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FACTORS INFLUENCING INDEGINOUS COMMUNITY PRACTICES IN CURBING POSTHARVEST LOSSES: A STUDY OF KIPSARAMAN DIVISION, BARINGO COUNTY, KENYA

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ABSTRACT

Hunger, malnutrition, and poverty remain stubbornly persistent in sub-Sahara Africa especially among poor rural households where postharvest losses are observed, thus increasing levels of hunger and poverty. In this context, postharvest management is practiced using technologies that are on different levels of development continuum. The purpose of the study was to explore the factors influencing postharvest and agro-Processing indigenous knowledge (PHAP-IK) practices in curbing losses in Kipsaraman Division of Baringo County, Kenya. The study objective was to determine how age, level of education and the communities' knowledge and attitude affect the practice of PHAP-IK. An exploratory survey design was used to generate a quantitative and qualitative data and analyzed using SPSS version 21. In relation to knowledge and attitude towards PHAP-IK, 99.7% of the respondents had some knowledge though minimally utilized especially among the young and educated. The study noted a strong positive association between age of the respondents and attitude towards PHAP-IK $\{\chi^2 (8, 314) = 54.48, p<.001, r (312) = 0.40, p<.01\}$ while level of education and PHAP-IK was negatively correlated $\{\chi^2 (8, 314) = 86.39, p<.001, r (312) = 0.47, p<.01\}$. Considering the prevailing food insecurity in the region, PHAP-IK should be considered alongside other strategies to help curb the food losses and hence contribute to improved food and nutrition security in the region. The study also recommends inclusion of indigenous knowledge in school curricula and its documentation to foster sustainability.

Keywords: Postharvest and agro-processing, Indigenous knowledge, knowledge & attitudes

1. INTRODUCTION

Food security and nutrition has remained a global concern in the recent past. The number of undernourished people in the world has been on the rise since 2014, reaching an estimated 821 million in 2017 (IFPRI, 2018) and expected to reach 10.5 billion by 2050 (UN March 2013), thus

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adding to global food and nutrition security concerns. Postharvest Losses (PHLs) have continued to be a major stumbling block to the attainment of food security both at the national and household level.

PHLs of food occur in quality and quantity between the time of harvest and the time it reaches the consumer (Mrema & Rolles, 2002). FAO (2011) estimates that approximately one third of food produced for human consumption is lost or wasted globally. This loss amounts to about 1.3 billion tons per year and it is worth nearly one trillion US dollars. FAO further reveals that one quarter of the annual food loss is sufficient to feed the world's hungry. In the developing world, estimates of PHL of food grains from mishandling, spoilage and pest infestation are put at 25% while those of fruits and vegetables can be as high as 50%. According to the African Post Harvest Loss Information System (2012), it has been estimated that at least 10 % of the Africa's crop productivity is lost on and off farm. It is also estimated that food that that 'disappears' from the food chain after harvest owing to spoilage could feed 48 million people in Sub-Saharan Africa (FAO 2018). Under the Malabo Declaration in 2014, African Union member countries set themselves the ambitious target of halving post-harvest losses by 2025. Locally in Kenya, postharvest losses stand at between 30-40% (Ministry of Agriculture, 2014).

Although postharvest losses have been identified as one of the key snags to the achievement of food security in Sub – Saharan Africa, there is no universal method of managing it (APHLIS, 2012). The Kenya Government has put several interventions to counter these losses in the midst of a 1.3 million Kenyans that are acutely food insecure (Ministry of Agriculture, 2016). However, there is no immediate intervention strategy put in place to curb post-harvest losses. Hence indigenous knowledge use in Postharvest Handling and Agro Processing (PHAP) maybe of paramount importance in addressing PHL challenge in rural communities. Indigenous knowledge use creates the basis for local decision making in agriculture, food preparation, and preservation, education, healthcare and natural resource management (Warren, 1991).This valuable knowledge that has sustained rural households for many generations has been grossly underutilized (Flavier et.al., 1995). There has been no formal intervention to promote its use in post-harvest and agro processing (PHAP) with the aim of reducing postharvest losses. The seasonal nature of food production and unforeseen instabilities creates the need for viable solutions to manage already produced food effectively. Hence the application of indigenous knowledge use in PHAP will lower the rate of food losses and subsequently improve food and nutrition security for rural populations. Policies targeting the rural poor and aimed at enhancing agricultural food production and reducing postharvest losses especially where small holders are involved should be initiated, nurtured and supported (FAO, 2013; Madebwe C, Madebwe V & Jacquiline K, 2005).

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Food security demands that all people at all times should have physical and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences (FAO (2001). Hence the four pillars of food security: availability, accessibility, stability and utilization have been a challenge owing to a variety of factors which include: climate change, land degradation, insecurity, land deals, water scarcity and postharvest losses, and price volatility. This study specifically examines PHLs and the role of Indigenous Knowledge in its management on food stability and utilization.

PHLs have been reported to be one of the contributing factors to food insecurity. Rural households have their own ways of managing these losses for generations. Despite the critical role played by these indigenous practices, they face extinction due to natural attrition, urbanization, marginalization and lack of documentation.

1.1 Indigenous Knowledge

Indigenous Knowledge (IK) also referred to as traditional, local or indigenous technical knowledge is a systematic body of knowledge acquired by local people through accumulation of experience, informal experiments and intimate understanding of the environment. IK is perceived to be the knowledge that is unique to a given culture or society. They are forms of knowledge of indigenous people of a particular geographical area and have originated locally and naturally (Mapara, 2009; Altieri, 1995). It is unique to a local area, culture or society, passed down from one generation to the next through oral tradition (Norem et al., 1985). It is the knowledge that encompasses the way in which the local populations relate with each other and their immediate environment (Mapara, 2009). IK has acted as a community's armor against environmental shocks and is a manifestation of communities' resilience and resourcefulness. It allows communities to solve local environmental problems using endogenous solutions over which they have full control (Madebwe, 2005).

IK emphasizes knowledge based on internally induced experiences of a particular people. It represents valuable source of local solutions to food security in terms of accessibility by the rural population during seasonal food shortages and during major stress periods like during prolonged droughts (Ibnouf, 2011). Despite the critical role of IK, it is unevenly distributed because of its nature of being closely tied to an activity where accessibility is determined by participation in related activities. Additionally, access to the relevant knowledge and skills is achieved through active involvement in such activities followed by a process of experimentation, adaptation and propagation of the new ideas learned through experience.

1.2 Postharvest and Agro-Processing Indigenous Knowledge (PHAP-IK)

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Indigenous Post Harvest and Agro-Processing practices have been in existence long before modern science came into existence. These technologies have played a critical role in sustaining rural households for generations. A number of local technologies were utilized in post-harvest food processing. These practices greatly enhanced the value of perishable foodstuffs by making them available for longer periods. Sun-drying has been one of the oldest methods of food preservation (Ibnouf, 2012). Vegetables are blanched and dried, grains and legumes are sundried to increase their shelf-life. Termites and other edible locusts are also dried and it becomes a good source of protein during dry times when other protein sources are difficult to access.

Fermentation has been used for generations as a method of food preparation and preservation. Fermentation enhances the nutritional quality of foods and contributes to food safety particularly under conditions where refrigeration and other food preservation facilities are unavailable (Motarjemi, 2002). A combination of several processing and preservation methods is a common practice among communities e.g. salting, smoking and drying of meats. Germination, drying and fermentation can be combined as in the case of local brews. Collection and processing of wild fruits, nuts and mushrooms, have cushioned communities during famine and prolonged droughts preventing massive deaths of populations (Guvelee et al., 2003). Hence the processed and preserved foods have played a key role in ensuring that there is a continuous supply of food all year round (Hamid, 2006).

Storage of farm produce has been a key indigenous practice in rural communities. Granaries are the most utilized in the storage of grains, legumes, dried fruits and vegetables. Fresh cassava and sweet potatoes are buried under the soil to prolong their freshness (Mutandwa & Gadzirayi, 2007; Kone, 1991). The same can also be sun-dried and stored. Some of the foodstuffs are hanged above the fireplace where they are safe from rodents and weevils as they undergo drying.

1.3 Marginalization of indigenous knowledge and practices

Indigenous knowledge has persistently been relegated to the background despite the critical roles of sustaining indigenous communities for generations. This can be traced back to the dark era of forced rule, imperialism, colonization where another form of knowledge was introduced. They thought that IK and practices are primitive, backward, irrelevant, outdated, obsolete, archaic, old fashioned and satanic (Mapara, 2009). It is paradoxical to note that despite the persistent exclusion of IK in all circles, no single community is devoid of this knowledge. If anything, the more an individual or community posses or practices this knowledge, the more they are marginalized. This negative tag branded on IK jammed the space for its inclusion with other forms of knowledge. Consequently, IK was suppressed, illegalized, and abandoned by some communities giving rise to a generation that does not recognize, understand, value or use IK.

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Certain characteristics of IK predispose it to constant marginalization: the fact that IK is shared orally, frequently not systematic and mostly rural based makes it difficult to appeal to the elite and urban folk. Further, IK is embedded in the culture, tradition, ideology, language and religion of a particular community challenges the possibility of generalization (Ocholla, 2007). IK in most cases tend to focus on the poor and frequently associated with developing countries. Therefore, all efforts must be made to ensure that IK is integrated with other forms of knowledge.

World Bank (1998) made recommendations on steps to integrate IK with other forms of knowledge as indicated below:

1. Recognition and identification of indigenous knowledge
2. Validation and affirmation by identifying its significance, relevance, reliability, functionality, effectiveness and transferability.
3. Codification, recording and documentation to enable sharing, transferability and storability.
4. Storage of Indigenous Knowledge for retrieval. Hence the need to create repositories, databases, and indexing for easy access and use.
5. Considering this framework, indigenous knowledge can be saved from extinction and its usefulness in the development progress maximally utilized if documentation is achieved.

2. MATERIALS & METHODS

2.1 Study Area

Baringo County is located in the former Rift Valley Province of Kenya. The County covers an area of 11,015.sq.kilometres and has a population of 552,254 (KNBS, 2009). The County is classified into six livelihood zones segregated into different proportions as follows: Pastoral (33%), Agro pastoral (9%), marginal mixed farming (39%), mixed farming (14%) and Irrigated cropping (4%). The food security and nutrition short rains assessment for February, 2014 described the overall food security situation as stressed (IPC phase 2). East Pokot Sub – County is faced with a food security crisis with about 58.5% of the population in urgent need of food assistance (NDMA, 2014). Suppressed rainfall with poor spatial and temporal distribution resulting in reduced water availability and quality in the pastoral livelihood zones are experiences annually. There has been no recharge of the water bodies with over 80% of the pans and seasonal rivers drying up (NDMA, 2014). Recurrent insecurity in parts of East and North Baringo has further complicated the food security situation in the County.

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Kipsaraman Division falls under the Arid and Semi-Arid Lands of Kenya. It has a population of 19,894 people with a huge percentage (89%) being rural dwellers. Their livelihoods revolve around rain fed subsistence agriculture and livestock rearing (KDHS, 2009). This region faces varied challenges: land degradation, erratic rainfall, poor road and electricity network (9.6%) and recurrent intertribal clashes (Red Cross, 2012; USAID, 2012). Hence food security has remained a challenge resulting in persistent reliance on relief food for survival (Red Cross, 2012).

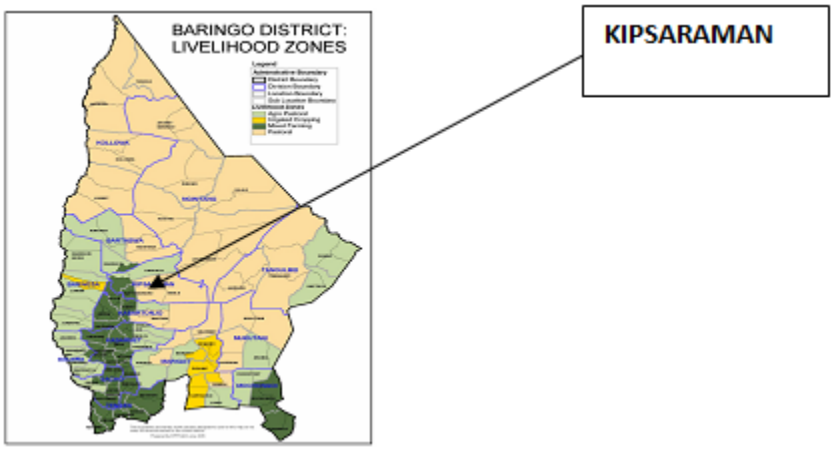

Figure 1: Map of Baringo County, Kenya, showing Kipsaraman Location.

2.2 Conceptual framework

The objective of the study was to determine the community's knowledge and attitudes towards PHAP-IK practices by seeking from the respondents about the PHAP-IK currently practiced, mode of learning, their referent sources, and finally the knowledge & attitude towards PHAP-IK amongst different age groups, and education level and the reasons for poor utilization of PHAP-IK in the community. The study also attempted to test the following hypotheses: H_0: Age does not affect an individual's attitude towards indigenous post harvest practices; H_0: Level of education does not affect the attitude of an individual towards indigenous postharvest practices.

As shown in the model below, the need to reduce the rate of PHLs drives those who practice indigenous methods to address this challenge in traditional ways as passed on from generations. These trials are done either individually or collectively. In the process, observational learning process takes place as other members get to learn the new practice. Depending on a variety of factors, the practice may be adopted or rejected. These factors include: complexity, compatibility, relative advantage, triability and observability of the practice under investigation. If adopted, chances are that the practice will later spread within the community of origin and

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beyond. The application of this knowledge in preprocessing, processing and storage can play a role in reducing postharvest losses. Subsequently, it is likely to enhance availability of food, improved sustainability enabling utilization especially when the food is in scarcity during harsh seasons. If the IKS practice is rejected, the cycle repeats and postharvest losses are observed, there may be no improvement in the food and nutrition security and status of the households.

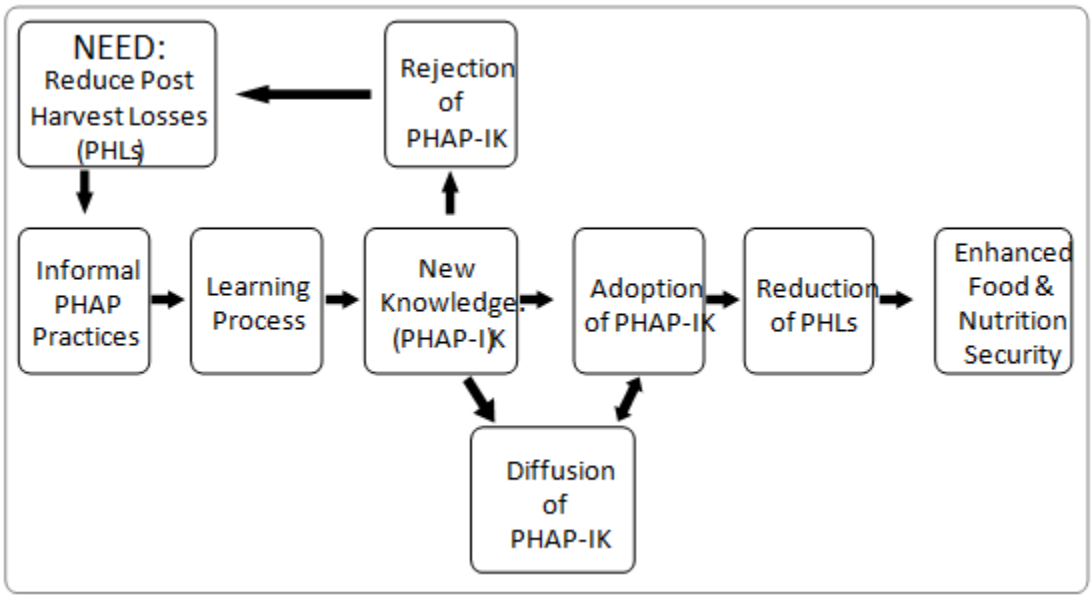

Figure 2: PHAP-IK Conceptual framework. Adopted and modified from Diffusion of Innovation Model by: E. N. RODGERS (2005)

2.3 Research Design

An exploratory survey design was used so as to probe characteristics that helped in answering the pertinent questions (what, how, why) related to the phenomenon under study. The design helped to illuminate the communities' knowledge and attitudes towards indigenous postharvest practices, and further revealed how the knowledge was acquired, adopted and spread within the community.

2.4 Target Population and Sampling Methods

The target population of the study comprised of all households in Kipsaraman Division. The Division is sub-divided into three locations namely: Kipkata, Kapteberewo and Sibilo which comprised of 1523, 1284 and 1250 households respectively. The age distribution of the residents were: <14 years: 48.4%, 15-64 years: 48.2% and those above 65 years comprise 3.3 % of the

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population. The sample size for the study was derived using Fishers formula (Mugenda & Mugenda, 1999) as shown below.

$$n = \frac{Z2\ pq}{d2}$$

Where:

n = the desired sample size (if the target population is greater than 10,000).
z = the standard normal deviation at the required confidence level
p = the proportion in the target population estimated to have the characteristics being measured
d = the level of statistical significance set.

$$n = \frac{(1.96)2\ (0.50)\ (0.50)}{(0.05)2} = 384$$

2.5 Sampling Methods

In the study, selection of samples for questionnaire administration was done using purposive, simple and systematic random sampling to select 314 respondents. Purposive sampling was used to select three sub-locations from the three locations (Kapteberewo, Kipkata and Sibilo) which form the Kipsaraman Division. The decision was based on the agro ecological zone the sub-location falls into. Bartolimo sub-location (mixed farming), Barketiew sub-location (agro-pastoral) and Rondinin sub-location (pastoral) were selected to represent Kapteberewo, Kipkata and Sibilo locations respectively. Simple random sampling was used to select three villages from each of the sub-locations sampled. From Bartolimo sub-location, Chambai, Kelwondonin and Kertikwo villages were selected. Rormoch, Kagir and Kapkomon villages represented Barketiew Sub-location while Burenin, Burburet and Kayat villages were randomly selected to represent Rondinin Sub-location. Afterwards, sampling of the households in Barketiew and Bartolimo sub-locations were systematically done. With the help of a local guide, the centre of the village was located and the direction to take was selected randomly after which every 4^{th} household was sampled. All family members present at home at the time and were aged 15 years and above were interviewed and questionnaires filled for them. As for Sibilo location, convenience sampling was applied to select the households and the respondents for questionnaire administration. This was occasioned by the very sparse settlement, bad terrain and the insecurity risks in the area. As a result, a total of 314 respondents were sampled for questionnaire administration as follows: Kipkata location – 134 respondents (Rormoch-47, Kagir-53,

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Kapkomon-34), Kapteberewo location – 102 respondents (Chambai-38, Kelwondonin-36, Kertikwo-28) and Sibilo location – 78 respondents (Burenin-27, Burburet-30, Kayat-21).

2.6 Data collection

The methods of data collection used in the study included: questionnaires and observations. The questionnaires used in the study were designed to contain both open and closed ended questions to cover five key areas namely: demographic data, food security, postharvest losses, indigenous postharvest practices and marginalization of indigenous knowledge. The questionnaires were administered to a total of 314 respondents. The respondents were aged 15 years and above and their selection was purely random. This group of individuals was considered because they play a critical role in postharvest handling and agro processing of agricultural produce in their households.

2.7 Data analysis

The generated data was cleaned; coded and analyzed using Statistical Package for Social Sciences (SPSS) version 22 and descriptive and inferential data were derived and presented in Tables. Chi-square and correlations tests were used to assess the association between age, the level of education of the respondents and their attitude towards PHAP-IK.

3. RESULTS AND DISCUSSIONS

3.1 Food security

A significant proportion (72.9%) of the respondents indicated that they always had shortage of food in their households. On the other hand, 18.2% of the respondents reported of occasional lack of food while a small proportion (9.0%) never experienced food shortage in their households (see Table 3.1). Cumulatively, 91.1% of the respondents are food insecure implying that for every 100 people, 90 were affected. Further, it was observed that there were particular periods of the year when the respondents were mostly affected. The study findings indicated that 66.9 % of the respondents experienced food shortage from January to April compared to 31.8 % between May and August. Early maturing foods like beans and vegetables may have contributed to improved food security in the second trimester of the year whereas September-December is the harvest season for most staple foods and thus is considered to be the season of plenty.

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Table 3.1: Frequency of household food shortage in Kipsaraman Division

Responses	Frequency	Percent (%)
Always	229	72.9
Sometimes	57	18.2
Never	28	9.0
Season of the year mostly affected		
January – April	210	66.9
May – August	100	31.8
September – December	63	20.1

NB: Multiple responses were allowed

N=314;

3.2 Knowledge and Attitude towards Post Harvest and Agro-Processing Indigenous Knowledge

As shown in Table 3.2 below, the respondents affirmed that sorting, drying, threshing and winnowing are currently being applied during pre-processing at 100%. During food processing, boiling (100%), roasting (88.8%) and fermentation (34.5%) are methods utilized by almost all households. Granaries were commonly used for storage (84.3%) compared to storage over the fireplace (15.7%) and the use of traditional bags (5.4%).

Table 3.2: Postharvest and Agro Processing –Indigenous Knowledge currently applied by the respondents

Responses	Frequency	Percent (%)
Sorting	313	100
Drying	313	100
Winnowing	313	100
Threshing	313	100
Grinding using grinding stone	28	8.9
Boiling	313	100
Roasting	278	88.8
Fermentation	108	34.5
Smoking	112	35.8

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Storage in granaries	264	84.3
Storage in pots	61	19.5
Above the fireplace	49	15.7
Traditional bags	17	5.4

N=314; NB: Multiple responses allowed

3.3 Salient Referents for Postharvest and agro processing practices

Majority of the respondents (94.6%) reported that they learned the skills practically. A smaller proportion (79.2%) reported to have acquired the knowledge through observation while 32.9% of the respondents employed trial and error. A huge proportion of the respondents (88.2%) felt that they acquired most of PHAP-IK from their parents followed by their grandparents at 73.8%.

Table 3.3: Salient referents of Postharvest and Agro-Processing Indigenous Knowledge

Salient referents	No of Respondents	Percentage
Observation	248	79.2
Doing practically	296	94.6
Trial and error	103	32.9
Village elders	164	52.4
Parents	276	88.2
Grand Parents	231	73.8
Older Siblings	120	38.3

N=314; NB: Multiple responses allowed

3.4 Attitude towards Post Harvest and Agro-Processing Indigenous Knowledge

Generally, the results indicated that a higher number of respondents (n=173, 55%) had a positive attitude towards PHAP-IK, than those who had neutral (n=53, 18%) and negative attitude (n=74, 26%). However, it was observed that the younger respondents (15-25 years; (62%)) displayed a higher negative attitude towards PHAP-IK than the older respondents in all the age categories, whereas older respondents (above 55 years; 82%) displayed the highest positive attitude (see Table 3.4).

The results also revealed that generally, there was an increasing level of negativity towards PHAP-IK with an increase in education. The respondents without any formal education (n= 72, 85%) and those with primary level education (n=68, 70%) had a positive attitude towards PHAP-

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IK whereas those with tertiary and university level had a neutral attitude (n=7, 23%); (n=3, 25%) and negative attitude (n=18, 58%); (n=7, 58%) respectively.

Table 3.4: Attitude towards Post Harvest and Agro-Processing Indigenous Knowledge by age and level of education

Variables		Positive attitude	Neutral	Negative attitude
Age group	No of respondents	n(%)	n(%)	n(%)
15-25 years	36 (12)	8 (22)	6(16)	22(62)
26-35 years	41(13)	15(37)	8(20)	18(43)
36-45 years	76(24)	37(48)	14(18)	25(34)
46-55 years	79(25)	46(58)	17(22)	16(20)
Over 55 years	82(26)	67(82)	8(10)	7(8)
Total	314(100)	173(55)	53(18)	74(27)
Education level				
No formal education	85(27)	72(85)	6(7)	7(8)
Primary	97(31)	68(70)	9(9)	20(21)
Secondary	89(28)	27(30)	28(32)	34(38)
Tertiary	31(10)	6(19)	7(23)	18(58)
University	12(4)	2(17)	3(25)	7(58)
Total	314(100)			

N=314

3.5 Hindrances to the adoption and spread of indigenous knowledge

The respondents were asked to indicate if PHAP-IK was being fully utilized by their households. A majority (78.6%) stated that this was not the case. Further, the researcher probed deeper to understand the reasons behind the dismal utilization of PHAP-IK in the community. The respondents gave varied reasons which included: negative attitude towards the PHAP-IK (68.4%), effects of modern education (89.5%), disconnect between the old and the young (64.2%), lack of appropriate equipment (45.7%) and time factor (54.3%), (Table 3.5).

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Table 3.5: Reasons for poor utilization of Postharvest and Agro Processing-Indigenous Knowledge in the community

Reason	Frequency	Percent (%)
Negative attitude	214	68.4
Disconnect between the old and the young	201	64.2
Modern education	280	89.5
Lack of appropriate equipment	143	45.7
Lack of time	170	54.3
Others	67	21.4

N=314; Multiple responses allowed

Chi square test of independence was conducted to check whether there existed any association between respondents' age and their attitude towards indigenous post harvest practices. The Pearson Chi-square statistic was also computed.

The results indicated a significant relationship between the respondents' age and their attitude towards PHAP-IK, χ^2 (8, 314) = 54.48, p<.001(Table 3.6).

Table 3.6: The Chi Square Test comparing respondent's age and attitude towards Post Harvest and Agro Processing Indigenous Knowledge

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	54.479[a]	8	.000
Likelihood Ratio	55.625	8	.000
Linear-by-Linear Association	50.396	1	.000
N of Valid Cases	314		

P<0.05

To assess the direction and magnitude of the relationship between the respondents' age and their attitude towards PHAP-IK, Pearsons correlation coefficient was computed. The results indicated a strong positive correlation r (312) = 0.40, p<0.001 between the two variables. Hence concluded that individuals' age significantly affects ones' attitude towards PHAP-IK as shown earlier(Table 3.7).

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Table 3.7: Symmetric measures showing the degree of relationship between age and attitude towards Post harvest and Agro Processing Indigenous Knowledge

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	.401	.050	7.738	.000[c]
Ordinal by Ordinal	Spearman Correlation	.395	.050	7.604	.000[c]
N of Valid Cases		314			

Source: *Survey Data*

To check the possibility of association between the level of education of the respondents and their attitude towards PHAP-IK, Pearson Chi-square analysis was conducted using the cross tabulated data (Table 3.8 below). The results indicated the existence of association between education level and attitude towards PHAP-IK χ^2 (8, 314) =86.39, $p < .001$ as indicated earlier.

Table 3.8: Chi square test of association between respondent's level of education and attitude towards PHAP-IK

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	89.451[a]	8	.000
Likelihood Ratio	93.270	8	.000
Linear-by-Linear Association	69.694	1	.000
N of Valid Cases	314		

To further establish the extent and magnitude of association of the two variables, Spearmans and Pearsons correlation coefficient was computed (see Table 3.9). The results showed a strong negative correlation r (312) = -0.47, p<.001, concluding that when the level of education goes up, the attitude towards PHAP-IK tilts towards the negative.

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Table 3.9: Symmetrical measures showing the extent of relationship between respondents' level of education and their attitude towards Post Harvest and Agro Processing Indigenous Knowledge

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-.472	.046	-9.454	.000[c]
Ordinal by Ordinal	Spearman Correlation	-.493	.045	-10.010	.000[c]
N of Valid Cases		314			

4. CONCLUSIONS AND RECOMMENDATIONS

From the study results, it was evident that a majority of the study population, which was rural based, had some knowledge of PHAP-IK practices though minimally applied. Further, it was observed that the PHAP-IK activities frequently practiced were those they considered critical and inevitable in the post-harvest process such as drying, winnowing, threshing, boiling and roasting. However, indigenous preservation techniques were minimally appreciated and seldom practiced by the younger respondents. This knowledge and skills were more utilized by the older respondents. Masta & Mukoni (2013) concurs with this finding and concluded these techniques are so critical to the older people especially the women whose major responsibility is to prepare and preserve food for their families so as to have supplies for longer periods, especially during the dry season.

The level of education appeared to have significant effect on the attitude towards indigenous post harvest practices. The study observed that the higher the level of education of an individual, the more negative the attitude towards PHAP-IK tended to be and vice versa. This may be explained by the fact that indigenous knowledge is orally transmitted with learning taking place in a rural community setting. The current school system is silent about indigenous knowledge systems, hence its relegation. The generational transfer of IK in the context of community practices and its lack of documentation in any form also hinders its transmission (Mkabela, 2005; Norem et al 1985)). This mode of dissemination of indigenous knowledge made it difficult to appeal to the elite folk, significantly contributing to the negative attitude observed with them (Ocholla ,2007; Mapara, 2009).

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Secondly, minimal level of interaction between the old and the young was considered one of the reasons of poor adoption and dissemination of PHAP-IK. This could be due to rural-urban migration, and time factor and language barrier among other factors. Hence the older generation found it a challenge to teach and pass the information to the younger people. Additionally, traditional tools may no longer be easily accessible as they have been replaced by modern equipments. For instance, the use of baskets, pots and calabashes have been largely replaced by modern tools like gunny bags.

Based on the foregoing findings and discussions, it is evident that food security is still a major challenge in Kipsaraman Division negatively impacting the lives of residents and retarding the development of the region. The contributing factors to food insecurity cannot be successfully handled by one group of individuals, but requires a multi-faceted approach which may produce sustainable solutions.

In view of the fact that food losses were one of the major contributing factors to food insecurity in the region, all efforts should be made to counter the vice. It is sad to note that despite the persistent household food insecurity, food losses are still encountered. Accessibility and utilization of modern PHAP methods is still a mirage because of infrastructural challenges. Hence PHAP-IK should be considered in post harvest food management among other avenues to counter food losses and subsequently enhance food and nutrition security of the region.

PHAP-IK has been in existence for generations despite a host of hindrances challenging its spread. The negative attitude towards this knowledge displayed by the young and schooled requires urgent, viable and sustainable counteraction measures. Introduction of IK in school syllabuses will send the right signal on its importance. Incorporating aspects of PHAP-IK in agricultural extension and nutrition education programmes will go a long way in appreciating the local knowledge and will produce a blend which could easily be adopted and disseminated in the community and beyond. Consequently, de-stigmatization of PHAP-IK should be encouraged; its use promoted at all levels and documentation of the same supported by policy.

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