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Impact of Using Extension Suite Online System as Solution for Subsistence Farming in Rural Areas: The Role of Universities

Chinaza Uleanya[1], Olukayode Oki[2], Jose Manappattukunnel Lukose[3]

[1]Department of Educational Management, University of Johannesburg, Gauteng, South Africa, [2 3]Information Technology Department, Walter Sisulu University, Eastern Cape, South Africa

chinazauleanya@yahoo.com

Abstract. Agriculture plays an important role in economic development especially in rural areas because it provides source of employment and sustainable livelihood. Meanwhile. Information Communications Technologies (ICTs) have brought to the fore more efficient ways of information dissemination and there is a general realization that information technology should be integrated to be effectively used in agricultural development. This study explored the impact of using Extension Suite Online System for subsistence farming using Qunu Area in Eastern Cape province. Quantitative method was adopted for the study. Data was collected through the use of questionnaire from 25 conveniently selected farmers and were analysed using Statistical Package for the Social Sciences (SPSS). The finding of the study amongst others showed that the introduction of Extension Suite Online system to the Qunu rural farmers managed to close the information gap that was initially a challenge and it fascinated young people who perceived agriculture as a sector for older people. Also the change in employment dynamics in the farming industry of South Africa, with women taking higher positions as women are now actively involved in farming activities. However, it was pointed out following the responses of the respondents that most farmers in the rural area are computer illiterates and this affects their appreciation and use of ESO system. The study recommends amongst others that alliance between universities and rural farmers should be formed. Also, short term programmes which promote computer literacy and other useful skills should be made available for rural farmers by universities.

Keywords. Eastern Cape Province, Extension Suite Online (ESO) System, rural areas, rural farmers, Subsistence Farming, Qunu Area

Introduction

Agriculture plays an important role in provincial development because it provides source of employment and sustainable livelihood (GCIS, 2009). The Journal concludes that agriculture features as a key focus for economic development and growth in all provinces. (Barbour & Sowman, 2004) Indicate that, one of the key objectives of agrarian transformation strategy is to improve food security of the poorest households specifically those in former homelands i.e. Transkei, Ciskei, Venda, QwaQwa amongst others. In the Agricultural Policy states that South Africa is characterised by two agricultural economy types, the well-developed commercial farming and more subsistence based production in the deep rural areas (Hanekom, 1998). South Africa's agricultural sector is branded by dualism, a modern commercial farming

as well as small scale farmers mostly in the former homeland areas (AgriSeta, 2010). Dawson, Ragel, Kahanda, Daniel, Kris, and Dilip (2011) describe the difference between commercial and subsistence farming on the basis of purpose of farming, percentage of farmers in the labour force, use of machinery, farm size. According to (Dawson, et al., 2011), this is a self-sufficiency type of farming in which farmers produce enough food for themselves and their respective families with minimal or no exchange or sale of produce. Subsistence farmers have no knowledge of soil science, fertilizing or irrigation. Once the soil becomes infertile, they look for other areas to plough and try again. It is usually smallholdings with labour intense activity and no machinery. Conversely, with regards to commercial farming, Dawson, et al., (2011), attempting to differentiating between the two agricultural sectors states that, the production of crops and farm animals characterised by high yields per unit of land produced for the purposes of sale usually with the use of machinery and modern technology is called Commercial farming (Dawson, et al., 2011). According to Hanekom (1998), in the Agricultural Policy in South Africa portrays that the South African government, in its move to cultivate economic empowerment and transformation, has focussed on building a strong economy by strengthening agricultural development programmes putting more emphasis on subsistence based production. Meanwhile, the Stats SA (2017) report, indicates that nearly 20 percent of all households are agricultural households but of that percentage, commercial farmers constitute the smallest number of these households (Pali, 2011). This means that interventions need to be employed in ensuring that more subsistence farmers grow to become established commercial farmers. Pali indicates that the Eastern Cape Province had the highest percentage of agricultural households (subsistence farmers) recording livestock ownership of 31%. In the same light, Hanekom (1998), states that, the measure of the effectiveness of government intervention programs in agriculture is the reduced reliance of rural subsistence farmers on state subsidies, increased levels of employment and for improving the welfare of emerging farmers, which has the potential to improve socio-economic stability in rural areas.

Elevating Subsistence farming into Commercial Farming to alleviate poverty

The National Development Plan, 2011, estimates that 650 000 jobs could be created through agriculture; however, the NDP acknowledges that meeting the targets will not be stress-free. Outcome 7 of the NDP vision 2030 is "Vibrant, equitable and sustainable rural communities contributing to food security for all". In implementing the Plan, specifically outcome 7, the Department of Agriculture, Forestry and Fisheries (DAFF) and Rural Development in collaboration with other related departments, was subsequently given a mandate to grow the agriculture sector, putting more emphasis on the small holders (subsistence) farmers seen as strong instruments for economic growth. The department was also entrusted with the responsibility to investigate the socio-economic implications and policy requirements to achieve the implementation of the Plan.

In the process of growing the sector, the department soon realised that agriculture is a specialised field and it needs high-level expertise to address most of the rural issues. (Joubert, 2013) Found that while South Africa has researchers, it has scarce skills when it comes to agricultural specialists. University enrolment numbers increased from 873 799 in 2009 to 937 550 in 2011 but only 1375 of those students were doctoral agriculture graduates. Joubert, (2013), further alluded that a particular big need for skills upgrading of advisors in technical and production related skills such as animal husbandry, crop production and horticulture. 'A similar comment can be made about provincial state vets who, despite being university-qualified often lack specific animal veterinary knowledge,' says David Hughes, South African Poultry Association (SAPA) Project Manager. Education (2014), compiled a list of top 100

scarce skills in South Africa. Agricultural Scientists and Engineers are in the top 50 occupations that are considered to be in short supply.

In ensuring delivery on the mandate in the midst of skills scarcity challenge, the department developed a number of programs to help emerging farmers. One of intervention programmes developed was a National Framework for Extension Recovery Plan (DAFF, 2008). The Extension Recovery Plan was conceptualised in 2007 as a strategy to revamp extension and advisory services and was adopted in 2008 during the Minister's Indaba in 2008.

Justification for Extension Recovery Plan (ERP)

(Forestry, 2011) Extension is a term for all activities that provide information and advisory services that are needed by farmers and other actors in the agricultural system and rural development this includes technical knowledge, facilitation and coaching. The extension officers were declared inefficient and ineffective by the beneficiaries of the government program. This was due to the limited skills and knowledge they possessed (Forestry, 2011). It was necessary that all government employed extension officers be profiled in terms gender, location, qualification, scope of work and to identify training needs and the study to obtain this demographic profile was done in October 2006.The report outlined the existing capacity and existing gap in order to comply with norms and standards. The study was conducted to gain sense of expertise and capacity levels at the department's disposal to further tease and break down its intervention plans (Forestry, 2011).

Implementation of the Extension Recovery Plan

Provinces that were found to be in dire resource capacity gaps received substantial funding. These included Eastern Cape, KZN, Limpopo and Mpumalanga (DAFF, 2008). The consolidated recommendations of the Minister's Extension Indaba of 2008, the norms and standard document, and the profile report on the agricultural extension formed the basis for the development of the framework for the implementation of the Extension Recovery Plan (DAFF, 2008). Five core pillars were drawn from the three documents and these were:

Ensuring accountability and visibility of extension officers, promoting professionalism of extension service, re-skilling and re-orientation of extension officers, recruitment of 1000 personnel in the next five years, Provision of ICT tools, infrastructure and other resources (DAFF, 2008). In order to create enabling environment, provinces were required to make provision of required ICT tools to the extension personnel. This included the provision for extension information management and dissemination through state of the art information and communication technology (Forestry, 2011)

Provision of ICT tools, infrastructure and other resources

To create enabling environment, provinces were required to make provision of required ICT tools to the extension personnel (Forestry, 2011). ICT tools that were required included the strengthening of extension information management and dissemination through the state of the art information and communication technology, provision of laptops, printers, cell phones, procure and provide enabling environment for the adaptation of the Extension Suite Online (ESO). Extension Suite online is a web based system designed for extension officers to access research information on the spot relating to agriculture in order to assist extension officers in decision making during contact sessions with farmers (DAFF, 2008).

Extension Suite Online system overview

ESO is an all-inclusive web based system containing current and historical data that encompasses any farming aspect (DAFF, 2008). The information on the system can be used by departmental officers who may not necessarily be agricultural experts (Forestry, 2011). According to Manstrat (2015), ESO was developed in an effort to provide linkage and information transfer mechanism between Agricultural Research and Extension Services as well as famers that they serve. The website continues to explain that ESO facilitates and enhances the transfer of information by collecting, organising, interpreting and transforming scientific agricultural related data into useful and to user friendly formats for use by Extension practitioners and farmers and also the system was developed to ensure that the information is not only current but contextually relevant (Manstrat, 2015). ESO has a mobile application version that will run on the most basic feature that provides easy access to vital information particularly for emerging farmers being targeted by government. The information on the system can be used by departmental officers who may not necessarily be agricultural experts (Manstrat, 2015).

Goals of Extension Suite Online System

Enable extension officers to find solutions to animal health and land matters quickly and effectively. Farmers will be supplied with appropriate, credible and relevant advice using expert data. Provide information when and where it is required by farmers regardless of geographical or political (demarcation) location.

Additionally, the Department of Agriculture realised that expert knowledge is key to achieving development programs, however, the access to relevant agricultural expert information is hindered due to a few number of specialists in the field of agriculture as indicated in the justification for Extension Recovery Plan. The challenge becomes apparent in the rural areas where the geographical and political factors play a role in hindering access to relevant information. While Information Communication Technology solutions like Extension Suite Online system are introduced to mitigate the skills gap challenge especially expert knowledge in agriculture, it is imperative to assess the impact of these ICT solutions. Meanwhile, since its inception in 2010, there has never been a study conducted to investigate and examine the impact of using the Extension Suite Online system and its effectiveness in subsistence farming in the rural areas. Thus, the reason for this study which explores the impact of Using Extension Suite Online System as an Expert Solution for Subsistence Farming using Qunu Area. In order to achieve the objectives of the study, attempt is made to proffer answers to the following research questions guiding the study: What are the challenges experienced by extension advisors as well as emerging farmers in using and accessing information? How has the Extension Suite Online impacted the lives of emerging farmers in Qunu?

Methodology

Quantitative method was adopted for the study. Data was collected by means of questionnaire. Kumar (2019) and Creswell (2014) opine that quantitative method can be adopted for data collection in a study through the use of questionnaire. Purposive sampling was adopted for selecting the research site: Qunu Area in the province of the Eastern Cape. This was to ensure that rural area was selected for the study. Meanwhile, convenient sampling was adopted for selecting the respondents of the study. Convenient sampling was adopted following the time schedule, availability and interest of proposed respondents to partake in the study. Out of a population of 63 subsistence farmers and from seven extension service advisers servicing the area, 25 samples were selected.

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Data collection method

The data collection method for this study was a hand distributed survey questionnaire. A questionnaire is a pre-defined set of questions assembled in a pre-determined order, which respondents are then required to answer, thereby providing the researcher with data that can be analysed and interpreted (Oates, 2006). Questionnaires were administered to 25 participants in the four villages in Qunu area of the Eastern Cape and all 7 Extension Service advisors of the EC Department of Agriculture. Prior to this, a pilot study was conducted to test the suitability of the research instrument. The purpose of this pilot study is to ensure that the questionnaire is a good research instrument. The pilot study was used for a number of 10 colleagues. This step is used to refine the questionnaire to ensure this research instrument elicits the most appropriate responses. From the pilot study some questions which required further explanation in order to gather the expected responses were revised and duly adjusted.

Sample and population

The population comprised all extension farmers and the extension advisors working in the selected area, Qunu in the Eastern Cape. Barreiro and Albandoz (2001) express that the process of sampling involves making use of a small number of items or parts of the whole population to make conclusions regarding the whole population. A list of population elements (sampling frame) is where the sample is drawn from.

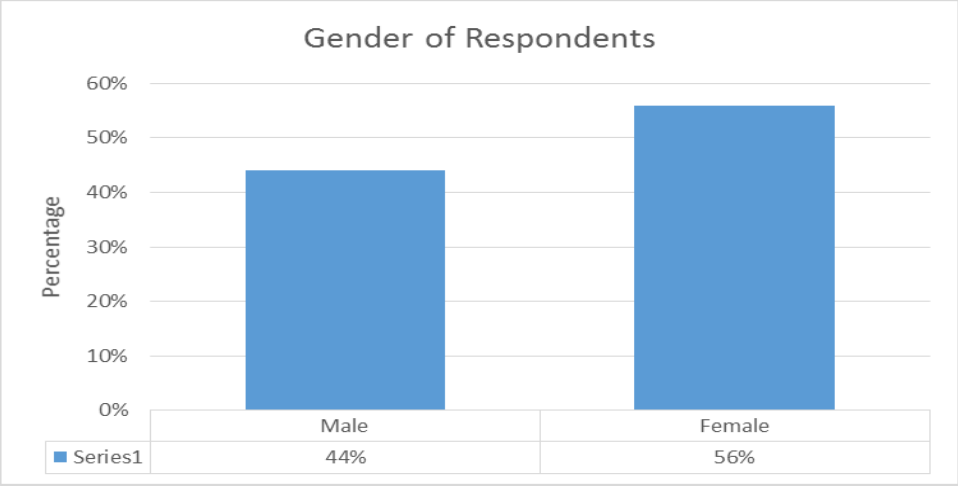
Data Analysis

The collected data were analysed using Statistical Package for the Social Science (SPSS). Figures 1-5 below give brief demography of respondents in the study.

Gender Information

This section provides the demographic analysis of the responses as per the profiling done by the researcher. The section covers, gender, race and age of farmers and advisors' respondents.

Fig. 1: Gender distribution of Farmers



With respect to the collected data, 44% of the respondents were male while 56% were female. This implies that the greater proportion of views expressed in this study represent views of females more than of men.

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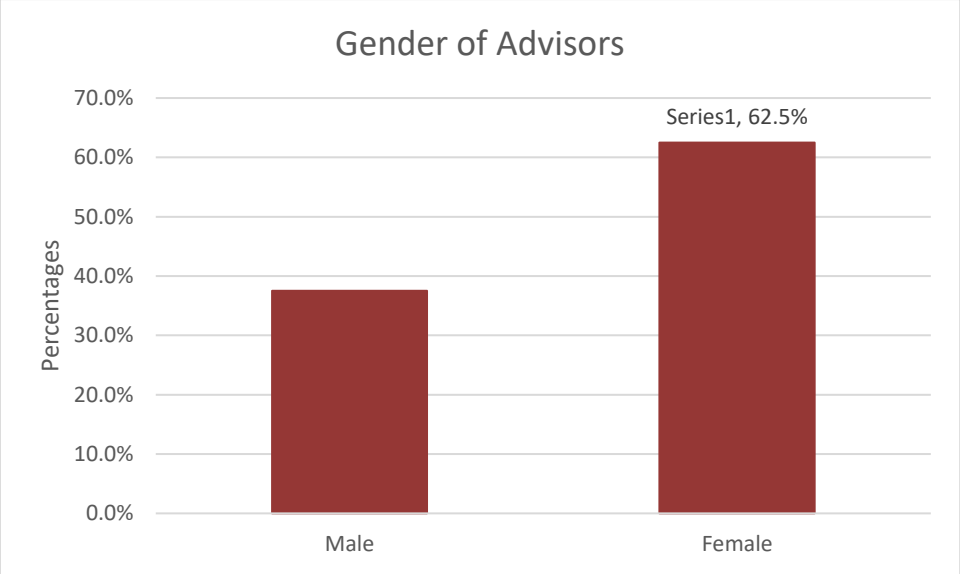
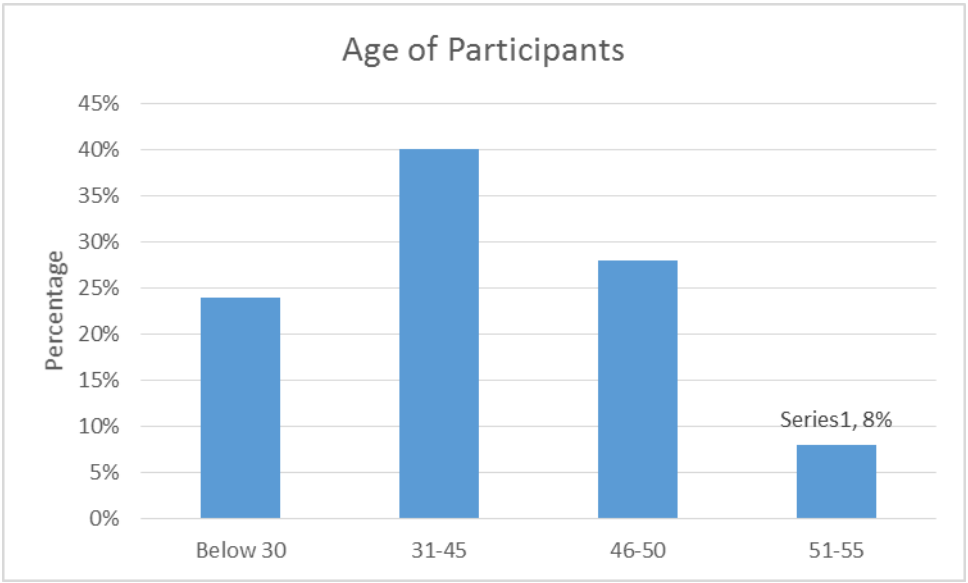
Fig. 2: Gender analysis of Advisors



The figure 2 displays the gender distribution of farm advisors from the Qunu area. According to the findings, most of the advisors were women, accounting for 62.5% compared to only 37.5% men. This shows change in employment dynamics in the farming industry of South Africa, with women taking higher positions.

Fig. 3: Age Distribution of Farmers



The largest percentage of respondents in the study comprised people aged between 31 – 45 years, with those aged above 51 yeas contributing the least percentage of 8%. Respondents below the age of 30 years accounted for 24% while those between 46 -50 years contributed 28%.

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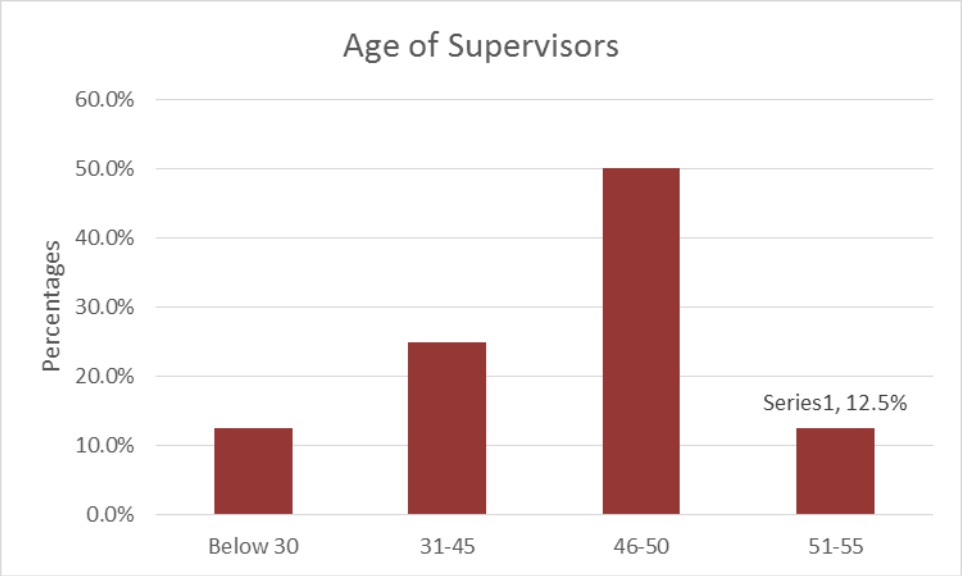
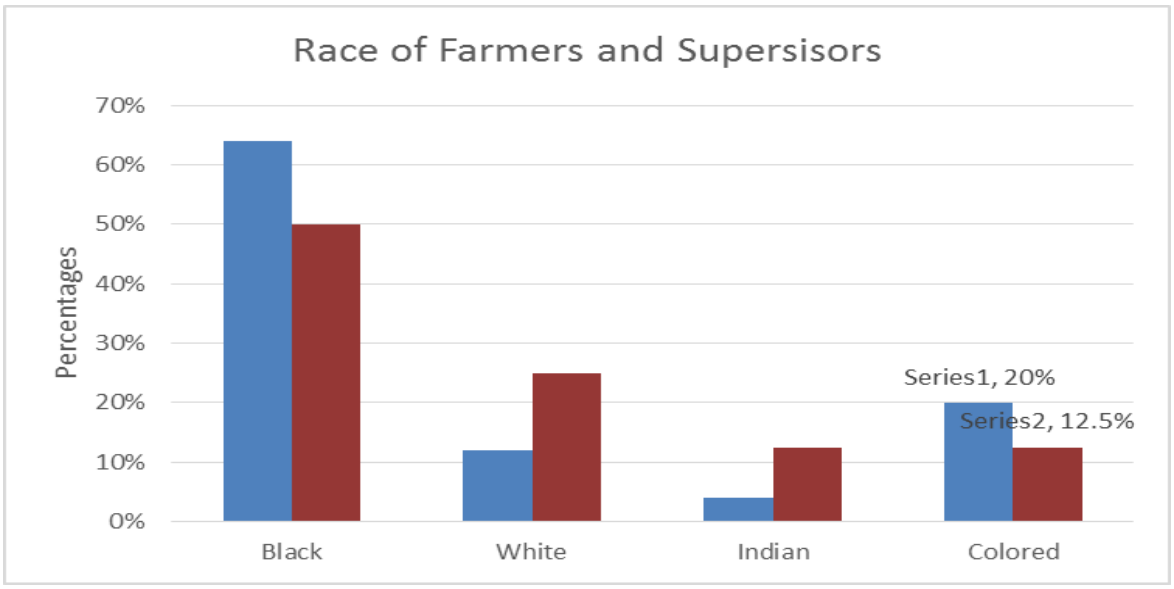
Fig. 4: Age of Advisors



Sequel to the analysed data, the age range of supervisors between 46 – 50 years' make-up the largest percentage, while those below 30 years of age accounted for only 12%. This could imply that supervisory tasks are traditionally reserved for matured and experienced individuals in the farming industry of South Africa. Altogether, people above the age of 30 years accounted for 88% of the supervisory staff.

The implication of the findings in terms of age distribution is that, the opinions of the elderly and youths were less represented than those of people in their middle ages. This could mean that most of the active farmers are people who are in their middle ages. Youths may not be willing to settle for farming professions while elderly people may view it as a high-energy demanding job.

Fig. 5: Race Distribution of Farmers and Supervisors



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The distribution in terms of races revealed that black people accounted for 64% of the Farmers while Indians comprised of the least proportion of 4%. Whites accounted for 12% only, while coloured formed 20% of the total respondents. Analysis of advisors shows that 50% of the advisors were black, with 25 % accounting for the white advisors and the rest covering 12.5% each. The distribution painted a close to accurate racial distribution of the true population of South Africa. The implication on a bigger picture is that racial distribution in the rural parts of South Africa comprise largely of black people.

Findings and Discussions

The results of the study are as presented below using the identified research questions guiding the study.

1. What are the challenges experienced by subsistence farmers as well as Extension Advisors?

Computer Literacy and Experience

Fig. 6: Computer Literacy of Farmers

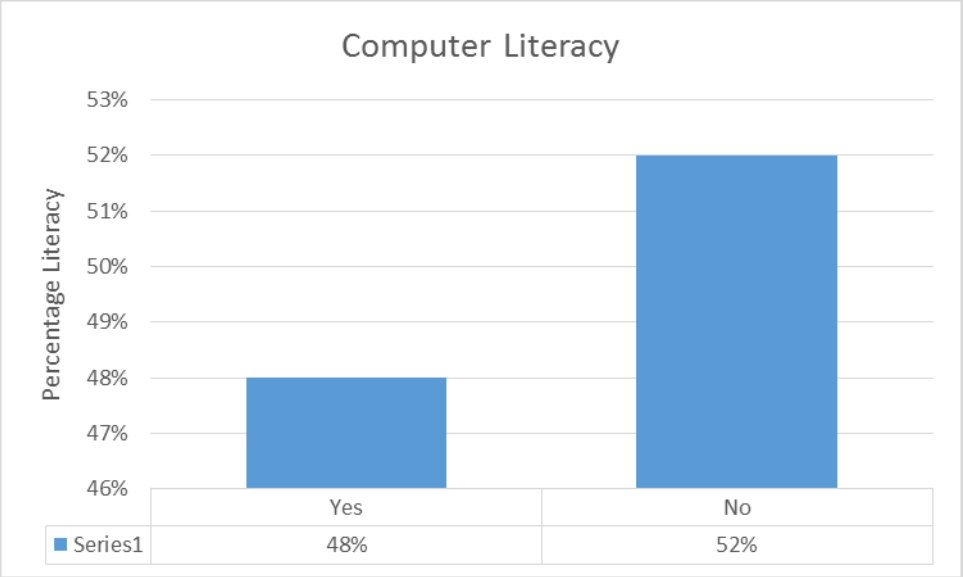

Fig. 6 above shows that 52% of the respondents indicated that they were computer illiterate, with 48% indicating the opposite. The implication is that lack of computer operating skills could be a major hindering factor in the adoption and use of the Extension Online System. Several of these farmers indicated that, while they could do basic switching on and a few other functions, they still struggled with various navigations on the computer. This finding agrees with the works of Agbo (2015) and Jokiaho, May, Specht, and Stoyanov (2018) who opine that lack of computer skills hinders learning in an online situation. This implies that following the lack of computer literacy of farmers, the learning and use of Extension Online System remains difficult and almost impossible.

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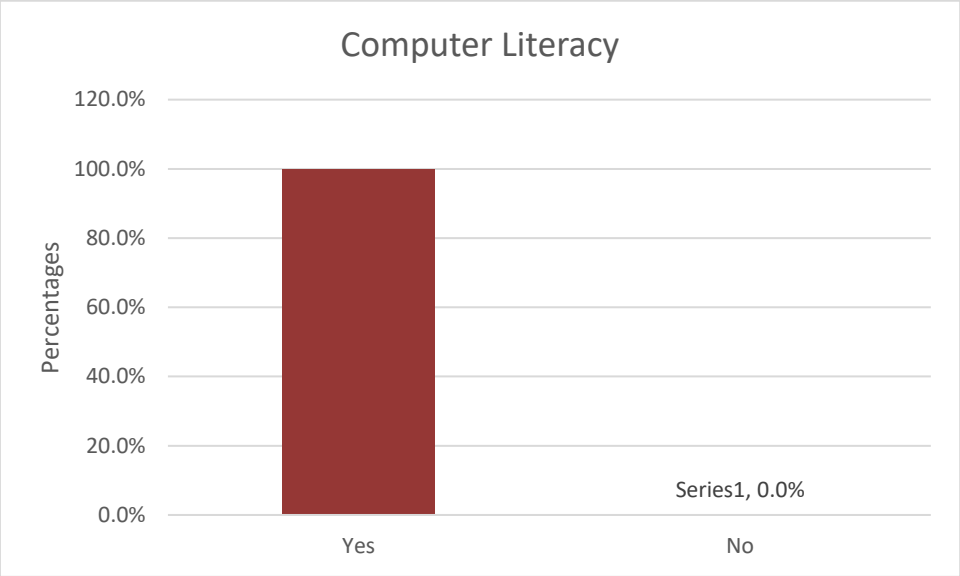
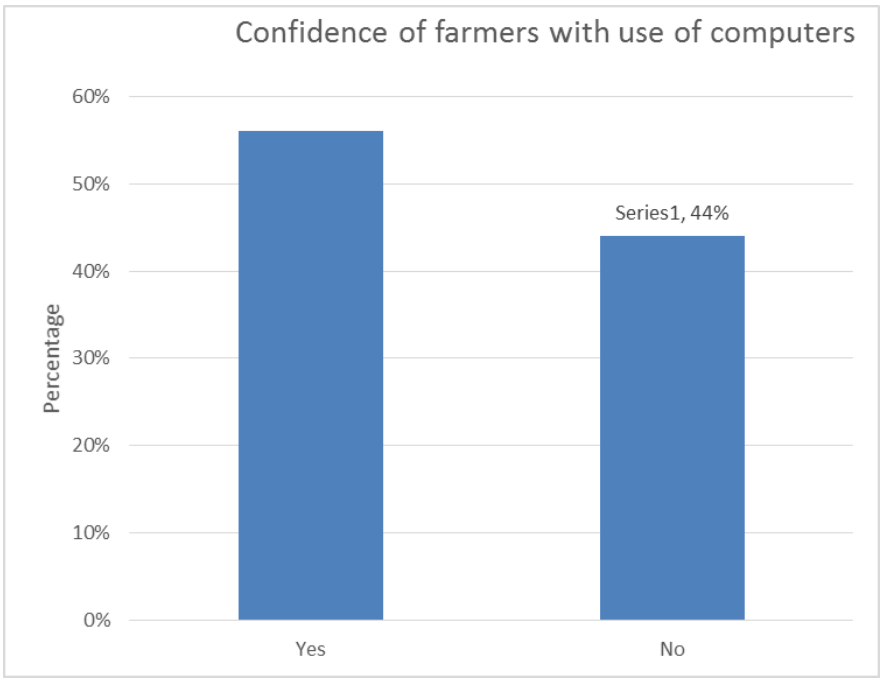
Fig. 7: Computer Literacy of Advisors



Following the analysed data, the results from fig. 7 shows absolute distinction when compared with farmers' computer literacy levels. All the advisors indicated that they possess computer literacy. This implies that they are in suitable position to help farmers with computer related farming technology. However, it may not be sufficient helping farmers with their farming technology and other related issues without teaching them how to carry-out such tasks. Meanwhile, the advisors may know how to operate and handle farming technology and other related issues whereas, they are unable to teach or impact such knowledge on farmers. Meanwhile, a review of the work of Agbo (2015) shows that there is disparity between having knowledge of computer, being able to operate it and teaching people such.

Fig. 8: Confidence of farmers with use of computers



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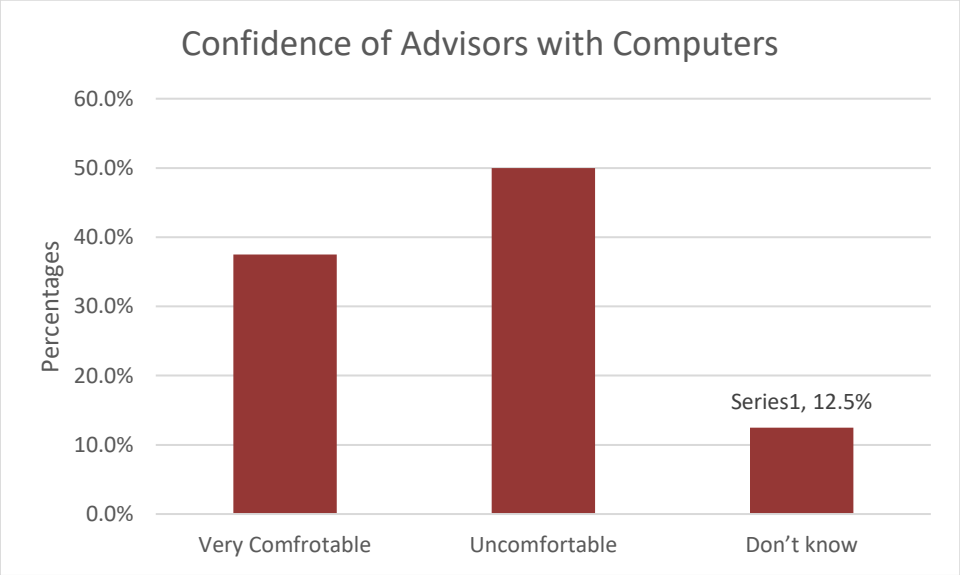
From the statistics presented in fig. 8 above, over 56% of the farmers indicated that they were comfortable with the use of computers, while 44% were not. This indicates that though most farmers are computer illiterate, they are comfortable with use of computers and desire to learn. Most farmers are likely to encounter challenges in the use and application of technology in their farming operations. There is need for an extensive programme to educate farmers with computer operating knowledge. This finding agrees with the work of Ganzel (2009) and Mzirai (2017) who hold the view that computers are farming tools, thus, needful for farming in the 21st century. In this regard, the confidence of farmers will increase, consequently, productivity.

Fig. 9: Confidence of Advisors with Computers



While 100% of the advisors indicated that they are computer literacy, the response however varied when they were asked whether or not every individual is comfortable with the use of the computers in farm work. Fig. 9 shows that about 50% of the advisors were uncomfortable with the use of computers, 37.5% revealed that they were comfortable with computer use and application, while 12.5% indicated that they were not sure of their position with regards to their feelings and attitude towards computers. Meanwhile, the finding of the work of Levine and Donitsa-Schmidt (1998) shows that there is a link between computer use, confidence, attitudes and knowledge displayed by a person. Suffice to state that advisors are likely to display more confidence with regards to computer if they use it regularly. In this regard, they can also transfer the right attitude towards the use of computer to farmers.

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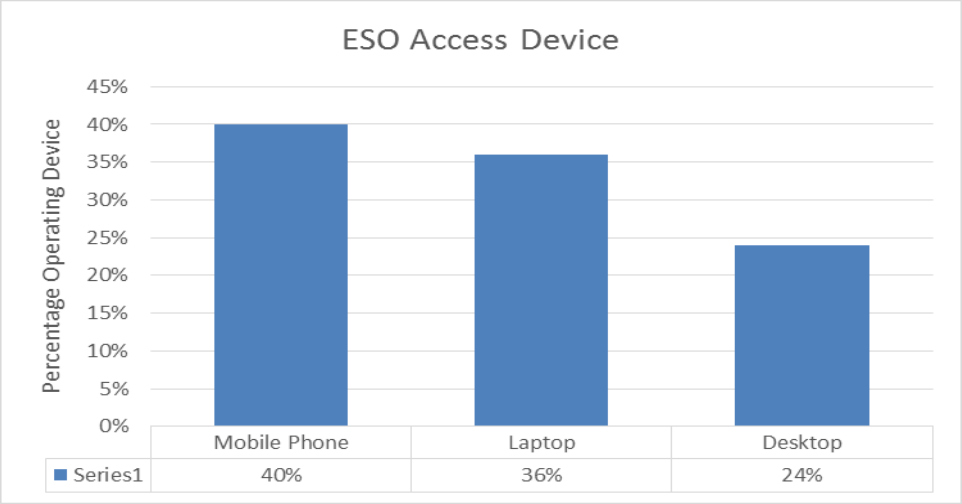
Fig. 10: ESO Access Device used by farmers



In terms of the used operating devices, fig. 10 shows that 40% of the farmers indicated that they had no both, neither laptop nor desktop and therefore used their mobile phones to access the ESO. While mobile phones offer the advantage of availability and flexibility, they however perform limited functions that could otherwise be performed by computers. This finding corroborates the finding of the work of Saiz-Rubio and Rovira-Más (2020) who consent to the view that non-use of computers could be a huge limiting factor in terms of exploiting all the functions of the system that farmers need to benefit from.

Fig. 11: ESO Training and Awareness

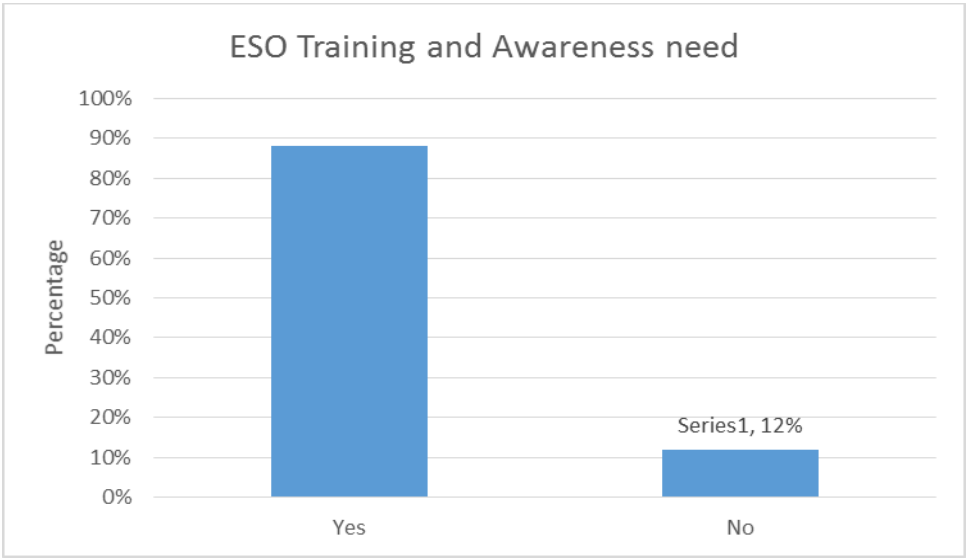


Fig. 11 shows that while 88% indicated that they would need to undergo training, 12% indicated that they did not need training. The implication is that ESO awareness training programmes must be rolled out, these could be very useful in ensuring that farmers acquire the basic knowledge that is necessary for using the ESO. This finding corroborates the works of Mzirai (2017) as well as Saiz-Rubio and Rovira-Más (2020) which suggest the need for farmers to be trained on the use of computers, which Ganzel (2009) had earlier described as a tool needed by farmers.

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ESO Usability Experience and Attitude of Users

This section covers areas of whether or not farmers had previously used ESO in the past years. It furthermore analyses the devices used in accessing the ESO and determines whether or not farmers needed training. The section also covered the perceptions of advisors with regards to the use of ESO.

Fig. 12: ESO Experience of Farmers

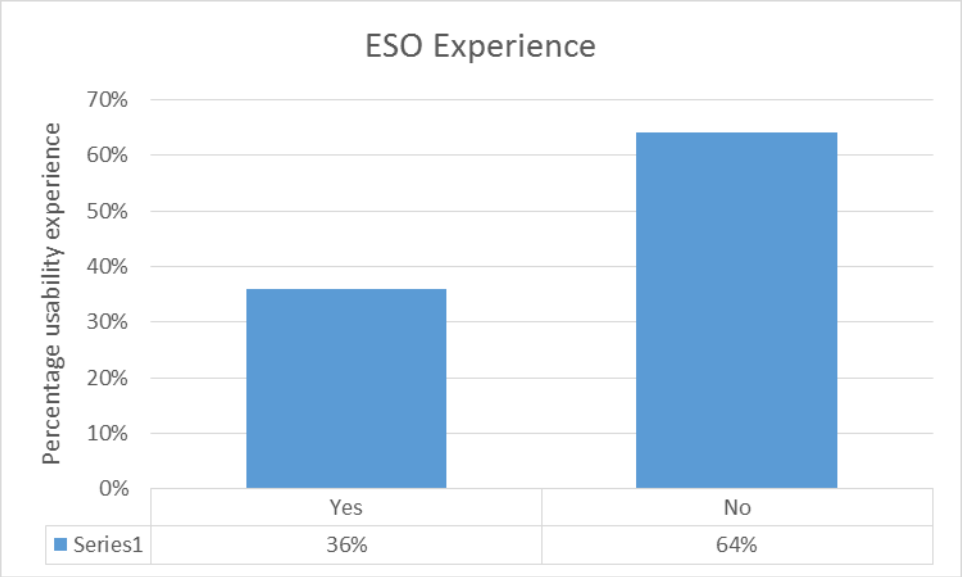
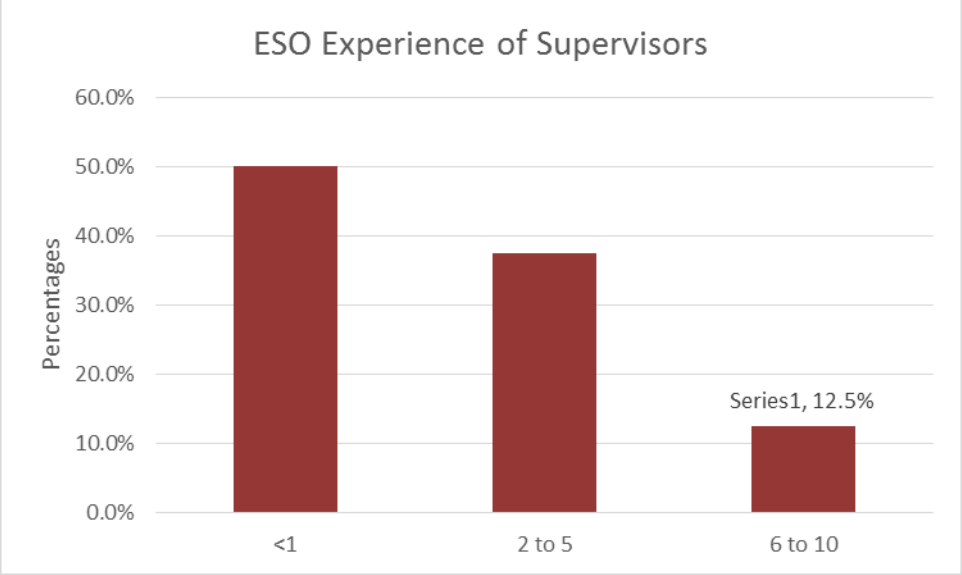


Fig. 12 above shows the distribution in terms of experience in years with using the ESO system. While 36% of the farmers indicated that they had experience with using the ESO, 64% disagreed. The implication is that the farmers are likely to encounter challenges with using the system since for most, it was their first experience.

Fig. 13: ESO experience of Advisors



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The number of years over which the advisors have used the ESO were also analysed. According to the analysis presented in fig. 13 above, about 50% of the managers were with only one year experience with the ESO, 37.5% of the respondents had between 2-5 years of experience while those above 6 years accounted for only 12.5%. This implies that the implementation and supervision of the ESO among farmers could be a challenge since half of the advisors do not have long enough experience. Lack of experience makes the advisors less qualified to effectively teach and help farmers

Research Question 2: How has the Extension Suite Online system impacted the lives of emerging farmers in Qunu?

Quality of Service

The quality of service was ranked on a scale of poor, good and excellent. Analysis of this element is based on whether or not the system efficiently delivered expected performance.

Fig. 14: Farmers' response

Fig. 14 shows that 16% of them indicated that the quality of service offered by the ESO is poor while 84% of the respondents agrees that the service was either good or excellent. Most of the respondents indicated that the system was good, accounting for about 56%. This implies that there is huge need for ESO. This finding agrees with the work of Ganzel (2009), who states that computer should be considered and treated as a tool. The finding also corroborates the works of Mzirai (2017) and Saiz-Rubio and Rovira-Más (2020) who support the quest for digital farmers, especially as it concerns the 21st century.

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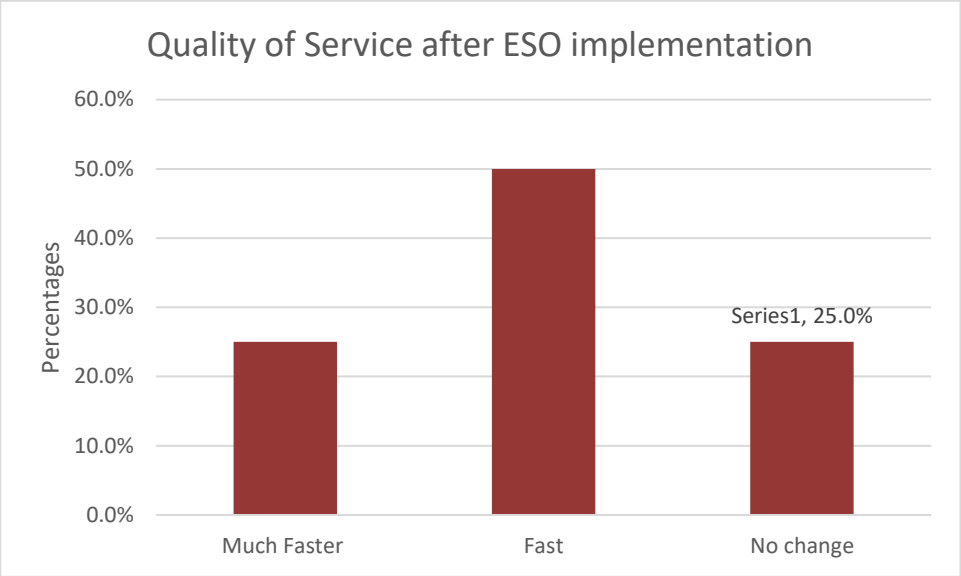
Fig. 15: Advisors' response

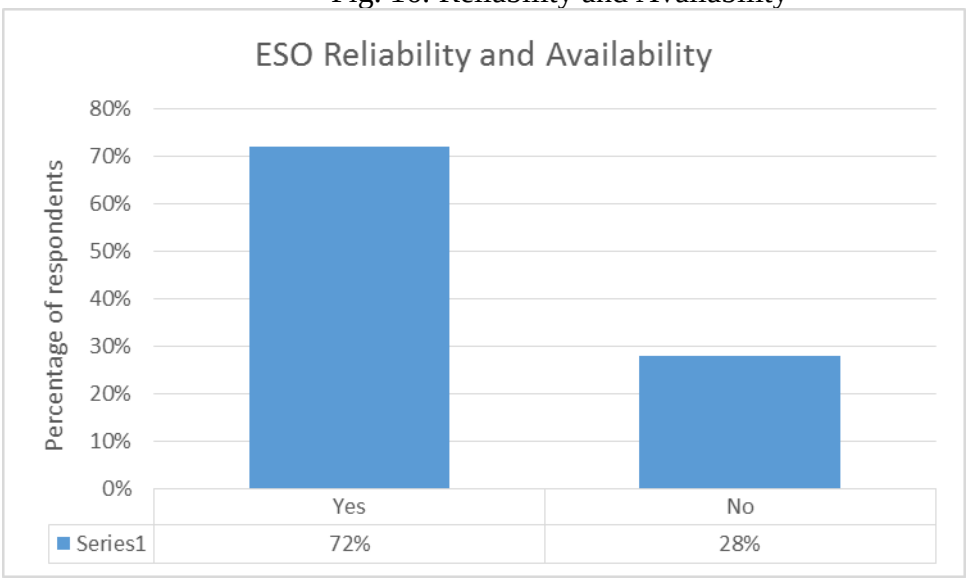


The quality of advisors was measured by assessing whether or not the system brought about any change. Change meant that the system met its requirements expectations. About 50% of the advisors responded that the system resulted in a fast change while 25 % indicated that the change was even much faster. One quarter of the advisors had doubt in the quality of the system and said it resulted in no change. The implication is that the system is of a commendable quality as indicated by the opinions of the respondents. Quality is supposedly measured according to the ability of the system to meet the expectations of the users in terms of performance. This finding agrees with the works of Mzirai (2017) and Saiz-Rubio and Rovira-Más (2020) who support the quest for digital farmers, especially as it concerns the 21st century.

ESO Reliability and Usefulness

This section looks into the technical reliability of the system and whether or not it experiences breakdowns.

Fig. 16: Reliability and Availability



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Respondents were also asked the question of whether ESO is always available and reliable. At least 72% of the respondents indicated that the ESO is always available and very reliable. The rest 28% of the respondents however disagreed to the reliability and availability of the ESO. Attention must be paid to the concerns of the respondents who indicated that the system is sometimes not available and experiences hiccups. This implies that there still exists room for the improvement of the extension online system.

Fig. 17: Usefulness of ESO

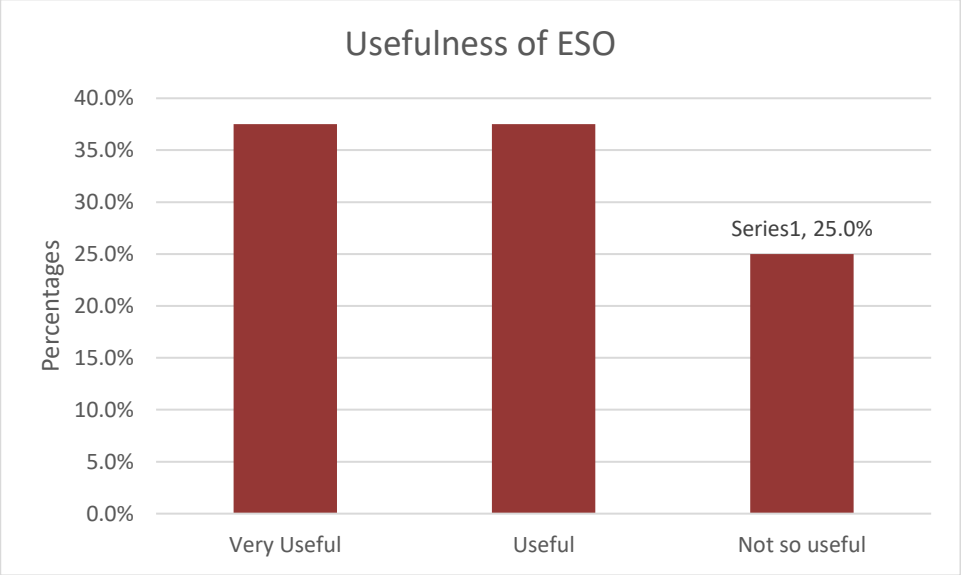

Fig. 17 shows the perceptions of farm advisors with regards to the usefulness of the ESO. While 75% of the respondents indicated that the ESO was crucial in their farming activities as it managed to close the information gap caused by a lack of expert advice, 25 % perceived the system to be useless. The implication is that the implementation of the system could be feasible owing to the attitudes of advisors towards the system. Awareness and more education could be provided to the advisors for them to the clear benefits of the system. This finding agrees with the work of Manstrat (2015) who opines that ESO was developed in order to provide linkage and information transfer mechanism between Agricultural Research and Extension Services as well as famers that they serve. The finding also corroborates the works of Mzirai (2017) and Saiz-Rubio and Rovira-Más (2020) who agree that computer programmes are needed by farmers especially in the 21st century.

Benefits of Using the ESO

This section presents the producer target group analysis of the effect of ESO on employment and farm productivity.

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Fig. 18: Producer target Group

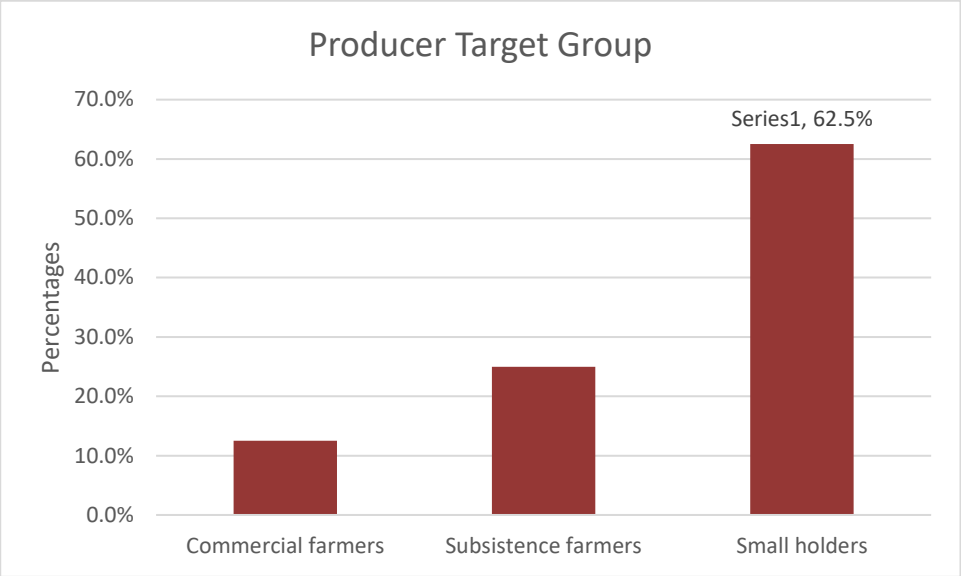
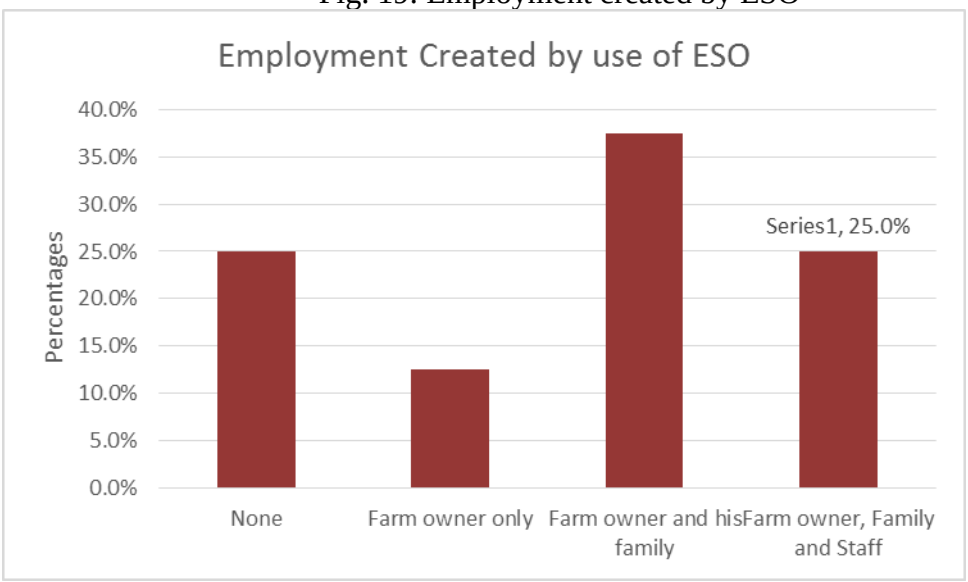


Fig. 18 shows that the majority of the advisors targeted small holder farmers while 12.5% targeted commercial farmers. Advisors targeting subsistence farmers accounted for only 28%. This implies that the ESO programme would require substantial amounts of money in to sponsor the possibly poor people from such community.

Fig. 19: Employment created by ESO



Statistics in fig. 19 revealed that 25% of the advisors indicated that ESO did not create any employment, 75 % agreed that the system created further employment for the farm owner, family and outside staff. The implication of the statistics is that the adoption and use of the ESO could have effects on employment and substitution of human effort. The system however, though it may not directly create several jobs, in an indirect way, it could create employment for developers and technicians doing maintenance works and training personnel.

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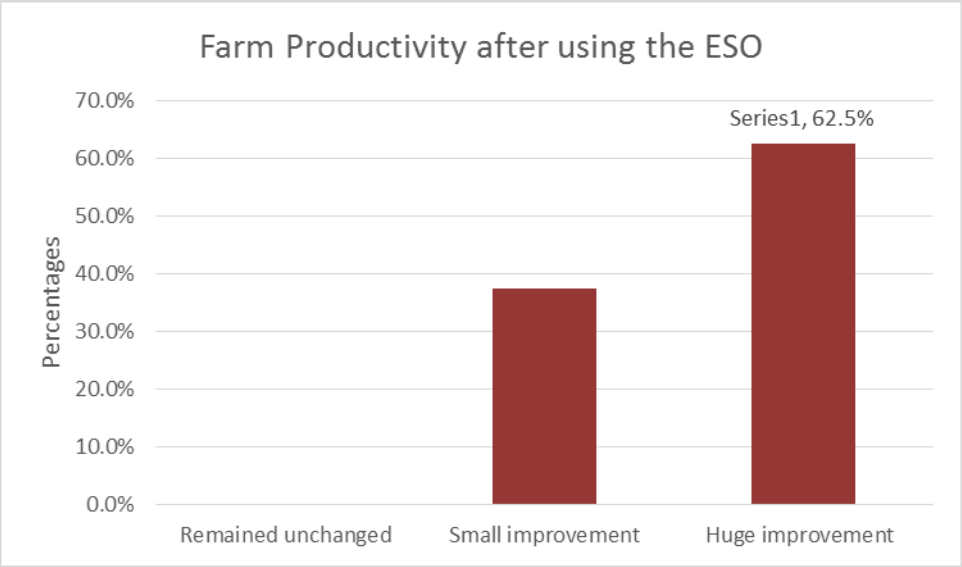
Fig. 20: Farm Productivity after using the ESO



The impact of ESO on productivity was also and evaluated by checking whether they caused any change. Fig. 20 shows that 62.5% of the advisors indicated that the system resulted in a huge improvement in the productivity on farms on which they were implemented while 37.5% indicated that the implementation of the system resulted in a very small improvement. Meanwhile, none of them denied its positive impact. This suggests that ESO positively impacts farmers.

Conclusion and Recommendations

The study explored the impacts of using Extension Suite Online System as solution for subsistence farming in rural areas. The researchers attempted to infer the role of universities following the findings of the study. The finding of the study amongst others showed that the introduction of Extension Suite Online system to the Qunu rural farmers managed to close the information gap that was initially a challenge and it fascinated young people who perceived agriculture as a sector for older people. Also, the findings of the study further showed that the adoption and use of the ESO have positive impacts such as sustaining and enhancing employment as well as substituting of human efforts. Additionally, in terms of reports generated for Extension Supervisors, the system aided the departmental officials with credible decision-support assistance. Suffice to state that ESO is crucial, highly needed by farmers, especially those in rural areas. This is deduced following the responses of respondents who commended the quality provided by the system as it has measurable ability to meet the expectations of the users in terms of performance and addressing the information gap. However, the finding of the study also showed that rural farmers are hindered in the adoption of ESO due to various factors, foremost of all which is lack of computer operating skills.

Sequel to the findings of the study, the following recommendations are made:

- Partnerships between rural farmers and universities should be formed, encouraged and promoted. This would enhance sustainable development growth in the society.
- Short term courses should be organised for rural farmers by universities. This can be in the area of acquisition of computer literacy skills and other needed areas of expertise. This would aid the productivity of such rural farmers and consequently, impact the society.

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