Threats to Indigenous Knowledge in Improving Agricultural Productivity in Crop Production of Kabasekende Sub-County, Kibaale District

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***Abstract*: - Indigenous knowledge (IK) is constantly phasing out by the new innovations amongst the youth, world population is steadily increasing and the demand for food is too appealing. Some 550 million of the 1,370 million hectares of global arable lands have suffered degradation as a result of non-sustainable cultivation. The Green Revolution technologies, which partly solved the problem of food and fibre needs, is expensive as the costs to transfer technology, soil erosion and loss of plant genetic materials that were resistant to diseases are high. Traditional agriculture cannot be fully resumed or would it satisfy the food needs of the increasing world population. Owning the indigenous knowledge's importance, it is thus inevitable to examine the threats to indigenous knowledge in improving agricultural productivity in crop production in Kabasekende Sub- County, Kibaale District.**

The study used a cross-sectional research design where an interview guide was used to sample 96 respondents with purposive sampling techniques. The study confirmed that farmers were still using IK to manage parasites and diseases, seed and breeds selection, determining seasons, pests and diseases control, harvest handling and ensuring safety of produce. Additionally, IK was reported beneficial in cost reduction on buying chemicals and maintaining soil fertility, recycling of farm resources, promoting the use of locally based resources in agricultural production, resiliency to climate change, maintenance and conservation of crop genetic diversity, increasing food security at house hold level and promoting life-support ecosystem services. Further the study established that individuals and communities should be supported to raise awareness, document and record IK they possess for future generations.

The study thus recommended that there was need to understand the major factors that contribute to indigenous knowledge production and how it's used within the farming communities if it is to be sustained for future development. Development programs need also to be tailor-made to suit specific situations and places, thereby increasing the likelihood of their success. There is a clear need to weigh the positive contributions of indigenous knowledge against their negative ones, in the sense that, for many in Africa, the use of indigenous knowledge has not necessarily transformed their lives as compared to modern technology.

***Keywords used in the Study:-* Indigenous knowledge, Agricultural productivity, Threats and Crop production**

I. GENERAL INTRODUCTION

1.1Background to the study

Traditional agriculture is believed to have been sustainable. This stimulates conservationists to analyze and, if possible, benefit from the wisdom of indigenous knowledge at least what has remained from it or can still be remembered by local people (Kumar, 2010). The reason for such a search is clear: world population is steadily increasing and the demand for food is too appealing. Poverty is growing and natural resources are degrading (Briggs, 2005). Some 550 million of the 1,370 million hectares of global arable lands have suffered degradation as a result of non-sustainable cultivation (Glasod, 1991).

The Green Revolution technologies, which partly solved the problem of food and fibre needs, appeared to be too expensive, as the costs of technology transfer, soil erosion and loss of plant genetic materials that were resistant to diseases are high (Kumar,2010). Traditional agriculture, as it was originally applied, can neither be fully resumed nor would it satisfy the food needs of the increasing world population (Kumar, 2010). It is however useful to preserve and mobilize local knowledge, which reflects expertise in and understanding of the environmental aspects gained over thousands of years (Kumar 2010).

UNEP (2002) argues that indigenous knowledge is the knowledge contained in the heads of farmers and agricultural workers. He draws the relation of indigenous knowledge to the development of technologies: "Part of indigenous knowledge consists of technologies developed over decades of adjusting farming systems to local agro-climatic and social conditions. And in some circumstances, local knowledge also consists of knowing how to keep conditions of productivity over the long run, rather than maximizing productivity in years of optimal conditions" (2001:94). On the other hand, Amiott (2003) indicates that indigenous knowledge entails practices of local communities around the world developed from experience gained over centuries and adapted to the local culture and environment, and transmitted orally from generation to generation. According to Nakata (2007), indigenous knowledge is mainly of a practical nature, particularly in such fields as agriculture, fisheries, health, horticulture, forestry and environmental management in general.

Semali & Kincheloe (2000), indigenous knowledge reflects the dynamic way in which the residents of an area have come to understand themselves in relationship to their natural environment and how they organize that folk knowledge of flora and fauna, cultural beliefs, and history to enhance their lives. Indigenous knowledge is the basis for local-level decision-making in many rural communities. It has value not only for the culture in which it evolves, but also for scientists and planners striving to improve conditions in rural localities. Incorporating indigenous knowledge into agricultural production can lead to the development of effective adaptation strategies that are cost-effective, participatory and sustainable (Robinson and Herbert, 2001).

In Uganda, agriculture is the source of livelihood (cash and food crops) and employment. The largest percentage of rural communities satisfies their subsistence needs through agricultural production by tending to majorly coffee, maize, beans, bananas and cassava.

For decades, farmers have planned agricultural production and conserved natural resources by adopting indigenous knowledge. According to Briggs (2005) the use of indigenous knowledge has been seen by many as an alternative way of promoting development in poor rural communities in many parts of the world. Kumar (2010) argues that with the rapid environmental, social, economic and political changes occurring in many rural communities, there comes a danger that the indigenous knowledge possessed is likely to be strained and lost forever.

1.2 Problem Statement

Agriculture is the source of livelihood (cash and food crops) and employment. The largest percentage of rural communities satisfies their subsistence needs through agricultural production by tending to major in production of coffee, maize, beans, bananas and cassava. World population is steadily increasing and the demand for food is too appealing. Poverty is growing and natural resources are degrading. Some 550 million of the 1,370 million hectares of global arable lands have suffered degradation as a result of non-sustainable cultivation (Glasod, 1991). The Green Revolution technologies, which partly solved the problem of food and fibre needs, appeared to be too expensive, as the costs of technology transfer, soil erosion and loss of plant genetic materials that were resistant to diseases are high (Kumar,2010). Traditional agriculture, as it was originally applied, can neither be fully resumed nor would it satisfy the food needs of the increasing world population (Kumar, 2010). It is however noted that amongst the reasons contributing to that cause is failure to apply Indigenous Knowledge in farming practices. Owning the indigenous knowledge's importance, it is thus inevitable to examine the threats to indigenous knowledge in improving agricultural productivity in crop production in Kabasekende Sub- County, Kibaale District.

1.3 Objectives of the Study

1.3.1 Major objective

The general objective of the study was to determine factors that threaten indigenous knowledge in improving agricultural productivity in Kibaale District.

1.3.2 Specific Objectives

i) To determine the ways in which IK is used in farming systems.
ii) To determine the benefits that farmers get from using IK in their farming systems.
iii) To establish ways by which IK used by farmers is losing its centrality in agricultural productivity.
iv) To find out the mechanisms of ensuring the IK survival and maintenance of its central position in farming in Kabasekende Sub-county.

1.4 Research Questions

i) What are the ways in which IK is used in farming systems?
ii) What are the benefits of indigenous knowledge towards agricultural production?
iii) What are the ways by which IK used by farmers is losing its centrality?
iv) What are the mechanisms of ensuring the IK survival and maintenance of its central position in farming in Kabasekende Sub-County?

II. MATERIALS AND METHODS

2.0 Introduction

The chapter indicated how data for the study was collected, analyzed and interpreted in order to answer the research questions.

2.1 Research Design

A research design is the overall blueprint or strategy for the research (Amin, 2005). This study used a cross sectional research design. A cross sectional research design was selected as ideal because the study was conducted within a specific period of time and respondents were purposely selected based on the knowledge they poses.

2.2 Area of the Study

The study was conducted in Kabasekende Sub-county of Kibaale District. The Sub-county is located 11 km from Kibaale town. The study covered six parishes which included; Nyamugusa, Rwamagando, Bukonda, Kabasekende, Nyamugura and Kicumita.

2.3 Study Population

The researcher carried out the study on Threats to indigenous knowledge in improving Agricultural productivity in crop production, Kabasekende Sub County, Kibaale District. The target population was 120 peoples. These consisted of 10 sub-county agricultural officials/extension staff and 110 indigenous farmers that were accessed through the Sub County's registry having 8 year and above of experience. The agricultural officials/extension workers were chosen because they were expected to be aware of the prevailing indigenous knowledge in the area which is used by local farmers' versus the modern knowledge introduced. Farmers were chosen since they hold a lot of indigenous knowledge that they repeatedly apply in farming against the modern knowledge being introduced.

2.4.1 Sample Size and Sampling Procedures

A sample size of 96 respondents was obtained from a population size of 120 using the Morgan and Krejcie (1970) tables. The sample size was then proportionately disaggregated for the six parishes, in the sub-county: Nyamugusa, Bukonda, Nyamugura, Rwamagando, Kabasekende, and Kicumita

2.4.2 Sampling Techniques

The study used purposive sampling method of non-probability sampling technique. It was used to select both agricultural extension officials and farmers who were targeted due to their perceived knowledge arising out of their experience. Purposive sampling was employed on assumption that if sampling has to be done from smaller groups of key informants, there is needed to collect very informative data (Sekaran, 2003).

2.5 Data Collection Methods and Instruments

2.5.1 Interview Guide

A semi-structured interview guide was used to conduct interviews with village farmers and agricultural/extension officials. Interviews were chosen because they provide in-depth information about a particular research issue or question. Interviews also provide in-depth data which is not possible to get using questionnaires (Mugenda and Mugenda, 2003). Still, interviews make it is easy to fully understand someone's impressions or experiences, or learn more about their answers as compared to questionnaires.

2.6 Quality Control Methods

2.6.1 Validity

The validity of the interviews was established using the content validity test. Using the ratings the content validity indices were computed. The Cronbach Alpha method of internal consistency was used to compute the validity of the questions from both interview items administered to respondents (Kothari, 1990).

According to Content validity Index,(CVI) the interview guides were considered valid since all the coefficients were above 0.7 acceptable in survey studies (Amin, 2004; Gay, 1996) hence the interview guides were considered valid for data collection.

2.6.2 Reliability

Gay (1996) defined reliability as the degree of consistency that the instrument demonstrates. Pilot testing was done with farmers of Wakiso district, Gombe Sub-county. After pilot testing in the field, reliability of the instrument was tested via the Cronbach Alpha Method provided by Statistical Package for the Social Scientists (Foster, 1998). This method was used because of the possibility of multiple responses per question. The liability of the interview guides was established by computing the alpha coefficient of the questions. According to Cronbach Alpha Coefficient Test (Cronbach, 1971), the interview guides were considered reliable since all the coefficients were above 0.7 which is the least recommended CVI in survey studies (Amin, 2004g; Gay, 1996).

2.7 Data Management Processing

Data collected was mainly qualitative but there was also some quantitative data from farmer respondents. The data collected included a range of opinions, socio-economic background of respondents, threats to indigenous knowledge, benefits farmers get from using IK and ways by which IK used by farmers is losing its centrality in agricultural productivity. The researcher presented views collected following a derived pattern. This was mainly a qualitative presentation of findings from the different subjects. Any quantitative data collected was rated in frequencies using tables and items recorded in percentages (%).

2.8 Data Analysis

Data generated was analyzed using Statistical Package for Social Science (SPSS). The generated descriptive statistics were analyzed and presented using tables, frequencies and percentages to determine relationships between study variables. The generated statistics were also used to examine how indigenous knowledge was being used in the study area, benefits obtained, how it is losing its centrality and mechanisms of ensuring that IK survives. Farmers' preferences and decision making were determined by using rank and point score analysis. The points were added and the totals were then expressed as percentages. The importance of preferences was determined by ranking the highest percentages as the most preferred option with the lowest percentage as the least preferred option. Qualitative themes were determined after reading through the scripts of the interviews (Briggs et al, 2007).

2.9 Ethical Considerations

The major ethical problem that was faced in the study was participation as they thought that the study was meant for some investigations from the government or other officials. Therefore, the researcher adopted voluntary participation so that a respondent who imagined of something beyond research was left out. Still, to ensure voluntary participation, those who attended to the study were informed upfront that indeed their names are not required, that they have the right to leave questions unanswered for which they do not wish to offer the requisite information, and that the researcher was not to put the respondent under pressure if this happens (Mugenda & Mugenda, 2003).

2.10 Limitations of the Study

Respondents were a bit busy since they had to look after their gardens. This delayed the overall progress of the study but this did not stop the researcher from finishing the study. The researcher traveled in the evening when respondents were back from their gardens. Poor means of transport was a problem because many of the roads were dusty and bumpy which lead to increased transport costs. In this case the researcher travelled in the evening when traffic is low and dust is reduced.

III. RESULTS

Presentation, Analysis and Interpretation of Results

3.0 Introduction

This chapter presents analysis and interpretation of findings in the study which was conducted on Threats to Indigenous Knowledge in Improving Agricultural Productivity in Crop Production of Kabasekende Sub-County, Kibaale District.

3.1 Empirical Findings on the Threats to Indigenous Knowledge in Improving Agricultural Productivity in Crop Production in Kabasekende Sub-county

In this section, the research findings are presented as per the study findings on the specified objectives. These findings were thus obtained on ways in which IK is used, its benefits, ways by which IK used by farmers is losing its centrality and mechanisms of ensuring the IK survival and maintenance of its central position. Below are the findings;

3.1.1 Ways in Which Indigenous Knowledge is used in Farming Systems in Kabasekende Sub-County

The study findings indicated that there are several ways in which indigenous knowledge in KabasekendeSub-county is used and among the ways include the following as obtained from respondents;

3.1.1.1 Crops Grown by Famers in Kabasekende Sub-county

Initially, to establish the ways in which indigenous knowledge is used in farming system in Kabasekende Sub-county, respondents were asked to state the crops grown in their gardens and table 1 below has details.

Table 1: Crops Grown by Famers in Kabasekende Sub-county

Name of the crops (in order of importance and nature of use)	Smallholder farmers Name of the crops (in order of growing the crops	
	Number of farmers growing the crop	Percentage of farmers growing the crop
Maize	76	100%
Beans	76	100%
Cassava	76	100%
Sweet potatoes	76	100%
Coffee	73	96%
Bananas	73	96%
Groundnuts	49	64.4%
Pineapples	40	52.6%
Green vegetables	36	47.3%
Mangoes	29	38.1%
Avocado	24	31.5%
Sugar cane	18	23.6%
N=76		

Source primary data 2018

Table 1 indicates that 76 respondents constituting a percentage of(100%)grow maize, beans, cassava and sweet potatoes. 73 of the respondents constituting 96% grow coffee and bananas, 49 of the respondents constituting 64.4% grow groundnuts, 40 of the respondents constituting 52.6% grow pineapples,36 of the respondents constituting 47.3% grow green vegetables, 29 of the respondents representing 38.1% grow mangoes.24 and 18 of the respondents representing 31.5% and 23.6% of the respondents were growing avocado and sugar cane.

3.1.1.2 Type of Livestock Kept by Famers in Kabasekende Sub-County

The researcher observed the types of livestock kept by farmers in Kabasekende Sub-county and below is some of the livestock that were noted in table 2 below.

Table 2: Type of Livestock Kept by Famers in Kabasekende Sub-County

Livestock	Frequency	Percentage
Cattle	18	23.7%
Goats	11	14.5%
Pigs	5	6.6%
Chicken	40	52.6%
Sheep	2	2.6%
Total	76	100

Source primary data 2018

It was found out that 40 of the respondents kept chicken and these constituted 52.6% It was established in the study that they kept more of the local breed as compared to the exotic breed, 18 of the respondents were rearing cattle constituting 23.7%, 11 of the respondents were rearing goats constituting 14.5%, 5 of the respondents were rearing pigs constituting6.6%and2 of the respondents were rearing sheep constituting 2.6%.

3.1.1.3 Indigenous Knowledge in Selection of Crops for Planting in Kabasekende Sub-County

When farmers were contacted and asked on how they select crops for planting in the area, below is what they said as shown table 3.

Table 3: Selection of Crops for Planting in Kabasekende Sub-county

Method	Very important(4)	Important(3)	Neutral (2)	Not important(1)	Not very important(0)	percentages
Seed size	18%	9%	2%	0%	0%	29%
Color	16%	8.4%	0%	0%	0%	24.4%
Texture	23%	8%	1.5%	0%	0%	32.5%
Recommended by extension staffs	15%	22%	7%	1.3%	0%	45.3%
Resistant to diseases	29.2%	7%	0%	0%	0%	66.2%
Resistant to pest attack	41%	24%	0%	0%	0%	65%
Drought resistance	32.5%	0%	0%	0%	0%	32.5%
Yield capacity	39.5%	0%	0%	0%	0%	39.5%
N= 76						

Source primary data 2018

Table 3 establishes that 66.2% of the farmers in Kabasekende Sub-county selected crops based on resistance to diseases. Those who based on resistance to pest attack constituted65% of the respondents, 39.5% of the respondents considered the yield capacity of the crop, 32.5% of the respondents considered both texture and drought resistance, 29% considered seed size and 24.4% color of the seed. On consideration based the recommendation from the extension staff, 37% of the respondents were in agreement, 1.3% disagreed and 7% were not certain.

3.1.1.4 Indigenous Knowledge on Season Determination for Planting in Kabasekende Sub-County

Table 4: Information on Determination of Season for Planting

Method	Very important(4)	Important(3)	Neutral (2)	Not important(1)	Not very important(0)	Percentage
Use birds	23%	2.5%	0%	0%	0%	25.5%
Use insects	16%	2%	4.1%	0%	0%	22.1%
Friends/other villagers	19.5%	17%	0%	0%	0%	36.5%
Agricultural officers advice	12.8%	0%	0%	0%	0%	12.8%
Meteorological Department	7.6%	4%	0%	0%	0%	11.6%
Rainfall	17.2%	15%	5%	0%	0%	37.2%
Clouds	33%	5.3%	0%	0%	0%	38.3%
Temperature	21%	5.1%	1.8%	0%	0%	27.9%
Direction of wind	3%	7%	8.6%	0%	0%	18.6%
N=76						

Source primary data 2018

Table 4, shows that 38.3% of the farmers determined season for planting while looking at clouds,37.2% of the respondents determined season at onset of rains, 36.5% of the respondents heard from friends and other villagers, 27.9% of respondents determined season based on temperatures, 25.5% determined season on appearance of birds especially in February. 18.6% of the respondents considered direction of wind. The wind starts increasing speed especially the season is beginning, respondents who based on Meteorological Department constituted 11.6%.

3.1.1.5 Indigenous Farmers Knowledge on Crop Management in Kabasekende Sub-County

It was established in the study that farmers have a range of knowledge about crop management in Kabasekende Sub-county and below is exemplified in table 5.

Table 5: Indigenous nowledge Based Practices on Crop Management

Crop management	Very important(4)	Important(3)	Neutral (2)	Not important(1)	Not very important(0)	Percentage
Mixed cropping	40%	5.5%	0%	0%	0%	45.5%
Crop rotation	26%	2%	4.1%	0%	0%	32.1%
Varying planting time	19%	7%	0%	0%	0%	26%
Weeding	12.8%	10%	0%	0%	0%	22.8%
Mulching	7.6%	4%	0%	0%	0%	11.6%
Application of synthetic chemicals.	7%	4.4%	0%	0%	0%	11.4%
Roughing	11.2%	0%	0%	0%	0%	11.2%
Hand picking and crushing pests	9.3%	0%	0%	0%	0%	9.3%
Drying of seeds prior to planting	7.9%	0%	0%	0%	0%	7.9%
N=76						

Source primary data 2018

Table 5 establishes that most respondents used mixed cropping and this was ranked highest by most of the respondents (45.5%), Crop rotation was reported by 32.1% of the farmers, Varying planting time was recorded by 26% of the respondents,22.8% of the respondents reported Weeding. Mulching and roughing of the crops were reported by 11.6% and 11.2% respectively. Handpicking and crushing was reported by 9.3% of the farmers, and lastly, drying of seeds prior to planting and trapping of crops were reported by 7.9% and 5.6% of the respondents. In the above table, it can be noted that farmers who used synthetic chemicals constituted 11.4% posing a risk to indigenous knowledge.

3.1.1.6 Indigenous Knowledge Based Practices in Harvesting Handling in KabasekendeSub-County

This section indicates how the respondents handle their harvests as a way of identifying how they use indigenous knowledge in the area. Table 6 below has more details.

Table 6: Information on Farmers Knowledge on Harvest, Harvest Handling and Ensuring Safety of the Harvest

Harvests , harvest handling and safety of harvest	Very important(4)	Important(3)	Neutral (2)	Not important(1)	Not very important(0)	Percentage
Harvest when completely dry	20%	7.3%	0%	0%	0%	27.3%
Sun dried	30%	5.5%	0%	0%	0%	35.5%
Gunny bags	10.1%	0%	0%	0%	0%	10.1%
Keep in a dry place	27%	2%	2.1%	0%	0%	31.1%
Keep in granaries	0%	0%	0%	0%	0%	0%
Ash treated	7%	4.2%	0%	0%	0%	11.2%
Use of locally made pesticides	7.6%	3.5%	0%	0%	0%	14.1%
Use modern chemicals/pesticides	9.3%	0%	0%	0%	0%	9.3%
N=76						

Source: primary data 2018

It was established from the study that most of the farmers employed IK in harvest handling. Harvesting when completely dry constituted 27.3%,sun drying constituted 35.5%, of the respondents, use of gunny bags constituted 10.1%, respondents who kept in dry places constituted 31.1%. No farmers kept in granaries. From the study it was observed that respondents practiced other activities to ensure safety of the harvest. 11.2% of the respondents applied ash to ensure safety, 14.1% used locally made pesticides. Locally made pesticides which were mentioned in interviews were prepared using; *akayukiyuki (tick berry).hot pepper, omujaja, kamunye, evvu (ashes)* Use of modern chemicals in harvesting and harvest handling constituted 9.3% of the respondents.

3.1.1.7Indigenous Knowledge on Pests and Diseases and how they are controlled in Kabasekende Sub-County

To further understand indigenous knowledge people had on pests and diseases and how it is used in controlling pests and diseases, they were asked to state the pests they observed in their crops and below are some of the pests that were mentioned (Table 7).

Table 7: Common Pests Observed by Farmers in Their Crops

ScientificName	Common Name	Crop	Very important (4)	Important (3)	Neutral (2)	Unimportant (1)	Very unimportant(0)	Percentage
Microtermesspp	Termites(enkuyege)	Beans and maize, sugarcane	10%	10.5%	0%	0%	0%	25.5
BusseeolaFusca, Chilopartellus	Maize stalk borer (ndiwulira)	Maize	2%	2%	2.1%	0%	0%	6.1
Aphis fabae, Brevicorynebrassicae	Aphids(Efidisi) Nnamukkuto	Beans, Cabbage	11.1%	0%	0%	0%	0%	11.1
Sitophiluszeamais	Maize weevil	Maize	20%	7.3%	0%	0%	0%	27.3
	Fire ants(Entalumbwa)	Coffee	7%	2%	2.1%	0%	0%	11.1
(Dysmicoccusbrevipes)	Mealy bugs(Muwempe)	Coffee, Pine apples	11%	2%	2.1%	0%	0%	15.1
	Sweet potatoe Catapillar	Sweet potatoes	20.2%	2%	0%	0%	0%	22.2
	squirrel and rat(Kamujen'emmese)	Cassava, groundnuts, maize, sweet potatoes	17%	4.2%	0%	0%	0%	21.2
Xylosandruscompactus	Coffee twig borer	Coffee	26%	7.3%	0%	0%	0%	33.3
Acanthoscelidesobtectus	Bean Bruchid (Kawukuumi)	Bean	17%	2%	2.1%	0%	0%	21.1
Tetranychusspp	Mites(Obukwa)	Beans and Tomatoes, Vegetables	27%	2%	2.1%	0%	0%	31.1
	Borers (Mmoggo)	Vegetables, Beans	7%	4.2%	0%	0%	0%	11.2
Ceratitis spp., Dacus spp., Bactrocera spp.	Fruit-fly	Mangoes, avocado	21.2%	2%	0%	0%	0%	23.2
Grylluspennsylvanicus	Crickets (Amayenje)	Sweet potatoes	7%	4.2%	0%	0%	0%	11.2
Agrotisspp	Cutworms (Amatemi)	Maize ,Vegetables	27%	2%	2.1%	0%	0%	31.1
Cosmopolites sordidus	Banana weevil (Kayovu)	Bananas	26%	7.3%	0%	0%	0%	33.3
	No.76							

Source: primary data 2018

Table 7 above, it can be realised that 33.3% of the respondents were affected by coffee twig borer and banana weevil, those who were affected by cutworms and mites came next with 31.1% and these were reported to affect Maize, vegetables and Beans and Tomatoes, maize weevils were reported by 27.3% of the respondents, termites in the area affected maize, beans and sugarcane (25.5%), bean bruchid were reported by 21.1% and they affected beans. Sweet potatoes caterpillars were affecting sweet potatoes and were reported by 22.2% of the respondents. 21.2%were affected by squirrels and rats 15.1% affected by mealy bugs in coffee and pine apples,11.2% affected by borers in Vegetables, Beans and crickets in sweet potatoes, 11.1 % reported aphids in beans, cabbage and fire ants in coffee.

Table 8: CommonDiseases Observed by Farmers in Their Crops

Scientific Name	Common Name	Crop	Very important (4)	Important (3)	Neutral (2)	Not important (1)	Not very important (0)	Percentage
P. parasitica	Heart rot	Pineapples,	30%	5.5%	0%	0%	0%	35.5%
Gibberellaxylarioides.	Coffee wilt Disease(Okukalakwemwanyi)	Coffee	32%	2%	2.1%	0%	0%	36.1%
Uromycesappendiculatus var. appendiculatus	Bean Leaf Rust (obutalavukubitunduebikwatidwa)	Beans	27%	2%	2.1%	0%	0%	31.1%
Ralstoniasolanacearum	Bacterial wilt (Kiwotoka)	Vegetables, Beans	19%	1.3%	0%	0%	0%	20.3%
Alternariasolani&Phytophthorainfestans	Blight Early and Late (Okubabukaebikoolan'okuvundaebibala)	Tomatoes	21.2%	2%	0%	0%	0%	23.2%
Fusariumoxysporum	Banana wilt	Bananas	6.8%	1.5%	0%	0%	0%	8.3%
Maize streak virus	Maize Streak (Ekikoolaokulagaenkoloboze)	Maize	7%	5.2%	0%	0%	0%	12.2%

Vegetables,Tomatoes,Groundnuts Cassava	Ebigenge		10.1%	0%	0%	0%	0%	10.1%
Xanthomonasaxonopodispv. Phaseoli	Common Blight	Tomatoes						
Potyvirus – Potyviridae	Cassava brown streak disease (ekigave)	Cassava	15%	2%	2.1%	0%	0%	19.1%
Cassava Mosaic disease	African Cassava mosaic (okugengewala)	Cassava	27%	2%	2.1%	0%	0%	31.1%
	Total=76							

Source: primary data 2018

Table 8 above that most of the farmers are affected by coffee wilt disease and this was reported by 36.1% of the respondents. 35.5 % 0f the respondents were affected by heart rot, 31.1% of the respondents were affected by cassava mosaic and bean leaf rust affected 31.1, 23.2 reported early and late blight on tomatoes, 20.3% reported bacterial wilt onvegetables and beans, 12.2% of the respondents reported maize streak on maize, 19.1% reported cassava brown streak on cassava, 10.1% reported *Ebigenge on* Vegetables, Tomatoes, Groundnuts, Cassava 8.3% reported banana wilt on bananas.From the above findings it indicates that coffee wilt disease was the highly ranked disease affecting the farmers in Kabasekende.

Table 9: Indigenous Knowledge Based Practices in Managing Pests in Kabasekende Sub-County

ScientificName	Common Name	Crop	Indigenous Control mechanisms	Very important(4)	Important (3)	Neutral (2)	Not important (1)	Not very important (0)	Percent age
Microtermesspp	Termites (enkuyege)	Beans and maize, sugarcane	Queen removal from termite mound.	10%	10.5%	0%	0%	0%	25.5%
BusseeolaFusca, Chilopartellus	Maize stalk borer (ndiwulira)	Maize ,coffee	Removing affected plant, crushing pest	4%	4%	2.1%	0%	0%	10.1%
Aphis fabae, Brevicorynebrassicae	Aphids(Efidisi) Nnamukkuto	Beans, Cabbage	Planting resistant seeds	9%	3%	2.1%	0%	0%	14.1%
Sitophiluszeamais	Maize weevil	Maize	sun drying	28%	1.2%	0%	0%	0%	29.2%
	Fire ants(Entalumbwa)	Coffee	Burning	30.2%	2%	0%	0%	0%	32.2%
(Dysmicoccusbrevipes)	Mealy bugs(Muwepe)	Coffee,Pine apples	Spread ash	7.6%	13.6%	0%	0%	0%	21.2%
	Sweet potatoe Catapillar	Sweet potatoe	Hand pick and crush caterpillar Apply ash	17%	4.7%	0%	0%	0%	21.7%
	squirrel and rat (Kamujen'emmese)	Cassava, groundnuts, maize,	Use f traps	7%	2%	2.1%	0%	0%	21.1%
Xylosandruscompactus	Coffee twig borer	Coffee	Collect dry twigs and burn, prune coffee tree,	26%	7.7%	0%	0%	0%	33.7%
Acanthoscelidesobtectus	Bean Bruchid (Kawukuumi)	Bean	Sun drying,use of pepperand tick berry	10.2%	2%	0%	0%	0%	12.2%

Table 9 above, shows that 43.9% of respondents use ash in bananas to manage banana weevils,34.1% use field hygiene, hand picking and crushing manage cut worms, 41.1% grow resistant varieties to manage fruit flies, 33.7% of respondents collect dry twigs and burn, prune coffee trees to manage coffee twig borer, 29.2% use sun drying to manage maize weevil,25.5% remove queen termite from anthills to manage termites, 21.7%hand pick and crush and also apply ash to manage sweet potato caterpillars, 21.2% spread ash to control mealy bugs in coffee. 14.1%plant resistant seeds to manage aphids in cabbage and beans, 12.4% use traps to manage crickets. This is mostly done by children who enjoy them as a delicacy by roasting them. 12.2% dry their beans in the sun and others add pepper and tick berry to manage bean bruchid. 10.1% remove affected plant and crushing pest to control maize stalk borer.32.2% use burning as a practice to manage fire ants .On the other hand, the risk to indigenous knowledge is observed in the use of pesticides by 18.2% of the respondents to control mites in beans, tomatoes and vegetables. The indigenous knowledge adopted in the study areas are directly in line with what earlier scholars had found out. For instance, Mukiibi (2001), in his study in Masaka and Rakai district, he realized that people favored 82% indigenous knowledge in controlling pests in their crops as they lowered scientific knowledge to only 18.2%. He mentioned of methods like scare crowing, bush fallowing, planting resistant crops.

Table 10: Indigenous Knowledge Based Practices in Managing Diseases in Kabasekende Sub-County

Scientific Name	Diseases	Crop	Indigenous Control mechanisms	Very important (4)	Important (3)	Neutral (2)	Not important (1)	Not very important (0)	Percentage
P. parasitica	Heart rot	Pineapples	Resistant seeds ,use pesticides	26%	10.5%	0%	0%	0%	36.6%
Gibberellaxylarioides.	Coffee wilt Disease(Okukalakwe mwanyi)	Coffee	Planting resistant Varieties, Uproot and burn affected plant.	22%	2%	0%	0%	0%	24%
Uromycesappendiculatus var. appendiculatus	Bean Leaf Rust (obutalavukubitundue bikwatidwa)	Beans	Planting resistant seeds, Burn crop residue, crop rotation.	11%	2%	3%	0%	0%	16%
Ralstoniasolanacearum	Bacterial wilt (Kiwotoka)	Vegetables , Beans	Removal of diseased plants, planting resistant varieties, crop rotation	20%	11.3%	0%	0%	0%	32.3%
Alternariasolani& Phytophthorainfestans	Blight Early and Late (Okubabukaebikoolan 'okuvundaebibala)	Tomatoes	Crop rotation, field sanitation, removal of diseased leaves and plants, use of pesticides.	20.2%	2%	0%	0%	0%	22.2%
Fusariumoxysporum	Banana wilt	Bananas	Use of clean suckers, cow urine, application of ash	17.6%	13.5%	0%	0%	0%	31.1%
Maize streak virus	Maize Streak(Ekikoolaokulagaenko loboze)	Maize	Uproot diseased plant, Plant resistant varieties	17%	4.2%	0%	0%	0%	21.2%
	'Ebigenge'	Vegetables ,Tomatoes, Groundnuts	Resistant Varieties, Use of Pesticides	11.1%	0%	0%	0%	0%	11.1%
\ *Xanthomonasaxonopodispv. Phaseoli*	Common Blight	Tomatoes	Use of resistant seeds ,Use of pesticides	11%	2%	2.1%	0%	0%	15.1%
Potyvirus–Potyviridae	Cassava brown streak disease (ekigave)	Cassava	Use of resistant seeds , select clean planting material, field hygiene	26%	7.3%	0%	0%	0%	33.3
Cassava Mosaic Disease	*African*Cassava mosaic (okugengewala)	Cassava	select clean planting material, field hygiene	17%	4%	0%	0%	0%	22.7

Source: primary data 2018

Table 10, shows that 36.6% of respondents used resistant varieties as well pesticides to manage heart rot in pineapples, 33.3% used resistant seed, clean planting material and field hygiene to manage cassava brown streak disease, 32.3% removed diseased plants, planted resistant varieties, crop rotation to manage bacterial wilt in vegetables and beans, 24% planted resistant varieties, uprooted and burn diseased tree to manage coffee wilt disease,31.1% used clean suckers, cow urine application and selected clean planting material, field hygiene to manage banana wilt,22.7% of the respondents selected clean planting material to manage cassava mosaic, 22.2% reported crop rotation, removal of diseased plants and leaves, use of pesticides to manage early and late blight, 21.2% reported uprooting diseased plants and planting resistant varieties to manage maize streak in maize,16% of the respondents plant resistant seeds, burn crop residue and crop rotation to manage bean leaf rusts15.1% of the respondents reported using resistant seed and pesticides to manage common blight in tomatoes, 11.1% used resistant varieties and pesticides to control *ebigenge* in vegetables, tomatoes and groundnuts.

3.1.1.8 Sources of Information on Preventing and Managing Pests and Diseases in Kabasekende Sub-County

Table 11: Information on Farmers Source of Knowledge on Harvest Handling

Source of information	Very important(4)	Important(3)	Neutral (2)	Not important(1)	Not very important(0)	Percentage
Farmers' own knowledge from experiments'and observations	83%	16.3%	0%	0%	0%	99.3%
From friends/relatives	18%	54%	2.8%	0%	0%	74.8%
From extension Services	14%	45.6%	7%	1%	1%	68.6%
Scale runs from 4 = very important to 0 = very unimportant						
N=76						

Source: primary data 2018

Table 11 shows that farmers' own knowledge is very important with a score of 99.3% as a source of information used in decision-making. The second important source of information for farmers in the study area is friends and relatives with a score of 74.8% and the extension services are least in importance with a score of 68.6%.

3.1.1.9 Indigenous Knowledge Based Practices in Feeding and Keeping Livestock in Kabasekende Sub-County

Table 12: Indigenous Knowledge Based Practices inFeeding and Keeping Livestock

Feeding Method.	Very important(4)	Important(3)	Neutral (2)	Unimportant(1)	Very unimportant(0)	Percentage
Zero grazing	30%	4.5%	0%	0%	0%	34.5
Graze in my own herd	27%	1%	1.1%	0%	0%	29.1
Rotational grazing	10%	2.3%	0%	0%	0%	12.3
Use of improved modern feeds	20.2%	1%	0%	0%	0%	21.2
Use natural pastures and forages	9.8%	3.5%	0%	0%	0%	13.3
N=76						

Source: primary data 2018

Table 12, shows that respondents feed and keep their livestock using zero grazing and these were indicated by 34.5%. Those who grazed in their own herd were 29.1%, 12.3% were using rotational grazing. Use of modern feeds was reported by 21.2%. Natural pastures and foliage (*ebisagazi*) were reported by 13.3%. All the indigenous methods as indicated by the respondents accounted for 78.8% and only 21.2 belonged to modern feeds

3.1.1.10CommonParasites and Diseases in Kabasekende Sub-County

The respondents have encountered the following parasites and diseases among their herds

Table 13 below indicated that farmers were affected by; worms constituting 22.4%, Ticks constituting 15.8%,Lice constituting 14.5%, East Coast Fever constituting 13.2%,Coccidiosis constituting 11.8%,Cough constituting 9.2%, Bloat constituting7.9% and Diarrhoea constituting 5.2%.

Table 13: Common Parasites and Diseases of Livestock in Kabasekende Sub-County

Parasites and diseases	Frequency	Percentage
A. Parasites		
Ticks	12	15.8%
Lice	11	14.5%
Helminthiasis(worms)	15	22.4%
B. Diseases		
East Coast Fever	10	13.2%
Bloat	6	7.9%
Coccidiosis	9	11.8%
Cough	7	9.2%
Diarrhoea	4	5.2%
N=76		

Source: primary data 2018

3.1.1.11 Indigenous Knowledge Based Methods to Manage Parasites and Diseases of Livestock in Kabasekende Sub-County

Various indigenous methods used by respondents to control parasites and diseases of cattle in their herds are presented in Table 14 below

Table 14: Control Methods of Pests and Diseases in Livestock

Pests and diseases	Control Method	Frequency	Percentage
A. Pests			
Ticks	Conventional method	76	100
Lice	Conventional method	76	100
Helminthiasis(worms)	Combination(Indigenous&conventional)	23	30.3
B. Diseases	B. Diseases		
East Coast Fever	Conventional method	52	67.5
Bloat	Combination(Indigenous &conventional)	15	19.5
Coccidiosis	Combination(Indigenous & conventional)	68	89.5
Cough	Combination(Indigenous&conventional)	60	78
Diarrhoea	Conventional method	76	100
N=76			

.*Source: primary data 2018*

Table 14, shows that 76 of the respondents used conventional methods constituting to100% to control ticks, lice, and diarrhoea. 68 of the respondents constituting 89.5% used a combination of both knowledge to manage coccidiosis.Ticks and lice were managed using the chemicals prescribed by veterinary officers. 60 of the respondents constituting 78% used a combination of indigenous and conventional method to manage cough. 52of the respondents constituting 67.5% controlled East Coast Fever using conventional methods. 23of respondents constituting 30.3% used both conventional and indigenous knowledge to manage worms and bloat. The indigenous locally available plants used to manage worms, bloat, Coccidiosis and cough were pawpaw seeds, sodom apple, *kisanda*, *ekisula*, *ekibwankulanta*, tick berry

3.1.1.12 Indigenous on Selection of Breeds in Kabasekende Sub-County

Table 15: Information on Selection of Breeds in Kabasekende Sub-County

Breeds selection	Very important (4)	Important (3)	Neutral (2)	Not important (1)	Not very important (0)	Percentage
Indigenous Local breeds favorable	23%	7.5%	3%	2%	1%	36.5
High milk productive breeds	24%	4%	2.1%	3%	1%	34.1
Crossbreeding	28%	7.1%	0%	0%	0%	35.1
Use modern breeds introduced by extension officers	20.2%	2%	1%	7%	3%	33.2
N=76						

Source: primary data 2018

Table 15, shows that most of the farmers use indigenous local breeds which they take as favourable constituted 36.5%, cross breeding constituted 35.1%,high milk productive breeds constituted 34.1% and modern breeds introduced by extension officers constituted 33.2. From this table, it is clear that respondents still preferred using local indigenous breeds because of their adaptability to the ecological environment.

3.1.2 The Benefits Farmers get from Using IK in Farming Systems in Kabasekende Sub-County

Various responses were given by the respondents on the benefits of using indigenous knowledge in agricultural production.

Table 16:Benefits Farmers get From UsingIK in there Farming System

Benefits of using IK	Frequency	Percentage
Reduced cost of buying chemicals	72	94.7
Avoiding pollution of the environment	67	88.1
Reduced cost of production	70	92.1
Maintenance and conservation of crop genetic diversity	56	73.6
Maintains soil fertility	72	93.5
Promotes use of locally available resources	67	88.1
Recycling of farm resources	70	92.1
Resilience to climate change	56	73.6
Promotes life-support ecosystem services	37	48.6
Controlling pests and diseases	67	88.1
Increased Food security at house hold level	37	48.6
Employment creation	22	28.9
Increased yield	17	22.4
N = 76		

Source: primary data 2018

Table 16, indicates that 72 of the respondents constituting 94.7%reported that indigenous knowledge was a remedy for reducing on the costs of buying chemicals. 70 of the respondents constituting 92.1% reported reduced cost of production and recycling of farm resources, 67 of the respondents constituting 88.1% reported promoting use of locally available resources,56 of the respondents constituting

73.6% reported maintenance of crop genetic diversity. 37 of the respondents constituting 48.6 %) indicated that IK is beneficial in increasing Food security at house hold level and promoting life-support ecosystem services, 22 of the respondents constituting 28.9% IK provide employment, 17 of the respondents constituting 22.4% indicated that IK leads to increased yield.

3.1.3 Ways by Which IK used by Farmers is losing its Centrality in Agricultural Productivity

Thoroughly, it was established from the study findings that IK is losing centrality because of several reasons deduced. Among the central basis as to why IK used by farmers is losing centrality is shown in table 17 below:

Table 17, shows results for the underlying reasons why IK is losing its centrality.17 of the respondents reported lack of scientific experimentation constituting 22.3%. 11 of the respondents constituting 14.4% mentioned of low levels of income and knowledge lives in isolation respectively. 10 of the respondents constituting 13.2% thought of IK as lacking power at the global scale and young generations acquiring different values and lifestyles as a result of exposure to global and national influences. 9 of the respondents constituting 11.8% reported employment opportunities, 7 of the respondents constituting 9.2% reported knowledge is becoming a commodity and education of the farmers. 6 of the respondents constituting 7.8% reported age of farmer and continual death of old ones.

Table 17: Showing Ways by Which IK Used by Farmers is losing its Centrality in Agricultural Productivity

Mechanisms	Frequency	Percentage
Knowledge lives in isolation	11	14.4
Lack of scientific experimentation	17	22.3
Knowledge is becoming a commodity	7	9.2
Low-levels of income	11	14.4
Lack of power of indigenous knowledge at the global scale	10	13.2
Employment opportunities	9	11.8
Age of the farmers and continual death of old ones	6	7.8
Education of the farmers	7	9.2
Younger generations are acquiring different values and lifestyles as a result of exposure to global and national influences	10	13.2
No.76		

Source: primary data 2018

3.1.4 Mechanisms of Ensuring the IK Survival and Maintenance of its Central Position in Farming in Kabasekende Sub-County

A number of respondents had different views on how IK can survive and be maintained to regain its central positions in farming especially in the study area and among the ways is what table 18 indicates below.

Table 18: Showing Mechanisms of Ensuring the IK Survival and Maintenance of its Central Position in Farming in Kabasekende Sub-County

Mechanisms	Frequency	Percentage
Recording and using IK.	38	50
Sensitize community on Values of IK.	33	43.4
Make IK available and accessible.	29	38.2
Support communities document their indigenous Practices.	19	25
Establish community resource centers.	12	15.7
Patent rights.	9	11.8
Integrate IK into school curriculum.	6	7.8
No.76		

Source: primary data 2018

Table 18, indicates that 38 of the respondents constituting 50% in the virtue to ensure survival and maintenance of IK, suggest that indigenous knowledge should be recorded and used, 33 of the respondents constituting 43.4% suggested to sensitize communities on values of IK, 29 of the respondents constituting 38.2% suggested IK should be made available and accessible, 19 of the respondents constituting 25% suggested government and non-government organization supporting communities to document their indigenous practises, 12 of the respondents constituting 15.7% suggested establishment of community resource centres for IK, 9 of the respondents constituting 11.8% suggested innovators of IK should own patent rights, 6 of the respondents constituting 7.8% suggested integration of IK into school curriculum to strengthen adoption of IK.

IV. DISCUSSION AND CONCLUSIONS

4.0 Introduction

This is the concluding chapter of the study. It consists of the discussion, summary; conclusion and recommendations offered on the topic of the study, entitled Threats to Indigenous Knowledge in Improving Agricultural Productivity in Crop Production of Kabasekende Sub-County, Kibaale District

4.1 Discussion of findings

4.1.1 Ways in which IK is used in farming systems

The study revealed that most of the crops grown in the area are food crops. This shows that the major food crops were maize, beans, cassava and sweet potatoes grown by all farmers in the study area. The patterns of crops grown indicate that farmers are able to satisfy nearly all their dietary needs from their own production.

The study further revealed that most of the respondents kept cattle and local chicken, goats, pig and sheep. This viably tells us that by keeping such livestock, farmers were ensured with food security (UNEP) 2008.They were also able to satisfy most of their dietary requirements using their own local production. It should be noted that cattle and chicken has a lot of proteins and fats. Pigs are also a source of minerals and important vitamins. Manure that came from the animals helped improve the fertility of the soil.

4.1.1.1 Selection of seeds

The study proven that most of the farmers preferred resistant seed to diseases. Most of the farmers (66.2%) acknowledged using indigenous knowledge in selection of seeds for disease resistance. This agrees with UNEP (2008) who stated that in the islands of Mfangano and Rusinga in Lake Victoria, for example, the people relied on their own seeds, which were identified during harvesting and preserved for the next season.

The study further revealed that farmers in the area know best how they select their crops for farming because such knowledge has been passed on from generation to generation and they have their own ways and names they call certain crops that they take as resistant to diseases. In his own words, he was quoted:

"Our farmers have been advised several times to plant seeds that are scientifically proven from research institutes but it seems that their turn up has not been good because they locally have their own seeds they want because of several reason but mostly they want those crops that are disease resistant and can make the best yields".

When you listen critically to their reasoning, it tallies directly with what Mukiibi (2001) found out in Masaka district. He found out that selection of seeds traditionally depended on good seeds which at the start were good crops, those seeds which in the garden contained more food and produce healthier, heavier seedlings with more roots.

4.1.1.2 Season Determination for Planting

The study also revealed that seasons are determined based on clouds. Most of the respondents interviewed believed that when the clouds become blue in the corner that goes to Kampala that is in the East of the county, it means that the rainy season has began for planting. According to village farmers, such clouds are lighter. Other farmers mentioned that if temperature levels increase even at night, one of the farmers was quoted saying:

> *'You can easily know that the rainy season has begun when every night you push your bracket away and feel too hot and sweating all the night.'*

The respondents who talked about Meteorological Department (11.6) seem to be very few compared to those who mentioned of traditional indigenous knowledge (89.4%). This is an indication of employing indigenous knowledge in the area. One of the interviewees was quoted saying:

> *"It is very difficult to rely on meteorologists because all factors have always proved them wrong in our area. The time they determine that rainfall will start, it doesn't, only to come when people are not prepared."*

UNEP (2008) reported an experience with peasant farmers who listen to weather forecasts on radio by the meteorological department but still prefer to rely on their own traditional knowledge of when to start planting.

4.1.1.3 Indigenous Farmers Knowledge on Crop Management

The study reported that mixed cropping and crop rotation were the highly used practices. They have benefits like protecting the soil surface. This is so as stated by (UNEP 2008) who noted that mixed cropping and intercropping farming technologies optimize the use of naturally available soil nutrients and promote high yield. It was observed however, that farmers who are employed and have additional income are able to improve yields through the application of chemical fertilizers, and therefore prolong crop production beyond what would be possible without chemical fertilizers. This was observed as a challenge in using of indigenous knowledge in the study area.

> *A farmer was quoted saying that hawkers move with chemicals in smaller units affordable to farmers from door to door.*

If this trend continues it poses a danger to the use of IK and it may be lost forever. According to the study, this has resulted into the dominance of Western ideologies with their corresponding silencing effects as rightly pointed out by Agrawal (1995), Mohan and Stokke (2000).

4.1.1.4 Indigenous Knowledge Based Practices in Managing Diseases

The study findings revealed that selection of clean planting material and use of resistant seed was the commonly used practices in Managing Diseases. Turning to Byabakama et al 2005 one finds out that about half of the farmers used their own mature crops as their main source of planting material and the others mostly obtained their planting material from their neighbors' crops or from a market. Almost all of those who selected planting material specifically selected disease-free material

4.1.1.5 Control Methods of Pests and Diseases in Livestock

The findings in table 14 show that western technology is dominating indigenous knowledge. Much as there is growing interest in IK, the work of Agrawal (1995) and Mohan and Stokke (2000) reveals that there is dominance of Western ideologies with their corresponding silencing effects.

4.1.2 The Benefits that Farmers get from Using IK in their Farming Systems

The findings revealed that reduced cost of buying chemicals, reduced cost of production and recycling of farm resources are among the highly ranked benefits indicating that IK is beneficial in the farming system. The work of Moyo (2010) revealed that indigenous knowledge is also found to be resilient and beneficial to farmers regardless of income level by reducing their costs of production, to be adaptable to different environmental and economic circumstances, and to provide for a more sustainable use of resources in farming.

4.1.3 Ways by Which IK used by Farmers is losing its Centrality in Agricultural Productivity

This study showed that indigenous knowledge is not evenly held across farmers within a community because of factors such as gender, past experience and having lived outside the study area impact on indigenous knowledge production.

Further findings proven that IK lacks scientific proof and it is only experimented on individual level. Farmers conduct many 'experiments' with crops and livestock, particularly regarding the time of planting of crops to escape pest damage and to achieve higher yields. For example, one of the interviewee expressed,

> *"Farmers who had lived outside the study area for some time plant maize earlier than those who had lived inside the study area, and their level of 'experimentation' is partly influenced by knowledge gathered from elsewhere".*

Those with only a limited experience of living elsewhere have a more limited exposure to ideas and their 'experiments' are limited to the extent of this exposure, which are derived from the practices observed from childhood and from what extension workers have promoted and demonstrated.

In addition, in the continued discussion with the agricultural officials, it was reported that indigenous knowledge generated by farmers is becoming more difficult to share freely because of the need to pay for it. One of the farmers who sells locally made vitamins demonstrates this point clearly.

> *"In the past, knowledge was free and we could reveal it to fellow farmers so that they could obtain it them themselves from the wild (virgin forests), but now I have to keep this as a secret to enable me sell the knowledge in the form of a product or commodity."*

> *"Another farmer said my treatment for bloat is effective but I cannot reveal it unless am paid so I keep it to myself"*

Since knowledge can be seen as a commodity and can be sold, indigenous knowledge at the farmer level is turning into a potentially big business. This could be a significant development that has a potential to reduce farmer to farmer extension, which is considered more effective compared to the official use of extension agents (World Bank, 2004). According to Nggabutho (as cited in Maumbe and Swinton (2003), their study showed that farmers rely on their colleagues for important information concerning farming.

The study findings further showed that farmers who have higher incomes, the low input use appears to be advantageous, because it results in increased savings. The use of indigenous knowledge therefore has two implications. The first is that those with limited financial resources can survive with a low external input use; and the second is that those who have higher incomes also survive on low input use and potentially can make higher profit margins. However, a major limitation of low input use is shown by Bebbington (1993), who argues that there are few experiences where low-input agriculture has proven economically viable. When the sole objective is to make profits, indigenous knowledge has mixed performance results.

The study revealed that there is lack of power of indigenous knowledge at the global scale as a result of the dominance of Western ideologies with their corresponding silencing effects as noted by Agrawal (1995) and Mohan and Stokke (2000). The study in Masaka also shows that reliance on scientific knowledge has not fully worked either. Development strategies, such as the milk-shed and egg production, did not benefit farmers in the study area. The trick is to use both knowledge systems in a manner that benefits the farmers most, and avoids swinging from one untenable position, that the scientist knows best, to an equally untenable one, where farmers know best (Mukiibi, 2001, Mohan and Stokke, 2000). Farmers in the study area have noted changes in the attributes of different crops. For example taste of maize where chemical fertilizers have been applied, beans take long to cook when synthetic chemicals are applied.

The study further proven that Elders are dying without passing their knowledge on to children. This threatens to break the communication network as Alan, R. Emery and Associates (1997) perceptively state, as the elders die, the full richness of tradition is diminished; some of it has not been passed on and so is lost. There is a danger that the knowledge will die with them because young people do not always follow traditional ways. One farmer was quoted saying:

> *"I know the sound frogs make when it's about to rain and I also see the swarm of bird in the sky but I have never taken the effort to explain this to my children yet they are with me most of the time".*

Living in and from the richness and variety of complex ecosystems, they have an understanding of the properties of plants and animals, the functioning of ecosystems and the techniques for using and managing them that is particular and often detailed. (UNESCO 2000)

4.1.4 Mechanisms of Ensuring the IK Survival and Maintenance of its Central Position in Farming in Kabasekende Sub-County

The study revealed that IK should not only be recorded but also be used by incorporating it into agricultural programmes, sensitization and awareness of the value of indigenous knowledge, especially its potential contribution to sustainable development. According to Simon Brascoupé and Howard Mann (2001), an informed community can meet any challenge to its IK whether it is preventing encroachment, negotiating equitable sharing arrangements, or creating processes to communicate traditional knowledge to future generation. In an article by Mphela Raphesu (2010) The International Federation of Library Association asserts that libraries could also help in: - collecting, preserving and disseminate indigenous and local traditional knowledge - publicizing the value, contribution, and importance of indigenous knowledge to both non-indigenous and indigenous peoples. - raising awareness on the protection of indigenous knowledge against exploitation. – involving elders and community in the production of IK and teaching children to understand and appreciate the traditional knowledge.

Further on the same, the study revealed thatthe way seed companies own seed and seed patents, so it be to the innovators of indigenous knowledge. According to Mphela(as cited in Doubell, 2010) rightly points out that intellectual property rights of the individuals and communities have to be protected and benefits have to be generated for innovators as well as local communities. Furthermore, it is crucial to safeguard indigenous knowledge holders from exploitation by commercial players. NARO (2010) correctly argues that recognition and protection of IK, copyrights and patent are the most important categories of rights to be considered.

The study revealed that Indigenous knowledge should be made available to ease its access. Egeru(2012) has drawn attention to the fact that it is imperative for education institutions, including primary schools, secondary schools and universities, to work with communities to validate and strengthen community practices. Educational institutions should particularly help the younger community members appreciate their cultural heritage and find value in the practices of their forefathers.

The study suggested that individuals and communities should be supported to document the IK they posses and establish community resource centers for indigenous knowledge. According to a study by Tabuti and Damme (2012) in Uganda, opportunities to support and promote IK exist. The work of Greyling (2010) reveals a model for community participation to preserve Indigenous Knowledge. Further integrate IK into School Curriculum in a way of ensuring IK survival and maintenances. According to UNESCO (2000), formal education systems had little place for indigenous knowledge or indigenous methods of education.

4.2 Conclusions

It can thus be concluded that;

- There were several ways in which IK was used in farming system and among these ways involving selection of Livestock and crops for growing in the next season, determining the growing season, IK based practices were realized in the management of crops.
- The benefits that farmers get from using IK in their farming systems ranges from reducing on the costs of buying chemicals and maintaining soil fertility, recycle farm resources , controlling pests and diseases, avoiding polluting the environment, promotes the use of locally based resources in agricultural production, resilient to climate change and can maintain and conserve crop genetic diversity, increasing food security at house hold level and promoting life-support ecosystem services.
- Among the major ways deduced from the study that are leading to IK used by farmers to lose centrality in agricultural productivity includes;IK lacks scientific proof , indigenous knowledge generated by farmers is becoming more difficult to share freely,. Indigenous knowledge lacked power at the global scale, employment opportunities provided a varied influence on knowledge produced by farmers, continual death of elders without passing on knowledge to the young ones and young people are growing up in a world of globalization.
- It can also be concluded that among the mechanisms of ensuring the IK survival and maintenance of its central position include; Individuals and communities should be supported to document the IK they possess, IK should not only be recorded but also be used, innovators of IK should own patents, sensitization and awareness on the value of indigenous knowledge, establishment of community resource centers for indigenous knowledge and integrate IK into the school curriculum where culturally and educationally appropriate

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