Globalization and Ndebele Indigenous Knowledge Systems in Agriculture: Challenges and Opportunities

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Abstract

The paper will explore how the liberalizations of knowledge and technological innovations can survive side by side with Indigenous Knowledge Systems and particular attention will be paid to the practice of agriculture (crop production) in rural Matabeleland in Zimbabwe. Despite the importance attached to the knowledge which resides in indigenous cultures, there is no unified understanding regarding the value and consequently opportunities of this knowledge in a global village. It has always been argued that the forces of globalization endanger the survival of this knowledge, while on the other hand it is also argued that they enhance the development of Indigenous Knowledge Systems. As a result the paper analyses the opportunities and challenges of globalisation on the Matabeleland community. The paper will further address the need to blend global and indigenous knowledge and to harmonize legislature so as to come up with an integrated approach to the application of the two systems

Globalisation and Indigenous Knowledge Systems

The word globalization prompts often highly polarized views. For some it is an evil devouring the environment, homogenizing cultures and values and subverting equity, justice and common decency. While for others it is the ultimate evolution of the market, it is the 'biblical Jesus' where multinational corporations are freed from government bureaucracy and promising previously unimaginable economic development which could overcome poverty and cut through what are seen as outdated, suffocating values of Indigenous Knowledge Systems.

According to Massey (2004:46) globalisation "is a commonly used term to describe the global spread and sharing of ideas, cultures and economic links across the world". It is further argued that globalisation has positive and negative effects, and scholars like Robins (1991:25) have argued that globalisation is a monster and has a lot of inequalities inherent within its scope. But this paper argues that globalisation should not be defined in terms of loss or cultural imperialism because there is so much to gain from it if it is properly blended with Indigenous Knowledge in Agriculture (IKA). It can bring about change, innovation and dynamism in farming methods and equipment leading to an improved agricultural production. On the other hand this paper appreciates indigenous knowledge systems 'as the information base for a society, which facilitates communication and decision making. Indigenous information systems are dynamic, and are continually influenced by internal creativity and experimentation as well as by contact with external systems' (Flavier et al 1995:479). In general, Indigenous Knowledge is local knowledge acquired through experiences and is open to outside influences in order to meet new environmental demands. It is also important to note that globalisation and indigenous knowledge are both "inextricably linked, where both feed off each other in a symbiotic fashion" (Kaschula 2008:179). Furthermore, globalisation and the increasing interconnection of knowledge and western technology are not imposed on people or are they coerced into adopting them but they are integrated into existing traditional knowledge by those who feel empowered by it. In essence, this article explores Ndebele indigenous agricultural knowledge in the light of modern agricultural practices.

Soil Fertility Management

According to Sanchez et al (1997:19-20) soil fertility depletion in small- holder farms is the fundamental bio-physical root cause of declining per capita food production in Africa. It is observed in this paper that Matabeleland region is also not spared from this problem and the locals have developed their own traditional practices which help in boosting soil fertility. The use of livestock manure (*umquba*), perhaps more than any other practice, has been the key in enhancing soil fertility. Manure is usually applied as an off season occupation during land preparation.

Research in the area also reveals that the Ndebele people graze their cattle on their fields after the harvest. The study also reveals that although the application of kraal manure is the most valued soil improvement strategy, it has its challenges. Only those with a large herd of cattle or goats are able to apply a lot of manure; while those who are poor are forced to become a beggar which obviously undermines their strategy of maintaining soil fertility.

The second popular local practice of improving soil's health is the slash and. In this strategy, locals clear and burn vegetation during land preparation resulting in ash that is used as a source of plant nutrients. The ash also acts as a pesticide in the sense that it also kills disease vectors for both humans and crops. This practice is not sustainable because if it is overdone, there are risks of burning some already existing nutrients and living organisms that enhance soil fertility. With the dawn of modernising agriculture there has been an extensive campaign on the use of fertilisers to boost productivity.

Spreading of soil material from termite mounds in the fields is yet another way traditionally used to improve soil fertility. This practice is more effective on small pieces of land such as backyard gardens where the amounts applied could make a significant difference. Soil from termite mounds is usually reach in organic matter and hence in nutrients. In situations where the termite mounds are located within the field, "selective" cropping is practised. This entails planting of special and/ or valuable crops like pumpkins (*amathanga*), squash (*amakhomane*), sweet sorghum (*imfe*) on more fertile mounds for higher yield and better quality of produce. This practice could somehow, in principle, be close to precision agriculture in modern day farming.

Small holder farmers in Matabeleland, like in other parts of the world, practise intercropping of staple cereals with legumes. Traditionally this cropping system utilizes the land space between rows of the main cereal crop while research has shown that the legume improves soil fertility by fixing atmospheric nitrogen and improving organic matter content after decomposition of the fibrous roots of the legume. In Matabeleland, maize is often intercropped with cow peas. Research results also show that while sole maize and sole legume yields are higher than when intercropped, the latter optimally utilizes the land area (i.e. has a higher Land Equivalent Ratio) and results in higher net income for farmers (Mudita et al, 2008). Crop rotations or intercropping with legumes were found to be easily adopted by farmers although the contribution of these cropping systems to soil fertility is low compared to agro forestry and application of manure and inorganic fertilizers (Mafongoya et al, 2006). Other benefits of intercropping are control of *Striga hermontica (witchweed/ isona)* compared to monocropping (Khan et al, 2007, Fatokun et al, 2002). While intercropping of cereals and legumes has been practiced for many years, evidence of its benefit has been quantified through research and sharing of information from other practices elsewhere in the world (globalization). Its high adoption rate as a strategy for improving soil fertility in small holder agriculture could be that it has been tried and tested over years, does not require resources compared to organic and inorganic fertilizers and all components (cereal and legume) contribute to household food security when compared to agro forestry.

From this study it was observed that most communal farmers could not afford fertilisers because of the costs involved. The second reason is that for poor households, chemical fertilisers are a luxury and some have never learnt how to use them. In Zimbabwe, generally, fertilisers are expensive since they are not available at subsidised prices. Fertiliser use in the area was more popular in the 1980s and 90s when it was provided by the government through extension services for free. Fertiliser use is further affected by low rainfall patterns. During stressful water conditions, chemical fertilisers tend to burn crops, this has forced people to be "satisfied with local available resources in the form of kraal manure" (Sithole, 2000:20). It should also be noted that not all households keep livestock and therefore may not have access to manure even though it is more effective than intercropping in improving soil fertility. Benefits of globalization in this case would be adaptation of intercropping systems that have yielded positive results elsewhere, to conditions in Matabeleland and also to research and improve on the current practices.

Farming Implements

The hand hoe is still the widely used farming implement in most households, however some groups noted that the hand hoe imposed severe limits on production and that they would never make progress without animal traction. The hand hoe caused a lot of physical pain and fatigue. One would logically suppose that hand-hoes, especially the length of the handles, would have evolved over time depending on local soil conditions, type of work involved and the user's physique. In general, this evolution, if indeed it is an evolution, has led to the use of short-handled tools that oblige users to bend double, thus causing fatigue and backache. Due to that, animal traction or ox drawn ploughs were seen as a solution to farmers' problems. However its adoption has been slow due to lack of draft power resulting from low livestock numbers per household and diseases that destroy the herd. The communities believed that the use of tools and implements that save time and effort gave them a chance to relax (FAO Magazine October 1998). While the local implements have given these people a hard time, the suffering of people is still perpetuated by the fact that they do not receive very much income from their farming activities as a result their buying power is reduced. The ox-drawn plough is further complimented by heavily mechanised equipment like tractors, disc harrows and combined harvesters. This kind of modernisation further eases the physical pain that the farmer goes through, increases the utilisation of land and the yields are bound to increase. However the greatest challenge has been the ability of the farmer to modernise due to lack of financial capital.

Farming practices like conservation agriculture that are being currently advocated for discourage conventional tillage which uses ox drawn implements. It is of interest to note that the hand hoe is the most used tool by smallholder farmers who practise conservation agriculture. This has evened out the advantage farmers with draft power had in terms of early planting, crop yields and subsequently, food security. This could be considered as a positive development that has come about as a result of knowledge transfer under the umbrella of globalization.

Farming/Cultivation Methods

Shifting cultivation was a major form of land use and management during the days when land for farming was in abundance. It involved cultivating one spot of land, then leaving it to lie fallow after a few years of cropping. This practice was possible and convenient because it allowed for natural fertility rejuvenation of the land. The most common farming method in the region was zero tillage (ukulima ngesibhakela) especially for those without livestock for draught power and the financial muscle to purchase inputs. The basics of zero tillage include minimal soil disturbance where farmers use hand planters to dig basins that capture water and plant nutrients. The digger opens just a very small furrow in the soil's surface instead of upturning an entire field which increases moisture loss and erosion. The seed is then dropped into the holes/ farrows. This kind of farming method is the most popular among the poorly resourced communities which even development agents like NGOs recognise, value and appreciate since it is not expensive and saves time. Christian groups have termed it 'farming God's way' because it is environmentally friendly. Other than low draft power requirements of this method, it also efficiently uses nutrients that are applied on station. Spreading manure or inorganic fertilizers evenly over the whole field is a waste of resources and also promotes weeds while on station application makes sure that nutrients are available only for the crop plant.

Crops

The cultivation of local crops is highly valued by the local communities. It emerged that these crops have been cultivated over a long period of time and have been an important component of the socio-economic and cultural well-being of the local communities. The farmers are involved in the cultivation of small-grain varieties of sorghum (*amabele*), millet (*inyawuthi*) and *rapoko* (*uphoko*) that are known to be adaptable to local conditions and therefore tolerant to the harsh conditions that obtain in the area. A wide range of other crops such as melons (amakhabe), pumpkins (*amathanga*), nuts (*amazambane/indlubu*) and cow peas (*indumba*) are cultivated.
Seeds for most local crops are not purchased from seed companies but are selected and saved mostly by women during and after harvest for the next farming season. Local crops were considered to be an important community resource. The most common reason put forward is the ability of such crops to withstand extreme physical conditions that obtain in the area. There is also assurance of some harvest even under severe drought conditions. However, people have been enticed to use modern seeds for cash crops especially maize. Why cash crops? They open up the external market for the farmers to sell their crops and get more money. The major challenge has been that the cash crop seeds are purchased at a higher cost and are not readily available. Between the period 2007 and 2008 the seeds were scarce and those that were locally available were found in the 'black market' at exorbitant prices, but at the same time in good seasons they bring good incentives for the farmer. Unlike traditional crops, the majority of hybrid varieties that have been introduced to the region are not adapted to local conditions and require high inputs of agro-chemical inputs such as fertilisers and pesticides, mechanisation, and water supply.

These crops tend to be more vulnerable to climatic risks such as drought. In preserving the crops it is important to note the central role played by women in practising and perpetuating the wisdom. The onset of the cropping season heralded their crucial role in the selection of seed with preferred characteristics such as colour, grain size, agronomic stability, suitability to different soil types and terrain, drought and disease tolerance, palatability, grain storage and processing (Matowanyika 1995:42).

The farmers deliberately influenced the natural process of mutation by careful seed selection over centuries and, in so doing, developed an intricate range of crop variability generated by sophisticated knowledge (Cashman 1989:33). Participatory breeding has enabled farmers to work with breeders incoming up with traits of importance in breeding objectives. The resultant varieties are not only adapted to the environment but also meet farmers' preferences in terms of taste, tolerance to drought, pests. Farmers are advantaged by the fact that they have a wide choice of crop varieties in the market. With the variability in climate, there is need to take an opportunistic approach whereby hybrid seeds are planted when the rainfall is normal to above normal and local drought-tolerant seeds are planted if the rainfall is below normal. The success of this strategy hinges on the accuracy and reliability of national and regional early warning systems.

Soil Moisture Conservation

Matabeleland is a semi-arid area and its vulnerability to climatic risks is likely to worsen with climate variability and climate change. Rainfall in semi-arid areas is not reliable for successful production of crops. Dry spells that occur in the middle of the cropping season are a common cause for crop failure than the total amount of rainfall received. There is poor rainfall distribution coupled with low infiltration as moisture is lost through run off and evaporation (SIWI, 2001). Rain water harvesting as a technology that has been transferred from other parts of the world has improved crop yields in semi-arid areas. It is observed that Zimbabwe and South Africa will experience more yield decline compared to other countries in Sub Saharan Africa as a result of increase in temperature (Schlenker et al, 2010). However, it is noted that globalization has facilitated inclusive efforts in tackling problems that affect the whole planet through cooperation and exchange of technologies.

Conclusions and Recommendations

It is a fact that globalisation has influenced traditional forms of agriculture. According to Malhan and Rao (2007:2) 'Globalisation has offered enormous opportunities but also threats to communities that are not adequately prepared to face its challenges. It has created turbulence, uncertainty.....' To some Africans, globalisation is always associated with loss or '...designed to undermine indigenous sovereignty, underdevelop sustainable and self- supporting agricultural.... systems, and breed a servile dependency that is tantamount to modern slavery" (Kunnie 2000:42**).**

It is argued that the process of opening up the traditional methods to modern practices requires a lot of money but most of the farmers in Matabeleland are financially handicapped to modernise their farming strategies. Inputs such as fertilisers and other farming implements are expensive to acquire. The lack of financial stamina has resulted in these farmers believing in the value and benefits of indigenous traditional farming technique which to them are '... ecologically balanced, resource sustainable and which produce the necessary food security (Gata in Matowanyika 1995:93). This shows that these farmers have intense knowledge of their environment which they exploit for their survival. Sithole (2004:19) notes that;

> It is apparent that these rural societies have great depth of knowledge concerning the complexity, diversity and the sensitivity of the different ecosystems in their areas and of the current management of each, a knowledge born of close association with their environment, intuitive insights and consequential long experience.

On farming equipment, the study has further shown that the adoption of modern farming implements like ox-drawn ploughs and tractors has 'led to greater control of the environment. Agriculture improved substantially' Nyathi (no date; 59).

The survival of humanity depends on their ability to exploit nature and globalisation is seen to have availed this opportunity even if these implements are accessed by a few this does not defeat the fact that '...latest ideas and better work technologies are essential to enhance productivity in the interest of economic well-being of farmers and for ensuring food security" (Malhan and Rao 2007:2). Maybe what is required is for government to make available financial support for the poor so that they can also benefit from new technology.

Before colonial intervention, indigenous rural societies of Zimbabwe were practising forms of agriculture, which were ecologically balanced, resource sustainable and which produced the necessary food security (Kunnie 2000:42). It is apparent that these rural societies have great depth of knowledge concerning the complexity, diversity and sensitivity of the different ecosystems in their areas and of the current management of each, a knowledge born of close association with their environment, long periods of informal research and experimentation, intuitive insights and consequential long experience.

It is palpable therefore that indigenous Zimbabweans were engaged in vocational forms of sustenance that had long term futuristic goals in mind and employed IKS to maintain and expand viable and vibrant socio-economies. Regrettably however, colonialism and postcolonial policies have tragically disrupted these powerful and innovative cultures with the objective of profit accumulation not necessarily promoting people's livelihood hence the feeling that people are rejecting globalisation, which is not the case (Kunnie 2000:43).

If a foreign concept is being introduced awareness campaigns have to be initiated and carried out. Hence there is need to educate people on globalisation so that they are able to appreciate and tame/ tape what is good from it and infuse it with local knowledge and discard that which they think is detrimental to their well-being.

As Africa enters the new millennium, modern African governments must do their utmost towards uncovering, recovering and re-appropriating IKS and supporting indigenous practitioners (Kunnie 2000:43). In the face of declining means of livelihood, some Zimbabwean people are left with no choice but to revert to these IKS. Evidently, the reliance on imported technologies has been a major feature of post-colonial development effort to the detriment of indigenous technologies. Atteh (1989:16) blames the African elite for this development. He argues that these have little or no sympathy for indigenous local knowledge as they viewed running away from IK as a mark of success. Such an attitude has been to a larger extent, influenced by the modernisation approaches to socio-economic advancement and has created a dependence, which has become perpetual. There are also problems associated with the lack of systematic records, means of transmittance to other societies and common measurement. These and other problems make IK vulnerable (Atteh 1989:16). When intergenerational transmittance does not take place, IKS are easily atrophied. Last but not least, many locals are obstacles themselves as they now view non-African systems as superior and deliberately seek to replace the African system (Atteh 1989:17). As a way of trying to fulfil Millennium Development Goal of poverty eradication the Zimbabwean government should concentise its citizens of new developments and assist them to modernise without discarding the local knowledge.

The study is a clear indication that indigenous knowledge systems are an important component of the agricultural sector. However, as has been shown, these knowledge systems face unconscious displacement by modern systems despite their importance especially among poor farming communities in low potential areas (Alcorn 1995:120). Local initiatives are continuously being challenged by big businesses seeking to expand sales of high yielding varieties, fertilisers, chemicals and other inputs developed under the protection of plant breeders' rights and patenting (Amanor et al 1993:30). It has come to be accepted that traditional agriculture is stagnant and impetus for change must come from external credit, education and new technologies (Schultz 1964:7). In a way, local farmers have been primarily seen as adopters of technologies introduced from outside and not as creators of their own solutions. This study recommends that an integration of the two knowledges would benefit the communities by increasing the potential for agriculture output.

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