Education Quarterly Reviews

Samoei, M. C. (2023). Agriculture Teachers' Perceptions on the Inclusion of Indigenous Technical Knowledge in Secondary School Agriculture Curriculum, Nakuru County, Kenya. *Education Quarterly Reviews*, 6(2), 233-243.

ISSN 2621-5799

DOI: 10.31014/aior.1993.06.02.752

The online version of this article can be found at:
https://www.asianinstituteofresearch.org/

Published by:
The Asian Institute of Research

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The Asian Institute of Research
Education Quarterly Reviews
Vol.6, No.2, 2023: 233-243
ISSN 2621-5799

DOI: 10.31014/aior.1993.06.02.752

Agriculture Teachers' Perceptions on the Inclusion of Indigenous Technical Knowledge in Secondary School Agriculture Curriculum, Nakuru County, Kenya

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Abstract
Purpose: This paper explores agriculture teachers' perceptions of the inclusion of indigenous technical knowledge in secondary school curriculum. Design/methodology/approach: This study used a cross-sectional research design to determine the perceptions of agriculture teachers on the inclusion of indigenous technical knowledge in secondary school agriculture curriculum. Findings: The findings of the study indicate that more than 50% of the agriculture teachers were aware of the different indigenous practices that are carried out in both crop and livestock production, also more than 50% of the teachers agreed that ITK is; cheap, reliable, enriches students with a wide range of knowledge, is friendly and easy to use. 82% of the teachers agreed that ITK should be included in secondary school agriculture curriculum because of its values, 18% were of the opinion that agriculture curriculum is already bulky and the knowledge is outdated hence it should not be included in the curriculum. Practical implications: This study highlights the essence of including indigenous technical knowledge in secondary school curriculum, little of the said knowledge has been taken into consideration by the curriculum developers yet the knowledge can equip the learners with diversified agricultural knowledge which is crucial in crop and livestock production, the knowledge is cheap and readily available. Theoretical implications: The results of the study reveal that most of the teachers were positive about taking ITK into consideration while teaching agriculture. Based on the values of ITK the researcher suggests to curriculum developers to research on ideas and practices related to ITK that could be beneficial to learners and develop learning materials to suit their needs. Originality/value: There are limited studies that highlight the value of indigenous knowledge and its inclusion in secondary school agriculture curriculum.

Keywords: Perceptions, Indigenous Technical Knowledge, Agriculture Curriculum

1. Introduction

Indigenous technical knowledge (ITK) refers to the local knowledge that is unique to a given culture or society and is acquired by local people through the accumulation of experiences, informal experiments, and intimate understanding of the environment in a given culture. These are practical, personal and contextual units which cannot be detached from individuals, their community or the environment (Chikaire, Ejiogu-Okereke, Ihenacho, Oguegbuchulam, Obi & Osugwa 2012). Agricultural indigenous technical knowledge includes but is not limited

to the following areas; climatology, local soil and taxonomy, soil fertility, intercropping, agronomic practices, irrigation & water management, plant & animal protection and post-harvest technology (Nyong et al., 2007).

Indigenous technical knowledge is a significant subject which is recognized worldwide. For many years, indigenous knowledge has been used by local people of Asia, Latin America and Africa to sustain them and to maintain cultural identity (Kyasiimire, 2010). The first deliberation on ITK took place during the World Commission on Environment and Development (WCED) in the period between the years 1984 and 1987. The report of this commission unveiled the value of indigenous technical knowledge in the sustainable development process (Cincin-Sain & Knetch, 1995).

Studies show that for a long time, farmers in the developing world have depended on ITK for improved agricultural produce. The applicability of ITK takes place during different farming seasons and periods, and this knowledge spans from land clearing, tilling of the land, selecting seed varieties for planting, harvesting and storage, and identifying weather patterns (Lwoga, Ngulube, & Stilwell, 2010). Indigenous technical knowledge is vital in preserving biodiversity, through World Bank, gene banks have been established to preserve genetic information of indigenous crop and animal species, such species may prove instrumental in future breeding programs to introduce resistance against pests, diseases or endurance to harsh climatic conditions (Nyong et al., 2007).

In Kenya, the government through the Ministry of Agriculture in conjunction with Kenya Agricultural Livestock and Research Organization (KALRO) has embraced ITK by establishing Farmers Training Centre for Indigenous knowledge in some parts of the country, for instance in Turbo Township in Uasin Gishu district (Chebutuk & Kiplangat, 2008). Farmers converge in the centers and are taught how to apply ITK in their farming activities. Through this training farmers learn various uses of ITK which includes; use of animal and compost manure, sprinkling of hot pepper on vegetables to control pests, drying of selected seeds for planting, alternating of livestock and crops on a field portion to restore fertility and soaking of seeds in water before planting to hasten germination (Chebutuk & Kiplangat, 2008).

According to Msila (2016), the rapid and constant changes in the society necessitate a different kind of student who will respond to the current and future challenges. Mauley (2001) observes that since independence, education reform has been political rather than professional in developing countries like Kenya and South Africa. In South Africa a major curriculum reform was undertaken after dismantling of apartheid and the establishment of the black majority government (Howie, 2002). The new curriculum (C 2005) which was developed through an extensive process of participation and consultation was released in 1997. The C 2005 curriculum was driven by principles of outcome-based education, learner-centered education and the critical outcomes of the National Qualifications Framework unlike the former curriculum which primarily consisted of teacher "chalk and talk" and was heavily dependent on text books and rote learning (Howie, 2002).

The current system of education in Kenya is the 8-4-4 structure, the 8-4-4 system entails eight years of primary education, four years of secondary (form 1-4), and four years of university. This system was introduced in 1985 to promote man-power capable of performing white collar jobs (Kaviti, 2018). The proposal to scrap the 8-4-4 system was first contained in a 2012 report by a task force which recommended a 2-6-3-3 education system that would, amongst other factors ensure that learners acquire competencies and skills to meet the human resource aspirations of Kenya's vision 2030 blueprint for development (Kaviti, 2018). The Director of Kenya Institute of Curriculum Development (Jwan, 2017) in his report points out that the proposed 2-6-3-3 education system is expected to produce responsible citizens who are equipped with skills and knowledge. A cross examination of the proposed education system (2-6-3-3) shows that it has only embraced production of indigenous crops while leaving out ITK on crop protection, livestock production and soil conservation.

Curriculum reform is a planned sequence in which curriculum specialists (teachers inclusive) assist in; conducting needs assessment, identifying a problem, finding a solution, conceptualizing the required curriculum, pilot testing the revised curriculum on a small-scale basis then implementing it nationally (Kenya National Union of Teachers, 2017). The quality of curriculum reform on its own doesn't guarantee a successful reception by teachers, teachers'

beliefs, values, and experiences play a vital role in the acceptance of the reform (Bantwini, 2010). Neglect of these issues creates frustrations and sends out a message that the Education Department lacks concern about its teachers and can widen the gap between conception and implementation of the curriculum (Lemon, 2004).

The government of Kenya has always continued to reform the country's formal curriculum in order to incorporate the indigenous knowledge into the school system (Owuor, 2007). According to Shizha (2013) inclusive perspective in knowledge production and mediation should be the aim of curriculum transformation. Formal education in Africa is still characterized by the dominance of Western systems coupled with unwillingness to represent and apply indigenous knowledge within formal education and socio-economic contexts (Shava, 2016).

One of the challenges facing the integration of ITK in the Kenyan agriculture curriculum arises from teachers' lack of faith that such a curriculum can actually contribute significantly in addressing the socio-economic needs of the country (Mwenda, 2003). Teachers' perception on the integration of ITK in the agriculture curriculum determines how they integrate this form of knowledge in the school curriculum (Gachanga, 2007).

Indigenous Technical Knowledge and practices plays a key role in crop and livestock production. In crop production it entails control of crop pests and diseases using locally available materials, production of traditional crops which are resistant to drought, pest and diseases and it can adapt to a wide range of soil characteristics among other practices. In livestock production the knowledge has been exploited in coming up with high performing breeds which are resistant to harsh climatic conditions, parasites and diseases. Despite the importance of ITK, less of it has been captured in the Kenyan secondary school curriculum. For many years education in Kenya has been based mainly on Western values, this has contributed to the fact that many learners from disadvantaged backgrounds cannot see the connection between the education they receive at school and their everyday experiences. Education is viewed as a tool through which the society can be changed for the better, if ITK is included in the secondary school curriculum learners who are future potential farmers will be equipped with diversified agricultural knowledge ranging from indigenous technical knowledge to scientific knowledge. This may boost agricultural production and in the long run improve the living standards of the society. This study will focus on perceptions of agriculture teachers in Njoro Sub-county on the inclusion of indigenous technical knowledge on crop and livestock production in secondary school agriculture curriculum.

This investigated the perceptions of agriculture teachers on the inclusion of indigenous technical knowledge on crop and livestock production in secondary school curriculum. The study addressed the following research questions;

i. What is the agriculture teachers' level of awareness on ITK pertaining to crop production in Njoro Sub-county?
ii. What is the agriculture teachers' level of awareness on ITK pertaining to Livestock production in Njoro Sub-county?
iii. What are the perceptions of Agriculture teachers in Njoro Sub-county on the inclusion of ITK pertaining to crop and livestock production in secondary school agriculture curriculum?

2. Materials and methods

A semi-structured questionnaire was used to collect data from the respondents. The instrument was developed by the researcher. The instrument was developed guided by the objectives of the study. The questionnaire was divided into three sections numbered A to C. Section A captured the respondent's personal information and consisted of closed -ended questions. Section B captured information on teachers' conversance with ITK pertaining to crop and livestock production, this section consisted of a four point Likert scale in which the respondent was required to respond to statements as High, Moderate, Low and None. Section C captured data on perception of secondary school agriculture teachers on ITK and its inclusion in secondary school agriculture curriculum, this section consisted a five-point Likert scale in which the respondent was required to give statements as Strongly Agree (SA), Agree (A), Undecided (U), Disagree (D), and Strongly Agree (SA). Section B consisted of closed ended questions while C had both closed ended and open-ended questions.

3. Data Analysis

The data collected was cleaned first to identify the errors made by the respondents. Once the data had been cleaned, the questionnaires were coded and the data entered into the computer using Statistical Package for Social Sciences (SPSS). Data was analyzed using descriptive statistics i.e. frequencies and percentages were used to analyze the results. The data was presented using tables and pie charts.

4. Results and Discussion

4.1. Agriculture Teachers' level of awareness on ITK pertaining to Crop Production Practices

This section discussed the Agriculture teachers' level of awareness of ITK pertaining to crop production practices, the respondents were asked to indicate whether they were familiar with ITK on crop production practices provided. The results were as indicated in table 1.

Table 1: Teachers' Level of Awareness on ITK pertaining to Crop Production Practices

Crop production practices	**Moderate to high**	**low**	**None**	**Total**
	pc	**pc**	**pc**	**pc**
Observing sprouting and flowering of certain plants which indicate onset of rain	74%	22%	4%	100%
Storing healthy seedlings above fireplace to preserve them for planting	74%	15%	11%	100%
Storing seeds in the kitchen ceiling for proper drying of the seeds	70%	23%	7%	100%
Selecting seeds (e.g. harvested maize seeds, beans peas etc.) of good size and shape	93%	7%	0%	100%
Use of ash on vegetables to control aphids	74%	20%	6%	100%
Dusting granaries with ashes to control weevils.	64%	29%	7%	100%
Use of pepper and ashes to control maize stalk borer.	54%	34%	12%	100%
Use of Mexican marigold and Lantana camara to control storage pests	41%	35%	24%	100%
Intercropping crops with tobacco in order to control crop pest	41%	28%	31%	100%
Use of scarecrows to control crop pests like birds	93%	6%	1%	100%
Winnowing crops to remove thrush before storage	99%	1%	0%	100%
Use of basket granaries which are well aerated to prevent a dumpy environment.	70%	19%	11%	100%
Soaking seeds in water overnight to bring forward the germination date.	78%	18%	4%	100%

The findings presented on table 1 indicate that 74% of the respondents had moderate-high familiarity with farmers' indigenous way of predicting the onset of rains by observing the sprouting and flowering of certain plants while 4% were not familiar with the practice. In the past indigenous people predicted the onset of rainfall using various environmental and astronomical indicators such as; fruit production of certain trees at the onset of the rainy season, behavior and movement of birds, animals as well as insects (Chang'a et al. 2010). Environmental indicators that farmers use to predict the coming rainy season became available for observation at different times of the year, beginning immediately after harvest and continuing into the new rainy season (Ingram et al. 2002). Though the majority of the teachers were familiar with this practice, research shows that the practice is under threat of disappearing due to lack of systematic documentation of the knowledge and lack of co-ordinated research to investigate the accuracy and reliability of forecasts (Kijazi, et al. 2013).

From the data collected, 89% of the respondents were conversant (low to high level) with the practice of how farmers select seeds for planting, 97% were conversant with farmers' practice of storing the selected seeds on kitchen ceiling in order to preserve them and lastly 96% of the teachers were conversant with soaking of seeds to bring forward germination. Traditionally rural subsistence farmers store their maize cobs (containing seeds) over the fireplace in their huts; this causes the seeds to come into contact with large quantities of smoke. Modi (2002) in his study of using two traditional maize varieties showed that the seeds exposed to smoke had a higher germination rate and final germination than untreated seeds. The smoke treated seeds produced significantly more vigorous seedlings than untreated seeds. According to Chebutuk & Rotich (2008), farmers prepare seeds for planting by selecting seeds which are of good health and size for planting. The selected seeds were then placed in baskets and hanged on kitchen ceilings so that smoke and heat would dry and preserve them. Prior to planting some indigenous farmers soak seeds overnight in order to bring forward germination. Indigenous farming practices for protection of seeds as well as grains by using various plant parts, ash; oils etc. are very old and based on some scientific principles.

On dusting of granaries to control weevils 93% of the teachers had a high level of familiarity with the practice while 7% were not aware of the practice. Research shows that ash from wooden and cow dung is used to control pests because of its silica content which deters egg formation and larva feeding (Metha et al. 2012). A research carried out by Lodhi, and Mikulecky (2010) indicates that Indigenous Knowledge on insect pest control is perceived as important because it was witnessed as useful in food security and survival of the users long before the invention of synthetic pesticides, this could be the reason why majority of the respondents were well conversant with this practice.

On the use of pepper and ashes to control maize stalk borer 88% of the respondents were conversant with the practice while 12% were not conversant with the practice at all. The use of various plant parts emits a pungent type of smell because of the availability of essential oil in them. The emission of the pungent smell acts as a repellent of insects and thus deters their survival (Methal et al. 2012).

On the use of *Lantana camara* and *Mexican marigold* to control pests 76% of teachers were aware of the practice while 24% were not aware of the practice. Research shows that *Lantana camara* has toxicity effects to animals and it is also a noxious plant that has been cited as invasive and it needs monitoring (Baars & Nesser, 1999). Literature also reports that *Lantana camara* causes less mobility, dehydration and constipation, congested heart and lung nephrosis, and teratology in pests like mice (Mello et al, 2005). Further research indicates that *Lantana camara* has been used for the control of insect pests in stored grains (Rajashekar et al, 2013). Other than using *Lantana camara* to control field pests, farmers can also use cats to control pests like birds and rodents as well as use of scarecrows to scare away pests like porcupines and birds. On the use of scarecrows 99% of the teachers were well conversant with the practice.

Further; 42% of the teachers had knowledge of control of crop pests by intercropping crops with tobacco. Crop pests can also be controlled by intercropping crops with tobacco. Intercropping refers to the practice in which two or more species or genotypes grow together at the same time in the same field, it can either be done where the second crop is cultivated before the earlier matures or the two crops are grown together in strips (Brooker et al. 2015). The results indicate that the majority of the teachers had not interacted with the practice, Chota et al. (2010) suggests that all Indigenous Knowledge Systems related to Agricultural practices which have something to do with plant and animal production should be protected and continued to be used since they a lot of advantages over the Western practices.

The findings of the study also indicate that 99% of the respondents agreed that they were conversant with ITK on winnowing of crops before storage while 89% were conversant on the practice of storing farm produce using basket granaries which are well aerated to prevent dumpy environment. One of the post-harvest practices in crop production is threshing; this is carried out on cereal crops like maize. The purpose of threshing is to detach the grains from the panicle. The cleaning process is performed after threshing to separate whole grains from broken grains and other foreign materials such as straw, stone, chaff and weed seeds. Winnowing is one of the most

common methods used for cleaning farm produce in developing countries (Kalita & Kumar, 2017). Once the farm produce is cleaned it is then ready for storage. Traditionally rural subsistence farmers store their produce using traditional storage structures which are made up of bamboo. The woven bamboo mat-like structure is rolled into a cylinder form and is first smeared with mustard seed cake to make it pest repellent; the structure is made air tight by plastering it with rice cow dung, mud or mustard cake (Kafle et al. 2021). On average more than 50% of the agriculture teachers are conversant with different ITK practices carried out in crop production.

4.2. Agriculture Teachers' level of awareness on ITK pertaining to Livestock Production Practices.

The findings of the study in table 2 shows 29% of the respondents were conversant with ITK on the use of traditional brew to control worms (internal parasites). Research shows that most traditional farmers practice a free range system whereby farm animals are allowed to graze freely in the field, they are left to graze on shrubs and herbs which are medicinal in nature. To control internal parasites, cows are dewormed using traditional brew which is prepared by the farmers who believe that the brew has the ability to clear worms in the digestive system (Chebutuk & Rotich, 2008). The brew is given to animals whose droppings are observed to be having eggs, larval stages of parasites or even the adult parasites.

Table 2: Teachers' Level of Awareness on ITK pertaining to Livestock Production Practices.

Livestock production practices	**Moderate - High**	**Low**	**None**	**Total**
	Pc	**Pc**	Pc	Pc
Use of traditional brew to control worms	29%	46%	25%	100%
Controlling ticks by extracting blood from an animal heavily infested with ticks in order to make the skin hard	20%	31%	49%	100%
Use of guard/calabash kept in cold places to preserve milk	79%	18%	3%	100%
Preserving meat by smoking	72%	22%	6%	100%
Keeping boiled meat in honey containers for long storage	48%	25%	27%	100%
Use of fire place to hatch and brood chicks	59%	30%	11%	100%
Rearing of hatched chicks near the fireplace for sometimes (fireplace provides warmth).	75%	20%	5%	100%
Extracting juice from aloe vera plant and adding to water to control coccidiosis in poultry	84%	10%	6%	100%
Choosing of a bull from a highly productive mother in order to get a good quality calf	93%	7%	0	100%
Borrowing a bull from another village for breeding.	85%	10%	5%	100%

On controlling ticks by extracting blood from an animal which is heavily infested, 51% of the respondents were aware of the practice while 49% were not aware; this reveals that the practice is not widely practiced among the different Kenyan communities. Due to scarcity of veterinary services in many developing countries, farmers depend on ITK to control ticks (Byaruhanga et al., 2015). This is done by extracting blood from the neck region of an animal heavily infested with ticks in order to make the animal skin hard, this makes the ticks to fall off and hence discourages ticks from invading.

Fermentation is one of the oldest methods of food processing to make naturally fermented and cultured foods worldwide, according to Van Hylckama Vlieg (2011). Fermented foods and beverages are estimated to make up approximately a third of the human diet. Fermentation process represents a food preservation technique particularly well suited to the climate of arid and semi-arid areas. Fermentation is an important food processing technology usually developed by women in most African countries (Methal, 2011). Research shows that the traditional food processing techniques are very important in preventing growth of microorganisms that cause food to decay, hence food can be kept at ambient temperature for long periods. Processing and preservation of food products helps in increasing the value of perishable foodstuffs by making them available for longer periods of time (Osumbi et al. 2000). Fermentation also enhances the nutritional quality of foods and it contributes to food safety

particularly where refrigeration and other processing facilities are not available (Motarjemi, 2002). In addition, some fermented foods like fermented milk contain high concentration of probiotics which have health benefits, some of the beneficial effect of lactic acid bacteria consumption includes; improvement of intestinal tract health; enhancement of immune system reduced symptoms of lactose intolerance and lastly reduced risk of certain cancers (Parvez et al. 2006). In conclusion, processing techniques such as soaking and fermentation have been found to significantly reduce the levels of phytates and tannins by exogenous and endogenous enzymes formed during processing (Nuha, et al. 2010). Most of indigenous food processing and preparation methods are well known to most households in rural and urban areas alike (Metha et al. 2012) this could be the reason why majority of the teachers (97%) were well conversant with the different methods of food preservation methods.

The data collected also indicates that 79% of the respondents were conversant with the practice of preserving meat by smoking while 5% were not aware of the practice. Research shows that in some African communities, meat from slain animals like sheep, goats, cattle and camels is first cut in long pieces, smeared with salt and then dried for about a week (Methal et al. 2012).

The traditional methods of hatching and rearing of chicks as well as control of poultry diseases such as coccidiosis seemed to be well understood by majority of the respondents since 89% of them agreed that they were conversant with traditional way of brooding and rearing chicks, and 94% were conversant with the practice of treating poultry against coccidiosis using aloe-Vera juice. Some farmers apply ITK in poultry production by hatching of eggs and subsequently rearing them near the fireplace. This technology involves the use of traditional hatchery (near the fireplace) which make use of fireplace heat to brood and hatch chicks and subsequently rear the chicks using the same fireplace until they are of age to be transferred to a different location. Once the chicks have grown they are treated against coccidiosis in case of an attack by using aloe-Vera juice which is extracted from the aloe-Vera plant (Chebutuk & Rotich, 2008).

Lastly the data collected revealed that most of the respondents seemed to be well conversant with ITK on selection and breeding of livestock, more than 90% responded positively. Research shows that indigenous farmers choose a healthy bull with desirable physical features to be used for siring. In order to avoid in-breeding, bulls with desirable traits may be brought from other villages for breeding purposes (Chebutuk & Rotich, 2008). On average 86% of the respondents were well conversant with different ITK practices carried out in livestock production.

4.3. Agriculture Teachers' Perceptions on ITK on Crop and Livestock Production and its Inclusion in Secondary School Agriculture Curriculum

Teachers are at the forefront in implementation of the agriculture curriculum, to investigate their perception they were required to indicate whether they strongly agree, agree, disagree or strongly disagree to various statements pertaining to ITK. Their responses are as indicated in table 3.

Table 3: Agriculture Teachers' Perceptions on ITK and its Inclusion in Secondary School Agriculture Curriculum

Statements about ITK	**SA Pc**	**A Pc**	**U Pc**	**D Pc**	**SD Pc**	**Total Pc**
Control of crop pests using ITK methods is cheap	35%	58%	7%	0%	0%	100%
Control of livestock parasites using ITK methods is cheap	30%	53%	13%	5%	0%	100%
Indigenous technical knowledge and practices are reliable	12%	49%	25%	18%	3%	100%
Inclusion of ITK in secondary school curriculum will enrich students with a wide range of knowledge	47%	49%	3%	1%	0%	100%
ITK is friendly and easy to use	34%	51%	10%	6%	0%	100%
ITK on crop production should be included in agriculture curriculum	31%	48%	10%	10%	1%	100%
ITK on Livestock production should be included in agriculture curriculum	27%	47%	14%	11%	1%	100%

The findings in table 3 show that more than 93% of the respondents agreed that the use of ITK practices in both crop and livestock production is cheap, reliable and easy to use. Research shows that despite the increased influence of modernization and economic changes, a few traditional agricultural management and knowledge systems are predominant in many African countries (Akullo et al, 2007). Many small-scale farmers in Kenya utilize Indigenous Knowledge Systems because it is cheaper as compared to modern techniques, they are also available locally and are easy to adapt and use (Chebutuk & Rotich, 2008). Chandola et al. (2011) also reports that Indigenous practices of pest management are effective without having a deteriorating effect on the environment; they also indicate that the practice is quite cheap. Further; Emeagwali (2003) in his research observes that Indigenous Knowledge Systems is cost effective and relevant and therefore it should be noted that the basic component of any country's knowledge system is its indigenous knowledge.

According to the data collected, the majority of the respondents (96%) agreed that ITK enriches the learners with a wide range of knowledge. This is in agreement with Msila, (2007) who argues that there is great knowledge of wealth in the local Indigenous Knowledge System.

The findings also indicate that 79% of the respondents agreed that ITK in crop production should be included in secondary school curriculum while 74% of the respondents agreed that ITK on Livestock production should be included in secondary school curriculum. Reid et al. (2004) indicates that Indigenous knowledge goes hand in hand with old age and the loss of the accumulated knowledge through death hinders the perpetuation and passing on of the knowledge from generation to generation. Such sentiment strongly supports the inclusion of ITK in the Kenyan secondary school agriculture curriculum in order to maintain its continuity from one generation to another. The result shows that 82% of the teachers were positive about the different statements concerning ITK.

4.4. Teachers' Perceptions about Including ITK in Agriculture Curriculum for Secondary Schools

Respondents were required to give (with a reason) their opinions on the inclusion of ITK on crop and livestock production in secondary school agriculture curriculum; their responses are as indicated in the figure below.

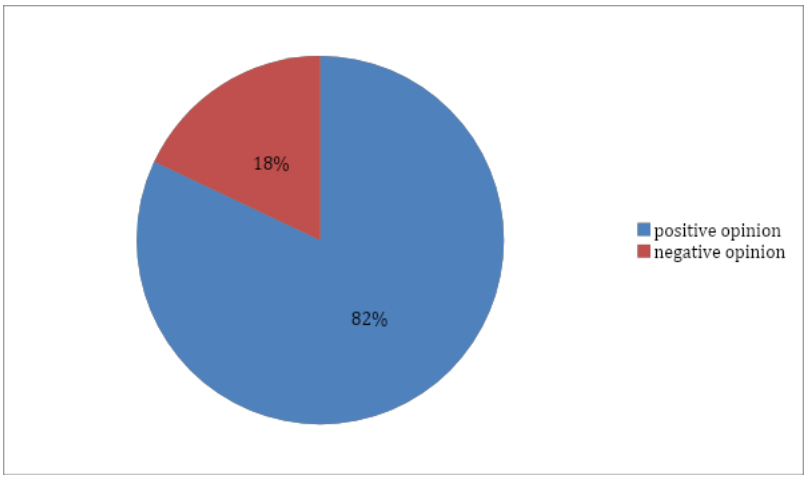

Figure 1: Teachers' Opinion about Including ITK in Agriculture Curriculum for Secondary Schools

The practice of including ITK into secondary school agriculture curriculum is a way of empowering the indigenous people through the learners and the future generation since ITK is a resource that provides a firm foundation of sustainable and sound approaches to agriculture. Despite the fact that Indigenous Africans had their own sustainable agricultural practices before colonization, Western agricultural practices still dominate the school agriculture curriculum in Kenya (Mapara, 2009). ITK provides an opportunity to bring forth an inclusive approach to education (Msila, 2016) and thus it is important that ITK be recognized and valued in the level of the school curriculum and that it should be incorporated in teaching and learning process (Semali & Kinchebe, 1999). From the research, the majority of the teachers (82%) are of the opinion that ITK on crop and livestock production should

be included in secondary school agriculture curriculum. Agriculture teachers' opinion on the inclusion of ITK in secondary school agriculture curriculum is very relevant since they are the implementers. Shizha, (2006) reports that the top down approach in which the curriculum is designed and implemented seems to underrate teachers' role in curriculum planning and implementation. Shava, (2016) also indicates that knowledge dissemination to learners through the curriculum shapes and guides the practice, perceptions, and value system of the learners' lifetimes long after it has been taught and thus education stakeholders (teachers inclusive) should be concerned about the kind of knowledge learners receive, its value and relevance to their contextual challenges. When teachers fail to take account of their students' diverse cultures, the students often fail to learn (Hewson, 2015). Therefore, it is very clear that time has come to rethink the local content of the subject area and by changing the curriculum in order to accommodate agricultural indigenous technical knowledge.

The negative attitude of some teachers towards ITK (n=18%) that the practices are out of date and unreliable is also amplified by Sibanda, (1998) who observed that many young people might view Indigenous knowledge as being obsolete and out of date when compared with Western Agricultural practices. Ogunyi, (2007) in his research discovered that teachers oppose indigenization and contextualization of Euro-centric curriculum due to the historical and traditional preparation of teachers who were schooled in western curriculum and hence are more familiar with that worldview than that of indigenous knowledge. 18% of the teachers were of the opinion that ITK should not be included in secondary school agriculture curriculum because of such reasons as; the knowledge is out of date, new farming technologies should be invented, ITK methods are not reliable among other reasons. This study was therefore viable since the majority of the respondents agreed that there is ITK that could be integrated in teaching of Agriculture in secondary school

5. Conclusions and Recommendation

5.1. Conclusion

Current literature highlights how ITK has been greatly neglected at the curriculum implementation level despite curriculum Policy documents providing for it (Gumbo, 2016). Motivated by the belief that agriculture teachers have a significant influence on agriculture curriculum implementation, this study focused on investigating the perception of agriculture teachers on the inclusion of ITK in secondary school agriculture curriculum. From the study findings the researcher concluded that;

1. Most of the agriculture teachers were conversant with Indigenous Technical Knowledge applied in crop production
2. Most of the agriculture teachers were conversant with Indigenous Technical Knowledge applied in livestock production.
3. A greater percentage of the teachers had a positive attitude towards the integration of ITK in secondary school agriculture curriculum.

5.2. Recommendations

This study was able to explore the perception of agriculture teachers on the inclusion of ITK on both crop and Livestock production in secondary school agriculture curriculum by using a questionnaire. Despite the fact that there is a wide range of agricultural indigenous technical knowledge on both crop and livestock production, it has not been included in secondary school agriculture curriculum yet it can enrich learners with a wide range of agricultural knowledge which is cheap, accessible and easy to use. The study therefore recommends the following;

1. Curriculum developers to research on ideas and practices related to indigenous technical knowledge that could be beneficial to learners in particular geographical and social contexts.
2. Curriculum developers should rethink revising the secondary school agriculture curriculum to include Indigenous Technical Knowledge
3. Curriculum developers to develop learning materials which integrate Indigenous Technical Knowledge.

5.3. Recommendations for Further Research

This study is not fully exhaustive and in order to achieve greater understanding, the researcher recommends the following for further research:

1. Similar research to be done in other counties of Kenya to determine the perception of Agriculture teachers in other countries on the inclusion of ITK in secondary school agriculture curriculum
2. Further research to be done on other relevant stakeholders like curriculum developers.
3. Research to be done on the perceptions of learners who are the recipients of the inclusion of ITK in secondary school curriculum.

Acknowledgements

First, I would like to thank the Almighty God who enabled me to carry out my studies by granting me finances, time, good health and the soberness of mind. Secondly, my heartfelt acknowledgement goes to my supervisors Dr. James Obara, and Dr. Miriam Kyule for their expertise in shaping this work. Their patience and crucial comments in correcting and guiding me in this work are of great value. I also wish to thank Dr. Catherine Munyua, and colleagues who contributed to the completion of this work. Lastly, my gratitude goes to all participants for their participation in the study.

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