

## Analysis of Long'et Ab Kabatik Programme on Crop Farming Practices among Households in Mosop Sub-County: Nandi County

Jepkemei Bilha Doris\*, Prof. Kibiwott Kurgat and Sr. Dr. Justine Nabushawo

Kisii University, Kenya

Received 23 Sept 2019, Accepted 24 Nov 2019, Available online 25 Nov 2019, Vol.7 (Nov/Dec 2019 issue)

### Abstract

Today, farmers are faced with the challenge of having to cope with the ever changing climatic conditions which have rendered their farm production to decrease every year. It is therefore the challenge of having the knowledge about the right crop to invest in, alternative farming methods and also storage of the farm products that is crippling the agriculture sector. This study focused on the contribution of KassFM radio program long'et ab Kabatik to the improvement of crop farming practices by use of modern and technological methods by households in Mosop sub-county of Nandi County, Kenya. The study sought to investigate the effects that Long'et ab kabatik radio programme talk shows has on promoting productive and sustainable crop farming practices; find out the salient features that Long'et ab kabatik radio program panel discussions highlights for the crop farmers in promoting effective farming practices and finally recommend the extent and nature of strategies that Long'et ab kabatik radio programme anecdotes can inculcate so as to increase productive crop farming practices in Nandi County. This study employed the diffusion of innovation theory. In this study, data was sought on the use of radio as a form of broadcasting media as an educational tool in the promotion of new improved methods of farming, communication and information sharing, storage and marketing of farm produce. This study was conducted using Causal research design. The data collection instrument used was questionnaires. This study targeted farmers in households in Mosop Sub-County considering a sample population of 753 households' sampled using systematic sampling method. Since this research was cause and effect, data was analyzed by use of inferential statistics and specifically regression analysis. Results indicated that radio talk shows, panel discussions and anecdotes were significant determinants of farming practices in Mosop Sub-County. Further the moderating regression was significant. There is need to increase the frequency of long'etab Kabatik radio programme in a week and Farmer education and extension programmes should be supported by the government and other stakeholders including policy makers.

**Keywords:** Long'et Ab Kabatik Programme and Crop Farming Practices

### 1.1 Background to the Study

According to Food and Agriculture organization, the agricultural sector comprises of sectors such as water, livestock, crops, environment, land and cooperatives. UNFAO in its 2015 publication titled World Agriculture: Towards 2015/2030 summary report, gave an explanation on Outlook for Agriculture noting that world agriculture has been able to respond to the ever rising demand for crop and livestock products. Furthermore, it stated that the world as a whole has production potential to cope with the demand. The same report however states the disadvantage that developing countries will become more dependent on agricultural imports, and that food security in many poor areas will not improve without substantial

increases in local production. Details that was then analyzed showed that globally, there is enough soil, land and water; and enough potential for further growth in yields, to make the necessary production feasible. Showcasing African farming through radio, Television and film can help engage the public in conversations about food justice, agriculture and sustainability, according to a report in Food Tank (2011).

Telecoms, Internet and Broadcast in Africa news, (2016) elaborates that forms of media allow information to cross geographic boundaries and reach a wide audience. This ranges from reality TV shows to radio broadcasts meaning that media can be a way for the world to learn more about African farming and the food system.

According to the food security report prepared by KARI (2015) on policy responses to food crisis in Kenya, The agricultural sector is the mainstay of the Kenya's

\*Corresponding author's ORCID ID: 0000-0000-0000-0000

DOI: <https://doi.org/10.14741/ijmcr/v.7.6.12>

economy. This is because the sector directly contributes to up to twenty four percent of the Gross Domestic Product (GDP) and twenty seven percent of GDP indirectly through linkages with distribution, manufacturing and other service related sectors. This report gives an approximation of forty five percent of Government revenue being derived from agriculture apart from the sector contributing over seventy five percent of industrial raw materials and more than fifty percent of the export earnings. The agriculture sector is the largest employer in the economy, accounting for 60 per cent of the total employment in Kenya. Over eighty percent of the population especially those living in rural areas derive their livelihoods mainly from agricultural related activities. Due to these reasons the Government of Kenya (GoK) has continued to give agriculture a high priority as an important tool for promoting national development and that is why the government places price control on agricultural products annually. This also explains the reason as to why in today's system of government, agriculture is a fully devolved function so as to ensure its closeness and functionality to the people.

The Sustainable Development Goals As adopted by the UN's 193 Member States on 25<sup>th</sup> September 2015, are new global goals that succeeded the Millennium Development Goals in 2016. The SDGs were developed with expectations that it would shape the national development policies for the next 15 years. Food and agriculture is central of the 17 SDGs, beginning with SDG1, Ending poverty and SDG2, Ending hunger. Food security and its connection to natural resources and rural development appear in every goal of the 2030 Agenda. Given the central role the agricultural sector plays in the economy, the Government has finalized the development of the Agricultural Sector Development Strategy (ASDS). The overall goal of this strategy is to strategically make the agricultural sector a key component for achieving the 10% annual economic growth rate expected under the economic pillar of Kenya's Vision 2030. Through the ASDS, the Government aims at entirely transforming the agricultural sector into a profitable economic activity that is capable of attracting private sector investment and providing gainful employment opportunities for the people. For the government to achieve this, it has to work with the main stakeholders in the sector and these are farmers who keep the agricultural sector vibrant. One way to enhance this is by use of medium of communication in order to see the desired goals achieved. Broadcast media is a common medium in Kenya (Smith 2003). Radio, specifically, is widely used by a wide range of farmers who live in agricultural parts of Kenya. Currently, farmers in rural Kenya rely on agricultural extension officers for information on best agricultural practices. KASS fm's *long'etab Kabatik* programme is one such media that has become highly adopted among residents in Nandi County as it is famous for its broadcast of agriculture related topics such as crop and livestock farming. These media of communication has been able to

fill the gap created by existence of few extension officers in the Counties who are available to serve the farmers. According to (Oriare, 2010) all the major language communities in Kenya have their own ethnic language radio station. Communication on best agricultural practices through these radio stations can fill the information gap left by the shortage of agricultural extension officers in the Counties.

According to KNBS statistics of 2009, Nandi County whose size is 2,884 km square is home to 752,965 people. The population density is approximated to be two sixty one people per kilometer square and a big number of them aged between fifteen and sixty four years being fifty one percent of the total population. Moreover, it was approximated that the county has 376,488 males and 376,477 females. In this age of timeliness and demand for information, the media plays a crucial role in informing the public about the effective farming methods. This explains media's role in helping to influence the issues that the public should care about in farming and on what criteria they should use to increase productivity. It was also noted that Nandi County enjoy high access to radio service with a high number of 678,807 people and the Mosop sub-county which was then Nandi North had a total of 148,586 people having access to radio (KNBS, 2009). However, the numbers could be higher in the year 2016 since the number of people having access to higher education and those engaging in agricultural practices have increased.

KASSFM is a radio station that is licensed under part (iv) of the Kenya's Information and Communication Act of 2012 article 35 and article 36. The provision of information and skills has recently gained popularity in the quest to empower communities, with the media being a unique and effective tool. There are reports on how there has been growth and improvement of lives, especially in the rural areas after the introduction of rural radio stations (Smith, 2003). This is because these are vernacular speaking radio stations and therefore they have the power to reach and influence a large number of people. This is because the media is identified as an avenue for participatory communication and as a tool effective in realization of both economic and social development in the country.

In Nandi County, residents majorly practice Agriculture in the form of livestock and crop farming and some of them are turning to cash crop farming of tea, coffee and sugarcane to supplement their income (KNBS, 2009). The cool wet climate in the county complemented by rich volcanic soils makes Nandi an ideal area for maize, tea and sugarcane farming as well as horticultural farming among other types of farming. Thus, *Kass FM long'etab kabatik* radio programme plays the role of educating people and also in creating awareness on improved farming methods such as using modern techniques so as to ensure high yields in today's times of ever changing climatic conditions. This study sought to show that indeed the education of crop farmers through radio also helps

them find the right type of seed for planting that is able to resist emerging diseases, the right time to plant crops, the most effective fertiliser types, appropriate harvesting techniques, modern crop storage techniques, crop rotation, means of marketing crop produce as well as modern storage techniques among others.

### 1.1.1 Role of radio in the Society

Media plays the role of informing the masses. There are different types of media; these include print, electronic, broadcast and digital media. All communication in whatever form contains information. Syukit (2015) noted that, communication aids the public in getting the facts about issues, events and happenings. Radio as a form of media also has a persuasive role which means they can easily appeal to people, persuade and even influence people to do something as per its content.

Providing information and educating the public does not stop at informing them on the current issues which most preferably is politics. (Baran, 2006) says that it also means shedding light on matters that affect the public like agriculture and how to advance in it. The information that is relayed through the radio programme is usually clear and very easy to understand. The radio reaches a diverse audience which in many instances, in case of a call to action, many people can be reached within a short time.

### 1.1.2 The media in Nandi County

Broadcast media as run in Kenya has a high percentage of reality programming. Radio in this case when airing agricultural programs rely on soft and actual activities and events based on reality. In Nandi County, broadcast media and especially KASS fm radio receive higher listenership (KARF, 2011).

The role of media, in any form is to entertain, educate and inform the public (Baran, 2006). Most of the media outlets in Nandi County, especially radio stations, have socio-economic programmes, educational as well as family programs. The socio-economic programmes aired on Kass fm radio are designed to make the life of the people in Nandi County better. The local audiences as well as people within the County are usually treated to informative news and programmes. The people of Nandi County have continuously benefitted from the informative content from *long'et ab Kabatik* radio programme. An example of broadcast media that is widely accessed by the residents of Nandi County are television and radio. The Nation TV has a weekly program on farming every Saturday which is known as the Seeds of Gold that runs as from 6:00pm to 7:00pm, citizen Tv has shamba shape up programme run every Sunday afternoon at 2.00pm whereas Kass FM's radio program of *Long'et ab kabatik* programme runs every Thursday as from 7:00pm to 9:30pm.

*Long'et ab Kabatik* programme airs in local Kalenjin dialect which means they get to reach a larger number of people, especially those who cannot read and write. This therefore means that when development programs are organized, many people will turn up to help in the project to make the life of the community members better. The content of *long'et ab Kabatik* programme is largely on effective and appropriate crop farming practices as per regions but also taught are practices on appropriate livestock rearing. Examples of radio stations that receive wide coverage in Nandi County include Kass FM, Chamgei FM and radio Citizen among others.

## 1.2 Statement of the Problem

Today, farmers in Kenya are faced with the challenge of having to cope with the ever changing climatic conditions which have rendered their farm productivity to decrease every year. It is therefore the challenge of having the knowledge about the right crop to invest in, the appropriate fertiliser to use, alternative farming methods and also storage of the farm products that is crippling the agriculture sector. Notably in Nandi County as from 2014 is the emergence of the lethal maize necrosis which led up to seventy percent decline in maize harvested (ASDS, 2014). Moreover, the weevil menace is always threatening storage of maize, thus harvested maize cannot be stored for more than six months in a farmer's store. The use of farming involving technological means improves economic stability. (Kiome, 2012) states that Agriculture is the engine of our nation's economy; yet too many Kenyans still struggle to ensure that their fields bring high yields and that their families are fed. Mr Mugo Kibati, the then director-general of Vision 2030 held a similar view adding that there is far too much promise in Kenya's agricultural sector for its people to fall short of their economic potential. This therefore means that in order to achieve the economic stability required, agriculture has to be given major focus. If farmers are empowered and taught on the right seeds to plant, effective fertilizer types include improved, crop rotation, marketing techniques and modern technological farming and storage methods, then the food basket of Kenya will be assured.

Thrall P.H. *et al.*, (2005) in their book *Evolutionary Change in Agriculture: The Past, Present and Future* mention that Agriculture has been the backbone of evolutionary change ever since its inception thousands of years ago, and that this change is included in agricultural endeavors at all levels of biological organization, beginning from the individual persons to community as a whole. According to the ministry of Agriculture statistics in April 2013, the average farming age in Kenya was between fifty five and sixty years compared to the age of forty five as it were in the 1960s and the 2000s. Dr. Romano Kiome, the then PS for Agriculture, noted that the young people wanted to do businesses and that the government had promised to offer between ksh 50,0000

to one million for startup youth agricultural business under the youth in modern Agriculture practice program. Syukit (2015) noted that media coverage of stories of successful farmers and effective farming techniques is the main way that stakeholders use to make people know about the facts on farming for economic prosperity and stability in the country. Vital information on agricultural development can be passed on through the use of radio such as information on better farming methods, improved seeds types, timely planting of crops, agro-forestry, better harvesting methods, soil conservation, marketing, post-harvest handling and diversification. (Baran, 2006) notes that vernacular radio programmes give farmers an opportunity to interact with each other including with other relevant authorities such as extension workers, animal experts and crops through formats like live talk shows, on-location broadcasts and phone-in programmes.

Since vernacular radio programmes targets a specific community most preferably in a specific geographical area or interest, then the language of choice can be used to ensure that the message is clearly understood Baran, (2006). Vernacular radio stations therefore, gives the listener the option of using information learnt from the prevalent language. The media in general has the absolute capability to influence the listener's perception on the viability and reliability of a particular method of farming through their coverage according to Syukit, (2015). In view of the above, and this research study analyzed the influence of *Kass FM* radio program *long'etab Kabatik* on effective crop farming practices, in Mosop sub county, Nandi County.

### 1.3 Purpose of the Study

The purpose of this study was to analyze the effect that *Long'etab kabatik radio programme* has on promoting effective crop farming practices in Mosop Sub-County, Nandi County.

### 1.4 Objectives of the Study

- 1) To analyse the effect of *Long'et ab kabatik* programme talk shows on farming practices in Mosop sub-county, Nandi County.
- 2) To analyse the effect of *Long'et ab kabatik* programme panel discussions on farming practices in Mosop sub-county, Nandi County.
- 3) To analyse the effect of *Long'et ab kabatik* programme anecdotes on farming practices in Mosop sub-county, Nandi County.

## Literature Review

### 2.1 Influence of Radio on Good Farming Practices

The most Widespread and dominant examples of the use of educational farm radio is known as Farm Radio Forum.

This programme was started in 1941 in Canada as a radio discussion programme and it served as a system that was then adopted thereafter in several developing countries. After ten years of existence farm radio forum sponsors, the Canadian Federation of Agriculture, the Canadian Broadcasting Corporation, and the Canadian Association for Adult Education, invited UNESCO to assist in carrying out an evaluation of the influence of the programme and its effectiveness as tool of adult education (Coleman & Opoku, 1968). The lessons learnt from Canadian evaluation where the use of forums, printed materials, multi-media, two-way flow communication as well as various production means such as talk shows, drama, interview and panel discussion were then adopted in Ghana in 1964 and in India early 1956 with the help and sponsorship of UNESCO. The radio programmes for rural farming forums have since then been aimed at solving the problems of rural farming development, rural education, agriculture, self-government, innovations, and literacy. Such farming forums have then been used in many other developing countries. By end of 1968, a total of approximately 15,000 programmes were said to be in place (Nyirenda, 2001).

In another study sponsored by UNESCO, P. Neurath (1960) researched on the effects of a Farm Radio Forum project at Poona, India, which sought to compare 145 forum villages with control forum villages. The study lasted for ten weeks involving a total of twenty programmes. Each farm forum had twenty farmers' members who met twice a week to listen to a 30-minute programme on issues such as literacy, agriculture, and health. Forum group members were questioned before and after the project as were the sampled twenty farmer adults from each of the control villages. Additionally, each farm forum was visited and evaluated four times during the project. It was concluded that forum members learnt more about the issues under discussion than did adult farmers in villages without forums and had acted as control. According to Neurath (1959), Radio Farm Forum project as an agent of transmission of knowledge proved to be a success beyond the set expectations. Increase in knowledge gained in the Farm Forum villages between pre-broadcasts and post-broadcasts was a lot, whereas in the non-forum villages it was negligible. The little gain that was there happened majorly in the non-forum villages with radio.

Abell (1968) conducted his study into the effect of listening in groups to Rural Radio Forums in Ghana. Like Neurath's study that was done earlier, Abell's research was financed by UNESCO. He selected the Eastern Region of Ghana for the experiment which involved sixty experimental forums being organized into forty villages, while forty more villages were reserved as controls. In that period, twenty programmes were broadcast once a week between December 1964 to April 1965 exclusively. Among these five programs dealt with agricultural problems directly while the rest handled the problems concerning national policy and relationships with

governments. Each farm forum held a meeting on the day of the broadcast and discussed ideas on the topic, then listened to the broadcast and evaluated it. After the last session was held, forum members as well as the (non-forum members) were interviewed concerning what they had learnt from the radio broadcasts. When the results were compared it was inferred that forum members learnt more than the control group members from the radio programmes.

Moreover, Jain (1969) conducted a research study on the influence of rural radio forums. Here he chose a several villages in one area of India and created in each one of them a volunteer team of adult farmers. All these groups were told to listen to a twenty-five minute record of broadcast on a topic of current rural farming interest; some farmers followed this up with group discussion and/or decision making. Others farmers were only told to listen and take no further action thereafter. In tests which were done after the broadcasts, results obtained showed that group listening followed by group discussions were more effective in influencing change in attitudes and beliefs concerning innovation on crop farming practices than among the group listening without discussion following. Moreover, group decision making was found to be an important factor as also. This is because it enabled farmers to approach their farming problems in a more informed way and to work together towards finding appropriate solutions.

In 1956 according to Abell, the Maharashtra Radio Forum project was a research study carried out in India. The purpose of this was to find out whether radio forums would be effective in India with rural farming audiences who were rarely exposed to radio, unfamiliar to organized group discussions and were mostly illiterate. The objectives of the study were to, increase participants' knowledge, ignite discussion and, where possible, have the activities lead to decisions and actions that improve village farming life (Bordenave, 2007). Interviewing in this study was done before, during, and after the broadcasts. The evaluation showed evidence that some action was taken by farmer village groups, but that several group actions and decisions were never acted upon because the necessary materials for implementation were not available. For example, a decision was put forth to use fertilizers on rice crops with intention of increasing productivity but, unfortunately, fertilizer was not availed to these farmers. From the evaluation results, it was inferred that farm forum members learnt a great deal of knowledge more than the control group farmers. Concerning the amount of knowledge gained, the illiterate farmers gained as did the literate farmers.

In the republic of Benin, vernacular radio programmes were used in educating rural poor crop farmers in the 1960s. This process involved organization of small farmer listening groups, referred to as radio clubs, use of village chiefs as presidents of the radio clubs, formation of national and departmental committees as well as use of animators as group leaders. In this case, group

discussions were carried out after listening to the vernacular radio broadcasts and animators concerned provided reports from group discussions. When a one-and-a-half year was over of the study, an investigation was carried as well to find out the reactions of the poor farmers. From the investigation, the way of administration of the Agricultural Radio programmes and organization of the farmer radio clubs was changed to the better. It started with the formation of a national committee to take up the responsibility of planning the farmer agricultural broadcasts schedule. Here, themes on rural farmer life and on motivation were formed for the programmes. Information from the radio clubs, and answers questions and of importance to the development of crop farming, all formed valid topics for the farm radio programmes. Departmental committees were also put up to give recommendations to the national committee on subjects and matters for the farm radio broadcasts. One year later, a national seminar was set up with the aim of evaluating the success of the Agricultural Radio programme. From that, about 60 respondents, mostly district heads and some operational heads attended the seminar (Anyanwu., 2008). The findings of the evaluation showed that vernacular radio is an effective tool of information dissemination and education for the rural poor farmers. It was then summarized that through teachings from the vernacular radio programme, the poor farmers were able to grow to fathom how to farm better even with introduction of new farm implements that also require new skills set for the enhancement of agriculture as a whole. The success realised in such a direction has showed that via group listening, discussion, and the use of audio the vernacular radio programme can contribute majorly in the process of bringing change to agricultural traditions as well as some economic and social attitudes in general.

Griffin and Punasiri.,(2006) put together the Farm Radio Forum Pilot study of Thailand in which they expound the aim of the study which was to give strengthen to existing agricultural services as well as to get qualitative data on the importance of farm radio forums in enhancing communication between the extension service and the farmer audience. The programmes involved interviews held by specialists, announcements, discussions derived from listening groups and giving answers to questions from the farmers' groups. The study was designed as an important part of the farm radio forum project activities. It involved use of a number of means of collecting data such as the weekly Radio Farm Forum attendance records and reports, follow-up visitation to villages, surveys of Radio Farm Forum leader and members, observation notes, survey of regional Level committee members, the presentations made to Department of Agricultural Extension (DOAE) and after-project seminar with team leaders. The study inferred that the two-way passing of information between the extension officers and the farmer had significantly improved. This is because the frequency of

extension agents' contact with farmers increased and farmers felt that the officers were attempting to give those messages directly which was relevant to their desired farming needs. Overall learning and Retention of information were generally improved as a result of high interest in the information and the reinforcement of content through several communication means such as literature, radio, and field visits by agriculture extension officers and technicians.

They also added that the farmer audience and the extension staff were discovered to be extremely motivated by the Radio Farm Forum activities. The evaluation of its communication programmes, experiments and projects have repeatedly showed that radio is an effective tool for teaching; it can present farming innovation, new concepts and information (McAnany., 2006). In this regard, (Sweeney and Parlato., 2002) summarized that radio plays an effective role of education either in conjunction with print and group support or as the sole medium. For instance, in a project used for learning mathematics through radio by school children in primary classes in Nicaragua, farmers who were taught via radio lessons gained significantly higher scores in the last evaluation than those taught through regular, classroom, face-to-face instruction. Rural crop farmers who were tested against rural control farmer groups gained more than urban farmers tested against urban control groups (Searle & Gaida., 2000). The project evaluators had earlier hypothesized that radio lessons were specifically effective in increasing the level of knowledge of those who knew the least, which in this case were the rural crop farmers.

Using a format which combines entertainment, instruction and humor, Kenya's nationwide weekly radio programme "Giving Birth and Caring for Your Children" was measured to be equally effective in educating its audience about modern child care practices (Jamison & McAnany., 2008). The findings showed that more than one-half of the audience interviewed listened for the educational content, while more than one-third watched out for entertainment. The study showed that general recognition of the major theme issue which was child care and a high recall on topical issues covered by the programme was adopted.

There is a civic education project that was organized in Botswana by a community college to give village residents the basic information about government and its policies and procedures about citizens' responsibilities and rights. The radio programmes were listened to and discussed by listening groups. Pre- broadcast and post-broadcast surveys revealed that there was a definite increase in people's awareness and knowledge of government and of the ways through which people can participate in the development processes (Byram, Kaute & Matenge., 2000). Punasiri & Griffin., (2006) Furthermore, added that the Radio Farm Forum Project of Thailand noted that the critical issue of the radio forums was the sole opportunity offered for the members to

exchange ideas and experiences and to take part in group problem solving discussions. The two-way flow system of communication between the farmer and an extension officer increased retention and learning of audience as a result of their high interest in themes broadcasts and the chances for discussion. Information were reinforced by several communication models such as radio programmes, literature and field visits by technicians and extension agents. Radio agricultural broadcasting was equally made relevant to farmer problem via problem-solving discussions and the exchange of ideas.

A study on nutrition education in rural areas of Mexico sought to compare the effectiveness of a mass media team especially radio with pamphlets and posters with a straight education group of audio-visuals and teachers in passing over nutrition concepts. The research involved use of three geographical areas with same features within the same country. Here, villagers from one region were taught via radio. In a second area, the method used was the face-to-face classroom the regular instruction by trainers. The third area was a control region and was neither taught directly by radio nor trainers. Public awareness was not done for them via the radio programmes despite the fact that some of them might have listened to them. Knowledge on nutrition concepts was then evaluated there after teaching and before three months have elapsed. A year later, variance in diet was observed. The general evaluation showed evidence that nutrition concepts were learnt equally well using, face-to-face instruction as well as through mass media. Both study groups reported a positive variance in food taking habits. It was later derived that radio messages were uniform than the face-to-face methods of instruction as information was received in an identical format by all audience. Moreover, the style of presentation and the messages did not differ as it did from teacher to teacher instruction showing the uniformity and uniqueness of educational radio programmes in teaching marginalized adults in the developing countries (Sweeney & Parlato., 2002)

Provision of skills and information gained popularity in the drive to empower communities who have vernacular radio stations as an effective and unique tool. Chapman *et al.*, (2003) reported that the growth of vernacular radio stations showed that the shifting of development paradigm towards a more participatory style of information and improvement in information technologies and knowledge transfer had been achieved. Al-Hassan (2011) identified that vernacular radio programmes is a means for community participatory communication and as equipment relevant in both social and economic development. Vernacular radio therefore can play an important role at the community level for enhancement of rural development. For example, issues of education, agriculture, gender inequality and social problems can be the focus for the radio programming. Chapman *et al.*, (2003) found that vernacular radio is effective in enhancing the transfer of agricultural

messages by remote rural farming communities. *Long'et ab Kabatik* radio programme in this regard gave a set of participatory communication skills that give help to agricultural extension efforts by using local kalenjin language to speak directly with listeners' groups and the crop farmers.

The aspect of communication is important in sharing of agricultural innovation among stakeholders in considering more than fifty years of radio broadcasting which makes farm radio forum the best known type of rural broadcasting (Dikshit et al., 2009). In their findings for publication by UNESCO on vernacular radio, they give a view into the history of agricultural programming on radio in the world. The ability of vernacular radio in development was obvious from the start in the 1920s in Africa when mass media was seen as instruments of power through which authoritarian governments could use to rally communities on their development agenda. For crop farming communities living along the edge of information technology and societies, radio is their only way to global reality (AFRI., 2008).

Mapusteni (2006) in his research concerning Use of Radio in Zimbabwe was of the opinion that what motivated the use of radio as an educational and pedagogic tool were its perceived strengths. The strengths of radio according to audiences have been listed by other researchers, appealing to the imagination of the listener, being based in oral tradition, it can cross space and time without limitation, it is a specific media that can reach millions of audience at once with ability to communicate to each one of them personally and, able to evoke images that are not possible in real life. The statements put across by researchers in favour of vernacular radio built cases its relevant continued radio use in agricultural development. Weaknesses were however observed by Girard (2001) that efficiency of vernacular radio is limited by lack of poor farmer involvement in determining its programming and its structure. Vernacular programs are usually aired on a single radio network that mostly doesn't cover entire country. Its strengths however surpass its limitations putting it above other mass media in developing world, where radio is an effective and powerful medium to relay knowledge related to agriculture (Nakabugu., 2001). In her other publication Nakabugu (2010) observed that messages on effective crop farming methods,, better harvesting methods, soil conservation, marketing, post-harvest handling improved quality of seeds, timely planting, agro forestry and crop diversification, vernacular radio gives crop farmers the chance to interact with each other as well as with extension workers, crop and animal experts via means like phone in programs, live talk shows and on location broadcasts. Since vernacular radio is regional, it can be used to rally people towards community agricultural development work such as construction of protected wells, valley dams and immunization of animals.

The importance of vernacular radio in agricultural development is undoubtedly important, according to Ansah (2002), where he notes that it has been advanced by the realization that the old ways of development that majorly equated development with modernization are questionable. This view was then characterized by the diffusion of innovations theory and the extension of service and knowledge from the change agents to the farmers. In this context, the role of radio communication was to pass over technological and knowledge innovation from change agents in *long'et ab Kabatik* programme to audience and therefore create room for a desire for change among the farmers striving for agricultural development. Ochilo (2003) however criticizes this design to be top-down, elitist and paternalistic so much that it excluded poor farmers from participating in planning and implementation of needed agricultural development programmes. Such criticisms therefore led to the realization involving radio communication in national programmes is important. This has then led to efforts by institutions and governments to develop communication models with the aim of bridging the gap in developing countries.

Moemeka (2000) gave examples of developing countries that used vernacular radio for raising living standard and intellectual standards among rural communities as Colombia and Tanzania. Tanzania's educational model was timely geared on national radio station broadcasting messages to many listening groups. Columbia also decreased physical distance by decentralization of radio stations in communities. According to Payne, Bell, and Bohn (2011), the function of agricultural extension agents are to raise awareness of opportunities, link crop farmers to markets, train, provide technical information, diagnose problems and propose solutions, provide general advisories, respond to questions raised by audiences, facilitate access to loans, conduct surveys and help with business planning. These are functions requiring ICT strategies. This is solved by Vignare (2013) case for integration of ICTs and extension services where he mentions that Broadcast media are important to extension strategies. Broadcast tools have limited listener participation, but many radio programs targeted to farmers involve questions and answers via call-in sessions. Nevertheless, there is limited audience participation than should happen with one-to-one or a well-designed Internet training. Use of broadcast media with interaction improves impact. Broadcast media is aimed at reaching large populations through television, radio or video production.

AFRRI (2008) states three types of vernacular radio: Private, public and commercial radio and that all are faced with varied challenges of funding and radio frequency allocations with many resources with public radio stations. Resource challenges of community radio led to partnership with organizations that support agricultural programming. Since 2009, Farm Radio International (Developing Countries Farm Radio) had

been helping radio broadcasters in Africa with free messages on food security and agriculture for small-scale farmers. Vernacular radio programs can greatly affect crop farming patterns by accelerating attention towards effective crop farming methods and focusing more on stories of successful crop farmers. Moreover, exposure to the vernacular radio has influenced campaigns on crop farming issues and can be regarded as social learning processes whereby when a topic on an innovation concerning crop farming is put on the public agenda, radio uses specific presentations and characterizations of news that influence how the listener understands and adopts the issue (Chapman *et al.*, 2003). He continues to note that vernacular radio has the ability to control selection of content and to frame new messages such that crop farmers are able to understand the issue and to formulate a decision to adopt in case of taking up of a new farming innovation.

## 2.2 Community Radio for Agricultural Development

Effective education, extension, and communication services are key strategies for sustaining strengthening food security, agricultural growth and combating hunger and malnutrition. However, linguistic barriers, diverse socio-cultural backgrounds of farmers' geographical remoteness and difference in incentives make the job of information sharing complicated. Agricultural extension is the key tool for passing useful information to crop farmers and assisting them to develop the required skills, knowledge and attitudes to make good use of the information and technology. Recently, advances in Information and Communication Technologies are advancing agriculture extension by giving varied technological options such as television, radio, internet, telephony and mobile use. Since its independence, India has acted upon implemented several extension programmes for agriculture and rural development. Agriculture is a state subject and there is a long list of multi-sectors and single sector extension approaches and models that were tested, one after another and sometimes in overlapping manner, in the agriculture sector. Despite being well-intentioned and designed, these efforts were then mostly criticized for its low performance as they all fell short of desired objectives.

Of the three major categories of mass communication media for agricultural extension for instance radio, print media and television the importance of radio cannot be overlooked. Radio is an efficient communication tool. India's after independence research with ICT involved use of agricultural development which started with radio. (AIR) which is a network of All India Radio stations was established throughout the country to broadcast agricultural programmes in community languages. Prasar Bharathi as it is known, has been a very significant factor for several years hence leading to new technological information on agriculture and other related subjects to the farmers. With the recent liberalization of the

broadcast licensing policy, vernacular radio has archived a new status in India. This type of participatory communication has proved efficient tool for economic and social development at community level. The farmer needs which are often overlooked by the mainstream television had been sufficiently addressed by community vernacular radio. Furthermore, farmer to farmer learning had been made possible via adequate capacity building such as the HAM radio trials that took place in Andhra Pradesh shows and Tamil Nadu. Experience with vernacular radio programmes has proved the potential for agricultural extension services to benefit from the relevance and the reach that vernacular broadcasting can achieve via participatory communication means. Extension officers use radio for passing information on new techniques and methods of crop farming practices thus giving timely information about the control of crop pests and diseases, appropriate seeds, weather changes, and crop marketing. For this purpose, dialogues, talks, dramas, group discussions and folksongs, are usually organized.

Radio programme initiatives as part of wider communication for agricultural development strategies have been adopted by international agencies such as FAO, UNESCO and UNICEF since 1960's. FAO developed the (SEC) Strategic Extension Campaign methodology in several countries in Asia, Africa and Latin America with the objective of helping local extension officers. For example, the campaign conducted in Malaysia, with FAO's Programme on Integrated Pest Management among Rice farmers. Moreover, vernacular radio was engaged in discouraging use of a particular farming chemical called Zinc Phosphide with preference given to a safer alternative. The follow up study showed good results as many rice farmers stopped the use of Zinc Phosphide by fifty two percent. Various related services like market standards, market information, post-harvest technologies and certification apart from production knowledge are key to crop farmers. During this era of globalisation, vernacular radio has proved to be a reliable and cost effective ICT tool with several advantages crop farming.

There is a combination of approaches to the use of vernacular radio for agriculture extension services all over the world. They are majorly focused on using indigenous knowledge of crop farmers to build on agro-ecological and local cultural diversity coupled with scientific innovation and technology. There is a two way communication model of disseminating farmers' experiences that can be an effective adaptation. Historically, agricultural extension has severally failed to pass technical information to crop farmers in a way that enables it to be adopted widely. Thus a combination of communication approaches forms an effective balance between scientific approaches to agricultural development and indigenous crop farmers. The evaluation of agricultural extension by Simli Radio for instance showed that popular vernacular radio programmes can give farmers an enhanced income-



earning opportunity. This case frequently involved training and discussion on themes that assist in combining planting of traditional crops with another activity that doesn't need a lot of investment or risk of sopping existing activities. Examples of radio programmes in India mostly have been on bee-keeping, rearing grass-cutters and snail production for sale to clients in the southern part of the country. The additional agricultural extension programs are popular during summer when farmers have the time to consider other farming strategies of fighting famine and drought. During cropping farming season specific ideas are offered on the wide range of crops being grown locally and are timed to coincide with the stages of planting, land preparation, weeding practices, marketing of the crops and water management, harvesting. However using vernacular radio for agricultural extension is one dimension as it can serve many roles of extending socio-economic and agricultural development in community such as nutrition, health and sanitation.

An NGO known as FRI, based in Canada functions directly with approximately 400 radio broadcasters in 38 African countries to fight food security and poverty. Their top objective is to help vernacular radio stations so that they can advocate for crop farming activities among poor farmers. FRI has been giving solutions to the need of crop farming programmes that supported small scale farmers. Before then, the available stations advocated for large scale farmers whose desires were very unique from those of the small scale farmers hence by producing suitable programmes, they were able to achieve their objective of assisting the small scale farmers (AFRI, 2008). The aspect of vernacular radio communication is important to disseminating of agriculture innovations among actors in the many years of radio broadcasting. The Farm Forum is one known type of vernacular broadcasting. Dikshit *et al.*, (2009). In their findings for a publication by UNESCO about vernacular radio, gave a slight view into history of agriculture-related programs on radio around the world. The potential of vernacular radio in agricultural development was obvious from its start in the 1920s and in Africa in 2000s; where it was seen as a means to power within which authoritarian governments used to rally people around the development manifesto. For crop farming communities living on the outside periphery of information technologies and societies, radio is the sole means to global reality (AFRI 2008).

In 2000, before vernacular radio became a common feature, McAnany (2000) complained that participatory communication models that were almost unachievable in rural areas can connect the agricultural extension workers, the government officers and farmers. Every important activity that is in support of agricultural development relies on communication channels and this explains why in the developing countries, radio is the sole media that can reach the rural communities. He argued that if radio was availed to the village-living people, it could make it simple to communicate with them so they

can take part in agricultural development studies. Since radio programmes have become easily accessible throughout Africa today, it now plays a larger role in communicating to the people and thus accomplishing McAnany's need for an informed population in Africa McAnany (2000).

(Chapman, 2003) concurred with the above line of thought by noting that vernacular radio can be used by village farming communities to enhance passing over of agricultural information. Participatory communication means, according to him can add to agricultural extension efforts moreso via use of vernacular languages and community radio to pass information directly to listener groups and farmers. Arpita (2011) argued that since vernacular radio programme is limited to an area and community, it passes information to a people who share resources for a livelihood. Such a community has similar agricultural development problems and challenges and this directly affects them in addition to them experiencing regional and national development goals. Therefore vernacular radio programmes connects the hard-to-reach farmer audiences and serves a specific purpose of community radio international and national radio cannot deal with. (Arpita, 2011) From the above statements, it is obvious that vernacular radio if well used, can serve an important role in communicating to the small-scale crop farmers with the important messages that will change their lives and their agricultural activities in a positive direction.

Fisher, (2000) argued that early development communication theories believed that just passing of information via vernacular radio programmes can an increase in effective agricultural practices. This belief led to the adoption of many other development projects such as in the earlier Farm Forum programmes as earlier mentioned where messages were just sent down from the extension agent and government agricultural department to the rural farming people. Very little feedback was received from farmers at that time and the messages passed were mostly technical, complicated and descriptive to be easily understood by the audience. It was hard for the farmers to fathom the messages and this disappointed them from adopting agricultural innovations they heard. These early schemes showed the disadvantages of top down government campaigns made to enhance agricultural development. For radio to be effective in passing agricultural information, it has to adopt a two way communication model, whereby the audience is allowed to air their opinions and seek for clarification (Fisher, 2000). This argument displays a need for the programme producers to be careful with the development of the programmes so as to ensure that they are easily understood and that during delivery, they provide for sufficient feedback from the listeners.

Vernacular radio has existed for more than a century. Mensa (2000) mentioned that in Canada where it originated, it was called the voice of the people. Through radio forums, farmers met to discuss their agricultural

problems as well as seek for its solutions. In 1964, UNESCO with Canadian help organized a study which involved 40 villages in an experiment that involved vernacular radio programmes. Farmers were involved in formulation of the content. These methods proved to be beneficial to the farmer as they easily owned the programme and its message and were more willing to adopt the new ideas. They were additionally able to monitor and evaluate the effectiveness of the programme. The radio listening groups involved professionals, people of both gender, both the illiterate and educated. This model was thereafter adopted on a large scale of four hundred groups in Zambia, Ghana, Malawi and Nigeria according to (Mensa.,2000). (AFRRI) Africa Farm Radio Research Initiative was developed to find out the effectiveness of vernacular radio programmes in addressing agricultural goals and the food security of poor crop farmers in five African countries: Malawi Ghana, Mali, and Uganda and Tanzania (Commonwealth, 2012). AFRRI involved the use of (PRC) Participatory Radio Campaigns to collect, implement, and share best practices for using radio-based communication strategies and to evaluate so as to improve food security in rural parts of Africa. It begun in Malawi in year 2007 with the beginning of AFRRI-I project that was funded by (BMGF) the Bill and Melinda Gates Foundation and implemented by (FRI) Farm Radio International.

(PRCs) Participatory Radio Campaigns were then developed by Farm Radio International as a means of helping farmers to evaluate, learn and adapt farming innovations. It gave support and trained vernacular radio station producers to work with farmers in planning and dissemination of farming innovation campaign programmes. FRI (2016) acknowledged that messages passed over vernacular radio are able to change lives by empowering farmers at community levels. Such information enabled farmers to act on their agricultural developmental challenges as they are able to take care of their environment, produce food, and develop employment and economic opportunities. With current increased access to mobile phones farmers have a chance to speak for themselves via call in to radio stations as they take part in agricultural development (FRI 2014-2015).

A study by CEDA (2001) on the influence of agricultural programmes passed by Radio Nepal confirmed that the programmes have helped crop farmers to improve their crop farming techniques and methods. Farmers, that took part in the programme, listened and received the agricultural programmes passed by Nepal Television and Radio Nepal with enthusiasm. Africa has so many vernacular languages that the radio producers can adopt to communicate effectively to the farmers. Overcoming the challenge of language barriers by communicating in vernacular language is a good step since for a long time many illiterate farmers have been deprived of information (CEDA 2001). A research study by Teran *et al.*, (2015) in Congo on the effect of vernacular radio programmes on Climate change knowledge had the

general objective of disseminating messages on climate change and to create opportunity for stakeholders to disseminate their ideas and views in a language they understand. The evaluation showed that the programme was impactful as the knowledge level among the audience improved. Girard (2003) emphasized the importance of vernacular rural radio programing by expounding that the strength of vernacular radio as an agricultural extension tool relies in its ability to disseminate information to illiterate farmers by giving them relevant agricultural information in their vernacular language.

Despite the fact that in Kenya agricultural extension officers do a good job, they at times might not be able to get to all the farmers nor to pass information to all the tribes effectively. To the *long'et ab Kabatik radio* programme producers, this does not mean simply reading technical information over the airwaves in Kalenjin languages, but fathoming the way crop farmers themselves talk about their problems in the community and by providing them with relevant information in cultural and the local agro-ecological context (Girard., 2003). Chapman *et al.*, (2003) in their research study on rural radio in agricultural extension while giving an example of vernacular radio programmes on water and soil conservation in Northern Ghana, concluded that the audience liked the radio programme and they enjoyed the group discussion and the drama between agricultural extension agents, the presenter, NGO representative and the invited farmers. The farmers' understanding of water and soil conservation practices, use of organic manure and agro-forestry improved after listening to the programme. If similar programmes were to be disseminated regularly, they can be used as a learning tool in the area of agro-forestry where farmers mentioned that there is lack of enough information. They summarized that all vernacular radio stations needed to adopt such methods of passing information so that they remain relevant and be more effective in influencing agricultural development.

### 2.3 How Radio Promotes Farming in Kenya

Radio is the most accessible and popular medium of communication in Kenya. 95% of all Kenyans listen regularly to radio (KARF Audience Research Q1, 2011 and Synovate, 2011) and that the number of vernacular radio stations have grown greatly since the first station, radio Kameme, was set up in 2000. Today there is a variety of state-run and community based vernacular language radio stations and commercial radio on air. According to the Communications Commission of Kenya (CCK) (which is now Communication Authority of Kenya), there are 30 stations broadcasting in vernacular languages other than Kiswahili and English. Eleven of them are owned and run by Royal Media Services (RMS), Kenya Broadcasting Corporation runs five vernacular stations and there are other seven vernacular regional stations. CCK said that,

more vernacular language radio stations were waiting licensing. Owners and editors of these vernacular radio stations put emphasis to the fact that vernacular language programs play a key role for the agricultural development and public participation of rural communities, even in which a number of people do not communicate in either English or Kiswahili.

Vernacular radio can play an important role at the community level for rural agricultural development. For example, issues of poverty, gender inequality, social problems and education can be the focus for such radio programming. In expounding on the importance of disseminating information locally and opening up of broader information networks for farmers in Northern Ghana with specific reference to vernacular radio programmes, Chapman *et al* (2003) concluded that vernacular radio is useful in improving passing of agricultural information to remote rural farming communities. Radio in this position uses a set of participatory communication model that supports agricultural extension efforts by using local community language to talk directly with listeners' groups and farmers. Using (MSC) the Most Significant Change process, Walters *et al* (2011) evaluated the impact of vernacular radio in Indonesia and summarized that effective vernacular radio programmes can be a significant change in a people's life. The MSC method had its origins in community health development conversations. It had also been used in vernacular radio impact assessment in Kenya. By the MSC process, farmers give feedback in the form of stories describing the needed change in their farming life as a result of the teachings of the radio.

Via media skills training and access to the airwaves, vernacular radio facilitates several capacity building activities. The exchange of information, provision of skills, networking of groups, and training are the key elements of developing a people economically. Moreover, a radio for a community helps in awareness of community farmer groups and facilitates them in the region in addition to giving the means for empowerment of these farmers' groups to adopt use of radio in promoting themselves to speak directly to the farmers. For its nearness to farmers a vernacular Radio works for a local community and their interest. This is accessible to the farmers in terms of decision making, ownership and programme output. In many cases, vernacular radio programming is developed by the community with focus on local issues and concerns. Unlike in the mainstream media, rather than just talking of the community, people themselves develop the radio programmes. This gives strength to local culture with recognition that that is their radio station, it became a forum for a broad diversity of people's views and opinions. Sterling *et al* (2007) gave evidence that female community radio audience were given a voice with which to answer to the programming and to develop programming theme. The writers approximated the cost of excluding women from ICT for agricultural

development and discussed how vernacular radio presents a chance for inclusion. They also conclude that by using the principles of (PAR) Participatory Action Research, the writers said that women will benefit from technology-mediated opportunities better for agricultural and economic development if they provide information that contributes to their advancement rather than just consuming messages given by others.

Syukit (2015) mentioned that vernacular radio formed an important component in enhancing farm production by creating awareness for farmers about agricultural models such as information on appropriate use of fertilizer, modern storage techniques, soil testing, timely planting of crops and the availability of markets for their crop produce. He added that that was expected to lead to improved livelihoods, food security and increased national economies since vernacular radio can be used to make public agricultural processes of study and extension work to crop farmers so as to provide means for meetings with agricultural extension workers, advise on where to get services and inputs as well as to advise on how to get technical support from agriculture extension officers. Karembu *et al.*, (2011) from their project in Kenya and Burkina Faso agree that majority farmers prefer that radio programmes on agriculture biotechnology to be broadcast in their vernacular languages as this enhances farmers' understanding of the message, their identification with the radio presenters. This, according to them, has enhanced farming practices moreso in areas with minimal rainfall in a year since introduction of greenhouse farming. There are two forms which vernacular radio programmes use to enhance crop farming practices in Kenya, free media and paid media. Smith (2003) explained that paid media can break or make an agricultural promotional campaign depending on how much can be spent on television, radio, posters and fliers for advertising. An example is that of Kenya's print newspaper where a quarter a page of print advertisement costs a minimum of one hundred and forty five shillings. The message must therefore be simplified in order to be heard and the campaigners must also use the most popular entertainment medium as the conveyor of their messages. Thus, vernacular radio programming fits the character.

Free media on the other hand is a better option if agricultural innovation campaigners can take advantage and put it in good use. Having knowledge of how to take advantage of the radio is important in a campaign (Edwards, 2009). This is where opinion leaders and politicians come in. Team players can work together with politicians to get public speaking about effective innovation for crop farming practices. Politicians are news makers and media will always follow them wherever they go even when they do not call for press briefings. Showcasing African farming and agriculture through TV, radio, and film can help engage the public in discussions about food justice, agriculture and sustainability according to a FoodTank report 2014/2015. An example of this is the broadcast on effective farming practices by Chamege fm on the Uasin Gishu County agricultural show held in March 2016.

## 2.4 Salient Issues highlighted by the Radio when promoting effective crop Farming Practices

Many authors have proposed that educational radio can be more effective when supported by group learning, trained facilitators and group discussion in the form of feedback, dialogues and use of multiple media approaches. For instance, Perraton (2008) argued that trained facilitators can be used to affect fully use educational radio. Similarly, Higgs and Mbithi (2007) contended that a "effective programme has to be backed by preparation of training materials, good training of trainers and continuous improvements in them."

Perraton (2008) emphasized that group listening is more effective than individual listening and thus group discussion is an efficient method of teaching via radio. The trainer must discuss with farmers so as to emphasize the major points covered by radio programmes in order to give feedback whenever necessary. The trainer must also ensure that programmes are supported by physical demonstrations that groups are cohesive and that debates were carried out well by using models of group discussion (Moore, 2003). Moreover, multi-media such as posters, print materials, chalk boards and films, may alternatively be used to explain the major points to farmers.

Vernacular radio programs deliberate on several issues during coverage of effective crop farming practices. To an extent, radio coverage of these campaigns in all democracies are to find out what issue's dimensions are of interest to the crop farmers and can be made salient in order to attract public support (McQail, 2010). Crop farming is an important part of Kenyan government's efforts to achieve the Millennium Development Goals and reduce poverty among its people as well as the sustainable development goals. It also involves several other areas of developmental policies that complement the government's ideals on matters such as forestry, fisheries, governance, food security and trade.

The mode that radio uses on crop farming is based on the idea that farming as a practice has the ability to enhance economic stability going beyond the direct influence it has on the gross income of these farmers. There is lots of evidence that an increase in agricultural productivity has been of great benefit to millions of people via increased incomes, more plentiful harvests and cheaper food. Farming additionally generates development systems that are job intensive and of benefit to the farmers from both urban and rural urban areas (Department for International Development, 2002). This greatly adds to economic development other than agriculture where job and growth creation are quick and salaries and wages are higher.

Other than agenda setting, vernacular radio as a form of media moreover determines what audience believes to be important issues. The public's knowledge on issues related to innovative crop farming practices is related to the extent and amount of their attention on the matters discussed by radio (Edwards, 2009). Edwards further stated that the radio develops a community which is the basis for the public's behavior and knowledge. The issues and themes that are talked about repeatedly on radio

programmes become valued by the public over time. Gershon *et al.*, (2005) noted that reception, exposure and acceptance play an important role in collecting information for use in campaigns. Exposure involves a farmer's physical closeness to a message, reception is actual taking in of a message while acceptance is allowing the message contained within the information to affect one's opinion and actions.

## Research Methodology

**Research Design:** Events under study. The population has all the variables of importance to the study. The sampled 753 farmers' households from the 42,000 households of Nandi County.

**Sample Size Determination:** The sample size used in this study was based on the formula provided by Pindyck and Rubinfeld in 2008. This formula is normally adopted when the population under study is greater than 10,000 households and was put forth as follows:

$$N = \frac{Z^2 PQ}{e^2} \quad (3.1)$$

Where  $Z$  = the normal quartile for wanted 95% confidence level and in this case,  $z = 1.6485$ ;  $P$  = Percentage of initial judgement of the correct value of  $P$  which is the value of non-adopters in the population under study,  $Q = 1 - P$ ,  $e$  = Margin of error. The study assumed that  $P = 50\%$  and  $e = 5\%$ . The calculation of the sample size is as shown below:

$$N = \frac{(1.6485)^2 (0.5) \times (0.5)}{(0.05)^2} = 751$$

The sample size of this study based on the formula above was 751 households. This was suitable and large enough to allow accurate and reasonable interpretation of the results for the study. However the study used 753 questionnaires filled per households. This is within Kathuri and Pals (2003) recommendation that a research sample size should ensure that several features of the households were captured.

**Data Collection Instruments:** Data refers to anything given as a fact on which a study inference will be based on (Onen, 2005). Data collection method was by use of questionnaires. The selection of this tool was guided by the nature of information desired, the time available as well as the set objectives and the purpose of the research study. This researcher was mainly interested in the opinions, views and perceptions that were relevant to the study as well as those that could be gathered through the mentioned tool. Data was collected by use of questionnaires. A questionnaire is a method of discovering the feelings, experiences, beliefs, perceptions and attitudes of a sample under study (Orodho, 2000).

**Data presentation and analysis:** data was analysed by use of descriptive statistics and presented in tables

**Table 4.3** Descriptive Statistics of Radio Talk Shows

Radio Talk Shows	5	4	3	2	1
Radio talk shows disseminate information on crop spacing	613(81.40%)	43(5.7%)	69(9.2%)	37(4.9%)	19(2.5%)
Radio talk shows educate farmers on crop species and their suitability	601(79.81%)	43(5.71%)	56(7.4%)	44(5.8%)	27(3.6%)
Radio talk shows inform farmers on fertilizer varieties and their use	637(84.64%)	101(13.41%)	9(1.20%)	6(0.79%)	37(4.9%)
Radio talk shows educate farmers on use of pesticides	672(89.24%)	29(3.85%)	18(2.39%)	21(2.79%)	13(1.7%)
Radio talk shows inform farmers on land preparation	585 (77.7)	32 (4.2%)	55 (7.3%)	30 (4.0%)	51(6.74%)

Source: Data Analysis, 2016

5 = Strongly Agree, 4 = Agree, 3 = Not Sure, 2 = Disagree, 1 = Strongly Disagree

## Analysis, Presentation and Interpretation of Results

### 4.1 Program talk shows

In this section the respondents gave their opinion on knowledge learnt from *Long'etab Kabatik* program talk show which is aired by Kass FM radio. 81.40% respondents strongly agreed, 2.5% strongly disagreed that radio talk sh disseminate information on crop spacing. From *long'et ab kabatik* programme factors that determine crop spacing included allowance for working space, allowance for sufficient space for crop root development and allowance for the crop leaves to acquire sufficient sunlight to enhance food production. 79.81% (601) strongly agreed while 3.59% (27) strongly disagreed that radio talk shows disseminate information on crop species. From the programme studied maize variety H628 and H614 was taught to be suitable for planting within Mosop sub-county since they are classified as highland varieties that do well in a region with temperature range 8-28degrees and rainfall 800-1500mm. 84.59% (637) strongly agreed while 0.5% strongly disagreed that radio talk shows inform farmers on fertilizer varieties and their use.

Murumba and Mugambi (2017) agreed with this that radio is a means of change where new farming practices cumulating to community development and variation in beliefs, attitude and skills of farmers. The study found that due to access to information from *long'et ab kabatik* programme of kass fm radio station, farmers have managed to improve their yields as a result of adopting appropriate fertilizer use. Through the findings and data analysis, it was evident that the programme is popular in Mosop sub-county. It has influenced crop farming activities and that through implementation of the new ideas on types of fertilizers, crop farmers in the region have been economically empowered. The crop farmers said that they had learnt a lot of new farming ideas on different types of fertilizer and their suitability to tested soil types.

89.24% (672) strongly agreed that Radio talk shows educate farmers on appropriate use of pesticides. This is in agreement with Simiyu (2015) who noted that Radio is the most cost effective method of creating awareness and

supporting the adoption of appropriate pesticide use by small scale crop farmers. This study therefore provided an insight into best approaches to agricultural programming for radio stations and other stakeholders in educating crop farmers on effective pesticide use. *long'et ab kabatik* radio programme is the preferred medium for small scale farmers and extension experts should adapt it in sharing information on agriculture innovations.

77.69% of the respondents strongly agreed whereas 6.77%(51) of the households strongly disagreed that radio talk shows inform farmers on effective land preparation methods. This was in agreement with study findings by Syukit (2015) who noted that radio formed a key component in improving crop production by creating awareness among farmers on matters concerning agricultural land preparation techniques. He added that this is expected to lead to food security improved livelihoods and national economies since radio can be used to make public processes of research and agriculture extension work to farmers so as to give means for meetings with extension workers.

### 4.2. Panel Discussion

This involved the composition of the panelists in discussion in the programme. This involved agricultural officers, crop production experts and extension officers who attended the show and shared their knowledge to crop farmers on soil suitability to crops, appropriate pest and disease control methods, appropriate weeding practices, timely planting of crops and crop rotation. From the findings, 80.61%(607) of correspondents strongly agreed while 5.71%(43) of the correspondents strongly disagreed that they gained knowledge on soil suitability to crop farming from programme panel discussions. From *long'etab Kabatik* radio programme panel discussion soil testing is advised so as to determine the soil PH, texture and nutrient levels. This helps in determining the appropriate type of crop to plant whether it is maize or potatoes.

91.90% (692) of the correspondents strongly agreed while 2.26 % (17) of the households strongly disagreed to have learnt appropriate pest and disease control

methods. From the programme, there are field management practices that can influence pest management. For example, for corn no-till farming has positive effect on army –worms and wireworms. Farm ploughing is effective in management of insect pests such as onion maggot and corn borer.

84.6%(637) while 1.73%(13) of the correspondents strongly disagreed that they gain knowledge on appropriate weeding practices from *long'etab Kabatik* programme panel discussions. The crop weeding practices taught by the programme are post-planting cultivation that helps in removing weeds from the crop, farm tillage which is effective in eliminating growing weeds by burying their seeds too deep for them to emerge easily and mulching which smoothers weeds as well as delays those weeds that do emerge.

85.13% (641) strongly agreed while 1.99% (15) strongly disagreed that *long'etab Kabatik* programme panel discussion teach them on timely planting of crops. From the programme, what was taught include early and timely ploughing of fields which helps in reduction in the size of the population of insect eggs that exist in the soil. Ploughing destroys biennial weeds that can attract insects

to a field at the beginning of a season. It is advised that this happens to give a period of fourteen days to starve caterpillars known as black cut worm that develop on winter weeds. Additionally, it is advisable to delay planting or if not possible then a farmer should protect early planted crops with row covers.

89.51% (674) farmer's households strongly agreed while 3.85% (29) strongly disagreed that they learnt crop rotation techniques. This was supported by Nakabugu (2010) who observed that information on improved crop farming methods and benefits of crop rotation through vernacular radio gives farmers an opportunity to interact with each other and with other relevant authorities such as crop and animal experts and extension workers through ways like live talk phone in programmes and on location broadcasts. According to *long'eet ab kabatik* programme, effectiveness of crop rotation is highly realised when a farm is divided into small crop units. Crop farmers are also advised to clean their farm equipment before tilling different units to avoid passing of diseases. More so, it all depends with the length of time required between crop rotation for specific disease management as there is variation.

**Table 4.4** Descriptive Statistics of Radio Panel Discussions

Radio panel discussions	5	4	3	2	1
Panelist's enlighten farmers on various types of soil suitability to crop farming	607(80.61%)	33(4.38)	44(5.84%)	26(3.45%)	43(5.76%)
Panel discussion highlights appropriate pest and disease control methods	692(91.98%)	24(3.19%)	6(0.42%)	14(1.85%)	17(2.3%)
Panel discussions educate farmers on best and appropriate weeding practices	632(84.6%)	46(6.11%)	33(4.38%)	29(3.85%)	13(1.7%)
Panel discussions enlighten farmers on timely planting of crops	641(85.25%)	36(4.78%)	38(5.04%)	23(3.05%)	15(2.0%)
Panel discussions effective ways of practicing crop rotation	674(89%)	24(3.08%)	9 (8.6%)	17 (4.0%)	29(3.85%)

Source: Data Analysis, 2016

5 = strongly agree, 4 = agree, 3 = Not sure, 2 = Disagree, 1 = strongly disagree

### 4.3 Program Anecdotes

Programme anecdotes are the impact realised when the program discussion is taught using short stories of real experiences to farmers. These can be either positive or negative effects of the program on the listener. This section focused on the findings on the effectiveness of *Long'et ab kabatik* programme on appropriate harvesting techniques, crop health management, marketing of crops, preparation of crops for storage, appropriate storage techniques gained adopted.

86.99% (655) farmers strongly agreed while 3.59% (27) strongly disagreed that they learnt appropriate harvesting techniques. 93.36 % strongly agreed while 0.53 % (4) strongly disagreed that they learned appropriate crop health management techniques. In *long'et ab Kabatik* programme, farmers are taught how to distinguish different types of pesticides, how to identify pests and their nature as well as methods of crop health management in controlled cultivation.

Eighty seven percent 84.46% (636) while 6.77 % (51) of the respondents disagreed that the respondents agreed that listening to *long'etab Kabatik* programme anecdotes aided them on improving their crop marketing skills. From the programme under study, farmers are taught marketing strategies of group marketing which increase farmers' bargaining power for their surplus goods especially when trying to enter international markets. 75.96 % ( 572) of the respondents agreed 3.19% (24) that programme anecdotes had really improved on their preparation of crop produce for storage while reported that their crop storage preparation has remained the same even after continuous listening to *long'et ab Kabatik* programme anecdotes. 91.10%(686) agreed whereas only 1.2%(9) disagreed that *long'etab Kabatik* programme anecdotes has really improved their adoption of modern storage techniques reported that the programme has never helped on their adoption of modern storage techniques.

**Table 4.5** Descriptive Statistics of Programme Anecdotes

Programme anecdotes	5	4	3	2	1
Farmers share their experiences on appropriate crop harvesting Techniques	624(82.87%)	88(11.69%)	16(2.12%)	11(1.46%)	14(1.86%)
Farmers share their experiences on appropriate methods of crop health management	703(93.3%)	27(3.59%)	7(0.93%)	12(1.59%)	4(0.54%)
Farmers share their experiences on preparation of their crop produce for storage	572((76.0%)	95(12.6%)	33(4.38%)	28(3.72%)	24(3.2%)
Farmers share their experiences on modern storage techniques for their crop produce	686(91.14%)	24(3.19%)	25(3.32%)	6(0.8%)	9(1.2%)
Farmers share their experiences on marketing of their crop produce	636 (84.46%)	15(1.99%)	37 (4.91%)	14(1.86%)	51(6.77%)

Source: Data Analysis, 2016

5 = strongly agree, 4 = agree, 3 = Not sure, 2 = Disagree, 1 = strongly disagree

## Conclusions

The provision of skills and information has gained popularity in the quest to empower communities with vernacular radio as a unique and effective method. The study established the effect of *Longetab kabatik* programme on crop farming practices among households in Mosop Sub-County, Nandi County. Results indicated that program talk shows had positive effect on crop farming practices. From the findings, results indicated that panel discussions highlight issues for the farmers to influence their crop farming practices and had positive effect. The findings on *Long'etab kabatik* program anecdotes showed that its inculcation led to increase in effective crop farming practices. Results indicated that the program anecdotes had positive effect on crop farming practices.

Evaluation of communication programs and experiments have shown that radio can teach, present new concepts and information as well as crop farming innovation. The study aim was to analyse the effects of *long'etab Kabatik* radio programme among households in Mosop Sub-County. The study statement is proved through empirical evidence as the more the farmers listen to the agricultural programme the more they adopted new crop farming practices. Furthermore, the study findings revealed that farmers adopted new crop farming practices via the information provided by *Long'etab Kabatik* programme. For instance, farmers adopted purchase of varieties of seeds as advised as well as using appropriate pesticides and adopting efficient weeding practices that help them to improve their yield.

Therefore with the right support, including an enabling government structure and relevant and appropriate use of technology, *Longetab kabatik* programme has the potential to enhance existing agricultural extension services by integrating both public and private sector partners in an effective response to the communication needs of crop farming households. The research findings indicate that agricultural knowledge is essential for increased productivity and that radio is the preferred medium for small scale farmers and extension experts in sharing information on agriculture innovations.

There is need to set up a County agricultural committee like in Benin to take up the responsibility of planning adoption and uptake of agricultural innovations learnt from radio by crop farmers. This is because many ideas learnt through radio programmes may never be adopted because farmers may lack necessary materials for implementation which can be availed by stakeholders such as government. Radio can contribute substantially to the process of transformation of agricultural traditions. It's also evident that small-scale crop farmers provide approximately 70% of the food eaten in Mosop Sub County. Yet despite being the prime food producers, small-scale farmers are more likely than any other part of the population to be impoverished and to suffer the effects of hunger and malnutrition. This situation can change by providing small-scale crop farmers with the support they need to enhance their resiliency, improve their productivity, and to connect more successfully with markets. This research documents evidenced that *Long'etab kabatik program* of KASS FM is a highly effective strategy for achieving these important crop farming objectives.

## Recommendation

From the study findings the following recommendations were drawn: First, KASS FM radio station should increase the air time that the *long'et ab Kabatik* programme is broadcast. Secondly the frequency of the programme should be increased to at least twice per week since it is of high demand among farmers. Model farmers should grace the programme panel discussions other than just experts as it currently is in order to increase farmer uptake of information as a result of familiarization from experience. Farmer education and extension programmes through radio should be supported by the government and other stakeholders including policy makers. Retention of information and overall learning were greatly improved because of high interest in the *long'et ab kabatik programme* content and the reinforcement of messages by quest to the programme. Thus agriculture extension officers need to adopt the use of this programme since evaluation of the programs have shown that radio can teach, present new concepts and information as well as

influence adoption of crop farming innovation. There is need to set up a County agricultural committee to assume the responsibility of planning adoption and uptake of agricultural innovations learnt from radio by farmers.

## References

- [1]. Abdulai, A. & Huffman, W. (2007). *The Diffusion of New Agricultural Technologies; The Case of Crossbreeding Technology in Tanzania*, Staff General Research Papers, Iowa State University.
- [2]. Abell, H.A. (1968). Assessment of the project. In H.C. *An African experiment in radio Forums for rural development; Ghana, 1964/1965* (pp. 22-70). UNESCO.
- [3]. Academy for Educational Development. (2009). *Paraguay using radio for formal education in rural areas*. Academy News, Washington, D.C.: Clearinghouse on Development Communication.
- [4]. Academy for Educational Development. (2000). *Health education radio dramas, Sri Lanka*. Project profiles. Washington, D.C. Clearing house on Development Communication.
- [5]. Adesina, A. and Baidu-Forson, J. (2005). *Farmers' Perceptions and Adoption of New Agricultural Technology; evidence from analysis in Burkina Faso and Guinea, West Africa*, Agricultural Economics, Blackwell, vol. 13(1), pages 1-9.
- [6]. Adil E. Shamoo and David B. Resnik Adapted from Shamoo A and Resnik D. (2015). *Responsible Conduct of Research* New York: Oxford University Press.
- [7]. Anyanwu, C.N. (2008). *The Agricultural Radio Clubs in the Republic of Benin; A case study of Cultural Diffusion in West Africa*. Nigeria.
- [8]. Baran, S. (2006). *Introduction to mass communication* (fourth edition). McGraw Hill
- [9]. Bates, T. (2002, September). The impact of educational radio. *Media in Education and Development*.
- [10]. Bereh, H. (2002). *Connecting Farmers Worldwide through Radio*. Low External Input and Sustainable Agriculture (LEISA) July. Vol 1 No. 2
- [11]. Bordenave, J. (2007). *Communication and rural development; UNESCO*.
- [12]. Byram, M., & Kidd, R. (2003). A hands-on-approach to popularizing radio learning group campaigns.
- [13]. Byram, M., Kaute, C., & Matenge, K. (2000, October). Botswana takes participatory approach to mass media education campaign. *Development Communication Report* No. 32.
- [14]. Cassirer, H. (2007). Radio in an African context; a description of Senegal's pilot project. In P. Spain, D. Jamison, & E. McAnany (Eds.). *Radio for education and development: Case studies* (Volume 2).
- [15]. Cauvery R, SudhaN, GirijaM, Meenakshi, R. (2003). *Research Methodology*, S. Chand & Company Ltd, New Delhi
- [16]. CEDA (2011) CEDA Fiscal Year 2011 Annual Report.
- [17]. Cerquiera, M.T., Casanueva, E., Ferrer, A.M., Fontanot, G., Chavey, A., & Flores, R. (2009, July-September). A comparison of mass media techniques and a direct method for nutrition education in rural Mexico. *Journal of Nutrition Education*.
- [18]. Chapman R., Blench R., Kranjac-Berisavljevic' G. and Zakariah A.B.T. (2003). *Rural Radio in Agricultural Extension; the Example of Vernacular Radio Programmes on Soil and Water Conservation in Northern Ghana; Agricultural Research & Extension Network; Network Paper No. 127 January 2003*.
- [19]. Chaudhury B. A, Barerjee S. S. D et al (2007) *Statistics without Tears- Inputs for Sample since Calculations*. Indian Psychiatry.
- [20]. Coleman, W.F., & Opoku, A.A. (1968). Rural radio forum project in Ghana. In H.C. Abell, W.F. Coleman, & A.A. Opolu edition. *An African experiment in radio forums for rural development: Ghana, 1964/1965* (pp.7-17). UNESCO.
- [21]. Cooke, T., & Romweber, G. (2007). *Radio Nutrition Education; Using Advertising techniques to reach rural families: Philippines and Nicaragua*. (Final Report).
- [22]. Creswell W. John (2012). *Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research*, Pearson Education. 4th edition
- [23]. Daniel, J.A., & Marquis, C. (2003). Interaction and independence; Getting the mixture right.
- [24]. In D. Stewart, D. Keegan, & B. Holmberg (2003). *Distance education*; International perspective (pg339-359).
- [25]. David B. Resnik (2015). *What is Ethics in research and why is it important?* National Institute for environmental Health science.
- [26]. David C. Edwards (2009). *Motivation and Emotion. Evolutionary, physiological, Cognitive and social influences*. Sage publications
- [27]. Deborah Smith (2003). *Principles for Research ethics*. Vol 34
- [28]. Denis McQuail (2010). *MacQuails Mass Communication Theory*. Sixth edition. Sage publications.
- [29]. Department for International Development (2002). *Annual report*.
- [30]. Diagne, A. and Demont, M. (2007). *Taking a New look at Empirical Models of Adoption: Average Treatment Effect estimation of Adoption rate and its Determinants*. Agricultural Economics, Vol 37 (2007).
- [31]. Diagne, A. et al., (2012). *The Impact of adoption of NERICA rice varieties in West Africa*. Presented at the International Conference of Agricultural Economists, Brazil 2012
- [32]. Dikshit et al., (2009) *Positive Environmental Externalities of Livestock in India*.
- [33]. Drost, E.A (2011). *Validity and Reliability in Social Science Research*. Educational Research and Perspectives. Vol 38 (1)
- [34]. Edwards, J. R., & Lambert L. S (2007). Methods of Integrating moderation and mediation. A
- [35]. General analytical framework using moderated path analysis. *Psychological methods*.
- [36]. Faulder, D. (2004, March). Learning on air. *Media in Education and Development*, 7(1), 36-39.
- [37]. FoodTank reort (2015). Showcasing African Farming.
- [38]. Galda, K. & Searle, B. (2000). *The Nicaragua radio mathematics project; Introduction*. California: Stanford University, Institute for Mathematical Studies in Social Studies.
- [39]. Galda, K. (2004, March). Learning math by radio. *Media in Education and Development*, 17, 40-42.
- [40]. Gall, Meredith (2007). *Educational Research: An Introduction*. Action Research. 8th ed. Boston, MA: Pearson/Allyn and Bacon,
- [41]. Gershon Feder et al (2005). *Adoption of Agricultural Innovations in Developing Countries; A Survey on Economic Development and Cultural Change*, Volume 33.
- [42]. Gert Van Dessel (2013). *How to determine population and survey sample size*. Market research.



- [43]. Gilham B. (2010). *Case study Research Methods*. London, GBR: Continuum International publishing
- [44]. Ginsburg, M.B., & Arias-Goding, B. (2004, February). *Non-formal education and social reproduction/transformation: Educational radio in Mexico*. *Comparative Education Review*, 28(116-127).
- [45]. Gueri, M., Jutsun, P., & White, A. (2008). Evaluation of a breastfeeding campaign in Trinidad. *Bulletin of the Pan American Health Organization*, 12(2).
- [46]. Haider Irfan (2014). More Farmers Listen, More They Adopt: Role of Local Radio Agricultural Programs in Small Scale Farm Extension *International Journal of Multidisciplinary Academic Research* Vol. 2, No. 3, 2014 ISSN 2309-3218
- [47]. Hall, B., & Dodds, T. (2007). Voices for development: The Tanzanian national radio study campaigns. In P. Spain, D. Jamison, & E. McAnany, (Eds.). *Radio for education and development: Case studies, Vol. 2* (Staff working paper, No. 266). Washington, D.C.: World Bank.
- [48]. Higgs, J., & Mbithi, P. (Eds.). (2007). *Learning and living: Education for rural families in developing countries*. Rome: FAO.
- [49]. Hostetler, S. (2006, July). Health messages through humor. *ICIT Report No. 15*. Washington, D.C.: Clearinghouse on Development Communications.
- [50]. Jain, N.C. (1969). *An experimental investigation of the effectiveness of commitment and consensus in India radio forums*. Unpublished doctoral dissertation, Michigan State University.
- [51]. Jamison, D., & McAnany, E. (2008). *Radio for education and development*. California: Beverly-Hills.
- [52]. John W. Creswell (2009). *Research Design: Qualitative, Quantitative and Mixed Methods approaches*. Sage publications
- [53]. Kaminski J. (2011). *Theory of informatics- Lewin's Change theory*. Canadian Journal of Nursing informatics.
- [54]. Kaminski, J. Spring (2011). *Diffusion of Innovation Theory*. Canadian Journal of Nursing Informatics. Theory in Nursing Informatics Column.
- [55]. Karembu, M. and Nguthi, F. (2011). *Communicating agricultural Biotechnology in Africa: What Role for radio?* ISAAA Africenter New Media and Biotechnology Research Brief, issue volume 1: Nairobi, Kenya
- [56]. KARF (2011). Audience Research.
- [57]. KARI (2010) *Policy Responses to food crisis in Kenya*. Food Security report.
- [58]. Kenya Information and Communications Act of 2012
- [59]. Kenya National Bureau of Statistics (2009) *National Census*.
- [60]. Kenya vision 2030 (2000)
- [61]. Kiess H. O and Bloomquist D. W (2005). *Psychological Research Methods*. A conceptual Approach. Published by Prentice Hall.
- [62]. Kinyanjui, P.E. (2003, December). Radio correspondence courses in Kenya: An evaluation. *Educational Broadcasting International*, 6(4), 180-187.
- [63]. Kombo D. K (2006). *Thesis and Thesis writing: an introduction*. Paulines Publications Africa
- [64]. Kothari, C. (2002). *Research Methodology; Method and Technique*. New Delhi: New age International Publishers.
- [65]. Kothari, C. R. (2004). *Research Methodology: Methods and Techniques* (2nd Edition). New Delhi, Age Publishers.
- [66]. Leslie, J. (2008, May). *Evaluation of mass media for health and nutrition education; a review of the literature*. A paper presented at the joint meeting of the World Federation of Public Health Associations and the Canadian Public Health Association Halifax, Nova Scotia.
- [67]. Long, T. (2004, March). Broadcasting for rural development. *Media in Education and Development* 17(1), 17-19.
- [68]. Maputsteni (2006) *Use of Radio in Zimbabwe*.
- [69]. M. Defleur and E. Dennis (2002). *Understanding Mass Communication; a Liberal arts perspective*. Houghton Mifflin publication.
- [70]. Mathur, J.C., & Neurath, P. (1959). *An Indian experiment in farm radio forum*; UNESCO.
- [71]. Mayer, H. (2006) Alternative approaches and guidelines for conducting needs assessments. *Canadian Journal of Educational Communication*, 15(2), 117-123.
- [72]. McAnany, E.G. (2006). *Radio's role in development; five strategies of use* (Information Bulletin Number Four). Washington, D.C.: Clearinghouse on Development Communication.
- [73]. Mcleod, S. A (2014). Sampling Methods.
- [74]. Media Council of Kenya (September 2011). *The performance of vernacular radio stations in Kenya*. Monitoring report.
- [75]. Michael Polonsky and Stacy Landreth (2010). *Assessing the Social impact of charitable organization's-four alternative approach*. International journal of nonprofit and voluntary sector marketing. Vol 16. Issue 2. Page 195.
- [76]. Miles, M.B., & Huberman, A. M. (2004). *Qualitative Data Analysis* (2<sup>nd</sup> edition). Thousand Oaks, CA: Sage Publications.
- [77]. Moore, M. (2003). On a theory of independent study. In D. Sewart, D. Keegan, & B. Holmberg. *Distance education: International perspectives* (pp. 68-94). Beckenham, Kent: Croom Helm.
- [78]. Moemeka A. (1980) *Use of Radio to raise Intellectual and living Standards of Rural Communities*. Case studied in Nigeria.
- [79]. Mugenda O. M and Mugenda A.G (2009). *Research Methods: Qualitative and Quantitative Approaches*. Acts Press Nairobi
- [80]. Muhlmann de Masoner, L., Masoner, P.H., & Bernal, H. (2002). An experiment in radiophonic education: Accion Cultural Popular, *Prospects*, 12(3), 365-374.
- [81]. Nakabungu (2010) *Role of Radio on Agricultural Development*. Kathmandu University.
- [82]. National Agricultural Extension Policy (2001)
- [83]. Nazari, M & Hazbullah, A. (2010). *Radio as an Educational media: impact on Agricultural Development*. The Journal of the South East Asia Research Centre for Communication and Humanities. Vol 2,
- [84]. Neil, M. (2001). *Education of adults at a distance*. (A report of the Open University's tenth anniversary international conference). London: Kogan Page.
- [85]. Neurath, P. (1959). Part two: Evaluation and results. In J.C. Mathur & P. Neurath. *An Indian experiment in farm radio forums* (pp. 59-121). UNESCO.
- [86]. Neurath, P. (1960). *The radio rural forum-report on the pilot project*. New Delhi: Government of India.
- [87]. Nicol, J., Shea, A.A., Simmens, G.J.P., & Sim, R.A. (Eds.). (1954). *Canada's farm radio forum*. Paris: UNESCO.
- [88]. Norman E. Wallen and J.R Frankael (2000). *Educational Research. A guide to the process*. 2<sup>nd</sup> Edition. Lawrence Elbraum associates publishers.
- [89]. Nowak, P. (2002). *Why farmers adopt production technology*. Soil Water Conservation, 47: 14-16

- [90]. Nwaerendu, Ndubuisi Goodluck, and Gordon Thompson (2007). *The Use of Educational Radio in Developing Countries: Lessons from the Past*. Journal of Distance Education
- [91]. Nyirenda, J.E. (2001). Research in developing countries. *Educational Broadcasting International*, 14(3), 101-104.
- [92]. O'Neill CJ, Swain DL, Kadarmideen HN (2010). *Evolutionary process of Bos Taurus cattle in favourable versus unfavourable environments and its implications for genetic selection*. Evolutionary Applications.
- [93]. Orodho, J.A (2000). *Techniques of Writing Research Proposals and Reports in Education and Social Sciences*. Masola Publishers, Nairobi
- [94]. Oso, W. Y and D. Onen (2005). *A general guide to writing research thesis and report*. Kisumu Kenya
- [95]. Ouane, A. (2002). Rural newspapers and radio for post-literacy in Mali. *Prospects*, 12(2), 243-253.
- [96]. Perraton, H. (2008). Radio broadcasting and public education in Africa. *Educational Media International*, 4-10.
- [97]. Peter H Thrall et al (2005). *Evolutionary change in agriculture: the past, present and future*.
- [98]. Peter Oriare Mbeke (2010). *Mass Media in Kenya: Systems and practice*. Jomo Kenyatta Foundation.
- [99]. Punasiri, S., & Griffin, R.S. (2006). *Summary report on the radio forum pilot project*. (ERIC Document Reproduction Service No. 146916).
- [100]. P. Spain, D. Jamison, & E. McAnany (2006) *Radio for education and development: Case studies*. Vol. 2. (Staff Working Paper, No. 266). Washington, D.C.: World Bank.
- [101]. Ray, H. (2008). *The basic village education project: Guatemala*. Washington, D.C.: Academy for Educational Development.
- [102]. Rogers, E. (2003). *Diffusion of Innovations*. Fifth edition. Free Press: New York.
- [103]. R. Savard (2000). *Adapting marketing to Libraries in a Challenging and world-wide environment*. Muchen: Saur Ed
- [104]. SCERT (2016) Agriculture crop Health Management
- [105]. S. R Melkote (2001). *Communication for Development in the Third world*. Theory and Practice for empowerment.
- [106]. Saunders M. et al., (2010) *Exploring the evolutionary ecology of fungal endophytes in agricultural systems: using functional traits to reveal mechanisms in community processes*. Evolutionary Applications.
- [107]. Seidu Al-hassan, Alhassan Andaniand Abdulai Abdul-Malik (2011). *The Role of Community Radio in Livelihood Improvement: The Case of Simli Radio*, Field Actions Science Reports Vol. 5
- [108]. Sewart, D. (2003). Distance Teaching: A contribution in terms? In D. Sewart, D. Keegan, & B. Holmberg. *Distance education: International perspectives* (pp. 46-61). Beckenham, Kent: Croom Helm.
- [109]. Shears, A.E. (2004). Development of management courses for the agriculture sector in Nigeria. *Programmed Learning and Educational Technology*, 21(2), 88-94.
- [110]. Sitaram, K.S. (1969). *An experimental study of the effects of radio upon the rural India audience*. Unpublished doctoral dissertation, University of Oregon.
- [111]. Sweeney, W.O., & Parlato, M.B. (2002). *Using radio: For primary health care*. Washington, D.C.: American Public Health Association.
- [112]. Syokit (2015). *The role of Radio Broadcasting in enhancing Farm Production in rural Kenya: A case of radio Namlolwe in Kakelo location, Homa Bay County*; University of Nairobi repository
- [113]. Telecoms, Internet and Broadcast in Africa News (2016)
- [114]. Terran P. et al., (2015) *Impact of Radio Programmes on Climate Change*. A Pilot experience from Congo basin.
- [115]. United Nations Food and Agriculture Organization (2015). *World agriculture: towards 2015/2030 Summary report*.
- [116]. Verbruggen E, Kiers ET (2010). *Evolutionary processes drive functional diversity in agricultural systems*. Evolutionary Applications.
- [117]. Wainewicz, I. (2002). *Broadcasting for adult education: A guidebook to world-wide experience*. Paris: UNESCO.
- [118]. White, R. (2006). *An alternative pattern of basic education: Radio Santa Maria*. Paris: UNESCO.