RE-IMAGINING AGRICULTURAL EXTENSION THROUGH A LEARNING LENS (RAELL): Zimbabwe Report

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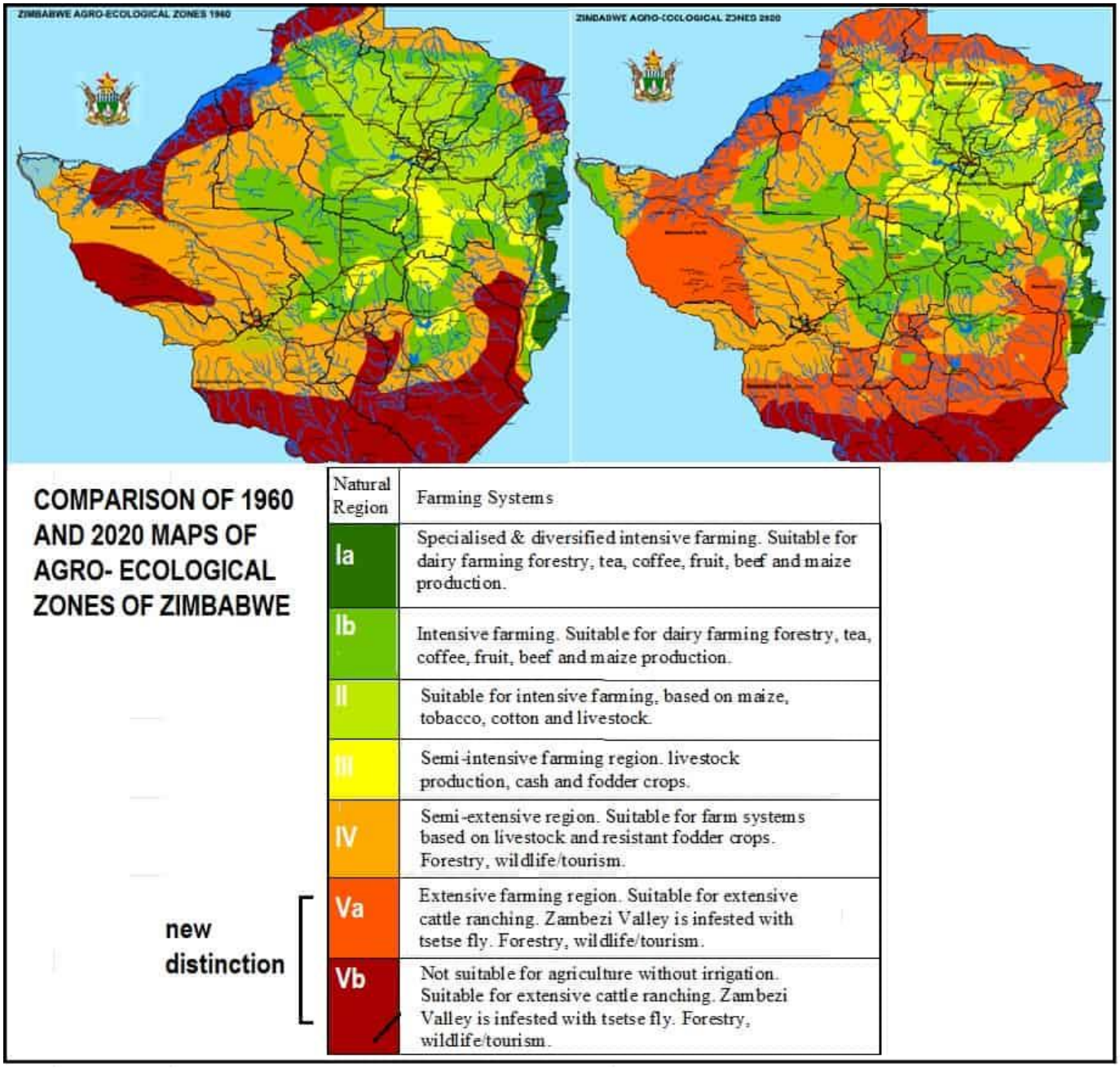

Map of Zimbabwe's agro-ecological regions in 1960 (left) and 2020 (right).

Source: https://wholeeartheducation.com/new-zimbabwean-map-of-agro-ecological-zones/

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

AEOs	Agricultural Extension Officers
AET	Agricultural Extension and Training
AGRITEX	Department of Agricultural, Technical and Extension Services
ART	Agricultural Research Trust
CA	Conservation Agriculture
CGIAR	Consultative Group for International Agricultural Research
CMB	Cotton Marketing Board
DEVAG	Department of Agricultural Development (formerly Department of Native Agriculture)
FAO	Food and Agriculture Organization of the United Nations
ICT	Information and Communication Technology
ISFM	Integrated Soil Fertility Management
MFT	Master Farmer Training
NGO	Non-Governmental Organization
ORPs	Occupational Role Profiles
RDCs	Rural District Councils
SOFECSA	Soil Fertility Consortium for Southern Africa
VTCs	Vocational Training Centres

SECTION 1: HISTORY, BACKGROUND AND CONTEXT

1. Introductory summary

1.1 Changing nature of agricultural extension officers (AEOs): Evidence from literature

Agricultural extension was introduced in Zimbabwe in 1927 by E.D. Alvord (Hanyani-Mlambo, 2002; Zvavanyange, 2014) when nine demonstrators were trained to help farmers improve their technical agriculture skills (Zvavanyange, 2014). During the early years, extension was mainly about demonstrations to native farmers on communal farms (known as reserves) on issues to do with soil conservation and land and livestock management (Maravanyika, 2013). Reserves typically had poor soils, rainfall, and topography, and were unsuitable for human settlement without proper management, so the colonial government tasked Alvord with championing agricultural extension in reserves to ease land congestion from an increasing population (Zvavanyange, 2014). The Department of Conservation and Extension (CONEX) was formed in 1948 to offer extension support to commercial farmers, mostly on soil conservation and master farmer training (Maravanyika 2013), but it was a further 20 years before the Department of Agricultural Development (DEVAG) was established to offer technical and extension support to smallholder farmers.

Founded in 1969, as the successor to the Department of Native Agriculture, DEVAG was responsible for providing extension services to native smallholder farmers in communal areas, then known as Tribal Trust Lands, who were typically engaged in subsistence agriculture (Gadzirayi et al., 2008). The department had subject specialists in areas such as crop productivity, livestock production, farm management, irrigation, conservation and monitoring and evaluation (Pazvakavambwa and Hakutangwi, 2006), and, as smallholder farmers started to become involved in the production of cash crops, extension officers (AEOs) began to provide information on farm budgets and access to markets, with a particular focus on cotton (Rukuni and Eicher, 1994). In the early 1960s, a highly focused campaign to increase cotton production in the Gokwe district in north-western Zimbabwe was launched, and the extension service arranged regular training courses for farmers and agricultural advisors and ran field days to promote the crop (Blackie, 2006). They also worked closely with the sole cotton marketing parastatal at that time, the Cotton Marketing Board (CMB), to train smallholder farmers to produce high quality cotton (ibid.). Such government initiatives saw cotton production

becoming largely dominated by smallholder farmers, and they now produce almost 100% of the cash crop (Mudhara et al., 1995).

DEVAG's role as the primary source of extension support for small-scale farmers came to an end with independence in 1981 and the establishment of the Department of Agricultural, Technical and Extension Services (AGRITEX). This combined CONEX and DEVAG into a single department with responsibility for both large-scale commercial farmers and native smallholder farming. As an amalgamation of two organizations with very different philosophies, experiences and service users, AGRITEX has taken some time to create a coherent identity and establish itself as a service for all farmers, especially small-scale producers (FAO, n.d).

Since the introduction of agricultural extension in Zimbabwe, several approaches have been employed to train farmers. The Master Farmer Training programme is the oldest approach; started in the 1930s and still ongoing (Maravanyika, 2013; Zvavanyange, 2014), it aims to spread modern, scientific, farming techniques in communal areas. In more recent times, international research and development organizations, such as the Food and Agriculture Organization (FAO) and the CGIAR (formerly the Consultative Group for International Agricultural Research), have shaped forms of agricultural extension. Starting in the late 1990s, approaches including group development, training and visits, farming systems research and extension, field days, commodity-based approaches, farmer field schools, farmer learning centres and innovation centres emerged and have been employed by AEOs and researchers in farmer training (Hanyani-Mlambo, 2002; Matsika, 2012; Mapfumo et al., n.d.; Mapangisana et al. 2020; Pazvakavambwa, 1994). Table 1 explains these approaches in more detail.

To deal with the threats to sustainability in small-scale commercial agriculture, there is a need to understand how farmers, AEOs, and scientists in agriculture learn. By extension, what they learn is also in need of thorough reflection. Crucially, this requires engagement with indigenous knowledge systems and a rebalancing of the current gender bias towards engaging with male rather than female farmers. With climate change bringing new challenges to the agricultural production system, there is an urgent need for AEOs to learn, unlearn, and re-learn cultural practices – discouraging negative practices and promoting good practices. In addition to scientific and technical knowledge, AEOs should also possess facilitation skills relevant for adult learners, as most farmers are adults and would learn better if the principles of adult learning (i.e. participatory and innovative approaches) were promoted.

Table 1: Forms of Extension Approach used in Zimbabwe
Source: Created by the authors

Type of approach	Description
Master Farmer training programme	The oldest approach; started in the 1930s and still ongoing. Aims to spread modern, scientific farming techniques in communal areas (Chipika, 1985; Pazvakavambwa, 1994) Farmers are trained in groups of 25-30, both male and female over a two-year period. They have to attend 24 training sessions which are conducted at designated training centres twice a month. The approach uses modules as training materials, and theoretical training is followed by demonstrations where possible. As a basis of qualification, farmers have to practice what they learn on their individual plots. There is a written exam at the end of the two years to get an Ordinary Master Farmer certificate and an extra one year of training to get an Advanced Master Farmer certificate (Matsika, 2012). One of the successes of these schemes was the high adoption rate of very visible innovations such as hybrid maize (Billing, cited in, Hemmes and Vissers, 1988).
Group development approach	This community participation approach was widely used in the 1960s and 1970s, notably in Mashonaland East Province, and typically involved local people working with government or donors. It enabled the extension service to introduce agricultural extension technology into new areas, but it was dependent on government/donor support, and assumed that all farmers faced the same issues (Hanyani-Mlambo, 2002).
Training and visit approach	Developed for the World Bank, this approach was introduced by Benor and Harrison (1977), and involved the dissemination of specialist technical advice from research centres to AEOs and then to farmers through tightly structured training systems. Practice recommendations from subject specialists were adapted to meet local needs, then passed on to village-level extension workers who visited farmers or farmers groups regularly and provided ongoing training (Hanyani-Mlambo, 2002). The approach worked well in irrigation projects in Zimbabwe, as these followed strict timetables, but it was criticised for being too inflexible to meet the needs of smallholder farmers (Pazvakavambwa, 1994). It was abandoned after 10 years for being too costly for a poorly resourced nation whose biophysical environment made it difficult to implement the programme effectively (Hanyani-Mlambo, 1995).

Farming systems research and extension (FSRE)	Developed in response to the failure of prescriptive, one-size-fits-all methods, this interdisciplinary, farmer-oriented approach is centred on problem solving within the context of local socio-economic circumstances and agro-ecological conditions. Focused on the needs of smallholder farmer, it emphasizes local resource utilization, values traditional knowledge, and promotes the use of on-farm trials. In Zimbabwe, FSRE has been championed by the Department of Research and Specialist Services with AGRITEX supporting grassroots development. However, it has been criticised in the past for focussing on crops rather than livestock, for being extractive rather than participatory, and for failing to incorporate farm trial findings into extension practices (Hanyani-Mlambo, 2002).
Field days	This approach involves high-performing farmers hosting a field day to share their knowledge and skills with other local farmers (Matsika, 2012) Prizes are awarded to the best-performing farmers to encourage others to adopt good farming practices. This approach is still used by AGRITEX and is mainly targeted at smallholder farmers. Agricultural input companies, such as seed, fertilizers, chemicals etc., also use it to promote their products among farmers, typically by financing activities and providing prizes. Research organizations and NGOs also use field days to raise awareness of new agricultural technologies (FAO, n.d.).
Commodity-based approach	The commodity-based approach is generally organized through parastatal organizations or private firms who provide extension and processing services. In Zimbabwe, it is mainly used for cash crops, notably tobacco, cotton, sugar cane, and horticulture (Hanyani-Mlambo, 2002). The extension services are provided as a package in contract farming, value chain financing or out-grower schemes. The approach has proved highly successful in promoting cotton production and horticulture, but it has been criticised for being top-down, mono-cultural approach, and giving monopoly power to parastatals/ firms at the expense of farmers and their requirements (FAO, n.d.).
Farmer Field School (FFS)	Developed by the FAO, this involves groups of farmers meeting on a regular basis in a field to do practical structured learning exercises that allow them to combine local knowledge with scientific ecological approaches. All courses are hands-on, practical, and field-based, with few or no lectures, using the field itself as a teacher. In Zimbabwe this was practiced by a number of NGOs starting in the 1990s. The FFS were used, for example, to promote permaculture among smallholder farmers.

Farmer Learning Centres	Initiated by the Soil Fertility Consortium for Southern Africa (SOFECSA) c. 2005 to support smallholder farmers, this approach enables farmers to establish their own learning alliances and, with the help of relevant stakeholders, design and evaluate technologies that suit their specific socio-economic and biophysical environments (Mapfumo et al., n.d.).
Innovation Centres	Introduced by international research centres and projects. Taken up and trailed by a number of NGOs in partnership with FAO. Examples include the Africa Challenge Programme implemented by FARA between 2010 and 2015 and the Livelihoods and Food Security Programme (LFSP) funded by FAO/GoZ and implemented in partnership with NGOs. Other developments include Zimbabwe Agricultural Knowledge and Innovation Services (ZAKIS) and the new centres of excellence in Zimbabwe

Agricultural extension work should therefore be viewed through a learning lens. There is a need for AEOs to understand the three dimensions of learning: formal, informal and non-formal (Semuli, 2016). These dimensions are anchored on different assumptions of what constitutes knowledge, the role of the learner, the role of the facilitator, and the behaviour expected from someone who has gone through learning process. While formal learning in institutionalised settings leading to the award of certificates, diplomas and degrees is widely used in the training of scientists and AEOs, it has had little success with farmers. Non-formal learning, by contrast, is pivotal in training farmer populations as well as AEOs. Anchored on the principles of flexibility, learner-centeredness, and the use of participatory methods, non-formal education within agricultural extension employs strategies such as demonstration plots, workshops, and farm field schools. In addition, professional development programmes for AEOs are crucial to ensure that they can respond to developments in the field of practice. However, challenges to professional development of VET teachers in Zimbabwe have been noted in past studies (see, for example, Muwaniki and Wedekind, 2019), notably the neglect and fragmented provision of professional development within the sector.

1.2 Description of the RAELL data used to prepare this report: number and type of interviews

This report presents findings from a series of interviews with stakeholders in agricultural extension and a number of occupational role profiles (ORPs) from different government, NGO and private sector organizations which were accessed online. Stakeholder interviews were conducted with 22 participants comprising farmers, AEOs, individuals that train AEOs (i.e. lecturers from universities), other agricultural extension implementors (i.e. working in the Ministry of Agriculture - Division of Extension, and Division of Research) and institutions involved in agricultural extension curriculum and policy development. The data set comprised recorded interviews and accompanying field notes for farmers (N=9), AEOs (N=5), individuals that train AEOs (N=3), other agricultural extension implementors (N=3) and agricultural extension policy makers (N=2) (See Figure 1). Field notes were completed at the end of each interview. Appendix B shows a word cloud created from the 22 sets of field notes generated from the interviews.

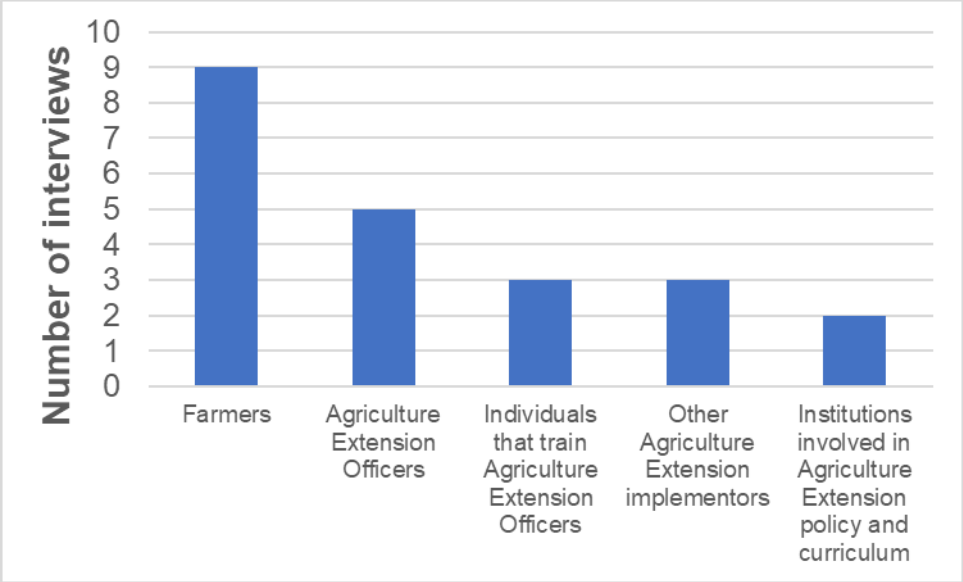

Figure 1: Type and Number of Interviewed Stakeholders. Total Number = 22
Source: Created by the authors

Occupational role profiles for AEOs were accessed online for the following roles: Ministry of Agriculture supervisor (N=1), Ministry of Agriculture crop and livestock AEO (N=2), Private sector AEO (i.e. Tobacco and Small-scale) (N=2) and NGO AEO (organic farming) (N=1) (See Figure 2). Tallies were done to code the data into 28 codes (See Appendix C). These were used to analyse the data to describe different stakeholder's perspectives on a) the role and purpose of AEOs, b) formal training of AEOs, c) whether teaching/training or social learning is recognized as a core function of AEOs etc. The number of tallies attained for the different roles of AEOs was used to rank the roles of AEOs as described by the different stakeholders. Data also included curriculua from five institutions offering training in agricultural extension. Curricula documents were sourced from universities and agriculture colleges in Zimbabwe.

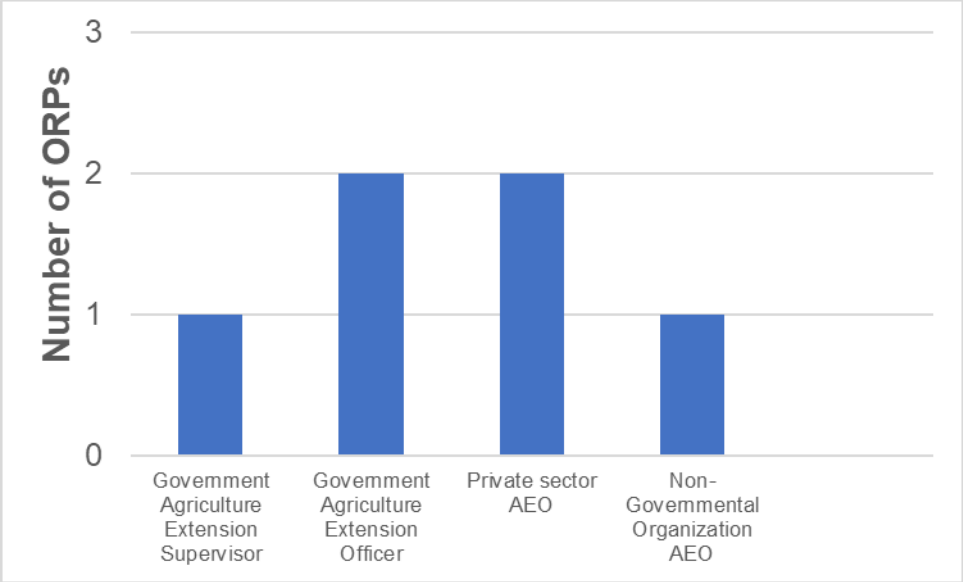

Figure 2: Number Of Occupational Role Profiles (ORPs) For Agricultural Extension Officer (AEO) Accessed Online. Total Number = 6.
Source: Created by the authors

1.3 Role and purpose of AEOs: Evidence and changes from a series of interviews and occupational role profiles

Agricultural extension officers are responsible for providing training and extension services to farmers, and, in Zimbabwe, AGRITEX is the largest employer of AEOs. Findings from the interviews and ORPs showed that AEOs have diverse roles within their respective organizations and communities. All the interviewees (N=22) were able to define or state the roles of AEOs. *Information intermediary* was ranked highest among the roles of AEOs, with 10 interviewees (45%) emphasizing that AEOs are responsible for the dissemination of agricultural information to farmers and promoting the adoption of agricultural practices by farmers. All 6 ORPs also highlighted this role (See Table 2). *Teaching, training and social learning* was ranked 2nd with 36% of the interviewees (N=8) highlighting this as one of the AEO roles, with *knowledge translator* ranked 3rd (highlighted by 27% of the participants; N=6). However, *teaching, training and social learning*; *knowledge translator* (i.e. *having knowledge of agriculture*) were ranked highest in all of the ORPs. While the private and NGO sector have a strong focus on commercialization, *promotion of agriculture production and commercialization of crops and livestock* was ranked lower than the above, and was mentioned in 5 ORPs.

Findings from the interviews and ORPs show the evolving nature of AEOs roles in Zimbabwe. One of the interviewees noted that, back in the 1970s, native agricultural extension (AE)

graduands qualified as agriculture promoters not as AEOs. They worked under white officers (who were qualified as AEOs) and were undervalued and underpaid (even though they had the same qualifications). This later changed and the term AEO is now used countrywide. In addition, in the early years, pre independence (c.1927), AEOs were primarily trained to focus on agriculture production. Two of the interviewees mentioned that AEOs employed by the government were mostly responsible for crop production training and extension services for farmers but not for advice on market access and other economic aspects of production. This often left farmers struggling to sell their surplus produce. Now, one of the essential skills required for the recruitment of AEOs is the ability to use information communication technology in business applications, and AEOs are assisting farmers with agriculture market information for their produce. In this regard, 9% (N=2) of the participants mentioned *monitoring of farmer activities*; *covering of economic aspects of agriculture* and *promotion of agriculture production (i.e. crops and livestock) for commercialization* as parts of the AEOs role (see Table 2). While AEOs in the private and NGO sectors have traditionally been expected to be market-oriented and to source markets for farmers' produce, analysis of the ORPs indicate that they are now also required to have quality control experience and a good understanding of the certification protocols and international standards required to export produce.

All the AEOs interviewed and other stakeholders highlighted that AEOs are responsible for providing training to all the farmers they work with as long as they are willing to be supported. One of the key responsibilities of AEOs in this area is setting up demonstration sites where farmers learn through observation. This is particularly important as most of the farmers are adult farmers who learn through observation and/ or implementation. In this regard, it is crucial that AEOs are able to engage and communicate with communities they work with. In this study, social skills were highlighted as key skills by 9% of interviews (N=2) and 33% of ORPs (N = 2). However, these were from AEOs and ORPs in the public sector, and there was not the same emphasis on the ability to work and communicate with communities and various stakeholders in the private and NGO ORPs. Indeed, one of the ORPs mentioned that such training and extension services were provided primarily to productive farmers. In terms of traning for AEOs themselves, the Extension Supervisor OPR suggests that there is support for the ongoing professonal development of AEOs employed by the Ministry of Agriculture. They report all progress to an AE Supervisor who has a responsibility to identify training needs, make recommendations to the District Head, and organize training and refresher courses for extension staff.

Analysis of the interviews and ORPs suggests that the AEO role has changed from the transfer of knowledge model, which assumed that farmers did not have knowledge, towards a more participatory extension approach that values farmers' knowledge and aims to enhance it. One of the farmers mentioned that:

> *AEOs help us with knowledge on good farming practices. They teach us on crop varieties as well as how to plant our crops. The information they give me is very useful. When I have a problem I visit the AEO and sometimes they come to visit me as well* (Farmer, Interview).

Farmers rely on AEOs to support their day-to-day activities, and facilitating farmer access to inputs is one of the main roles of AEOs in the public, private and NGO sectors. Inputs provided in the public sector are mostly from government subsidies promoted under the Command agriculture (World Bank, n.d.) and Presidential input or *Pfumvudza* scheme (The Herald, 2021). The *Pfumvudza* scheme is a new initiative by the Government of Zimbabwe (with support from the FAO) to promote conservation agriculture. In the private and NGO sectors, inputs are typically provided via contract farming where the farmer pays by selling their produce to the contractor. AEOs are key in these initiatives. The critical role of AEOs in farmers' day-to-day agriculture activities implies that AEOs ought to be up to date with extension knowledge and emerging issues affecting agriculture such as climate change and technologies to curb effects of a changing climate (i.e. CA, integrated soil fertility management (ISFM) and climate resilient crop varieties). Table 2 highlights the main roles of AEOs as defined by the interviewees, the proportion of interviewees, and the ranking of each role.

Table 2: Roles of Agricultural Extension Officers (AEOs), Proportion of Interviewees, and Ranking of Roles (as defined in stakeholder interviews and ORPs)
Source: Created by the authors

AEO roles	Proportion of interviewees	Rank	Proportion of ORPs	Rank	Sector	Summaries and example quotes from interviews and ORPS
Monitor farmer activities	9% (N=2)	8th	83% (N=5)	5th	*Public, private and NGOs	Extension officers should make routine visits to the farming enterprise to check if these stages are moving accordingly. AEOs should monitor all faming activities at peoples' farms. They should be able to identify outbreaks in animal diseases as well as provide quick solutions to avoid losses.
Cover economic aspects of agriculture, for example, assess performance of projects and their impacts by capturing sales data (i.e. monitoring and evaluation)	9% (N=2)	8th	0% (N=0)	9th	Mostly private and NGOs	AEOs assist farmers in the value chain of agricultural production from land preparation, budgets, planting, weeding, harvesting and even post-harvest management and marketing of produce.
Promotion of agriculture production and commercialization of crops and livestock	9% (N=2)	8th	83% (N=5)	5th	Public, private and NGOs	AEOs need to inform farmers on the best crop varieties for different seasons, for example, wheat in the winter season.
Teaching, training and social learning	36% (N=8)	2nd	100% (N=6)	1st	Public, private	AEOs train farmers in livestock, conservation, irrigation and veld management among others. AEOs work is important in that they help farmers achieve in their work.

					and NGOs	They also assist in mentoring farmers, building the capacity of farmers to be self-reliant. AEOs work with farmers across the whole sector. Small-scale farmers, Resettled farmers- A1 and A2; Commercial farmers.
Have an understanding of social contexts and cultures	9% (N=2)	8th	33% (N=2)	7th	Public, private and NGOs	AEOs build capacity for youth empowerment. AEOs also conduct non-agricultural roles, such as working as polling officers during elections as well as participating in various surveys for NGOs and other government departments. AEOs work with willing farmers AEOs observe customary non-field/ resting days i.e. "*Chisi".*
Innovation broker[1] *Influence wider use of knowledge, facilitating innovation, system integration, feedback to scientists, training institutes, where impact is on the system*	18% (N=4)	4th	n.a	n.a	Public	AEOs are responsible for networking innovation to farmers so that they can share experiences.
Collaborate with various stakeholders to expand their learning[1]	18% (N=4)	4th	n.a	n.a	Public	For AEOs to do well, they need to rely on specialists who have adequate time to source information from the Internet as well as other researchers and scientists.
Information intermediary *Enables access to knowledge, connects people, suggests resources*	45% (N=10)	1	100% (N=6)	1st	Public, private and NGOs	AEOs are responsible for the dissemination of agricultural information to farmers.

Have agriculture knowledge	18% (N=4)	4	100% (N=6)	1st	Public, private and NGOs	AEOs are responsible for delivering technology and agricultural knowledge to farmers, giving timely and correct information to farmers on crops and livestock and supporting farmers in the running of farm enterprises. They also address challenges faced by farmers. AEOs help farmers solve problems encountered in agriculture. One farmer said "*AEOs give us advice on planting, cultivation, harvesting and marketing of our produce. They inform about the use of agro-chemicals and even new varieties of crops*".
Knowledge translator *Helps people make sense of knowledge, helps apply knowledge and collate knowledge*	27% (N=6)	3	100% (N=6)	1st	Public, private and NGOs	"*AEOs are the first port of call to help farmers who need assistance with farming challenges. They are responsible for the dissemination of agricultural information to farmers. AEOs remind farmers of seasons, fertilizers required for their field, but, generally, farmers know what they should do*".
Knowledge broker *Improving knowledge use and application, co-creates knowledge, e.g. working out a solution to a problem with a farmer*	14% (N=3)	7	33% (N=2)	7th	Public, private and NGOs	"*AEOs help farmers solve their problems relating to animal health. Some farmers need to be taught to operate independently in performing bull castration and dehorning of their cattle*".

Total number of interviews = 22. Total number of ORPs = 6.

*Public sector refers to AEOs working for the Government and providing extension support to smallholder (and newly resettled) farmers.

[1]Analysis from 22 interviews, ORPs (N=6) were not included in this analysis due to a lack of details regarding the specific role.

n.a. = not applicable (as ORPs were not analysed for this role). Ranking was done based on number of tallies attained for each role.

SECTION 2: SCOPE OF TRAINING SECTOR AND SECTOR'S INSTITUTIONAL NETWORKS AND THEIR ROLES AND RELATIONSHIPS

2. Key institutions involved in AEO training in Zimbabwe

2.1 Description of key institutions involved in AEO Training

This section provides a description of the key institutions involved in AEO training in terms of the type of institutions, how they are related, challenges that exist in the relationships, what they do in terms of contributing to and supporting the learning of AEOs, and comments on whether information is located in networks or single institutions, and if so, what tools are being used and how.

2.1.1 Types of institutions

The key institutions involved in AEO training include universities (both public and private) and public and privately funded agricultural colleges and training centres located throughout the country. There are also training centres and colleges run by NGOs and international organizations.

Zimbabwe now has over 20 registered universities spread across all the country's ten provinces, with at least one state university in each province, and these offer training to both AEOs and farmers. Public universities include the University of Zimbabwe, Midlands State University, Bindura University of Science Education (BUSE) and Chinhoyi University of Technology while private universities include Africa University and Solusi University, as examples. The main target groups for agricultural extension services training in both the public and private universities are conventional, large-scale commercial agriculture and small-scale agriculture. The universities primarily offer training leading to the award of certificates, diplomas and degrees at both undergraduate and postgraduate levels. Certification is offered in different areas of specialization, depending on the mandate and thrust of the institution. The universities also run short courses that are meant to deliver specific skills, and these normally lead to the award of a certificate of attendance or specialist training certificates. Other forms of training include education, mentorship and the provision of technical advice to large and small-scale farmers.

Apart from the universities, publicly funded agricultural colleges, such as Gwebi College of Agriculture, Chibero Agricultural College, Esigodini, and Kushinga Pikelela, among others, offer training leading to the award of certificates and diplomas in agriculture. The duration of training for the certificate is two years while for the diploma the duration is three years. The colleges offer both theoretical and practical training and aim to produce agricultural graduates capable of delivering agricultural support services, practical farming, research, extension and farmer training. Most of the colleges offer diplomas and certificates in conjunction with state universities. For example, Gwebi and Chibero offer agricultural diplomas in conjunction with the University of Zimbabwe, while other colleges operate in conjunction with universities such as Midlands State University and BUSE. Besides the publicly funded colleges and training centres, there are privately funded colleges, such as Blackfordy Agricultural College. Private colleges also offer diploma courses, in addition to offering tailor-made short courses where trainees are awarded a certificate of attendance. Private colleges also offer integration of Information and Communication Technologies (ICT) in agricultural market intelligence.

Besides universities and agricultural colleges, vocational training centres (VTCs), which are spread throughout the country (with at least one per province), offer agricultural training programmes at the national certificate level. These include Magamba training centre in Manicaland, Kaguvi in the Midlands, Mshagashe in Masvingo, and Chaminuka training centre in Mashonaland Central province. VTCs offer agricultural education and training to youths and adults, some of whom go on to join the agricultural extension service while others become full time farmers. NGOs such as the Fambidzanai Permaculture Centre also train both AEOs and farmers. Fambidzanai offers diploma courses in collaboration with BUSE, alongside short courses that are offered to different clientele. Independent training centres such as the Mwenezi Development Training Centre also offer training and partner with a number of international organizations and NGOs such as the World Food Programme, Plan International, and the Norwegian Agency for Development Cooperation. Research organizations such as the Agricultural Research Trust (ART) also offer training to AEOs, mainly through farm visits, field days, and practical demonstrations of the research trials that are used to showcase the latest technologies.

2.1.2 How the institutions are related: overarching policy framework

The Government of Zimbabwe has an agricultural extension and training (AET) policy framework to guide the sector for the period 2012 to 2032. This regulatory policy framework provides the overall guidelines for the industry and how the institutions within it are related. A key issue addressed in the policy framework is agricultural and extension training and the increasing private sector participation in the provision of AET. Publicly funded agricultural training colleges fall under the Department of Agricultural Education and Farmer Training in the Ministry of Lands, Agriculture, Fisheries, Water and Rural Resettlement (MLAFWRR). Since the expectation of the policy framework is to produce graduates that meet certain competencies, whether trained in the private or the public sector, the duration of the training, key entry requirements for the training programmes, and key training competencies are usually harmonised for both the private and public sector colleges and training centres. For entry into the certificate training courses, the main requirements are passes at the Ordinary level (which must include English Language), while entry at the diploma level requires a minimum of five Ordinary level passes, including Mathematics, English Language, and Science. The training duration is generally two years for the certificate and three years for the diploma, and this includes eight months and one year attachment periods at certificate and diploma levels respectively. Certificate holders are exempted from the one year attachment if admitted to training at the diploma level. The Minister of LAFWRR launched the new agricultural education for development 5.0 curricula for agricultural colleges in July 2021 with the expectation that it would come into use in August 2021. The new curricula focusses on training, business advisory, research, innovation and entrepreneurship. It is expected to respond to the needs of the economy and provide learners with the skills, knowledge and competencies important for the labour market, personal development, and active citizenship.

2.1.3 Challenges that exist in the relationships (policy implementation)

When he launched the new curricula, the Minister of LAFWRR indicated that the current rigid agricultural education system was not sufficiently responsive to the needs of farmers resettled under the land reform programme, with production and productivity negatively affected. Although the Ministry has a policy framework to guide AET in Zimbabwe, the main challenge lies in the implementation of the policy. There are several dimensions to this. Firstly, although the policy framework acknowledges the need for a responsive AET system in the country, the challenge is to have a well-adapted curriculum to suit the level and context in which the training

takes place. For example, much training takes place in private agricultural colleges, such as Blackfordy, and in public agricultural colleges, such as Chibero, but the context of the training is not the same as in these colleges. Secondly, the curricula reform in AET has to address the challenge of the misalignment of training with the skills needed by smallholder farmers. For example, smallholder farmers require extension support in the use of appropriate technologies, yet, for training in the agricultural colleges, the emphasis is on technology suitable for large-scale commercial farms. Thirdly, the reconceptualization of the AET policy is not the same in all training colleges. This is because the national AET policy at central government level in Zimbabwe is reconceptualized at a particular agricultural training college, reproduced within the classroom during teaching and learning and then applied by extension officers as they pass it on to farmers. However, this process of reconceptualization is influenced by discipline specific requirements (internal dynamics) as well as external requirements, and this therefore leads to variations.

Besides these factors, the training curricula in AET has been criticised for not developing the right competencies in the AEOs. In Zimbabwe, one of the main challenges is to align the curricula to the key requirements and needs of emerging farmers resettled under the fast-track land reform and resettlement programme. However, the Minister indicated that agricultural colleges have continued to produce graduates that are ill-suited to meet this challenge. Both curricula and teaching methods have been criticised for emphasizing theory with little practical training because most lecturers do not have the relevant practical skills themselves. This is the public perception of the agricultural education curricula. Challenges are also faced at the institutional level as most institutions have poor institutional linkages, poor access to technology, and dilapidated infrastructure and equipment. Lastly, there is a misalignment between the gender of graduates and the smallholder farmer population. Most smallholder farmers are women, yet most AEOs lack the skills to deal with gender dynamics. If the policy framework is to achieve the desired outcomes, the curricula needs to take into account the needs of A1 and A2 farmers as well as national priorities such as food and nutrition security.

2.1.4 What institutions do to contribute/support the learning of AEOs

Institutions contribute to and support the learning of AEOs through various forms of training delivery and the scope of the activities and topics covered in their training programmes. Most institutions provide a mixed form of training delivery, encompassing classroom based lectures,

farm demonstration sites, on-farm training, including site visits by AEOs, workshop training, and information technology based online training platforms. These training programmes aim to produce graduates who can offer extension support for mixed cropping, mixed livestock production, and marketing. The content of the agricultural extension curricula includes components such as crop production, animal production, engineering, agricultural economics, animal sciences, pedagogy and entrepreneurship. The training topics and on-farm activities include farming techniques, equipment maintenance, planting and harvesting, irrigation management, fertilizer and pesticide use, yield management and marketing.

2.1.5 Location of information

Some of the agricultural extension information for the key training institutions is located in networks while some rests in single institutions, depending on the mandate of the institution and the main funders of the training programmes. Most publicly funded agriculture training colleges and centres run certificate and diploma programmes in collaboration with the main state universities. For example, Gwebi and Chibero agricultural colleges run their diploma programmes in collaboration with the University of Zimbabwe. Meanwhile, BUSE offers certificates and diploma courses in partnership with four agricultural colleges, Shamva agricultural college, Fambidzanai Permaculture Centre, and Chaminuka and Magamba training centres, located mainly in Mashonaland Central province. The university offers diplomas in agriculture, agroecology, and a diploma in agriculture specializing in tobacco in association with the four agricultural colleges.

Some of the institutions started their training and research programmes, or initiated training programmes based on specific and targeted support from donors. Blackfordy agricultural college was founded as the Tobacco Training Institute in 1974 at the request of members of the Zimbabwe Tobacco Association (ZTA) to specialize in the training of AEOs or managers for tobacco production and this has been its main mandate up to now. The Agricultural Research Trust (ART) was formed by the Commercial Oilseeds Producers' Association of the Commercial Farmers Union and the Commercial Grain Producers Association, and initially received funding from the Zimbabwe Cereal Producers Association and the Cattle Producers Association. International organizations and NGOs also fund some of the more specialist training programmes, such as conservation agriculture training for AEOs and refresher courses run by training centres such as the Mwenezi Development Training Centre. Other training

funded by NGOs and international organizations includes climate change and variation, entrepreneurship, innovation, sustainability and community development.

2.2 Knowledges to AEOs in daily practice

This section reports the results of the question about where AEOs get their knowledge and information from according to the AEOs interviewed, and describes the sources of knowledge in terms of formal, informal, farmers and others. The types of knowledge, and the need for knowledge and information, medium and tools, and examples that illustrate the dynamics of AEO learning are included.

2.2.1 Sources of knowledge and information

According to the AEOs interviewed, they gain knowledge and information form a variety of sources; these include universities, research centres, farmers, as well as the media, such as radios and televisions. Digital media is also becoming increasingly important. Knowledge and information from universities comes in the form of certificates, diplomas and degree programmes, some of which are tailor-made to offer specific skills for specific commodities where there is need for such training. For example, the Great Zimbabwe University offers certificate and diploma programmes in sugar cane production targeted specifically at producers located in the sugar cane producing area of the Lowveld in Zimbabwe.

AEOs can also source information from specialist research centres in cases where they fail to provide all the information required by farmers. Zimbabwe has specialized research centres catering for the various commodities and livestock grown and produced in different parts of the country. These include research centres such as Makoholi Research Centre in Masvingo, specializing in the indigenous Mashona livestock breeds, Grassland Research Station in Marondera, specializing in livestock production, Horticulture Research Centre in Marondera, for horticultural commodities, and Matopos Research Centre, for research on small ruminants, among others. AEOs act as the link for the transfer of information and knowledge from the specialists at the research centres to farmers. The following quote from an AEO gives an example of this role:

> *"[I] Came into AGRITEX as a specialist for soya beans. A ground level job. Assigned to a Ward and works directly with farmers. Cascades information from the specialist to the farmer. Supervises AEOs operating on the ground* (AEO, Interview)*"*

AEOs, therefore, have a two-way role in participatory extension by linking the farmers with research.

Another important source of knowledge and information are the commodity specialists and the AEOs' line supervisors. These provide back up support with specialized information and materials as required by the frontline AEOs. In addition to the supervisors, other fellow AEOs support each other, sharing advice about solving problems encountered by farmers if they have experienced something similar in their own extension work. Farmers themselves are also an important source, particularly in relation to indigenous knowledge systems and traditional knowledge and farming in their specific localities. The following gives an insight from one of the extension officers:

> "*AEOs work with farmers. Sometimes research centres such as Makoholi fail to provide all the necessary information required by AEOs. Traditional knowledge possessed by farmers is also very important especially in treating wounds in cattle. Traditional knowledge is also very important in wound management in cattle in the absence of conventional medicine. It is important to capture local knowledge because farmers will use the experience they have to deal with their problems even in the absence of extension officers*" (AEO, Interview).

Besides the formal and informal information networks, the internet is increasingly becoming an important source of information alongside more traditional sources, such as the radio and televised programmes run specifically for farmers. Private companies such as seed, fertilizer and chemical companies also provide knowledge and information for AEOs regarding specific products targeted at producers of various commodities. The following quote from an AEO illustrates this point:

> *"AGRITEX has been more effective in training AEOs. Even if you move to the NGO or private sector you apply skills from AGRITEX, but the difference is that you become product specific when you move to seed companies"* (AEO, Interview).

2.2.2 Types of knowledge

The type of knowledge sourced varies from agricultural, contextual, and general educational knowledge. Private seed companies, for example, provide information and knowledge relating to the types of seed products and information on farming using their specific seeds. Although the objective of the seed marketers is to promote their seed technology, they also provide useful

information for AEOs and farmers. This includes the seeding rate depending on the agro-climatic conditions of different areas, and specialist knowledge on specific crops, such as soyabeans, cotton, tobacco etc.

One of the most important aspects of agricultural extension work is to provide demonstrations to farmers. In order to keep abreast of the latest developments, AEOs also have to source information and practical advice that is relevant to the specific commodities grown in their respective areas and the technologies relevant to local farmers. These can include the latest techniques in areas such as conservation farming, and updated information on the drugs and medicines relevant for the different types of livestock kept by farmers in their area of operation.

Farmers also have a wealth of traditional and indigenous knowledge, particularly relating to the different types of remedies that can be used to treat livestock. It is important for AEOs to capture local knowledge because farmers will draw on their previous experiences and traditional knowledge when they encounter problems, especially in the absence of conventional medicine or alternative advice and solutions.

2.2.3 New and emerging areas

There are various needs for knowledge and information, especially related to new and emerging issues such as climate change and the specific challenges facing farmers. AEOs also need to be up to date with the new technologies that are available. As such, the AEOs interviewed indicated that the training needs of AEOs include issues of innovation, precision agriculture, use of geographic information systems (GIS), remote sensing and climate change adaptation. Training in digital systems such as GIS would enable digitization of land use planning using the new technologies instead of the outdated manual systems. AEOs also need training in soft skills that make use of modern technologies in terms of management of extension approaches, such as management of groups and participatory extension. The need for training in climate change mitigation must be emphasized as it is one of the most important emerging issues affecting agriculture. Seasons and patterns of growth are changing, and training in climate change mitigation would enable AEOs to assist farmers more effectively.

Part of the need for knowledge and information relates to specific challenges such as the skills to deal with farmers participating in irrigation schemes. Government and other private companies have been supporting irrigation scheme farmers with inputs such as seed, fertilizers and chemicals. These are supposed to be used for specific crops; however, some farmers who

are not honest may present false information on the usage of the inputs. The AEOs verify the usage of the inputs in terms of confirming that the inputs have been put to the correct usage, thereby increasing the productivity of irrigation schemes This serves to deter farmers from using the inputs for anything other than the intended purpose. AEOs also need training on challenges relating to water management in farming areas, technologies such as conservation farming, and livestock management.

Interviewees also indicated a need for refresher courses in the use of chemicals and herbicide management as well as in pest control. In terms of livestock, there is also a need for knowledge and information on treating disease outbreaks in the absence of conventional medicines, for example, by making use of traditional remedies, and in livestock wound management in cattle, both of which can be a major challenge to smallholder farmers. AEOs also need information and knowledge relating to market challenges. Interviewees indicated there is need to train AEOs in market surveillance so they can train farmers to understand markets better and respond to changing market conditions.

2.2.4 Methods of knowledge sharing

AEOs source knowledge and information and share it with farmers in a number of ways. Farmers tend to be organized into various associations, with groups convening and attending annual general meetings, and these act as an important platform for knowledge exchange and sharing of information. AEOs are an important stakeholder in such gatherings. They also meet farmers individually, or in some cases in groups if they want to give information to many farmers at once. Farm visits and demonstrations are also an important platform for knowledge exchange and sharing of information. Technology now plays a major role in providing specific local knowledge to farmers and sharing information with AEOs. The use of short message service (SMS), social media platforms such as WhatsApp and use of the internet have grown considerably in recent years, alongside more established media, such as radio programmes for farmers, which complement the work done by AEOs.

2.2.5 Examples that illustrate the dynamics of AEO learning

Various examples shared in interviews illustrate the dynamics of AEO learning. The first comes from sugar cane out-growers in the Chiredzi area of Zimbabwe. The out-grower farmers in one section of the sugar cane estate came into conflict over access to and use of irrigation water in their section. The farmers invited their local AEO to assist them in resolving their

conflict. The AEO took the farmers on a site visit to another section where the farmers had developed their own mechanisms to deal with such conflicts. As a result, the first group of farmers learnt how to resolve their conflicts and develop sustainable mechanisms for sharing the irrigation water. Here the AEO used the knowledge and experience he had gained from local farmers to support another group of farmers facing similar challenges.

The second example relates to an AEO who was teaching farmers how to calibrate a knapsack sprayer in the field. The AEO was quick to notice one farmer who was particularly good at this. This farmer had previously worked for COTTCO, which is the major buyer of cotton in the country, and was, in fact, more knowledgeable in this area than the AEO. The AEO gave the farmer the opportunity to share his knowledge by teaching both the other farmers and the AEO himself. The third example relate to the use of ridges in agricultural production. One farmer indicated that he shared information and advice about this with his local AEO. The AEO then implemented the knowledge the farmer shared with him and incorporated it into the training he provided to other farmers.

Another example to illustrate the dynamics of AEO learning relates to use of traditional remedies in livestock management. Lastly, the dynamics of AEO learning can be illustrated through an AEO who contributed to the adoption of drip irrigation in the area he was working in, contributing to higher yields being realised in the area, while conserving water. The AEO learnt about this from fellow AEOs as well as through modern technologies, notably Twitter. The AEO follows a number of experts on Twitter who provided valuable practical information on the subject which the AEO then shared with farmers in order to improve productivity.

SECTION 3: TRAINING FOR AEOS - CURRICULUM ANALYSIS

3. Curriculum component breakdown

3.1 Programmes offered to AE trainees in Zimbabwe

3.1.1 Certificate in Agriculture

The majority of agricultural colleges and vocational training colleges (VTCs) in Zimbabwe offer the Certificate in Agriculture programme. The duration of this programme ranges between two and three years. Conventional agricultural colleges emphasize the need for five Ordinary level passes including English, Mathematics and Science, but entry requirements are more

flexible in VTCs. Mlezu College of Agriculture provides a typical example of the curriculum for the Certificate in Agriculture. It offers four certificate programmes in agriculture, namely: Crop Production, Animal Production, Agricultural Production and Farm and Agri-Business. Of these, Agricultural Extension is offered only in the Farm and Agri-Business programme (as one of the ten modules), contributing 10% of the total credits.

3.1.2 Diploma in Agriculture

The Diploma in Agriculture is offered to candidates who either already possess the Certificate in Agriculture or who have passes in Ordinary level Sciences, Mathematics, and English. The example of Gwebi College of Agriculture illustrates the Diploma in Agriculture. Gwebi offers four diploma programmes in Agriculture, namely: Diploma in Agriculture - Crop Production; Diploma in Agriculture - Animal Production, Diploma in Agriculture - Agricultural Engineering and the Diploma in Agriculture – Farm and Agri-Business Management. The duration of these programmes is two years for candidates with a Certificate in Agriculture and three years for non-certificate holders. Completion of any of these diploma programmes qualifies individuals to work as an AEO. However, in terms of the curriculum breakdown, only the Diploma in Agriculture - Farm and Agri-Business Management programme has a module on Agricultural Extension, and this is the last module on the programme.

3.1.3 BSc Agriculture

In the majority of cases, Agricultural Extension is offered under the BSc Agriculture degree programmes with an emphasis on agricultural economics. These programmes are responsible for further developing the knowledge and skills of AEOs who have graduated from Diploma awarding colleges. However, universities also recruit students with Advanced level passes in the science subjects. For this report, examples from Bindura University of Science Education (BUSE), Lupane State University, and Zimbabwe Open University are cited. Although the nomenclature differs from one university to the other, for example, BUSE currently offers a BSc degree in Agricultural Economics, Education and Extension (AEEE), the BSc Agriculture degrees offered in these institutions have a duration of four years.

The first year of the BSc in Agriculture programme across universities in Zimbabwe typically comprises introductory modules. These build on students' prior knowledge from Advanced level Biology, Chemistry, Agriculture, and other related subjects, as well as from the Diploma

in Agriculture, and provide a firm foundation for the study of a range of science, socio-economic, agricultural and agricultural extension modules in the subsequent years. For example, the distribution of modules in the BSc AEEE offered at BUSE is as follows: out of a total of 40 modules, science related modules constitute about 26% of the total credits, agricultural application constitutes 42%, socio-economic modules 22% and agriculture extension 10%. At Zimbabwe Open University, over the four years, a student must complete a total of 34 modules and 136 credits to graduate. Of these, 60 credits are for science related modules, 72 for applied agriculture, and four for agricultural extension. The distribution of credits is similar at Lupane State University: to complete the BSc in Crop Science, programme; one has to pass 36 modules and complete an industrial attachment in the third year. While the credits for this programme are not spelt out, the distribution of the modules is as follows: 18 (50%) are science related; fourteen (38%) are linked to applied agriculture, and one (10%) addresses agricultural extension. Examination of the modules in other universities in Zimbabwe also reveal that agricultural extension is given little attention in BSc Agricultural degree programmes. More time is devoted to science related subjects and applied agriculture, with agricultural extension often offered only as an elective module.

3.2 What AEO competencies are prioritised?

The curricula for the Certificate, Diploma and Degree in Agriculture seem to prioritise the following areas:

- Scientific application and analysis
- Critical thinking
- Management
- Communication and facilitation

3.4 To what extent does the curriculum define specific extension skills and what they entail?

Examination of the curricula for the Certificate, Diploma and Degree in Agriculture suggests that these skills are given priority in both colleges and universities:

- Communication skills: Listening, giving presentations, and speaking
- Material development
- Programme planning and management

3. 3 What AEO topics are prioritised?

An analysis of Agriculture Extension modules in both colleges and universities reveal the following topics according to priority:

1. Rural sociology
2. Principles and Theories of Adult Learning
3. Extension methods
4. Communication in extension
5. Rural Development
6. History of extension in Zimbabwe

3.5. Is there evidence of curriculum content on these knowledge types: agricultural knowledge; contextual knowledge; general education knowledge?

Table 3: Agricultural, Contextual and General Education Knowledge Curriculum Content

Source: Created by the authors

Agricultural Knowledge	Contextual Knowledge	General Education Knowledge
• Introduction to Animal Science • Principles of Genetics • Principles of Crop Production • Agricultural Biochemistry I • Introduction to Plant Science • Introduction to Microbiology • Practical Agricultural Management • Agricultural Marketing • Principles of Soil Science	• Introduction to Sociology and Ethics • Farm and Business Management • Rural Development	• Communication Skills • Citizen Education and Conflict Transformation • HIV and AIDS Education • Adult learning principles • Facilitation methods

3.6 How much attention is placed on educational/training facilitation skills

The institutions studied reveal that facilitation skills are not given much priority in the programmes that train AEOs in Zimbabwe. Most of the modules are scientific and emphasize agriculture application, with, in the majority of cases, only one module catering for this aspect.

For example, the module on Agricultural Extension offered at Gwebi College includes 30 contact hours, but only 26% of module time deals with education/training facilitation skills. Topics relating to facilitation skills covered in the module include: definition of an adult, the principles of adult learning, and factors affecting the rate of learning in adults; approaches (individual, group and mass media; advantages and disadvantages); and methods (definitions, advantages and disadvantages, participatory, demonstration, field visits/tours, shows, role plays, lectures).

SECTION 4: AEO KNOWLEDGE FLOWS AND FUNCTIONS

4. AEO Knowledge flows and functions

This section presents a synthesis of the finding of the study on the knowledge flows and functions of AEOs.

4.1 Sources of knowledge

AEOs in Zimbabwe are a central nerve in the agricultural knowledge and information network. They receive agricultural knowledge and information from a web of actors and pass it on, primarily to farmers. However, the findings of this study reveal that information flows in both directions; farmers also pass knowledge on to AEOs. AEO are therefore reliant on a multiplicity of sources, both formal and informal, for agricultural knowledge and information.

The formal sources include formal institutions such as agricultural colleges, national agricultural research centres (Makoholi, Chiredzi, Matopos etc), Ministry of Agriculture departments, and other government departments, universities, international agricultural research centres (CIMMYT and ICRISAT), NGOs (e.g. Fambidzanai Permaculture Centre and Care International), Agro-industry and service providers (Pannar, SeedCo, Zimbabwe Fertilizer Company, John Deer), and agri-commodity buyers, particularly tobacco buyers. Informal sources include the AEO's social networks, co-workers, college alumni, Google, online experts, Twitter, and knowledgeable farmers.

Knowledge mainly flows to AEOs as part of mandatory or voluntary training, as well as on request or demand (by AEOs). The main employer, AGRITEX, requires AEOs to go through occasional in-service training in various areas as part of their continual professional development. Examples of training areas include specialized irrigation management,

conservation agriculture, and, of late, entrepreneurial skills. The training is usually organized with support from development partners, such as the FAO, NGOs or international research centres. An example from the field is a case where Care International offered AEOs short courses on agri-business management and solar power.

A lot of the AEOs interviewed for this study indicated that they also actively consult external sources in situations where their knowledge is limited. They said that this often happens when farmers' information needs are beyond their areas of training or specialization. In addition, the technological environment is changing quite quickly. Farmers may seek knowledge about a new crop variety, an agrochemical, a production practice or a new application of technology which they may not be familiar with. A number of AEOs mentioned turning to colleagues or resorting to Google to search for journals and experts online to find solutions. However, they cautioned that information from the internet lacks local context and may not be directly applicable.

The AEOs also admitted that there are a number of occasions where they have received knowledge from farmers. The current typology of farmers in Zimbabwe is quite diverse, particularly among the model A2 and model A1 farmers—these are new farm resettlement types introduced by the land reform programme. Among them are retired civil servants, including former extension officers, agro-industry workers, teachers, etc. As mentioned above, a young female extension officer admitted to learning how to properly calibrate a knapsack sprayer from a farmer who was a former employee of COTTCO. However, an attitude change is required so that AEOs recognize the knowledge and experience some farmers already have. Figure 3 shows the various sources of knowledge for AEO in Zimbabwe.

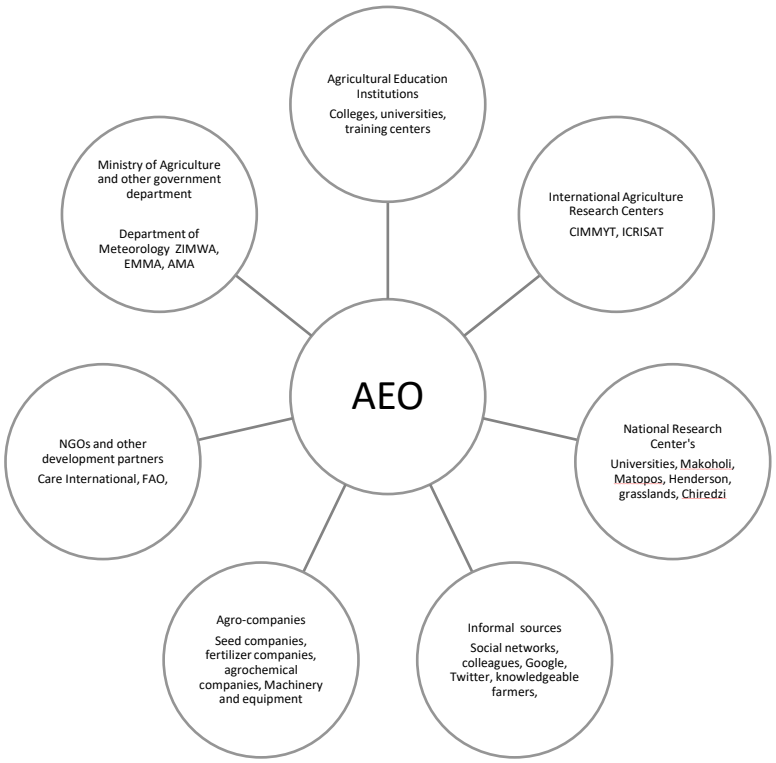

Figure 3: Sources of Knowledge for AEOs in Zimbabwe
Source: Created by the authors

4.2 Channels and tools of knowledge flow

The knowledge shared by AEOs flows into the agricultural sector through a variety of channels. The medium choice seems to be influenced by the philosophical approach to extension, appropriateness, resources availability, and the unfolding ICT revolution, among other factors. The channels include farmer meetings, formal short courses, workshops, pamphlets, and manuals, messages on mobile phones, practical demonstrations, field days, radio programmes, TV programmes, and word-of-mouth or farmer-to-farmer. Although, the predominant method used by AEOs is farmer group meetings and individual farmer visits, limited resources have constrained the mobility of AEOs. This was echoed by the farmers interviewed in the study who indicated that AEOs, particularly from the government, were not visible. In this context, the use of mobile cell phones seems to have become popular, perhaps because it is less costly for both the farmer and AEO and more appropriate in the midst of the Covid 19 pandemic. Farmers reported that they now called their AEO to seek solutions to farming problems rather than arranging farm visits.

Farmers, also have the option to organize themselves into interest groups and request special training from agricultural training centres and colleges. This is particularly common in cases where farmers wish to acquire knowledge about growing a new crop or rearing animals, usually at commercial levels. Examples from the study include new sugarcane farmers in the lowveld, Chiredzi, who sought support from a special centre at Great Zimbabwe University which takes cohorts of farmers through sugarcane production courses. Farmers may also be organized into young farmers' clubs or designated lead farmers and receive training through a training-the-trainers programme. AGRITEX, for example, runs the popular Master Farmer programme within this framework. Other more recent channels through which knowledge flows to farmers include, farmer field schools, innovation platforms, and learning alliances. These approaches tend to be more participatory and encourage the multi-directional flow of knowledge which recognizes farmers as sources of knowledge as well.

Agricultural research centres and universities typically conduct on-farm trials to demonstrate the performance of a new technology and co-learn with farmers . In Zimbabwe, CIMMYT and ICRISAT have done a lot of on-farm trials to promote conservation agriculture to smallholder farmers. In addition, seed companies, such as Seedco and Pannar, typically use demonstration plots and field days to promote and popularise new crop varieties.

As efforts to digitalise agriculture increase, mobile phone applications and online platforms are becoming important channels for knowledge and information flow in Zimbabwe. In response to this, LAFWRR recently launched the Zimbabwe Agriculture Information Hub (ZAIH) in collaboration with development partners. This website serves as a repository for a wide range of agricultural information resources and a platform to disseminate information on agricultural events, programmes, project, markets and prices among others. Materials uploaded to ZAIH include virtual field days, crop and livestock production manuals (electronic print, pictures, video and audio), and all stakeholders, including farmers, can freely access the information.

Table 4: Mediums and Tools for Knowledge Flow

Source: Created by the authors

• Farmer group visits • Individual visit • Demonstration plots • Field days • Mobile phones • Workshops • On-farm trials	• Internet • Farmer field schools • Farmer-to-farmer • Schools • Learning alliances • Media all types (print, TV, radio) • Virtual field days

• Training manuals, pamphlets and booklets	• Exchange visits

4.3 Knowledge of context specific challenges

The farming community in Zimbabwe has a diverse context shaped by agro-ecological, sociocultural, and land tenure differences. Some farms are large and commercially oriented while others are small and subsistence oriented. A diversity of crops and animals are produced in different agro-ecological environments, ranging from semi-arid in the southern parts to the relatively wet eastern highlands. Given this diversity, it is important for AEOs to understand how issues such as climate change are affecting their locals areas and how to support farmers to address their impacts. However, the interview findings suggests that AEOs' knowledge levels are limited for some context specific challenges, partly due to the unresponsive and inadequate feedback mechanisms associated with the extension/research system.

4.3.1 Climate change

Climate change has become an increasingly significant challenge in Zimbabwe, but there has been a slow response in terms of incorporating climate change issues into the AEO training curriculum. It is only now in 2021 that the curriculum is being reviewed to include a comprehensive treatment of climate change issues. This means that many AEOs have graduated with little formal training on climate change and its impacts. However, this gap has been filled to some extent by "informal" exposure to climate change issues through other sources of agricultural knowledge that were quicker to respond, notably NGOs, universities, and international research centres, most of whom work hand-in-hand with AEOs in farmer communities. Nonetheless, the amount of knowledge on climate change is still small in Zimbabwe, many specificities are still to be understood, and agricultural adaptation processes are still being refined. For example, conservation agriculture (CA), known locally as P*fumvudza/Intwasa*, is a major government response to climate change and is promoted by AEOs as a way of conserving moisture in soils and promoting productivity. However, when excessive moisture is present it may have adverse yield effects. Research is yet to provide solutions to situations like this, and how to apply CA to other crops that smallholders typically grow in addition to maize—such as sweet potatoes, sorghum rice, and wheat.

Soil fertility is an underlying production challenge in Zimbabwe, particularly for smallholder communal farmers. Though AEOs are generally aware of the problem, they are limited in their

response to solutions for specific farmer's fields, and it is difficult for most smallholder farmers to test their soils due to limited labs and the high costs in the country. In addition, while there are several micro-irrigation schemes across the country, AEOs often lack the knowledge and skills required to manage such schemes effectively. They need both specific training on irrigation scheme management and on the culture and group dynamics particular to the different parts of the country where the schemes are located.

4.3.2 Cultural issues

The interviews with AEO trainers revealed that there is no comprehensive coverage of cultural issues in their training. In many cases the young graduates go through a cultural shock in their early days of deployment. Women and gender issues which are quite "old" issues were surprisingly not being mainstreamed in the training of AEOs. Female extension officers gave several examples where they experienced gender discrimination at the workplace and from farmers, with limited training on how to respond appropriately. Some of the instances include preference for males in the distribution of motorcycles, hostility from female farmers who feared they would 'snatch' their husbands, farmers doubting their ability, and limited physical strength to handle animals e.g. cattle for dosing or other such operations.

4.3.3 Changing client groups

AEO training has been largely directed towards serving smallholder subsistence farming. However, the land reform programme of 2000 has changed the agrarian landscape, and AEOs now have to serve a more heterogeneous clientele in the form of A1, A2 and large-scale farmers. The new class of farmers have different production goals, education levels, resources, endowments and attitudes than the communal farmers, and AEOS often lack the knowledge and skills to support them. Because of poor funding, most agricultural colleges and training centres do not have access to the latest farm machinery or equipment to use in training, so AEOS cannot serve well farmers if they require assistance with this equipment.

4.3.4 Pests and diseases

Animal and crop diseases and pests (insects, weeds, etc.) tend to differ by agroecology. A lot of the extension officers interviewed reported facing challenges in terms of their knowledge of pests and diseases. They usually had to consult subject specialists based in district or provincial offices. For examples one extension officer said that they relied on ministry colleagues, a

provincial veterinary officer, and a soya bean specialist to provide solutions for local farmers' pest control issues.

4.4 Functions of AEOs

AEOs play an important role in the transformation of the agriculture system. According to one of our respondents, "*the extension officer is an agent of change and pivotal in transforming agriculture and livelihood[s] of rural farmers*". AEOs perform a number of functions in relation to knowledge sharing, and Shaxon et al. (2011) present a useful model that categorises these into four key functions: information intermediary, knowledge translator, knowledge broker and innovation broker (see Figure 4). We reviewed evidence from the study to see to what extent the AEOs roles are consistent with this stylised model.

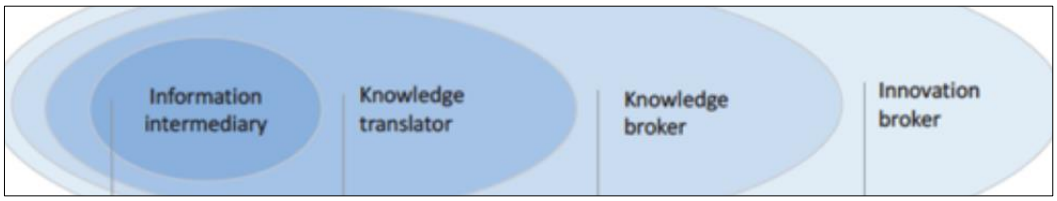

Figure 4: The Shaxon model of knowledge functions.
Source: Shaxon et al., (2011)

4.4.1 Information intermediaries: Enables access to knowledge e.g. connects people, suggests resources

There are several instances where AEOs act as information intermediaries. They do not always have the knowledge required themselves, but they help farmers to connect with other sources of knowledge. These connections happen in a number of ways. In many cases they refer farmers to more expert sources by giving names and contacts of relevant organizations and individuals. At times they organize meetings where they bring experts to interface directly with farmers. In fact, this is a common practice in Zimbabwe where AEOs mobilise and convene meetings on behalf of other actors, such as development NGOs, researchers (universities and international agricultural research centres), input supply companies and commodity buyers, and even for politicians to pass on the information they have to farmers. The AEOs are the *de facto* entry points into the rural farm communities in Zimbabwe because they are the closest, and are generally well known and trusted by farmers.

4.4.2 Knowledge translators: *Helps people make sense of knowledge, help apply knowledge, collates knowledge.*

AEOs interact with farmers on a daily basis, are approachable and understood by farmers. They are also usually knowledgeable about farmers' context, living conditions, environment and language. When new knowledge or technology is disseminated to farmers, through farmer trials or field demonstrations, it is generally the AEO who usually spends more time answering farmers' queries. AEOs help make new knowledge meaningful to farmers within their farming context. As new knowledge has to be applied in relation to old existing knowledge, they also act as an institutional memory for all the knowledge that has been introduced into the agricultural sector. For example, initiatives such as CA (*Pfumvudza/Intwasa*) initially appear complex to farmers and may seem contrary to their conventional wisdom rooted in the traditional ploughing methods. AEOs were, and still are, very important in helping farmers make sense of the CA principles being promoted by "emergent" researchers and NGOs. The critical role of translating this knowledge in light of climate change and soil degradation issues is best played by trusted AEOs, and, according to those interview for this study, CA adoption rates in Zimbabwe increased after the official mainstreaming of CA by AGRITEX.

***4.4.3 Knowledge brokers*:** Improving knowledge use and application, co-creates knowledge e.g. working out a solution to a problem with a farmer

Knowledge brokering is one area where government AEOs have been criticised for not performing effectively. When farmers face a local farming problem and the immediate solution is not available, extension officers should be able to conduct basic problem-solving research with farmers and co-create new knowledge and solutions with the farmers. However, current AEO training does not appear to equip or empower AEOs to be good at brokering knowledge. This weakness was pointed out by the trainers of AEOs, and a push to include it in the new curriculum.

***4.4.4 Innovation brokers*:** Influence wider use of knowledge, facilitating innovation system integration, feedback to scientists, training institutes

AEOs are key nodes in the agricultural innovation network and platform. As indicated earlier, most agricultural research organizations and actors who bring new innovations to farmers do so through AEOs. AEOs thus play an important role in disseminating innovations and, to some extent, adapting technologies with farmers to make them more suitable and, therefore, more widely adopted or applied by farmers. Farmers tend to trust AEOs' recommendations and are

willing to trial new innovations with guidance of extension officers, who are in turn supported by the sources of the innovations, notably research centres and seed companies. AEOs are viewed as neutral players who mostly act in the interest of farmers. When innovations are not being taken up by farmers, AEOs are usually the first to be consulted for feedback, and they usually have very good understanding of the underlying causes of poor adoption, including the farmers' concerns. Feedback from farmers via AEOs on CA, for example, include the following difficult questions for researchers: how can CA be applied in the production of other crops, such as sorghum and sweet potatoes? and What can be done in the event of flooding since CA aggravates the situation?

SECTION 5: RAELL FUTURE PERSPECTIVE SUMMARY ON AEOs

5. Core function of AEOs

5.1 Teaching/training/social learning recognized as a core function of AEOS in Zimbabwe

In the Zimbabwean agricultural context, teaching, training, or social learning is designated as a core function of AEOs. They work with local farmers (communal, newly resettled A1 and A2 farmers, commercial farmers), Rural District Councils (RDCs), headmen, chiefs and other local authorities in their respective areas/wards, District Administrators, AGRITEX officials, private companies, research institutions, and NGOs, among other agriculture stakeholders. The diverse continuum of stakeholders working with AEOs shows the relevance of teaching, training and social learning in the functioning of AEOs. AEOs teach/train individual farmers and farmer groups through verbal training, participatory research, farmer exchange visits, field days and the use of demonstration field sites. They train new farmers (A1 and A2), smallholder farmers (including men, women and youths) and commercial farmers. The inclusion of youths in agriculture training is an increasingly important part of the role AEOs perform in a bid to encourage more young peple to take up farming rather than migrating to urban centres in ever-increasing numbers (UN, 2016).

Approximately 37% of participants (N = 8) in this study reported that teaching, training and social learning are recognized as core AEO functions. One of the interviewees commented that farmers already have a basic knowledge about farming and AEOs are just there to remind them about which practices to conduct at specific calendar times. This was also mentioned by two

other interviewees who defined one of the AEOs' roles as being available for farmers to provide a two-way participatory extension, and remind farmers of seasons and fertilizer requirements for their fields. These three examples show that farmers have indigenous knowledge which could be used in daily AEOs duties (including learning).

Apart from learning from farmers, AEOs also learn from fellow AEOs, researchers, NGOs, agricultural extension specialists (i.e. veterinarians and livestock specialist), publications on requirements for specific crops, farming platforms, symposia, workshops, agricultural shows (local or national), local fairs, field days, stakeholder meetings, and media, ,media (including social media i.e. Twitter, Google, WhatsApp). Radio is another platform where AEOs could learn, but one participant highlighted that it is difficult to evaluate radio programs.

AEOs understand the social dynamics in communities they work in, and the importance of this aspect of AEOs' work was clearly elaborated in the interviews. For example, one participant mentioned that farmers prefer male AEOs, another added that wives whose husbands are farmers are sometimes uncomfortable with them meeting female AEOs alone. AEOs also recognize that farmers know a lot. For example, one AEO mentioned she learnt from one farmer how to control frost damage in winter tomatoes through the use of sprinkler irrigation at night and how to dilute chemicals and calibrate knapsacks. Due to the appreciation of the diverse knowledge which farmers have, one AEO recommended that retired farmers should be given a platform to train other farmers. These examples show that AEOs the value communities they work in and understand the importance of working well with farmers, local authorities, and other agriculture stakeholders for their functioning and success of their work.

Below are examples from ORP related texts highlighting teaching, training and/ or social learning as a core function of AEOs.

1. Agricultural extension is the vehicle for helping farmers utilize their land.
2. An extension officer is a teacher. Their role is to see if farmers are following.
3. AEOs are responsible for training farmers. They are the first port of call to help farmers who need assistance with farming challenges. They are responsible for dissemination of agricultural information to farmers. Extension officers are better distributed in communities to solve challenges faced by farmers.

4. AEOs help farmers solve their problems relating to animal health. Some farmers need to be taught to operate independently in performing bull castration and dehorning of their cattle.
5. AEOs are the backbone of farmers. They assist in farm management. They inform farmers on changes in climate as well as new approaches in conservation farming such as the *Pfumvudza* Government initiative.
6. AEOs train youths for income generating activities.
7. AEOs are involved in non-agriculture roles i.e. act as polling officers, involved in surveys from government and NGOs. AEOs are reachable/available to be involved in most activities introduced in smallholder communities.

One ORP indicated that AEOs should raise awareness and disseminate information about government agricultural programmes among farmers and ensure they are involved in the planning of policies (i.e. involved in policy consultations). This is an important point as enlightening and guiding farmers on how to influence policy formulation and contribute to shaping government initiatives is a meaningful way to empower them.

Although teaching and training was highlighted as a core function of AEOs, some of the participants mentioned that AEOs lack the technical/ up to date expertise needed by farmers. Another farmer reported that he had never even met an AEO: "*AEOs should give knowledge and skills to farmers. They must be available throughout to support farmers at every stage in the production process. However, from my experience, I have not met AEOs to assist me in farming. They are not visible. The lack of visibility is of huge concern. Some farmers make use of private AEOs whom they are friends with, but I have never encountered them*". This suggests there is a need to improve the mobility and availability of AEOs in the areas they work in and to equip them with the knowledge required (through professional development and reviving government in-house training) to meet the needs of increasing numbers of farmers, especially those who are new to rural agriculture.

5.2 What knowledge, teaching and social learning skills are required from a RAELL perspective?

5.2.1 Farmers' perspective

Farmers indicated they required AEOs who are capable of helping them make practical decisions on their farms and who can also help them draw up business plans and establish viable projects (agri-business skills). They indicated that while AEOs provide various pieces of technical information they were unable to pull it all together into concrete agri-business/farm plans, which is what they need for them to grow. This was particularly the case with those farmers who attempted to venture into horticulture production and other high value chains. They noted the AEOs were not so helpful for them. An example is a new farmer in Masvingo who invested a lot of money in horticulture production but lost most of his investment because he did not receive adequate guidance from his local AEO on marketing, soil fertility and management of pests and diseases in the context of a commercial farm.

5.2.2 AEOs' perspective

AEOs echoed the weakness identified above and pointed to the need to upgrade their agri-business skills. They admitted that a lot of farmers were much more knowledgeable than them in this respect. They also mentioned challenges and the need to upgrade training in animal and crop disease identification and treatment. Other areas of knowledge improvement include general mathematical skills, a mind-set change to appreciate that some farmers are more knowledgeable than them and can therefore teach them things, use of ICT to access more knowledge and information, exposure to the latest farm machinery and equipment, climate change, and gender issues.

5.2.3 Agriculture Training Institutions' (ATIs) perspective

ATI identified a serious need to revamp the training curriculum, upgrade training facilities and the provide opportunities for lecturers to access in-service training and continuing learning.

5.2.4 Policy makers' perspective

Policy makers also indicated the need to provide ongoing in-service training to enable AEOs to keep up with the latest technological developments and trends. The need for regular soft skills development in the area of ICT and in curriculum development were particularly

highlighted. One policy maker interviewee indicated that the now defunct training department at the Ministry of Agriculture needed to be revived. This could be done could in collaboration with partners under a PPP framework, something the Government of Zimbabwe has embraced in other areas.

5.2.5 Research community's perspective

Research communities often work closely with AEOs, and they have noticed the huge differences in technical knowledge and research skills levels, particularly the ICT gap. For them, AEOs lack resources such as ICT equipment, and this limits their contributions in research collaborations and dialogues. This may in turn limit the effectiveness of AEOs in their role as knowledge brokers on the ground, and yet they are the most active agents who deal with farmers on a day-to-day basis. AEOs should be able to access research journals and extract useful knowledge which they can then apply within their domains. This would improve the rate and velocity of innovations coming through from farmers and help solve their context specific problems.

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APPENDIX A: Occupational Role Profile (ORP) Synthesis Document

i. RAELL ORP Template - Zimbabwe

Case country:	**Zimbabwe**
Sources:	Job descriptions provided by country team
Job title	• Agricultural Field Extension Officer [Z1] • Agricultural Extension Officer [Z2] • Crop and Livestock Extension Supervisor [Z3] • Small-Scale Extension Officer [Z4] • Field/Extension Officer (P/T) [Z5] • Extension Officer [Z6]
Main purpose of the job / About the role	• Providing extension services at the ground level, i.e. in communal lands, resettlements, Al and A2 small-scale farms, commercial areas, as well as irrigation schemes. [Z2] • Supervising plantation activities from planting to harvesting, assisting small-scale farmers in project management and crop budgeting, and training them on crop protection by providing guidelines on the selection of chemicals to be used. [Z4] • Managing tobacco farmer groups through Group Chairpersons. The role holder is directly involved in the distribution of farming inputs for tobacco farmers, assisting farmers from nursery up to delivery at the tobacco floor. [Z5] • Ensuring small-scale farmers produce quality produce according to international standards. [Z6]
Reports to	• Agricultural Extension Supervisor [Z2] • District Crops and Livestock Production Officer [Z3] • Area Manager [Z5]
Essential duties and responsibilities	See list of ‘Essential duties and responsibilities’ (ii) below.

Skills and Experience [*Required*]	Skills: • Ability to work under pressure to meet deadlines. [Z3, Z6] • Exceptional people/interpersonal skills [Z3, Z6] • Ability to communicate and network with a broad spectrum of stakeholders at various levels. [Z2] • Strong research background and good analytical skills. [Z3] • A fairly strong flair for figures. [Z3] Experience: • Min. 2 years' experience as a Principal Agricultural Extension Worker or equivalent grade [Z3] • Min. 3 years' experience in commercial horticulture, livestock production and staple food production [Z1] • Min. 3 years' experience in extension services work [Z5] • Min 8 years post-education experience in extension work [Z6] • 8 - 10 years' extension work experience [Z4]
Skills and Experience [*Advantageous*]	• Ability to use information communication technology in business applications (an advantage). [Z2] • Experience in Tobacco production (highly desirable) [Z5]
Professional experience	• Experience with production and post-harvest handling techniques for horticulture and staple crops [Z1] • An understanding of the relevant crops and livestock regulations and policies. [Z2] • A thorough understanding of national development aspirations and imperatives. [Z2] • Experience in identifying and registration of out-growers; [Z6] • Experience in undertaking farm risk assessment, inspection and evaluation for conformity to organic standards; [Z6] • Experience in cultivation and procurement of cotton or vegetables with small-scale farmers; [Z6]

	• Experience in quality control, packaging and shipment procedures; [Z6] • Understanding of certification and international standards; [Z6] • Experience in disease control and management. [Z6]
Competencies [*Required*]	• Must be a self-starter [Z2] • Computer literacy. [Z3] • Requires a vibrant and experienced individual. [Z4]
Competencies [*Advantageous*]	
Other aspects	
Qualifications required	• Diploma in Agriculture/Horticulture [Z1, Z4]; Diploma in Agriculture [Z3] • Diploma/Degree in Agriculture or equivalent qual. [Z2] • Certificate/Diploma in Agriculture or Tobacco Production. [Z5] • Farming certificate/diploma [Z6]
Additional certification	• A clean Class Four drivers' license /or Motorcycle rider's license [Z1, Z4] Clean class 3 & 4 drivers' licence. [Z6] • A certified internship or experience in Agricultural production. [Z2] • A Master's degree would be an advantage. [Z2] • BSc Degree in Agriculture is an advantage. [Z3]
Associations / Organizations	
Other aspects	• Willing to travel extensively/ out of Harare. [Z3, Z4, Z6] • Fluency in Ndebele, Kalanga and Nambya will be an added advantage. [Z1] • Knowledge of Ndebele, Tonga, Nambla, Venda, Kalanga and Suthu will be an advantage. [Z2]

ii. Essential Duties and Responsibilities Compiled from ORPs

[Z1 = Gov. (2013)] [Z2 = Gov. (2020)] [Z3 = Gov. (2018) (Supervisor role)]

[Z4 = Private Company (n.d.) (Middle Management)]

[Z5 = Private Company (2021) (Tobacco)]

[Z6 = NGO (2018) (Organic Africa Holdings (OAH)]

Training and Capacity Building

- Conduct farmer training and extension in the selected wards and support other related capacity building initiatives to enhance agricultural production. [Z1, Z2, Z3, Z5]
- Organize and conduct field days in the operational wards [Z1, Z5]
- Source potential markets of the crops being produced by farmers [Z4] and participate in the promotion and commercialization of marginalized crops and livestock in the Ward. [Z2]
- Implement activities in wards according to monthly work plans and instructions issued [Z1]
- Implement advocacy programmes for farmers to disseminate information on new crop and livestock production technologies and market trends in the sector. [Z2]
- Assist in the development of appropriate land/farm management practices and tools. [Z3]
- Coordinate agricultural implements distribution. [Z3]
- Supervise farmers in the application of agrochemicals, weeding, irrigation management of crops, crop establishment and making sure that they adhere to the advised cropping programmes as per seasons. [Z4]
- Train farmers on crop protection, best agronomic practices and provide guidelines on the selection of chemicals to be used for the pests attacking their crops. [Z4]
- Select productive farmers for crop and livestock production [Z1]
- Select suitable demonstration sites and together with farmers establish demo sites [Z1]
- Maintain the demo site to the highest standard and ensure that farmers adopt good agriculture practices [Z1]
- Take delivery of inputs for farmers and demo sites according to a delivery schedule and ensure proper distribution of inputs to farmers whilst maintaining proper records [Z1]

Technical and Data Support

- Assist farmers with agricultural market information for their produce at Ward level. [Z2]

- Capture field data (rainfall, input rates, yields) of demo plots and farmers' crops and livestock [Z1]
- Provide relevant technical input into the procurement of agricultural equipment, services and materials by farmers. [Z2]
- Provide technical advice to farmers, other relevant Line Ministries, officers/employees, and other stakeholders on agricultural production management [Z2]
- Provide technical extension and advisory services in the implementation of agricultural policies for both crops and livestock at Ward Level. [Z2]

Planning

- Formulation of work plans and action plans, strategies and operational budgets. [Z1]
- Prepare Area Agricultural Plans for submission to the District Crop and Livestock Production Officer. [Z3]

Monitoring and Evaluation

- Assess the performance and impact of various agricultural programmes and projects being Implemented at Ward level. [Z2, Z3]
- Contribute to the collection of statistics and management of the database on crops. sells and livestock production technologies and the production of reports on agricultural production in the Ward. [Z2]
- Ensure Monitoring and Evaluation tasks are captured accurately and submitted through weekly and monthly reporting (attendance forms, type and number of trainings, commodity purchase forms, weekly reports, monthly reports, marketing and survey reports etc.) [Z1]
- Produce routine consolidated District monthly reports. [Z3]
- Monitor farmer activities, performance and project impact by capturing all sales data. [Z1]
- Maintain an up to date database of farmers and payments made monthly. Accurate record keeping of inputs supplied, crop yield, project progress and monthly reports. [Z1]
- Monitor input and output markets within the selected wards. [Z1]
- Monitor debt recovery from farmers. [Z1]
- Participate in crop and livestock assessments for early warning surveillance for food security, pests and diseases in the Ward. [Z2]
- Identifies and mobilises free uncontracted crop in the area. [Z5]
- Monitors all competitor moves and reports to Area Manager. [Z5]

Collaboration and Liaison

- Collaborate and work closely with local authorities and Agritex personnel. [Z1, Z4]
- Coordinate and collaborate activities in operational area with relevant stakeholders. [Z1, Z5]
- Liaise with local authorities RDC, headman, chiefs, DAs, Agritex Officials, etc. [Z1, Z4]
- Provide a secretariat function to committees. meetings and programmes related to agricultural development in the ward. [Z2, Z5]
- Receive and relay information from the Area Manager to the Chairmen. [Z5]

Management and Supervision

- Supervise Agricultural Extension Workers within a defined area of jurisdiction. [Z3]
- Assign duties to subordinates and ensure they adhere to safety and health practices. [Z4]
- Oversees appointments of and coordinates the work of Chairmen in his/her area. [Z5]
- Identify training needs for Agricultural Extension Workers and make recommendations to the Head of District. [Z3]
- Organize refresher courses and training of extension staff. [Z3]
- Ensure timely disbursement of inputs and consumables to Chairmen and full recovery thereof. [Z5]

Other

- Maintain all allocated company property in safe and good order. [Z1]
- Assist in full recovery of all company assets and inputs. [Z5]

iii. RAELL Occupational Role Profile Synthesis

Table 5: AEOs Knowledge and Learning Roles and Educational Needs

A competent AEO needs to ***know about***…. (e.g. farming, climate change, biosciences etc).		
AEO role requirement	**Elaboration**	**Educational underpinning**
Crops and livestock regulations and policies.	Provide technical, extension and advisory services in the implementation of agricultural policies for both crops and livestock at Ward Level.	A Diploma/Degree in Agriculture or equivalent. A Master's degree would be an advantage.
Implementation of agricultural policies for both crops and livestock		A certified internship or experience in Agricultural production will be an advantage.
Crop and livestock assessments for early warning surveillance for food security, pests and diseases	Participate in crop and livestock assessments for early warning surveillance for food security. pests and diseases in the Ward	A diploma in Horticulture.
Agricultural market information		Certificate/Diploma in Agriculture or Tobacco Production.
Statistics and management of the database on crops and livestock.	Contribute to the collection of statistics and management of the database on crops, sales and livestock production technologies and the production of reports on agricultural production in the ward.	Farming certificate/diploma. A Diploma/Degree in Agriculture or equivalent.
Commercialization of marginalized crops and livestock	Participate in the promotion and commercialization of marginalized crops and livestock in the ward.	A Diploma/Degree in Agriculture or equivalent.

Agricultural production management	Provide technical advice to farmers. other relevant Line Ministries officers/employees and other stakeholders on agricultural production management	A Diploma/Degree in Agriculture or equivalent.
New crops and livestock production technology	Implement advocacy programmes for farmers to disseminate information on new crop and livestock production technologies and market trends in the sector.	A Diploma/Degree in Agriculture or equivalent.
Agricultural equipment, services and materials	Provide relevant technical input into the procurement of agricultural equipment. services and materials by farmers.	A Diploma/Degree in Agriculture or equivalent.
Commercial horticulture, Livestock production and staple food production		A Diploma/Degree in Agriculture or equivalent.
Post-harvest handling techniques for horticulture and staple crops		A Diploma/Degree in Agriculture or equivalent.
Disease control and management	Experience in disease control and management.	A Diploma/Degree in Agriculture or equivalent.
Certification and international standards	Understanding of certification and international standards.	A Diploma/Degree in Agriculture or equivalent.
Farm risk assessment	Experience in undertaking farm risk assessment, inspection and evaluation of conformity to organic standards.	A Diploma/Degree in Agriculture or equivalent.
Quality control, packaging and shipment	Experience in quality control, packaging and shipment procedures.	A Diploma/Degree in Agriculture or equivalent.

Cultivation and procurement of cotton or vegetables with small-scale farmers	Experience in cultivation and procurement of cotton or vegetables with small-scale farmers.	A Diploma/Degree in Agriculture or equivalent.
A competent AEO needs to **have the skills to**… (these are separated into agricultural and facilitation skills)		
AEO role requirement	**Elaboration**	**Educational underpinning**
Agriculture skills		
Identify training needs	Identify training needs of Agricultural Extension Workers and make recommendations to the Head of District.	A Diploma/Degree in Agriculture or equivalent. A Master's degree would be an advantage.
Conduct farmer training	Conduct farmer training and support other related capacity building initiatives to enhance agricultural production in the selected wards.	A certified internship or experience in Agricultural production will be an advantage.
Implement activities	Implement activities in the wards according to monthly work plans and instructions issued from time to time	A diploma in Horticulture.
Plan, budget, and strategize	Formulation of work plans and action plans, strategies and operational budgets	Certificate/Diploma in Agriculture or Tobacco Production.
Coordinate and collaborate	Coordinate and collaborate activities in the operational area with relevant stakeholders. Liaison with the local authorities, RDC, headman, chiefs, DAs, AGRITEX officials, etc Coordinate agricultural implements distribution	Farming certificate/diploma.

Monitor and evaluate	Assess the performance and impact of various agricultural programmes and projects being Implemented at Ward level. Monitor farmer activities, their performance and project impact by capturing all sales data. Monitor input and output markets within the selected wards. Actively monitor debt recovery from farmers. Monitor all competitor moves and report to Area Manager.	On the job training.
Keep records	Maintain an up to date database of farmers and payments made monthly. Accurate record-keeping of inputs supplied, crop yield, project progress and monthly reports.	On the job training.
Organize	Organize and conduct field days in the operational wards. Organize field days and other grower functions and meetings in liaison with Area Manager Organize refresher courses and training of extension staff.	On the job training.
Reporting	Ensure M and E tasks are captured accurately and submitted through weekly and monthly reporting (attendance forms, type and number of trainings, commodity purchase forms, weekly reports, monthly reports, marketing and survey reports etc.)	On the job training.
Supervise	Supervise farmers in the application of agrochemicals, weeding, irrigation management of crops, crop	On the job training.

	establishment and making sure that they adhere to the advised cropping programmes as per seasons. Supervise Agricultural Extension Workers within a defined area of jurisdiction.	
Advise	Provide technical, extension and advisory services.	
Delegate	Assign duties to subordinates and ensure that they adhere to safety and health practices.	On the job training.
Communicate	Receives and relays information from the Area Manager to the Chairmen.	On the job training.
Facilitation skills		
Secretariat functions	Provide a secretariat function to committees, meetings and programmes related to agricultural development in the ward.	On the job training.
Advocacy programmes	Implement advocacy programmes for farmers to disseminate information on new crop and livestock production technologies and market trends in the sector.	On the job training.
Work without-grower farmers	Experience in identifying and registration of out-growers	On the job training.
A competent AEO needs to **possess *the ability and understanding to***… (the values, attitudes and skills [incl. interpersonal, learning and social skills] necessary to perform the role)		

AEO role requirement	Elaboration	Educational underpinning
Ability to use information communication technology in business applications		A Diploma/Degree in Agriculture or equivalent. A Master's degree would be an advantage.
Ability to communicate and network with a broad spectrum of stakeholders at various levels		A certified internship or experience in Agricultural production will be an advantage.
Thoroughly understand national development aspirations and imperatives		A diploma in Horticulture
Be a self-starter		Certificate/Diploma in Agriculture or Tobacco Production
Be able to work under pressure		Farming certificate/diploma
A clean Class three or Four Drivers' license /or Motor cycle rider's license		
Travel or relocate	Station may be in various areas of Zimbabwe	
Speak local languages	Knowledge of Ndebele. Tonga. Nambla. Venda. Kalanga and Suthu will be an added advantage	

Source: Analysis and Compilation from the ORPs (2021).

APPENDIX B: Word Cloud from 22 Field Notes from Interviews

Word Cloud created using https://monkeylearn.com/word-cloud/.

APPENDIX C: Analytical Codes (For Interviews And ORPs)

Code		*Explanation / examples*
Q1: What is the role and purpose of AEOs arising from the data? Is this changing over time?		
1	Definitions / expectations of AEOs	*E.g. different stakeholder perspectives on the role and purpose of AEOs*
Q2: Is teaching/training/social learning recognized as a core function of AEOs?		
2	Teaching / training / social learning **IS** recognized as a core function – general references	*Teaching/training/social learning recognized **as a core function** of AEOs, e.g. by AEOs themselves, by others.*
3	Teaching / training / social learning **IS NOT** recognized as a core function – general references	*Teaching/training/social learning **is clearly not recognized** as a core function of AEOs, e.g. by AEOs themselves, by others.*
Q3: Formal training of / curriculum for AEOs: what is working, training gaps, areas for improvement?		
4	Source of formal training?	*E.g. training institute, university, professional development courses*
5	What is working - examples	*Examples of formal training that seem effective – either pre- or in-service*
6	Training gaps in formal training /curriculum	*Evidence of gaps in formal training, .*
7	Areas for the improvement of formal training	*Suggestions for changes to curriculum, training system*
Q4: Knowledges to AEOs in daily practice		
8	Source of knowledge flows to AEOs in daily practice	*E.g. formal training institute, informal network, farmers, other stakeholders etc*
9	Medium / tools	*E.g. website, newspaper, radio, training workshop*
10	Type of knowledge: Agricultural knowledge	*E.g. types of scientific and agriculture knowledge*
11	Type of knowledge: Contextual knowledge	*E.g. community knowledge, understanding of the social context, culture etc*

12	Type of knowledge: General educational knowledge	*E.g. teaching skills, pedagogic understanding, knowledge of learning needs*
13	Knowledge of specific topic / challenges	*E.g. climate change, small-scale farmers etc.*
14	Exemplars that illustrate the dynamics of AEO learning	*E.g. where and who AEOs learn from? Farmers, colleagues, scientists, books, radio etc*
Q5: Knowledge flows and functions of AEOs in daily practice (Shaxon et al., 2011)		
15	Target (of AEO knowledge transfer/teaching/social learning)	*E.g. who are AEOs 'teaching' or collaborating with in learning contexts: farmers, scientists, colleagues, policy makers?*
16	Information Intermediary	*Enables access to knowledge e.g. connects people, suggests resource etc*
17	Knowledge Translator	*Helps people make sense of knowledge, helps apply knowledge, collates knowledge*
18	Knowledge Broker	*Improving knowledge use and application, co-creates knowledge, e.g. working out a solution to a problem with a farmer*
19	Innovation Broker	*Influence wider use of knowledge, facilitating innovation, system integration, feedback to scientists, training institutes, where impact is on the system*
20	Topic (of AEO knowledge)	*Context specific challenges e.g. climate, small-scale farmers*
21	Exemplars that illustrate the dynamics of AEO knowledge flows and functions	*Examples that illustrate the main roles that AEOS are playing in terms of knowledge sharing and mediation?*
Q6: AEO knowledges, teaching and social learning skills required from a RAELL perspective (futures perspective)		
22	From farmers perspective	*Knowledges, teaching, social learning required for AEOs in future from a RAELL perspective according to key stakeholders . E.g. related to new and*

		emerging issues such as climate change, new technologies, new methodologies of teaching and learning etc.