reduction

The private sector players are very important to achieving and contributing to sustainable poverty reduction in Zambia and Zimbabwe. The reasons behind the persistent high levels of rural poverty are a complex mix of socio-economic, historical and political factors. Information asymmetry, lack of trust, and misaligned private sector business models are some of the causes why the private sector and small holder farmers have struggled to engage commercially. Within the context of Markets Systems Development (MSD) and recognising that rural farming households depend on markets as both consumers and producers, the private sector plays a critical role in providing markets that generate and helps secure incomes and access to goods and services for the poor, therefore providing a potential pathway out of poverty. The private sector provides inputs markets for quality seeds, and other inputs that are needed to improve production and productivity by the small holder farmers, however access by smallholder farmers to these markets are constrained by several factors such as long distances to the markets, affordability, and lack of information. Further, the private sector plays an important role as offtake markets where the smallholder producers will be able to sell their produce and generate income. However, smallholder access to these markets is constrained in many cases by poor product quality, lack of consistent supply, distance from the markets, and mistrust.

The MASAP role will be to facilitate and strengthen commercial linkages between the poor producers and link them to willing private sector partners. MASAP, through the private sector engagement component will identify willing private sector partners and co-create business models that are aligned to the small holder farming systems, and that will help to reduce poverty through provision of markets, developing mutually beneficially contract farming schemes, as well as creating employment opportunities along the value chains.

At the risk of over-simplifying a complex matter, many of the reasons for continued poor smallholder productivity levels are related to failures of agricultural markets to satisfy their needs. Until recently, Zambia and Zimbabwe's robust private sector agricultural seed markets focused mainly on the commercial farming sector, thereby largely excluding smallholder farmers from critical sources of productivity-enhancing information and technologies.

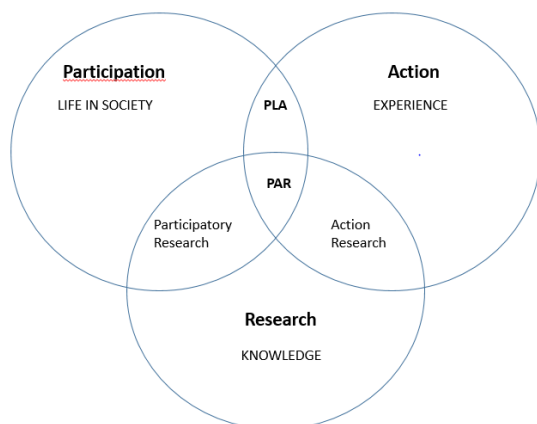
Besides providing markets (inputs, output, and financial services) to the poor, the private sector has potential to leverage their resources to help the poor out of poverty especially where the conventional financial services providers are willing to design pro poor financial products. This can be done mainly through contract farming models that give smallholder farmers access to quality agricultural inputs, guaranteed markets, and extension services that increase farmer knowledge. Despite the potential of contract farming arrangements to leverage resources towards smallholder farmers, the contract farming schemes have not been used to their maximum potential due to mistrust between and among the contracting partners, with smallholder farmers often being accused of side marketing, while the contracting companies are accused of giving farmers raw deals in terms of pricing, repayments, and quality requirements. With high levels of unemployment in both countries, private sector engagement and growth has the potential to create employment opportunities in the selected value chains at different nodes. The potential to establish dealer networks or branches, or aggregation points by the private sector in the rural areas provide opportunities to create off farm labour for the rural poor. The increased demand for inputs such as seed and other inputs, as well as expanding processing capacity of agro processors also presents opportunities to employ additional labour. The anticipated increase in the number of private sector firms entering/expanding the processing of small grain and legume commodities and products will provide additional employment opportunities in the value chains. The anticipated increase in the number of farmers engaged by seed companies in seed growing/multiplication is an opportunity for creating on farm employment and considering the prices of seed is much higher than staple crops, contracting smallholder farmers in seed production will increase their incomes considerably.

2. Role of Action Research in poverty reduction

In Zambia and Zimbabwe, like in many other countries, the role of agricultural and related research in poverty reduction has not been optimally explored despite the significant roles that research institutions and their actors play. The prime role for research institutions and players in poverty reduction among smallholder households is to generate crucial agronomic, socio- and economic data and information in a sound manner and availing this to stakeholders across the value chains for their planning, decision taking and advocacy. By analysing the performance of and opportunities in formal and informal agricultural value chains, including of small grains and legumes, and evaluating the impacts of various regulations, legislations, policies / Acts / Laws and cultural norms and values, the research actors can help to spur change that enables economic empowerment of youth and women, as well as the poor communities in society. Moreover, by engaging in Participatory Action Research, the research institutions have the potential for building the capacities of communities in undertaking their own research to develop practical solutions which are contextual for their needs and situations. Women and youth can potentially participate in farmer research groups and champion the inclusion into social and field research of views from vulnerable groups such as the elderly, children, youth, and women in society. Additionally, the research institutions can also work directly with mainstream and social media channels and platforms to share their findings and develop messages which the media can take to the public in a way that is more consumable and relatable by the public.

MASAP emphasizes Action Research as an integral component to the co-generation of information and evidence, and co-creation of knowledge, related to the selected small grains and legumes seeds and commodities. The Action Research also assures co-learning and evidence-based practice, planning, decisions and policy reforms among actors along the small grains and legumes seed and commodity value chains. The term Action Research is also referred to as Participatory Action Research (PAR), community-based study, co-operative enquiry, action science and action learning as depicted on Figure 1.

Figure 1: The PAR as an interaction among participation, action and research

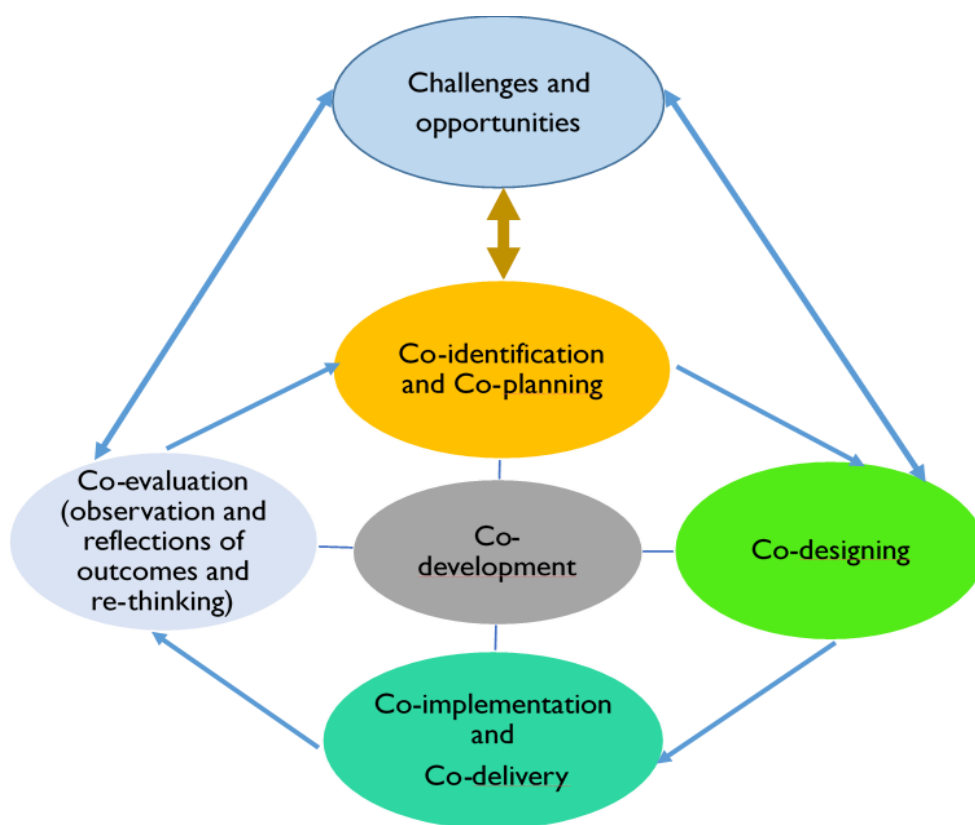


PAR entails creation of knowledge through action at the area where the knowledge is to be applied, such knowledge can be geared towards problem solving through finding suitable practical solutions to identified bottlenecks. It is also embedded within context specificity and situation-based and involves participation and collaboration among individuals who share and aim for a common objective and purpose.

Joint development of reflection points based on interpretations made by the action research participants, with potential for action research findings to be dynamic in response to any changes happening to or within the affected communities or groups makes PAR suitable for addressing hurdles faced by smallholder farmers. Figure 2 demonstrates a spiral model to action research, meaning that new knowledge or solutions are generated continuously to address further or emerging needs and/or challenges faced during interventions.

There are several models to the concept of action research, an overview depiction to the model, steps and process is provided on Figure 2, below.

Figure 2: Depiction of the spiral / cyclical nature of Participatory Action Research



Within this context, MASAP will apply PAR in helping the small grains and legumes value chain actors to address pertinent challenges at all levels of the value chains. The PAR will empower the target groups or communities to engage in activities and actions that are geared towards solving their contextual problems and bottlenecks and hence change the situation for them and for the communities at large. To complement the evidence from its action research, MASAP will also draw information from formal existing research findings to draw on the nutritional value and health benefits of small grains and legumes based on their diversity.

3. A pro-poor focus in Community Seed/commodity production

The Zimbabwean and Zambian seed industry has been dominated by large scale commercial seed producers focusing on hybrid seed crops which are unaffordable to the small-scale farmer. In the past 10 years some small to medium seed companies have emerged, promoting legume seed production and OPV cereal production. However, access to early generation seed (EGS), has been limited for these emerging companies due to high breeding costs and dependence on public research institutions and CGIAR centres. With the large commercial seed companies, there has been minimal to zero consideration of farmer preferred seed but major focus on profitable seed production. MASAP realises the potential of focusing on developing the small holder farmer into a seed producer of renown through the COEs. Seed production will also be driven by farmer choices and preferences considering climate change adaptation and also palatability of the commodities. Historically seed production was a preserve of large-scale commercial farmers with irrigation facilities, however small-scale farmers have historically undertaken unnoticed and undocumented participatory varietal selection (PVS) and participatory varietal evaluation (PVE). This experience is critical to develop a business minded small holder farmer who will develop multiple value chains from the seed production initiative ensuring access, availability and affordability of OPV seed to all small holder farmers who are currently feeling the heat of climate change as droughts and prolonged dry spells have become the norm in Zimbabwe and Zambia.

MASAP through the COEs will advocate for harmonised seed laws that take into perspective interests and perspectives of small holder farmers including the development of farmer managed seed systems. The MASAP will engage the government at policy level for the adoption and operationalisation of the SADC and COMESA harmonised seed laws in respect of development of standardised seed descriptors that consider the open pollinated varieties which are most common in the farmer managed seed systems

Furthermore, knowledge services for farmers are critical for enhancing productivity. Thus, the public sector provides the bulk of the extension services however with some private sector extension being done by seed and fertiliser companies and NGOs. Limitations have been noted in the public extension sector since the 1990s, where the performance of extension weakened with increasing fiscal constraints whilst services covered too wide an area and range of activities amidst poor linkages with research. It is critical work to support public extension to ensure effective information dissemination to the grassroots farmer offering the best, up to date information (good agricultural practices, current evidence based innovative technologies that are climate smart). The farmer field school model has been used to facilitate and enhance extension and promotion of technologies.

Zimbabwean policies inclusive of agricultural and seed production and marketing policies, have had little or no focus on the small holder farmer. The Zimbabwean seed laws have mainly focused on commercial seed production focusing on distinctiveness, uniformity and stability which is typical of hybrid seed. The OPV seed with a wider genetic base which makes them adaptable and tolerant to the changing climate have not been considered. These OPV crops have seen the small holder farmer survive several drought years through selection and advancement.

4. A Pro-poor focus in private sector engagement

Despite significant constraining political, economic and social factors, Zambia and Zimbabwe have seen an encouraging but slow shift in the approach of commercial input and output markets towards the smallholder sector. Traditional views that smallholders lacked buying power, required credit to function, have a poor credit culture and are an unreliable supply base, and have been given way to a positive realisation that engaging smallholders can be commercially viable and represents a major long term growth opportunity. The MASAP intend to invest into pro-poor innovative business models that aggregate demand and supply and drive down transaction costs and, this progress will effectively and sustainably can positively changes in the agricultural seed and commodity markets. This process will be assisted by the fact that wider national economic development is stimulating domestic demand in OPV seed. Coupled with this process and largely because of it, there will be also a growing group of smallholders adopting a more commercial attitude to their farming, becoming more sophisticated consumers of OPV seed and more market savvy seed suppliers.

MASAP aims to work with government to demonstrate the ability of the private sector to provide pro-poor services. Though this demonstration process, MASAP hopes to encourage further liberalisation and market friendly policy development. To do this, MASAP requires raising the consciousness of the private sector to understand their individual and collective self-interests in advocating for a more transparent and effective policy environment, and in using evidence-based tools to drive towards that objective. It is only when the private sector sees the value of co-operating to push for transparency and uniformity in enforcement of laws and regulation that Government will see its own self-interest in changing its approach.

While the major agricultural policies do not encourage or facilitate private sector engagement with smallholders, there are signs that this situation will change. The election and establishment of a new government in Zambia and the upcoming election in Zimbabwe is coinciding with the inception of MASAP provides a unique opportunity to help shape the policy environment in the coming years.

These factors all represent a coincidence of opportunities to facilitate more constructive and commercial relationships between commercial and smallholder markets. It is into this environment, in which the foundations of inclusive market development have largely been set, that MASAP will operate to make agricultural markets work for the poor.

5. A Pro-poor focus in action research

In Zimbabwe and Zambia, the national Departments of Agricultural Research are mandated to conduct research on agriculture and related topics to inform special services offered to the sector.

Zambia

The Zambia Agriculture Research Institute (ZARI) is a department in the Ministry of Agriculture and Livestock (MAL) with 10 research stations. ZARI's mission is to contribute to the welfare of the Zambian people through the provision of appropriate technologies and knowledge that increase agricultural productivity and diversity, enhance household food security and equitable income-generating opportunities for sustainability of the farming community and agricultural enterprises while ensuring the maintenance of the natural resource base.

Zimbabwe:

The Zimbabwe Department of Research and Specialist Services (DR&SS) has the vision to provide research-based technologies, knowledge and information to facilitate a sustainable and viable agricultural

sector. According to the Department's website¹), the major mandate is to provide research-based technologies, technical information for advisory services and products for supporting enhanced agricultural productivity and the production of various crops and livestock.

Both Zambian and Zimbabwean Government foresee the importance of small grains as a coping strategy for climate change adaptation and mitigation. The Government of Zimbabwe is developing a strategic document for traditional grains and has over the years been consciously promoting and urging farmers in marginal arid and semi-arid areas to take up small grain such as millets and sorghum as a coping mechanism to climate change. UN agencies such as FAO and UNDP, the CGIAR Centres and a number of NGOs are encouraging farmers to increase the production of these crops which help to reduce their vulnerability to food insecurity and offer nutritious options for healthier diets. The promotion initiatives for small grains have not been matched with adequate extension and advisory support services from the governments. One contributing factor is that government funding towards extension services, in general, is low and that past focus has emphasized on maize at the expenses of small grains.

The wider promotion of small grains and legumes requires action research to provide supporting objective evidence and solutions to some of the limiting factors associated with these crops. Action research has been applied in various semi-arid regions to engage communities, focussing as well on the vulnerable groups, like women and female headed households, in society. In Zimbabwe, the use, by ICRISAT, of participatory variety selection to understand sweet sorghum cropping systems and trait preferences by farmers in Nkayi District, Matabeleland North Province ranked maize > sorghum > cowpeas > pearl millet > groundnuts. That study revealed that, among the sorghum varieties grown by farmers in the district, only two improved varieties (white grained SV-1 and red grained DC75) were common among farmers. The farmers considered drought tolerance, pest resistance (especially bird resistance), diseases resistance and early maturity as key traits in choosing sweet sorghum varieties. It emerged from this study that varieties such as Seredo which exhibit water stress tolerance during the vegetative stage, are red grained hence bird resistant and with multiple grain uses like thick porridge making and brewing, were more favourable. ICRISAT estimates that smallholder farmers get 10 % of their seed from formal systems (agro-dealers, government, NGOs) while the remaining 90 % is through informal means (own-savings, farmer to farmer exchange and local markets or other local systems)². However, there is potential for smallholder farmer investment into improved seeds as reflected for example through the Tropical Legumes project (2007 – 2014). This project was designed to help the smallholder farmers to overcome constraints (drought, pests, diseases and lack of improved seed varieties) by ICRISAT in 15 sub-Saharan Africa (SSA) countries (Burkina Faso, Ghana, Mali, Niger, Nigeria, Senegal, Ethiopia, Kenya, Malawi, Mozambique, Tanzania, Uganda and Zimbabwe, and India and Bangladesh in South Asia) helped to increase seed production significantly by 221 % (from 139,048 to 446,359 tons) through enhanced skills and knowledge of seed value chain actors as well as promotion of various innovative approaches, such as small seed packs, seed loans and decentralized production schemes. Improved varieties were adopted on at least 2 million hectares through the project, with good financial returns on the investments.

These above and other successful cases provide good examples to MASAP to learn from regarding co-designing and co-developing technologies which suit the smallholder farmers' needs. The key PAR and techniques demonstrated in past or ongoing initiatives which MASAP can consider for the target crops are summarized as follows:

¹ (<http://www.drss.gov.zw/index.php/typography/manpower-planning-and-institutional-development>

² <https://www.icrisat.org/seed-systems-models-lessons-learned>

- a) Innovations to refining community level seed banks and Seed Fairs as already promoted in both Zambia and Zimbabwe in addition to formal seed systems as a strategy to increase availability of quality and affordable seed in timely manner
- b) A systems approach to evidence-based small grains and legume seed and commodity production within a climate change adaptation and mitigation framework. The farming systems approach embraces the farm as an entity and considers what else grows with the small grains and legumes on smallholder farms, e.g. roots and tubers, other grains and other legumes, traditional and non-traditional vegetables, indigenous fruits, small and large livestock. Developments on the target small grains and legumes seed and commodity could explore how these secondary value chains, which play important roles to households, can be enhanced and contribute to food and income sources diversification for the benefit of MASAP households. Crop-livestock relationships, both positive and negative, would need to be addressed through innovative win-win synergies. Enhancing the synergies between crop and livestock (manure use and fodder provision) and minimizing trade-offs such as competition for crop residues (soil covers, mulches versus grazing by livestock and use as fuel sources and construction) need to be tackled.
- c) Testing and demonstrating innovative techniques which are sensitive to soil fertility / soil health, human health and climate change in the seed and commodity crops – these can include:
 - Water harvesting and conserving / saving techniques
 - Application of the principles of conservation agriculture (CA) and organic agriculture. On a large scale though, CA can lead to increased use of herbicides. Alternatives to weed control need to be explored to reduce potential environmental contamination.
 - Using soil cover crops, integrating agroforestry for fodder and soil fertility improvement
 - Using organic resources as fertilizers, e.g. green manures (sunhemp, velvet beans, and others); integration of legumes as intercrops, e.g. pigeon pea in between maize crops; composting from crop/plant residues, animal manure and non-contaminated industrial waste (e.g. from breweries); strategic management and application of animal manure in a way that is compatible with environmental protection (reduce the chances of greenhouse gas emissions from the manure); use of effective micro-organisms (Vessey, 2003; Adedeji et al., 2020); and other techniques. As biomass is often limited in semi-arid regions, deliberate production in fields using annual and perennial crops, and rearing of livestock, can help to assure a steady supply. Zambia has a long history of research on agroforestry. The ORM4Soil project in Zambia (including Chipata) showed that alley cropping with tephrosia, sunhemp and cowpeas reduced the need for synthetic fertilizers without compromising yields from the current normal practices by smallholder farmers (Kalala et. al, 2020; Kalala et al., 2022). Alley cropping using Gliricidia trees in maize – cotton – sorghum systems increased the effectiveness of applied fertilizers leading to yield increases of up to 150 %. Multipurpose trees and shrubs in fields and farms where small grains and legumes are produced provide the much-needed fodder besides fixing nitrogen and providing shade.
 - Reducing the use of synthetic fertilizers can help to reduce greenhouse gas (GHG) emissions. Nitrogen, the most limiting nutrient in crop production, can lead to significant GHG emissions through nitrous oxide (N₂O) production whose global warming potential is about 300 times higher than carbon dioxide. The N₂O, is said to remain in

the atmosphere for over 100 years and depletes the ozone layer according to the UK Country Land and Business Association (CLA). Striking a good balance between the crop demands for N and the reduction of possible environmental impacts of N-based fertilizers is important. The use of slow-release sources, such as manure and other organic sources, while ensuring a good synchrony between mineralisation and availability of the nitrogen nutrient and crop demand is crucial for MASAP.

- Integration of plant health management approaches that take into consideration the health and safety of humans, the soil, environment, and animals - MASAP will explore the use of biopesticides; biological control methods; plant mixes / patterns which promote the availability of natural enemies to pests and natural repellents – e.g. the Push-Pull Technology; direct physical control of pests, and other strategies. Research and innovations into postharvest protection of the seed and commodity in MASAP could include: vacuum packaging (e.g. using hermetic sealable bags) and modified atmospheres; di-atomaceous clays as grain protectants; metallic silos; traditional grain protectants; and other strategies. Hutano Foods, for example, has established some silos in Mudzi to facilitate aggregation of the sorghum seed / commodity crops from smallholder farmers. In organic management, farmers often use innovative seed coatings such as garlic-turmeric powders, oils, and microorganisms like pseudomonas species and trichoderma species to protect seed. However, some of these microorganisms may require approval for their use.

- d) Value addition, processing and preservation, product development, and food preparation in view of the needs by different markets, consumer and users.

The Seed System in Zambia and Government policy analysis

Zambia is generally considered to have one of the most developed seed sectors in the Southern African Development Community (SADC) and the African region at large. The sector has evolved over the years from one that was focused on supporting the formal seed system aimed at producing and supplying seed of a few high value crops for large commercial farmers to the current seed system that promotes the production and supply of seed of a broader range of crops to supply to all categories of farmers – smallholder farmers who may produce both for subsistence and cash, medium and large commercial farmers, who mainly produce cash crops.

The seed sector in Zambia has over the years been influenced by policy changes in the agricultural sector, which in turn has been influenced by changes in the economic policies. One of the major national economic policies that impacted the agricultural policies was the shift from state control to market liberalization in the mid-1990s. The changes in the agricultural policies affected the seed industry in several ways, including the proliferation of seed companies and moving from a system that only promoted the formal seed system to one that sought to recognize and promote the informal seed system.

However, the seed sector in Zambia, has been dominated by maize hybrid seed in line with the agricultural policy that promoted the production of maize as a commercial and food security crop. As a result of this policy direction, the use of certified seed, of hybrid maize varieties, has been on the increase among smallholder farmers. The main objective was to increase maize productivity and production to have enough staple food supplies to feed the growing urban population. The formal seed system has however neglected most of the crops traditionally cultivated by smallholder farmers such as small grains (sorghum & millets) and legumes (groundnuts and cowpea). Smallholder farmers in Zambia predominantly rely on seed of local varieties saved from previous harvest and exchanged amongst themselves.

These policy changes also impacted the seed laws (Agriculture (Seeds) Act No. 14 of 1967), which provided for regulations for the release of varieties, seed certification and quality control, seed distribution and marketing within the country, and seed exports and imports. The Act allowed only public sector participation and promoted a controlled seed supply system, in which crop varieties/hybrids developed by the public agriculture research were taken up for production and distribution through a monopoly seed company. Initially the National Agricultural Marketing Board (NAMBOARD) and later the Zambia Seed Company (ZAMSEED), both being quasi-government companies, contracted the Zambia Seed Producers Association (ZSPA) to produce seed under a guaranteed market and price arrangement. Coupled with subsidies and provision of credit the industry successfully managed to ensure the provision of seed mainly of maize to farmers. The seed industry however failed to make available seeds of traditional crops, which were grown by smallholder farmers in the country mainly to meet their subsistence needs.

The monopolistic and controlled seed production and marketing system changed in 1991 following economic reforms that led to the introduction and implementation of structural adjustment programme (SAP). The major change in the agricultural sector was the liberalization of the agricultural marketing for inputs and produce, and the encouragement of private sector participation in the economy. This also led to the review and amendments to the seed law in 1994 and 1995 (Plant Varieties and Seeds Act No.13 of 1994 and No. 21 of 1995). Additional key features of this amended Act included provisions to increase private sector participation in seed quality control by way of licensing seed companies to perform this function by Seed Control and Certification Institute (SCCI). It also led to the introduction of minimum standards for Quality Declared Seed (QDS). There are ongoing processes to amend the seed regulations to conform to the COMESA and SADC Seed harmonization regulations. Another development was the enactment of the investment Act, which provided for private investment and tax incentives for new investment. This stimulated entry of other seed companies into Zambia.

Other changes that have occurred since 1991 include the move by SCCI to license private seed companies to undertake seed inspection, seed sampling and seed testing. Furthermore, there has been a move to encourage private sector participation in crop research as evidenced by the formation of the Golden Valley Agricultural Research Trust.

Most of the seed companies concentrated on maize, leaving most of the traditional crops unattended to, which resulted in shortage of seed of such crops. Such seeds have mainly been supplied through the informal seed system. Results of studies undertaken in Zambia relating to seed production and supply situation have indicated the significance of the informal seed system being a major source of seed for smallholder farmers and rural farming communities in general. This is especially so for crops that are important for food and nutrition security such as groundnut, cowpea, common beans, rice and sorghum. Some studies conducted in recent years estimate that seed sourced through informal sources is planted to over 80% of area planted to groundnuts and common beans in Eastern and Northern Province.

Non-Governmental Organisations (NGOs) have played an important role in supporting and promoting seed production and distribution at community level, complimenting seed companies and seen to be critical in filling in the gaps left by the formal seed system particularly in outlying areas. These NGO-led initiatives and programmes tended to prioritise the production and supply of seed for crops traditionally cultivated by smallholder farmers and important for household food security. The NGOs involved in the informal seed sector in rural areas included, i) Programme Against Malnutrition (PAM); ii) Africare; iii) Care International; iv) Lutheran World Federation (LWF) and; v) World Vision International.

Zambia has been a party to the Convention on Biological Diversity (CBD) and the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) since 1992 and 2004 respectively. Some of

the provisions of these international instruments were meant to benefit smallholder farmers and communities. With regard to the ITPGRFA, the Articles of particular interest and relevance are 4, 5, 6 and 9, which call governments to take policy, legal and administrative measures to support the conservation and development of local crop diversity, sustainable use and improvement of smallholder farmers' access to good quality and affordable seed of a broad range of locally adapted crop varieties. Article 9 on Farmers Rights is particularly significant as it calls for the recognition of the important role farmers have and continue to play in supporting the seed value chains, including the need to provide farmers their right to save, exchange and sell their on-farm saved seed. This also implies that farmers are supported to participate in the seed enterprises and integration of the informal and the formal seed systems. Such interventions are expected to lead to the promotion of local seed systems that enhances farmers' access to a broad range of crop diversity and to support their on-farm efforts for the conservation of crop diversity, including farmers' varieties. However, Zambia as a Contracting Party to the ITPGRFA, has so far made limited progress in domesticating the Treaty, in particular implementing measures to promote the realization of Farmers' Rights.

The seed industry in Zambia continues to grow both in terms of the seed types commercially available, the number of seed companies involved, including the emergency of small indigenous and local seed companies and increase in seed volumes exported and imported. Zambia's seed market share within both SADC and COMESA regions has been growing. There is also increased private sector participation in research for the development of improved varieties. Some of these seed companies, such as ZAMSEED, SEEDCO and Syngenta/MRI, have since established in-country crop research programmes that have led to the development and release of new varieties/hybrids, especially for maize. Limited quantities of seeds of soybean, rice, common beans, sunflower, and groundnuts are produced and marketed by some seed companies. Some of seed is of these crops is imported from other countries for distribution and marketing in Zambia. Some seed companies also export seed produced in Zambia to other countries.

Following the liberalization policies crop varieties developed by ZARI are no longer only available to ZAMSEED but accessible to any other seed company or entity through a licensing and commercialization scheme. As a result of this arrangement a number of seed companies, especially small emerging companies, have entered into licensing agreements with ZARI and are producing and marketing seed of its varieties. The major challenge with these licensing agreements is the failure by most seed companies to meet their obligations to pay royalties to ZARI based on gross sales of seeds of the licensed varieties/hybrids. Small emerging seed companies are solely relying on varieties licensing from ZARI as they do not carry out their own research and development work.

Zambia developed and put in place a Plant Breeder's Rights Act of 2007, which is largely based on the UPOV plant variety protection (PVP) model. This was largely in response to demands by the private sector player, mainly seed companies. This was to ensure that the efforts of breeders or research institutions involved in variety development were rewarded adequately to encourage further investment in the development of more new varieties. The enactment of the Plant Breeder's Rights Act was also driven by the need for the country to meet its obligation to comply with Article 27.2 (b) of the Trade Related Intellectual Property System (TRIPS) Agreement, under the World Trade Organisation (WTO), which requires that governments that are party to the agreement put in place national measures for the intellectual protection of plant varieties, either by patents or sui generis system.

The current Plant Breeder's Act is based on the UPOV model and does not consider the rights of farmers or recognise local farmers' varieties. In the initial stage of developing the Plant Variety Protection legislation in Zambia attempts were made to come up with a sui generis system that

addresses both breeders and farmers rights. This approach was however abandoned in preference for the UPOV style regime. Several stakeholders continue to push for the review and amendment of this Act with a view of replacing it with a new legislation that is expected to adequately address the needs of various stakeholders in the agricultural sector, including the need to strengthen the informal seed system and the smallholder farmers.

Zambia is a member of both SADC and COMESA and has signed and ratified both the SADC and COMESA seed harmonization regulations and has begun the process of aligning its national seed regulations with these regional harmonized regulations. Some stakeholders have not been satisfied with the level of stakeholder consultations regarding this process.

The seed system in Zambia has two components, the formal and informal systems, which are described in the following.

Formal Seed System

The formal seed system is regulated by government and focuses on breeding, producing and selling certified seed of officially registered crop varieties/hybrids. These varieties/hybrids have mainly been developed through formal breeding programmes and activities by breeders/researchers from Zambia Agriculture Research Institute (ZARI), the Department of Crop Sciences, University of Zambia and seed companies. The major actors of the formal system are private seed companies, most of whom are foreign owned and market their seed through a network of agro dealers as seed stockists or outlet agents scattered throughout the country. There are also a number of small emerging indigenous seed companies that have entered the formal sector in the recent past. These have a broader business portfolio, which includes seed production and marketing of some traditional crops, such as groundnuts, cowpeas, common bean, sorghum and rice.

Large seed companies, who include foreign owned seed companies, dominate the formal seed system. The seed business is also dominated by hybrid maize seed as it is the most attractive in terms of business. On the other crops varieties that are self-pollinating are on the peripheral of the seed business and therefore receive limited attention, contributing to shortage of seeds for these crops, including small grains and legumes. Traditional farmers' crop varieties are excluded from the formal seed system mainly because they do not meet criteria for release and registration, which are largely based on Distinctness, Uniformity and Stability (DUS) as well as Value for Cultivation and Use (VCU).

Informal Seed System

The informal seed system in Zambia is based on unregistered seed producers, mainly involving smallholder farmers, who conserve, multiply and exchange seeds of local crop varieties, which are in most cases genetically diverse and adapted to the local environments. The other major players involved in the informal seed system are the NGOs, who have supported community-based seed production and distribution programmes. The informal seed system is considered a major source of seed for smallholder farmers in Zambia, accounting for over 70 percent of their seed requirements. Seed for most of the traditional crops cultivated by smallholder farmers, among them small grains (pearl millet, finger millet, sorghum and rice) and legumes (groundnut, cowpea and common beans) is sourced through the informal seed systems. There is limited use of QDS and the informal seed system is dominated by farmer saved seed where farmers produce and save seed from their harvest and disseminate it through exchange and barter among friends, neighbors, and relatives; and sell in local markets as grain. The seed produced and exchanged through the informal system is not regulated in terms of variety release, seed certification and control and therefore not officially recognized to be traded as seed on the open market. Standards in the informal seed sector are guided by indigenous knowledge and practices (TASAI, 2017).

The seed systems in Zimbabwe and Government Policy

Seed systems can be either formal or farmer led. Formal systems generally consist of public sector research institutions, public and private sector agencies producing and marketing seed, and organizations responsible for seed certification and quantity control. The farmer seed system consists of large numbers of smallholder farmers who produce mostly their local varieties, market their seed, and take care of their own research needs. Smallholder farmers in Zimbabwe use both formal and informal seed channels for procuring their seed.

Formal seed sector in Zimbabwe

- Zimbabwe has been long known for having a very well-developed national seed industry with several well-established seed companies which produce and market seed of different crops. (Key companies include Seed Co, Pannar, K2, Champion Seeds, Agri Seeds, National Tested Seeds.)
- The major crop grown and marketed by these seed companies is maize. This is the most important focus of breeding and seed sector efforts and the only important food crop for which small farmers are dependent on the formal seed industry.
- Some of the commercial crops for which seed has been produced and sold include wheat, barley, sunflower, soybeans and cotton. Until recently seed of improved varieties of sorghum, cowpeas and groundnuts are being produced by these well established and upcoming seed companies.
- The well-established private seed companies invested heavily in breeding and crop improvement efforts of crops like maize, wheat, soyabeans and burley.
- Crops like sorghum, pearl millets, cowpeas, finger millets have received limited attention in terms of research, production and marketing.
- Serious challenges of shortages of early generational materials of these crops have been reported in Zimbabwe.
- National and international crop improvement institutions such as the Crop Breeding Institute, ICRISAT and CIMMYT play key roles in availing early generational seed of sorghum, pearl and finger millets, cowpeas and OPV maize respectively.
- Only until recently, hybrid breeding materials of sorghums, pearl and finger millets are being evaluated on-station and on-farm using Participatory Variety Selection methods in Zimbabwe.
- The market for hybrid pearl and finger millets and sorghum varieties still needs to be tested because most smallholder farmers are used to OPV varieties of these crops.

Farmer Seed System in Zimbabwe

In an almost derogatory manner and tone, this seed system has been referred to as the informal seed sector. This and the formal seed sectors are complimentary and should be treated as an important seed system. Except for maize, this seed system supplies over 95% of the seed that Zimbabwean farmers grow. Crops such as sorghum, pearl millet, groundnuts, cowpeas, Bambara nuts, and sweet potato constitute the bulk of crops that are important among smallholder farmers in Zimbabwe. Other crops include open pollinated maize and finger millet varieties.

In the face of climate change, the farmer seed systems have proved to be resilient and efficient while the formal seed systems are in most cases not serving the best needs of smallholder farmers. This is so because: they do not ensure seed diversity and quality; lack decentralized (local) seed production and marketing organizations and enterprises that provide for the location specific demands of smallholder farmers. The farmer seed systems are not reinvigorated by crop breeding, they are constrained by limited and uncoordinated forms of ex-situ conservation of plant genetic resources; they are not supported by effective implementation of international agreements related to plant

genetic resources; and they are constrained by national seed laws which currently do not allow for their registration and inclusion in the Seed Certification Scheme which allows for seed marketing.

Smallholder farmers use the best practices of conservation agriculture, also known as agroecology, to grow large quantities of quality seeds for local food production. Conservation agriculture employs methods of cultivation that work with nature, emphasizing soil as a living organism, improving water conservation, and advocating for intercropping. These practices mobilize what others now call “ecosystem services”: pest mitigation by natural enemies, nutrient turnover, water quality, carbon sequestration, and planting trees/shrubs to attract pollinators, essential to the very formation of seeds for an estimated one-third of food crops.

National seed policies need to aim at combining and scaling from local to the global level, successful strategies, methods and tools that increase women and men farmer’s and their communities, timely availability, affordability and improved access to good quality seed of a wide range of crops and crop varieties that are farmer centric. This includes novel crops and varieties that are better adapted to current and future climate change conditions. In other words, such policies should aim at building resilient seed systems, focusing on the complementarity of farmer seed systems and formal seed sector.

Such seed systems should be demand driven and responsive to differentiated needs and interests supporting all users and farming systems. There is need to recognize, respect and support the key roles played by women farmers as seed custodians, managers, networkers and entrepreneurs. The policies and laws ought to benefit and support diverse seed practices and business models that include smallholder farmers seed sector development.

The major thrust of the seed policies and laws should be to reduce smallholder farmers vulnerability and assuring access to seeds in terms of affordable price and when needed, assuring availability in terms of production and distribution, guaranteeing seed quality in terms of adaptability, safety and longevity. The policies need to promote seed diversity, producing crops for a healthy diet, recognizing and respecting seed as a social and spiritual capital.

The Current Situation in Zimbabwe

While the development and adoption of regional and international instruments relating to seed such as the ARIPO Arusha Protocol and UPOV has been celebrated as encouraging innovation and development with IP protection playing a central role in business competitiveness and development in the seed sector, the region is asking for room to be created for its smallholder farmer seed producers in a UPOV 91 informed PVP system in order to perpetuate traditional farming practices without creating impediments to accessing protected varieties by small holder farmers. The region Zimbabwe included has therefore been advocating for the establishment of a sui generis legislation which will lead to the establishment of a differentiated PVP regime creating different levels of protection for different crops and with respect to different categories of farmers. The FAO Guidelines becomes critical source material for the development of an integrated seed system recognizing and respecting seed as a social and spiritual capital.

Importance of Farmer Integrated Seed Systems

Participatory networks among farmers, developed over decades, build foundations for farmer seed enterprises. Farmer integrated seed systems foster pluralism and diverse programs, including seed exchanges, seed saving, buying from neighbours, accessing from local markets, seed fairs and

community seed banks. More than 30 years of experience among active and successful community seed banks (CSB) in Zimbabwe guide directions for a national cooperative seed enterprise controlled by farmers. As centres for sustainable use of local germplasm, community seed bank activities involve on-farm characterization and dissemination of local knowledge, from indigenous ecological practices to current field trials giving evidence-based results. Their networks (often led by women) participate in action research to determine ways in which species—'neglected and underutilized' by commercial markets—can become key sources of food and nutrition security for more communities, including near-by towns and cities. CSBs have long been instrumental in distributing climate adaptive crop cultivars among farming communities. Both the research and distribution facilitate increased utilization, value-addition, and market linkages of favoured seeds for preferred food crops.

Two seed systems exist in Zimbabwe: farmer seed systems and formal seed systems. The legislation in the country recognises the formal seed system and hardly does so for the farmer (informal) seed system. However, about eighty to one hundred percent (80-100%) of seed that is used in Africa is farmer retained seed. There has been very little investment in small seed research by the private sector.

An integrated seed system could be one of the approaches that could be adopted through using the FAO Guidelines and the Integrated Seed Sector Development (ISSD) approaches. An integrated seed system involving both formal and informal seed systems will contribute to increased access to seed by smallholder farmers and lead to increased and sustainable production for both cash and food crops. This will in turn improve the food and nutrition security, increase income regeneration opportunities and improve the overall wellbeing among smallholder farmers and their communities. Further, this will also play an important role in enhancing the resilience of the farming systems of smallholder farmers, especially under the adverse weather conditions arising from effects of climate change.

Since large seed companies who are the main players in the formal seed system, do not pay adequate attention to self-pollinated crops, including small grains (pearl millet, finger millet, sorghum) and legumes (groundnuts, cowpea, common beans) and open-pollinated varieties (OPVs) of maize, which are the main crops cultivated by smallholder farmers, seeds for these crops are in most cases in short supply, leading to reduced production of these crops by smallholder farmers. In order to meet the seed needs of these farmers it is important that the capacity of smallholder farmers to participate in seed production and marketing is enhanced.

A functional farmer variety registration system, alongside the requirement for some form of seed certification will benefit farmers as it ensures that seed produced is of a particular variety and meets some minimum quality standards. This will also lead to the development of a catalogue for farmer varieties representing an official documented inventory of these varieties in the country and providing a basis to formally recognize farmers' efforts in the development and maintenance of crop diversity.

There has been renewed interest in local crop diversity and in particular farmers' varieties among various stakeholders involved in the promotion of smallholder agriculture and rural livelihoods in recent years. This has been due to a realization that local seed systems and networks that are essential in maintaining smallholder farmers' access to planting material is gradually diminishing due to the weakening of social institutions and structures at the local level that are supposed to support and sustain these seed systems. This has been exacerbated by changes being made to seed laws that aim to further entrench the formal seed systems and diminish the role of farmer-managed seed systems (FMSS) at both regional and country levels. Various stakeholders involved in agrobiodiversity management and the promotion of agro ecological farming systems in Zambia have over the years

embarked on initiatives aimed at promoting a holistic and broader seed system that integrates the farmer-managed seed system into the formal seed system in order to improve access to seeds of a broader range of crops for all categories of farmers, especially smallholder farmers. In this regard Civil Society Organisations (CSOs) and other stakeholders have been pushing for some kind of reforms to the seed policy and legislative frameworks. These organisations have also designed and implemented programmes and activities which are aimed at strengthening farmer managed seed systems (FMSS), that include the genetic enhancement of farmers' varieties through participatory plant breeding and variety selection and supporting increased involvement of smallholder Farmers in community-based seed production and marketing.

6. Gender and Social Inclusion (LNOB), Women and youth potential in Community Seed/commodity production

Gender based inequalities, structural barriers and discriminatory social norms along the food production value chain impede the attainment of food and nutritional security. Although rural women constitute the larger percentage of labour force and contribute to food and nutrition security at the household level, they face several challenges. (Ndumuyana, IFAD, 2018). Discriminatory social and gender norms mean that girls and women, in all their diversity, are too often the hardest hit by climate change and have the fewest resources to cope. Failing to keep global warming below 1.5C will only see more climate impacts and roll back progress towards equality and justice.

In both Zambia and Zimbabwe, gender policies exist but do not have any specific focus in addressing gender disparities in the rural sector. Even though both men and women have access to land, land access remains skewed as men have access to more land due to the patriarchal and cultural systems. In Zimbabwe land redistribution allocated a 20% quota to women but to date women only accessed 15% of the said quota (FAO gender study, 2017). Women by nature of their household responsibilities focus more on crop production towards household food and nutrition security. Women in Zimbabwe are generally faced with several challenges, including poor access to means of production (capital, labour, land, and mechanization and irrigation infrastructure) to actively participate in highly capitalized agricultural enterprise (MAMID, 2011). There are several issues attributable to this which include

- i. Limited to no control over land resources hence women are usually allocated small pieces of land and relegated lands of poor terrain and fertility
- ii. Limited access to financial support (loans and credit) even in sectors that they dominate such as the informal economy, micro and small-scale enterprises, and agricultural production where they outnumber men as labourers. This is mostly due to absence of collateral support
- iii. Women have limited decision-making powers, hence remain relegated on the side-lines and their male counterparts get preferential treatment in developmental environments.
- iv. Women participation at wholesale markets remain limited due to intimidation by men brokers who create an unfriendly environment making marketing of produce complicated and harsh.
- v. Even though women now have access to extension services at grass-root level, they still lag in technical business/entrepreneurship competencies compared to men as men undertake more professional courses on business entrepreneurship and agriculture production.

There are institutions in both Zambia and Zimbabwe furthering gender equality issues, and these include Women for Change, Zambia Alliance of Women, Non-Governmental Organisations Coordinating Council (NGOCC) and MAL in Zambia and Zimbabwe Farmers' Union Gender wing, Women and Land, Self Help Development Foundation, Jekesa Pfungwa, Kunzwana, Women in Politics Support Unit and Women's Coalition in Zimbabwe.

The youth are an important demographic sector that can advance the agricultural economy if given the requisite resources and technical expertise. The Youth in Zimbabwe and Zambia lack access to land and capital, hence remain idle in their households. The youth are an economic group targeting fast revolving cash enterprises e.g. in Mudzi district, the youth tend to shun agriculture and pursue the dangerous and unprotected artisanal mining, whilst in Tsholotsho the youth cross over into neighbouring South Africa or Botswana. However, there is potential for the youth in agriculture as they form the economically active population of the nation. Youths often have a low level of involvement in the decision-making process of farmer's cooperatives and organisations

The MASAP recognises all the efforts that have been made towards gender equality and social inclusion and pledges to work with these institutions to advance women and youth empowerment in Agriculture. The MASAP will engage the GALS methodology to ensure effective categorisation and understanding of roles and responsibilities amongst men, women and the youth. The GALS methodology will go beyond categorisation of roles and responsibilities but ensure appreciation of the significance of each household member in economic household development. This will ensure a turnaround from the patriarchal thought processes where the men hold superior power in economic development, but this will bring our a more inclusive and holistic economic developmental process within the household and the community as a whole.

The Government of Zimbabwe has in place the Ministry of Women Affairs, Community, Small and Medium Enterprises to drive the gender equality agenda forward. The Ministry is one of the most highly decentralized government ministries, having field officers with strong presence in the rural areas that go as far down as the village level. However, impact of this gender machinery has not been felt. Women as major custodians of seed and production systems for food and nutrition security and also the major labour-force within the agricultural industry have the muscle to drive the agricultural industry to success if given the requisite production resources and also technical capacities to manage the systems. The MASAP envisages leveraging on these existing structures in the empowerment of women and youth in the creation of lucrative and sustainable seed production and marketing value chains

A huge gap exists in the technical and financial assistance to inventories that support women with labour saving technologies that reduce drudgery, establish available and time saving technologies that can be used in the processing of small grains and groundnuts. A lack of vibrant mechanical processing associations reduces the consumption of grit free sorghum and pearl millet meal hence reducing the market demand for the commodities.

The appetite for Female and Youth led Community Owned Enterprises has been realised to be developed and capacitated to run the post-harvest processing enterprises for the benefit of the seed and commodity producers ensuring grit and chaff-free commodities for the market. Small grain (Sorghum and pearl millet consumption is negatively affected by the presence of grit in the meal which is a result of the threshing method used.

7. Gender and Social Inclusion (LNOB), Women and youth potential in Private Sector engagement

The International Monetary Fund has documented that more growth would occur if women were better included, but also predicts that more economic equality for women would push economic growth dramatically in developing countries. (Elborgh-Woytek, et al., 2013), In developing countries such as Zambia and Zimbabwe, there are gendered differences in private sector engagement and market participation that must be recognized and addressed in Market Systems Development. Gender and social inclusion related barriers exist within the private sector engagement context which restrict women's, youths, and the disabled access to the decision-making processes, markets and financial resources needed to invest in their business and participate fully in value chains. Some of

the key issues constraining women's and youth engagement with markets and economic participation include:

- Disparities in asset ownership: Gender disparities in asset ownership place restrictions on the economic opportunities of women and youth. Access to land, for instance, can be constrained by law and custom, meaning that women are unable to use it as a production input or collateral for credit. There is consistent empirical evidence that asset inequality has a negative impact on growth in the agricultural sector (Barrett, Manfre and Rubin 2009).
- Social attitudes and norms: Women's common triple role – productive, reproductive and community managing – contributes to time poverty and constrains their ability to engage in paid employment.
- Access to financial services and markets: Women and youths' lack of collateral, and lack of mobility can limit their access to market and financial services. For example, women may have access to less information about prices, rules, and rights to basic services (World Bank 2007).
- Lack of representation in decision-making processes also hampers women, youth and elderly in engaging with private sector and markets.

In order to achieve inclusive growth, the MASAP will work to deal with constraints that hamper women and youth to engage with markets by providing solutions to issues like.

- What innovative approaches and entry points will bring improvements in women, youth and disabled skills and opportunities?
- How will youth and women participation in the value chains fill unmet needs within the larger agricultural market system/value chain?
- How can upgrades in the value chain open new opportunities for youth and women employment/engagement? This is after realizing that already, women form the bulk of producers in the selected value chains which are generally regarded as "women crop"

Women and youth can be capacitated to be Community Business Facilitators (CBF) who serve as sales agents for private sector input suppliers, output buyers or financial institutions and disseminate technologies to rural areas. CBF roles can be by youth and women who get seeds and other inputs on credit from suppliers. The program serves as the guarantor in this arrangement as young and women often lack capital and assets—major impediments in accessing finance. Development of labour saving processing and other appropriate technologies in the value chain could enhance women and youth participation in the value chain and engagement with markets.

8. Gender and Social Inclusion (LNOB) in Action research

The MASAP Market Systems Development programming may create opportunities, but without targeted support and skills development in place, women and youths may not effectively access market opportunities created through private sector engagement efforts. The International Monetary Fund has documented that more growth would occur if women were better included, but also predicts that more economic equality for women would push economic growth dramatically in developing countries. (Elborgh-Woytek, et al., 2013). In developing countries such as Zambia and Zimbabwe, there are gendered differences in private sector engagement and market participation that must be recognized and addressed in Market Systems Development. Gender and social inclusion related barriers exist within the private sector engagement context which restrict women's, youths, and the disabled access to the decision-making processes, markets and financial resources needed to invest in their business and participate fully in value chains. Some of the key issues constraining women's and youth engagement with markets and economic participation include:

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9. HIV/ AIDS, COVID-19, climate change, environment, and good governance focus in relation to Community Seed/commodity production

The change in climate has drastically affected rainfall patterns across the globe. Climate change has become an important global issue because it is causing a threat to people, ecosystems, livelihoods (from energy generation, health) and food production (crops and livestock). More extreme and longer lasting weather events are predicted for most of the climatic regions worldwide with consequences for soil fertility and food production. There is an urgent need to adapt agricultural management strategies to the climatic changes and be more flexible in choices. Continuous prevalence of droughts in Zimbabwe and Zambia, coupled with other economic calamities has contributed to a larger extent to the reduction in grain production among communal farmers, most of whom are in semi-arid areas. IPCC (2007) notes that climate change has significantly modified rainfall and temperature patterns in many parts of the world. The effects of climate change in Zimbabwe are exacerbated by the concentration of most smallholder farmers in marginal soils in semi-arid and arid areas located in the natural region IV and V, which makes them more vulnerable to climate change due to their low adaptive capacity. Small grains, cowpeas and groundnut are conducive in hot areas; their drought-tolerant nature enables them to thrive in marginal areas making their inclusion in cropping systems an appropriate strategy in responding to climate change. However, adaptation efforts are being thwarted by numerous barriers such as high labor demand associated with small grain production, the challenge posed by the quelea birds, food preferences, low markets, and low extension services and government support.

HIV/AIDS has had major impacts on the small holder agrarian system both in Zimbabwe and Zambia through the loss of labour supply, loss of on and off farm income and assets leading to reduced productivity, yields and agricultural output. A survey conducted by the Zimbabwe Farmers Union in 1997 revealed a reduction in agricultural productivity of up to 50% amongst households affected by HIV/AIDS. According to FAO, 2000, Zimbabwe was set to lose agricultural productivity by up to 23% between 1985 and 2020 due to the effects of the HIV/AIDS pandemic. This is mostly due to loss of productive labour as the economically active members of society are affected by the disease whilst women and the girl child also lose productive time whilst caring for the sick.

The COVID 19 pandemic which saw movements restrictions being instituted and markets being closed caused a major blow on small holder farmers as they failed to access output and input markets. This had a major impact on household income.

The MASAP will ensure farmers have a platform where they will be able to access HIV/AIDS and COVID 19 information on prevention, management and eradication of the diseases. There will also be inclusion of food aid through collaborative partnership with already existing programmes like the Mary meals feeding programme in Zambia. In the same vein, the small grains and legumes being promoted under MASAP will continue to be highly recommended for people affected by COVID 19 and PLWHIV/Aids as these are highly nutritious and immune boosting due to their slow release of essential nutrients.

A need towards increased small grains and legume production through the development and dissemination of improved high yielding, drought tolerant, disease and pest resistant varieties (including bird resistant small grain varieties), adoption of climate smart agricultural practices, improved technical and extension support, and access to markets among other interventions has been realised. This will enable improved production through enhanced soil moisture and nutrition (soil improvement and management).

Varieties and also a blend of varieties can develop locally upon the selection of farmers according to the pedo-climatic conditions and they are expected to be better adapted and react more flexibly to weather extremes. Varietal improvement towards farmer preferred tastes is an action point for research and also ensuring communities and the nation at large understand and appreciate the health and nutrition benefits of small grains and legumes. The use of OPVs of small grains and legumes has more potential to mitigate climate change through improved soil organic matter content, increased crop cover, better retention of soil moisture and increased soil biodiversity. OPVs also have over time provided a strong climate change adaptation strategy to introduce more durable crops for increasingly dry conditions. The need for the promotion of a combination of sustainable agro-ecological practices e.g. application of improved organic fertilisers (e.g. compost and biochar), conservation farming has also been realised. Rainfed water access is a challenge to farmers, limited improved water conservation and water harvesting techniques are used. The status of soil fertility, water availability, as well as soil organic matter content is generally poor.

Governance is a pre-requisite for proper functioning and success of community owned enterprises (COEs). Governance for COEs begins with and is based on a clear formulation of goals, which act as guidelines for the operations of the COEs. Competent management of decision making and implementation processes in a manner that is transparent, effective and efficient, participatory, accountable, observe rule of the law, equitable and responsive to people's needs. Good governance assures that corruption is minimized, the views of minorities are considered and that the voices of the most vulnerable in the society are heard in decision making. COEs need to have authority which is the power to give orders to other people and the supreme authority is vested to the members. The members also exercise the authority at the Annual General Meeting by making policies and decisions to be implemented by the Board and management of COEs. COEs must have well documented and approved constitutions or by-laws, rules & regulations. All board members must have their roles and responsibilities stated clearly in the constitution.

Members of COEs should have a duty to patronize their COEs and make policies which will enable the COEs to perform its functions. When promoting the formation of producer groups and COEs, it is imperative to establish strong structures of good governance at all levels, ensuring full participation, accountability, transparency, predictability in procedures and that all decisions are within applicable Rule of Law. The formation of producer groups, COEs and associations needs to be based on a critical analysis of the existing reality, lessons from other past and or existing interventions, taking into consideration the different options or models under the existing Policies and Laws in the two countries. It is imperative that support to producer groups and COEs should build on the following principles: Membership is voluntary, Leadership is mainly through a democratic process (election), Collective marketing of commodities, Access to affordable inputs, aggregation, access to finance among others, Shared values and principles, Capacity building, training, coaching and mentoring, Collective production and/or processing

MASAP realises the need to collaborate with the Ministry of Small & Medium Enterprise and use their structure to deliver technical cooperative expertise through the Provincial cooperative officer, District Cooperative officer and Cooperative inspectors. This is possible in conjunction with Ministry of Agriculture extension staffs through their well-structured system, with delegation from the district level agricultural staff (led by the District Agricultural Coordinator – DACO) to the Senior Agricultural Office (SAO), Block Extension Officer (in charge of a number of Agricultural Camps)- Camp Extension Officer (CEO), down to Lead Farmers/farmers. The Zimbabwe system is different as extension services are provided at the Ward level, and therefore synergies will be sought with Agritex at Ward level.

10.HIV/AIDS, COVID-19, climate change, environment and good governance focus in relation to private sector

The HIV/AIDS epidemic and Covid-19 pandemic have serious consequences for rural households and companies in terms of the removal of productive and often skilled labour from the farming system either directly through illness and death, or through the care of burden for the sick. The increased adoption of agro-ecological practices, mechanised land preparation services, shelling services and spray services all provide labour-saving opportunities and allow labour-constrained households to continue to farm. There is need for collaboration with extension service providers to improve their outreach to vulnerable households, e.g., working through existing home-based care programmes, using rural radio or introducing farmer field schools. • Promotion of labour- saving practices and seed technologies to mitigate labour shortages in HIV affected households in addition, the Covid 19 has highlighted the extent to which women are excluded from technologies and online spaces, so it is harder for them to access information and mobilise for change in the business sector. Therefore, the need to transformatively address these norms, attitudes and values by working with men is realised. This call for intervention that is cognizant of the pandemic. This calls for proactive and special incentive for the private sector to thrive. Participation of women and youths in running businesses, is generally low. The low participation is due to capacity gaps in identifying business opportunities and risks, financial services and business training opportunities. Women and youths also have low self-esteem to make decisions which hinder their effective participation in economic empowerment programmes. They also carry the heavy burden of family care work and adding economic empowerment activities on their schedule further increases their responsibilities. In addition, women have limited linkages and networks to enhance their participation in businesses. The limited linkages are due to limited access to essential information on available markets, inadequate access to technologies and the technical know-how to operate the technologies to enable them add value to their merchandise and fetch higher prices. In terms of Seed production, they have limited knowledge of how they can leverage on that small grain and legumes which are traditionally known

as women's crops to boost their businesses. Additionally, women and youths have limited access to markets because they operate informal businesses which lead to lack of scaling up the business, making a profit and ultimately less income.

Good corporate governance practices in any sector are important to give investors comfort. There is a link between good governance norms and economic growth, competitiveness and prosperity. Good governance lowers investment risk. An assessment of governance issues in any sector is becoming a key part of any investment or credit decision. Investors (public, social or private) look for "good governance" in a company, or sector with regulatory certainty, clear investor rights, good disclosure, and financial markets built on trust and probity. It is therefore imperative for the MASAP to analyse the corporate governance structure for COEs, private sector and Intervention Partners with a view of strengthening their governance and management systems.

One of the main causes of deforestation and degradation of the natural environment in Zambia and Zimbabwe is the expansion of agricultural activity, which itself is often a result of poor farming techniques on existing lands that degrade the productive soil environment. There is need for commercialization of conservation farming technologies and sustainable agro-ecological farming practices through minimum tillage land preparation services and the expansion of herbicide usage through commercial retail channels. Other productivity enhancing technologies such as open- and self-pollinated seed varieties of small grain and legumes, and improved crop nutrition products also serve to allow the intensification of production and greater returns from a given land area over the long term, thus mitigating the need for 'shifting cultivation' practices.

11.COVID-19, climate change, environment, and good governance focus in relation to action research

Zambia and Zimbabwe are among the countries faced with most extreme impacts of climate change. They increasingly face and experience the slow and rapid onset extreme weather events such as late onset of the rainfall season, mid-season droughts, flash and non-flash floods, and with both extremities of weather often affecting the same areas within the same season with dire consequences and impacts to food and nutrition security and natural ecosystems in fragile environments. For example, the 2018/2019 and 2021/2022 cropping seasons were characterised by a late start to the rains coupled with midseason droughts and flooding thereby placing many crops, livestock and human lives at stake. Such climatic shocks are occurring in a region where the prevalence of HIV/AIDS and related challenges already reduce the coping capacity of households to economic and other shocks within the high levels of poverty particularly in rural areas. Women, children and the youth, in particular girls, often suffer the most from such combined shocks and stresses and this widens the socio-economic gap between men and women in society. According to a Plan International report (2017), young women and girls have peculiar challenges from climate change in the sense that the financial burden suffered by households due to climate change shocks and impacts often causes families to pull girls out of school. Emerging health problems such as the COVID-19 pandemic amid underlying significant levels of malnutrition exacerbate the situation.

C. COMPONENT STRUCTURE AND PERFORMANCE

This section aims to analyse the overall structure of the three MASAP components, highlighting key features, trends, and players. An analysis of how the components are structured with respect to the players and the roles they perform within is made.

12. Competitiveness of COEs/SHFs/Cooperatives/Associations

Small holder farmers play a critical role in agriculture, food and nutrition security. Though production at individual household level may be insignificant due to the land area under production and yields attained, globally they are a force to reckon with and they are the major contributors to food security and nutrition. According to FAO (2008), small holder farmers are the main food suppliers in the developing countries, and they play a crucial role in the developmental processes of these 'third world countries'. In a level playing field, small holder farmers can easily outcompete commercial farmers as agriculture is their mainstay and have abundant indigenous knowledge systems that they have lived on from time immemorial including traditional landraces which have remained culturally important in ensuring food and nutrition security where the improved varieties have failed. Traditional crop varieties of local significance amongst the small holder sector are the traditional grains and pulse legumes (cowpea, groundnuts and Bambara nuts) of which pearl millet, sorghum, cowpea and groundnuts are the MASAP focus crops.

However, the competitiveness of SHF in agriculture has been eroded by multiple factors which include

1. Limited policy support on farmer managed seed systems where farmers have strongly leveraged for continued production enhancing food and nutrition security at household level. SHF have limited influence on agricultural policy reforms.
2. Lack of influence on national budgets and global supply chains that they are part of. The small holder farmer and the commercial farmer compete on the same market. However, the commercial farmer is supported by an enabling policy environment which takes little note of the poorly resourced SHF. The current farmer organisations (e.g. Zimbabwe Farmers' Union) have little support that they are rendering to the SHF especially in a deteriorating macro-economic environment. Agricultural input costs have continued to soar and very few to no off takers are willing and prepared to engage and support SHF because of the huge risk associated with them. The national financial systems currently anti-SHF support due to lack of collateral and the high risk posed by this group of farmers in a changing climate and a deteriorating macro-economic environment.
3. Poor infrastructure encompassing poor quality land (soil nutrition and water holding capacities), inadequate water supplies and low to nil mechanisation. All this has a bearing on land area cropped and yields attainable at any given time.
4. Poor marketing strategies for the seeds and commodity: The SHFs are unable to develop marketing plans with extensive advertisements and branding of their products as compared to commercial seed enterprises. This leads to failure of product development and market penetration within the seed sector.

Cooperatives, associations, and community owned enterprises are the best possible institutions to enable SHF to compete comparatively in the agricultural economic market as this gives them a stronger bargaining power on the financial, input and output market. However up to 90% of associations existing in the Chipata, Sioma, Mudzi and Tsholotsho communities are loose associations with very weak governance and management structures. Even though both Zambia and Zimbabwe have national ministries addressing issues of small to medium enterprises (SMEs), resource constraints have left these cooperatives/associations/COEs without economic strengthening support (both hardware and software), thereby leaving them economically vulnerable.

In order to boost the competitiveness in Chipata, Sioma, Mudzi and Tsholotsho districts there is need to support development and strengthening of the community owned enterprises (either at group and individual level) for seed production, seed multiplication, processing, aggregation and marketing

of small grains and legumes seeds and commodities. The facilitation of governance, financial and business management strengthening of the institutions taking into cognizance that the project is not entering districts to change existing structures but to leverage on and strengthen existing structures is also critical.

From a production perspective, many facets that have a direct bearing on attainable yield, environmental conservation and climate change adaptation will be addressed. Suitable consulting partners will be engaged to conduct capacity enhancement trainings amongst the COEs ensuring that public and private extension continue to mentor the COEs in the value chain development process for the 4 target crops

13. Competitiveness of Private Sector

The project defines competitiveness as the sector ability to respond effectively to market demand and 'shock' over time. This will involve demonstrating strong commercial relationships between all players including the rural poor small holder farmer that are more transparent, focused on long term sector level goals and continuously creating economics opportunities for rural poor as consumers, suppliers and employees.

A wider market environment that provides seed growers and commodity farmers with incentives and confidence to invest in new technologies and intensify and expand their production capabilities is essential. Additionally, economic incentives and enabling environmental changes are needed to stimulate the commercial sector's confidence to deepen engagement with the smallholder sector

Developing a 'circle of confidence' (see figure below) through simultaneous, co-ordinated intervention at every level of the four-value chains on both the demand and supply sides. Therefore, MASAP will build on this principle and its work with its intervention partners (IPs).

Zimbabwe and Zambia seed industry can be categorised into two broad categories, the formal and informal. Zimbabwe has a well-established, formal seed sector with a long history. Presently, the country has high adoption rates for certified seeds – approximately 80% for hybrid seeds (Chikobvu, Kassie and Lunduka, 2014). However, the country's economic woes that started in the mid-2000s have significantly diminished Zimbabwe's seed security. The informal sector broadly refers to the system where farmers produce, obtain, maintain, and distribute seed resources from one growing season to the next (FAO, 1998). Standards in the informal seed sector are not monitored or controlled by government policies and regulations; rather, they are guided by indigenous knowledge and standards, and by social structures. The colloquial nature of transactions means that there is scant performance data on the informal sector. Due to the recent economic problems, a growing number of smallholders have returned to the informal sector.

The formal sector focuses on breeding, evaluating, and releasing improved varieties, and producing and selling certified seed. The Seed Services Institute (SSI) in Zimbabwe and Seed Control and Certification Institute (SCCI) in Zambia, under the Ministry of Agriculture, regulates variety registration, seed production and marketing activities. Complementing the two Institutes are associations of seed companies known as the Zambia/Zimbabwe Seed Trade Association (ZASTA/ZSTA), which also coordinates seed industry activities, sales and marketing. ZASTA/ZSTA also plays an advocacy role and represents members at various forums. Through Seed Services and ZASTA/ZSTA, the seed industry participates in various regional and international associations and technical bodies such as ISTA, AFSTA, UPOV and OECD. According to the TASAI 2019 Country Report, as of 2016, Zimbabwe had 16 registered seed companies: 13 produced maize, 8 produced beans, 6 produced soya bean, and 7 produced sorghum. Further, two were government parastatals and the rest private companies.

14. Action Research

Due to their tolerance to hot climates and marginal rainfall areas, small grains are increasingly recognized for their importance in climate change adaptation. Despite this reality and untapped potential, an insignificant proportion of farmers from marginal rainfall areas grow these crops and utilize them to a large extent. Many contributing factors pose barriers to the wide uptake of these crops, chief among being high labour demands in production and processing, bird damage, preference for maize as a staple, poor markets, limited prioritization of such crops at the national level translating to low research and extension support. The recent declaration in Zimbabwe by the Government to promote Traditional Grains (now also referred to as the Future Grains) and legumes is a positive and welcomed development which is expected to spur the uptake of these crops. It is necessary to encourage the adoption of small grains by developing improved varieties which address the needs of farmers and other value chain actors, and to encourage the adoption of safer climate smart agricultural practices, improved technical support, and access to markets among other interventions (Nciica et al. 2021).

In both Zambia and Zimbabwe, government and non-government institutions or organizations are involved in PAR at various levels with regards to small grains and legumes seeds and commodities. The national Agricultural Research Organizations (NAROS), i.e. the Zambia Agricultural Research Institute (ZARI) and the Department of Research and Specialist Services (DR&SS) are primarily working on research that involves the MASAP target crops. The crop breeding institutions and agronomy research institutions in the two NAROs are involved in the development of crop varieties adapted to various conditions. In Zambia, ZARI has a sub-station in Chipata with the mandate of dealing with groundnuts and other legumes such as cowpeas, and in Kaoma dealing with millets as well as sorghum breeding and varietal trials. In Zimbabwe, the DR&SS and the respective Research Stations such as Matopos, Chiredzi and Sabi Valley conduct on-station and on-farm varietal development and selections as part of the Crop Breeding Institute programme. The DR&SS collaborates with relevant NGOs such as the Community Technology Development Organization (CTDO), academic institutions and others in varietal testing. Both Zambia and Zimbabwe have well developed National Seed Services (Inspection, Testing and Quality Assurance), albeit the key capacity and funding challenges that bestow their functions and operations and limit their performance.

The CGIARs such as ICRISAT and IITA are pivotal to both Zambia and Zimbabwe in terms of breeding and germplasm access and exchange of knowledge and experiences of the target MASAP crops. ICRISAT conducts research on five highly nutritious drought-tolerant crops: chickpea, pigeon pea, pearl millet, sorghum, and groundnut. Traditionally, IITA focuses on cassava, yams, cowpeas, plantain, banana, and maize, but has also been involved in the development of Aflasafe technology for the control of aflatoxins in groundnuts. The Aflasafe technology is reportedly effective in reducing aflatoxin contamination, but the challenges of access, cost, isolation distances (at least 50m) from non-treated plots, and also acceptability by smallholder farmers remain to be further explored. The World Agroforestry Center is well known for the development and promotion of technologies that combine trees and animals on farms to enhance soil fertility, fodder production, biodiversity, production of by products such as fruits and timber/fuel wood, and other benefits. Such technologies are essential for regenerative agriculture and general land restoration and rehabilitation. Their compatibility with small grains and legume crops, and potential for imparting resilience to small grains and legume seed and commodity production has not been explored to a large extent in Zambia and Zimbabwe. While CIMMYT is not among the key CGIAR centres re: small grains and legumes, in both Zimbabwe and Zambia they have been conducting research, both on-station and on-farm, including demonstration plots, on conservation agriculture (CA). One of the main principles of CA relates to mixing and rotating crops, and some of the crops often used in the rotations are cowpeas and groundnuts among others. In this regard, and in view of agro-ecology focus in MASAP, CIMMYT has some experiences and key data and evidence to share and contribute to the forum.

Both ZARI and CBI perceive the CGIAR centres to be complementary to the breeding programmes and varietal development initiatives in their respective countries. ICRISAT is considered as a strategic partner on groundnuts, pearl millet, finger millet, sorghum, chickpeas and pigeon peas while IITA is key for

cowpeas. The CG centres are said to be an important source of a diversity of improved germplasm regarding varietal lines and donor parents. They collaborate with the government institutions to develop trait profiles which are then used as breeding objectives. As both ZARI and CBI are under-funded, the CG centres are seen as helping to close the funding gap by implementing some of the breeding programmes. However, while this may hold truth, the sustainability of such an approach may also need to be viewed from the consideration that CG centres largely depend on donor funding for their activities. The comparative advantages of the CGs and national breeding organisations need to be closely analysed to enable synergies and comparative advantages to be built upon and ensure that national programmes have the capacities to continue releasing varieties that are adapted and important for their countries. Other questions which may require further analysis are: Do CG centres manage to have better capacity because they are better funded compared to national programmes? How can the capacity of national programmes be enhanced to achieve greater competitiveness and synergies with the CGIAR centres? How can the two systems be more complementary rather than overlapping or creating parallel structures and programmes?

Academic Institutions like the University of Zambia (UNZA) and University of Zimbabwe (UZ), and others, also play a crucial role in breeding research programmes and agronomic action research. For example, the UNZA developed a cowpea variety through mutation techniques. Universities often have good molecular level laboratory facilities for genetic studies. Further, academic institutions also conduct research on climate change adaptation and mitigation, socio-economic analysis and other impact assessments related to the importance of small grains. For example, Mapfumo et al, 2016, demonstrated the importance of small grains in imparting resilience of smallholder farmers in Zimbabwe to the negative effects of climate change.

Other key players in the small grains and legume sectors, within the framework of agroecology as well, are Private Research Centres / Institutions / Trusts like the Golden Valley Agricultural Research Trust (GART) and the Conservation Farming unit (CFU) in Zambia and the Rattray Arnold Research Station run by Seed Co in Zimbabwe where hybrids of sorghum, cowpea and groundnut varieties are being tested. Rattray Arnold Research Station, similarly, to other private companies, highlight the challenge of promoting OPVs whereby seed retention by farmers is high thereby reducing the business sense in dealing with such types of seed. The private research stations are generally well capacitated – with highly qualified staff, laboratories, equipment, storage facilities, and resources for promotion, including varietal performance showcasing along the roadsides and in national media platforms. Community based organizations and other NGOs are also playing a critical role in terms of promoting the uptake of adapted crops for resilient food systems, and the application of agro-ecological and organic practices in agriculture as well as the promotion of agrobiodiversity. Examples in Zambia include Kasisi Agricultural Training Centre, PELUM, ReSCOPE, ZAAB and COMACO. Examples in Zimbabwe include ZOPPA, Foundations for Life and the SDC supported SKI project partners such as ZIMSOFF, PELUM, Fambidzanayi Permaculture Center, TSURO, and others. The ICIPE (International Centre of Insect Physiology and Ecology) is also crucial when it comes to agroecological approaches to pest management, and the utilization of insects for food and feed all of which can benefit smallholder farmers.

At the regional level, there are bodies and networks with a bearing on research related to seed systems, trade and policy, e.g. IAPRI based in Zambia, FANRPAN based in South Africa, the African Conservation Tillage Network (ACT), the SADC's CCARDESA, COMESA, and others.

15. Core market performance: the diversity, quality, and quantity of the products (seed and commodities) and services

Small holder farmers have evolved one time producing small grains and legume commodities for household food and nutrition security and the excess for income generation. It is mostly in the fields of SHF that one finds small grains and legumes being produced and most aggregators of these commodities

have gone into contractual partnerships with small scale farmers. In Mudzi and Tsholotsho, seed production of the small grains and legumes is an income generating activity that has been going on for several years since early 2000. A lot of participatory plant breeding and participatory varietal selection has been done and farmers are experienced in these processes.

Market Performance in the Seed Sector

Small holder farmers equally produce quality seed in comparison to commercial farmers. The SHF seed fields are subjected to the same production and quality inspections as those of commercial farmers prior to certification. The seed commodities have been certified and this SHF produced seed has been and it is found on the seed market. Currently, SHF remain with an upper hand in small grains and legume (cowpea and groundnut) seed production. Commercial farmers have been seen to target the high yielding commercial crops (maize, tobacco, soyabean and some horticulture crops). However main competitive limitations for SHF in seed production include

- Minimal support for farmer managed seed systems from a policy and production perspective. According to the Seed Services Department, Zimbabwe, the main challenge with farmer managed seed is the lack of trueness to type of the locally improved seed varieties. Large seed companies prefer working with farmers who have well established irrigation facilities to manage production risk. However less than 30% of small holder farmers have access to irrigation facilities.
- Lack of a level playing field amongst the large and the small upcoming seed companies as the large seed companies have a bigger market share of the seed market. In this respect, the upcoming seed companies support SHF seed businesses and are developed on the principles of small holder business development using a bottom-up approach. Lack of marketing budgets and resources affect cash flows hence resulting in late payment of seed growers. This has a ripple effect as it affects household level planning for the seed farmers.
- Limited research and breeding opportunities for small grains and pulse legumes. Massive financial input has gone into maize and soyabean research with very little focus on small grains and legumes. Breeding for improvement for the local landraces which are mostly the farmer preferred varieties has been negligible except the participatory plant breeding and varietal selection that has been done by the farmers through various support organisations. These farmer managed varieties remain unrecognised as they do not have descriptors to signify them as true to type varieties to enable varietal registration and release.

Lack of advertisement of the available improved varieties. Massive advertisements have been done for maize and soyabean but close to zero advertisement of small grain, cowpea and groundnut varieties. Focus of large seed companies is on the hybrids which give them massive profits whilst the upcoming seed companies who are supporting SHF have limited resources for marketing therefore the improved varieties and their characteristics and benefits remain unknown.

Market Performance in the Commodity Sector

Small grains and legume commodities are essential for household food and nutrition security. However, despite the nutrition superiority of small grains and legumes as shown in the table below, market performance is very poor. Maize and soyabean dominate the market because of consumer and market preferences for certain products. Livestock feed producers prefer maize and soyabean over small grains and cowpea and/or groundnuts due to ease of aggregation of the former and low importation parity. Consumers have developed an acquired taste towards maize products which also needs to be developed for small grains.

Table 1 : Nutritional comparison of cereal and Legume crops

Cereals

Nutrient	Maize (g/100g)	Pearl Millet (g/100g)	Sorghum (g/100g)	Finger (g/100g)	Millet
Carbohydrate	77	146	138	74.73	
Fat	3.9	8.4	6.6	1.35	
Protein	6.9	22	20	9.27	
Dietary fibre	7.3	17	13	3.56	
Potassium	315mg	390mg	697mg	408mg	
Magnesium	93mg	228mg		137mg	
Iron	2.4mg	6mg	6.5mg	14.03mg	

Pulses

Nutrient	Soyabean (g/100g)	Cowpea (g/100g)	Groundnut (g/100g)	Common (g/100g)	bean
Carbohydrate	1	35.5	18.6	25	
Fat	1	0.91	47.5	0.1	
Protein	1.9	13.2	26	7.5	
Dietary fibre	0.6	11.1	2.1	7.3	
Potassium	55mg	475mg		532mg	
Magnesium	9.2mg	91mg		52mg	
Iron	0.5mg	4.29mg	2.1mg	2mg	

***Source:** USDA, nutritionix; www.healthbenefitstimes.com*

The poor market performance has resulted in fragmented production of small grains and legumes (considered 'poor men's crops'). However, the superior nutritional values compared to the common commercial crops give small grains and pulse legumes an added advantage. There is therefore need for a concerted effort on awareness raising to increase consumption which will in turn increase product demand. Once demand for these commodities is increased it stimulates supply, hence increased production. Where there is increased commodity production, there is also increased seed demand.

In Zimbabwe, small holder farmers have a competitive edge to produce small grains due to the government-controlled market price which is higher than maize. There is therefore a comparative advantage to increase land area under sorghum as the farmers would gain more income compared to maize. However fragmented production then requires the farmers to be organised in groups to improve

on aggregation to enable easy offtake by the market. The COEs will then give the SHF a superior advantage on increased area under production and aggregation potential.

Despite low market performance, small grains and legumes are highly competitive environmentally as they are highly adaptable to climate change, producing yield albeit low where maize and soyabean fail. These crops are also low input crops with legumes being soil nutrient enhancers through their nitrogen fixing ability.

16. Core Market Performance: Private players

The private sector has been approached from 2 different but complementary angles, namely the seed sector, and commodity sector.

1. Private Sector Partners in the Seed Sector



Core Markets Actors- Seed Supply Side

- a. Research and Plant Breeders- MASAP will work with different players involved in the supply of seeds starting from germplasm collection and conservation, plant breeding programmes, and maintenance of breeders' seed. These include
 - Public Agricultural Research and Crop Breeding Institutes in Zambia, the Zambia Agricultural Research Institute, (ZARI) and in Zimbabwe the Crop Breeding Institute (CBI). ZARI has specialised research stations such as Musekera Research Station in Chipata which focus on legumes, and Longe Research Station in Kaome specialising in traditional grains. The CBI in Zimbabwe also has research station dotted around the country such as Matopos, and the Makoholi Research Station in Masvingo.
 - Private Research and Breeding Programmes- MASAP has also identified potential privately owned research and breeding programmes such as Rattrey Arnold Research Station run by SeedCo for Zimbabwe and Zamseed, Afriseed, Kamano Seed and Good Nature Agro for Zambia where breeding programmes for all MASAP value chains are being done. While the

Rattrey Arnold Research Station has some OPVs, they are gravitating towards hybrids for all the seed varieties.

Partnering with Research Institutes and plant breeders will ensure timely supply of Early Generation seeds required by seed companies for multiplication.

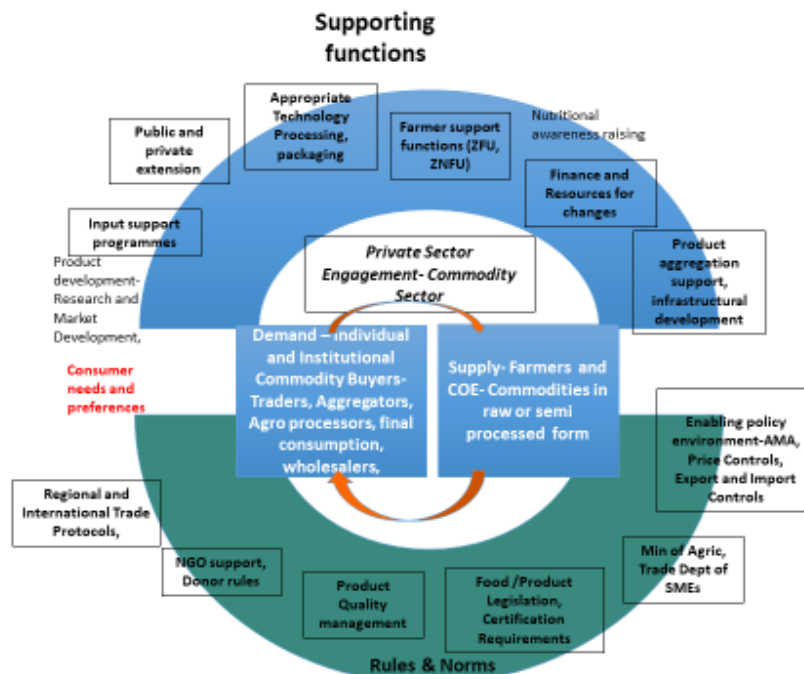
- b. **Seed Companies-** MASAP has identified a number of large scale and upcoming seed companies for potential partnerships. In Zambia, these include Zamseed, Good Nature Agro, Kamano, and Afri Seeds, while in Zimbabwe, the project has identified companies such as Zimbabwe Super Seeds, Champion Seeds, Zadzamatura (Tocek Investments), Mukushi Seeds and SeedCo as some potential partners. These seed companies will be linked to smallholder farmers for the production/multiplication of seed for the targeted value chains. Working with smallholder farmers will entail changing of business models, especially for the established seed companies with an inclination of working with large scale producers. MASAP will intentionally work towards strengthening upcoming seed companies so as to improve the overall competitiveness of the seed supply sector dominated by large Multinational Companies which have huge market power and influence on government or agricultural policy such as promotion of hybrids. MASAP will also work towards capacitating Community Owned Enterprises and seed banks to become more competitive in production and marketing of seeds.
- c. **Seed Multiplication-** Seed houses contract farmers to multiply both the foundation seed and final seed that is sold. In both countries the established seed houses such as SeedCo and Zamseed mainly work with large scale commercial farmers, and only contract smallholder farmers based in irrigation schemes mainly for legume seeds. Upcoming seed companies such as Good Nature Agro, Kamano, Afriseed, Zimbabwe Super Seeds and Champion Seeds contract smallholder farmers and focus on OPVs. The situation is also similar in Zambia where upcoming companies work with thousands of smallholder farmers in seed production. MASAP will partner with seed companies to develop or enhance the capacities of smallholder farmers in the target districts to produce quality seeds and improve their agribusiness skills.

Core Market Actors- Seed Demand Side-

The demand side of the seeds market is comprised of large scale and small-scale farmers. In Zimbabwe, changes in the land holding structure over the past decade has seen an increase in the number small holder farmers, and many are engaged in subsistence and semi commercial farming. Large scale commercial farmers produce maize, and other cash crops such as soya beans, sugar beans, wheat, horticultural and livestock, while small holder are the ones who mainly produce the traditional grains, groundnuts and cow peas for domestic consumption and sell any surplus. This has a huge bearing in demand patterns for seed of the selected value chains, and most established seed houses have not invested in their production citing weak or unpredictable demand. For the targeted value chains, where small holder farmers dominate, use of retained seeds is prevalent, and this has been compounded by the adverse macroeconomic environment where some farmers cannot afford to purchase certified seed every season. Small holder farmers on the other hand do not invest much in large scale commercial production of the selected value chain citing absence of a sustainable end market and birds attack for small grains. However, in both countries, the opaque beer industry provides a viable and steady market for red sorghum, and companies in Zimbabwe such as Delta and Ingwebu Breweries have production and supply contracts with farmers in mainly in Chiredzi district, therefore ensuring a market for sorghum seed. In Zambia, Zambia Breweries (ZB) is the major stakeholder in the sorghum and millet value chains, others in the confectionary industry with the similar model of engaging small holder farmers are Shais foods, Omega food, Sylva foods etc. Zambian Breweries last year ran a successful pilot programme with Silverlands Ranching, of Southern Province, that aimed to create a direct purchase process from smallholders via a central buying point, with seed distribution and skills training being provided to

participating farmers. In 2021, the Mosi brand owner procured 5,000 metric tons of sorghum compared to 2,300 metric tons in 2020³

Private Sector Partners in the Commodity Sector



Core Markets Actors- Commodity Supply Side

The commodity sector is important in the MASAP project because seed production is/ or should be determined by the demand of commodities in the market.

Farmers- At the centre of commodity supply sector are farmers, as individuals or organised as Community Owned Enterprises or commodity/producer groups. The targeted smallholder farmers are mainly subsistence farmers who occasionally sell surplus commodity in the market. MASAP will enhance the production and entrepreneurial skills of the smallholder producers so that they graduate into commercial production of both seed and commodities to diversify their income streams. Another key intervention point on the supply side will be to improve the capacity of the smallholder farmers in value addition or processing so that they integrate upwards in the value chain and increase their incomes. Organising the producers under Component 1 will be key to improve their market power as suppliers of commodities.

Core Markets Actors- Commodity Demand Side

The demand by individual and institutional buyers for the 4 commodities will determine the sustainability of MASAP interventions. The changing in consumer taste towards healthy eating habits is expected to increase the demand of targeted commodities. Most individual buyers of the commodities buy from traders at open markets such as Chain store like Shoprite, Pick n Pay, Food lovers, Choppies in Zambia and Mbare in Harare, and Shashe in Bulawayo where the commodities are traded in small quantities such as 1kgs therefore the traders are an important player in the value chains. Supermarkets also sell repacked raw commodities. Agro processors such as Zambia Breweries, COMACO, Delta Beverages and Ingwebu breweries run contract farming schemes with farmers for supply of red sorghum, which is used to opaque beer, however Zambia Breweries, Delta and Ingwebu are not operating in any of the MASAP districts, but

³ Food Business Africa | [Zambian Breweries continues to support country's agriculture value chains through local sourcing initiative](#)

COMACO is in Chipata. Omega Foods, Shais Foods and Buntu Foods, one of the promising partners and major processors for sorghum and millets into refine flour and has potential to partner the MASAP in district in both Countries. Other processors in Zimbabwe for small grains are Nestle and National Foods for their instant porridge source the raw materials through aggregators/commodity brokers such as PaperHall Investments and Peak Trading. There are other small processors of tradition grains such as Hutano Foods, who have established silos in Mudzi districts. For groundnuts, there are number of peanut butter making companies such as Associated Food Zimbabwe, Nutrie Foods, Lyons, and Better Peanut Butter currently importing groundnuts from Malawi as they cannot secure enough quantities of right quality in Zimbabwe. This poses a huge opportunity to partner these companies and produce the right varieties and quality from the MASAP targeted districts. There are also several backyard groundnut processors (MSMEs) who purchase groundnuts from traders and directly from farmers, and these provide another market opportunity for the commodity. MASAP can also work with these small processors and increase their capacity and market share, therefore increasing overall sector performance. For cowpeas, market demand for large scale commercial purposes in Zimbabwe is not well defined and may require investment in product development.

Consumer Taste and Preferences- The Consumer Market

At the core of demand and supply of both seeds and commodities are consumer tastes and preferences which determine the demand of the final products in the market. It is therefore critical for the project to the able to work with private sector to estimate the demand for the commodities, which will in turn trigger demand for seeds and breeding services. Currently, there is a heavy preference by farmers as seed consumers towards hybrids due to heavy marketing which has influence their behaviour as consumers. For each value chain, the project will work with private sector to get the specific quality and quantity of each commodity that they require, and this will inform the specific intervention for each sector.

Supporting Functions

Besides the key actors, the market performance of each sector is determined by the supporting functions of different actors. These are

- a. **Research and Product Development** – these involve research and release of new varieties that respond to market needs, and localised agro climatic conditions as well as investment into final product development informed by consumer tastes and preferences. MASAP will therefore need to partner with market research institutions such as Select Research and Research Matters to help determine consumer trends in the 4 value chains. This will also help to shape product development and marketing campaigns required to increase and sustain demand for the commodities, and seeds.
- b. **Appropriate Technology-** The development of appropriate technologies across the value chains will help increase competitiveness. Such technologies cut across the value chain as such breeding technologies, agronomic practices, harvest and post-harvest technologies, and processing technologies. In Zimbabwe companies such as Tanroy and Grownet Investments are key in development appropriate technologies for smallholder farmers and processors. In Zambia, threshers for pearl millet are a challenge and have greatly contributed to the low production of the value chain due to the labour intensity. Therefore, Zambia will learn from the Zimbabwean technology companies to develop appropriate technologies.
- c. **Public and Private Extension providers-** These are key in skills development especially for farmers and Community Owned Enterprises. MASAP will not create parallel structures in the districts but will leverage on and capacitate both the public and private sector extension system and improve their efficiency towards working with farmers and COE.

- d. **Access to Financial Resources-** MASAP will work with financial institutions such as Financial Services, Agricultural Finance Cooperation in both countries through the development of financial package that fits the SMEs to unlock financial resources required by value chain actors. Seed production for example requires adequate water supply to ensure good quality, and there COE and farmers may need to invest in irrigation technologies. MASAP will broker linkages such as using seed production contracts between farmers and seed house to access credit by the farmers. Small processors requiring upgrading their production systems will also need capital investments from financial services provides.

17. The wider market performance: The quality of supporting functions and rules in Community engagement

Seed Value Chain

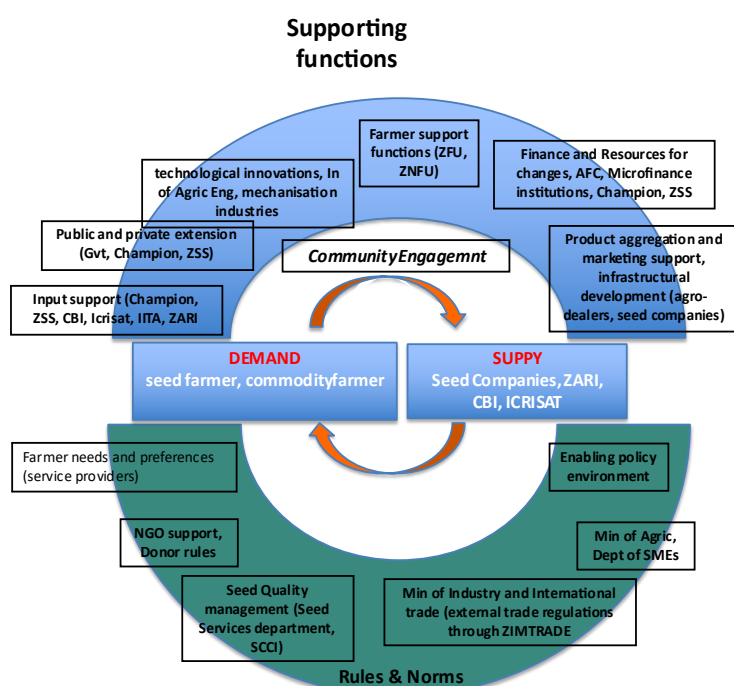


Table 2 : Players in the Seed Industry and their roles

Support function	Stakeholders	Roles
Research Institutions(	CGIAR centres, ZARI, GART, SCCI, CIAT, CBI, IITA	Varietal improvement, source of EGS
Seed Houses	Champion Seeds, ZSS, Mukushi Seeds, Goodnature agro, Afriseed, Kamano, Share Africa	EGS, contractual agreements with farmers for seed production. Product aggregation, packaging and marketing. Farmer extension support

Mechanisation Institutions/ Institute of Agric Engineering, private mechanisation companies ()	Grownet, Tanroy, SARO, CAMCO	Technological innovations development especially post-harvest handling equipment and climate smart agriculture equipment, agro processing equipment
Farmer Organisations	Zimbabwe Farmers Union, Zimbabwe National Farmers Union, EPWA, ZCF, CFU, CDWA, CDFA, MDFA, Sioma Seeds Association	Information dissemination, pro-SHF Policy and advocacy
Finance Institutions	Banks, micro-finance institutions, contracting companies-Champion Seeds, ZSS, Vision Fund, FINCA, AB bank	Appropriate financial products and services for all Value Chain actors from production to marketing
Agro-dealers/ Retailers	Judo, MC Sangwani, Lighthouse Agro, Farmers choice, ETC	Marketing of seed
Seed/trade regulatory boards/	ZASTA/ZSTA/ Zimtrade,SADC, COMESA	Regulation of the seed import and export market
Government Ministries/Departments	SCCI, Seed Services, Min of Agric, SMEs, ZDA, ZABS, Technoserve	Seed inspection and certification, COE support, Policy management and regulation, public extension support
Donor Agencies/NGOs	WFP, WWF, Plan International, Care International, SDC, Oxfam, ZimOFF, PELUM, CTDO, CTDT,	Farmer support in value chain development, food and nutrition security and Farmer Managed Seed Systems

Commodity Value Chain

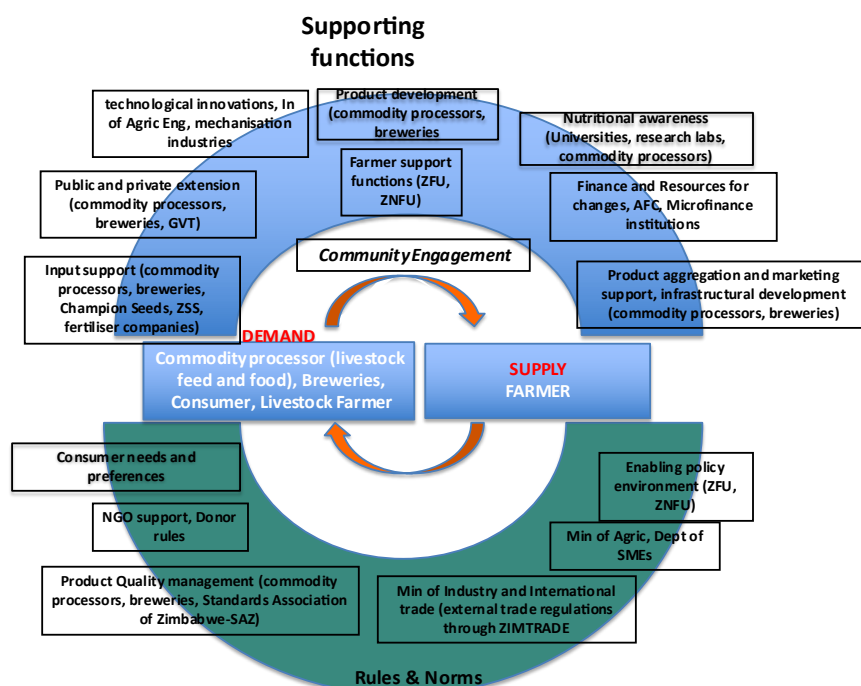
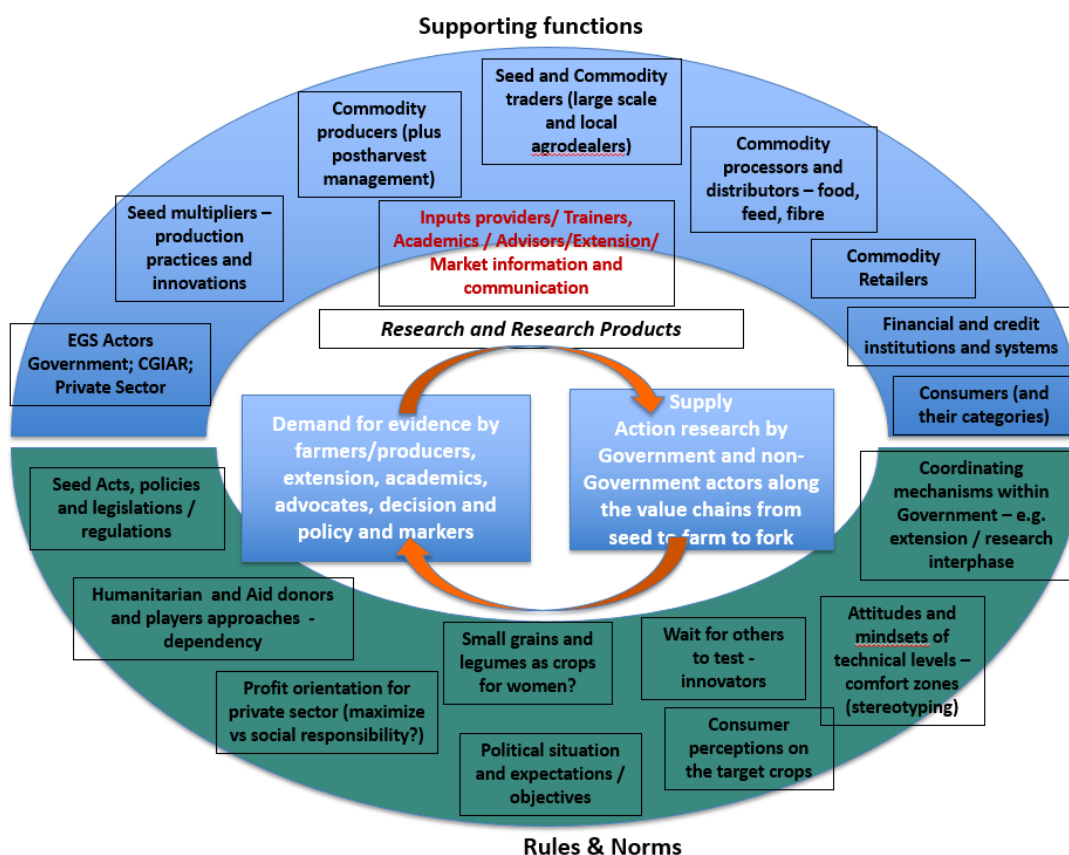


Table 3 : Players in the Commodity Value chain and their roles

Support function	Stakeholders	Roles
Input support	commodity processors e.g. Buntu Foods, Comaco; Breweries e.g. Ingwebu; Seed Companies e.g. Champion Seeds, Kamano; Afriseed, Goodnature Agro, Share Africa Zambia, chemical companies, Syngenta, Bayer, CHC, Snowz, Farmers Africa	Contract engagements for commodity production, seed support, fertiliser and pesticides support, and technical support for production of quality produce
Public and Private extension,	Govt, commodity processors, breweries MOA, Min SMES, MCTI, CFU, Good Nature Agro, Share Africa, CDWA, CDFA, FOF, COMACO, Zambia Breweries, Buntu foods, Delta beverages	Farmer extension support for Good Agricultural Practices and Climate Smart interventions
Farmer Organisations	ZFU, ZNFU, ZCF, CDWA, CDFA, Sioma Seed Association, Mongu DFA, CTDT	Information dissemination, pro-SHF policy and advocacy
Product development	commodity processors, breweries - Shais, Omega food, Newgrowco, Muzuma, Zambia breweries, share Africa Zambia, COMACO, Grain traders Association, Essential Commodities, Tiger feeds, Novatek, Capital Feeds, National Foods, Buntu Foods, Utano Foods, Agrifoods, Delta Beverages, Ingwebu, Meso Organic	Processing of commodities to consumer preferred products, market intelligence on consumer preferences and needs

Nutritional awareness	Universities, research labs, commodity processors - Technoserve, ZABS, ZDA, UNZA, UZ, CUT	Nutritional analysis, awareness raising/advertisement of products and their nutritional worth. Advertisement of different types of recipes, cooking demonstrations
Financing and resourcing for change	banks, micro finance institutions, donors, Vision Fund, FINCA AgleaseCo, Microloan Foundation	Production financing, product development and marketing
Seed regulation board	ZIMTRADE/Grain traders Association/Min of Fin, SADC, COMESA	Regulation of the import and export market
Product Quality Management & Control and certification	commodity processors, breweries, Standards Association of Zimbabwe-SAZ, ZABS, ZAMACE, Grain traders Association, ZDA ZAMACE, Newgrowco	Commodity grain inspection, product quality management, quality standards management, Certification of product, branding
Technological innovations	Institute of Agric Engineering, mechanisation companies, ZDA, ZABS, Technoserve, NTBS, SARO, CAMCO, AgleaseCo	Post-harvest management, Equipment for threshing and processing
Government ministries and departments	Min of Agric, SMEs., MCTI	Extension, policy management and regulations, COE governance and management support
Donors and NGO	NGOCC, WWF, World Vision, CNFA, WFP, ZAAD, Caritas, Plan International, Care International, CTDO	Capacity building, Saving groups, grants, Lobby and advocacy

18. The wider market performance: The quality of supporting functions and rules in Action Research



In addition to the national actors on Action research, there are some regional research related organizations with a significant potential to contribute at both technical and policy levels. These include:

- The Indaba Agricultural Policy Research Institute (IAPRI) based in Zambia whose Mission is to provide evidence-based policy solutions through high quality research and outreach services for the transformation of Zambia's agricultural sector to achieve sustainable broad-based pro-poor growth.
- The Common Market for Eastern and Southern Africa (COMESA) – based in Zambia - is a regional economic community in Africa with 21 member states (stretching from Tunisia to Eswatini) that came together with the aim of promoting regional integration through trade and the development of natural and human resources for the mutual benefit of all people in the region. The Mandate of the Industry and Agriculture Division is to promote development of competitive, sustainable, and profitable agriculture and industries that contribute to economic and social prosperity of the COMESA citizens.
- SADC Centre for Coordination of Agricultural Research and Development for Southern Africa (CCARDESA) has the mandate of coordinating all matters of agricultural research and development in the SADC region.
- Food, Agriculture and Natural Resources Policy Analysis Network (FANRPAN) - an all-inclusive multi-stakeholder pan-African network that provides independent evidence to inform and influence policy processes at national and regional levels (<https://fanrpan.org/origin-mandate/>)

D. CONSTRAINTS AND OPPORTUNITY ANALYSIS

In this section, focus is made on analysing the constraints and opportunities that exist involving the tracing back of problematic functions/rules that impact on the component performance to their roots (i.e., moving from looking at symptoms to understanding causes). The section assesses how the sub-sectors function, and particularly focus on the main constraints leading to underperformance in the different value chains.

1. Community Engagement

Table 4 : COE/Associations/Cooperatives CONSTRAINTS & OPPORTUNITIES

Constraints	Causes	Opportunities
Inability to penetrate the market	- low production and poor aggregation models (individualism) - no business skills and business plans - lack of trust amongst members - lack of marketing skills - poor ownership of business projects - Poor pricing strategies - Climate change affecting quality and quantity of produce	- Small holder farmers have strong aggregation and bargaining power in numbers. - High producer price for small grains an advantage for increased production - Availability of vast land and information - Readily available accessible off takers and processors
Access to finance and farming inputs	- Little or no business planning skills - Low financial literacy - Lack of collateral - Weak governance structures and undefined constitutions - No registration of COEs (esp in Zim) - Limited high yielding EGS varieties for small grains - Large Seed companies not focusing on OPVs landraces - High prices for certified seed	- Seed companies and commodity companies willing to contract farmers for seed and commodity production in groups and as individuals - Presence of Micro Finance institutions - NGOs formation of Saving groups - Presence of seed companies focusing on legumes seed - FISP incorporation of small grains and legumes on the package
Weak governance structures	- Lack of support from relevant line ministries - Limited resources for effective support within the relevant line ministries - Wrong objectives in the formation of groups/associations - High illiteracy levels in management teams - Lack of cooperation among members of COEs - Political interference	- Presence of Min of SMEs in Zim and Min SMEs, MOA and MCTI in Zam for COE strengthening and continuous backstopping - Presence of NGO providing Capacity building (Edge project, CNFA, WWF)
Poor business management skills	- No entrepreneurship skill - Lack of business plans and strategic plans	Presence of Min of SMES, MCTI, MOA, and NGOs (CNFA, WWF)

	• Poor record management skills • No internal and external controls • Poor budgeting and planning • Lack of audited financials • No development of business continuity plans	• Presence of local government conducting audits for COES
VALUE CHAINS		
<i>Small Grains</i>		
Low demand of small grain products.	• palatability issues affecting consumer preferences • limited knowledge of small grains and their importance • Limited accessibility and availability of the small grains in Zambia	• high nutritional values compared to staple maize • emerging companies processing and marketing small grains (enhanced awareness campaigns required) • Availability of agro processors
Grain quality shunned by the market	• laborious manual harvesting and threshing processes • poor post-harvest handling and storage facilities (presence of grit in grain) • limited access to technology	• Institute of Agricultural Engineering working on mechanical threshers • No agro-processing companies in the districts
Low production and aggregation of small grain	• Recurrent droughts and climate change • Little to no inputs used • Small and fragmented production areas • Poor seed varieties used • Recycled seed • Lack of crop rotation • Poor agronomic practices • Birds attacks in small grains • Lack of information on markets • Traditional Mindset • Poor postharvest handling • Lack of threshing equipment • Bad road networks • Lack of transportation from aggregation centres	• Drought tolerance and climate change adaptability of small grains • Contract growing support • COE strengthening • Use of CSA practices • Presence of seed companies producing small grains and legumes • Presence of NGO in capacity building • ZARI developing new high yield varieties and varieties not prone to bird attacks • Presence of technology companies to make equipment
<i>Groundnuts</i>		
Low yields	• Use of low vigour retained and recycled seed • Poor soil and water management • Poor soil nutrition management • Poor pest and disease management • Poor seed quality (too many off types during seed multiplication) • Little to no inputs used	• Improved varieties available • New improved varieties being introduced on the market
Poor access to markets	• Aflatoxin contamination	• Processors currently importing groundnuts

	- Limited information on available markets - Control of market forces (monopoly within the markets)	- Aflasafe technology for the control of aflatoxin - Community ability to process into end products
Poor Shelf life	- Poor storability - Poor post-harvest handling abilities and facilities	Availability of shellers and processing equipment for on-farm processing
<i>Cowpea</i>		
Low yields	- Poor pest and disease management - Poor soil nutrition management - Poor soil and water management - Fragmented production - Little to no inputs used	- CBI has developed 9 improved varieties - Climate change adaptation and drought tolerance - Varied crop uses (grain and leaves- food and feed)
Limited markets	- Limited research on uses of cowpea - Low market preferences - Limited commercial product mix to promote uptake	- High nutritional values - Availability of traditional food processors

Areas for further investigation under the community engagement component

- Soil improvement and management techniques to improve soil fertility
- Product development and consumer sensitization for small grains and cowpeas, effective was to change consumer behavior towards consumption of traditional grains and legumes
- Management of aflatoxin levels in groundnuts and development of tolerant varieties to aflatoxin
- Easy Ways of threshing small grains (piloting affordable mechanical equipment for the SHF)
- Linking grassroot value addition to the large-scale processors
- Socio-economic development of COEs/associations/cooperatives
- Annual demand estimation for targeted commodities in Zimbabwe and Zambia

2. Private Sector

Table 5 : Private sector Engagement constraints and Opportunities

Constraint	Causes	Opportunity
Inputs (Seed and Commodity)		
Absence of an EGS demand projection system	There is absence of an EGS demand projection	Creation of a formal centralized process in which demand for EGS is captured and informs how much

Under-capacity of breeder seed	•Lack of Funding for Public Research Institute (ZARI /CBI) •Heavy reliance public research and breeding institutions which are underfunded especially by upcoming or small seeds houses	basic and breeder seed needs to be produced in a set time horizon
Lack of Funding for Public research Institute (ZARI /CBI)	•Under-capacity of breeder seed production and poor seed quality	Support breeders so that they can also produce seed off-season to meet the demand.
Small seed companies' heavy reliance on public research institutions which are under funded	•Climate change and recurrent droughts and climate change	Support breeder seeds production by small seed companies to come up with own breeding programme
Poor seed quality		Investment in irrigation systems to support smallholder seed system

Production

Resource-intensive certification system	•Resource-intensive certification systems which require lots of skills and investment by farmers •Low levels of private sector involvement in basic and commercial seed production of OPVs –Large companies investing more in hybrid seeds production	Seed growers and smallholder farmers having access to finance to invest in seed and commodity production, and best agronomic practices.
Lack of private sector involvement in basic and commercial seed production of OPVs	•Limited awareness of the business case to invest in OPVs	Formation of more COEs and Out-growers to serve as seed supplier hubs to smallholder households within communities at affordable cost
Limited awareness of the business case to invest	•Lack of access to finance for seed producers and smallholder farmers	
Lack of access to finance for seed producers and smallholder farmers		

Storage, Transportation, and processing

Insufficient storage facilities for both seed and commodity grower	•Weak or poor aggregation models for both seed and commodities •Insufficient storage/warehouse facilities for both seed and commodity growers	Capacity building in terms of improving post-harvest processing, handling and storage technologies that minimise on labour requirements, yield and nutrient loss.
Lack of mechanization for seed growers and value addition for commodity farmers	•Lack of mechanization for seed growers and value	Cross learning between Zimbabwe and Zambia in terms of agro-technologies especially threshers for small grains

Lack of access to modern technologies for SMEs in the processing industry

addition for commodity farmers; absence of appropriate threshing technology

- Lack of access to modern technologies for SMEs in the processing industry

Marketing

Limited market for small grains seeds and commodity

- Market is dominated by large seed houses which have considerable influence of seed policies in the country

Creating awareness at all levels about the benefits of OPV for smallholders

Lack of promotional awareness campaign

- Poor marketing budgets by small seeds companies to match the established companies

Identification and promotion of site-specific nutritious OPVs for the target crops

Lack of promotional budget for SMEs

- Poor marketing skills because of poor budgets

Working with small seeds houses to build their internal capacity and develop business and marketing plans

- Low demand of OPV seeds as farmers see hybrid as superior

High producer price for small grains in Potential to work with SMES to tap into export markets

- Weak business models-upcoming seed companies aligned to developmental

Improvement of market information systems so that farmers are aware of the advantages of OPVs and influence behavioral change

3. Policy and Action Research

Zimbabwe

- The legal framework that currently exist in Zimbabwe does not incorporate the informal seed systems leading to siding of small holder farmers who for a long period of time have been collecting, selecting, crossing, testing, multiplying and storing their seed without formalized quality control.
- Smallholder farmers' indigenous knowledge systems relating to seed varieties are not adequately protected although Zimbabwe is party to the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) and the WTO TRIPS Agreement and other regional instruments which emphasize the importance/ need of formulation of national policies and legislation to support the activities of small holder farmers
- It is to be noted that Zimbabwe enacted its Plant Breeders' Rights Act to protect new plant varieties by borrowing heavily from the UPOV Convention particularly the DUS (Distinct, Uniform and Stability) criteria.
- In developing countries Intellectual Property Rights (IPRs) are viewed as an obstacle to access the transfer of technology as well as the purchase of seed

- Current seed laws may hinder farmers from acquiring seeds to the extent that only registered and /or certified seeds may be offered in the market by registered sellers.
- Formal registration and public marketing of farmers' varieties may be very difficult if requirements to be met are the same as those posed for the formal sector.
- Registration of farmers' varieties is difficult given legal requirements regarding DUS/VCU testing and seed certification.
- Registration of farmer seed enterprise is difficult since the laws demand meeting of seed certification standards.
- The Smallholder farmer (SHF) seed system is not fully recognized under the Plant Variety Protection (PVP) law resulting in the exclusion of important crops from dietary, food security and diversity perspectives. There is a huge risk of loss of genetic biodiversity and agro biodiversity.
- The lack of recognition for traditional farming practices of saving, exchanging and trading farm-saved seed.
- The SHFs' rights are not recognized in the current PVP law resulting in the communities not receiving recognition for their innovations.
- The processing of sorghum, pearl and finger millets present labour bottlenecks especially among women farmers. The need for mechanization in the processing of sorghums and pearl millets cannot be overemphasized.
- Barriers such as taste and colour of pearl and finger millet products present utilization challenges especially among the young despite the high nutritional values in these products.

Zambia

The seed sector in Zambia plays a pivotal role in crop productivity and production among all categories of farmers. Seed accessibility, which is impacted by several factors, including price, quantities of available seed, seed type and quality. Smallholder farmers are affected by several challenges, which have emerged over time as the seed sector developed. These include the following:

- Low consumption levels for small grains and legumes:** consumption levels for small grains and some legume crops such as cowpea are generally low. This is partially attributed to policies biased towards maize production, marketing and value addition or processing.
- The traditional knowledge system** of smallholder farmers and communities is **not recognized** and protected.
- Inadequate seed supply of other crops other than maize:** Most large seed companies in Zambia have concentrated on hybrid maize, as it is considered the most economically viable crop. This has left most of the traditional crops such as groundnuts, beans, sorghum, millet and cowpea, as well as Open-pollinated (OPV) maize largely unattended to, resulting in inadequate availability of seed of local crop varieties and therefore reduced access to seed by smallholder farmers, which negatively impacts on household and national food and nutrition security.
Access to local seed is also difficult because these are only available in very small quantities and in the hands of few farmers. This contributed to loss of crop diversity in local traditional crops.
The role of the informal seed system in filling this gap, especially in outlying rural areas, is seen as critical in improving crop production and productivity among most smallholder farmers. Poor access of seed of local varieties by smallholder farmers is one of the recognized factors limiting crop and food production.
- Lack of standalone national seed policy:** The current agricultural policy does not provide adequate guidance to the operation of the seed industry. Stakeholders have been advocating for a specific and coherent seed policy framework that will provide a conducive environment necessary for both public and private sector initiatives to thrive in the seed

industry. Many stakeholders desire a standalone national seed policy as opposed to the current situation where the seed policy is embedded in the agriculture policy. A national seed policy drafted in 1999, aimed at addressing the interest of key actors, including smallholder farmers could not be adopted as a standalone policy, but was integrated into the National Agriculture Policy (NAP). The NAP, however, is very limited in its coverage of seed issues and does not in any way address the informal seed system.

- v) **Lack of information on effective demand for certified seed among smallholder farmers:** There is currently lack of clear information on the actual demand for certified seed for a number of crops by smallholder farmers. It is generally perceived that such demand is limited, and is the main reason for the poor attention given to other crops other than maize by seed companies to engage in the seed production and supply for most of the crops grown by smallholder farmers.;
- vi) **Inadequate access to seed of preferred varieties by smallholder farmers:** Apart from maize, seeds for most traditional crops grown by smallholder farmers are not readily available and accessible, partly because seed companies do not produce and distribute seed of these crop varieties. Secondly, farmers' varieties are excluded from the national variety register. Although traditional farmers' varieties are widely used by smallholder farmers in Zambia, there are no policies or legislation to enable their registration on the national variety list, making them legally ineligible to be included in commercial seed production. The current variety registration system, administered by SCCI, sets conditions that make it difficult to register farmer varieties. The focus of the registration system on very few crops and varieties contributes to narrowing of crop diversity on farm, thereby limiting smallholder farmers' adaptive capacity and resilience especially in the light of climate change. The current seed legislation, covering both variety release and registration, and seed certification, quality control and marketing, is largely aligned to the UPOV model, which is largely based on DUS and VCU;
- vii) **Lack of progress in domesticating some regional and global agreements:** The global agreements which Zambia has signed and ratified, that has provisions addressing the interests of smallholders' farmers and communities include the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) and the Convention on Biological Diversity (CBD). The lack of progress in domesticating these and related agreements that are related to the promotion of crop diversity and food and nutrition security has negatively affected smallholder farming communities. Of particular interest to smallholder farmers and the farming communities in which they are found is the article dealing with the rights of farmers under the ITPGRFA. Implementing provisions of this article, would have positive impacts on the farming systems of smallholder farmers.
- viii) **Exclusion of farmers and community rights under the PBR Act:** The enactment of the Plant Breeder's Act of 2007, which excludes farmers and community rights is a contradiction to the objective of the national agriculture policy which recognizes the importance of the informal seed system.

Government's Plans to join UPOV 1991: Reported plans by government to seek membership to UPOV under 1991 convention poses concerns to a number of stakeholders who fear that this could introduce more restrictive conditions concerning farmers privileges.

Table 6 : Constraints and Opportunities in Action research

Constraints	Causes	Opportunities
Farmer seed systems remain informal and smallholder seed production faces more challenges compared to commercial	- Seed systems in Zambia and Zimbabwe mostly favouring formal seed production. - Underlying limitations in smallholder farming, e.g. small land area in irrigated sites in view of isolation distance requirements, resources limitations, limited technical, knowledge and institutional capacities.	Smallholder farms can offer platforms for conserving and multiplying seed of landraces while offering a platform for the multiplication of EGS and the production of commercial seed. Development of the capacity of smallholder women and youth farmers to become trainers and to be confident entrepreneurs on seed production and marketing can improve their livelihoods.
Low seed quality and low productivity in small grains and legume seed and commodity crops	- Poor quality germplasm / seed including low quality Early Generation Seed - Low soil fertility – the soils in most of the production areas are inherently low in nutrients, coupled with repeated extractive farming practices, which do not replenish the nutrients. - Low rainfall, poor moisture retention by the largely sandy soils, limited supplementary irrigation and limited knowledge on in-field water harvesting and soil moisture conservation - Poorly adapted varieties - Pests and diseases pressures (e.g. aphids and beetles on cowpeas with high levels of agrochemical use; birds on sorghum and millets; aflatoxins in groundnuts, etc.) - Low integration of crops and livestock management and synergies - Low crop husbandry and management practices accorded to the small grains and legumes	- Local seed banks, good quality seed of OPVs possible, upgrading storage facilities for EGS - Tolerant varieties – existing and potential hybrids and OPVs - Demonstration of suitable agroecological management practices that can enhance soil fertility and impart resilience - The target districts are key livestock areas – better management and utilization of livestock and farmyard manure in crop production - Green manures (sunhemp, mucuna, jackbeans, etc) - Agroforestry – N-fixation and prunings, improved rotational fallows using leucaenas, acacias, gliricidia, sesbania, etc. - Rotations and mixtures / intercropping with food legumes (small grains and legumes intercropped with companion crops or plants, and the application of Push-Pull Systems) - Plant leaf / manure tea extracts (e.g. tithonia leaf tea) - Water harvesting practices - Locally available materials used in olden days to control pests – indigenous knowledge practices - Improving production and post production practices can reduce problems such as aflatoxin in groundnuts, sorghum and other crops - Increasing health consciousness among consumers for food safety and human health, and the increases in fuel and fertilizer prices favour organic and agroecological practices
Low uptake of small grains and legumes	- Lack of seed, or of good quality seed - Labour bottlenecks for production and processing - Taste and dietary preferences	Climate change negative impacts are driving farmers towards small grains and legumes

	• Limited knowledge on health benefits • Limited knowhow on processing and preparation of delicious products, meals etc. • Cultural beliefs and norms • Limited promotion and awareness on small grains and legumes and their nutritional and health benefits • Perceptions that these crops are for the poor	• Market opportunities – domestic and export – for niche organic and agroecologically produced foods in addition to the conventional production • International Food Fairs and Events such as the annual Organic Biofach Event in Germany • Improved postharvest management practices to reduce pest damage and enhance shelf life • Household nutrition and health benefits, including opportunities for development of novel functional foods for local and export opportunities • Youth business incubations – related to technological innovations and product development and processing for food, feed, fibre and other products • Government strategies on small grains and legumes in Zimbabwe • 2023 the UN Year of Millets • Potential incentives for the agroecologically produced seed and commodity through price premiums, linkage with credit and insurance schemes, climate change adaptation and mitigation initiatives • Informing / training / equipping the mainstream and social media actors to be wide disseminators and advocates for small grains and legumes • Disruptions in global wheat supplies call for the need to develop long lasting alternatives, including wheat flour blending with small grains flour and other flours
Labour intensity in small grains and legumes production	Limited or lack of suitable options for mechanized production – women are mostly responsible for small grains and legumes and impacted more by high labour demands	• Mechanization options at various levels • The youth who are technologically savvy can innovate in machinery prototypes and adaptations
Low funding to action research in public institutions and low technical capacity related to seed and commodities for small grains and legumes	• Low allocations from the national budgets, low earnings from royalties, low donor funding, low income generating activities if permitted) • Vacant positions for breeders and high staff turnover, low numbers of seed inspectors to meet the increasing demand • Poor facilities, including the lack of appropriate breeders seed storage facilities, transport and appropriate equipment and laboratories and recurrent budgets for consumables • Poor roadmap for breeders seed demands - ineffective mechanisms for estimating the demands for breeders seed. This is often confounded by climate change – e.g. late start to the	• MASAP directly facilitating some activities through small grants • Honouring of varietal royalties by private companies can improve incomes to breeding institutes • Synergies with other programmes – e.g. on seed inspections • Innovative integration of Internal Savings and Lending Schemes (ISALS) to support farmer research groups

season or droughts can lead to fewer planted hectares resulting in higher seed returns and carryover seed that then demands good storage facilities in order to maintain viability until the following season.

- Developing of a good forecast method will also mean that some down payments are made to the Crop Breeding Institutions by the purchasers of breeders seed in order to show commitment.
- Sometimes emerging seed companies demand larger quantities of breeders seed in order that they skip the foundation seed multiplication and go straight into commercial seed production using the breeders seed

Overlaps
potential
competition

and

- Limited exchange among stakeholders on seed and commodity crops
- Conflicting programmes and approaches, e.g. Farm Input Subsidies and agro-ecological approaches

- Innovation platforms that are well coordinated and facilitated can help collaboration and participation while
- Horizontal evaluation approaches have been shown to enable effective cross-learning and sharing
- Existing sources of information, e.g. on agroecology and organic in both Zambia and Zimbabwe, the region and beyond
- African Organic Agriculture Training Manual
- The KCOA (Knowledge Centre for Organic Agriculture in Africa) programme where Zambia is one of the key countries in Southern Africa
- National organic agriculture and agroecology movements
- Complementarity of activities, e.g. inclusion of small grains and legumes in Farm Input Subsidy Programme packages for distribution to farmers strengthened with good technical capacities and monitoring and feedback mechanisms with producers
- Evidence basis for informing decisions, practice and policy

E. COMPONENT VISION, STRATEGIES AND ACTION

This section draws on the constraints and Opportunities analysis with the vision for each component providing a strategic direction for implementation, containing a clear response which identifies the interventions required and the affect that they will have on 'correcting' or 'improving' the functioning of the market system where the target group is engaged (i.e. in terms of competitiveness, output, and impact on the poor).

1. Community Engagement Component

The Component seeks to ensure that the following benefits are realised by the Smallholder Farmers.

- Self-confidence and collective implementation of economic, social and cultural activities
- Enhanced economies of scale in marketing and inputs supply. Marketing in bulk enabling to fulfil the quality and quantity condition of the market and therefore accessing good price at minimal costs.
- Enabling small producers to join to access market to acquire or increase the value they produce
- Enabling SHFs to raise capital and access quality seed at affordable prices
- Provision of products and services required by users such as education through trainings, insurance, water, energy, transport, and finance.
- Enabling low-income people build joint ownership
- Empowering and enabling women and youths to eliminate any form of gender discrimination
- Creating management systems that encourage better performance and without bias or partiality Surplus generated from the operations of the COEs is appropriated to members according to their participation
- Members to get good quality products and services at reasonable prices
- Increased bargaining power of members for their products in the market

Component Vision: MASAP vision towards Community Engagement is to ensure well developed, strategically positioned and competitive COEs on the small grains, cowpea and groundnut seed and 'commodity markets ensuring increased utilisation of improved and diverse seed varieties of small grains and legumes contributing to resilient livelihoods of smallholder farmers in Zimbabwe and Zambia

Figure 3 : MASAP Leveraging Actions



Strategies

- Consolidation of COEs/Associations/Cooperatives (group and individual level) within the operating districts and undertake needs assessments and understanding of their business case for the development of capacity building and training plan.
- Establishment of new and revamping/strengthening of existing community-owned enterprises or associations leading to the recruitment of SHF (direct and indirect beneficiaries engaged in seed and commodity production)
- Undertake gender analysis to understand women and youth involvement in the seed value chain ensuring 60% of beneficiaries in the seed value chain are women and youth.
- Promote agro-ecologically friendly and climate sensitive approaches in OPV seed and commodity production of pearl millet, sorghum, groundnut, and cowpea ensuring a 30% increase in income and food and nutrition security for the SHFs.
- Facilitate stakeholder dialogue and strengthening, avoiding creation of parallel structures but working within and strengthening existing structures. Understanding missing links, challenges, and nuggets for improvement in COE strengthening and seed value chain development and strengthening.
- Improving the outreach and strengthen the business planning of 50 private sector value chain actors targeting those with a potential for scaling up in the subsequent phases.
- Undertake a step-by-step developmental process with the COEs from governance strengthening into business planning and execution, providing technical assistance strengthening strategic planning processes; improve governance and accountability structures and strengthening linkages to markets and institutions without creating parallel structures.
- Conducting Exchange visits to successful and failed (where possible) COE intra and inter-country for appreciation and extensive learning

Table 7 : Community Engagement Interventions

Area of Intervention	INTERVENTIONS	Results	Other Initiatives	Donor
MARKET ACCESS	• Market survey, Research • Development of buyers database per specific value chain • Market Linkage • Development of marketing plans • Market information platform (Digital)	• Farmers have sustainable market • Buyers database developed • Improved and up to date Market knowledge	• GIZ • WFP • UNDP-ZRBF	
Engagement of COEs/Farmers/Seed growers	• Development of selection criteria of COEs and seed growers • Scoping of producer groups, seed growers and already existing COEs • Assessment of already existing COES • Engagement of COES/Action plan development • Assessing the needs of smallholder farmers	• COEs recruited • Farmers engaged and recruited • MOUs signed with COEs • Implementation of activities	• CNFA • EDGE • We Effect • Oxfam-SD=HS • ZimSOFF	

	• Sensitization of smallholder farmers about the project and crops (target value chain) • Youth/Women involvement survey • Review of constitution/By-laws • Participation of COEs in district shows to showcase their products • Contracting farmers through Seed companies like Afriseed, GNA, Kamano • Stakeholder engagement		
Seed Production and Multiplication	• Engaging ZARI to breed high yielding and adaptive varieties • Variety registration, ownership, testing and release • Identification and registration of seed growers in targeted districts • Training Seed growers in participatory plant breeding and other requirements of seed growers • Seed certification • Seed sampling • Distribution of EGS to seed growers • Field inspections of seed crops • Creating awareness about export and import of seed • Maintenance of released varieties/cultivars	• High yielding and adaptive varieties registered • Quality seed produced • Early distribution of high yielding seed	• GIZ • SKI

Production (Cowpeas, pearl millet, Groundnuts, Sorghum)	• Development of production manual for Cowpeas, Sorghum, Pearl millet and groundnut • Sensitization of smallholder farmers about the project and crops (Value chain) involved • Promotion of diversified diets and nutrition • Setting of demonstration plots • Farmer fields schools plan(CSA & GAP) • Development of Value addition techniques • Integrated pest and disease management (inclusive of biological control) • Postharvest handling techniques training • Quality control and assurance training • GIS platform • Participation of COEs in National and district seed fairs and field days	• Improved and increased production and utilization of small grains and legumes seeds and commodity • Higher and stable crops yield and Improved farming practices. • Increased access to certified seed of small grain and legumes • Consumption of nutritious diets.	• CNFA • EDGE • We effect • GIZ • Oxfam • ISSD- Bioversity International • NAZ • BMZ-MANA • FAO
Soil Improvement and management	• Conducting Soil testing • Introduction of simple soil testing techniques • Development of innovations and techniques to improve soil fertility • Production of compost from manure or plant residues, cover crops, and legumes • Development of an integrated soil management system • Water management and surveys in Sioma • Undertake Soil Surveys and Studies to provide a national soils and land resources inventory for judicious use for sustainable agricultural development • Evaluation of soil fertility enhancing technologies	• Improved soil fertility and soil structures • Have a soil and land inventory	• SNV • GNA • GIZ
Business Development and management	• Developing a capacity building workplan to strengthen the COEs in Governance, financial management, Entrepreneurial, member commitment, Youth involvement, Female leadership, and sustainability plans • Business/Strategic development plans	• Well-governed and managed community owned enterprises and associations • Business oriented COEs	• EDGE • CNFA • GIZ

	• Development of aggregation models • Business Model development • Stakeholder engagement • Stakeholder network platform event • Social media platform development (Twitter, Facebook) • M & E Mentorship and coaching	
Youth and Female involvement	• Assessing youth and women involvement within the value chain at farm level • Assessing needs of Youths and women within the value chain • Formation of youth and women groups • Capacity building in leadership and business management • Revision of gender policy and regulations • Develop a youth trajectory • Develop business models for youths and women • Exchange visits (Peer to peer learning) with already existing groups • Mentorship and coaching in all activities	• Roles, voices and needs of women, youth and vulnerable groups are recognized and supported. • Youth and women groups formed • NGOCC • We Effect • SNV • GIZ

MASAP appreciates that it is working in a market system where COEs/Associations have performed, albeit poorly and the four value chains sorghum, pearl millet, cowpea and groundnuts have been piloted with minimum success. MASAP will not create parallel structures and systems but through needs and capacity assessments, will improve existing systems and structures of COEs enhancing viability and sustainability. Any new COEs will go through a business process review where they outline needs and aspirations and map their developmental pathways. This will enable the COEs at group level to engage like-minded individuals into their systems and understanding business developmental pathways will ensure development of strong governance, financial and business management systems, and structures. The project will ensure that a mentorship and coaching plan is developed e.g. business management, financial literacy and financial inclusion (to mention a few) to enable continuous coaching and mentorship and to ensure understanding, appreciation and growth by COEs.

In seed value chain development, MASAP will stimulate commodity demand by consumers and private sector players. Consumer preferences form the basis for food commodity demand for the four value chains. Therefore, massive effort is supposed to go towards promotion of four commodities through nutrition awareness. Advertising, awareness campaigns, food tasting sessions, testimonials are all important strategies that will be employed to stimulate commodity demand. The MASAP will not walk alone in this endeavour but will work with appropriate research institutions and private sector commodity processors to raise the nutrition flag of these under-utilised but highly nutritious food crops.

The four value chain crops are not only important for food but also as feed in the livestock market. The livestock feed processors will also be engaged to understand and appreciate their requirements and

stimulate demand to use small grains, groundnut cake and cowpea in feed formulations. This will stimulate demand for increased seed and commodity production.

The MASAP team are facilitators to the whole process whilst the different market actors will have direct interface with the farmers (COEs) for better market understanding.

2. Private Sector Engagement

Strategies:

- Provision of technical assistance and catalytic funding- involves mobilise and support private sector involvement and provide catalytic funding, facilitate PPPs, as well as partnerships confirmed by concrete contracts.
- Innovation grants- Facilitating design of innovative technologies for production and value addition which will be adopted by farmer groups and other small-scale value chain actors (mainly women and youth), incentivised through the awarding of small-scale innovation grants.
- Development of inclusive business model through direct engagements with private sector value chain actors to improve their outreach and strengthen their business planning, focusing on those with a potential for scaling up or out during the subsequent phases of the project.
- Facilitating concrete contract arrangements between farmers and seed houses/ off-takers, mobilise farmer groups and associations, and promote stakeholder engagement, including the food processing sector and commodity buyers
- Engage with financial institutions to design appropriate products for all value chain actors

Component Vision: The MASAP Private Sector Engagement strategy strives to develop commercial oriented, purpose driven partnerships that deliver a meaningful inclusive impact to the Small Holder Farmers engaged in the four MASAP value chains.

Table 8 : Private Sector Engagement Interventions

Area of Intervention	Description of Intervention
Access to appropriate finance (including Asset finance)	• Developing appropriate Technologies to support seed producer and grower investment. • Design appropriate financing mechanism e.g. Deploying short term credit guarantee facilities to the COEs and SMEs • Support through market linkages SHF access to on-farm processing technologies to create value addition (e.g. small scale mechanisation, processing or innovation). • Designing tripartite financing schemes involving seed/commodity farmers, seed companies/off takers and financial institutions, whereby seed grower contracts and off take agreements can be used as collateral to access finance by farmers who do not have the required security to borrow against.

Development of Business Models	- Targeted technical assistance at firm/COE level to co-design and test new and inclusive business models - Support the private sector engagement in the Small holder markets by bringing additional SHFs into the seeds value chains throughout-grower schemes, contract production and/or established sale contracts with COEs (Women and youth groups) or associations
Support to Grain Aggregators and traders	Developing the capacity of the Medium and small-Scale trading sector to undertake the critical aggregation, storage and transport role in rural grain markets in a more efficient, less risky manner with greater benefits for the smallholder farmers
Support to Financial Institutions to develop innovative credit models	- Support FIs develop, test and promote a robust equipment leasing model for emergent farmers and mechanized service providers - Support leasing companies to expand into the smallholder contracting market through establishing partial credit guarantees
Support to COEs and SMEs to increase service provision business capacity	- Support training of COEs and SMES in business, marketing and financial management, in conjunction with interested private sector IP or Service provider such as Banks, Seed companies, Processing companies, fertilizer and agrochemical companies - Support to agricultural equipment suppliers or owners to establish a tractor/Sheller/Thresher operator training process to ensure the evolution of a cadre of trained, certified, and capable operators
Establish PPPs in EGS production and marketing	- Creation of a formal centralized process in which demand for EGS is captured and informs how much basic and breeder seed needs to be produced in a season to avoid of ZARI/CBI/Seed Companies produces small amounts of breeder seed and supplies it to seed producers on an ad hoc basis. - Support the forecasting and budgeting of EGS demand to able plan EGS production to supply the market.
Market Research and marketing strategies to influence consumer behaviour.	Support market research institutions to get insights of into consumer patterns/behaviours and how to implement strategies to increase adoption and consumption of traditional grains

3. Action Research

Strategies

- Analysis of, and building onto, the core functions and comparative advantages of national, CG and private (including NGO) entities in conducting action research on small grains and legumes seeds and commodity – identification of key needs of the different categories of the Action Research Players, particularly of the NAROs to enable them to continue with their key mandate of varietal release and provision of good quality EGS; and Farmer's Seed Sovereignty and Rights).
- Enhancing funding support to the relevant NAROs, directly from MASAP for building up and/or improving the facilities and methodologies that are key for seed and commodity value chains, and facilitating the private sector to honour their obligations on varietal royalties towards the NAROS.
- Innovations in the integration of suitable agro-ecological approaches (including testing of appropriate mixed cropping; strengthening community seedbanks; and greater involvement of traditional leaders in agrobiodiversity conservation) in seed and commodity crop production, handling and storage for enhanced quality of EGS (both Breeders and Foundation) and commercial seed.
- Greater integration of climatic information and forecasts in planning and advance decision making by stakeholders / actors for a more-informed decision making.
- Promotion of greater collaboration and synergies while reducing overlap and potential competition among the Action Research actors, and to leverage on limited resources.
- Women and youth responsive technological developments and innovations to address the labour related challenges associated with small grains and legume production and processing.
- Innovations in product development (standard and niche), food preparation / processing techniques that enhance nutritional value and sensory properties for greater acceptability by users and or consumers. These hold potential for business incubations among women and youth.
- Capacity development (technical and 'infrastructure'-related) for enhanced action research along the value chains (women and youth farmer research teams at village level, village level agroecology champions comprising women and youth, mainstream research and extension staff, etc.)
- Participatory market (local and export) development approaches for agroecologically produced raw and processed products from small grains and legumes – with suitable packages and packaging, messaging, labelling, and traceability
- Analysis, documentation and consolidation of evidence (intended and unintended benefits and any trade-offs) from MASAP, and other similar projects such as SKI, for strengthening the evidence basis to contextualize decisions, policy dialogue and reforms.

Component Vision:

Small grains and legume seed and commodity value chains that are supported with sound data, evidence and practical solutions to inform and guide practice, decisions, legislations, and policy dialogue and reforms in Zambia and Zimbabwe.

We envisage action research to be a key requirement throughout the value chain of the target small grains and legume seeds and commodities, including the cross-cutting socio-economic, cultural, climatic, and other issues.

Figure 4 : Participatory Action Research as an Integral Component of the MASAP Components

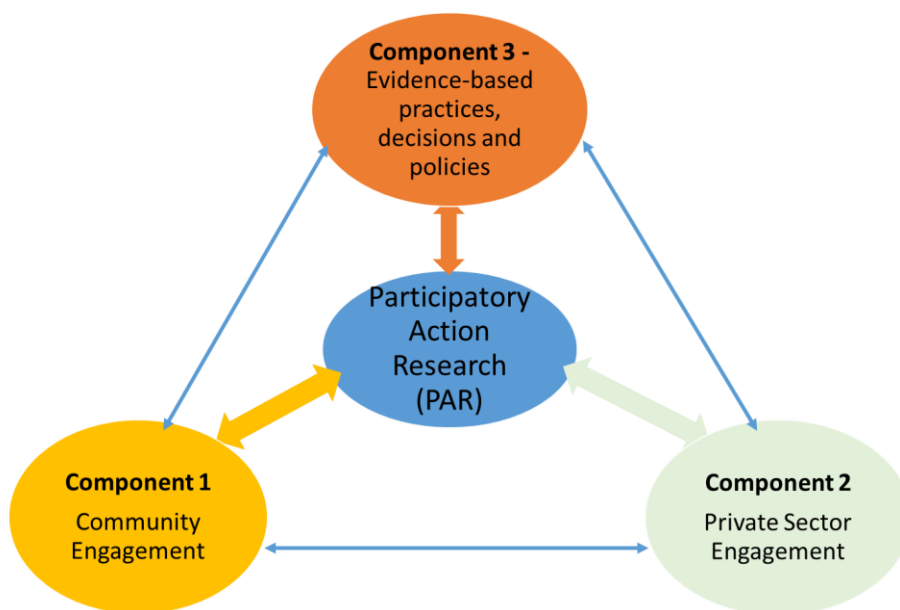


Figure 5 : Importance of Participatory Action Research at all levels in MASAP



Table 9 : Action Research Interventions

Challenge category and description	Possible Interventions	Stakeholders, synergy projects/ programmes	
Smallholder seed production faces more challenges compared to commercial	Participatory evaluation of the existing seed regulatory processes for their suitability to smallholder farmers (isolation distances, prohibition of intercropping, use of traditional seed protection methods, etc.) and the quality of seed produced. Activities will help to answer the question: <i>Is seed quality compromised at all by practicing agroecology, and by intercropping a seed crop with suitable crops (e.g. cowpea and sorghum / millet)?</i>	- National Seed Services and Genebanks in both Zambia and Zimbabwe. - Breeding and Agronomy Institutes - Identified farmer organizations and civil society organizations and networks (members of AFSA, e.g. agroecology and agrobiodiversity network members)	
Low yields and overall crop and soil productivity - Low soil fertility, - moisture constraints, - Poor quality germplasm / seed including low quality Early Generation Seed - Poorly adapted varieties - Pests and diseases pressures (e.g. aphids and beetles on cowpeas with high use of agrochemicals; birds on sorghum and millets; aflatoxins in groundnuts, etc.) - low integration of crops and livestock management and synergies	- When farmers prefer their landraces, MASAP will facilitate refining and strengthening of the local level seed / germplasm conservation practices in community seed banks, support seed quality testing, multiplication of the seed, and comparative evaluations with hybrids along the value chain. - Support the national Genebanks to conduct collections for small grains and legumes, and to upgrade their storage facilities, greater use of Seed Fairs as possible sources of germplasm needs to be strengthened - Participatory evaluation of adapted or tolerant hybrid and OPV varieties with the communities and assessing for their acceptance along the value chains - Explore the development and registration of farmer varieties for the target crops which are better adapted to local conditions - Outgrower schemes as pilots for quality seed production, and aggregation options as well as distribution channels for various contexts - Participatory multiplication of good quality early generation seed at the community level – but with risk management strategies such as irrigation (explore the	Zambia - Government breeders in Zambia (ZARI) - Eastern Province – Chipata (Msekera Research Station and SCCI), Mount. Makulu Research Station - Western Province - Longe and Mongu Research Stations for Sioma, Sesheke and Kazungula; SCCI Sioma / Mongu, Mount Makulu Research Station - National Gene Bank of Zambia - Academic institutes (UNZA and others to be identified) dealing with agriculture (including plant breeding) - Private / Semi-private Research Entities (GART)	Zimbabwe - Government breeders (DR&SS) – Crop Breeding Institute in Harare and substations at: ❖ Mashonaland East (Mudzi) (HRC / Grasslands Research Station) ❖ Masvingo (Zaka) Makoholi Research Station ❖ Matabeleland North (Tsholotsho and Hwange) – Matopos Research Station - National Seed Services Harare - National Gene Bank of Zimbabwe - Academic Institutes (UZ, Marondera Uni of Science and Technology; Africa University) - Private Research Entities - CGIAR Centres

potential for using Seed Growers Contracts as collateral for borrowing to set up irrigation systems – ref. Seed Co. approach)

- o Along with seed for the target crops, good quality seed for agroecological approaches, e.g. for agroforestry, fodder and soil fertility improvement need to be multiplied
- Participatory development of integrated pest and diseases management strategies and techniques from production to storage – keeping in mind the human, soil, animal and general environmental health and safety
- Small grains and legume seed and commodity production as part of a farming system – what else do they grow with (including indigenous fruits and vegetables), what are they consumed with, etc.?
- Long term participatory evaluation of hybrids, OPVs and farmers' own landraces under different agro ecological practices (including in-field water harvesting) in the specific districts, and consideration of breeding for agro ecological management and adaptation
- Exploring greater synergies and addressing possible trade-offs between crop and livestock entities on farms – manure / fodder nexus
- Evaluation of various postharvest management techniques that are climate sensitive and help to preserve seed (EGS, Foundation and Commercial) and commodity crops and processed products
 - ❖ *Appropriate seed treatments e.g. hot water, seed coatings using plant extracts (turmeric, crushed garlic or clove-cinamon); coating seed with antagonistic microorganisms such as Trichoderma or pseudomonas species or acceptable chemicals like vinegar,*

- CGIAR Centres
- IITA
- ICRAF
- SADC SPGRC
- Cooperatives / Farmer Organizations / COEs / NGOs
- Mutukwa Mutukwa's Cooperative + WWF in Sioma
- Farmers Outgrowers Foundation (FOF) in Chipata
- Self Help Africa
- Cultivating New Frontiers in Agriculture (CNFA)
- CTDT
- Kasisi Agricultural Training Centre
- PELUM Zambia
- Regional Schools and Colleges of Permaculture (ReSCOPE)
- FAO, WFP – early recovery programmes
- Conservation Farming Unit (CFU)
- ZNFU – Zambia National Farmers Union
- Individual farmers – landraces and community gene banks
- SME / Emerging Private Companies
- Good Nature Agro (GNA)
- Kamano Seeds
- AfriSeeds

- ❖ ICRISAT – Zimbabwe (and Malawi, Kenya, India)
- ❖ CIAT Zimbabwe
- ❖ CIMMYT
- ❖ SADC SPGRC
- Coops / Farmer Organizations / COEs / NGOs
 - ❖ CTDO
 - ❖ Action Aid
 - ❖ Amalima Loko
 - ❖ PELUM Zimbabwe
 - ❖ Fambidzanayi Permaculture Centre
 - ❖ African Conservation Tillage Network (ACT)
 - ❖ River of Life?
 - ❖ Regional Schools and Colleges of Permaculture (ReSCOPE)
 - ❖ ZOPPA
 - ❖ ZIMSOF
 - ❖ FAO, WFP – early recovery programmes
 - ❖ Zimbabwe Farmers Union (ZFU)
 - ❖ CARE International / World Vision
- Individual farmers – landraces & community gene banks
- SME / Emerging Private Companies, such as:
 - ❖ Champion Seeds
 - ❖ Zimbabwe Super Seeds
 - ❖ K2 Seeds
 - ❖ Easiseeds

	• <i>copper salts, baking soda, or mineral oils, di-atomaceous clays and other materials for pest and disease control during storage</i> ❖ <i>Good drying and moisture control.</i> ❖ <i>Metallic silos; Hermetically sealable bags and vacuum storage; Modified atmospheres;</i> ❖ <i>Quality control and governance approaches mechanisms during aggregation</i> • Leveraging on Farmer Field Schools and Farmer Training Centres for the establishment and management of farmer-led demonstrations and research and learning. • Quantification of immediate, short term and long-term benefits and trade-offs in monetary and non-monetary (or economic and non-economic) – application of sustainability assessments to show the environmental, economic, social and governance sustainability of the MASAP interventions. Socio-cultural implications and taboos and norms related to small grains and legumes and livestock integration	❖ Mkushi Seeds ❖ and others
Labour intensity in small grains and legumes production and processing •	• Mechanization options for ❖ <i>Two-wheel tractors for land preparation and direct seeding</i> ❖ <i>Mechanical weeding with minimal soil disturbance</i> ❖ <i>Evaluation by women and other key community groups re: acceptance of the awned varieties such as Dola and 'tsvimbo yemupositori' millet and sorghum varieties</i> ❖ <i>Development of innovations to bird scaring in cases where farmers are not growing the bearded / awned varieties of sorghum and millets</i> ❖ <i>Testing of mobile seed shellers and cleaners (if they exist) – adaptation and</i>	• CIMMYT • CFU • Local artisans? • Youth as incubators and vehicles of technological innovations and exchange on labour saving technologies • and others • Institute of Agricultural Engineering • CIMMYT and African Conservation Tillage Network – regarding the two-wheel tractor prototypes • Tanroy and Grownnet Engineering (for threshers) • Local artisans • Youth as incubators and vehicles of technological innovations and

	<i>development of prototypes including the testing of smart ways which prevent the small grains heads and grain from meeting soil/grit</i>		<i>exchange on labour saving technologies</i>
Low capacity in Government institutions	• Capacity development at all levels for enhanced action research. • Facilitation with funding, and income generating initiatives • Explore possible funding opportunities from governments and donors in line with government and global declarations re: small grains and legumes • Exploring synergies with other other programmes which share similar development objectives	• All Government Action Research Actors along the value chains • External donor communities, including development banks • UN Agencies • Private sponsors – e.g. through crowd funding approaches	• All Government Action Research Actors along the value chains • External donor communities, including development banks • UN Agencies • Private sponsors – e.g., through crowd funding approaches
Low uptake and consumption of, and low value attached of the target small grains and legumes s	• Better analysis and understanding of the specific needs of various groups including women and youth • Better documentation and innovative dissemination (including the use of influencers) of the published nutritional and health benefits of small grains and legumes and their implications to human health and development indicators • Assessment of nutritive values and anti-nutritional factors when different production, processing and storage methods and practices are used. Innovative exploitation of varietal differences in health benefits, e.g., the differences in functional properties of dark and light-coloured sorghums. • Preparation (processing and cooking) education and training in schools and communities – linkages with nutrition gardens concept. Operationalization of existing recipe booklets (the Health and Nutrition Technologies Recipe Book in Zimbabwe) and other sources of cooking and food preparation methods. Engagement with	• Food Scientists and Technologists from Universities such as UNZA • Zambia Scientific and Industrial Research and Development Centre • Ministry of Health • Nutrition Council of Zambia (including ZAMVAC) • Restaurants – public and private • Cooking schools • Individual chefs • Emerging processing initiatives • Media – training on how small grains and legumes • Crop breeding Institute	• Food Scientists and Technologists from Universities such as UZ, Lupane, Chinhoyi • Scientific and Industrial Research and Development Centre (SIRDC) or equivalent • Ministry of Health and Child welfare • Nutrition Council of Zambia (including ZIMVAC) • Restaurants – public and private • Cooking schools • Individual chefs • SMEs in processing initiatives such as Hutano Foods, Orsha Wholesome Foods, Lily's Natural Foods, and othersMedia – training on how small grains and legumes • Crop breeding Institute

	cooking schools and restaurants and prominent chefs to develop innovative products from the target crops, and leveraging onto the Food Festival Platforms, for example in Zimbabwe the Coordinator of the Traditional Food Festival proposed to decentralize the Annual event to district level – the MASAP project districts could be the pilots. • Technological innovations in packaging, processing, e.g., fermentation, malting, and other processing methods have been shown to significantly improve the nutritional value of sorghums and other crops. • Combining sensory tests and other farmers/user's preferences and agronomic performance traits for a better characterization of varieties into demand-led breeding and selections.	
Limited and unstable markets	• Understanding the needs and preferences of different markets and market segments • Applying participatory methods of market development, e.g., the Participatory Market Chain Approach for the identification and implementation of business opportunities oriented to local and export markets. ❖ <i>Including piloting of digital approaches such as ESoko and E commerce for linking consumers to markets and product sources that are also enhanced by social media influencer marketing and outreach</i> ❖ <i>Compatibility of the digital platforms with mobile phones used by farmers is important.</i> • Branding on healthy diets and niche markets and/or specialty diets ❖ <i>Baby weaning foods</i> ❖ <i>Diabetics</i> ❖ <i>Celiac disease</i> ❖ <i>Healthy lifestyles-oriented consumers</i> • Traceability and compliance to standards, e.g., organic	• Ministries of Trade and SMEs in both countries • Universities and policy research organizations such as IAPRI, ZEPARU, FANRPAN • Emerging private sector companies on small grains and legume commodities • Regional bodies on trade – SADC, COMESARegulatory and certification entities • Media
Limited collaboration – working more in isolation (silos) than building onto comparative advantages (also conflicting	• Documentation of success approaches to community and multi-actor engagement • Apply innovation and networking platforms at all levels • Horizontal evaluations of action research initiatives – annual at	• All key Action Research Actors along the value chains • FISP actors / stakeholders • All key Action Research Actors along the value chains • Input support programme actors

programmes and approaches, e.g., Farm Input Subsidies versus some agro-ecological approaches)	village, camp, block / ward, district and cross district levels • Learning tours, virtual and face-to-face exchanges, integration and linkages through innovation networking platforms
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Possible solutions in strengthening the Government Seed Policy and Legal framework

- There is a need for an integrated seed system development to formally recognize the huge contribution of small holder farmers towards attainment of seed, food and nutrition security. Thus, the merits and demerits of these systems are supposed to be interrogated and appropriate recommendations proffered to policy makers.
- There is need to re-design a new PVP system reflecting on the country's interests, particularly on the issue of Farmers' Rights as contained in the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), which entitles farmers to be recognized and rewarded for contributing to the conservation and the improvements they have made over centuries. Small holder farmers need to be recognized and rewarded for their effort in conservation of genetic resources. Such recognition and rewards will spur the smallholder farmers excel in their efforts to grow some of these crops that are marginalized by the formal seed sector.
- It is therefore important that the PBR legislation is in line with the International Treaty on Plant Genetic Resources for Food and Agriculture.
- It is essential to rationalize PVP policies and legislation to incorporate the informal seed system.
- The Article 27.3(b) of the TRIPS Agreement, which allows for the development of an alternative system where communities and indigenous people could protect their lifestyles.
- Article 8(j) of the Convention on the Conservation of Biological Diversity (CBD) provides an opportunity for the lifestyles of communities to be considered in relation to agriculture and access and benefit sharing mechanisms.
- The Food and Agricultural Organisation of the United Nations (FAO) Guidelines and the Intergovernmental Committee on Intellectual Property on Genetic Resources, Traditional Knowledge and Folklore (ICIPGR TKF) recognise that both seed systems are equally important and ultimately, they should complement each other.
- There is need to realize farmers' rights, through provision of a legal framework for farmers' rights based on the ITPGRFA. The Treaty should be fully domesticated at national level through enactment of appropriate policies and legislation.
- In defining a SHF in Zimbabwe, there was need to strike a balance between the provisions in the PBR Act (Sections 17(3) (c) and 17(3) (d) whose criteria include land size and percentage of earnings from farming. Zimbabwe has a differentiated PVP system in place.
- There is need for a policy framework that is supported by appropriate legislation on integrated systems that takes both seed systems into account. This is because neither of the two systems is sufficient on its own and the two are complementary and mutually supportive of each other.
- SHFs produce new varieties but these varieties are not acknowledged. This is unfair especially because the profits generated from the new varieties are not given to the SHFs. The seeds

are taken from Zimbabwe, multiplied elsewhere and then resold locally, which demonstrates unfairness at play.

- Conduct awareness campaigns to sensitize the SHFs of their rights as some of them are not aware that they should be respected.

Possible Solutions/Interventions

- Promoting community-based seed enterprise development:** In order to address shortage of quality seed of traditional crops and poor access to seed by smallholder farmers, deliberate efforts should be made to support and promote community-based production and distribution of seeds of traditional crops grown by smallholder farmers. The model to be adopted in this intervention should pay particular attention to entrepreneurship development and creation of market linkages. The initiative should also be based on a wider crop diversity base involving locally adapted farmers varieties and adapted improved varieties. Efforts should make to create effective demand of certified seed among smallholder farmers and farming communities.
- Supporting the development of a standalone seed policy:** There is need to increase advocacy to push for the drafting and adoption of a separate standalone national seed policy that is comprehensive and addresses the interests of all key stakeholders. Such a policy should aim at promoting both formal and informal seed systems. This should involve a consultative process involving a broader range of stakeholders.
- Establishing effective demand for certified seed:** A survey, aimed at collecting data and information relating to demand for certified seed of traditional crops cultivated by smallholder farmers should be undertaken. There is also a need to embark on awareness creation campaigns on the benefits of using certified seed among smallholder farmers as a way of contributing to the creation of demand for certified seed.
- Supporting the development of farmer varieties registration system:** This would entail developing and adopting of a legislative framework that allows for registration of farmers varieties and the integration of the formal and informal seed systems. Ultimately this would lead to an increase in the use of farmers' varieties and increased access by smallholder farmers to seeds of their locally preferred varieties. This would build upon efforts currently being undertaken to develop the farmer varieties registration system in Zambia being spearheaded by the Community Technology Development Trust, Zambia (CTDT-Zambia).
- Support capacity building among smallholder farmers:** This would include enhancing the capacity of smallholder farmer groups and organisations to enable their effective participation in policy reform processes. An organized and strong farmer movement is necessary to facilitate more effective farmer consultations and engagement.
- Supporting national efforts to realise farmers' rights:** The realization of farmers' rights and its impact on the conservation of local crop genetic diversity could be achieved by bringing the Protection of Traditional Knowledge, Genetic Resources, and the expression of folklore Act of 2016 into effect. This could also be used to implement the provision of Article 8 (j) under the CBD.
- Supporting the review of PVP legislation:** Review the current PVP legislation with a view of making amendments that take into account the interests of both Breeder's and Farmers' rights

F. ISSUES/RISKS TO HIGHLIGHT LEADING TO IMPLEMENTATION

RISK	IMPACT	MITIGATION MEASURES	PROBABILITY POST MITIGATION
CONTEXTUAL RISKS			
Currency instability and frequent monetary policy changes in Zimbabwe causes loss of value of incomes for farmers and SMEs.	high	Promotion of locking income in assets to avoid household income devaluation Financial literacy training and savings in physical stock or stable currency Encourage USD payments where possible observing local financial laws	medium
COVID-19 cases increasing in Zambia and Zimbabwe; continued restrictions affecting supply chain causing economical reductions.	high	Include information on preventive measures and designed to minimise spread; strengthening the value chain with primary focus on local and national markets to limit movement. The communities can also be trained on the community action cycle (CAC), where communities become each other's keeper to ensure COVID 19 protocols are adhered to in the communities. Engagement with National and Regional Health Authorities for guidance on COVID Prevention Protocols	medium
Climate change, droughts and unpredictable rain patterns.	high	Promotion of Climate Smart Agriculture techniques and participatory weather forecasting; seek collaboration with irrigation initiatives, support cowpea (a more drought tolerant crop) from the outset as a crop rotation/food security crop. Promotion of early maturing varieties.	medium
Political environment (as we go towards elections) not conducive for value chain development and project objectives are misconstrued	medium	Ensure a strong project buy-in by the government stakeholders, traditional and local leadership at all levels so that they will be able to support project activities for community enhancement	medium
Pests, diseases and bird damage; physical contamination and storage losses	high	Capacity building in agroecological methods and integrated pest management, community coordination of variety and planting dates to minimise total crop loss due to birds and improved post-harvest technologies. Adoption of improved seed varieties.	low
The overall economic situation hampers the creation of	medium	Partner and strengthen SMEs or processors to be competitive and explore export market options as	low

markets for smallholder farmers in respect of grains and legume seeds.

part of market creation, work with organisations such as ZimTrade for export markets.

Work with the Ministry of Commerce and Zambia Bureau of standards to build the capacity of SMEs and processors to unlock local and export markets.

Promote innovative business models that aggregate demand and supply and drive down transaction costs for smallholder farmers in respect grains and legume seeds

Demonstrate and showcase some quick wins to stimulate interest and demand

PROGRAMMATIC RISK

Isolation distance required for cross-pollinated crops resulting in physical and genetic contamination.	medium	Work with COEs of the seed production, promote production zones within the communities to produce one variety within the same community. Raise/increase awareness on the importance of isolation distance and barriers Raise awareness to seed growers/producers on the importance of following isolation distance to maintain genetic purity.	low
Seed and commodity prices for targeted OPVs become unaffordable thus limiting access by smallholder farmer households.	medium-high	Work with COEs and associations producing seed to retain stocks of seed and promote local level community seed sales at manageable prices. Also promoting barter trade within the communities to enable households with liquidity challenges to access quality seed. Capacitating farmers to save, exchange, multiply and sell farm-saved seed and development of COEs Work with government and private sector agencies on mechanisms to provide seeds to smallholder farmer households at affordable prices. Formation of more COEs to serve as seed supplier hubs to smallholder households within communities at affordable cost. Promote formation of village savings groups for farmers to save money for them to buy seed	low
Number of private sector value chain actors with potential for scaling up or out is in reality limited thus limiting likelihood of reaching proposed target	medium	Register and capacitate more COEs and associations to engage and work with more small holder farmers Advocacy to private sector to scale up their business to smallholder farmers in target districts in Zambia and Zimbabwe Capacity development of identified potential private value chain actors. Suitable incentives for motivating emerging small scale private value chain actors.	medium

		Identify the limiting factors and build their capacity through training and grant assistance to serve as a springboard for them. Promote the production of OPVs through SHFs, cooperatives and association, and COEs to increase the availability and supply of OPVs in communities (Price relation to Supply and Demand concept) MASAP work with private sector value chain actors to demonstrate the viability of the rural and agricultural system through buying down some risk through provision of catalytic funding and incentivizing their engagement with SHFs, COEs and Association	
Large seed producing companies producing hybrid and other non-OPV varieties continue to dominate policy agenda and private sector planning in the target countries thus having a negative impact on policy and resulting adoption of target OPV varieties amongst the private sector value chain actors and smallholder farmers.	high	Lobby for national fora for articulation of seed production and management strategies, with a clear definition of farmer varieties. These national forums must help to advocate for the Farmer Managed Seed Systems to be mainstreamed into the commercial seed systems. (seeking for harmonisation of seed laws) Advocacy to large seed producing companies to include OPVs varieties in their business to reduce poverty and increase income for SHFs mostly in rural areas. • Creating awareness at all levels about the benefits of OPV for smallholders • Identification and promotion of site-specific nutritious OPVs for the target crops • Capacity development of FPOs and farmers about seed saving and multiplication. • Raising / increasing awareness to communities about local, national, regional and global seed regulatory frameworks and laws to enhance knowledge and information on the potential impacts of such on their farming and agribusinesses and strengthen their participation in seed related policy debates and dialogue. Participation of growing/upcoming seed producers, SMEs and processors in policy agendas for them to be heard and lobby for policies that favour them too. MASAP work with large seed producing companies to demonstrate the business viability of OPVs seed systems in the smallholder market and buy down the risks of initial transaction to encourage the companies' investment in the OPVs seed system.	low
Cumbersome and labour-intensive post-harvest on farm	low	Partner with technical organisations/companies for mechanised post-harvest processing technologies	low

processing practices for small grains can affect adoption

and value addition for small grains at the farm and community levels.

Programme promoting increased use of pesticide as a requirement for specialised seed production of healthy seeds, can harm both human health and environment.

medium

Set up clear safeguarding guidelines where the promotion of pesticides should always be followed by training in safe use and integrated pest management methods, plus ensuring access to personal protective equipment and training on its use. Intervention partners should be requested to assess different alternatives for treatments and chose the one with less side-effects to human health and the environment. Establish clear communication routines around these principles and build them into our agreements with Intervention Partners and Service providers.

low

MSD programmes are highly complex and without competent staff and structured procedures will not reach their intended targets

MASAP Core staff have all been selected for their experience in managing MSD programmes and the organisational set up is designed to manage large numbers of MSD Intervention partners and projects with full time FM and MEL Manager in addition to the Component advisors. Provide clear procedures and templates for Sub-award management. Deliver capacity building in MSD, including workshops to internalise MSD processes and participate in MSD networks.

There is an increasing control of NGO's and projects by the government, specifically for Zimbabwe

Establish MoU's with local authorities. CTDO will support with networks and relations as existing members in the local authorities' planning meetings for related programmes.

There is a risk of being overstretched, especially in development of new COEs.

MASAP will need to balance working with existing COEs and develop new ones as developing new ones takes more time.

INSTITUTIONAL RISK

Weak private sector engagement in the seed value chain

medium

Private sector actors will be invited as key stakeholders in the design, be directly engaged as intervention partners and business models will be promoted to the private sector actors to gain their interest and facilitate informed decisions.

low

Assist in creation of strategic partnerships between SHFs and private sector players in the seed value chain

Large seed companies lobby against revision of the seed laws to protect their "breeders right"

high

Negotiate on behalf of the SHFs with the commercial seed industry, explaining the purpose of farmers' privilege to create common understanding.

medium

		Strategic support to existing SHFs associations/unions in lobbying for revision of seed laws	
		Work with Zambia Agricultural Research Institute (ZARI) to understand what the Seeds Act stipulates.	
Limited volume of breeders (EGS) and pre-basic seed	high	Analysis of availability of varieties and volume, inform breeders in advance about the demand for a specific variety and establish contracts, clear variety production advice to reach high quality and achieve maximum multiplication rate.	low
		Support breeders so that they can also produce seed off-season to meet the demand.	
Policy and regulatory system not conducive to private sector investment in OPV seed systems	high	Collaboration with national Governments, institutions, SADC, COMESA, international research organisations, CSOs and private sector associations to address improved national policy environments and harmonisation of regional legislation.	medium
Limited political willingness to make policy changes in the small grains and legumes sectors' needs and interests.	low	Engage decision makers on the value of investing in the small grains and legumes for improved nutrition and health.	low
		Demonstrating, to policy makers, the social and economic benefits of small grains and legumes to sustainable development of households, communities and businesses using sound evidence from project impact assessments and action research.	
		Use proactive approaches in reaching out and participating in national and regional Policy Dialogue Platforms	
Free inputs and seeds distribution programmes by NGOs and Government in Zimbabwe distorts the seed markets especially for small grains and legumes, discouraging private participation	medium	Partnering with Government and NGOs in seed programmes towards a more sustainable seed markets model based private sector participation and market linkages.	low

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