

Teachers' Views on the Utility of Indigenous Knowledge Systems in the Teaching of Agriculture in Selected Schools in Zvimba District, Zimbabwe

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Abstract

This qualitative phenomenological study analysed teachers' views on the utility of Indigenous Knowledge Systems in the teaching of agriculture in primary schools. The study utilised a phenomenological multiple case study design which focused on three primary schools. A sample of 12 participants was purposively selected based on having five years or more teaching experience. Data collection utilised semi-structured interviews and focus group discussions for purposes of methodological triangulation. Data analysis utilised Interpretative Phenomenological Analysis in which themes were generated from participants' transcripts. The study established that teachers are aware of Indigenous Knowledge Systems and their importance in the teaching of agriculture. In addition, teachers also demonstrated knowledge of those indigenous knowledge forms prevalent in their communities and that they utilised these knowledge forms in the teaching of agriculture. However, despite their knowledge of indigenous knowledge forms, participants exhibited limitations in conceptualisation that tended to negatively impact on the range of syllabus topics that could benefit from the infusion of indigenous knowledge. In view of these findings, the study recommends that the Ministry of Primary and Secondary Education should mount workshops to conscientize teachers on the infusion of Indigenous Knowledge Systems in the teaching of agriculture. Furthermore,

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book publishers should be encouraged to publish textbooks that reflect the incorporation of Indigenous Knowledge and encourage schools to research and document indigenous knowledge prevalent in their communities from which pool of knowledge they can draw during teaching.

Keywords: *Indigenous knowledge, curriculum, traditional, Western knowledge, technology*

The issue of relevance of the school curriculum has seized many governments in Africa since the attainment of independence. Postcolonial discourse in education has demonstrated how the content of the school curriculum was structured to serve the needs of the colonisers at the expense of the local and indigenous people (Kanu, 2007; Katola, 2014; Musaazi, 2015; Ngutor et al., 2014). Shizha (2005) cited in Shizha & Kariwo (2011), observes that debates on knowledge and the school curriculum in Africa often focus on the dominant Western knowledge that was imposed on schooling practices by colonial regimes. It follows that, to a large extent, in the colonial era the content of the curriculum lacked relevance. This view is supported by Shizha and Kariwo (2011) who posit that the net effect of colonialism was the legitimisation of imperialistic and hegemonic Western ways of perceiving colonial life while concurrently disembodimenting and delegitimising the local indigenous social realities. In this regard, Indigenous Knowledge Systems suffered calculated neglect.

Since independence, there has been massive investment in education in several African countries. Given this development, it therefore becomes imperative to focus on the relevance of the school curriculum in meeting the needs of the different countries through enhancing socio-economic transformation. Attainment of independence was followed by curricula review whose main objective was to make the curricula more relevant to the learner as well as ensuring responsiveness to the new socio-economic and political dispensation. The extent to which this objective has been realised in several countries is a matter of debate as most researchers indicate that not much has been achieved to date (Mavhunga, 2008). Zimbabwe, like many other former colonies, is no exception in this regard as a number of initiatives were instituted since attainment of independence in 1980. Such initiatives have included the introduction of new technical and vocational subjects such as agriculture into the primary and secondary school curriculum. This subject is taught from Grade 3 up to secondary school level in terms of the new Curriculum Framework 2015- 2022. This is not surprising since Zimbabwe's economy is agrarian based (Ministry of Primary and Secondary Education, 2015b).

With the implementation of the land reform programme which took effect in 2000, it means that the number of people directly earning a livelihood from agriculture has increased substantially. This innovation is in line with the ideals of the new curriculum which seeks to develop learners' practical skills to be used in solving problems encountered daily. In terms of the new curriculum framework document, one of its aims is to prepare learners for the world of work in a largely agro-based economy and in an increasingly

globalised and competitive environment (Ministry of Primary & Secondary Education, 2015). This is, therefore, a noble innovation indeed. However, it is the contention of this study that whilst the introduction of agriculture as a taught subject in primary and secondary schools is a noble and progressive idea, there is need to equip learners with skills that they can readily utilise in solving problems in agriculture on a day-to-day basis. This position cannot be achieved through exclusive reliance on Western forms of knowledge and technologies which in some cases lack relevance for local conditions and are also out of reach for several people in terms of cost.

The agriculture syllabus for Grades 3 to 7 has room for the incorporation of Indigenous Knowledge Systems (IKSs) in the subject. One of the objectives of the syllabus is to enable learners to apply indigenous knowledge, scientific principles, and new technologies to improve agricultural production (Ministry of Primary & Secondary Education, 2015b). Given this thinking, it is imperative that curriculum planners revisit IKSs to incorporate these in the agriculture curriculum at both primary and secondary school levels. It has been argued that IKSs constitute the core of community development processes in agriculture, the preservation of food, collection and storage of water, animal husbandry and ethnic veterinary medicine (Emeagwali & Shizha, 2016). Thus, the incorporation of IKSs in teaching agriculture should enable learners to readily apply skills gained to practical situations and should go a long way in boosting the nation's food security which has been a perennial problem for the country. The incorporation of IKSs into the school curriculum is based on the view that, the two knowledge systems (Western and Indigenous) complement each other in their strengths and weaknesses, and their combination may achieve what neither would achieve alone (Das Gupta, 2009, cited in Ruheza & Kilugwe, 2012).

Statement of the Problem

Zimbabwe's economy is agrarian based. Agriculture is a taught subject in the school curriculum from primary school (Grade 3) level up to secondary school level. The objective is to equip learners with relevant exit knowledge and practical skills that they can utilise in their communities. It is even more compelling to make the subject relevant to the needs of the different communities in which the school operates by way of incorporating IKSs into the school curriculum. However, the overreliance on Western knowledge forms and technologies in agriculture may not yield the desired results given the costs of accessing Western technologies. In view of cost implications associated with accessing western technologies, there is therefore need to explore teachers' perceptions on the utility of IKSs in the teaching of Agriculture.

Research Questions

This study was guided by the following main and sub research questions:
What are teachers' views regarding the incorporation of IKSs into the primary school curriculum in selected primary schools in Zvimba district?

Sub Questions

What are teachers' conceptualisations of Indigenous Knowledge Systems?

Do teachers infuse Indigenous Knowledge Systems in teaching agriculture?

What are the benefits of incorporating Indigenous Knowledge Systems into the agriculture curriculum in primary schools?

Which Indigenous Knowledge Systems are prevalent in the community that can be incorporated into the agriculture curriculum?

What challenges do teachers face in incorporating Indigenous Knowledge Systems in teaching agriculture?

In which agriculture syllabi topics are Indigenous Knowledge Systems readily applicable?

Significance of the Study

The study is of significance in terms of policy development and informing practice in education. The results of this study should enable policy makers to design policies that encourage the incorporation of IKs into the school curriculum. In the practice of education, the results of this study will enable teachers to equip learners with skills that are readily applicable in agriculture in the different communities. The spill-over benefit will extend to the communities in which the schools are located, ensuring boost in agricultural production and food security at the level of the household and nation.

Theoretical Framework

This study is informed by postmodernism. Postmodernism is a theoretical perspective that acknowledges and celebrates the diversity that is found in society which, in the case of this study, should be reflected in school curricula. Lyotard in Ritzer and Stepnisky (2013, p. 617) argues that "let us wage war on totality: let us activate the differences". This view implies that other forms of knowledge also need to be accommodated in society particularly in the content of the school curriculum. It is posited that postmodernism has several distinguishing hallmarks which include relativism rather than absolutism in deciding what constitutes worthwhile knowledge and the view of knowledge as a human social construct (Jameson, 1991, cited in Cohen et al., 2011). Most importantly, the views of post-modernist scholars such as Foucault and Lyotard on the nature of knowledge need to be highlighted. Lyotard (1990) cited in Kirby et al. (1997) points out that knowledge is relative; all is good as any other. These views emphasise the need for incorporating diverse knowledge forms in the content of the school curriculum.

On the other hand, it is argued that knowledge is never separate from power, but it is a means of exercising power by constituting people as subjects then governing the subjects with the knowledge (Ritzer & Stepnisky, 2013). This is the scenario that prevailed during the colonial era when IKs of the colonised were not included in the content of the curriculum. Given the foregoing views, it follows that knowledge is plural and exists in innumerable forms. Premised on these views, the need to incorporate different forms of knowledge in the school curriculum becomes imperative for two reasons. Firstly,

it should be construed as an attempt to take cognisance of diverse learners' cultural backgrounds and make the content of the school curriculum relevant to the immediate needs of learners. Secondly, it is a way of ensuring cognitive justice in the context of learner diversity. Therefore, this theory is appropriate in undergirding this study as it places emphasis on the incorporation of learners' diverse cultural backgrounds which by default encourages the incorporation of IKSs into the school curricula.

Literature Review

The Link between Culture and IKSs

To appreciate the concept of IKSs, it is critical to discuss the concept of culture. This is relevant considering that all knowledge is bound within a certain cultural context. Fabiyi and Oloukoi (2013) posit that in Africa, traditional or local knowledge is strongly linked to local culture and past experiences. Similarly, Shizha (2013) argues that culture contains the Indigenous Knowledge of the people and generally culture is symbolic as it is based on the symbolisation of things as they are used in behavioural patterns that a group of people understands. Ndura (2006, p. 2) defines culture as "the acquired complex knowledge that individuals and communities use to affirm and interpret the values, beliefs, customs and practices that distinguish them from other people and groups in society". Ngara (1991) cited in Viriri (2003) avers that culture is the expression of people's social activities in relation to their struggle with forces that threaten their survival. There are commonalities running through the two definitions which carry the theme that culture is the total way of life of people in a given community. In essence, culture provides a useful guide for people as they interact with both the physical and social environment. Culture is not homogeneous even for members of the same society. Rather, it is heterogeneous owing to the existence of numerous sub-cultures, implying that knowledge is plural in character.

Conceptualising IKSs

IKSs have been defined in numerous ways. According to Sillitoe (2010) cited in Shizha (2013), these are often referred to in different ways including but not limited to local knowledge, traditional knowledge, indigenous technical knowledge, peasants' knowledge, traditional environmental knowledge and folk knowledge. At a very basic level, they can be defined as localised forms of knowledge prevalent within a given community. They represent intellectual and aesthetic heritage of the community which are passed on from generation to generation. IKSs refer to knowledge and technologies indigenous to a particular space and contexts (Masoga, 2001). Noyoo (2007) perceives IKSs as a complex set of knowledge, skills and technologies existing and developed around specific conditions of populations and communities indigenous to a particular geographical area. In a similar vein, Matsika (2012) argues that IKSs encompass the traditional and local knowledge of a community that is originated, developed, and incorporating the experiences of the community in managing the everyday life of individuals.

From these definitions, it is apparent that IKSs are localised forms of knowledge that have provided and continue to provide solutions to challenges encountered by people in their daily interaction with the physical and social environment (Mazonde & Thomas, 2007). Unlike Western knowledge forms, IKSs exist in an oral form passed on from generation to generation in the context of community life and activities undertaken thereof (Mkabela, 2005) and are not written down thus greatly affecting their status. They have wide application in a vast array of fields ranging from anatomy to zoology.

In the discourse of IKSs, there is need to clear one misconception. A tendency has been observed in some academic and social circles to regard IKSs as something that belongs to the past and has no relevance in contemporary society. This is flawed thinking, since on the contrary IKSs are very much alive in different communities. The essence of indigenous knowledge is that it is alive in indigenous peoples' cultures (Maurial, 2010). The concept of indigenous people needs further clarification as there has been a tendency by international non-governmental organisations to restrict the term to societies that have remained on the margins of modernisation, (Shizha, 2013). In the case of Africa, Shizha (2010a) is of the view that all original citizens of Africa by ancestry and not through being settlers or off-spring of settlers and colonisation are entitled to the term indigenous people. With regards to the utilisation of IKSs by indigenous people, the issue could be of the extent to which they are now currently utilised.

It should also be noted just like any other forms of knowledge, IKSs are dynamic; they have undergone several changes such that they do not exist in their pure and natural form. As society experiences changes due to several factors so do IKSs. According to Tharakan (2017, p. 125),

the notion of the static nature of Indigenous Knowledge has been disproved through numerous examples showing how Indigenous Knowledge can be changing continuously, especially as a culture or a community develops and grows, and is subject to changing environmental, cultural, physical and economic stressors.

Similarly, Tanyanyiwa and Chikwanha (2011) state that Indigenous Knowledge just like any type of knowledge is subject to change because of economic, environmental and social forces. Matsika cited in Hari (2020:104) identifies the following characteristics of IKSs:

- It is a home-grown form of knowledge derived from the solution to everyday problems;
- It is part and parcel of community's cultural practices and ways of life;
- Often it is not documented but has been passed from one generation to another through oral history;
- It is used in solving the immediate problems that confront the community;
- It is a dynamic form of knowledge that changes in line with the events that may be taking place in society;
- It is always under scrutiny, and it is valued for its ability to solve prevailing problems.

Rationale for IKs

Colonialism had a negative impact on the development of IKs. In other words, colonialism stifled the development of IKs through deliberate neglect with a view to disempowering the indigenous people. This was largely because the colonial school curriculum did not appreciate and incorporate the IKs of the learners into the school curriculum. Goduka in Gudhlanga and Makaudze (2012) states that, African indigenous values did not conform to European norms and were considered as offensive and abhorrent. In a similar vein, Shizha (2013) states that colonial education was hegemonic and disruptive to African cultural practices and ways of knowing. As such, it can be argued that the colonial school curriculum lacked relevance for the colonised as it tended to emphasise alien Western knowledge forms.

In the post-independence era, it is important to revisit IKs and incorporate these into the school curricula, not only as a way to enhance cognitive justice but also to equip learners with relevant knowledge and skills that are readily applicable in their different communities. In the field of agriculture, IKs have a wide array of applications which can go a long way in boosting agricultural productivity and ensuring food security at both household and national levels.

The Place of IKs in Agriculture

Research studies into the utility of IKs in agriculture provide useful insights on how these forms of knowledge can be tapped and exploited in the agriculture curricula in schools (Altieri, 1995; Gudhlanga & Makaudze, 2012; Mapara, 2009; Siamombe et al, 2018; Tanyanyiwa & Chikwanha, 2011). According to Mapara (2009), in pre-colonial Zimbabwe, there was utilisation of slopes (terraces) for cultivation known as *matema* in Sanyadowa area of Nyanga in Manicaland in Zimbabwe in addition to doing selective weeding which was meant to use certain weeds as a form of moisture control. The slopes were meant to minimise the effects of erosion that resulted from runoff water and was therefore a form of conservation. Gudhlanga and Makaudze (2012) made similar observations and posit that, in pre-colonial Zimbabwe, mixed cropping and intercropping were practised with use being made of organic manure as a form of fertiliser.

To further highlight the utility of IKs, Pedzisai (2013) found the utilisation of IKs in agriculture in planting techniques, control of pests, storage of cereals and dressing of cattle wounds among many other uses. In Nigeria, Altieri (1995) posits that research has documented the use of polyculture which provided farmers with a number of advantages. Siamombe et al. (2018) have demonstrated how the BaTonga people in Zimbabwe use traditional knowledge to determine weather patterns to inform their economic and other activities. Furthermore, Haugerud and Collinson in Tanyanyiwa and Chikwanha (2011) found that East African farmers recognise in maize, important differences in taste, texture, storability, marketability, disease and pest resistance and response to moisture stress.

The contention of this study is that, these valuable IKSs should be incorporated in the agriculture curricula in schools, not only as a way of enhancing cognitive justice but also as a way of equipping children with knowledge and skills that are useful and relevant in their different communities. In this context, it is important to appreciate that:

Indigenous Knowledge and IKSs are based on communities at the very grassroots level; this knowledge provides critical socio-cultural capital that is essential for communities not only to survive but also to go beyond and flourish within the given contexts of that community's geography, environment, culture, and economy (Tharakan, 2017, p. 125).

Research Methodology

The study adopted a qualitative method. Qualitative research is a method of studying people in their naturalistic setting (Minichello & Kotler, 2010; Marshall & Rossman, 2006). Phenomenology was utilised as the research design. This design was chosen since phenomenology focuses on the subjectivity of reality by continually pointing out the need to understand how humans view themselves and the world around them (Willis, 2007). Data gathering methods consisted of semi-structured in – depth interviews and focus group discussions. Both interviews and focus group discussions were conducted with the teachers at their respective schools with the latter process being conducted immediately after the former. The population consisted of all the teachers in primary schools in Zvimba district, Zimbabwe from which a sample of 12 participants was purposively selected. The selected participants had a minimum of five years post-qualification experience so that they can add value to the phenomenon under consideration.

Data Analysis

Thematic analysis was utilised in the study; which technique is the process of finding patterns or themes that are found in qualitative data and reducing the data to a story and its interpretation (Maguire & Delahint, 2017; Neuendorf, 2019). The analysis process involved organising and reducing the data by way of summarisation and identification of themes (Castleberry & Nolen, 2018). According to Braun and Clarke (2006), the approach is flexible and is not tied to any epistemological or theoretical perspective. Thus, the approach was found to be appropriate because of its main goal of identifying and analysing themes.

Validity and Reliability

To ensure trustworthiness in this qualitative study, Lincoln and Guba's (1985) criteria were utilised. These include credibility, dependability, transferability and confirmability. The measures of trustworthiness were interwoven as we attempted to conduct a trustworthy thematic analysis (Nowell et al., 2017). Credibility addresses the fit between the participants' views and those represented by researchers (Tobin & Begley,

2004). This aspect was satisfied through prolonged participant engagement during data collection which involved interviews and focus group discussions thus constituting methodological and participant triangulation (Anney, 2014). In showing that the research process is logical and traceable, one is satisfying the dependability of the research thus allowing other researchers to judge for themselves whether the research is dependable or not. This was demonstrated through providing auditable materials such as participants’ audios and transcripts generated from interview and focus group data. We also provided thick description of the methodology utilised (Pillay, 2016). To achieve transferability, we provided a dense description of the entire research process. To ensure confirmability, we provided detailed description of our choice for the theoretical framework as well as methodological and data analysis procedures (Koch, 1994).

Ethical Considerations

Researchers are ethically responsible for protecting the rights and welfare of participants who take part in a research study (Bowen, 2017). Adherence to ethical issues ensures that the standard of behaviour of people and relationship with each other are respected (Haines, 2017; Leedy & Ormrod, 2014). Prior to conducting this study, permission was sought and granted by the Ministry of Primary and Secondary Education Zimbabwe. Participants were made aware of purpose of the study. Verbal consent was obtained from participants who volunteered to take part after their role and right to withdraw without consequence were fully explicated (Denzin & Lincoln, 2005). Data were collected at participants’ schools. To ensure confidentiality, participants’ names and those of their schools are not divulged in the study thus concealing their identities as is expected when dealing with human participants in research (Pillay, 2016).

Findings

Demographic Profile of Participants

All the participants in the study were qualified teachers who held at least a certificate in education thus pointing to extensive experience in the field of education (see Table 1). Schools A and B are rural schools in the communal lands whilst School C is in an urban area.

Table 1

Participant	School	Sex	Age	Qualification	Teaching experience in years	Class /Grade taught
1	A	Male	47	Diploma in Education	9	3
2	A	Male	35	Diploma in Education	11	7
3	A	Male	38	Diploma in Education	9	6
4	A	Male	48	Diploma in Education	8	5

5	B	Female	35	Diploma in Education Bachelor of Management and Human Resources	15	5
6	B	Male	39	Diploma in Education Bachelor of Management and Human Resources	15	7
7	B	Female	34	Diploma in Education	7	6
8	B	Female	38	Diploma in Education	12	3
9	C	Female	54	Certificate in Education	31	4
10	C	Male	58	Certificate in Education	31	5
11	C	Female	38	Diploma in Education Bachelor of Arts	16	6
12	C	Male	55	Certificate in Education	30	6

Conceptualisation of IKs

Most of the participants showed an appreciable understanding and awareness of the concept of Indigenous Knowledge. At a very basic level, most of the participants were of the view that Indigenous Knowledge is a form of local knowledge. This is captured in the following explanation by a participant:

When we talk of indigenous, the word indigenous itself talks about things, people or anything like animals, plants which are found originally in a certain area or a certain country. So, we have got our indigenous languages; those languages spoken in Zimbabwe, not only but originated from the people of Zimbabwe then they expand it depending on the migration of people. This is what I understand by Indigenous Knowledge. (Participant 11, School C)

In agreement, Participant 2, School A retorted: "I think it refers to maybe how we teach this subject of agriculture, where we apply what the children practise in their communities and use that as the background knowledge that the learners have. According to Participant 1, School A, "indigenous Knowledge Systems are systems that we have been using traditionally before the inception of other knowledges from outside. In the case of agriculture, it has been practised even before the invention of some Western scientific technology."

Similar views were expressed in focus group discussions where one participant referred to IKs as "using locally available knowledge, the Indigenous Knowledge that we find in our area even using the local facilities. They may be traditional ways of doing

farming that are being passed on maybe from generation to generation” (Participant 6, School B). Participant 12, School C concurred by saying that “when we had a discussion earlier on, we agreed that Indigenous Knowledge systems are traditional methods which were used by our forefathers.”

The views expressed by the participants reflect an awareness of the concept of Indigenous Knowledge. This awareness is important as it demonstrates that the participants have the potential to include it in the teaching of agriculture.

Infusion of IKSs in the Teaching Agriculture

All the participants indicated that they infuse IKSs in the teaching of agriculture to varying degrees. Infusion of Indigenous knowledge is seen in a variety of areas which include the use of traditional manure and intercropping patterns. According to Participant 3, School B

On soil fertility, you can start by putting manure. Almost everyone knows manure because they have cattle, goats, and chickens in their homes. We explain about manure which they already have knowledge about, and then we move on to fertilizers; from organic to inorganic matter. We teach them from the known to the unknown and we explain about different types of fertilizers.

In agreement, another participant averred:

We usually practise crop rotation. Crop rotation was practised by our forefathers. Like in this case, this year we have grown peas and onions which were not normally planted here. We think it will improve the soil fertility as well as the soil structure. (Participant 12, School C).

Regarding crop rotation, yet another participant concurred by saying:

On the issue of gardening for example, you see we have our garden over there. We are practising intercropping which looks at the destruction of pests and diseases using different species of plants that we grow in the garden. At the moment we have got onions, peas and rape. Although they are not in the same bed, the plants are in the same garden. Long ago people used plants instead of pesticides to control diseases and pests. We are also doing the same in our school garden. The smell of onion repels pests which could otherwise be dangerous to the health and development of other vegetables like rape and cabbage. (Participant 11, School C)

Similar views were recorded during the focus group discussion where Participant 4, School A attested:

The other method includes the use of manure; the cultural method of composts

which were used by our forefathers just because they were poor. We are still making composts; we also use cow dung for manure and even goats' droppings or even dead leaves from trees so that our crops grow well.

The views expressed by the participants show that Indigenous Knowledge is used in different ways in the teaching of agriculture. However, the range of inclusion appears to be narrowly focused as the infusion of Indigenous Knowledge in the teaching of agriculture tended to focus on enhancing soil fertility at the exclusion of other forms of indigenous knowledge systems. Teachers' limited knowledge means that they cannot effectively apply IKSs across a whole spectrum of topics in the agriculture syllabus.

Benefits of Incorporating of IKSs in Teaching Agriculture

All the participants were of the view that the incorporation of Indigenous Knowledge in teaching agriculture brings in a lot of benefits. Some of these benefits were conceptualised in terms of costs and pedagogy. Outlining pedagogical benefits, one participant verbalised the following statement:

When you teach from the known to the unknown first, it helps the learners to retain concepts since they learn about what they already know. When I proceed to teach about the unknown, for example horses, they master the concept easily because suppose they have donkeys at home it is easier for them to understand about horses. (Participant 7, School B)

Most of the participants were of the view that IKSs have immense benefits in terms of cost as the following excerpt demonstrates:

There are quite a number of benefits of using the local knowledge. It is very cheap. You also get good results. When you grow vegetables using natural manure such as cow dung in the rural areas, you can get the cow dung everywhere and put it in the garden. The vegetables grow well without the application of chemical fertilisers. Inorganic fertilisers are unaffordable. With natural manure, vegetables remain with their natural taste; they are not bitter as is the case when they are fed with chemical fertilisers. You never know what is causing different ailments such as cancer these days. (Participant 3, School A)

In agreement, Participant 1, School A opined that "the benefits are that generally they (Indigenous Knowledge) are cheap. The cost of using modern technology may be higher" On the same issue, according to Participant 10, School C:

Some of the benefits, since this community is rural, are that some people may be financially crippled. Projects such as livestock rearing, growing crops whereby one has to buy fertilisers, stock feed and other inputs require capital. They can use locally available material instead as an alternative measure. Like I said before, we can use

compost, herbs, and other locally available material.

Similar views emerged during focus group discussions where Participant 8, School B said that “the use of Indigenous Knowledge is cost effective because people would be using organic material rather than buy inputs such as Compound D fertiliser, insecticides, and other chemicals. Relying on indigenous practices is cost effective.”

A similar view was expressed by Participant 12, School C:
I will give an example of livestock production. If you are based in the rural areas, you cannot neglect your sick animal. You just go into the forest and search for natural medicine ... and treat your animal. It works and it is cheap.

Benefits of Incorporating IKs for Pupils

All the participants were of the view that the incorporation of Indigenous Knowledge in the teaching of agriculture has immense benefits for pupils. These benefits were seen in terms of the acquisition of lifelong skills which pupils can use to sustain themselves through the use of IKs as verbalised by one participant:

It is very beneficial in the sense that it is not always every learner who will excel academically. Most of us come from subsistence farming backgrounds. This type of agriculture empowers learners to become effective farmers when they are at home or when they grow up. They do not have to go hungry when they are equipped with the knowledge which they can readily use. (Participant 6, School B)

A similar sentiment was articulated by Participant 1, School A who argued that “you never know how one would grow. Sometimes we may have a situation where one is not equipped well financially, therefore there would be need to apply these traditional systems in sustaining agriculture activities at household level.” In agreement, Participant 10, School C had this to say:

Learners will gain knowledge and skills on how to effectively use local knowledge. They will realise that their environment is endowed with useful materials. Furthermore, they will learn how to cut costs considering that Western technologies do not come out cheap.

In focus group discussions, participants expressed similar views where one participant elaborated:

I say that it is very relevant for our learners to use Indigenous Knowledge in agriculture. This is because in terms of exit skills learners should be able to function effectively in their environments. Considering this environment that we are in, our children come from subsistence farming communities and most of them cannot afford inorganic farming inputs. Using locally available inputs such as cow dung manure, composts and liquid manure helps the learners to acquire skills for the future. When we look

at indigenous farming, we can easily see that it brings forth a number of advantages for the learners. It also preserves the environment, for example prevention of soil erosion and enhancement of soil fertility. Prevalent diseases such as cancer and diabetes are being caused by genetically modified foods, so if we use Indigenous Knowledge, we promote a high rate of life expectancy. (Participant 6, School B)

Incorporation of IKs Prevalent in the Community

All the participants were of the view that there are certain Indigenous Knowledge forms which are prevalent in the community that can be infused in the teaching of agriculture. This knowledge has application in livestock production, land preparation as well as crop production. In view of this, Participant 8, School B said:

Personally, I know that when rearing cattle, they use grass with soot derived from rural kitchen huts as an alternative for salt. They mix the soot with water and then sprinkle the mixture on grass before feeding cattle with it. They do this so that the cattle obtain nutrients similar to those they would obtain from salt. They also crush the aloe plant which they put in water and give to chickens to drink. Aloe has medicinal properties which are capable of treating a wide range of poultry diseases. Furthermore, they are no longer buying pellets for rabbits, but they collect green plants which are locally available which they use for feeding them and they grow very well in that way.

In relation to vegetable production, another participant added:

We have Batsirai garden as an example. It is next to the school. It is a cooperative that grows vegetables. They normally use dried leaves, cow dung and natural manure. If you go there you will find that their vegetables are evergreen and have a good appearance. If you take the learners there they will understand that the use of Indigenous Knowledge yields good results. Such vegetables taste nice too. (Participant 3, School A)

Similar sentiments were expressed by Participant 5, School B who gave the following account:

In this area they practise "timba ugute" (zero tillage). It is an indigenous way of farming whereby when the summer season approaches, people dig holes in the fields in preparation for planting seeds. When the first rains come, they plant their seeds in those holes. The holes they dig are not deep and this is a sort of minimum tillage. It is meant to conserve moisture. They put manure directly into the holes so that only the germinating seed(s) use(s) up the manure. This practise is contrary to spreading manure all over the field.

Participant 8, School B had this to say about "timba ugute". It

is being practised in our community which we should bring into the school curriculum. This will allow learners to appreciate the “science” behind digging and putting manure directly in the holes and planting seeds in the holes (zero tillage). Bringing such knowledge into the school curriculum allows learners to engage in experiential learning as they conduct experiments, record [their] observations and report results.

Similar views were expressed during focus group discussions when Participant 2, School A opined:

Sometimes during harvesting season cattle eat maize which when after they drink water, the maize ferment in the stomach posing a danger to life. Under such circumstances we force the affected cattle to drink our home-brewed beer called “Chikokiyana or Chihwani” which becomes ready for consumption within a day. This home-brewed beer is made with yeast which when taken by a cow can upset its stomach due to yeast thereby causing diarrhoeal dung thus easing the fermentation consequently saving the life of the animal. This is a form of Indigenous Knowledge where we use our ingenuity to solve our challenges. There is no need to see the animal vet who may not be readily accessible.

Challenges Encountered in the Incorporation of IKSs in teaching Agriculture

Most of the participants stated that they experience several challenges in their efforts to incorporate IKSs in the teaching of agriculture. Some of these challenges have to do with lack of resources from the community as well as environmental degradation which have led to the diminishing of natural flora and fauna. In view of this, Participant 10, School C said:

We face a challenge when people destroy the environment which contains the resources, we need to teach our learners with. People need to be educated on how to conserve the environment. Practices like deforestation should be discouraged in view of the negative effect it has.

Another challenge according to Participant 8, School B is that sometimes learners lack information on IKSs that we use here in Zimbabwe. They are used to Western knowledge for example if you tell them about ‘murakwani’ (humus) they will ask you what it is. There is need to explain to them what Indigenous Knowledge is all about. They only know Western methods of treating cattle. They don’t even know that soot works very well. Their generation lacks guidance from the elderly, for example grandparents. This could be attributed to the effect of globalisation which has come with technological advancements.

The issue of attitudes was raised by Participant 6, School B, who pointed out that some people may see IKSs as outdated methods in comparison to Western technologies. Obviously perceiving IKSs in this light heightens unacceptability of

such knowledge by people, thus relegating it to the periphery. They also view it with suspicion and scorn due to the fact that some of the herbs are not packaged and therefore lack proper dosage.

Similar views were raised during focus group discussions where Participant 11, School C stated that

since more land is being allocated for housing, the bush is being destroyed and it makes it difficult for us to find indigenous medicines. We no longer have “Mutamba” (strychos)- trees nearby. I also haven't seen any ‘Munhundurwa’ (solanum icanum) tree in this area. Some of the trees that we have known to have medicinal properties no longer grow here.

Participant 8, School B expressed concern regarding teachers' knowledge of IKs noting that

Some of the teachers do not have the knowledge. We are not really aware of the methods being practised in our communities. We hear about some of the methods in passing. Because of the generational gap that you mentioned, some teachers lack the knowledge, so it means that the teacher has to have the knowledge of the community that he/she lives in. Sometimes we are not even aware of local ceremonies that take place within the community. It is important for us to attend such ceremonies so that we will be able to teach the learners about them. There is also need for officials from the Ministry of Agriculture to visit schools and educate us on the importance of utilising IKs in agriculture. Local Agriculture Extension Officers (Agritex) are best placed to assist in this regard.

Syllabus Topics and IKs

All the participants concurred that there are several topics in the agriculture syllabus that can be enriched through the incorporation of Indigenous Knowledge. These topics include weather, livestock production and crop production among many others as the following excerpt reveals:

Where I find Indigenous Knowledge applicable is where we will be talking about soil and weather. On the topic weather, we have got our seasons. The children understand that during the rainy season everyone is busy planting the crops in their fields and weeding. We also have the dry season as well as winter. It is easy to teach the children using the concepts that they know like “Zhizha” (summer),,,“Matsutso” (spring), “Chando” (winter), “Chirimo’ (dry season). (Participant 2, School A)

Participant 7, School B expressed a similar opinion by saying:
I can give you an example of a simple prediction in terms of weather forecasting. People know that the direction of the wind determines whether it is going to rain. If the wind persists from a certain direction for one to three days, it will definitely

rain. Learners know that when it is very hot in summer there may be thunderstorms. This in essence is utilising indigenous knowledge to predict the weather and take precautionary steps to avert disaster.

In agreement, Participant 3, School A provided a list of topics in the syllabus that can be taught using Indigenous Knowledge by saying that “the topics include introduction to agriculture, soil fertility and crop production.” Similar views were raised in focus group discussions. Participant 8, School B said that, for example, “when we look at crop production we can apply ‘timba ugute’ (zero tillage). This practise is a moisture conservation method which allows crops to grow even when there is little water.”

Discussion

All the participants were of the view that IKSs have a place in the teaching of agriculture in primary schools. Most of the participants demonstrated an awareness of the concept of IKSs although they encountered limitations in terms of the definition of the concept. This limitation was reflected in the way they discussed the range of application of IKSs in the primary school agriculture curriculum. At a very basic level the participants acknowledged that IKSs are forms of localised knowledge that is passed on from generation to generation. This observation is in harmony with the definitions of Indigenous Knowledge Systems that have been proffered by several scholars (Masoga, 2001; Shizha, 2007; Warren, 1991 in Shizha, 2013). It is important to note that the awareness of this concept by the participants facilitates their ability to incorporate IKSs in teaching agriculture. This becomes relevant considering that Zimbabwe’s economy is agro-based and as such, learners need to be equipped with relevant and functional skills in agriculture (Ministry of Primary & Secondary Education, 2015).

All the participants indicated that they infuse IKSs when they teach agriculture at primary school level. This should be seen as part of efforts directed towards making the curriculum relevant as well as celebrating cultural diversity in line with postmodernism. Odora – Hoppers (2015) argues that when African or indigenous people, for instance, cry out that the education system throughout the continent lacks familiarity with the context and culture of its learners; what they are saying is that it is carrying another default drive altogether. A process that disenfranchises and disadvantages children epistemologically. It is argued that since IKSs arise out of children’s real experiences, its incorporation into schoolwork can serve as motivation as they begin to see that recognition is given to what they see in their communities (George, 2011).

However, participants view about infusion of IKSs is rather limited to soil fertility, livestock, and crop production. In essence, IKSs cover a broad field which includes knowledge of plants, climate and meteorological features, wildlife, soil classification, traditional soil improvement, agriculture, fishing, and governance systems to mention a few (Matowanyika, 1995; Nwonwu, 2006 cited in Muchenje & Goronga, 2013; Odora-Hoppers, 2002). The desirable situation is one where IKSs are incorporated across all topics in the agriculture curriculum. This limited view is largely attributed to the way

in which the participants conceptualised Indigenous Knowledge, and this tends to have negative implications in the way and manner they infuse Indigenous Knowledge into the agriculture curriculum.

At the same time, the impact of colonialism on knowledge production needs to be unpacked (Shizha & Kariwo, 2011). Colonial education was hegemonic and disruptive to African cultural practices, indigenous knowledge, and ways of knowing (Shizha, 2013). These observations point towards the non-neutrality of knowledge (Odora-Hoppers, 2015). In the post-colonial state, there is need to revisit IKSs and infuse it across the school curricula. The incorporation of IKSs in the teaching of agriculture should be seen as a form of cognitive justice which brings in a number of benefits. Cognitive justice recognises the diversity of knowledges and equality of knowers (van der Velden, 2006). It is an acknowledgement of the diversity found in society as advocated for by postmodernism which celebrates the plurality of knowledge (Lyotard in Ritzer & Stepnisky, 2013).

Incorporation of IKSs in teaching agriculture is also influenced by the view that the two knowledge systems (Western and Indigenous) need to complement each other in their strengths and weaknesses (Das Gupta, in Ruheza & Kilugwe, 2012) as well as the relative character of knowledge (Lyotard, 1984, cited in Kirby et al., 1997). The benefits of incorporating IKSs were seen by the participants to be in the area of pedagogy, cost and learner exit skills. In terms of pedagogy, the participants felt that this enables teachers to teach from the known to the unknown. This implies that, through this incorporation, teachers are teaching children things they are familiar with in the home and as such this should provide a source of motivation for the learners in line with the dimension of constructivist epistemology. Constructivist methodology generates interest and ownership in the subject matter and is therefore a source of motivation (Semali, 2011). This approach should also be construed as a form of cognitive justice where concern should be about the right of different forms of knowledge to survive - and survive creatively and sustainably, turning the toxic hierarchy left behind by colonialism into a circle (Visvanathan in Odora-Hoppers, 2015). Secondly, the incorporation of Indigenous Knowledge in teaching agriculture has a cost benefit attached to it since Indigenous Knowledge is cheap in comparison to Western Knowledge forms. The import here is that learners become empowered to provide solutions to problems faced on a day-to-day basis leading to the socio-economic transformation of their communities. School knowledge must express the social desires, anxieties and socio-cultural needs for socio-economic development (Shizha, 2013).

Learners also stand to benefit from the incorporation of IKSs. Apart from the cost-benefit alluded to earlier. The participants felt that learners would benefit immensely in terms of the skills acquired using localised knowledge. These skills should enable the learners to become self-reliant as they may engage in income generating projects. In the ultimate analysis, learners should become self-reliant and utilise low-cost Indigenous Knowledge (Ministry of Primary & Secondary Education, 2015b). This should be seen as a form of challenge to the epistemological hegemony imposed by dominant Western

knowledge (Shizha, 2005, cited in Shizha & Kariwo, 2011). In this regard, IKSs have transformative power which can be used to foster empowerment and justice in a variety of contexts (Macedo, 2011).

Regarding Indigenous Knowledge forms prevalent in their different communities, all the participants indicated their awareness of these. In the different communities, IKSs are at work in informing day to day practices as people interact with both the physical and social environment. IKSs are generated as lay people seek to find solutions to problems in their day-to day lives by drawing on existing societal wisdom and other local resources that are available (George, 2011). Participants in this study indicated that these Indigenous knowledge forms were to be found in livestock production, crop production and land preparation and should be infused in the teaching of agriculture.

Arguments have been put forward that it is impossible to create a well-functioning society and a way of approaching livelihoods and human security from a knowledge base that excludes the knowledge holders in real time (Odora-Hoppers, 2015). This observation reinforces the need for such knowledge systems to be incorporated into the school curriculum, particularly in the teaching of agriculture. However, the range of IKSs prevalent in the community in which the participating schools are located appears to be rather narrow, suggesting the need for schools to research more on these knowledge forms and document them. Furthermore, limited IKSs can be attributed to the way and manner in which participants conceptualised IKSs. However, their identification of IKSs prevalent in the community is testimony that such knowledge is still alive and useful (Maurial, 2010).

Although participants were of the view that they incorporate IKSs in teaching agriculture, they also face some challenges. The challenges encountered have to do with lack of knowledge about IKSs by the teachers and the learners as well as environmental degradation. The lack of knowledge about IKSs by both teachers and learners has more to do with the way in which this knowledge is transmitted. It has been observed that indigenous knowledge is orally transmitted from generation to generation by elders in the community. This is a characteristic of IKSs as indigenous knowledge is personal, oral, experiential, holistic and conveyed in narrative or metaphorical forms (Castellano (2000) cited in Hart, 2010). Due to the generational gap and urbanisation, this is no longer happening hence the need for schools to research and document Indigenous Knowledge Systems that are found in their communities. Warren et al. (1999) cited in Muchenje and Goronga (2015) have observed that the documentation of vast amounts of unrecorded, often rapidly disappearing IKSs could provide the basis for many effective development interventions if this knowledge could be shared. Environmental degradation, through deforestation, was cited as a challenge as this destroys ecological resources which are important in Indigenous Knowledge preservation thus curtailing the impact such knowledge should have on learners as they grapple with effects of climate change.

Conclusion

This study has shown that participants are aware of IKSs more so those that are found in their communities. However, the participants tended to have limitations in their conceptualization. This limitation also has a negative impact on the range of syllabus topics that can benefit from the infusion of IKSs. Participants decried the effect of land degradation resulting from indiscriminate cutting down of trees for firewood as well as urbanisation which has resulted in sand poaching for building construction thus defacing the environment.

Recommendations

In view of the findings, the study makes the following recommendations:

- The Ministry of Primary and Secondary Education should mount workshops to conscientise teachers on the infusion of Indigenous Knowledge in the teaching of agriculture.
- The Ministry of Primary and Secondary Education should closely liaise with book publishers so that agriculture textbooks incorporate Indigenous Knowledge Systems.
- Schools should research and document Indigenous Knowledge forms prevalent in their communities for their preservation.

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