

**CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE**

**Faculty of Tropical AgriSciences**



**Faculty of Tropical  
AgriSciences**

## **Impact Assessment of Agricultural Education in Zambia**

**MASTER'S THESIS**

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## Declaration

I hereby declare that I have done this thesis entitled *“Impact Assessment of Agricultural Education in Zambia”* without outside help apart from the careful guidance of my supervisor. All the work in this document is genuine and all the work gotten from other publications has been well acknowledged with complete references.

In Prague 27<sup>th</sup> April, 2018

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Tembo Nkandu Levie

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## **Abstract**

The main purpose of this study was to provide an effect assessment of agricultural education based on the expected and attained skills, competencies and knowledge of the students in Zambia. The study used the survey approach to gather the necessary data that was needed. Three groups were targeted which are the students, graduates, and the employers. A sample of 89 students, 41 graduates and 20 employers were used in the study. The students were subjected to a semi-structured questionnaire for data collection meanwhile the graduates and the employers were subjected to semi structured guided interview. According to the findings of the study, it was revealed that students and graduates expected and attained agricultural skills, competencies of communication, teamwork, decision-making, and agricultural knowledge through agricultural education. However, it was further revealed towards the completion of the attainment of the degree, the students and graduates lacked some agricultural skills such as skills and competencies of administration. Most of the students revealed that they did not face challenges in the acquisition of agricultural skills and competencies but those that faced challenges experienced technical and practical. From the findings, the study concluded that students and graduates acquire agricultural skills and competencies of communication, teamwork, decision making, and agricultural knowledge although they lacked some of the agricultural skills and competencies such as administration. Therefore, there was need for the government and the universities' agricultural faculties as well as other connected stakeholders to make sure that the students are exposed to the technical and practical skills for the efficient and effective administration of the organizations.

**Key Words:** Agricultural education, Employability, Competencies, Skills, Zambia.

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## List of abbreviations used in the thesis

AIDS	Acquired Immune Deficiency Syndrome
CAADP	Comprehensive Africa Agriculture Development Programme
CSO	Central Statistical Office
FAO	Food and Agriculture Organisation
FI	Farmer Institute
FIC	Farmer Training Centre
FSR	Farming Systems Research
GRZ	Government of the Republic of Zambia
HIV	Human Immunodeficiency Virus
ILO	International Labour Organisation
LSC	Livestock Service Centre
MOE	Ministry of Education
MU	Mulungushi University
NAIP	National Agriculture Investment Plan
NAP	National Agriculture Policy
NATP	National Agriculture Transformation Programme
NRDC	National Resources Development College
OJT	On Job Training
PEA	Participatory Extension Approach
RSNDP	Revised Sixth National Development Plan
SAE	Supervised Agricultural Experience
SMS	Subject Matter Specialist
SSA	Sub-Saharan Africa
TEVET	Technical and Vocational Training
UN	United Nations
UNZA	University of Zambia
YPARD	Young Professionals Platform for Agricultural Research for Development
ZDA	Zambia Development Agency
ZNFU	Zambia National Farmers Un



# 1 Introduction

The enhancement of the competencies and skills of a country's citizenry exhibits a valuable requirement for the development of the living conditions. According to Johanson (2004), capitalizing in competencies and skills of the country's populace proliferates the economic performance as well as economic status of the marginal segments, thereby, leading to a minimized poverty level. It is for this matter that a majority of the countries such as Zambia have initiated the agricultural education and extension programmes as a conduit of improving the livelihood of the people and achieve sustainable economic development. Most people in Zambia work in the agricultural sector. Household incomes as well as the economy's incomes are dependent on the agricultural sector. Hence, for many years now, the Zambian economy has facilitated attempts to enhance agriculture in order to be self-sustainable in both crop and livestock production, including exports. An early framework was the support given to the farmers who were inclined to produce crops or livestock on a large scale. This supports why agriculture along the line of rail (i.e. from Copperbelt to Livingstone) has developed so well. Most of the farmers who lived elsewhere suffered from support of agricultural amenities for household sustainability.

A number of organizations have adopted the strategic development goals and the Vision 2030 framework aimed at eradicating poverty and induce sustainable development. These initiatives aim at letting governments facilitate an enabling environment to conjure prolific employment and business prospects for the poor and the marginalized economic segments (United Nations 2016). Hence, governments have formulated and implemented course of actions and economic policies that encourage pro-poor development and minimize poverty. Agriculture continues to be a significant sector in accomplishing sustainable economic development and minimizing poverty in Zambia. This is because the country has colossal natural resources such as land, water and fertile soils to support agricultural activities. Besides, at least 80% of the population especially that in remote areas subsides on agriculture associated activities

to sustain their livelihood. The development of the agriculture is, thereby, significant for the accomplishment of the sustainable development goals which is centered on becoming a successful middle-income nation by 2030 (The Government of the Republic of Zambia 2011).

Dearth of capitalization in the Zambian agricultural sector and low performance and production volumes especially among subsistence farmers are some of the serious challenges currently affecting the agricultural sector. Climate change is aggravating this challenge because of its menaces, which encompass droughts, water logging, seasonal floods, increased temperatures, shortening of the rain season especially in the preceding three yesteryears, and long dry spells coupled with irregular rainfall distribution. The limitations to development of the agriculture the sector encompass among others inadequate education and extension programmes, costlier financial resources, insufficient infrastructure, livestock diseases, over fishing and poor operating agricultural markets. Moreover, the aggressive willingness to compete by the sector has been severely affected by poor road network, inadequate storage and limited access to electricity.

In this regard, the GRZ aims to enable a thrust of the reforms in the sector that will enable the development of a favorable environment to encourage private sector led agricultural growth. Due to the fact that poverty is most prevalent in remote areas and that most of the rural and peri-urban population is involved in agricultural-based activities, capitalizations especially in agriculture infrastructure and agro-related industries are aimed to provide an efficient conduit to facilitate the country's rural development and reduce the levels of poverty. Efforts are also aimed to improve productivity and increase production in the sector by centering on the development of human capacity through training, research and extension services (GRZ-RSNDP 2011). For this to be possible there is need for extensive agricultural educations and extension services. Effective agriculture educations and extension involves maintenance of the knowledge and skill of agriculture students. Agricultural

competencies and skills involve not only knowledge of the discipline but also the ability to impart that knowledge to the students (Lindner & Baker 2003).

According to Melak & Negatu (2012), agricultural institutions must be equipped with the content of their disciplines well substantiated to impart it to someone else and respond to questions about its underlying assumptions and theories. To make this possible through the agriculture education and extension services, the GRZ has necessitated the education of agriculture science in academic institutions such as primary and secondary schools, Technical and Vocational Training (TEVET) institutional colleges, and universities. The extension of agriculture education and extension services to academic schools did not only exhibit an origin of competent human resources for agriculture nonetheless as well as an opening for new graduates get into the labour market. In the same vein with Sub Saharan African countries, studies reveal that there is immense pressure to proliferate the competencies and skills of human capital in agriculture in Zambia. Nevertheless, there is dearth of evidence to explore whether the present academic school agriculture education and extension service students have the prerequisite competencies and skills to address the needs of the local agriculture sector. Therefore, despite the efforts of sustainable development goals, little has been carried on the skills and competencies of agricultural students.

## 2 Literature Review

In the present global setting, where know-how is considered as the utmost significant factor of production, thereby, the competencies and skills attained by the human capital is conceived as a significant purpose and function in the sustainable economic development of a majority of economies. Hence, modernizing the education, skills and competencies of the human resource of any country facilitates socio-economic development through the increased productivity, thereby, conjuring extra capital required to improve the livelihood of the general population (International Labour Organization 1997). According to the UN (2014) the human capital growth exhibits the self-sustaining of people by furthering the influential capabilities that conjure improvement of their lives and the communities as a whole. In the same vein, ILO (1997) described it as an approach of enhancing the knowledge base, skills, competencies, and the capabilities of the general populace of a particular community. In this view, it certainly develops that communities or economies with poorly skills and incompetent human resource is likely to find it a challenge to advance further with their socio-economic development.

A number of evidences have recommended that the proliferation of the human capital exhibits a foremost challenge to the growth of the agriculture sector in most of the African countries especially Zambia. Notwithstanding the current attempts of getting the better of poverty, the dearth of skilled and competent human resource acts as hindrance to the growth of the agriculture sector and markets. In this view, there is some sustained necessity well-grounded academic and training institutions with a concentration on training time to come experts and professionals with labour market required technical and vocational competencies and skills (World Bank 2013). Besides education, it is also essential to develop very sound associations between education and training and the labour market. In several countries around the world particularly the emerging markets, there are exceedingly weak associations between educational or training institutions and the labour market (Percy-Smith et al. 2012).

## 2.1 Agricultural Education

Phipps et al. (2008) provided a firm establishment to fathom what agricultural education is and what the agricultural education system. The authors asserted that agricultural education may be described as a methodical training and teaching in agriculture and natural resources at the elementary, middle school, secondary, postsecondary, or adult levels. The purpose of training and teaching agriculture includes:

- (i) Making people ready for entry and advancement in agricultural occupations and professions;
- (ii) Job creation and entrepreneurship; and
- (iii) Agricultural advancements awareness and literacy.

The initial two purposes encompass education in agriculture, while the third one considers education about agriculture. Education about agriculture remarkably considers occupational or career awareness, exploration, orientation and preparation, depending upon the age of the students enrolled. On the other hand, agricultural education in educational institutions can provide a well-grounded fundament for further study and preparation for professional careers in agriculture and natural resources after the attainment of the certificate (Han 2014). Education in agriculture may encompass a vocational, practical arts, consumer, literacy, and therapy course and learning experiences. Agricultural education in the learning institutions has also contributed a significant role in improving student achievement in the core subject areas, particularly science (Phipps et al. 2008).

The description of Phipps et al. (2008) on agricultural education is in the same vein with the suggestions for education in and about agriculture by the National Research Council (1988) in Han (2014), that is;

- (i) Organized informative and instructive attempts should be arrived at to give a grounding in or formulate an updated agricultural programme in students of any age.
- (ii) Educating science through agriculture would integrate supplementary agriculture into syllabi, whereas further efficaciously educating science.
- (iii) The calibre of vocational agriculture curricula must be improved by a step by step framework management, agricultural science, agribusinesses, marketing, management and food production and processing.

The National Council for Agricultural Education (2000) provided a number of suggestions on recapitalizing agricultural education for the yet to come and this included:

- (i) Ensure there are exuberant highly motivated, well-educated teachers or trainers offering agriculture education and extension.
- (ii) Render all students with access to unified, enduring education in agriculture, in diverse educational settings.
- (iii) Ensure that every student is informally educated in agriculture.
- (iv) Make sure that, that is a sustained education about agriculture. To accomplish the sustainable development goals and the Vision 2013, a high-calibre teacher-training programme has to be offered to the present agriculture students and yet to come agriculture students.

Phipps et al. (2008) as well contributed on an explication on agricultural teacher education by opining that agriculture education involves a number of facets such as program planning and evaluation, curriculum and course development, instructional design, teaching methods, teaching and learning processes, learning assessment, laboratory and facility design and use, instructional technology, adult and youth development, experiential learning, and many other areas. Agricultural education and extension facilitators teachers or trainers apply their skilfulness in these traditional

field to prepare the students entry and advancement in the labour market and to come up with a better apprehension of how the agriculture market can offer such a profuse provision of food, fibre, and other products for end user.

Talbert et al. (2007) indicated how agricultural students become fortunate in their career by opining that agricultural education in the local institutions will be only as fortunate as the skills, knowledge and competencies of the agriculture facilitators improves. For this to be possible, the facilitators such as teachers or trainers are vital to the achievement or disappointment of the program and must be highly qualified, well trained, and passionate about the profession of teaching. Facilitators must not only master the art and practice of teaching, but then they must as well remain present in the technical content of the profession. Teachers or trainers must have expert growth course of actions that facilitate them to remain well-informed of current developments in the areas of agriculture. Even the best teachers or trainers turn unproductive when the technical capacity of their teachings turn superannuated.

Talbert et al. (2007) as well provided some suggestions concerning the agricultural education programme. The agricultural education programme should be determined by the market demand in agricultural labour market. The TEVET services should offer knowledge capabilities that gear up students for the entry point into agricultural labour market in the society and the economy as whole, nevertheless the skills and competencies demanded by the agricultural sectors of most of the emerging economies less productive and less technical than in developed economies. For example, if the economy demands workers to operate on a farm machinery, the agricultural education and extension should gear up students for jobs of that nature.

In this view, the instructional modules of agricultural education programs include lecture-room instruction, supervised agricultural experience (SAE) programs, laboratory instruction, and student leadership development through participation in programs and activities of national organizations such as the Zambia National Farmers

Union (ZNFU). As industry practices, educational developments and priorities, and student features have changed over the years, the relative amount of instructional time dedicated to each of these four components has varied (Phipps et al. 2008; Han 2014).

## **2.2 Enforcing Agricultural Education Through Tevet**

The formulation and execution of policies targeted at proliferating employment opportunities is very important, particularly in emerging economies because of the undeviating linkage to the enhancement of the income vulnerable people as well as minimizing poverty. According to Food and Agriculture Organization - FAO (2013), employment in the remote areas of any country is an essential factor to accomplishing the challenges of food security and reduced poverty. Nevertheless, the accomplishment of such challenges needs capitalizing in the growth of the labour force (FAO 2012). For this matter, it has come to be indispensable to highpoint the purpose of strengthening agriculture in TEVET due to the fact that a number of emerging economies particularly Zambia, the agriculture industry does not only influence economic growth then again acts as a facilitator of job creation. In this view, through agricultural TEVET services, a number of job opportunities would be created for the youth as they are colossal unemployment of youths in Zambia.

Slushier et al. (2009) remarked the presence of agricultural TEVET education programs as essential in aiding students to develop the skills and competencies required to accomplish increased employment in an economy. Oni (2013) also adds that TEVET programs do not just offer students the opening to acquire basic knowledge and practical skills but also skills and competencies required for incoming into the labour market. With respect to Zambia, agricultural activities are the primary origin of sustenance of a majority of its adult population, hence, the strengthening of agricultural TEVET programs can bring about a well-grounded system in the agricultural sectors. The modification of the Zambian education system was last executed in 2014 with concentration on the TEVET syllabi and curriculum. Regardless



of the improved economic development, the main source of employment of students who have completed the agriculture program or training is no other than the government, which has propelled the Ministry of Education (MoE) to embrace entrepreneurial programs primary and secondary levels of education as well as in institutions of higher learning (Ministry of Education 2014).

### **2.3 Agricultural Education: Africa Perspective**

The region of Africa has largely been influenced by financial and economic crisis, instability in the political systems, wars, ill-leadership and the dearth of systems and administrative insignificant modifications related with unsupported evidences, low qualified personnel and ineffectual job skills and competencies of the proactive population. This phenomenon has led to the tenacity of low economic performance, increased hunger and poverty levels as most of the population is subdued land tilling, that is families of subsistence farmers. Obviously, the performance of African economies is largely subdued on the agriculture sectors particularly the societies in the remote areas (where a large proportion of the population generally depend in agricultural processes of low income). This maturation can be maintainably be accomplished if capitalizations to enhanced skill and competencies education programs are undertaken so as to promote families of the subsistence farmers to become self-sustainable and productive.

Post the colonial regime, a number of countries were left with distinctive educational procedures particularly to agricultural education, research, and training. The whole globe has been affected by significant variations such as by economic and financial liberalization and reduced trade restrictions, socio-economic variations such as population growth and HIV/AIDS, ecological variations colligated to climate change and urbanization, and adoption of new technological advancements. However, these colonial educational procedures did not significantly modify even after the colonial regimes in Africa (Spielman et al. 2008). Agriculture education and extension continues to be poor to supply modern knowledge, competencies, and skills of production

adjusted to the fluctuations in the global setting so as to address the current and to come challenges among the African community.

## **2.4 Types of Agricultural Education and Extensions in Africa**

Educational structure in several African countries encompass both general education and vocational education. General education allows students that have admission to them to sustain their education to higher levels whereas vocational education allows one to center on imminent employment or it is for those that are unable to have access to the general education openness. However, some countries conduits by which one with vocational education have an opportunity to higher education (Oketch 2007). Traditionally, in the African agricultural education and extension, there are three distinct conduits of human knowledge, competence and skill development, such as formal, informal and non-formal education, and are completely unnecessary for TV work skills development of one self. Lindley et al. (1996; 2002) claimed that that formal agricultural education is a prerequisite for skilled and competent workforce as to facilitate the agricultural market through extension, research, entrepreneurship and commerce. The non-formal agricultural education is provided with public and private education and extension services and it is required for training of farmers, farm families and workers and for skill development particularly for organizations and groups in remote areas.

Notwithstanding to this, to supplement these basic concepts concerning agriculture education and extension, Oketch (2007) asserted that non-formal education ensues from structured processes endogenously and exogenously the workplace which comprises momentous education which is not recognized. Informal learning' takes place not deliberately or as a spin-off of other processes (OECD 2003; Green et al. 2004). Oketch (2007) further opined that a majority of vocational education is formal learning, that is, structured and intentional education whose results are recognized. Nevertheless, vocational and training education, primarily, as well involves the non-formal education and informal education which happen usually through training and

extension and coordinated within family lines. Most of what is considered as work experience and for the most part on-the-job training (OJT), is either non-formal or informal in nature and comprises a substantial proportion of vocational education. In the intervening time, with regard to UNESCO (2002), agricultural education and extension occurs in a number of distinctive level of education, that is from primary education level up to levels of higher education such as university level.

According to FAO (1997) in Paulino (2012), agricultural education and extension concerns to educational institutions and programs of agricultural educational services at all educational levels and tenure, from full time degrees to part time and extension programs. In this view, educational architecture still encompasses the following credentials:

- TEVET which is undertaken in secondary-level institutions, colleges and technical high schools.
- Higher-level Education and Training which are undertaken at university (degree) level programs.
- Extension education programs which are a system of education carried out through OTJ training and short courses.

A majority of Africa's field-level agricultural extension trainers are developed at the intermediate level, namely, TEVET, due to the fact that in such educational levels, students can gain practical based education such as skills, knowledge and competencies that are being needed by the public sector and private employers (Lindley et al. 1996; 2002). These practical human resource features are anticipated at the labour market with aim of enhancing performance and production. Hence, most of the organizations encourage and affirm most of the technical and vocational agriculture institutions. Nevertheless, Spielman et al. (2008) explicated the post-secondary agriculture and extension systems in Africa. These systems are usually

integrated no less than by four distinctive segments such as universities, colleges, TEVET institutions, and non-formal educational programs. These segments function a purpose of bringing about agricultural innovation, a purpose that subdues on the intensities of the specific economies and components of the agricultural sectors that it aids. Secondary and post-secondary agricultural education complement to address the demand of the labour market for modern job skilled methods or experts who can address the vitality of environmental settings and demand for agricultural goods and services.

In this regard, traditionally in Africa, agricultural education and extension initiates in secondary educational levels (i.e. Junior and High secondary) in which students acquire skills and competencies, thereby becoming ready to engage the economical active life continued in higher education. Oketch (2007) carried out his study on seven African countries (i.e. Botswana, Egypt, Senegal, Zimbabwe, Ghana, Seychelles, Tanzania) and established that the accompaniment directed on TEVET at each of these levels of education differs from one country to another and that in Africa, TEVET is a scheme discerned from general education structure, typically on the share of academic content in the programs provided and the degree of particularity in the vocational programs provided. Hence, TEVET is a composite scheme with own schools, trainers or teachers, courses, and syllabi.

## **2.5 Zambian Educational System**

According to a survey by the Central Statistical Office of Zambia (2015), about 63.4% of the population aged 15 and above was literate. The proportion of the female that were literate was about 56% while male was about 70%. In urban regions, literacy was approximately 83.8% while in rural regions, it was about 60.5%. There was approximately 53.2% survival rate among primary going students, approximately 45.6% among secondary going students, 4.8% among vocational and training school, and 2.7% among university school students. Zambia, like most other countries, has a structured education system. The Zambian education system has a 7-5-4-year

education system. The seven and five encompasses the general education while four years encompasses tertiary education. The general education system is segmented into three distinct level, that is, primary, secondary, and high school. The initial average school attendance age is six years old. The primary level survival rate has improved while most of the school dropouts are being experienced in the secondary and high school levels where students have to spend about five years, that is, two years in secondary school and three years in high school.

To cross from one level to another, students are required to participate national school examinations. Crossing the high school level, the students have an option to study in any field of study at any institution of higher education of their choice. Based on performance, best performing students are selected to study at a public university with a government scholarship. Presently, there are 25 institutions of higher education in Zambia, of which 16 are public institutions and nine (9) are privately owned institutions. Most of the institutions of higher education are located in the urban regions of Zambia. All of the institutions are under the supervision of the Ministry of education (MoE) (MoE 2016). Among the 25 institutions of higher education, 12 of them are universities, of which four of them are public institutions. Some universities provide post graduate studies in agriculture, but no post-doctoral study programs are available in Zambia. With the emergence of privately owned institutions of higher learning, the attendance of higher education has surged in Zambia.

Currently, there is only one privately owned higher education institution providing agricultural education, that is, the Zambia Open University and four government run universities providing agricultural programs: The University of Zambia (UNZA), Mulungushi University (MU), Zambia College of Agriculture (ZCA), and the Natural Resources Development College (NRDC). Each of these institutions have at least faculties offering higher education in agriculture and related social sciences. With the economy's need to diversify the economy, agricultural sector is the second most

contributor to the economic growth, hence, there is urge in the education of agriculture and educational extension programs in the country.

## **2.6 Agricultural Education in Zambia**

In Zambia, agriculture is one of the essential economic activities that contribute significantly to the growth of the economy and development as well as improving the living conditions. Presently, it represents about 22% of the country's Gross Domestic Product and enhances the living conditions of at least 50% of the entire population (Central Statistical Office 2015). The sector has also come up to be a significant earner in terms of foreign exchange. The Zambian government in its efforts towards the Vision, 2030, has come up with plan in relation to agricultural development frameworks. The aim of this Vision 2030 is to enable Zambia become a successful middle-income country by the end of 2030 and in the government's, plan is the recognition of agriculture education programmes as vital to improved agricultural production and sustainable production particularly amid the subsistence farmers (GRZ 2014). The RSNDP 2011 – 2017 was a capitalization strategy with its centre on the development of rural areas and increase employment levels, as well as suggested to enhance sustainable and effective productivity and value addition of an expanded and differentiated industry through improvements of education and extensions service delivery (GRZ 2011).

Further, the National Agricultural Policy (NAP) includes the vital aspects of agriculture and functions as a guide to the growth of the agricultural industry. Among its twelve general aims, the number nine aim which is to “strengthen agricultural extension service delivery”, asserts the demand for enhancing the optimality of the extent extension and education human capital and encouraging agricultural extension and education through the private sector so as to supplement the provision of the extension and educational programmes provided by the public sector (GRZ 2015). For the policies and aims set under the NAP to materialize, the National Agricultural Policy, the National Agriculture Investment Plan (NAIP) 2014-2018 was as well established

under the Comprehensive Africa Agriculture Development Programme (CAADP) to explore and place in order essential capitalization and changes in policy demanded to improve the productivity of agriculture in Zambia in a manner that alleviates poverty and bring about sustainable economic development (GRZ 2016).

For the workability and implementation of the NAIP and the R-SNDP, the National Agriculture Transformation Programme (NATP) was structured with essential goals and roles for short-term execution. The programme has several vital thematic fields including research and education as well arguments to the demand for human capital growth of all the staff in the extension and education service delivery (GRZ 2016).

These aforementioned policies established by the government regurgitate the essential function of agricultural education and extension in the enhancement of agricultural output and its sustained production particularly among the income vulnerable economic agents so as to improve the living conditions.

## **2.7 Services Under Agricultural Education and Extension in Zambia**

Agricultural education and extension programmes in Zambia have been rendered through several designs over a number of years. Prior the country's independence in the year 1964, an administrative procedure to the delivery of agricultural educations and extension was applied to target particular liberal discrete farmers who were commanded the crops to grow. This colonial command farming and extension approach specifically encouraged the growing of the staple crop which was maize so as to feed the itinerant workers who were centered in the country's mining area, the Copperbelt Province. Post the independence in 1964, the government came up with strategies to enhance agricultural production and made sure that food sufficiency in the country brought about an increase in the number of income vulnerable individuals to take up agricultural activities. This facilitated the government to enhance on the

previous regime command farming approach by coming up with the Farmer Training Centers (FTCs), Livestock Service Centers (LSCs) and Farm Institutes (FIs) (GRZ 2016).

The FTCs and the LSCs were designed in several strategic places, that is, districts that were vital for agriculture and a Farm Institute was built in each of the nation's then nine provinces. The establishment of the farmer training centres for the aim of commodity expo and to necessitate training of the farmers in the effective and efficient management of the farm. On the other hand, the LSCs were convenient shops for livestock products and services meanwhile the Farm institutes covered for in-house training of education and extension and the provision of improved training to liberal subsistence farmers (Brinkman et al. 2011).

Zambia, in the early 1980s, turn out to be one the first Sub Saharan African (SSA) countries to apply the Training and Visit (T&V) procedure to agricultural education and extension. The T&V education and extension procedure was featured amid others by organized periodical trainings of field education and extension officers by the Subject Matter Specialists (SMSs), all-encompassing application and usage of contact farmers, focus of education and extension messages on the staple crop which is maize and an integrated thorough knowledge for livestock, crops and fisheries education and extension services (GRZ 2016). The same time period the T&V procedure was being executed, the Farming Systems Research (FSR) methodology was originated as a more all-encompassing problem-solving beneficiate for scholars, practitioners, and researchers to bring about improved apprehension of farm households, family decisions and decision making beneficiates, however, could not take a strong stand in the conventional education and extension system (Young Professionals' Platform for Agricultural Research for Development 2012).

The personalized household procedure was again applied in most cases by the foreign aid funded projects between the late 1980s and the late 1990s and is ascribed to have been a framework that accomplished worthy outcomes in gender traditional and



economic development and growth. During the late 1980s and 1990s, the Zambia agricultural education and extension representativeness opined to that fact that agricultural issues went beyond the intensities of personal farms or farm households. Education and extension service delivery had to experience such challenges as natural resources management, management of value chain, production and distribution channelling, and marketing. These new challenges generally demanded new ways of integrated in time combatting as well as collaboration amid farmers, between farmers and connected stakeholders.

The Participatory Extension Approach (PEA) in the early 2000s, was declared to be the chief instrument for the rendering of education and extension services after the World Bank study which was backed up by the Government study to seek conduits of stimulating education and extension services delivery in Zambia. The PEA is an efficient learning benefiariate centring on aggregated colligate learning using both traditional and present knowhow methodologies. It emphasizes on the practical facilitation rather than too much theoretical teaching.

The public education and extension services rendering in Zambia is centred on the premises of communication and adult learning. According to Government of the Republic of Zambia (2016), the PEA educations, extension and advisory services are supplementary and individually rendered in four general categories:

- (i) Technology Transfer: by which agricultural education and extension is a way of proactively altering own free conduct in the form of the talking up of exogenous growth, working technologies, or management activities. This is accomplished by making people believe of the value of taking up via the application of agriculture expos, demonstrations in the field, field work, education and extension resources and presentations.
- (ii) Problem solving: by which agricultural education and extension is a way of aiding individuals to elicit resolutions to proven technological and

management issues which come about and are conquering their expectation and with to enhance unit productivity.

- (iii) Education: by which agriculture education and extension is a way in which proactive formal and informal education seeks to aid individuals and groups to improve apprehend their cases and to be capable to come up with choices as well as make actions that better their status quo. This normally facilitated through agricultural institutions which includes universities and colleges as well as through the farm institutions.
- (iv) Human Development: by which agricultural education and extension is a way to be of use and enhance individuals and societies to take the programmes in problem description and coming up with resolutions to individual and communal challenges. The supposition is that an opening and integrated methodology, individuals and societies will best better their current state.

The four educations and extension categories are complementary preferably than in contravene, each to the point to deviant demands and cases. Education and extension under each of the categories could be used to aid alteration in several fields such as quality of food, production and productivity, sustainable economic development, and improved competencies and skills. There are basically two channels for the educations and extension of agriculture in Zambia, that is, through Farm Institutes, Livestock Service Centres and Farmer Training Centres and conversely through academic institutions.

## **2.8 Employability in Zambia**

The qualification of working is regarded as an economic variable of gaining a competitive edge, due to the fact that it is associated to the grade of excellence of the human capital which exhibits a cardinal requirement in the gaining of competitive advantage in the economic sectors. According to most of the evidence, the

qualification of working or rather employability refers to the organization of the education system in association to its near relations with the market for the labour force. It is as well described as the capability to trend into and within the market for the labour force and to materialize the possibility via continued and available employment (Lindsay & McQuaid 2005).

Overtime, the share of education institutions in the skills and competencies of persons has turned out to be a very significant aspect due to the fact that they are essential in providing people with professionalism in their respective specializations so as to easily enter the labour market. In Zambia, the agricultural sectors allow for at least 70% employment as a share to the total labour force (Central Statistical Office CSO 2016). In this instance, agriculture has sustained to experience precedent devotion by the government and the connected stakeholders, through increased backup through the national budget that aims at surging agriculture performance to make that there is sufficient security of food, generation of income, bringing about employment openings, and alleviating income vulnerabilities (Zambia Development Agency ZDA 2015).

The surge of skills and competencies is essential into the agricultural labour market in Zambia. Hence, the coming up of educational programmes such as agricultural education and extension in Zambia which is basically aimed at enhancing professionalism of the local labour force does not only share to the proliferation in the human capital through knowledge spill over however as well conjure new under-goings from other jurisdictions which are vital to the makeover of existent agricultural institutions in the nation. The assessment of the agricultural skills, competencies and knowledge of the agricultural students in Zambia is significant to ascertain whether they match with the competencies, skills and knowledge need for employability.

### **3 Aims of The Study**

The study aims to provide an in-depth insight on the expectations and challenges of agricultural education in Zambia. The analysis oriented to identify the skills, competencies, and skills of current students at the University of Zambia (UNZA) and the Mulungushi University (MU) who progress towards the attainment of a degree in agricultural fields.

The main aim of the study is to conduct the effect assessment of agricultural educations among the students in terms of skills, competencies and knowledge. The following questions were taken into consideration:

- (i) What are the perceived knowledge, skills, and competencies among the students studying agricultural specialisation?
- (ii) What are challenges being faced in relation to competencies and skills in agriculture?
- (iii) What is the relationship among knowledge and skills in agriculture and progress toward a degree attainment in agricultural fields?

The specific objectives of this study were as follows:

- (i) To identify perceived knowledge, skills, and competencies among the students studying in the field of agriculture at the two universities.
- (ii) To explore challenges in the field of agriculture that are being faced during their studies.
- (iii) To establish and examine the relationship between knowledge and skills in agriculture gained during their studies and their employability.

## **4 Methods**

### **4.1 Research Design**

This section provides the methodology that elucidates the operationalization of the procedure for the data collection and data analysis that was used to evaluate the assessment of the agricultural education competencies, skills, and knowledge of the university students in Zambia. The study was undertaken in two parts. Both the primary and secondary data collection approaches were carried out. The secondary data was used to gather information which provided information for the theoretical background and the literature review. The primary data were collected through survey approach included the collection of data from the targeted respondents (i.e. the university students, graduates, and employers) and further outlines the procedure of assessing the collected data.

The primary data were collected from following main target groups: (i) students from two selected universities (the University of Zambia and Mulungushi University) via structured questionnaire, (ii) graduates of these two selected universities who were interviewed personally and (iii) employers of these graduates who were interviewed personally.

The secondary data for this study was collected from books, scientific journals, publications by international institutions and government. The secondary data was purposively collected to build the secondary information for the theoretical background and the literature for the study. Key words for selection of appropriate articles were identified as followings: agricultural education, skills and competencies, employability, Zambia.

## 4.2 Research Instruments

The study used both questionnaire survey and guided interviews to collect data from the targeted groups. The questionnaires were administered to the students from the two universities while the guided interviews were used to collect data from the graduates and the employers.

According to Stuart & Wayne (1996), a questionnaire is a band of well designed, documented and tried questions which are asked to group or individual respondents to gather data in a research study. The application of the type of research instrument was adopted due to the fact that it is suitable for collecting adequate data in minimal particular period of time. The data for this study was collected using semi-structured questionnaires oriented to the students, graduates and their employers.

The questionnaire designed for the students of two selected universities includes 13 questions oriented to two parts. The questions in the questionnaire gathered data on the competencies, skills, and knowledge of the students, their current and desired skills and competencies, the agricultural education curriculum, and their expected employability. The drop and wait approach was used to make sure that the information provided was adequate and fitting the study. The scope of structure of the questionnaire is as shown in annex 1. Respondents were asked to indicate their expectations and challenges of their current level of competence in each dimension using a five-point Likert-type scale. The points on the scale are as follows: 1=Very Low; 2=Low; 3=Average; 4=High; and 5=Very High. The limitation was that competencies are self-reported expectations and challenges and not a test measurement of the variables themselves. The questionnaire for the study gathered both open and closed ended data, the questionnaire had both open and closed questions.

For the graduates, the researcher had to go into large commercial farms as well as large corporations that dealt with agriculture products and services to randomly select

the graduates. The graduates were interviewed using the semi-structured interview guide and the information provided was recorded by the researcher. The questionnaire designed for the graduates includes eight questions. The graduates were interviewed on the skills and competencies acquired, whether the skills and competencies acquired met the labour market standards and helping them to the job effectively. The scope and structure of the questionnaire is as shown in annex 2.

The graduates were selected using random sampling procedure. This is because every graduate from the university had an equal chance of participating in the study to reduce biasness. Through the registry of the university a list of agricultural education graduates was provided, and the researcher used random number generated using a scientific calculator. The selected graduates were then conducted either physically or by phone depending on their proximity of residence.

The employers were purposively selected and interviewed using a semi-structured interview guide. The questionnaire designed for the employers includes 13 questions. The employers were asked to reveal the skills and competencies in the labour market under agricultural education, whether the graduates meet the required skills and competencies needed in the labour market. The scope and structure of the questionnaire is as shown in annex 3.

### **4.3 Sample Frame and Sampling Procedure**

The target population were the students at the University of Zambia (UNZA) – the Department of Agricultural Education and the Mulungushi University (MU) – the Department of Agricultural Education. Thus, all the students studying agriculture at both universities were considered for study. Students have progressed to various levels in the agricultural program, from first year enrolled in courses to last year enrolled in courses. There were total of 1,070 students from both universities, representing 671 students studying at UNZA and 399 students studying at MU.

In coming up with the sample size for the study, the Yamene Formula was used. The sample size was estimated as follows:

$$n = \frac{N}{1 + Ne^2}$$

Where: n is the sample size to be determined, N is the population size, and e is the margin of error taken to be 10%. The margin of error of 10% was considered due to the fact that the research lacked the understanding of the statistical descriptive of the population under study. The operationalization of the Yamene formula resulted to a sample size of 91.

To make the data collected comprehensive, the study also included the graduates and the employers. These were included to ascertain whether the competencies, skills, and knowledge acquired meets the required competencies, skills, and the knowledge needed in the labour market. All the respondents under study, the students, graduates, and the employers were selected purposively since due to the fact that only respondents in the agricultural sciences were required from investigation.

For the graduates, a total number of 50 graduates were targeted to control for the time and funding of the study. The graduates were selected purposively from their work of place. In addition, the employers were also selected purposively. Large commercial farms and large corporations that dealt in agricultural related products and services were targeted under study. Most particularly the Human Resource (HR) department was targeted as employers as these are the ones involved in recruitment and selection. Only a total number of 20 employers were purposively selected.

The study targeted three groups: the students of the two universities, graduate and their employers. The study targeted 100 students from two universities, 50 graduates and 20 employers. Finally, 89 of the 100 distributed questionnaires were adequately responded from the students representing response rate of 89%. Regarding the



graduates, 41 of the 50 distributed interview guides to the graduates were adequately responded representing 82% response rate and all the 20 employers who were administered the interview guide responded representing a 100% response rate. The table 1 summarizes the response rate of the respondents.

**Table 1. Respondent's Response Rate**

Response	Students		Graduates		Employers	
	N	%	N	%	N	%
Responded	89	89	41	82	20	100
Not Responded	11	11	9	18	0	0
Total	100	100	50	100	20	100

#### 4.4 Data Analysis

The primary data that was majorly collected for the analysis was processed by the application of the qualitative methods. Qualitative method is the one that focuses on establishing motives and opinions using in-depth interviews and questionnaires for the study. Meanwhile, secondary data for analysis is focused on the ascertaining of quantity or amount and it is used to researches that can be carried out in terms of amounts (Kothari 2004). Because of the study's need for the qualitative data for the data analysis, the study centred much on the qualitative methods of data analysis. Thus, the inferential statistics demanded for the study asked for the use of the qualitative data.

The study used a semi-structured questionnaire and interview guides to gather data from the targeted groups: students, graduates, and employers. The data which was gathered using these research instruments was consistently structured in such a way that facilitated analysis through descriptive research approach. Descriptive statistics

(i.e. mean, standard deviation, valid percent, and other parameters) were used to analyse qualitative data. The data was coded, summarized, presented and analysed using the Statistical Package for Social Sciences (SPSS) version 24. The findings were presented using tables, bar charts, and graphs using frequencies, percentages as well as inferential statistics.

## 5 Results

### 5.1 Profile of The Respondents

The study requested to find the characteristics of the students that were targeted. Among the 89 targeted respondents, were 33% female (N=30) and 67% were male (N=59). Further, according to the findings, a majority of the respondents (78.3%), were aged between 21 to 25 years (N=70) of which a majority of them (43.3%) were from the Mulungushi University (N=39). This entails that most of the students that were undertaking agricultural education from the two universities were between 21 and 25 years of age. The figure 1 shows the age distribution of the respondents.

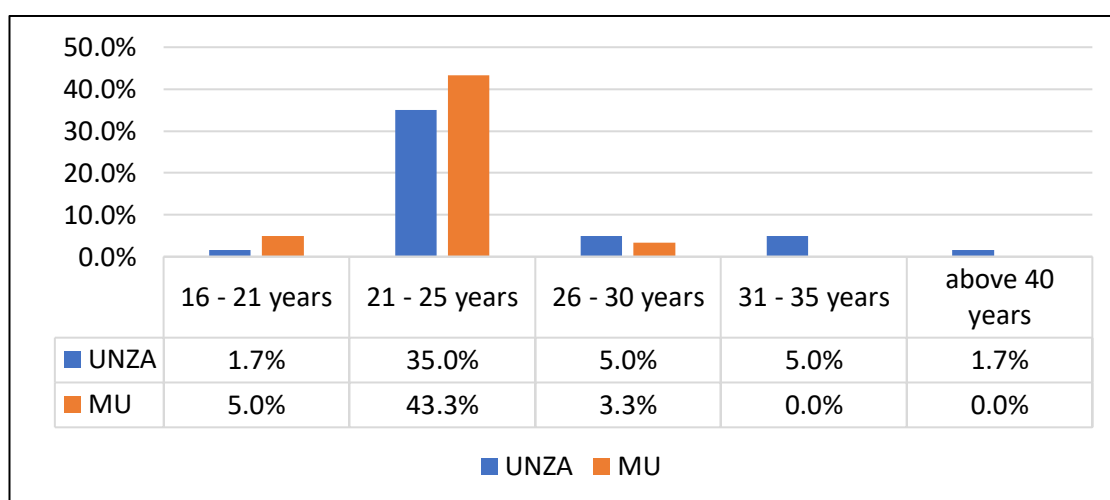


Figure 1. Age Distribution of the Respondents.

### 5.2 Student's Experiences

The study sought to find out whether resources and tools for delivery quality education were adequate enough to impart students with the skills, competence, and knowledge in agriculture. According to the findings, most of the students (32.6%) claimed that the ratio of the lecturer to student was one lecturer to at least 50 students with a majority of 28.1% being UNZA students. It was further discovered that

another 28.1% of the students with 18% of the students from Mulungushi University indicated that the ratio of the lecturer to students was 1:10 while at most 1.1% student from Mulungushi University indicated that the ratio was 1:12 and 1:15 respectively. Only 13.5% of the students with a majority of 9% from Mulungushi University and 5.6% of the students from UNZA indicated that the ratio of the lecturer to students was 1:20 and 1:23 respectively meanwhile 6.7% of which 4.5% of the students from the Mulungushi University indicated that the ratio the was 1:25. It is clear that UNZA had a largest ratio of lecturers to students with 28.1% have one lecturer to at least 50 students. The findings are summarized in table 1.

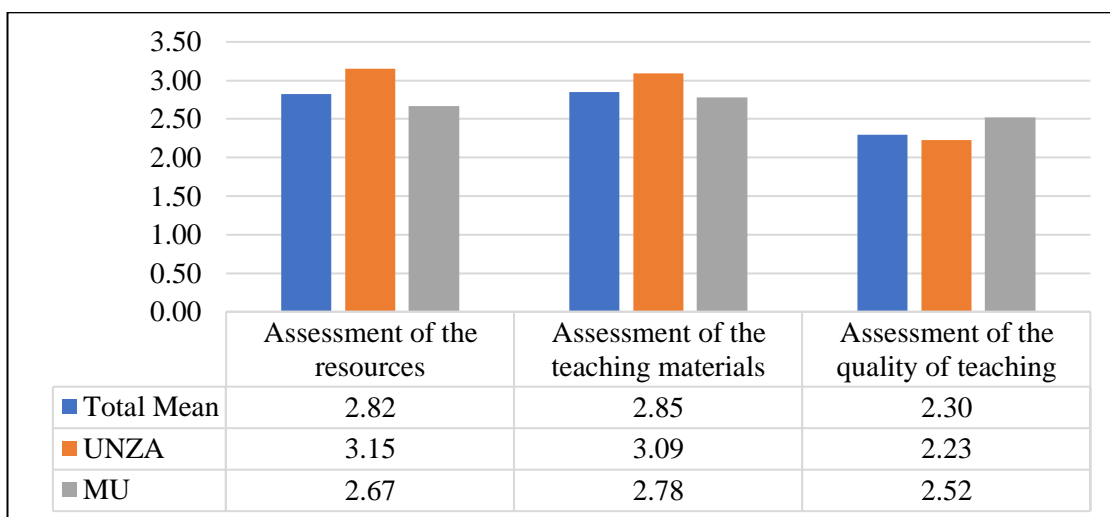
**Table 2. The Lecturer to Student Ratio**

Ratio	UNZA		MU	
	N	%	N	%
1:5	0	0.0	1	1.1
1:7	0	0.0	1	1.1
1:10	9	10.1	16	18.0
1:12	0	0.0	1	1.1
1:15	0	0.0	1	1.1
1:20	4	4.5	8	9.0
1:23	5	5.6	0	0.0
1:25	2	2.2	4	4.5
1:30	0	0.0	3	3.4
1:40	0	0.0	1	1.1
1:50	3	3.4	0	0
1:50	25	28.1	4	4.5
2:100	1	1.1	0	0.0
<b>Total</b>	<b>49</b>	<b>54.9</b>	<b>40</b>	<b>44.9</b>

Using a five-point scale, the respondents were asked to reveal an assessment of the resources, teaching aids, and quality of teaching at the university. Most of the students, 58.4%, claimed that the resources at the university such as laboratories and

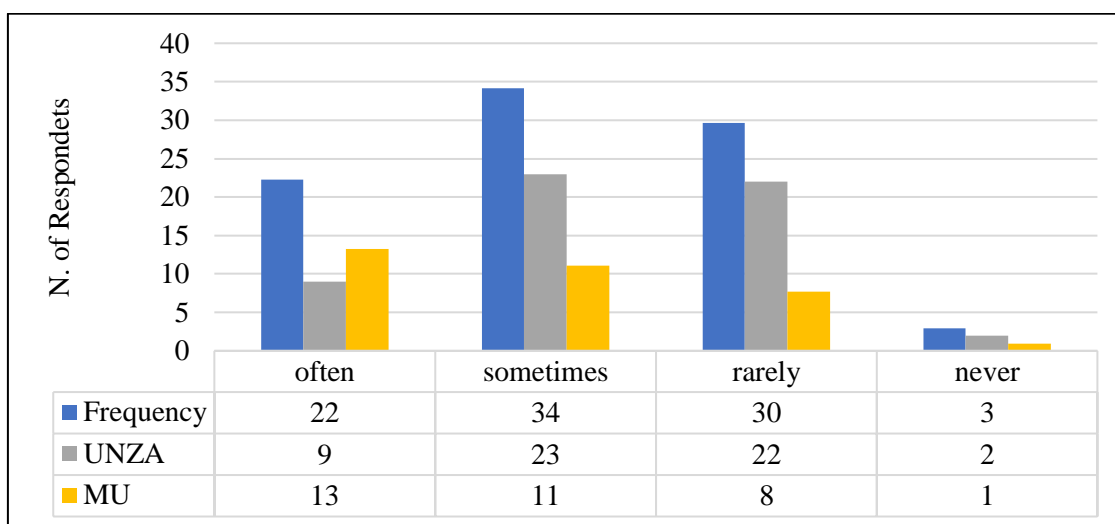
classrooms were good as this was supported by a mean score of 2.82 which was less than the median score of a five-point scale. This entails that the resources such as laboratories and classrooms were a good for the student’s education. Further, most of the students (55%), claimed that the teaching aids at the learning institution were good. This was supported by the mean of 2.85 which was less than the median score of the scale. This shows that the teaching aids such as the Moodle, internet, and the library is good for the student’s education.

In terms of the quality of education, it was discovered that most of the respondents, (73.4%), indicated that the quality of education at the learning institution was good. This was supported by a mean score of 2.30 which was less than the median score of the five-point scale. This shows that the quality of education at the learning institutions was good for the student’s education in agriculture. The figure 4.3 below shows the findings on the assessment of the resources, teaching aids, and quality of education at the learning institutions. It was further revealed UNZA was only good in quality of teaching with a mean score of 2.52 meanwhile MU was good in terms of resources and teaching materials with a mean score of 2.67 and 2.78 respectively.



**Figure 2. Resources and Tools for Delivering Skills and Competencies.**

The respondents were asked how often they conducted experiments other than theoretical studies. It was discovered that the students at the learning institutions conducted experiments. 25% of the respondents with a majority of them at MU indicated that they conducted experiments often while 38.3% with a most of them MU conducted the experiments sometimes. 33.3% of the respondents with a majority of them UNZA indicated that they conducted the experiments rarely while 3.3% of the respondents with most of them from UNZA indicated that they had never conducted any experiments. The frequency of conducting experiments by the students at the learning institutions is as illustrated in figure 3.



**Figure 3. Frequency of Conducting Experiments.**

Regarding the satisfaction of the students with the current agricultural curriculum at the learning institution, most of the students were not satisfied with the current agricultural education curriculum at the learning institutions. According to the results, 60% of the students were not satisfied with the current agricultural curriculum while 40% of the respondents indicated that they were satisfied with the current agricultural education curriculum. The majority of the students were not satisfied with the current agricultural education curriculum because it was more theoretical and not very much practical hence bringing about less practical skills and competencies needed in the labour market.

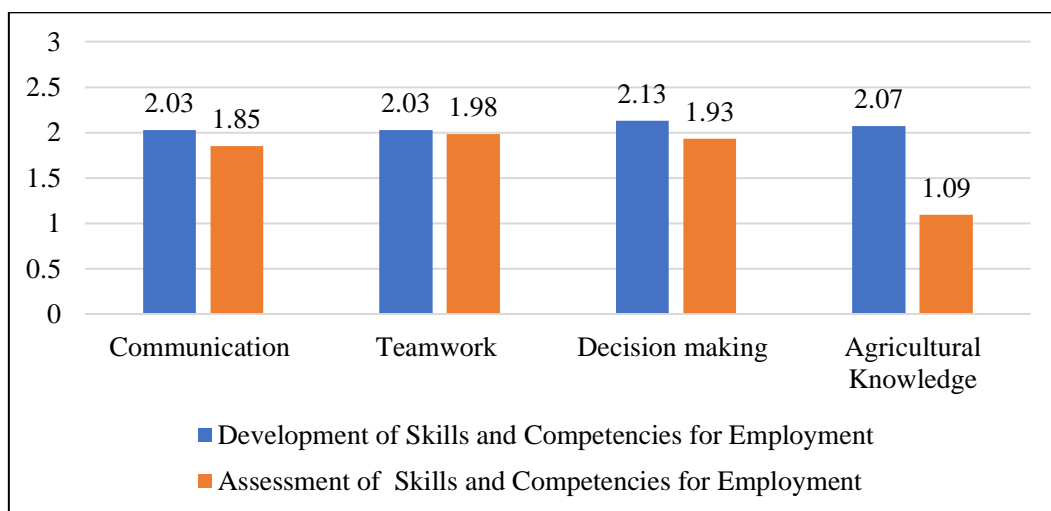
The study sought to find out whether the delivery of agricultural education has aided them to develop some skills and competencies for employment. It was discovered that most of the respondents (80%) agreed that they acquired communication as a skill and competence for them to get employed. This was supported by a mean of 2.03 which was less than the median of the scale. Communication is vital for conveying information and transmitting ideas and knowledge; hence most of the students undertaking agricultural education from higher learning institutions had acquired this skill and competence for employment. Further, most of the respondents (85%) agreed that they acquired teamwork as a skill and competence for employment. This was supported by a mean score of 2.03 which was as well less than the median score of the scale. Teamwork is one of the essential tools for management and most of the students revealed that they had acquired this skill and competence for employment.

It was also found that most of the respondents (76.7%) agreed that they had acquired decision making as a skill and competence for employment. This was backed by the mean score of 2.13 which was less than the mean score of the five-point scale. Decision making like team working is one of the vital management tools that is used for problem solving as well as effective and efficient operations. In terms of agriculture competence, a majority of the respondents of about 78.4% indicated that they had acquired the skill and knowledge of agriculture for employment. This was supported by a mean score of 2.07 which was as well less than the mean score of the scale of five points. Therefore, most of the students indicated that they had acquired the skill and competence of decision making for employment.

Furthermore, regarding the assessment of the competencies and skills for employment after the attainment of their degree at their learning institution, most of the students agreed that communication, teamwork, decision-making and agriculture are skills and competencies for employment after completing their academic studies. It was discovered that most of the respondents (91.7%) indicated that communication was a good skill and competence for employment after their attainment of their degree and

this was supported with a mean score of 1.85 which was below the mean score of the five-point scale. Meanwhile most of the respondents of about 88.3% indicated that teamwork was a good skills and competence for employment after their attainment of their degree with a mean score of 1.98 which was below the mean score of the five-point scale. About 83.3% of the respondents indicated that decision making was good skill and competence for employment after attainment of their degree with a mean score of 1.93 while most of the respondents if about 85% indicated that agriculture knowledge was a skill and competence for employment after attainment of degree and this was supported by a mean score of 1.09.

In this view, all of the skills and competencies had a mean score of less than three which is median score of scale and this entailed agreement towards a particular skills and competence. The assessment of the skills and development by respondents was more that the development (i.e. the materialisation) of the skills and competencies provided by the universities. The results on the assessment and development of the competencies and skills for employment towards and after completing their agricultural education at the learning institutions are illustrated in figure 4.



**Figure 4. Assessment and Development of the Skills and Competencies for Employment.**



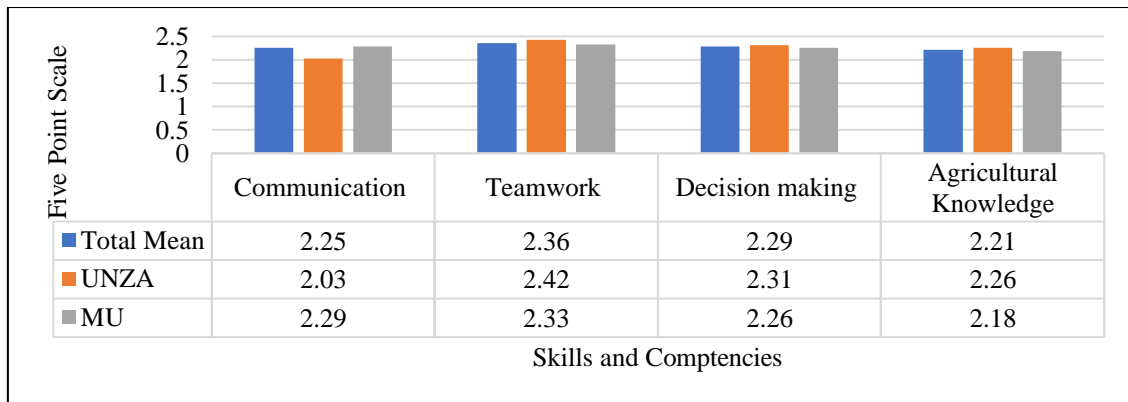
Regarding on whether the students faced challenges in the acquisition of agricultural skills and competencies, most of the students at the learning institution did not face challenges in the acquisition of agriculture skills and competencies. It was discovered that 40% of the respondents indicated that they faced challenges while 60% indicated that they did not face any challenges. However, among those that faced challenges in the acquisition of agricultural skills and competencies, the major challenge was that the theoretical aspect of agriculture and the practical aspect are not jointly taught throughout the agricultural education at the higher learning institutions. The institutions as well lacked particular laboratories and classes for carrying out skill and competent based agricultural education.

### **5.3 Perceptions of Graduates**

In this study, 41 graduates took part in the interview procedure. They were purposively selected among the companies and organizations they were working. The graduates were only those from the two learning institutions under study.

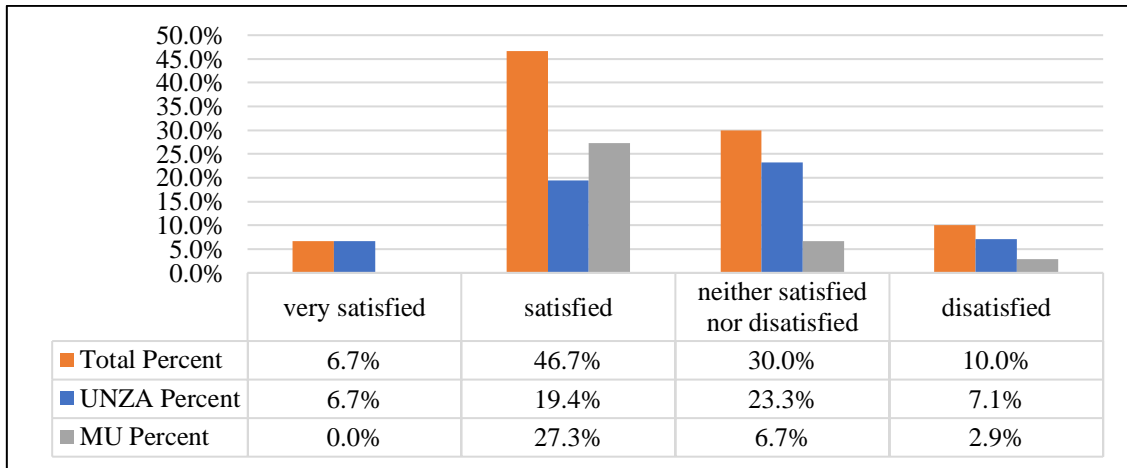
The respondents were asked to contrast their competencies and skills prior and post their attainment of the degree. According to contrasting of the students, communication, teamwork, decision making, and agriculture knowledge were good skills and competencies acquired from agricultural education from the learning institutions. Findings show that most of the respondents of about 63.3% indicated that communication was good skill and competencies before and after the acquisition of the degree while most of the respondent (63.3%) indicated that teamwork was a good skill and competence before and after the acquisition of the degree. A majority of the respondents (63.3%) indicated that decision making was a good skill and competence before and after the attainment of the degree. Lastly, most of the respondents of about 66.7% indicated that agriculture was a good skill and competence before and after the acquisition of the degree at the learning institution. The findings were supported by the mean score of which all of the skills and competencies had a mean

score of less than the mean score of the score. The figure 5 shows the results for the contrasting by the students the competencies and skills before and after their attainment of the degree.



**Figure 5. Contrasting of Competencies and Skills.**

Regarding on whether the graduates from the learning institutions were satisfied with their work, most of the students were satisfied with their work. About 6.7% of the students from UNZA indicated that they were very satisfied with their work meanwhile 46.7% with a majority of 27.3% from MU indicated that they were satisfied with their work. Only 30% of the respondents of which 23.3% were from UNZA indicated that they were neither satisfied nor dissatisfied with their work meanwhile 10% of the respondents of which 7.1 were UNZA students indicated they were dissatisfied with their work. Thus, the majority of the students with a majority of them from MU were satisfied with their work due to the fact that they were involved with agricultural related jobs of which they were familiar with. The figure 6 indicated the satisfaction of the graduates with their work.



**Figure 6. Satisfaction with Work by Graduates.**

Asked whether the current agriculture provides the students with employability competencies and skills, the findings showed that a majority of the students were provided with employability competencies and skills by the agricultural education curriculum. About 63% of the respondents indicated that the curriculum provided the students with employability competencies and skills while 37% indicated that agriculture education curriculum did not provide the students with employability competencies and skills. With respect to whether the development of agricultural curriculum and programmes are carried out by competent personnel and according to the findings, the agricultural curriculum and programmes are carried out by competent personnel's. About 47% of the respondents indicated that the development of the agricultural curriculum and programmes were not carried out by competent personnel's meanwhile 53% of the respondents indicated that development of the agricultural curriculum and programmes were carried out by competent personnel's.

The findings of the study further revealed that there are possibilities of introducing changes in the agriculture curriculum to make it relevant for employment so as to improve the skills and competencies. There is still room for improving the improving the agriculture education curriculum and this might be the reason for the dissatisfaction for the current curriculum by the students. According to the findings, 76.7% respondents indicated that there are possibilities to introduce changes in the

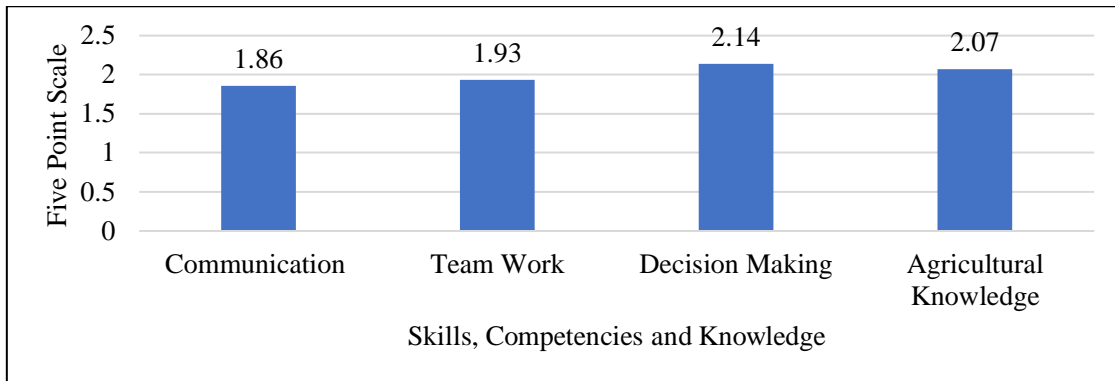
agriculture curriculum to make it relevant for employment meanwhile 23.3% of the respondents indicated that there are no possibilities to introduce changes in the agriculture curriculum to make it relevant for employment.

#### **5.4 Employers' Perception of Employability**

A total 20 employers from farms and large organizations engaged agriculture and agricultural education were asked to share their opinions. In the labour market, there are particular skills and competencies that are required for one to be considered fit for a particular job or task. The respondents were requested to reveal whether the labour market required certain skills and competencies from the higher learning institution students. The results showed that most of respondents indicated that the labour market did require certain skills and competencies from the university students. About 40% of the respondents indicated that the labour market did not require certain competencies and skills from the university students while the rest indicated that the labour market did require certain competencies and skills from the university students.

From the employer's assessment of the skills and competencies of the agricultural students, most of the respondents (96.7%) indicated that communication was a competence and skill for employment in agriculture and this was supported by a mean score of 1.82 which was below the five-point scale mean score. Among the respondents, 93.1% indicated that teamwork was good competence and skills for employment in agriculture. This was supported by a mean score of 1.93 which was below the mean score of the five-point scale. About 82.8% indicated that decision making was a good competence and skill for employment and this was supported by a mean score of 2.14 which was below the five-point scale. Meanwhile 82.8% of the respondents indicated that agriculture was a good competence and skills for employment. This was supported by a mean score of 2.07 which was below the five-point scale.

In this view, from the employer’s perspective, it was found that communication, teamwork, decision making, and agriculture were a good and essential competencies and skills for employability of students of agriculture education. This was supported by each skill and competence mean score which was less than the mean or median score of the scale. The figure 7 illustrates the findings on this particular aspect.



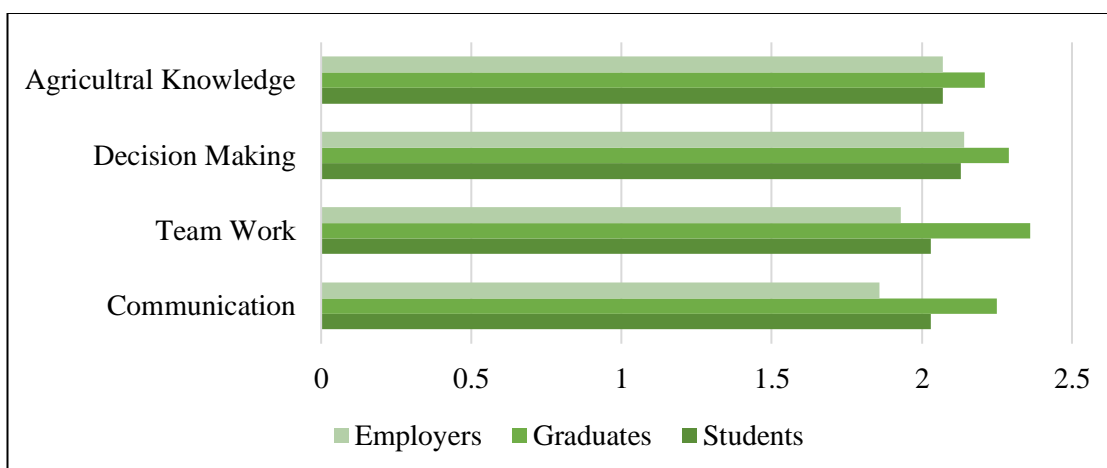
**Figure 7. Employer’s Assessment of the Required Skills and Competencies.**

Furthermore, according to the findings, the most required competencies and skills by the labour market are communication, teamwork, and agriculture. This was followed by administrative competencies and then the last one was the decision-making competencies. In contrast to the assessment of skills and competencies attained by the students, it can be noted that the employers require more skills and competencies than those attained by the students. These skills and competencies include the administrative skills so as the students are able to administrate the affairs of the workplace more efficiently and effectively. The table 2 shows the required competencies and skills by the labour market.

**Table 3. Required Competencies and Skills Requested by Employers**

Required competencies and skills	Responses	
	N	%
Communication	20	22.5%
Team work	20	22.5%
Decision making	13	17.2%
Agriculture Knowledge	20	22.5%
Administrative	16	17.9%
Total	89	100%

The following figure 8 shows the particular judgement of the targeted groups that participated in the study on the agricultural education skills, competencies and knowledge. Foremost, the students from both UNZA and Mu assessed their skills, competencies and knowledge gained during their studies, secondly, the graduates contrasted the skills and competencies, and lastly the employers assessed the skills and competencies of the students and graduates from the universities and further provided the required skills and competencies. The figure 8 below shows the combined results of the skills, competencies, and knowledge has assessed and contrasted by the students, gradates and employers.



**Figure 8. Assessment of Skills, Competencies and Knowledge.**

## 6 Discussion

It has come to the attention of a number of governments and stakeholders on the agricultural skills, competencies and knowledge to enhance the employability of students. Incorporating the skills, competencies and knowledge in the modern higher education curriculums is well noted as one of the significant of the teaching frameworks in various jurisdiction around the world. According to the Movahedi & Nagel (2012), the skills, competencies and knowledge are essential in conjuring sustainable economic development and maintaining the development of the university student's careers. It both applies to the university undergraduate and the postgraduate students.

Among the reasons of less than expected production in the Zambian agricultural sector is the dearth of workforce with competent skills and knowledge (GRZ 2016). Thus, this sorts it noticeable the demand to make sure the competent higher education to facilitate a conducive setting that is well-disposed to promote skilled, competent and knowledgeable labour force. This skilled, competent and knowledgeable workforce is necessary to conjure development in the agricultural sector. Moreover, the agricultural education skills, competencies and knowledge are as well significant to make sure that even other skills and competencies for employability that are vital to enhance the yet to come careers of the university students. Developing the current skills, competencies, and knowledge and coming up with fresh ones may essentially contribute to the more improved personal skills needed by the labour market during employment of graduates (Melak & Negatu 2012).

It is due to this matter that an impact assessment of agricultural education in terms of the skills, competencies and knowledge of the students in Zambia was conducted. This was to provide a comprehensive apprehension of the effect of the skills, competencies and knowledge acquired through agricultural education has on the student's employability in the Zambian labour market. It was as well extended to apprehend on how these students are perceived in the labour market by the employers after they graduate.

According to the findings, it was claimed by a majority of the students that they were not satisfied with the current curriculum for the agricultural education. This was due to the fact that the agricultural education attained was more based on the theoretical perspective and less on the technical perspective. This might have been exacerbated by the findings which showed lumpiness in the conducting of experiments among students and this may contribute less than expected technical skills, competencies and knowledge needed in furthering the careers of the students. This is likely to influence negatively the skills, competencies and knowledge demanded by the labour market. This is contrary to the findings of Movahedi & Nagel (2012) which revealed the students had a comparatively acceptable level of the agricultural education curriculum. This made the students to acquire significant skills and competencies among others, communication, agricultural knowledge, and personal competencies.

However, the findings further revealed that a majority of the students agreed that the quality of agricultural education acquired during their attainment of the degree contributes essentially in the attainment of skills, competencies and knowledge for employability. Most of the students agreed that the agricultural education attained from the higher learning institutions have influenced them in a positive manner. The positive influence has been in many aspects of employability skills, competencies and knowledge such as communication, team work, agriculture, and decision making. Similarly, Roberts et al. (2007) on a study on the “competencies and traits of successful agricultural science teachers” revealed that the teachers had particular identified competencies which included them demonstrating a convinced cognitive position towards agricultural science education.

With respect to the results, the development of the agricultural skills, competencies and knowledge towards the attainment of the degree, the communication, teamwork, decision making, and sector associated skills and competencies were the most assessed by the university students. A study by Ndem et al. (2015) revealed that the students developed agricultural skills and competencies which included technical and practical competencies and knowledge of agricultural fields. Therefore, students are required to develop knowledge and competencies of agriculture particularly the technical or practical aspect. Nevertheless, it is as well vital to reveal agricultural skills



and competencies were a number of times regarded by the university students to one of the most essential skills and competencies gained towards the attainment of the degree.

Most of the students agreed that agricultural education provided them with the technical skills needed in the labour market and that these skills worked well with decision making and communication skills. Through communication skills, most of the students asserted that they acquired computer-based skills which are widely used in the modern communication. These computer-based skills attained are among the requirements that are needed for the entry level in the current labour market. Idaho & Florida (2004) revealed computer skills are most significant as most of the operations in agriculture have advanced in terms of technology.

In this view, it suffices to note that the agricultural education in the higher learning institutions in Zambia are channelling skills and competencies needed for the employability of the students. This can be supported by the good resources, teaching material, and quality of teaching based on the assessment of the students. Similarly, the study by Cho et al. (2013) on the effect of the Malawian vocational training revealed that the person undertraining the vocational training claimed a positive reflection on their skills and competencies.

The evolution of the agricultural education students to graduates and later on to the labour market is a challenge in most of the developing countries such as Zambia. In Zambia, it is all about frame-working as the sector needs qualified workforce, yet the agricultural sector does not draw attention youthful graduates. The sector is deemed to be undertaken after retirement from formal employment as the sector has low wage remittances, not good conditions of work, and poor association between the higher learning institutions and the commercial farms and other connected agricultural companies (GRZ 2016). At the higher institutional level, the findings revealed that the students face challenges in the attainment of agricultural skills and competencies. The students asserted that challenges that were faced involved the lack of association of the theoretical aspect and the technical aspect of the agricultural skills and competencies. This entails that students gained the theoretical aspect as compared to

the practical aspect and this was exacerbated by the lack of laboratory accessories as well as adequate classes.

The introduction of agricultural education in higher learning institutions in Zambia was to contribute to the workforce skills and competencies development in Zambia (GRZ 2016). The findings revealed that graduates were satisfied with their work because that a majority of them decided to engage themselves in agricultural related work. This entails that the employability of the graduates is positive, that is, a majority of them are working in various fields in the agricultural sector. Some are extension officers and others are administrative officers in various agricultural related companies. Just like the students, the graduates also agreed that they gained the agricultural skills and competencies. These skills and competencies gained by the graduates influenced them positively particularly towards work such as communication skills, teamwork skills, decision making skills as well as agricultural work-related skills. These findings are similar to the those by Chaloupkova et al. (2015) that the Erasmus Mundus alumni showed satisfaction with their work in the labour market after the completion of the mobility programme. This was due to the knowledge and competencies that were developed during their mobility programme.

However, despite the positive influence of the skills and competencies gained by the graduates, most of the graduates claimed that there are possibilities of introducing changes in the agricultural education curriculum. There are basically two chief possibilities to introduce changes in the agricultural education curriculum, that is, endogenous and exogenous possibilities. Endogenous changes include deliverers of skills and competencies such as lecturer's, university agricultural organization, financial resources, university management, as well as the university legal framework need to be well organized for the alterations in the agricultural education. On the other hand, the exogenous changes needed to alter the agricultural education in Zambia must include the alterations in the development of the agricultural education curriculum, that is, exchange of foreign lecturer and students, cross border agricultural experiences and frameworks, and cross border treaties and mutual aid in agricultural education. Movahedi & Nagel (2012) suggested that endogenous and exogenous

possibilities for establishing changes in the agricultural education should be used in a proper manner.

In order to have an entry in the labour market in Zambia, a graduate is required to possess certain skills, competencies and knowledge. With respect to the required skills and competencies, the results showed that the labour markets required the graduates to have the communication, teamwork, decision making, and agricultural related skills, competencies and knowledge. The employers further indicated that computer-based skills are an added advantage. Further, the most required skills and competencies in the labour market are communication, teamwork, and agricultural related skills. These were followed by the administrative and decision-making skills and competencies. Thus, the higher learning institutions in agricultural education need to make sure that they associate themselves to the required competencies and skills in the labour market. This will further improve and sustain the careers of the students as well as the graduates.

## **6.1 Limitations**

During the period of data collection, the researcher experienced a number of challenges during the period of data collection and a number of these challenges were the same across three target groups under study. One of the challenges was that a majority of the students showed some reluctance as data collection was conducted during the exam period. This was one of the challenges that significantly resulted into not meeting the sample size that was expected (i.e. the researcher was able to collect instead of 91 samples, the 89 respondents who finally correctly answered). There were also a number of circumstances when the respondents particularly those with a number of personal activities failed to make for the appointments for the interviews with the researcher after facilitating all the meeting arrangements. They were either out of school or merely altered their mind and turned away straightaway to participate in the research study. In this regard, the researcher had to schedule for appointment for a second round.

With respect to the employers, a majority of the commercial farms refused to take part in the research study minus making an appointment and more or less of the commercial farmers gave obscure responses and feedback. Some of them failed to provide information concerning the aspect of agricultural education skills and competencies because they feared that the information provided might work against them such providing it to their rivals. Some of the employers were reluctant to provide data because bylaws of their companies or farms inhibited them from revealing it to the researcher especially that which concerned with the returns on investment and something to do with the workforce. In some instance, the researcher had to solicit for employer replacement to meet the planned number of respondents. On the other hand, graduates were extremely willing to take part in the research by sharing information, however, they had a challenge in retaining some of the information as some of the respondents had been graduates for quite some time. Respondent's failure to retain some of the information and provide it to the researcher was a challenge in all the respondent's workplace. This challenge as well contributed to not meeting the planned number of respondents for both the students and the graduates.

## **6.2 Recommendations**

The assessment of the agricultural education skills, competencies knowledge among students was conducted to allow for an apprehension on the effects that the skills, competencies and knowledge attained on the labour market employability. This was in a way to allow for whether the students develop the skills, competencies and knowledge that are pertinent for the employability in the labour market and as well define how these skills, competencies and knowledge attained fit with those required in the labour market.

It is essential for the students in agricultural education to attain the skills and competencies for the further development of their career and as well aid in the necessary skills, competencies and knowledge in the diversification of the economy to agriculture. For instance, the results of the study revealed that the students acquire skills and competencies for communication, decision making, team working, and agricultural knowledge. However, it was discovered that the students lack other necessary skills and competencies such as administrative skills. Thus, the labour

market requires students that are able to effectively and efficiently administrate the affairs of the organization (farm). This might be due to the current agricultural education curriculum and the results revealed that the respondents felt the need for the change the agricultural education curriculum.

Based on the aforementioned background, the study provided the following recommendations to be undertaken:

- (i) The Ministry of education and agricultural faculties in the universities must make sure that the students are exposed to the technical and practical skills for the efficient and effective administration of the organizations (farms and agricompanies).
- (ii) The students in the higher learning institutions must be educated by lecturers that adequately impart them with agricultural knowledge that meets the required skills and competencies in the labour market.
- (iii) Students at the higher learning institutions should be considered for educational tours to sound operating organizations (farms and agricompanies) where they will gain technical and practical skills and competencies.
- (iv) The government should consider constructing adequate and improved laboratories so as to enhance agricultural experiments among students in agricultural education.

## 7 Conclusion

Zambia is among the developing countries in Africa and is striving very hard to diversify its reliance on copper. Agriculture has been noted as the next best alternative to copper production. However, agricultural education since its inception in the Zambian higher learning institutions is still a situation of hypothetical evolution. Competent and qualified possible students should be attracted towards the agricultural education to have a competent and skill workforce to efficiently operationalize the economic diversification to agriculture. Without this happening, the country may sustain to rely on the mining sector and that the students will always be attracted by the skills and competencies in the mining sector as compared to agriculture.

Further, the issue of food security in Zambia to an extent can be managed soundly through a well-grounded agricultural framework. A sound agricultural framework itself can be accomplished only with agriculture skilled, competent and knowledgeable workforce in the agriculture sector. The GRZ has efforted through various mechanisms such as the inclusion of agricultural education in higher education institutions to aid and improve the production of food in the country. Agricultural education is noted as one of the essential components of meeting one of the targets among the SDGs which is reduced poverty. In other words, agricultural education can aid achieving reduced poverty levels in Zambia.

The integration of agricultural education in higher learning institutions is directed at imparting students with the pertinent skills, competencies and knowledge related with agriculture. Student and graduates from universities are anticipated to possess agricultural related skills, competencies and knowledge. This study revealed that students and graduates have agricultural skills, competencies of communication, teamwork, decision making, and agricultural knowledge. However, it was revealed that the students and graduates lacked the agricultural skills and competencies of administration.

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## 9 Appendices

### Annex 1: Questionnaire and Interview Guide for the Students

## CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE



## Faculty of Tropical AgriSciences

Dear respondent,

I am a student from the Czech University of Life Sciences Prague researching on ***Impact Assessment of Agricultural Education in Zambia***. A case study of the University of Zambia and the Mulungushi University, as part of my studies in a master's degree programme in International Development and Agricultural Economics.

The questionnaire is intended to help me collect information that is needed for analysis. Please be assured that the information I will obtain from you (respondent) will be treated with high level of confidentiality and shall only be used for academic purposes. However, I am kindly asking that you (respondent) provide correct and accurate information to the best of your knowledge as your views are very vital for the completion of this study.

**Do not write your name unless you want to.**

**Tick the answer of your choice in some cases fill in the blanks.**

1. What is your gender?

Male [ ] Female [ ]

2. What is your age?

16 – 20 years [ ] 21 – 25 years [ ] 26 – 30 years [ ] 31 – 35 years [ ] 36

– 40 years [ ]

above 40 years [ ]

**SECTION A: FOR STUDENTS**

3. What is the ratio of the lecturers to students at your institution?

.....

4. What is your assessment of the resources (e.g., laboratories and classrooms) at your institution?

Very good [ ] Good [ ] Not Sure [ ] Bad [ ] Very Bad [ ]

5. What is your assessment of the teaching aids (e.g., Moodle, Internet, and Library) at your institution?

Very good [ ] Good [ ] Not Sure [ ] Bad [ ] Very Bad [ ]

6. What is your assessment of the quality of teaching at your institution?

Very good [ ] Good [ ] Not Sure [ ] Bad [ ] Very Bad [ ]

7. How often do you get to conduct experiments other than theoretical?

Often [ ] Sometimes [ ] Rarely [ ] Never [ ]

8. Are you satisfied with the current agriculture curriculum at your institution?

Yes [ ] No [ ]

9. Do you regard that the delivery of the agricultural education has aided you to develop some of the following competencies and skills for employment? In a scale from 1 (strongly agree) to 5 (strongly disagree).

10.

<b>Competencies and Skills</b>	<b>Strongly Agree</b>	<b>Agree</b>	<b>Not Sure</b>	<b>Disagree</b>	<b>Strongly Disagree</b>
Communication					
Team work					
Decision making					
Agriculture					

11. How do you assess the competencies and skills for employment after the attainment of your degree at your institution? In a scale from 1 (Very Good) to 5 (Very Bad).

<b>Competencies and Skills</b>	<b>Very Good</b>	<b>Good</b>	<b>Not Sure</b>	<b>Bad</b>	<b>Very Bad</b>
Communication					
Team work					
Decision making					
Agriculture					

12. Do you face any challenges in the acquisition of agriculture skills and competencies?

Yes [ ] No [ ]

If yes, what are these challenges?

.....  
 .....

13. What suggestions can you give on the current skills and competencies provided in the agricultural education programmes in Zambia?

.....

.....

.....

.....

## Annex 2: Questionnaire and Interview Guide for the Graduates

### SECTION B: FOR GRADUATES

14. Are you working in agricultural related field?

Yes [ ] No [ ]

15. Contrasting your competencies and skills prior and post your attainment of your degree, how do you assess the following competencies and skills for employment? In a scale from 1 (Very Good) to 5 (Very Bad).

Competencies and Skills	Very Good	Good	Not Sure	Bad	Very Bad
Communication					
Team work					
Decision making					
Agriculture					

16. Are you satisfied with your work?

Very satisfied [ ] Satisfied [ ] neither satisfied nor dissatisfied [ ]  
Dissatisfied [ ] Very Dissatisfied [ ]

17. Does the current agriculture curriculum provide you with employability competencies and skills?

Yes [ ] No [ ]

18. Is the development of agriculture curriculum and programmes carried out by competent personnel?



Yes [ ] No [ ]

19. Are there possibilities to introduce changes in the agriculture curriculum to make it relevant for employment?

Yes [ ] No [ ]

20. What can you propose for the improvement for the agricultural education in Zambia?

.....

.....

.....

.....

### **Annex 3: Questionnaire and Interview Guide for the Employers**

#### **SECTION C: FOR EMPLOYMENT PROVIDERS**

1. Does the labour market require certain competencies and skills from the university students?

Yes [ ] No [ ]

2. How do you assess the following competencies and skills for employment in agriculture? In a scale from 1 (Very Good) to 5 (Very Bad).

<b>Competencies and Skills</b>	<b>Very Good</b>	<b>Good</b>	<b>Not Sure</b>	<b>Bad</b>	<b>Very Bad</b>
Communication					
Team work					
Decision making					
Agriculture					

3. What are the required competencies and skills by the labour market?

Communication [ ]

Team Work [ ]

Decision making [ ]

Agricultural specific [ ]

Administrative [ ]

4. What do you think about the competencies and skills required by the labour market from the agriculture education graduates?

Stringent [ ]

Fair [ ]

Reluctant [ ]

5. Do the agriculture students acquire the technical competencies and skills in agriculture?

Yes [ ] No [ ]

6. Do you think there are weaknesses of practical experiences in agriculture during university programmes?

Yes [ ] No [ ]

7. What competencies and skills are the missing?

Communication [ ]

Team Work [ ]

Decision making [ ]

Agricultural specific [ ]

Administrative [ ]

Other [ ]

.....

8. Is there need to adjust student’s competencies and skills to the labour market?

Yes [ ] No [ ]

9. How can student’s competencies and skills be adjusted to the labour market?

.....

.....

10. In general, are the university students contributing towards the development of the agricultural?

Yes [ ] No [ ]

11. If yes, explain how?

.....  
.....  
.....

12. Has the introduction agriculture in higher education contributed benefited the agricultural landscape?

Yes [ ] No [ ]

13. What can you recommend to improve the agricultural education in Zambia?

.....  
.....  
.....

THANK YOU FOR YOUR PATICIPATION.