AfriFuture Research Bulletin
2021, Volume 1, Issue 2
ISSN: 2710-0421 (Print) ISSN-L: 2788-8924 (Online)
www.afrifuture.org

Research Article:

Insights into Sesame Production as a Livelihood Option for Smallholder Farmers. The Case of Sesame Farmers in Bubi District, Zimbabwe

Freedom Nleya[1]
Department of Development Studies, Lupane State University, Bulawayo, Zimbabwe

Abstract
Sesame is a relatively new crop in Zimbabwe with a potential to improve household income and resilience in the face of climate change. This paper follows a mixed methods approach, which is exploratory in nature to reconnoiter the perceptions that smallholder farmers in Bubi district have regarding sesame production as a livelihood option. Informed by Amartya Sen's Capabilities Approach, the paper explores how policies and projects translate to actual opportunities that can be utilised by smallholder farmers to improve their quality of life. The study concludes that sesame production is a viable livelihood option for rural households affected by limited livelihood options and climate change. The paper highlights the threats to sustainable production by smallholders and recommends that government and its development partners should implement policies and setup systems that will create an enabling environment for the growth and sustainability of the sesame value-chain in the country.

Keywords: *adaptation, capabilities approach, climate change, livelihood portfolio, market linkages, sesame, sustainability*

Introduction

Rural households that depend on rain-fed agriculture are the most vulnerable to climate change, and it poses serious threats to agro-based livelihoods (Phiri et al., 2014; Dube et al., 2016; Ndlovu et al., 2020; Dube et al., 2021). Climate change is a phenomenon in which changes are experienced in properties of climate in an area, the changes persist over decades and can be traced through statistical measurement of climate properties (IPCC, 2014 in Dube et al., 2021). With the adverse effects of climate change expected to increase, there is need for increased climate change adaptation among smallholder households to reduce vulnerability and increase livelihood sustainability (Dube, 2020; Chingombe and Musarandega, 2021). Climate change adaptation has been characterised by climate-smart agricultural practices including, but not limited to conservation agriculture, small livestock rearing and adoption of small grains (Nyanga et al., 2011; Phiri et al., 2019; Ndlovu et al., 2020). The poor performance of traditional cash crops and food crops due to climate change

[1] Corresponding author email: freedomnleya@gmail.com

demands an introduction of a new breed of crops that could resist harsh weather conditions and contribute to household incomes. One such crop that is gaining attention in Zimbabwe is sesame.

Sesame is regarded as a highly rewarding crop with relatively simple cultivation demands, low production costs and high returns (Ansah et al., 2015; Dossa et al., 2017). Sesame is a drought resistant crop that can survive in arid and semi-arid areas where most grain crops suffer from moisture stress (Ayana, 2015; Myint et al, 2020). Sesame is sensitive to water logging but tolerant to relatively high temperatures and dry spells (Zerihun, 2012). Despite being draught resistant, yields and crop performance are affected by moisture stress at critical growth stages (Girmay, 2018). In Zimbabwe, sesame adoption as a livelihood option and climate change adaptation strategy is somewhat limited. This study sought to gather insights surrounding sesame production as a livelihood option for smallholder farmers.

Literature review

The global production of sesame is on the decline despite the growing demand for the crop (Girmay, 2018; Myint et al., 2020). Asia and Africa are the largest producers, accounting for 97% collectively, 37.5% and 59.4% respectively (FAOSTAT, 2020 in Myint et al., 2020). Sesame is mainly cultivated for its high oil content (44-60%), use as a healthy food source and in biomedicine (Abejide et al., 2013; Mesera and Mitiku, 2017; Nguyen et al., 2017; Garba et al., 2018). Global production of sesame is almost exclusively done by smallholder farmers, characterised by extensive and not intensive production (Olewe, 2007; Abebe, 2016; Mesera and Mitiku, 2017). Smallholder producers achieve as low as 30% of the yield potential, with the highest loses recorded during harvest and post-harvest handling mainly due to the lack of non-shattering cultivars coupled with poor production and management practices (Ayana, 2015; Pathak et al., 2017; USAID, 2017). Adoption of good agronomic practices and improved harvest and post-harvest handling techniques have the potential of increasing yields without increase in land and labour (Ofusuhene and Yeboah-Badu, 2010). Sesame is equally risky, with losses of 100% where there is poor crop management and handling (Gelalcha, 2009; Ayana, 2015).

Sesame production in Africa is concentrated in Central and Western Africa with Sudan, Ethiopia, Tanzania, Uganda and Nigeria being the leading producers (Islam et al., 2016; Pathak et al., 2017). Although sesame production is suitable in many African countries, there has been low uptake and scaling up due to volatile markets, poor market information and inadequate support from policy makers (Olewe, 2007; Ayana, 2015; Dossa et al., 2017). Sesame is an under-researched crop in the continent, with a lack or high cost of high-quality seed which is both high yielding and resistant to pests and diseases for cultivation in multiple regions with ease (Zerihun, 2012; Ayana, 2015; Girmay, 2018). Production has gained momentum in Southern Africa, with Malawi and Mozambique leading the region and already producing significant quantities for export (CISANET, 2015; USAID, 2016). Sesame production as a livelihood option and a climate change adaptation strategy for smallholders is also gaining traction in Zimbabwe. Studies in the context of Zimbabwe are limited and lean more towards

crop science (Mujaya and Yerokun, 2003; Murimwa, et al., 2019; Muyambo and Shava, 2020), hence the need to study the crop from a livelihood development perspective.

Study area and methodology

Study area

The study was conducted in Bubi district (Ward 7), located in Matabeleland North province, Zimbabwe. Bubi is in region IV of the natural agro-ecological regions. The region receives 450-650mm of rain annually (Brazier, 2017). The natural agro-ecological regions have distinct characteristics and recommended agricultural practices as shown in Table 1. The area is characterised by low rainfall with erratic distribution. This makes the area prone to frequent droughts and crop failure for rain-fed agriculture (FAO, 2006; Brazier, 2012). By virtue of their location, smallholder farmers in the district have limited agro-based livelihood options and remain susceptible to high food and nutrition insecurity.

Sesame production was introduced in the district through the Zimbabwe Resilience Building Fund (ZRBF), a donor funded programme in partnership with the Government of Zimbabwe in 18 districts across the country through 7 implementation consortia (APT, 2017). Bubi district benefited from the funding through the Matabeleland Enhanced Livelihoods, Agriculture and Nutrition Adaptation (MELANA) project. This project introduced sesame production in partnership with IETC Zimbabwe Pvt Ltd (a private actor) using a contract farming model in the 2017/2018 season.

Table 1: Description of agro-ecological zones of Zimbabwe

Natural Region	Area (000ha)	% of total land area	Annual Rainfall (mm)	Farming Systems
I	613	1.56	> 1 000. Rain in all months of the year, relatively low temperatures	Suitable for dairy farming forestry, tea, coffee, fruit, beef and maize production
II	7 343	18.68	700–1050. Rainfall confined to summer	Suitable for intensive farming, based on maize, tobacco, cotton and livestock
III	6 855	17.43	500-800. Relatively high temperatures and infrequent, heavy falls of rain, and subject to seasonal droughts and severe mid-season dry spells	Semi-intensive farming region. Suitable for livestock production, together with production of fodder crops and cash crops under good farm management

IV	13 010 036	33.03	450-650. Rainfall subject to frequent seasonal droughts and severe dry spells during the rainy season	Semi-extensive region. Suitable for farm systems based on livestock and resistant fodder crops. Forestry, wildlife/tourism
V	10 288	26.2	< 450. Very erratic rainfall. Northern low veldt may have more rain but the topography and soils are poor	Extensive farming region. Suitable for extensive cattle ranching. Zambezi Valley is infested with tsetse fly. Forestry, wildlife/tourism

Source: Food and Agriculture Organisation (2006)

Methodology

This paper adopted a mixed method research design. This design makes use of both quantitative and qualitative approaches in data collection and analysis in a single study (Doyle et al., 2009). The qualitative approach was dominant in this study as it is suitable for gathering insights on how individuals respond to a phenomenon under study (Holloway and Wheeler, 2002 in Abosede and Onanuga, 2016). The quantitative component, used for quantifiable phenomena (Almalki, 2016), was used for the cost/benefit analysis in the study. The study was explored a subject that has limited research material (Kothari, 2004; Akhtar, 2011) in the Zimbabwean context.

Table 2: Key informants

Organisation	Number of Key Informants
IETC (Pvt) Ltd	2
MELANA Project	2
Department of Agricultural Technical and Extension Services	1
Community Leader	1
Total	**6**

Sampling and data collection

Data were collected in October 2019. The study utilised semi-structured interviews, key informant interviews (KIIs) and one focus group discussion (FGD). The sample was drawn from the 893 smallholder farmers who had adopted sesame production in Bubi district. A sample of 30 smallholder farmers was drawn purposively from 83 farmers that adopted sesame in Ward 7. The purposive sampling technique is used to deliberately select study participants (Tongco, 2007), of which only sesame adopters were considered for the study. Women accounted for 60% of the respondents mainly because they spend more time on on-farm

activities and are therefore the first adopters of new crops than men who concentrate mainly on livestock and staple crop production (Sithole et al., 2021). Data from the respondents was collected through semi-structured interviews, a blend of close-ended and open-ended question to allow the researcher to probe further into responses (Adams, 2015). Questionnaires were administered in the local language (IsiNdebele).

KIIs were conducted with six key informants (shown in Table 2). A key informant (KI) is an individual that is an expert or possesses valuable knowledge about the study area and research problem (Ali et al., 2013). These KIs were selected because of their perceived expertise in shedding light on the value of sesame production from the perspective of the community, government, NGOs and the private sector. Data collection also involved the use of one FGD, a technique used when a researcher seeks to draw beliefs, perceptions and attitudes on a topic from a group of participants purposively selected to share their complex experiences (Nyumba et al., 2017). The FGD was made up of 12 participants, of which 66.7% were women. Descriptive statistical analysis was used for quantitative data and thematic analysis for qualitative data.

Theoretical framework

The study was guided by Amartya Sen's Capabilities Approach (CA). The approach submits two concepts - functionings and capability. Functioning's refer to the opportunities that people have in terms of what they can become and what they can do (Robeyns, 2005). Capability on the other hand refers to the ability to convert the available means to achieve into actual achievements (Gasper, 2006). The CA acknowledges that individual perspectives influence how people view and choose to take advantage of opportunities that come their way, within the context of socio-economic factors that affect the ability to convert opportunities into achievements (Robeyns, 2003). The CA further interrogates the potential and ability of an opportunity to contribute to the overall wellbeing of the individual and/or household rather than just focus on the income (Robeyns, 2003).

Results and discussion

The study sought to answer the following questions:

1. What are the insights/perceptions on sesame production in Zimbabwe?
2. What is the cost/benefit analysis of producing sesame as a livelihood option?
3. How can the Government and its development partners enhance the uptake of sesame production?

The results and discussions that follow bring to light the potential of sesame production as a viable livelihood option in the context of climate change for smallholder rural households. The study findings also reveal the gaps that need to be addressed in order to develop a sustainable value chain for sesame in the country.

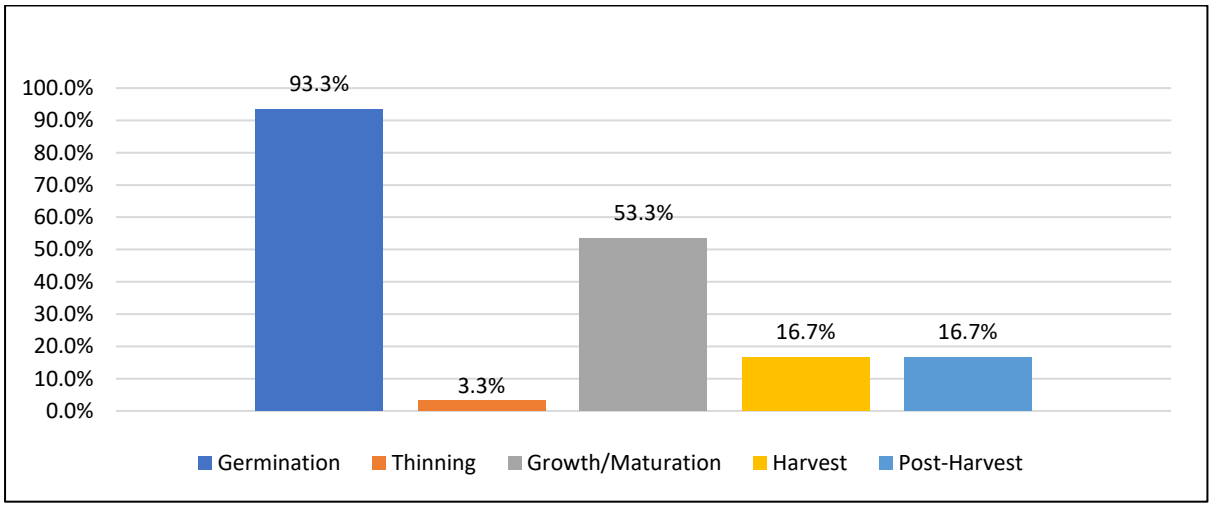
AfriFuture Research Bulletin
2021, Volume 1, Issue 2
ISSN: 2710-0421 (Print) ISSN-L: 2788-8924 (Online)
www.afrifuture.org

Smallholder perceptions and attitudes towards sesame production

Perceptions on sesame production

The production of sesame in the district is in its infancy and households have not yet mastered the production practices that minimise unnecessary losses. Results from the study on the production stages where significant losses (Figure 1) were incurred, show that heavy losses occurred in the germination stage and the growth and maturation stage. The underlying factors for these losses were identified by respondents and KIs as poor agronomic practices (germination) and weather induced losses (growth/maturation).

Figure 1: Production stage of significant loss



Source: Author fieldwork

According to Zikhali (2017), there is a direct link between technical support through extension and production among smallholder farmers. This was collaborated by KIs, who pointed out that consistent attendees of trainings performed better than those not consistent in their attendance. Some respondents (56.7%) had attended all trainings on the production stages that were conducted by the IETC field officer. Study findings revealed a high prevalence of poor agronomic practices and losses among those who missed trainings. The findings revealed that the field officer was spread thin across the participating wards and was not able to conduct all trainings and field assessments on time. As such, farmers that did not attend the training on planting and those that received training late planted too deep, leading to poor germination. The effectiveness of farmer trainings was also undermined by farmer apathy, where some farmers were reluctant to attend or implement the prescribed practices on the pretext of being seasoned farmers. Women were unable to attend all trainings as the timing sometimes clashed with their daily duties in the household economy.

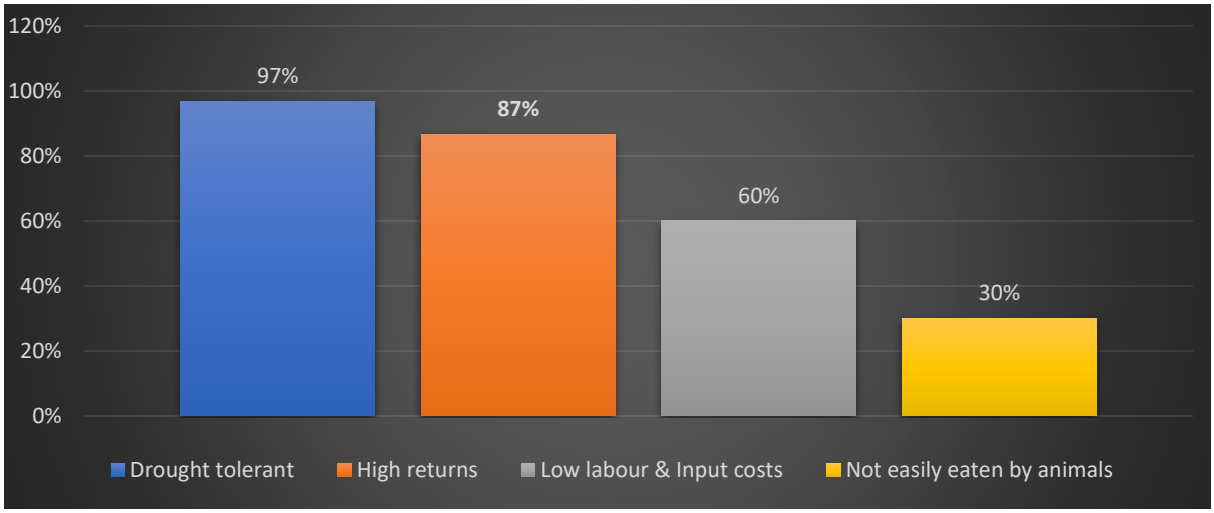
Losses identified during growth and maturation were attributed to climatic conditions. Results revealed that yields were affected by a long dry spell during the critical stages of flowering and pod filling. Farmers that had received seed late pointed out that they planted

way after the first rains had been received. This compromised germination and subsequent growth leading to short heights and incomplete pod filling. Short heights lead to few pods per plant, affecting quantity and incomplete filling affects the quality (oil content and weight). The results of the study show that harvest and post-harvest losses were much lower than those submitted by Gelalcha (2009) and Ayana (2015) compared to other growth stages. The reason for this seeming discrepancy emanates from the unnecessary losses that were incurred at germination, growth and maturation stages. The harvest and post-harvest losses were a result of pod shattering in the field due to late harvesting and failure to follow proper post-harvest handling techniques.

Smallholder reasons for uptake

The adoption of sesame was determined by its relevance to the household economy and assumed benefits to the same. Figure 2 presents a summary of the factors that smallholder farmers considered in adopting sesame. Respondents that had been engaged in sesame production since its introduction in the 2017/18 season made up 56.7% of the study and 43.7% adopted sesame in the 2018/19 production season.

Figure 2. Reasons for sesame uptake



Source: Author fieldwork

Sesame was attractive for smallholder farmers because it performed better than other crops under harsh climatic conditions. This was consistent with Zerihun's (2012) observation that sesame is able survive under high temperatures which could not be tolerated by cereal crops. Sesame reached maturity, although harsh conditions affected the quantity and quality of yields. These findings were consistent with Girmay (2018) who noted that moisture stress at critical growth stages affects yields. The crop is viewed on positive terms because it is a convenient cash crop for the district which had missed out on traditional cash crops such as

cotton and tobacco due to its unsuitable climatic conditions. Accordingly, sesame is regarded as a lifeline to the household economy, expanding available opportunities (functioning's) and the ability to turn these (opportunities) into capabilities (through trainings and market linkages).

Push/pull factors for uptake

The study reveals non-agronomic factors that influence sesame uptake (Table 3). The study identified information and farmer performance as the top 2 factors influencing farmer decisions into adopting sesame. These factors feed into each other as both push and pull factors. When people have inadequate information on the benefits of sesame and also fail to see the benefits among those that have adopted the crop, they are not motivated to consider its adoption. Interest in the crop is generated when they see tangible results from first adopters. The study revealed that 7% of respondents broke even without realising profits, while 23% failed to break even. These results collaborate the findings by other researchers who note that sesame is still a risky crop with a potential of severe losses despite being drought tolerant (Gelalcha, 2009; Ayana, 2015). The evidence of unsuccessful production become a limiting factor to increased uptake.

Table 3: Push/pull factors for sesame uptake

Push Factor	% In Support	Pull Factors	% In Support
Lack of adequate information on benefits of sesame production	60%	Sharing information on the benefits of sesame production	70%
Failure of current farmers to master production and realise significant benefits	63.3%	Evidence of current farmers mastering production and reaping benefits from production	66.7%
Unreliable markets	43.3%	Reliable markets	46.7%
Lack of endorsement from influential members of the community	36.7%	Endorsement by influential members of the community	26.7%
Belonging to other donor funded projects	26.7%		

Source: Author fieldwork

The cost-benefit analysis

The sustainability of sesame production as a livelihood option for smallholder farmers hinges on its profitability to both the producers and the off takers.

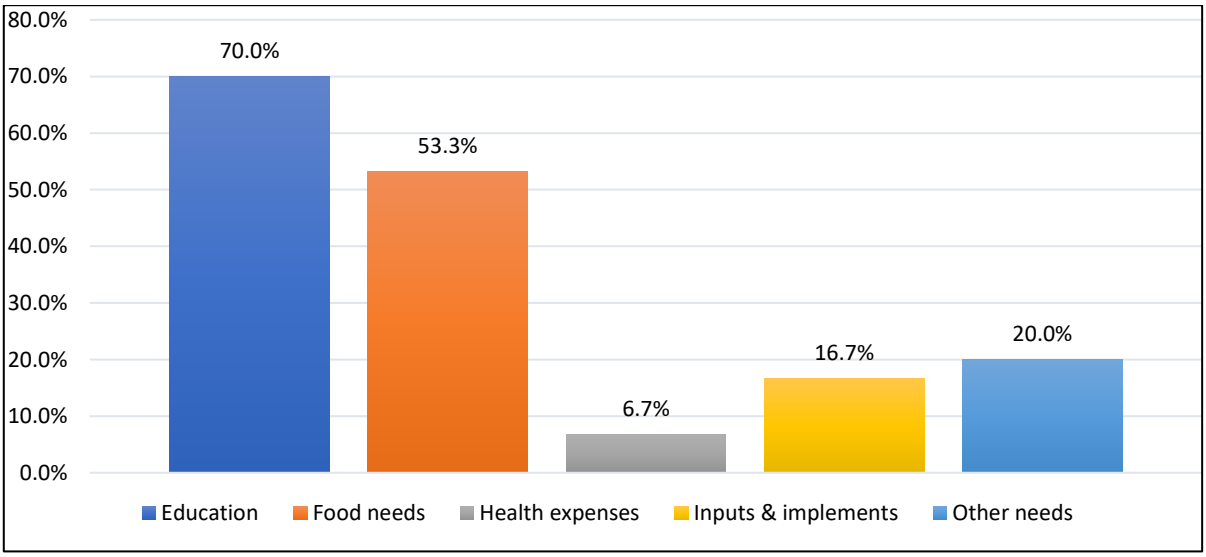
Perceptions on production costs

The two main costs for smallholder farmers were seed and labour. Some households (66.7%) had adequate family labour and their only cost was seed. The remaining households (33.3%) either had few non-labour constrained household members and/or inadequate productive resources. These households incurred additional costs of hiring draught power and/or labour for key stages such as thinning, harvesting and cleaning. Results from the study show that the cost of seed loans was a determining factor for 73.3% of the respondents on the amount of seed they acquired, which also affected the land under cultivation and the possible yields. The recommended seed for production of 1ha is 3kg, but study findings show that farmers took an average of 1.2kg and cultivated an average of 0.22ha. Farmers were cautious towards the new crop and were reluctant to increase seed loans before understanding production dynamics.

Perceived benefits of sesame production

Representative benefits from sesame production transcend the household economy and contribute to community and national development. Some respondents (70%) managed to record profits after accounting for their costs. Sesame was an alternative cash crop for 53.3% of households who produced groundnuts for sale and the only cash crop for 46.7% of households that had been producing at subsistence level. Disposable income from sesame was used to meet several household needs (Figure 3). Non-financial benefits highlighted by KIs and the FGD were stock feed from residue and nitrogen fixing, which improves soil quality. This makes sesame suitable for effective crop rotation.

Figure 3: Household uses of income



Source: Author fieldwork

According to the community leader (KI), sesame production has the potential to break the culture of depending on donor handouts and is a shift to a production-based development that allows people to take charge of their own livelihoods. At community level, sesame brought an expansion of seasonal employment opportunities through hired labour and draught power. Sesame is produced mainly for the export market, therefore, contributes to revenue and economic growth at national level. The trading company brings in foreign currency and pays for its trading privileges to the Government. KIs also noted a potential for increased employment creation through local processing of sesame seed for oil and other related products. This will be possible if production grows to levels that sustain profitable processing and value addition.

Threats to sustainability

The sustainability of the sesame value chain is dependent on profitability for both the smallholder farmers and the private sector partner (off-taker). Despite being regarded as a low input crop by 80% of the respondents, study findings show that sesame production has high labour demand at thinning, harvest and post-harvest handling. Labour constrained households incurred significant losses if they failed to outsource labour on time. Outsourcing increased costs affecting profit margins. Households that depended on hired draught power were found to be at a higher risk of losses and failing to break even. Study results show that 26.7% of households that depended on hired draught power planted late, as owners prioritised their own land preparation before hiring out their resources. Late crop missed early rains and suffered from insufficient moisture at germination and thinning stages and failed to reach physiological maturity resulting in significant losses.

KIs identified a symbiotic relationship between the producer and the off taker. The productivity of the farmers ensures profitability for the off-taker and the support for the smallholder farmers by the off-taker directly impacts productivity. Technical support is a vital cog for the sustainability of the sesame value chain. The study revealed that the efficiency of extension services (input distribution and trainings) were a breaking point for producers, with high losses related to poor timing in seed distribution and training. KIs and responses from the FGD further reveal that the threat from rainfall distribution could be mitigated through early seed distribution, land preparation and planting to ensure that the crop benefits from the rain received. Low productivity threatens profitability for the off taker, who needs to recover the costs of seed loans, technical and logistical support in the value chain. KIs pointed out the need for increased production in terms of area planted (at least 1ha) and the productive output, which would allow farmers to use chemicals for pest and disease control without affecting profitability, while ensuring that production is profitable for the off taker to justify continued support.

Markets were also identified as a possible threat to sustainability. The efficiency of markets can attract or repeal producers depending on whether they feel adequately rewarded for their labour. Farm-gate procurement and instant pay-outs were welcomed by farmers, but the use of mobile money (Ecocash) was a discouragement. Ecocash is a phone-

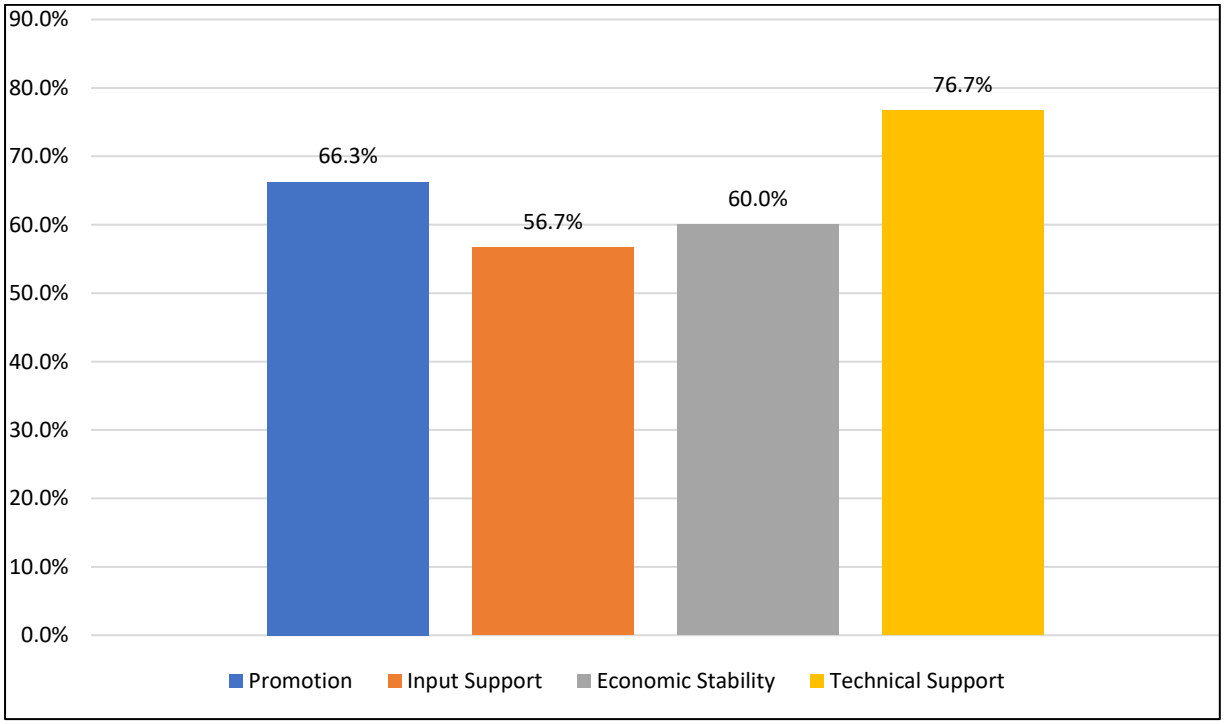
based financial service provided by Econet Wireless (Mobile network provider) that allows its customers to carry out transactions with each other and related businesses. The use of Ecocash was a result of Government policy that that restricted the use of the US dollar in local transactions. The FGD revealed that Ecocash was unfavourable as goods and services were more expensive when using mobile money compared to cash. As such, the purchasing power was eroded by macro-economic dynamics. Macro-economic policy undermines profitability for producers therefore poses a threat to sustainability.

Role of government and its development partners in sesame production

Role of government in sesame production

Findings from the study show that Government involvement was minimal in the sesame value chain. The Ministry responsible for agriculture was a partner in the ZRBF through which the sesame value chain was introduced in Bubi district. The involvement of AGRITEX officers was limited to farmer mobilisation and passive attendance of trainings. The FGD and KIs noted a lack of deliberate interest in sesame by the Government. Farmers identified a need for increased Government involvement in sesame production in several aspects (Figure 4). KIs highlighted the need for closing the information gap on sesame production in the country through Government promotion of research and setting up seed houses for breeding and multiplication.

Figure 4: Perceived role of government in sesame production



Source: Author fieldwork

Role of NGOs and the private sector

Findings from the study revealed that the Matabeleland Enhanced Livelihoods, Agriculture and Nutrition Adaptation (MELANA) project was implemented by an NGO (Welt Hunger Hilfe – WHH) in consortia with other organisations under ZRBF. The market development approach of the MELANA project was credited with the introduction of sesame production to smallholder farmers. The NGO played a key role in developing market linkages for smallholder farmers and the provision of market related information. IETC project staff (KI) highlighted that NGO involvement extended beyond market linkages, but subsidised the technical support provided by the private sector. Insights from farmers and KIs indicated that NGOs could subsidise chemicals, seed houses and research in local hybrid varieties.

Findings identified the private sector as a fundamental constituent in the sesame value chain, implementing the contract farming model of production. IETC was the main source of inputs (seed), extension services (trainings and field assessments), market information and the market. Gaps in the value chain that were cited by the farmers and should be filled by the private sector include the timely distribution of inputs and market information especially commodity prices announced before the beginning of the season as a motivator for crop uptake. Without a general picture of the expected market returns, farmers were not motivated enough to take up a crop that is primarily produced for the market. The farmers and KIs noted the need of increasing experts for purposes of providing technical support and information dissemination. Suggested solutions to the unhealthy farmer-field officer ratio included the training of AGRITEX officers and local trainers and the provision of incentives for the same to help the field officer(s) in providing technical support.

Perceived role of community leaders

The findings of the research brought to light the need to involve traditional leadership in the implementation of development projects in general and sesame in particular. These insights were supported by 33.3% respondents and 83.3% (5) of KIs. Farmer mobilisation for trainings and feedback through community leaders was observed to be more effective compared to AGRITEX officers and/or leaders of farmer groups. Being community influencers, the endorsement of sesame production by the community leaders is likely to have a positive impact on the adoption of sesame production by more farmers in the community.

Conclusion and recommendations

The potential of sesame production as a livelihood strategy and climate change adaptation option is one that cannot be ignored by development organisations and policy makers. The low labour and input cost make it a low-risk crop that smallholder farmers can engage in without incurring significant losses even if they fail to break even. The suitability of the crop to smallholder production and dry climatic conditions makes its production a viable option for diversifying the livelihood portfolios of smallholder households who have been affected by crop failure due to erratic rainfall patterns in recent years. The market-oriented approach

to sesame production contributes to economic growth, employment creation and poverty alleviation at household, community and national level. The production of sesame presents both economic and non-economic benefits for smallholder farmers - benefits which outweigh the cost of production and justify the need for all stakeholders to promote and support sesame production among smallholder farmers. With deliberate efforts by Government and its development partners, sesame production can grow to levels that can sustain industrial processing and value addition. In light of the foregoing discussion, this study submits the following recommendations:

1. Technical support and capacity building - There is need to invest in extension services to achieve a healthy ratio between field officers and farmers. This can be achieved by training local-level resource persons and AGRITEX officers on sesame production, and assessment should be readily available to provide basic information and support to farmers. Sesame needs to be a crop of interest for AGRITEX officers with resources and incentives for carrying out training and monitoring activities. Training materials should be availed in local languages, with relevant illustrations to ensure that farmers understand all the production requirements. The training needs of smallholder farmers should not be limited to agronomy and crop management but include soft skills for understanding agriculture as a business and a vehicle for sustainable community development.
2. Research and development - The Government should partner with interested stakeholders (NGOs, private sector and universities) to invest in seed engineering and multiplication for local farmers. Research should focus on high yielding, pest resistant seed varieties that are suitable for local conditions. The production of sesame should be promoted and supported as an employment creator through agriculture for youth and women in rural areas to reduce the levels of poverty among women and young people. The Government and private sector should focus on industrial processing for increased income.

References

Abebe, T. N. (2016). Review of Sesame Value Chain in Ethiopia. *International Journal of African and Asian Studies*, vol. 19, https://pdfs.semanticscholar.org/36e5/ecbaa648b61ae271f1fa1aec1554e138acf4.pdf

Abejide, D. R., Falusi, O. A., Daudu, O. A. Y., Gado, A., Dangana, M. C., & Lateef, A. A. (2013). Assessment of Pollen Production, Viability and Germinability in Three Sesame Cultivars. *International Journal of Applied Biological Research*, 5(1). https://www.researchgate.net/publication/268523696

Abosede, A. J. Onanuga, A. T. (2016). Research Design: A Review of Features and Emerging Developments. *European Journal of Business and Management*, 8(11). https://pdfs.semanticscholar.org/4ed0/447407c184df1a556eaee069879809364fdd.pdf

Adams, W. C. (2015). Conducting Semi-Structured Interviews, in Newcomer, K. E. Hatry, H. P. & Wholey, J. S. (Eds), *Handbook of Practical Program Evaluation,* 4th Edition. London: Jossey-Bass, https://www.researchgate.net/profile/William_Adams22/publication/301738442

Akhtar, I. (2016). *Research Design,* Research in Social Science: Interdisciplinary Perspectives, https://www.researchgate.net/profile/Inaam_Akhtar/publication/308915548

Ali, M., David, M. K., & Ching, L. L. (2013). Using Key Informant Interviews (KIIs) Technique: A Social Sciences Study with Malaysian and Pakistani Respondents. *Man, and Society*, https://www.researchgate.net/profile/Ali_Mumtaz/publication/273636636

Almalki. S. (2016). Integrating Quantitative and Qualitative Data in Mixed Methods Research – Challenges and Benefits. *Journal of Education and Learning*, 5(3). https://files.eric.ed.gov/fulltext/EJ1110464.pdf

Ansah, K.D., Sintim, H. O., Awuah, S., Ali, J. E. & Oteng, G. (2015). The Adoption of Temperate Selected Accessions in the Tropics: Selected in Japan and grown in Ghana. *Journal of Agricultural Science*, 7(5). http://www.ccsenet.org/journal/index.php/jas/article/download/44151/25577

APT. (2017a). Zimbabwe Resilience Development Fund. Available at http://apt.co.zw/682-2/, accessed in June 2019

Ayana, N. G. (2015). Status of Production and Marketing of Ethiopian Sesame Seeds (Sesamum Indicum L: A Review. *Agricultural and Biological Sciences Journal,* 1(5). http://orgprints.org/22873/1/22873_%20OWC14_MM.pdf

Brazier, A. (2017). *Climate Change in Zimbabwe: A Guide for Planners and Decision-Makers,* 2nd Edition. Harare: Konrad Adenauer Stiftung. https://www.researchgate.net/publication/322794578

Chingombe, W. & Musarandega, H. (2021). Understanding the Logic of Climate Adaptation: Unpacking the Barriers to Climate Change Adaptation by Smallholder Farmers in Chimanimani District, Zimbabwe. *Sustainability 2021*, 13. https://doi.org/10.3390/su13073773

CISANET. (2015). Sesame Value Chain Analysis Policy Study. *Civil Society Agriculture Network*. https://www.mitc.mw/trade/images/Sesame_Chain_Study_Report.pdf

Dossa, K., Konteye, M., Niang, M., Doumbia, Y. & Cisse, N. (2017). Enhancing Sesame Production in West Africa's Sahel: A Comprehensive Insight into the Cultivation of this Untapped Crop in Senegal and Mali. *Agriculture and Food Security*. https://agricultureandfoodsecurity.biomedcentral.com/track/pdf/10.1186/s40066-017-0143-3

Doyle, L., Brady, A. M. & Byrne, G. (2009). An Overview of Mixed Methods Research. *Journal of Research in Nursing*. https://www.researchgate.net/publication/233882561

Dube, N., Sithole, M. Ngwenya, T. Muhwati, T. Moyo, E. Manyanga, K. (2018). Impact of Climate Change on Sustainability in Semi-arid, Rural Africa: Lessons from Rural Zimbabwe. *Cogent Social Sciences*, 4(1). https://www.tandfonline.com/doi/full/10.1080/23311886.2018.1553327

Dube, T. (2020). Smallholder Farmers' Perceptions on Climate Change and Implications for Adaptation: A Case Study of Matobo District in Zimbabwe, in Ndlovu, D. (Ed). *The Role of the Media in Environmental Studies in Zimbabwe.* Harare: Konrad Adenauer Stiftung. https://www.researchgate.net/profile/Thulani-Dube-2/publication/346966815

Dube, T., Moyo, P., Ncube, M. & Nyathi, D. (2016). The Impact of Climate Change on Agro-ecological Based Livelihoods in Africa: A Review. *Journal of Sustainable Development*, 9(1). https://www.researchgate.net/profile/Thulani-Dube-2/publication/291975533

Dube, T. & Phiri, K. (2013). Rural Livelihoods under Stress: The Impact of Climate Change on Livelihoods in Southwestern Zimbabwe. *American International Journal of Contemporary Research*, 3(5). https://www.researchgate.net/publication/284720227

Dube, T., Sibanda, S. & Chiwara, P. (2021). Adapting Peri-Urban Agriculture to Climate Change in Bulawayo, Zimbabwe: A Qualitative Assessment. *Cogent Social Sciences*, 7(1). https://doi.org/10.1080/23311886.2021.1944486

Garba, A., Idrisa, Y. L. & Abdulhamid, A. (2018). Comparative Analysis of Economics of Sesame Production between Improved Sesame Seed Adopter and Non-Adopter Farmers in Jigawa State, Nigeria. *Journal of Agricultural Economics, Environment and Social Sciences*, 4(1). http://www.unimaid.edu.ng/jaeess

Gasper, D. (2006). *What is the Capability Approach? Its Core, Rationale, Partners and Dangers* (Working Paper Series No. 428). Netherlands: Institute of Social Studies. https://www.researchgate.net/publication/5130709

Gelalcha, S. D. (2009). *Sesame Trade Arrangements, Costs and Risks in Ethiopia: A Baseline Survey.* Available at: https://www.wur.nl/upload_mm/9/a/9/59d09a46-b629-4014-b2bd-adf765894adc_Report2Gelalcha170610.pdf

Girmay, A. B. (2018). Sesame Production, Challenges and Opportunities in Ethiopia. *Agricultural Research and Technology Open Access Journal*, 15(5). https://juniperpublishers.com/artoaj/pdf/ARTOAJ.MS.ID.555972.pdf

Islam, F., Gill, R. A., Ali, B., Farooq, M. A., Xu, L., Najeeb, U. & Zhou, W. (2016). Sesame, in Gupta S. K. (Ed), *Breeding Oil Seed Crops for Sustainable Production: Opportunities and Constraints.* London: Elsevier Inc., https://www.researchgate.net/publication/284499055

Kothari, C. R. (2004). *Research Methodology: Methods and Techniques,* Second Revised Edition. New Age International Publishers. http://dspace.utamu.ac.ug:8080/xmlui/bitstream/handle/123456789/181

Mesera, T. & Mitiku, M. (2017). Performance Evaluation of Sesame (Sesamum Indicum L.) Varieties in Lowland Area of South Omo Zone, SNNPR, Ethiopia. International Journal of Research in Agriculture and Forestry, 4(9). https://pdfs.semanticscholar.org/6002/8aecf8016528d07f6a5d2256d9f4607010a7.pdf

Mujaya, I. M. & Yerokun, O.A. (2003). Response of Sesame (Sesamum Indicum L.) to Plant Population and Nitrogen Fertiliser in North-Central Zimbabwe. Sesame and Safflower Newsletter, 2003 No. 18, 64-69. http://safflower.wsu.edu/20093312510

Murimwa, J. C., Rugare, J. T., Mabasa, S. & Mandumbu, R. (2019). Allelopathic Effects of Aqueous Extracts of Sorghum (Sorghum bicolor L. Moench) on the Early Seedling Growth of Sesame (Sesamum indicum L.) Varieties and Selected Weeds. *International Journal of Agronomy*, 2019. https://doi.org/10.1155/2019/5494756

Muyambo, T. & Shava, S. (2020). Indigenous Crop Production for Sustainable Livelihoods: A Case of uninga in the Rural Areas of South-Eastern Zimbabwe. *International Journal of Community Well-Being* (2020), https://doi.org/10.1007/s42413-020-00102-6

Myint, D., Gilani, S. A., Kawase, M. & Watanabe, K. N. (2020). Sustainable Sesame (Sesamum Indicum L.) Production Through Improved Technology: An Overview of Production, Challenges, and Opportunities in Myanmar. Sustainability 2020, 12. http://www.mdpi.com/2071-1050/12/9/3515/pdf

Ndlovu, S., Mathe, B., Nyathi, D. & Casadevall, S. R. (2020). Factoring Water Harvesting into Climate Change Adaptation: Endogenous Responses by Smallholder Farmers in Gwanda District, Zimbabwe. *Cogent Social Sciences*, 6(1). https://doi.org/10.1080/23311886.2020.1784652

Nguyen, T. T. H., Nguyen, T. T. D. & Truong, H. T. H. (2017). Selection of Sesame Accessions (Sesumum Indicum L.) in the Thua Thien Hue Province, Vietnam. *Journal of Agricultural Science and Technology A and B.* https://pdfs.semanticscholar.org/ec69/26e8c3ab3ac82e1bdde39bc9ed65c988e066.pdf

Nyanga, P. H., Johnsen, F. H., Aune, J. B. & Kalinda, T. H. (2011). *Smallholder Farmers' Perception of Climate Change and Conservation Agriculture: Evidence from Zambia.* Journal of Sustainable Development, 4(4). https://www.researchgate.net/publication/264943555

Nyumba, T. O., Wilson, K., Derrick, C. J. & Mukherjee, N. (2017). The Use of Focus Group Discussion Methodology: Insights from Decades of Application in Conservation. *Methods in Ecology and Evolution*. https://besjournals.onlinelibrary.wiley.com/doi/pdf/10.1111/2041-210X.12860

Ofusuhene, S. H. & Yeboah-Badu, V. I. (2010). Evaluation of Sesame (Sesamum Indicum) Production in Ghana. *Journal of Animal and Plant Sciences*, 6(3). http://www.m.elewa.org/JAPS/2010/6.3/2.pdf

Olewe, V. I. O. (2007). Optimum Planting Date for Sesame (Sesamum Indicum L.) in the Transitional Zone of Southwest Nigeria. Agricultura Tropica et Subtropica, 40(4). Available http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.546.5554&rep=rep1&type=pdf

Pathak, K., Rahman, S. W., Bhagawati, S. & Gogoi, B. (2017). Sesame (Sesamum Indicum L.), an Under Exploited Oil Seed Crop: Current Status, Features and Importance – A Review. Agricultural Reviews, 38(3). https://pdfs.semanticscholar.org/12c1/ad01260c7e165cc673883c0c0150c268fdea.pdf

Phiri, K., Dube, T., Moyo, P., Ncube, C. & Ndlovu, S. (2019). Small Grains "Resistance"? Making Sense of Zimbabwean Smallholder Farmers' Cropping Choices and Patterns within a Climate Change Context. *Cogent Social Sciences*. Available online at https://www.tandfonline.com/doi/pdf/10.1080/23311886.2019.1622485?needAccess=true

Phiri, K., Ndlovu, S. & Chiname, T. B. (2014). Climate Change Impacts on Rural Based Women: Emerging Evidence on Coping and Adaptation Strategies in Tsholotsho, Zimbabwe. *Mediterranean Journal of Social Sciences*. 5(23). https://www.researchgate.net/publication/286702024

Phiri, K., Ndlovu, S., Mpofu, M., Moyo, P. & Evans, H. (2020). Addressing Climate Change Vulnerability through Small Livestock Rearing in Matobo, Zimbabwe. *African Handbook of Climate Change Adaptation,* Springer Nature Switzerland AG. https://www.researchgate.net/profile/Keith-Phiri/publication/34253067

Robeyns, I. (2003). Sen's Capabilities Approach and Gender Inequality: Selecting Relevant Capabilities. *Feminist Capabilities*. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.335.803&rep=rep1&type=pdf

Robeyns, I. (2005). The Capability Approach: A Theoretical Framework. Journal of Human Development, 6(1). http://omega.cc.umb.edu/~pubpol/documents/RobeynsJHDoncapabilities.pdf

Sithole, M., Phiri, K. & Masabo, T. (2021). Gendered spaces in natural resource utilisation for sustainable development in rural communities of Zimbabwe. *Cogent Social Sciences*, 7(1). https://doi.org/10.1080/23311886.2021.1909792

Tongco, M. D. C. (2007). Purposive Sampling as a Tool for Informant Selection, Ethnobotany Research and Applications. *A Journal of Plants, People and Applied Research*, https://scholarspace.manoa.hawaii.edu/bitstream/handle/10125/227/I1547-3465-05-147.pdf

USAID. (2017). *Feed the Future Mozambique Agricultural Innovations Activity (FTF Inova): Value Chain Analysis.* New York: United States Agency for International Aid. https://beamexchange.org/uploads/filer_public/14/77/14771655-1655-4d04-842c-ded244327ba7/ftf-moz-value-chain-analysis-2017.pdf

Zerihun, J. (2012). Sesame (Sesamum Indicum L.) Crop Production in Ethiopia: Trends, Challenges and Future Prospects. *Science, Technology and Arts Research Journal*. https://www.ajol.info/index.php/star/article/download/98793/88053

Zikhali, W. (2017). Impact of Agricultural Staff Training and Development on Agricultural Productivity: A Case of Bubi District, Zimbabwe. *International Journal of Academic Research and Reflection*, 5(3). https://www.idpublications.org