S. Afr. J. Agric. Ext. Van Niekerk, Von Maltitz, Davis
Vol. 50 No. 2, 2022: 57-80
10.17159/2413-3221/2022/v50n2a13806

Investigating process skills and competency gaps in undergraduate agricultural extension curriculum in selected South African Universities

Van Niekerk, J.A.[1], Von Maltitz, L.[2], Davis, K[3]

Correspondence Author: J.A. Van Niekerk, Email: vniekerkJA@ufs.ac.za;

ABSTRACT

The Michigan State University Alliance for African Partnership (AAP) launched a multi-country study to contribute to upgrading and tailoring the agricultural extension curricula at participating institutions. The first phase of primary data collection consisted of focus group discussions. The focus groups were structured around a specific objective: gathering information around specific questions. Focus group discussions were followed by an online survey of Agricultural Extension and Advisory Services (AEAS) role players, of which the results will be discussed separately. It was concluded from the focus group discussions that the AEAS workers in South Africa lacked the critical skills to perform their responsibilities efficiently. Several required skills were singled out during the focus group discussions. It was concluded that it is vital for agricultural development in the country to ensure that these skills and competencies are included in all South African teaching institutions' curricula. It is therefore recommended that it is critical for each institution offering agricultural extension training to keep the curriculum relevant so that it meets the needs of the profession. Keeping the curriculum relevant includes participatory curriculum development (PCD), regular review of the curriculum by all the stakeholders of the profession, and the necessary collaborations with professional bodies to regulate the curriculum. The efficiency in the sector will be enhanced if AEAS qualifications at the various training institutions cater to the profession's demands.

[1] HOD: Department of Sustainable Food Systems and Development, University of the Free State, 205 Nelson Mandela Avenue, vniekerkJA@ufs.ac.za;

[2] PhD Student: Department of Sustainable Food Systems and Development, University of the Free State, 205 Nelson Mandela Avenue, vonmaltitzl@ufs.ac.za;

[3] Research Collaborator, Department of Sustainable Food Systems and Development, University of the Free State, 205 Nelson Mandela Avenue, k.davis@cgiar.org.

Vol. 50 No. 2, 2022: 57-80
10.17159/2413-3221/2022/v50n2a13806

KEYWORDS: Extension, curriculum, Agricultural Extension Advisory Services

1. INTRODUCTION

An efficient, sustainable agricultural sector is imperative in a world where the population continues to increase annually and zero poverty, and zero hunger is high on the global agenda. A key component of such an agricultural sector is skilled and competent agricultural extension and advisory services (AEAS) workers.

The global agricultural landscape is ever-changing, and AEAS must continually adapt to stay relevant (Davis and Sulaiman, 2014:6-18). The current challenges experienced include climate change, increasing agricultural input costs, changing consumer demands, producing despite a deteriorating natural resource base, and utilising the benefits of rapidly transforming information and communication technologies (Suvedi, 2019:6306-19; FAO, 2017). Increasing productivity in a sustainable manner per hectare is vital to ensure global food security (Calicioglu *et al.,* 2019:222).

According to Suvedi and Kaplowitz (2016), agricultural advisors/extension agents of the 21st century must be competent communicators and share the latest research-based knowledge and information with their clients. They have to be skilled in adult learning principles and techniques and be able to facilitate development using, among others, practical networking skills. They should understand risk in agriculture and assist farmers in managing risk, adapting to climate change, and increasing their resilience. Market analysis and value adding must be part of their skill set to link farmers to markets. Understanding human nutrition, as well as information and communication technologies (ICTs), is essential. The ability to work with minority groups is also critical (Gadzirayi *et al.,* 2020:165-172).

Chikaire *et al.* (2015:13-21) mention that AEAS should assist farmers in creating resilient farming systems. Skilled AEAS workers demonstrate communication competence (the ability to convey knowledge effectively to a diverse audience), farming (staying informed and sharing the latest developments and solutions), science (the ability to comprehend scientific literature and demonstrate it practically), economics (marketing, policies, cost-benefit scenarios), and social skills (familiarity with the customs, values, and realities of their clients).

The recent Futures of Agricultural Employment in South Africa 2035 report (IFR, 2022) listed essential skills for agricultural employees in the future. They include soft skills (collaboration/teamwork, communication, customer service, business principles, and sales), systems thinking (design thinking, critical thinking, exponential thinking, problem-solving), technology integration (low-tech and high-tech, engineering, and analysis), data management (storage, analysis, collection, security), and basic natural sciences (soil, biology, plant, animal) (IFR, 2022).

In South Africa, several tertiary educational institutions offer agricultural extension qualifications, including colleges and universities that offer diploma, undergraduate, and postgraduate degrees. Improving the competencies and skills of agricultural extension staff has been on the national agenda for quite some time. The 2009 Department of Agriculture report profiling the current government extension and advisory service officers indicated that 80% of extension officers had a diploma qualification or lower, and just under 20% had a degree or higher. This was in contrast with the norms and standards specification at the time requiring all agricultural advisors to have a degree qualification or higher (DFFE, 2009). However, the situation has improved significantly over time, and the latest report, of 2020, showed that 77% of extension staff met the minimum requirements of a four-year degree in agriculture (DALRRD, 2020).

The contents of South African agricultural extension curricula differ vastly among the many tertiary educational institutions that offer training (Davis *et al.,* 2021). Qualifications vary from three-year undergraduate degrees, postgraduate degrees, diploma courses, and single subjects available to students. Contents vary between the qualifications. Some include training in the competencies mentioned previously; others do not. In many instances, the available agricultural extension curricula in South Africa still focus predominantly on production/technical training (Davis *et al.,* 2021). The current available undergraduate agricultural extension qualifications are summarised in Table 1.

Table 1 - Available AEAS qualifications at various universities in South Africa.

Institution	Qualification	Contents summary
University of Kwazulu Natal	B.(Agric) Agricultural Extension	**First year**: Farming Systems; Agricultural Production; Rural Wealth Creation; Rural Economic Systems; Production Economics and Marketing; Farm Infrastructure and Machinery; Natural Resource Identification; Impact on Natural Resources
		Second year: Field Crop Production; Intensive Livestock Production; Forage Livestock Production; Plant Propagation; Extension Methods; Extension Practice; Farm Business Management; Farm Development/Basic IsiZulu Language Studies; Land Preparation
		Third year: Designing Extension Projects; Participatory Extension; Extension Placement; Farm Finance; Land Use Planning
University of Fort Hare	B. (Agric) in Agricultural Extension/Production	**First year**: Basic Chemistry; Biology; Introduction to Scientific Concepts; Introduction to Agric Economics; Elements of Agro Meteorology; Introduction to Scientific Concepts; Introduction to Crop Science; Marketing of Agricultural Products; Intro to Computers and Computing Theory (University of Fort Hare, No Date:29-31)
		Second year: Introduction to Animal Science; Introduction to Pasture Ecology; Introduction to Soil Science; Elements of Crop Production; Introduction to Seminar Writing; Elementary Irrigation; Introduction to Agric Engineering; Pedology; Farm Management; Introduction to Agricultural Extension; Veld & Cultivated

		Pasture Management; Principles of Animal Nutrition (University of Fort Hare, No Date:29-31)
		Third year: Plant Pest Control; Elements of Horticultural Science; Elements of Fruit and Vegetable Production; Land Use Planning; Small Stock Production; Practical Vacation Training; Elementary Animal Health; Agricultural Extension & Human Dev; Applied Extension & Rural Development; Seminar in Agricultural Extension; Project in Land Use Planning (University of Fort Hare, No Date:29-31)
University of the Free State	B. (Agric) in Agriculture majoring in Agricultural Extension	**First year**: Biological Principles in Agriculture; Mathematical and Biometrical Principles in Agriculture; Chemical Principles in Agriculture; Physical and Mechanised Principles in Agriculture; Introduction to Soil, Crop and Climate Sciences; Introduction to Agricultural Economics; Introduction to Animal, Wildlife, and Grassland Science (UFS, 2022)
		Second year: Extension within the Agricultural Innovation System; Communication for Innovation; Introductory Ruminant Production; Introduction to Animal and Plant Breeding (UFS, 2022)
		Third year: Facilitation for Development; Extension Program Management; Community Mobilization and Local Organizational Development; Management of Changes and Adaptation; Agricultural Entrepreneurship and Value Chains; Adult Learning, Behavioral Change, and Gender (UFS, 2022)

		Electives: Introductory Ruminant Production; Introductory Monogastric Production; Animal Production Practical; Sustainable Soil and Water Management; Grassland Ecology; Game and Natural Environment Interaction (UFS, 2022)
Mangosuthu University of Technology	Diploma in Community Extension	**First year:** Agricultural Extension; Basic English; Basic Science; Health & Hygiene; Human Ecology; Basic Food; Basic Skills; Extension; Basic Nutrition (MUT, 2022)
		Second year: Agricultural Extension; Basic Food; Extension; Human Ecology; Basic Nutrition; Land Use Planning (MUT, 2022)
Tshwane University of Technology	National Diploma: Agriculture: Development and Extension	**First year:** Agricultural Anatomy and Physiology I; Agricultural Calculations I; Agricultural Botany I; Agricultural Mechanisation I; Soil Science I; Agricultural Extension I; Agricultural Economics I; Crop Production I; Crop Protection I; Soil Surveys II (TUT, 2018)
		Second year: Agricultural Extension II; Agricultural Marketing II; Natural Pastures I; Agronomy II; Fruit Production II; Beefer Production II/Small Stock Production II; Agricultural Extension III; Farm Planning I; Vegetable Production I; Agronomy/Fruit Production III; Beefer/Small Stock Production III (TUT, 2018)
		Third year: Work Integrated Learning I (on completion of all the above subjects); Work Integrated Learning II (TUT, 2018)

A study conducted in 2017 by the Academy of Science of South Africa (ASSAF) found that:

There is no shortage of registered qualifications in the field of agriculture in the NQF. To date, the focus has been primarily on production; yet, skills for the agricultural supply chain come from a wider range of disciplines than the specific agriculture-focused qualifications. There is an urgent need for improved relevance in the curricula. Although there are exceptions, students are primarily educated for commercial agriculture, with little focus on smallholder farmers (SHF) or on the social and human dimensions of agriculture. Linked to the need for relevance is the need for multi and transdisciplinary approaches to curricula that address modern-day topics, find solutions to grand challenges, such as climate change, and drive economic development (ASSAF, 2017:11).

Educational qualifications in South Africa are classified according to the National Qualifications Levels (NQF) framework, which is administered by the Council on Higher Education (CHE) and the South African Qualifications Act (SAQA). NQF levels were implemented in the country in an effort to standardise qualifications under the authority of a single system framework post-apartheid. NQF qualifications are divided into three sections: General Education and Training (GET), which includes schooling from Grade R (preschool) until Grade 9 (NQF level 1), and Further Education and Training (FET), which provides for Grades 10 to 12 (NQF levels 2 to 4) and finally, Higher Education, which includes all post-school qualifications (NQF levels 5 to 10) (van Huyssteen, 2002; ASSAF, 2017). In this system, NQF level 7 is a bachelor's degree, NQF level 8 is an honours degree, NQF level 9 is a master's degree, and NQF level 10 is a doctorate (SAQA, 2021; van Huyssteen, 2002).

In a further effort to improve the competencies and skills of agricultural extension workers in South Africa, the Department of Forestry, Fisheries and the Environment (DFFE), as well as the Department of Agriculture, Land Reform and Rural Development has required all public agricultural extension staff members to register with the South African Council for Natural Scientific Professions (SACNASP) since the second half of 2014 (Davis and Terblanche, 2016:231-247). Specific requirements to register include appropriate qualifications and a code of conduct, including continuing professional development.

Vol. 50 No. 2, 2022: 57-80
10.17159/2413-3221/2022/v50n2a13806

Even though most public agricultural extension staff meet the minimum qualification requirements of the norms and standards set by the South African government (DALRRD, 2020), there are still questions surrounding the competencies and skills of AEAS in the country (ASSAF, 2017). Accordingly, this research study aims to determine whether existing higher education qualifications provide the necessary skills and competencies needed by AEAS to meet today's agrifood system challenges.

2. METHODOLOGY

2.1 Study design

In light of the fact that many African institutions struggle with the right qualifications for extension (Freer, 2015), the Michigan State University Alliance for African Partnership (AAP) launched a multi-country study to contribute to upgrading and tailoring the agricultural extension curricula at participating institutions. The research aims to identify skills and competency gaps in undergraduate agricultural extension curricula in the participating countries -- Nigeria, Malawi, Uganda, Kenya, and South Africa -- and use the results to contribute to formulating appropriate curricula.

In South Africa, the research team included the University of Pretoria and the University of the Free State staff. Following a literature review and a review of existing curricula in the country, the first phase of primary data collection consisted of conducting focus group discussions (FGDs) with relevant participants to discuss AEAS curricula in South Africa. The goal of the FGD was explained to participants with the purpose statement:

We have asked you to join us today to hear your views on the extension and advisory services curricula in South Africa. Specifically, we are interested in your thoughts and opinions regarding how extension and advisory services can address the evolving needs of South African farmers, agribusinesses, and other role players.

Focus group discussions were followed by an online survey of AEAS role players. These results will be discussed separately.

2.2 Sample selection

Purposeful sampling was used to select appropriate participants. Purposeful sampling in

qualitative research implies selecting participants that can actively contribute to the research problem through their knowledge and expertise (Luciani *et al.,* 2019:152-161). The selection criteria were that participants had to be involved in agricultural extension through either the private or public sector or via training institutions in South Africa. The research team identified suitable participants using their existing database of extension professionals, key informants, and available public information.

A total of 38 potential participants were identified and invited to the focus group discussions through an informative email. Twenty-one participants replied and took part in the FGDs over three meeting days. Of the 21 participants, nine were from tertiary training institutes across South Africa, seven were from agricultural producer organisations providing AEAS to producers, and five worked for the Department of Agriculture Land Reform and Rural Development in different provinces. Fifteen of the participants were male, and six were female.

Two of the participants could not find a suitable time to attend and returned their answers to the questions via email.

2.3 Data collection

As mentioned, data were collected using focus group discussions. According to Hennik (2014), focus group discussions involve inviting pre-selected participants to participate in a discussion that focuses on a specific problem in an environment where they feel comfortable sharing their views. The purpose is not to reach a consensus among participants but rather to discover various insights and experiences. Questions were designed to lead the discussions to focus on the research problem at hand. Typically, six to eight participants are invited to a session to allow everyone to participate.

The FGDs were held on 9, 10, and 11 November 2021. Given the diversity of locality of the participants and the constraints of the COVID-19 pandemic, the FGDs were conducted online using Microsoft Teams software.

The research leader from the University of Pretoria welcomed the participants and explained the purpose of the FGDs. She explained that participating in the discussion implies their consent to do so. Confidentiality was ensured by clarifying that transcribed comments will not

10.17159/2413-3221/2022/v50n2a13806

be attributed to any individual. The study's ethical approval from Michigan State University and the University of the Free State was confirmed to the participants.
The timeframe for the sessions was specified as 90 minutes without any breaks and was facilitated by the research leader. Sessions were recorded and transcribed using the transcription function of Microsoft Teams with the permission of participants.

Participants were asked to introduce themselves and provide information on their involvement in agricultural extension. They were asked to activate their device cameras while doing so. They then had the option to switch off their cameras to limit bandwidth use.

The research team leader from the University of Pretoria led the discussions, with the University of the Free State team member assisting and taking notes. Discussions were structured through a semi-structured guide.

The structure of the focus groups was based on a specific objective explained at the start of each session. The objective was to gather information, including perceptions and ideas around specific focus areas in AEAS training. The questions asked were:

1. What are the critical job skills or core competencies required of agricultural extension and advisory services officers from the public and private sectors in light of the changing agricultural and rural development context?
2. Does our extension curriculum effectively train students on the above-mentioned job skills and core competencies?
3. What are the barriers to effectively train extension and advisory services students with the required core competencies, and how can these barriers be removed?
4. What changes or modifications might you recommend concerning the agricultural extension curricula? Are there courses that we are not teaching that we should consider including in the extension curriculum? Conversely, what courses or contents are outdated that we should consider leaving out?
5. How effective are South African extension and advisory services in addressing challenges in the agricultural system? What is one thing that extension and advisory services are doing exceptionally well?

6. If you could come up with one major recommendation to improve agricultural extension and advisory services in South Africa, what would it be?

2.4 Data analysis

The constant comparative method of analysis was used to analyse the data. This method implies categorising data into sections according to characteristics to eventually reach a conclusion or formulate a new theory (Merriam and Tisdell, 2016). The discussions were organised into three sections, as displayed in Figure 1.

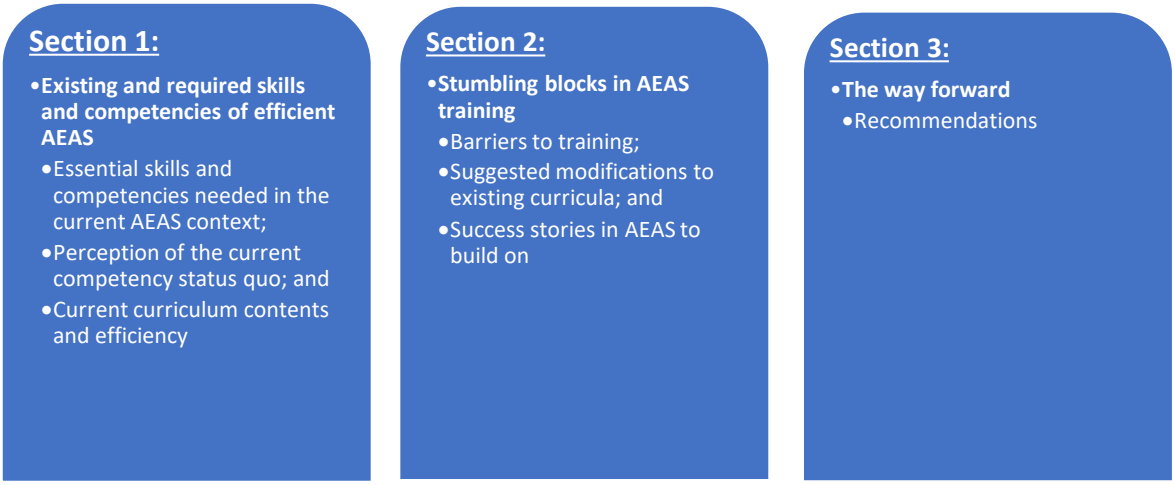

Figure 1- Categorisation of data for the purpose of analysis.

The answers of the three groups were compared to determine the similarity to conclude the research question.

2. RESULTS

The inputs received from the focus groups were categorised under three main sections, namely; 1 - Existing and required skills and competencies of efficient AEAS, 2 – Stumbling blocks in AEAS training and 3 – The way forward. Six questions guided the focus groups. Questions 1 and 2 addressed the first section, questions 3 and 4 addressed the second section and lastly, questions 5 and 6 addressed section three. The responses to each question were analysed, and the main points will be highlighted for the results.

The discussions in the focus groups started by looking at existing and required skills and

10.17159/2413-3221/2022/v50n2a13806

competencies of efficient AEAS. Firstly, the participants were asked to give their perspectives on the critical job skills or what the core competencies required of agricultural extension, and advisory service officers would be called in both the public and private sectors. Four main themes stood out from the discussion surrounding this question. These themes included; technical skills, facilitation and communication skills, soft skills and business management and marketing skills. The following technical skills were reported as essential by two-thirds (67%) of the participants; basic knowledge about agricultural production or farming, specialisation in certain areas or enterprises (related to the individual's area of employment), in-depth practical training or knowledge about production and farming, the principles of sustainable agriculture, as well as doing research (sourcing and processing information). Communicating effectively with all stakeholders, including farmers, and the private and public sectors, was the most essential facilitation and communication skill mentioned by all three focus groups (100%). Finally, the needed soft skill that was agreed upon the most was critical thinking, mentioned by two of the three (67%) focus groups. There were no apparent themes in the business management and marketing skills mentioned in the focus groups. However, some skills discussed included farm business management, financial management, entrepreneurship, and value chain management skills.

Secondly, the participants from the focus groups were asked whether the current extension curriculum effectively trains students on the above job skills and core competencies. The consensus among the three focus groups was that the current extension curricula in South Africa do not produce competent AEAS professionals. However, it was highlighted by all three focus groups (100%) that the curriculum should not be blamed for everything. In many instances, the curriculum is sufficient, but it needs to be followed up by practical training relevant to the context students will work in. It is also unfair to expect a freshly graduated individual to dispense expert advice immediately.

An experienced professor teaching in extension said: *"In many instances, diploma students are better equipped than students with degrees because the focus in the diploma curriculum is more on soft skills and practical skills and not so much on science. In one particular case where the extension department was moved from the university to the agricultural college of an institution, training improved drastically because it became more practical and valuable".*

Increasing the practical exposure of students through fieldwork was reiterated by all of the participants. A private sector participant actively involved in extension mentioned: "*In many cases, the new extension officer does not know the differences between crops. This is a huge negative for their self-confidence. My personal view is that universities should concentrate on fieldwork and teach students how to use the science in practice."* It was mentioned that students should be exposed to farmers as well as all the various role players in the agricultural system, including researchers, financial institutions, input suppliers, marketers, etc. It was further stated that the lack of regular interaction between research and extension in practice leads to the lack of knowledge transfer between researchers and farmers. It was suggested that this could be improved by regularly facilitating cooperation between these role players.

Furthermore, enhanced communication between the training institutions and the employers of extension staff will also result in greater efficiency.

Participants said that graduates do not have the necessary skills to interact with farmers because they are not exposed to them at an undergraduate level. As a result, they lack problem-solving and critical thinking skills. For example, suppose they advise a farmer to apply fertiliser, and the farmer says they cannot afford it; in that case, extension graduates cannot find solutions to the problem.

The trend at tertiary institutions has been for students from other disciplines to enrol for extension courses, such as communication and facilitation, because they understand their importance.

It was recommended that it would be advisable for the curricula to be structured to allow students first to complete their basic scientific agricultural training and then move on to extension skills training. This is because they often become confused when agricultural science and social science are mixed.

Participants mentioned that the topics included in the Global Forum for Rural Advisory Services New Extensionist Learning Kit (NELK) incorporated into the University of the Free State's extension curriculum are essential and relevant. The New Extensionist Learning Kit includes modules on risk management, adult education, value chains, program management, facilitation, and professional ethics (Oliveira, 2022). Some of these topics are also included in the honours extension curriculum at the University of Pretoria.

Thirdly, the participants were asked to recommend changes or modifications concerning the current agricultural curricula, whether there are courses that are not taught that should be considered and included in the curriculum, and what courses or contents they consider outdated that should perhaps be dropped. During discussions, participants believed that the curriculum they know about is adequate and that the contents must be updated continually. This could mainly be attributed to the fact that two of the tertiary institution participants were from the University of the Free State that, as mentioned, incorporated the NELK into their curriculum.

Other participants mentioned a dire need for soft skills training such as critical thinking and adaptability in the curriculum. Students should be taught how to prepare for and adapt to unfamiliar circumstances, often experienced in agriculture. They also mentioned that a three-year qualification does not allow enough time to provide in-depth training in the required knowledge. It will enable students only to touch the surface of the various topics.

It was further contributed that collaboration with commodity associations can assist in providing students with practical experience and refresher courses. However, commercial farmers are often hesitant to offer opportunities to students to gain practical experience because they do not have the time to accommodate them. They also mentioned that the NELK topics taught by the University of the Free State are essential and applicable to the current extension needs.

One of the participants who sent his answers via email commented that soil science and the knowledge of soil-water relationships (dryland or irrigation) are essential topics that must be adequately studied because of their importance in crop cultivation. In addition, students should also complete an introductory course in agricultural economics to assist farmers successfully with financial planning on the farm.
The other individual participating via email said he would like to see a link to the industry for practical training. As an example, he mentioned linking students with radio, television, and print media in the communication module.

The fourth question asked participants about the effectiveness of South African extension and advisory services in addressing challenges in the agricultural system. Participants were also

10.17159/2413-3221/2022/v50n2a13806

asked to mention one thing that extension and advisory services are doing exceptionally well. In response to these questions, most focus group participants said that the challenges experienced in the AEAS environment in South Africa are often unique. Many public sector extension workers become fund managers. Selected farmers who are beneficiaries of farming grants are only interested in the next funding opportunity, often used by politicians to manipulate support. In South Africa, the word "beneficiaries" is commonly used in public sector projects because people are selected to benefit from some form of a grant to initiate and support an agricultural project.

Participants mentioned that extension officers often become demotivated to improve their skill set because they hardly ever use it. Farmers will regularly speak with high regard about an extension officer only if they are a successful channel of funding for them. Extension staff are also regularly burdened with providing transport to beneficiaries from the rural areas to the nearest town/city and back, which discourages the officers from visiting their projects.
AEAS are often efficient in assisting farmers in dealing with production issues. However, the challenge remains to assist farmers in engaging in value chains rather than merely producing basic supplies for other businesses.

Another challenge mentioned was keeping statistics up to date. The government often requires this because the focus tends to be on statistics such as the number of beneficiaries assisted rather than on success stories and quality of service. Public extension services' political influence and agenda are detrimental to its efficiency. Private sector extension services often have more time to assist farmers because they do not have to adhere to the same administrative protocols.

Cooperation is needed between private and public extension, small farmers, commercial farmers, and commodity organisations to facilitate the transfer of knowledge, mentorship, and guidance emerging farmers require.

On the positive side, participants mentioned that extension services link well with NGOs and the private sector in some areas. Furthermore, all three focus groups (100%) mentioned the Western Cape Department of Agriculture as competent and efficient. When asked why participants thought this was the case in the Western Cape, they replied it is due to more

efficient and responsible management than in other provinces. In addition, the "smartpen" used in the Western Cape by public extension staff enables swift completion of the required administrative tasks while visiting farmers in the field and focusing more on practical issues. When asked why other provinces do not use the "smartpen", the participants replied that it had been offered to all of the provinces, but the Western Cape was the only one that implemented the system.

An organisation that was singled out as a good example of providing quality extension services to farmers is the National Wool Growers Association. According to participants, extension staff members there were highly motivated, eager to assist, and knowledgeable.
The Land Care program of the Western Cape was also mentioned as a well-functioning program that can be used as an example of effective extension. Their specialists know everything related to soil, water, drainage, and land care.
The participatory approach of the Department of Agriculture in Limpopo was mentioned as very effective. In addition, the graduate placement program of the Department of Agriculture in Limpopo has also worked well.

Looking at the way forward, question five asked the participants to mention one major recommendation to improve agricultural extension and advisory services in South Africa. Two out of the three focus groups (67%) recommended that extension workers should be provided with sufficient support and equipment to conduct their tasks and not be burdened by copious amounts of administration. Two focus groups (67%) also recommended creating a positive environment for extension workers to work in. Finally, a participant mentioned, "*Success comes with excitement, and excitement comes with success."*

Closer cooperation between universities/training institutions is needed to communicate relevant skills and competencies regularly through short courses. This will help institutions to build on the positive, explore the success stories, visit them, and learn from them. Better collaboration is also needed between private and public extension services. Private extension services are often better resourced and more up-to-date because of private funding; public extension can learn from this. The focus must be on quality service and not statistics/quantity.

To conclude the focus groups, participants were asked whether they had suggestions for others

who should be included to give input and advice. Participants agreed that it is important to include the recipients of extension services, the farmers, when discussing the efficiency of AEAS in South Africa. Especially how they experience the competencies of extension workers. *"Extension work should aim to develop the farmer who in this educational process is empowered to develop his or her farm. The cornerstone of extension work is a scientifically based extension program, jointly developed with relevant stakeholders."*

4. DISCUSSION

As previously mentioned, the ever-changing agricultural environment in which producers find themselves presents a constant array of challenges that directly influence AEAS. The South African context brings about its own unique challenges shaped by the diversity of socioeconomic circumstances the agricultural system functions in (Khapayi and Celliers, 2016:25-41).

The participants of the FGDs were of the opinion that the AEAS workers in South Africa lacked the critical skills to perform their responsibilities efficiently. Skills singled out were required specialised technical skills, facilitation and communication skills, soft skills such as critical thinking and problem solving, and business management and marketing skills. Therefore, ensuring that these skills and competencies are included in all South African teaching institutions' curricula is vital for agricultural development in the country.

The national policy on extension and advisory services (DFFE, 2016) lists a number of requisites of effective AEAS. These include building the capacity of producers in marketing, farm productivity, and financing. Enabling farmers to deal with climate change and practice sustainable farming methods is also on the agenda. This has to be done while networking among the various role players in the sector and facilitating interaction between them to initiate and sustain change.

The most recent draft review of the national framework for the minimum norms and standards for extension and advisory services in agriculture stipulates that tertiary training institutes that offer agricultural extension training should regularly review their curricula. This will allow effective training and support to AEAS enabling them to function in the current agricultural environment (DALRRD, 2020).

Extension staff members must be appointed according to their individual skill set. For example, an extension officer with substantial sheep production experience should be allocated to an area with predominantly sheep farmers.

5. RECOMMENDATIONS

Equipping educators to educate is the responsibility of each institution involved in training extensionists. It is vital for each institution offering agricultural extension training to keep the curriculum relevant to meet the profession's needs. There is a need for participatory curriculum development (PCD) in AEAS to ensure that students are trained appropriately for the demands of their profession. The relevant stakeholders include training institutions, government, appropriate private sector role players, and farmers. This complex process can be cumbersome to the procedure of curriculum development and requires specialised expertise (Stabback, 2016:14).

"Inclusive and consultative curriculum development processes will help in finding appropriate balances among a range of stakeholder aims that sometimes, but not always, compete: individual aims versus social ends; academic versus vocational aims; economic versus democratic purposes; social conservatism and continuity versus social reform and change; local versus global priorities."

Regular review of a curriculum by all the stakeholders of the profession is also needed to ensure appropriate training of AEAS professionals to equip them for the workplace (Easterly *et al.*, 2017:225-239).

Professional bodies play a fundamental role in the development of curricula in certain professions in South Africa. For example, many of the qualifications related to economic and management sciences have professional bodies that prescribe the curriculum and accredit the degree. In the accounting profession, the South African Institute of Chartered Accountants (SAICA) prescribes and accredits the degrees. Degrees in marketing and communication management are prescribed and accredited by the Public Relations Institute of South Africa (Dowelani and Dowelani, 2020). As previously mentioned, natural and agricultural science qualifications are regulated by the South African Council for Natural Scientific Professions

(SACNASP). Although they play an advisory role to their members, they are not involved in curriculum development and accreditation. An institution that can facilitate this collaboration and play a more regulatory role in curriculum development for AEAS is the South African Society of Agricultural Extension (SASAE). More research is needed on this process, the advantages and disadvantages.

Ensuring that AEAS qualifications at the various training institutions cater to the demands of the profession will enhance efficiency in the sector. Collaborating with private sector role players that are willing to provide practical training and exposure to students will ensure that students arrive at the workplace already exposed to the environment they will work in.

6. CONCLUSION

This multi-country study launched by the Michigan State University Alliance for African Partnership (AAP) aimed to contribute to upgrading and tailoring the agricultural extension curricula at participating institutions. Furthermore, the study aimed to identify skills and competency gaps in undergraduate agricultural extension curricula in the participating countries and to use the results to contribute to formulating appropriate curricula.

From the focus group discussions, four primary critical job skills were highlighted that is required of agricultural extension and advisory service officers in both the public and private sectors. These skills include; technical skills, facilitation and communication skills, soft skills and business management and marketing skills.

The participants from the three focus groups agreed that the current extension curricula in South Africa do not produce competent AEAS professionals. However, it was agreed that the curriculum shouldn't be blamed for everything. In many instances, the curriculum is sufficient, but it needs to be followed up by practical training relevant to the context students will work in, as reiterated by all the participants.

A strong theme from the focus groups was that communication and interaction at all levels should be improved. The regular facilitation between role players, including farmers, researchers and extension, would improve knowledge transfer between the involved role players. Furthermore, enhanced communication between the training institutions and the

employers of extension staff will also result in greater efficiency. It was also mentioned that exposing undergraduates to farmers would enhance their problem-solving and critical thinking skills.

In the discussion around recommended changes and modifications concerning the current agricultural curricula, most participants agreed that the current curricula are adequate but must be updated continuously. Some of the recommendations included that students must be taught how to prepare for and adapt to unfamiliar circumstances (often experienced in agriculture), the length of the qualification should be extended to allow for more in-depth training, it is essential that soil science and the knowledge of soil-water relationships is included into the curricula due to its importance in crop cultivation, and it would be beneficial to students to complete an introduction in agricultural economics to assist farmers in financial planning on their farms.

Discussing the effectiveness of South African extension and advisory services in addressing challenges in the agricultural system, participants mentioned that most of these challenges experienced are unique. In the public sector, extension workers often become fund managers, as selected farmers who are beneficiaries of farming grants are only interested in the next funding opportunity, often used by politicians to manipulate support. Due to the circumstances, extension workers get demotivated to improve their skill sets as they hardly ever use them. They are only spoken of in high regard if they can provide a successful funding channel to the farmers. Another political challenge extension officers experience in the public sector is keeping statistics up to date, as the government is only interested in the number of beneficiaries assisted rather than the success stories and quality of services. The political influence and agenda on the public extension services are detrimental to their efficiency. It was agreed that the Westen Cape Department of Agriculture is efficient and competent as they have more efficient and responsible management than the other provinces. Other organisations, programmes and departments that were singled out for providing quality extension services, being well-functioning and effective were the National Wool Growers Association, the Land Care program of the Western Cape and the Department of Agriculture in Limpopo.

Looking at the way forward, participants recommended that extension workers have sufficient support and equipment to conduct their tasks and that a positive environment should be

provided for them to work in. In addition, regular short courses provided by universities and learning institutions will help institutions to build on the positive, explore and visit success stories and learn from them. Finally, as private extension services are often better resourced and more up-to-date, better collaboration between them and the public extension services would be beneficial as the public extension services could learn from this, keeping the focus on quality and not quantity.

Finally, it was recommended that it is vital for each institution offering agricultural extension training to keep the curriculum relevant to meet the profession's needs and enhance the sector's efficiency. Participatory curriculum development (PCD) in AEAS is needed to ensure that students are trained appropriately for the demands of their profession. In addition, the curriculum has to be reviewed by all involved stakeholders of the profession to ensure that AEAS professionals are appropriately trained and well equipped for the workplace.

REFERENCES

ACADEMY OF SCIENCE OF SOUTH AFRICA (ASSAF)., (2017). Revitalising agricultural education and training in South Africa (Concise), p. 11. Available online at: https://research.assaf.org.za/bitstream/handle/20.500.11911/97/2017assaf_revitalising_agricultural_education_concise.pdf?sequence=1&isAllowed=y

CALICIOGLU, O., FLAMMINI, A., BRACCO, S., BELLÙ, L., AND SIMS, R. (2019). The future challenges of food and agriculture: An integrated analysis of trends and solutions. *Sustainability*, 11(1) 222. https://www.researchgate.net/publication/330149688_The_Future_Challenges_of_Food_and_Agriculture_An_Integrated_Analysis_of_Trends_and_Solutions https://doi.org/10.3390/su11010222

CHIKAIRE, J.U., ANI, A.O., ATOMA, C.N., AND TIJJANI, A.R. (2015). Capacity building: key to agricultural extension survival. *Scholars j. agric. vet. sci.*, 2(1A), 13-21.

DAVIS, K., AND SULAIMAN, R.V. (2014). The new extensionist roles and capacities to strengthen extension and advisory services. *J. Int. Agric. Ext. Educ.*, 21(3), 6-18. https://www.cabdirect.org/cabdirect/abstract/20153090436 http://dx doi.org/10.5191/jiaee.2014.21301

DAVIS, K., AND TERBLANCHÉ, S.E. (2016). Challenges facing the agricultural extension landscape in South Africa, Quo Vadis? *SAJAE*, 44(2), 231-247. http://www.scielo.org.za/scielo.php?script=sci_arttext&pid=S0301-603X2016000200020 http://dx.doi.org/10.17159/2413-3221/2016.v44n2a428

DAVIS, K., VON MALTITZ, L., ANUGWA, I., VAN NIEKERK, J., AND NGOMANE, T. (2021). Extension system and curriculum review in South Africa. Online presentation for MSU Alliance for African Partnership (AAP) Consortium Partners in Africa.

DEPARTMENT OF Agriculture, Forestry and FisheriesFORESTRY, FISHERIES AND THE ENVIRONMENT (DFFE)AFF., (2009). Report on profiling of the current government employedgovernment-employed extension and advisory service officers. Pretoria: Department of Agriculture, Forestry and Fisheries.Forestry, Fisheries, and the Environment.

DEPARTMENT OF AGRICULTURE, LAND REFORM AND RURAL DEVELOPMENT (DALRRD)., (2020). Draft review of the national framework for the minimum norms and standards for extension and advisory services in agriculture. Pretoria: Department of Agriculture, Land Reform and Rural Development.

DOWELANI, M., AND DOWELANI, F. (2020). Curriculum development in South Africa: the role of professional bodies. *6th International conference on higher education advances.* Universitat Politécnica de Valéncia, Valéncia, Spain. https://archive.headconf.org/head20/wp-content/uploads/2020/05/HEAd20-program.pdf http://dx.doi.org/10.4995/HEAd20.2020.11188

EASTERLY, R.G., WARNER, A.J., MYERS, B.E., LAMM, A.J., AND TELG, R.W. (2017). Skills students need in the real world: competencies desired by agricultural and natural resources industry leaders. *J. Agric. Educ.*, 58(4), 225-239. https://files.eric.ed.gov/fulltext/EJ1167162.pdf https://doi.org/10.5032/jae.2017.04225

FOOD AND AGRICULTURE ORGANIZATION (FAO), (2017). The future of food and agriculture – Trends and challenges. Rome, Italy.

FREER, T.J. (2015). Modernising the agricultural education and training curriculum. Innovation for agricultural training and education. Retrieved from: https://innovate.cired.vt.edu/wp-content/uploads/2015/09/Thematic-Study-Modernizing-AET-Curriculum_112415_-FINAL.pdf https://innovate.cired.vt.edu/wp-content/uploads/2015/09/Thematic-Study-Modernizing-AET-Curriculum_112415_-

FINAL.pdf

GADZIRAYI, C., MAFUSE, N., ZIVENGE, E., VEREMU, R., AND SANSOLE, W. (2020). Agricultural extension needs of frontline extension workers under a pluralistic advisory system: Case of Zimbabwe growth program. *IJASRT in EESInternational*, 10(4), 165-172. https://ijasrt.shoushtar.iau.ir/article_678013_4f3341097f0c232cdb1a6c6ae4baf590.pdf http://ijasrt.iau-shoushtar.ac.ir

HENNIK, M.M. (2014). Focus group discussions. Oxford University Press, New York, United States.

INSTITUTE FOR FUTURES RESEARCH (IFR)., (2022). Futures Report on Agricultural Employment 2035. University of Stellenbosch, Stellenbosch, South Africa.

KHAPAYI, M., AND CELLIERS, P.R. (2016). Factors limiting and preventing emerging farmers to progress to commercial agricultural farming in the King Williams's Town area of the Eastern Cape Province, South Africa. *SAJAE,* 44(1), 25-41. http://dx.doi.org/10.17159/2413-3221/2016/v44n1a374

LUCIANI, M., CAMPBELL, K., TSCHIRHART, H., AUSILI, D., AND JACK, S.M. (2019). How to design a qualitative health research study. Part 1: Design and purposeful sampling considerations. *Prof. Inferm.*, 72(2):152-161. https://www.researchgate.net/publication/335883545_How_to_Design_a_Qualitative_Health_Research_Study_Part_1_Design_and_Purposeful_Sampling_Considerations

MANGOSUTHU UNIVERSITY OF TECHNOLOGY (MUT). 2022. Community Extension. Available at: https://www.mut.ac.za/community-extension/

MERRIAM, S.B., AND TISDELL, E.J. (2016). Qualitative research: a guide to design and implementation. John Wiley and Sons, San Francisco, USA.

OLIVEIRA, INGRID. 2022. "The New Extensionist Learning Kit." Global Forum for Rural Advisory Services (GFRAS). Available at: https://www.g-fras.org/en/knowledge/new-extensionist-learning-kit-nelk.html.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA). (2021). National Qualification Framework. Available online at: https://www.saqa.org.za/

STABBACK, P. (2016). What makes a quality curriculum? In-Progress Reflection No.2 on Current and Critical Issues in Curriculum and Learnming. UNESCO International

Bureau of Education, p.14. Available online at: https://unesdoc.unesco.org/ark:/48223/pf0000243975

SUVEDI, M. (2019). Global need for revitalisation of agricultural extension training. *JOE (Conference Special),* 31(3):6306-19. Available online at: https://pdfs.semanticscholar.org/9597/aa22e6253754a4abf498ee9e95109d0cc45b.pdf https://doi.org/10.26725/JEE.2019.3.31.6306-6319

SUVEDI, M., AND KAPLOWITZ, M. (2016). What every extension worker should know. Core competency handbook. USAID Modernizing Extension and Advisory Services (MEAS). https://meas.illinois.edu/wp-content/uploads/2015/04/MEAS-2016-Extension-Handbook-Suvedi-Kaplowitz-2016_02_15.pdf www.meas.illinois.edu

TSHWANE UNIVERSITY OF TECHNOLOGY (TUT). 2018. Prospectus 2018, Faculty of Science. National Diploma: Agriculture: Development and Extension, p. 2-4. Available at: https://www.tut.ac.za/ProspectusDocuments/2018/4.%20NDip_Agricultue_Develoment_2018.pdf

UNIVERSITY OF FORT HARE. No Date. Faculty of Science and Agriculture. P. 29 – 31. Available at: https://www.ufh.ac.za/files/Faculty%20of%20Science%20and%20Agriculture.pdf

UNIVERSITY OF THE FREE STATE (UFS). 2022. Faculty of Natural and Agricultural Sciences. Sustainable Food Systems and Development. Agriculture Extension. Available at: https://www.ufs.ac.za/natagri/departments-and-divisions/Sustainable-Food-Systems-and-Development/agriculture-extension/agriculture-extension

VAN HUYSSTEEN, R. (2002). The introduction of the South African National Qualifications Framework: A brief overview with reference to higher education. The University of Cape Town, Cape.