

THE EFFECT OF POST HARVEST HANDLING TECHNOLOGY ON MAIZE INCOME IN RWANDA: A CASE STUDY OF PASP IN KAYONZA DISTRICT

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Abstract: The purpose of this research was to assess the contribution of post-harvest handling technology on maize income in the Climate Resilient Post-harvest and Agribusiness Support Project (PASP) of Ministry of Agriculture and Animal Resources (MINAGRI) in Kayonza district with the following objectives; to identify the contribution of storage technology on maize income in Kayonza district, to assess the effect of drying technology on maize income in Kayonza district and to examine the influence of packaging technology on maize income in Kayonza district. The researcher reviewed both theoretical and empirical literature related to post harvest handling technology and maize income, a critical review of existing literature was done to identify the gap to be filled by the research. The research design used was descriptive and analytical while the population was 80 including 20 employees of PASP project and 60 communities from Kayonza district and the sample size was 44 respondents. Data collection tools were questionnaires and interviews while the collected data was presented using tables and analyzed based on percentages and frequencies. The researcher found out that packaging technology in maize is able to be kept and lead to improvements in quality. When maize is well packed packages lead to improvements in value leading to increased income. Packaging increased the appearance which is attributed to quality and this makes customers buy more of packaged maize since it is considered to be safe and leading to increased income. The researcher concluded that thorough drying and packaging, maize value is improved as well as than physical appearance which are all attributes of improved values and justification for selling at higher or reasonable prices. The researcher recommended that farmers in Kayonza district should continue using improved post-harvest handling technology so as to improve quality and increase maize income.

Keywords: Harvest, Post-harvest handling, Income.

1. INTRODUCTION

1.1 Background to the study:

Limited capacity for post-harvest handling and processing often undermines the profitability of farming particularly during years of bumper harvest. Notably, the perishable nature of many agricultural products limits their access to profitable markets thus dwindling income of small farmers. Hence, enhancing post-harvest technologies is the critical strategy to add value to the food crops so as to increase price and move millions of African small farmers from poverty (Masih and Trambauer, 2014)

The most important goals of post-harvest handling are keeping the product cool, to avoid moisture loss and slow down undesirable chemical changes, and avoiding physical damage such as bruising, to delay spoilage. Sanitation is also an important factor, to reduce the possibility of pathogens that could be carried by fresh produce, for example, as residue from contaminated washing water. After the field, post-harvest processing is usually continued in a packing house. This can be a simple shed, providing shade and running water, or a large-scale, sophisticated, mechanized facility, with conveyor belts, automated sorting and packing stations, walk-in coolers and the like. In mechanized harvesting,

processing may also begin as part of the actual harvest process, with initial cleaning and sorting performed by the harvesting machinery (Mahuku, 2015).

Initial post-harvest storage conditions are critical to maintaining quality. Each crop has an optimum range of storage temperature and humidity. Also, certain crops cannot be effectively stored together, as unwanted chemical interactions can result. Various methods of high-speed cooling, and sophisticated refrigerated and atmosphere-controlled environments, are employed to prolong freshness, particularly in large-scale operations (Thornton & Giller, 2014).

Post-harvest technology constitutes an inter disciplinary science applied to agricultural commodities after harvest for the purpose of preservation, conservation, quality control/enhancement, processing, packaging, storage, distribution and marketing to meet the food and nutritional requirements of consumers. Post-harvest technology stimulates agricultural production, prevents post-harvest losses, and adds value to agricultural products thereby opening new marketing opportunities and generating new jobs while stimulating growth of other related economic sectors (Grings and Blümmel, 2013).

The process of developing post-harvest technology requires an interdisciplinary and multi-dimensional research approach, which includes scientific creativity, technological innovation, and commercial entrepreneurship and stakeholder inputs. Post-harvest technology involves all treatments or processes that occur from time of harvesting until the foodstuff reaches the final consumer. These includes: harvesting methods/tools/equipment, handling (preparation-sorting, trimming, cooling), conveying/transportation (field processing unit), processing/preservation (tastes, smell, colour, texture) packaging, distribution and sale and storage (Baudron, 2015).

Inefficient systems of harvesting and drying, high relative humidity and inefficient practices of storage have led to losses up to 70% in stored grains. The losses for post harvests can be reduced significantly if the humidity of the grain is controlled and if the grain is protected against pest and rodents. This is based on the good handling of the product after harvesting, carrying out an efficient process of drying and storage. In such conditions the producers are forced to sell their product at low prices because they lack mechanical threshing, drying and storage facilities. In the season of grain shortage and when the prices are high the producers do not have grains to sell so they lack the benefit from the market opportunities. Most times they even buy back the grains as food source at a much higher cost (FAO, 2011).

Agriculture dominates both the economy and livelihoods in Rwanda. It makes up just under half of GDP, employs most of the labor force, and is the main source of income for the majority of the poor. Poverty elimination thus depends heavily on raising agricultural productivity through new technology, improved access to markets, better prices and policies that promote agricultural growth. There has been increased production and improvement in productivity since 2000, mainly due to improvements in inputs use but also due increased hectareage. Despite the long-standing agricultural challenges, the government of Rwanda has made commendable strides through the Ministry of agriculture and several agricultural programs were put in place. The major aim is to reinforce the capacity of farmers as a priority for turning traditional agriculture into a market oriented and revenue generating activity (Masih and Trambauer, 2014).

More than 70% of the sub-Saharan African population is directly involved in agriculture as the primary source of income and food security. Therefore, growth in agriculture production and productivity are critical for eradicating extreme poverty and hunger in the continent. However, sub-Saharan African agriculture productivity and the per capita value of agriculture output is the lowest in the world (Fisher, 2015).

The Rwandan agricultural constraints like other developing countries are eminent in market and are exacerbated by lack of innovative post-harvest technologies to improve quality of agricultural products. Imperatively, policies and initiatives that target to improve farming and collection systems of harvest are paramount to increase incomes of small farmers and motivate young farmers to engage in agriculture as business activity.

In Rwanda the government is committed towards ensuring that agriculture is promoted through pre planting, plant, harvest and post-harvest so as to increase incomes from agriculture and minimize the losses. Maize being one of the major food crops grown in many parts of Rwanda is given much emphasis whereby harvesting is being done using improved technology in order to save both time and costs.

In Kayonza district, farmers are using both simple and improved technology so as to minimize losses involved in harvesting and post-harvest, in order for maize to retain its original quality maize is harvested for thorough drying and harvesting is also done using locally made machines. According to the farmers in the district, this helps to reduce losses and increasing agricultural incomes. However, this can't be confirmed without sufficient research in this area. It is against that background that the researcher intends to carry out this research on the effect of post-harvest handling technologies on maize income with reference to Kayonza district.

1.2 Statement of the problem:

Post-harvest loss in terms of value and consumer quality attributes can occur at any stage between harvest and consumption. The major physiological, physical and environmental causes of post-harvest losses are high crop perishability; mechanical damage; excessive exposure to high ambient temperature, relative humidity and rain; contamination by spoilage fungal and bacteria; invasion by birds, rodents, insects and other pests; and inappropriate handling, storage and processing techniques (Fisher, 2015). The economic importance of the factors leading to high post-harvest losses varies from commodity to commodity, season to season, and the enormous diversity of circumstances under which commodities are grown, harvested, stored, processed and marketed. Identifying best practices and innovative arrangements for increasing agricultural productivity to improve income and nutrition of farm households is a priority of most countries. For this reason, improving post-harvest management systems is a priority for farmers and policy-makers. Maize being reliable to different pests and other forms of losses resulting from post-harvest handling challenges that reduce incomes, needs to be handled in the best way after harvest so as to maximize returns in form of income. This has led to introduction of post-harvest technology applications in maize handling, however, these are viewed by some as increasing costs or as less important as far as increasing incomes is concerned and as a result agricultural incomes have remained low. This is resulting from limited understanding on how post-harvest handling technology can affect maize incomes. It is against that background that the researcher carried out this research on the effect of post-harvest handling technology on increasing maize income with reference to PASP project in Kayonza district.

1.3 Objectives of the study:

The general objective of this research was to assess the effect of post handling technology of maize income. The research was guided by the following specific objectives

- i. To identify the contribution of storage technology on maize income in Kayonza district
- ii. To assess the effect of drying technology on maize income in Kayonza district
- iii. To examine the influence of packaging technology on maize income in Kayonza district

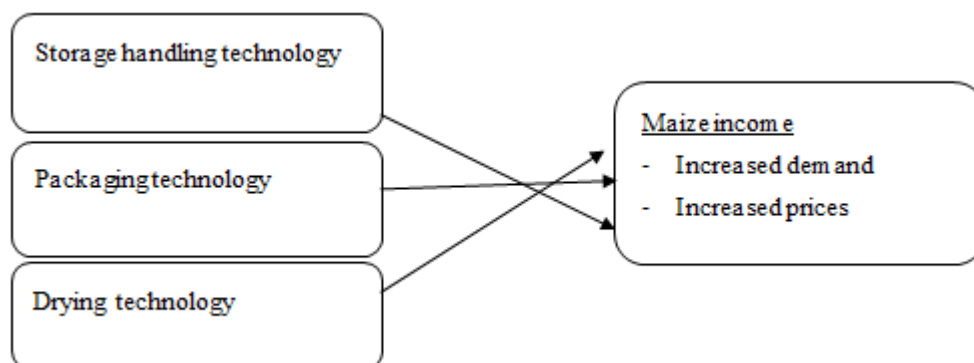
1.4 Research questions:

The research was guided by the following research questions

- i. What is the contribution of storage technology on maize income in Kayonza district
- ii. What is the effect of drying technology on maize income in Kayonza district
- iii. What is the influence of packaging technology on maize income in Kayonza district

2. THE CONCEPTUAL FRAME WORK

All agricultural produce, either of plant or animal origin starts deteriorating almost as soon as they are harvested and it leads to losses. This deteriorating may start within a few minutes of harvest resulting in partial or total loss within days; it may also take place very slowly making the crop to retain some essential quality for months. The urgent need to match all efforts of increasing crop production with equal efforts to save the crop that is produced from deteriorating and waste (Grings and Blümmel, 2013).



Primary source: the researcher (2018)

Figure 1: The conceptual framework

2.1 Empirical literature:

All agricultural produce, either of plant or animal origin starts deteriorating almost as soon as they are harvested and it leads to losses. This deteriorating may start within few minutes of harvest resulting in partial or total loss within days. Maize, an important food for man and an ingredient of poultry and livestock feeds, is often with high moisture content during harvest and it is liable to microbial deteriorating even during storage (Masih and Trambauer, 2014).

Prices of most products generally respond to both the quantity supplied and the quantity demanded of that product. In theory, when prices go up there will be a fall in demand and an increase in supply. In time, the amount supplied at a particular price will come to equal the amount demanded. In the case of staple foods such as maize the situation is not so straightforward. Farmers do not, in the short term, have much control over how much of a product is produced. They can, for the following season, reduce the amount of maize they produce by using less fertilizer, not planting such a large area, growing other crops, or do just the opposite by increasing maize output. For any particular harvest, however, the prices they receive are very much influenced by the total amount produced in the country and region which, in turn, is mainly influenced by the weather (Mahuku, 2015)

3. RESEARCH METHODOLOGY

3.1 Research design:

In carrying out this research, the researcher will used both descriptive and analytical design where by issues related to the contribution of post-harvest handling technology were analyzed and interpreted. Both quantitative and qualitative data was used. The research design refers to the overall strategy that you choose to integrate the different components of the study in a coherent and logical way, thereby, ensuring effectively addressing the research problem; it constitutes the blueprint for the collection, measurement, and analysis of data.

The population of the study targeted was 80 respondents who involves 20 employees of PASP project and 60 communities from Kayonza district. The sample size was determined by use of Slovene’s formula.as stipulated herein,

The sample size used the formula $n = \frac{N}{1+N(e)^2}$ where n is the sample size, N is the total population and e is the sampling error (0.1)

$$n = \frac{80}{1+80(0.1)^2} \quad n = \frac{80}{1+80(0.01)} \quad n = \frac{80}{1+0.8} \quad n = \frac{80}{1.8} \quad n = 44$$

The sample size of the study was 44 including 11 employees of the project and 33 communities from Kayonza district. The research used simple random sampling technique on local communities and for employees the researcher used purposive sampling techniques. The Data collection instruments used include, questionnaires, interviews and documentary review.

4. RESULT PRESENTATION AND DISCUSION

Table 1: The period respondents have worked in PASP project

Period (Years)	Frequency	Percent
Less than 2	4	30
2 – 4	3	27
5 – 7	1	16
Above 7	3	27
Total	11	100.0

Source: Primary Data, 2018

According to Table 1, respondents contacted 23% revealed that they had worked in PASP project for the period less than 2 years while 25% said for the period between 2 – 4 years and 45% had worked in PASP for the period between 5 – 7 years. 7% had worked in PASP for the period above 7 years. This led the researcher to the understanding that they had worked with PASP for the period long enough to make them have enough information regarding the contribution of post harvest handling technology and maize income.

Table 2: The period respondents have lived in Kayonza district

Period (Years)	Frequency	Percent
Less than 2	11	32
2 – 4	8	25
5 – 7	5	16
Above 7	9	27
Total	33	100.0

Source: Primary Data, 2018

According to Table 2, respondents contacted 23% revealed that they had worked in PASP project for the period less than 2 years while 25% said for the period between 2 – 4 years and 45% had worked in PASP for the period between 5 – 7 years. 7% had worked in PASP for the period above 7 years. This led the researcher to the understanding that they had worked with PASP for the period long enough to make them have enough information regarding the contribution of post harvest handling technology and maize income.

4.1 The contribution of storage technology on maize income in Kayonza district:

The researcher made a presentation, analysis and interpretation of the views given by respondents concerning the contribution of storage technology on maize income in Kayonza district so that relevant study conclusions can be made.

Table 3: The extent to which respondents agree that post-harvest handling technology affects maize income

Extent	Frequency	Percentage
Strongly agree	18	40
Agree	13	30
Neither agree nor disagree	9	20
Disagree	2	5
Strongly disagree	2	5
Total	44	100

Source: Primary data, 2018

According to table 3, respondents contacted strongly agreed that post harvest handling technology affect maize income (40%) while 30% of respondents said they agree and 20% of respondents said they neither agree nor disagree. 5% of respondents said they disagree and 5% of respondents said they strongly disagree. On reasons for the answers give, respondents post harvest handling technology preserves maize quality and increases its demand hence leading to increased income. This led the researcher to the realization that post harvest handling technology increases maize income through the preserved quality and nature of maize results from better keeping and preservation.

Table 4: The extent to which respondents agree that storage technology affects maize income

Extent	Frequency	Percentage
Strongly agree	20	45
Agree	11	25
Neither agree nor disagree	11	25
Disagree	2	5
Strongly disagree	0	0
Total	44	100

Source: Primary data, 2018

According to table 4, respondents contacted strongly agreed that storage technology affect maize income (45%) while 25% of respondents said they agree and 25% of respondents said they neither agree nor disagree. 5% of respondents said they disagree. When asked to give reasons for their answers, respondents said storage facilities protect maize from damage by pests and provides it with opportunity to last for long and meet periods of scarcity hence leading to increased income. This led the researcher to the realization that storage technology in maize leads to increased maize income through matching the needs of customers in the market.

Table 5: The extent to which respondents agree that Aerial Storage technology affects maize income

Extent	Frequency	Percentage
Strongly agree	22	50
Agree	16	36
Neither agree nor disagree	4	10
Disagree	2	4
Strongly disagree	0	0
Total	44	100

Source: Primary data, 2018

According to table 5, respondents contacted strongly agreed that aerial Storage technology affect maize income (50%) while 36% of respondents said they agree and 10% of respondents said they neither agree nor disagree. 4% of respondents said they disagree. When asked to give reasons for their answers, respondents said aerial Storage technology protect maize from damage by pests and losing its quality through improved aeration through maize which keeps it in its original form. This led the researcher to the realization that aerial storage technology in maize leads to increased maize income through enabling it to retain its original form.

Table 6: The extent to which respondents agree that storage on the ground, or on drying floors affects maize income

Extent	Frequency	Percentage
Strongly agree	23	52
Agree	15	34
Neither agree nor disagree	4	10
Disagree	2	4
Strongly disagree	0	0
Total	44	100

Source: Primary data, 2018

According to table 6, respondents contacted strongly agreed that storage on the ground, or on drying floors affect maize income (52%) while 34% of respondents said they agree and 10% of respondents said they neither agree nor disagree. 4% of respondents said they disagree. When asked to give reasons for their answers, respondents said storage on the ground, or on drying floors help farmers to reduce expenses that would be spent on expensive technology hence leading to minimization of losses and maximization of revenues. This led the researcher to the realization that storage on the ground, or on drying floors in maize leads to increased maize income through reduction in costs.

Table 7: The extent to which respondents that open Timber Platforms affects maize income

Extent	Frequency	Percentage
Strongly agree	26	60
Agree	15	34
Neither agree nor disagree	2	4
Disagree	1	2
Strongly disagree	0	0
Total	44	100

Source: Primary data, 2018

According to table 7, respondents contacted strongly agreed that open timber platforms affect maize income (60%) while 34% of respondents said they agree and 4% of respondents said they neither agree nor disagree. 2% of respondents said they disagree. When asked to give reasons for their answers, respondents said open timber platforms help farmers to reduce expenses because the methods is cheap compared to other methods hence leading to reduction in costs and increase in revenues. This led the researcher to the realization that open timber platforms in maize leads to increased maize income through increased revenues.

Table 8: The extent to which respondents agree that solid wall bins affects maize income

Extent	Frequency	Percentage
Strongly agree	28	64
Agree	13	30

Neither agree nor disagree	2	5
Disagree	1	1
Strongly disagree	0	0
Total	44	100

Source: Primary data, 2018

According to table 8, respondents contacted strongly agreed that solid wall bins affect maize income (64%) while 30% of respondents said they agree and 5% of respondents said they neither agree nor disagree. 1% of respondents said they disagree. When asked to give reasons for their answers, respondents said solid wall bins help farmers to reduce are considered to be more convenient in maize drying due to the fact that they facilitate drying without reduction in size and weight This led the researcher to the realization that solid wall bins in maize leads to increased maize income.

Table 9: The extent to which respondents agree that storage techniques improve maize quality

Extent	Frequency	Percentage
Strongly agree	26	60
Agree	13	30
Neither agree nor disagree	4	9
Disagree	1	1
Strongly disagree	0	0
Total	44	100

Source: Primary data, 2018

According to table 9, most of the contacted respondents strongly agreed that storage technology improves maize quality (60%) while 30% of respondents said they agree and 9% of respondents said they neither agree nor disagree. 1% of respondents said they disagree. When asked to give reasons for their answers, respondents said storage technology preserves maize or keeps it safely and avoids any possible damage that would affect maize quality This led the researcher to the realization that storage technology is vital in improves maize quality which in the end an attribute for quality improvement.

Table 10: The extent to which respondents agree that storage techniques match market demand

Extent	Frequency	Percentage
Strongly agree	28	63
Agree	13	30
Neither agree nor disagree	2	5
Disagree	1	2
Strongly disagree	0	0
Total	44	100

Source: Primary data, 2018

According to table 10, most of the contacted respondents strongly agreed that storage techniques match market demand (63%) while 30% of respondents said they agree and 5% of respondents said they neither agree nor disagree. 2% of respondents said they disagree. When asked to give reasons for their answers, respondents said storage techniques match market demand because the maize that is safely kept will match the market demand. This led the researcher to the understanding that by matching the market needs storage services lead to increased sales and income.

Table 11: The extent to which respondents agree that storage techniques protect maize quality

Extent	Frequency	Percentage
Strongly agree	30	70
Agree	11	25
Neither agree nor disagree	2	3
Disagree	1	1
Strongly disagree	0	0
Total	44	100

Source: Primary data, 2018

According to table 11, most of the contacted respondents strongly agreed that Storage techniques protect maize quality (63%) while 30% of respondents said they agree and 5% of respondents said they neither agree nor disagree. 2% of respondents said they disagree. When asked to give reasons for their answers, respondents said Storage techniques protect maize quality because the maize that is safely kept will match retain its quality. This led the researcher to the understanding that by storage techniques protect maize quality lead to increased sales and income.

Table 12: The extent to which respondents agree that Storage improve maize appearance

Extent	Frequency	Percentage
Strongly agree	29	66
Agree	11	24
Neither agree nor disagree	2	10
Disagree	2	5
Strongly disagree	0	0
Total	44	100

Source: Primary data, 2018

According to table 12, most of the contacted respondents strongly agreed that storage improve maize appearance (66%) while 24% of respondents said they agree and 10% of respondents said they neither agree nor disagree. 5% of respondents said they disagree. When asked to give reasons for their answers, respondents said storage improve maize appearance because the maize that is safely kept will look nice in front of customers hence a lot of it will bought. This led the researcher to the understanding that by storage improve maize appearance lead to increased sales and income.

Table 13: The extent to which respondents agree that expectations from storage technology have been met

Extent	Frequency	Percentage
Strongly agree	30	70
Agree	10	24
Neither agree nor disagree	2	3
Disagree	2	2
Strongly disagree	0	0
Total	44	100

Source: Primary data, 2018

According to table 13, most of the contacted respondents strongly agreed that expectations from storage technology has been met (70%) while 24% of respondents said they agree and 10% of respondents said they neither agree nor disagree. 5% of respondents said they disagree. When asked to give reasons for their answers, respondents said through improved storage they have been able to store and sell their maize at the right period. And this has helped them to improve and increase income.

4.2 The effect of drying technology on maize income in Kayonza district:

The researcher made a presentation, analysis and interpretation of the views that respondents gave concerning effect of drying technology on maize income in Kayonza district so that relevant study conclusions can be made.

Table 14: The extent to which respondents rated the effect of drying technology on maize income

Extent	Frequency	Percentage
Very good	33	76
Good	7	16
Neither good nor poor	4	8
Poor	0	0
Very poor	0	0
Total	44	100

Source: Primary data, 2018

According to table 14, most of the contacted respondents rated the effect of drying technology on maize income as very good (76%) while 16% of respondents said they good and 8% of respondents said they neither good nor poor. When asked to give reasons for their answers, respondents said drying technology facilitates maize to stay for long so that farmers can sell it when prices are favourable. This led the researcher to the realization that drying technology leads to improvements on maize income.

Table 15: The extent to which respondents agree that sun drying contributes to increase in maize income

Extent	Frequency	Percentage
Strongly agree	30	72
Agree	10	26
Neither agree nor disagree	2	1
Disagree	2	1
Strongly disagree	0	0
Total	44	100

Source: Primary data, 2018

According to table 15, most of the contacted respondents strongly agreed sun drying affects maize income (72%) while 26% of respondents said they agree and 1% of respondents said they neither agree nor disagree. 1% of respondents said they disagree. When asked to give reasons for their answers, respondents said through thorough drying maize is able to be kept and sold at the right time when prices are favorable hence leading to increased income. This led the researcher to the understanding that maize drying is relevant in improving quality and leading to increased income

Table 16: The extent to which respondents agree that crib drying contributes to increase in maize income

Extent	Frequency	Percentage
Strongly agree	26	60
Agree	14	30
Neither agree nor disagree	2	5
Disagree	2	5
Strongly disagree	0	0
Total	44	100

Source: Primary data, 2018

According to table 16, most of the contacted respondents strongly agreed crib drying affects maize income (60%) while 30% of respondents said they agree and 5% of respondents said they neither agree nor disagree. 5% of respondents said they disagree. When asked to give reasons for their answers, respondents said through crib drying in maize is able to be kept and lead to improvements in quality. This led the researcher to the understanding that maize drying is by crib drying is relevant in improving quality and leading to increased income.

Table 17: The extent to which respondents agree that solar dryers contributes to increase in maize income

Extent	Frequency	Percentage
Strongly agree	26	60
Agree	14	30
Neither agree nor disagree	2	5
Disagree	2	5
Strongly disagree	0	0
Total	44	100

Source: Primary data, 2018

According to table 17, most of the contacted respondents strongly agreed that solar drying affects maize income (60%) while 30% of respondents said they agree and 5% of respondents said they neither agree nor disagree. 5% of respondents said they disagree. When asked to give reasons for their answers, a respondent said through solar drying in maize is able to be kept and lead to improvements in quality. This led the researcher to the understanding that maize drying is by solar drying is relevant in improving quality and leading to increased income and leading to improvements revenues.

4.3 The influence of packaging technology on maize income in Kayonza district:

The researcher made a presentation, analysis and interpretation of the views given by respondents concerning influence of packaging technology on maize income in Kayonza district in order to make relevant study conclusions

Table 18: The extent to which respondents agree that packaging technology affects maize income affect maize income

Extent	Frequency	Percentage
Strongly agree	26	61
Agree	17	38
Neither agree nor disagree	1	1
Disagree	0	0
Strongly disagree	0	0
Total	44	100

Source: Primary data, 2018

According to table 18, most of the contacted respondents strongly agreed that packaging technology affects maize income (61%) while 38% of respondents said they agree and 1% of respondents said they neither agree nor disagree. When asked to give reasons for their answers, a respondent said through packaging technology in maize is able to be kept and lead to improvements in quality. This led the researcher to the understanding that when maize is well packed packages lead to improvements in value leading to increased income.

5. SUMMARY OF THE FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction:

In this chapter, the researcher presents the summary of the findings based on respondent's views. The summary of the findings is presented in line with the objectives of the research. The researcher also presents the conclusion of the study, gives the recommendations and suggests the possible areas for future research.

5.2 Summary of the findings:

This part presents the summary of the research findings in view of the objectives of the research, the researcher found out that post harvest handling technology is vital in improving maize income in Kayonza district. The post harvest handling technology used in Kayonza to increase income are storage techniques, drying techniques as well as packaging techniques. post harvest handling technology increases maize income through the preserved quality and nature of maize results from better keeping and preservation.

The researcher found out that drying technology facilitates maize to stay for long so that farmers can sell it when prices are favourable. Drying technology leads to improvements on maize income, through crib drying in maize is able to be kept and lead to improvements in quality. Maize drying is by crib drying is relevant in improving quality and leading to increased income and that through solar drying in maize is able to be kept and lead to improvements in quality. maize drying is by solar drying is relevant in improving quality and leading to increased income and leading to improvements revenues..

The researcher found out that packaging technology in maize is able to be kept and lead to improvements in quality. When maize is well packed packages lead to improvements in value leading to increased income. Packaging increased the appearance which is attributed to quality and this makes customers buy more of packaged maize since it is considered to be safe and leading to increased income.

5.3 Conclusion:

The researcher concluded that post harvest handling technology affects maize income in Kayonza district through improved storage, drying and packaging which lead to safeguarding and improving quality of maize hence leading to high income through increased prices of maize in the market.

The researcher concluded that through improvements in storage, maize is able to retain its quality and last for long so that it can be sold during periods when prices are favourable and this leads to increase in income,

The researcher concluded that through thorough drying an packaging, maize value is improves as well as than physical appearance which are all attributes of improved values and justification for selling at higher or reasonable prices.

5.4 Recommendations remade:

The researcher made recommendations in relation to the contribution of post harvest handling technology on improving maize income.

The researcher recommended that farmers in Kayonza district should continue using improved post harvest handling technology so as to improve quality and increase maize income.

The government should continue giving support to farmers through improvements in post harvests handling so as to increase income.

5.5 Areas for future research:

The researcher suggested the following areas as necessary for the research in future in order to make the field related to post harvest handling technology and maize income.

The researcher suggested that in future a research should be carried on the best ways through which post-harvest handling technology can improve social development of farmers

The researcher recommended that in future research should be carried out on the various benefits of increased farmers' income.

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