

Participation of in and out of-school youth in decision making on use of information communication technology to facilitate implementation of agricultural programmes and markets

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ABSTRACT

Youth may not be interested in primary farm production agriculture because of its drudgeries and low remuneration nature but application of ICT in implementation in its various nodes offers them alternative occupation for self-reliance. However, secondary school agriculture curriculum might be inadequate in information communication technology (ICT) that would initiate youth at that early stage to ICT use to facilitate implementation of agricultural programmes and markets. The consequence is low participation of youth out-of-school in decision-making on ICT use to facilitate the implementation. Research was carried out to determine the influence of participation of in and out of school youth in decision-making on use of ICT to facilitate the programmes and markets. The research was done in five farming systems prevalent in Kenya and three categories of secondary schools. Cross-sectional survey design, purposive, stratified and simple random sampling were used to select 160 out-of-school youth and 361 school youth taking agriculture subject. Data was collected using questionnaires and analyzed by qualitative and inferential statistics at probability level 0.05. Results show that out-of-school youth rated their use of ICT to facilitate implementation of the programmes as considerably lower than those in school. Strategy 5 was ranked significantly highest as solution followed by strategy 4. Strategy 5 suggested as solution the establishment of digital infrastructure in rural areas to enable out of school youth who are ICT knowledgeable create platforms and support youth farmers by sharing information. Strategy 4 propose to establish and manage networks for youth agri-preneurs to enable them share experiences for efficiency in agricultural production and marketing as the answer. The rest of the strategies 1, 2 and 3 were also rated as very important thus indicating their potential as solutions. There is a significant positive linear regression correlation ($R^2 = 0.751$; $p \leq 0.005$) between level of participation in decision making on use of ICT by out-of-school youth and level of its application in the operation of agricultural programmes and markets.

Keywords: Agricultural programmes, decision-making, ICT, markets, youth

INTRODUCTION

Secondary school agriculture curriculum may be inadequate in relevance that would lead to attainment of self-reliance for out-of-school youth. Konyango & Asienyo (2015) justifies the need for its reform to fill a gap that exists between the demand for quality of academic grades and the relevance of lessons implemented for its practical and vocational objective. Ibrahim, (2015) in Nigeria recommends refocusing agricultural education's curriculum and methodology in line with training for self-reliance. This deficit in agricultural education curriculum has also been attributed to weak linkages in the agricultural research-education-extension nexus. The information communication technology (ICT) offers an excellent opportunity for improved coordination across the agricultural nexus, bridging the information gap, sharing information and creation of knowledge. Students are required to develop rigorous digital skills to suit themselves to the multi-faceted world (Nallusamy *et al.*, 2015). Kenya youth agribusiness strategy 2017-2021 recognizes the ICT sector as source of solutions and products that would make the agriculture sector more efficient. Further, the strategy describes the rates of uptake of ICT innovations and technological platforms as being higher in the youthful

age bracket compared to other demographic segments (GOK, 2017). It therefore becomes necessary to integrate ICT in school agriculture curriculum as a tool to enhance decision making on the implementation of agricultural programmes and markets for efficiency. The ICT refers to communication by electronic (e) means. It denotes hardware, software, networks and media for collection, storage, processing, transmission and presentation of information in the formats of voice, data, text and images (Bhattacharjee & Saravanan, 2013). Youth and their parents may not be interested in farm production agriculture because of its low remunerative and drudgeries nature. However, agriculture occupation is the major fallback option for the creation of livelihoods in rural areas for 75% of the human population in developing world. The use of ICT in the sector offers alternative occupation for in-and-out of school youth in the implementation of agricultural programmes and markets for creation of livelihoods (Kiambi, 2018). Bhattacharjee & Saravanan (2013) observe that youth could best employ ICTs in agriculture since it can make agriculture 'modern' and thus attract them to participate in the sector. In this case, the synergy of youth and ICT could be utilised to facilitate implementation and a symbiotic relationship established to reap its optimum benefits for

adolescents. The integration of ICT would facilitate the execution of programmes in wide array of sectors including extension mechanism, crop and animal production and protection, disaster management, market information and participation, financial institutions and information, natural resource management, fishery-wave heights, location of fish shoals etc. But along with that, ICT could make information more accessible and user-friendly to enable young people to play a greater and more effective role in decision making on its use in the implementation of agricultural programmes and markets. The use of ICT tools characterizes the new age digital literacy (Nallusamy *et al.*, 2015). This study is motivated by the need to harness the liking of ICT by the youth out-of-school to modernize agriculture. The study investigated participation of in and out of school youth in decision-making on use of ICT to facilitate implementation of agricultural programmes and markets.

Statement of problem

There is low participation of in and out of school youth in decision making on use of ICT to facilitate the implementation of agricultural programmes and markets that would create occupation opportunities for self-reliance. The shortfall may be attributed to ICT content in school agriculture curriculum which may be inadequate to initiate youth to its application in implementation of programmes at that early stage of education. There is therefore a gap in the aspect and strategy interventions are necessary to guide best way forward in facilitating out-of-school youth to participate in ICT application in agriculture as an occupation. The available literature is scanty on opinion of in and out of school youth on the low application of ICT by youth who are technology savvy to provide solutions, and modernize implementation of agricultural programmes, markets and productivity (Nyang'au, 2012). Probably, youth should be involved in the development of ICT innovations and technological platforms to ensure its appropriateness for adolescent audience in agriculture and markets. The importance of meaningful youth involvement in decision-making in what concerns them is demonstrated by Dewey the father of modern progressive education (Dewey, Referred & Yat-sen, 1911). The later delineated a course of learning that is easily adaptable for student involvement in education decision-making (Ogwora, 2013). The lesson derived from Dewey (Referred & Yat-sen, 1911) in this context is that it may not be possible for youth to make informed contributions on use of ICT to facilitate operations in agriculture if they are isolated from the curriculum debates taking place, strategies being developed, and decision making process. Kempe (2012) notes, education is the next important area for engaging the youth and for their development thereby

suggesting necessity for interventions to change the situation.

Objectives of the study are to determine the influence of participation of in and out of school youth in decision-making on use of ICT to facilitate implementation of agriculture programmes and markets.

The hypothesis was stated that there is non-significant difference in the participation of in and out of school youth in decision-making on use of ICT to facilitate implementation of agricultural programmes and markets.

METHODOLOGY

Study area - Jaetzold *et al.* (2009) characterized the Kisii and Nyamira counties region, southwest Kenya into five agro-ecological zones. The zones defined were used as farm types; and adopted as different and unique sampling locations for respondents in the study. They were used to obtain diverse youth population segments of respondents with varied exposures, opportunities and experiences arising from different farming systems. The farm types indicated are typical of similar ones prevalent in the Kenyan highlands and are as follows: 1) Tea-dairy, 2) Tea – coffee, 3) Maize-pyrethrum or wheat, 4) Coffee-banana and, 5) Marginal-sugarcane farming systems. The later farm type is for example characterized by livestock extensive grazing systems, and cultivation of crops such as cassava, sweet potato, groundnuts, fruits like pawpaw, chewing sugarcane besides maize/beans that are the stable food in Kenya.

The school youth, were secondary school form four students registered for KSCE agriculture subject and were thus involved in implementing KCSE agriculture project practical offered for national examinations by the Kenya National Examination Council (KNEC) during their education (Nyang'au *et al.*, 2022). The youth were proportionately sampled from three school categories; extra-county, county and sub-counties in the study region. The school categories were spread in the five farm types adopted from Jaetzold *et al.* (2009) and the 3 types of learning institutions: (1) Extra county, (2) County, and (3) Sub-county schools. The study took on 30 schools as units of investigation, according to Mugenda & Mugenda (2003) who suggest 30 cases as the least that could be used if some form of statistical analysis is to be carried out on the data obtained. Thus, basing on the adopted units of 30 schools, the total population of 302 schools and the proportion of each category. proportionate stratified random sampling procedure was employed to obtain 19 sub-counties, 9 counties and 2 extra-county schools to participate in the research. However, for purposes of representation the researcher purposefully sampled

5 extra-county schools in order to have a representation of extra-county school from each farm type. Similarly stratified random sampling was applied to get the number of schools to be sampled from each farm type basing on the number of schools in each. Stratified random sampling procedure resulted in 8, 6, 5, 6 and 8 schools being drawn from; tea-dairy, maize-pyrethrum, tea-coffee, coffee-banana and marginal-sugarcane zone respectively (Nyang'au *et al.*, 2022). The Table in Krejcie & Morgan (1970) which summarizes the population sizes and recommends sample sizes to be adopted was used to arrive at a sample size of 361 from four KCSE agriculture youth from a population of 6,312 youth registered for 2019 KCSE agriculture subject examination. Proportionate stratified random sampling technique resulted in 74 school youth being sampled from extra-county category of schools, 109 youth from county and 178 from sub county schools. Using proportionate stratified random sampling, the following proportions of youth were sampled from each farm type: 86 school youth from tea-dairy, 58 from maize-pyrethrum, 52 were taken from tea-coffee farm type, 60 from coffee-banana area and 105 school youth were drawn from sugarcane chewing and crushing farm type totaling 361. At school level, simple random sampling procedure was used to select 15, 13 and 12 youth from extra-county, county and sub-county categories respectively to participate in the study from class lists provided by the agriculture teachers.

The out-of-school young people were purposefully sampled from youth groups spread across the five farm type zones of Kisii and Nyamira counties region, Kenya. The out-of -school youth were purposefully sampled from youth groups spread across the five farm type zones. These youths who had studied secondary school agriculture are out after completion of their education at that level. They lack formal employment and find themselves in rural areas where more than 75% of the population is engaged in agriculture for livelihood something typical of most African countries (Nyang'au *et al.*, 2022). The youth had therefore fallen back to the skills gained in secondary school agriculture to carry out farm-related activities for self-reliance. Using the table in Krejcie & Morgan (1970) which summarises the population sizes and sample sizes, and basing on a population of 280 out of school youth, the study adopted a sample size of 160 out- of-school youth. This population was purposefully obtained by finding out from adolescents registered with agricultural youth groups in the rural sub counties if they had studied agriculture subject in their secondary school education. Those who had studied agriculture were included in the list. Whereas it was not possible to stratify out -of-school youth according to the school category since they were no longer in school, information concerning the school category they had attended was captured in section A of the

interview instrument for data collection which had an item asking the youth to indicate the school they had attended. Stratified random sampling procedure was employed to sample 29 out-of-school youth from tea-dairy, 9 from maize-pyrethrum farm type, 32 youth from tea- coffee and coffee-banana each, and 58 out-of-school youth from sugarcane farm type.

The investigation adopted an ex-post facto research design and a cross sectional survey approach. According to Simon & Goes, (2013) ex-post facto method of research design is an investigation in which there is no interference from the researcher and in which it is not possible or acceptable to manipulate the characteristics of human participants. The researcher therefore did not create a treatment but examined the effects of a naturally occurring treatment after it had taken place (Cohen *et al.*, 2007). A cross-sectional survey approach was considered most convenient research tool in the investigation.

Data was collected using a questionnaire. The questionnaire had two likert rating scales; one coded from 1 to 10, that was used to measure the level of participation of youth in decision making on application of ICT to facilitate, and the level of implementation of agricultural programmes and markets. The second scale was coded, 1 to 5 and it was used to rate the strategies proposed to increase the level of participation of in and out of school youth in decision making on application of ICT to facilitate implementation of agricultural programmes and markets. In data collection process the questionnaire was left with the school agriculture teachers in charge of form four students after the school teacher had been briefed on the procedure of administering it. This was occasioned by the tight schedule in secondary schools as the form fours were preparing for the national examinations which were about to start (Nyang'au *et al.*, 2022). Five strategies were proposed and evaluated for increasing participation of in and out of school youth in decision making. These were ranked on a five-point rating scale, where: 1=Not Important; 2=Least important; 3=Important; 4=Very Important, 5=Extremely Important. The respondents were asked to tick [✓] the scales appropriately. The frequency of the respondents, who ticked the scale of 1 to 5, was then used to calculate a mean score for each individual strategy. Depending on the mean scores, the strategies were described as either not important if the average score was less than 1.50, least important if the mean rating was between 1.50 and 2.50, important if the mean rating of the factor fell between 2.50 and 3.50, while a factor whose mean score was between 3.50 and 4.50 was described as very important and extremely important if the mean rating was between 4.50 and 5.00.

The quantitative data collected was coded and entered into computer programme software, statistical package for social sciences (SPSS version 21). Data were analysed using descriptive and inferential statistics to answer the research objectives. Means, standard deviations and percentages were the descriptive statistics used. The following inferential statistics that were applied to test for significant differences: two tailed t-test, Dunn's; analysis of variance (ANOVA); followed with Tukey Post Hoc test. The test for any relationships among variables was done using, two-tailed Spearman correlation coefficient test, Pearson correlation and linear regression correlation coefficients. The inferential statistics were all set at 0.05 level of significance.

RESULTS AND DISCUSSION

Differences in the level of use of ICT between in and out of school youth in implementation of agricultural programmes.

Table 1: T-test on the differences on the level of use of ICT in implementation of agricultural programmes by in and out of school youth

Respondents	n	Participation mean score	(Std Dev.)	df	t-value	P - value
In school youth	361	5.950139	8.197507	287	1.968264	0.052002
Out of school youth	159	5.396226	9.20277			

Hypothesis Ho: which stated that there is non-significant difference in the participation of in and out of school youth in decision-making on use of ICT to facilitate implementation of agricultural programmes and markets; tested at $p \leq 0.05$ level of significance is rejected. From the results, there is significant differences in the participation of 'in school and out of school' youth in decision making on use of ICT to facilitate implementation of agricultural programmes and markets.

Rating of strategies proposed to increase participation of out-of-school youth in decision making on use of ICT to facilitate implementation of agricultural programmes and markets

Results in Table 2 provides mean ratings of strategies proposed to increase participation of out-of-school youth in decision-making on use of ICT to facilitate implementation of agricultural programmes and markets. Results indicate that the five strategies proposed were ranked very important by out-of-school youth with means ratings of 3.5 - 4.5. The results imply that if all the proposed strategies are put in place

Result in Table 1 shows significant differences in the level of use of ICT by school youth ($M = 5.950139$, $SD = 8.197507$) and out-of-school youth ($M = 5.396226$, $SD = 9.20277$); $t(287) = 1.968264$, $p = 0.052002$ to facilitate implementation of agricultural programmes and markets. Therefore, being in or out of school affects the level of use of ICT for the purposes. School youth rated their use of ICT to facilitate implementation of programmes and markets as considerably higher than the out-of-school. The finding is within expectation given that school youth are KCSE candidates who might be using ICT much more as they search for solutions to use in smooth implementation of their agriculture project offered for examination to better their scores and grading.

out-of-school youth are likely to use ICT to facilitate implementation of agricultural programmes than is the case at present. Also, that the youth were in consensus that all the strategies would make it possible for youth and other farmers to sell their own produce by linking them to markets and e-extension services for real time results. The finding is in line with Bahaman *et al.* (2010) who indicate that networks and linkages among agripreneurs would improve implementation of agricultural programmes. That is likely to improve self-reliance in out-of-school youth. Probably because with ICTs even youth who do not have access to land and those who hate farming will find something to do in different nodes of the agricultural value chains by working from anywhere, anytime, using their phones, laptops etcetera. With ICT the youth are likely to connect farmers to local and outside markets and reduce post-harvest losses for profitability (Wawire *et al.*, 2017). The platforms would connect producers and consumers; also enable youth to share prices of various commodities in different markets, distribute useful extension information, and boost production and revenue for farmers.

Table 2: Mean ratings of strategies proposed to increase participation of out of school youth in decision-making on use of ICT to facilitate implementation of agricultural programmes and markets

No.	Strategies proposed to increase participation of youth in decision making on the use of ICT	Means	SD
1	Use ICTs to gather and share information on prices of commodities in different markets to avoid swindling of farmers by middlemen for profitability	3.75	1.245283
2	Linking farmers with traders, stockists and consumers to facilitate production of various agricultural chains on demand	4	0.930818
3	Online services like (e-extension and e-marketing) using ICT to make access to information easy and affordable at anytime and anywhere for real time results	3.81875	1.62103
4	Establishment and management of network for youth agri-preneurs to enable them to share experiences for efficiency in production and marketing	4.025	0.892453
5	Establish a digital infrastructure in rural areas to enable youth who are ICT knowledgeable create platforms and support youth farmers by sharing information	4.04375	1.073546

The e-markets would eliminate swindling by middlemen as brokers. The observation on this strategy is in line with Irungu *et al.* (2015), who note that with ICT tools youth are more likely to reap benefits since they could easily access markets on their own without the presence of middlemen. The e-extension information would also make operations more efficient than the conventional extension systems and thus the youth will get real-time solutions to agricultural problems.

Table 3 indicates that the differences in the ratings of the strategies proposed to increase participation of out-of-school youth in decision making on use of ICT to facilitate implementation of agriculture programmes and markets were significant ($F = 10.27573$, $p \leq 0.005$). The significant differences amongst the rating of strategies imply that although the youth rated all the strategies as being very important, it would appear that some strategies like 5 and 4 were more important than the others.

Table 3: Analysis of variance of ratings by out of school youth on strategies proposed to increase participation in decision making on use of ICT to facilitate agricultural programmes and markets

Source of Variation	Sum of Squares	df	Mean Square	F	p-value	F crit.
Between Groups	11.4575	4	2.864375	2.485087	0.042302	2.383132
Within Groups	916.3375	795	1.152626			
Total	927.795	799				

Strategy 5 scored highest mean of 4.04375 qualifying it as very important, followed by strategy 4 (Table 2). The strategy states that that establishment of a digital infrastructure in rural areas would enable youth who are ICT knowledgeable to come up with platforms to support them and other farmers through sharing of appropriate information that can boost production. Strategy 4 was on the need to establish and manage networks for youth agri-preneurs to enable them share experiences for efficiency in implementation and marketing. The sentiments in strategies number 5 and 4 agree with a recommendation by Mtega and Msungu (2013) who indicate that having ICT infrastructures in the rural areas would enable stakeholders in agriculture to share information more easily and cheaply thus increase productivity and agribusinesses. The implication is that ICT infrastructure will enable youth to create interactive platforms and networks for youth farmers to share information, experiences and

link to internal and external markets on their own. Youth are likely to facilitate connections to markets to reduce post-harvest losses and platforms for sharing experiences and information thus boosting revenue from implementation of agricultural programmes. They will be able to access online extension services and markets thereby bypassing brokers. The operations may be more efficient than the conventional systems and thus get real time solutions to agricultural problems. The implication of the result is that out-of-school youth were in agreement that the strategy of establishing a digital infrastructure in rural areas will make it possible to participate in the agricultural value chains because the activities involved are less labour intensive (Nyang'au, 2012). The finding is in line with Bahaman *et al.*, (2010) that networks and linkages among agri-preneurs would improve the implementation of agricultural programmes. The ICT is necessary for efficient

exchange of ideas and assured markets by linking farmers with traders, stockists and consumers. Velmurugan & Velmurugan (2013) indicate that ICTs can enable youth to get up-to-date market information and sell their products anytime and anywhere. For instance IICD (2013) observes that by use of m-Farm technology, young agripreneurs in western Kenya are making more money than when they sold their produce to brokers because they can directly connect to markets and sell at higher prices.

Relationship Between Level of Participation in Decision Making on use of ICT and Level of Implementation of Agricultural Programmes and Markets by out of School Youth

Linear regression correlation coefficient analysis on level of participation in decision-making in use of ICT and level of implementation of agricultural programmes and markets, by out-of-school youth

Table 4 on linear regression correlation show significant positive correlation ($R^2 = 0.751$, $p \leq 0.005$)

between the level of participation in decision making on use of ICT by out-of-school youth and the level of implementation of agricultural programs and markets. Table 5 confirms the relationships are statistically significant. The results as demonstrated in Figure 1 show that the level of implementation of agriculture programmes by out-of-school youth increases with an increase in the level of participation in decision-making on the use of ICT to facilitate agricultural programmes and markets. Whereas participation in decision-making on use of ICT by out-of-school youth accounts for 75.1%, increase the remaining 24.9% may be due to other factors. The result suggests that improved engagement in decision-making on implementation by out of school youth is more likely to increase involvement of young people in various nodes of the agricultural value chains. These include the use of ICTs like smart phones, computers and laptops to network or link farmers, to traders, consumers, stockist and extension services using social forums like whatsapp and facebook for purposes of boosting agricultural activities.

Table 4: Regression on influence of participation in decision-making on use of ICT to facilitate implementation of agricultural programs and markets by out-of-school youth

Regression Statistics	
Multiple R	0.866759
R Square	0.751271
Adjusted R Square	0.749697
Standard Error	1.446207
Observations	160

Table 5: Analysis of variance on relationship between level of participation in decision-making in use of ICT by out-of-school youth on level of implementation of agricultural programmes and markets.

Analysis of variance					
Source of variation	df	SS	MS	F	Significance F
Regression	1	998.1342	998.1342	477.23	0.00
Residual	158	330.4595	2.091516		
Total	159	1328.594			

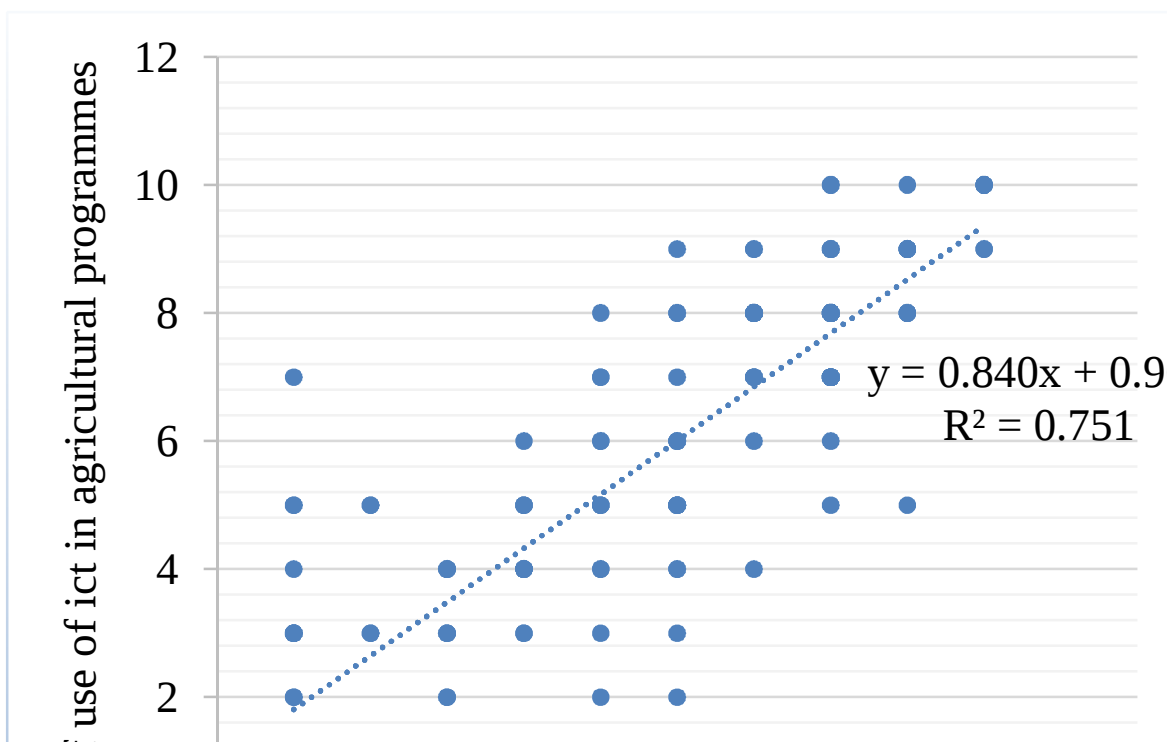


Figure 1: Scatter plot on the influence of participation in decision-making on use of ICT on level of implementation of agricultural programs and markets by out-of-school youth.

The findings in Figure 1 suggest that when youth are part and parcel of decision-making process of any activity that requires their involvement, they are likely to get motivated and implement it with enthusiasm because they will be putting their own perceived views into action or operation. This is unlike when decisions are made on their behalf and ideas passed to them to implement. The result is in line with Olaniyi (2018) who found that the use of mobile phones in agriculture had a significant positive effect on agricultural development an indication that use of ICT tools are likely to boost youth participation in the implementation of agricultural programmes due to easy access to information on modern production techniques and sharing of experiences.

CONCLUSIONS

Youth out-of-school participate less in decision making on use of ICT to facilitate the implementation of agricultural programmes and markets than adolescents in school, signifying a gap that needs to be filled. Out-of-school youth rated as very important all the five strategies proposed to enhance their participation in decision-making in the use of ICT to facilitate implementation of agricultural programmes and markets. Strategies 5 and 4 had significantly highest rating. There is a significant positive linear regression correlation between level of participation in decision-making on use of ICT by youth and level of

its application in the implementation of agricultural programmes and markets.

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