

Back to the Future! Harnessing Indigenous Knowledge Systems for Wealth Creation in Zimbabwe.

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Abstract

Through imperial logic, scientific knowledge has since been perceived along racial lines. The penultimate hierarchy of knowledge has created and continues to nourish natural imperialism where it has become the white men's burden to civilize the Africans. This research attempted to sterilize the celebrated falsehood that the Europeans have the 'scientific spirit' while the Africans have a 'magic conception' of nature. A historical appreciation of African innovative and inventive ingenuity was traced from the pre-colonial times to the present. The study drew insights from a broad evidentiary base that includes oral traditions, archival sources and secondary material. The research established that aloes were and continue to be administered for a variety of complaints like constipation and venereal diseases and other non-human disorders like the cure of disease in chickens. The calendar function of the stars and constellations is ascribed to early African agriculturalists who also exhibited an astounding knowledge of techniques of weather forecasting. The research confirmed that African indigenous knowledge systems, although rarely acknowledged, have provided the solid foundation upon which Europe has claimed dominance over the environment by cataloging and classifying plants, insects, animals and many other creations according to 'modern' criteria. The Africans' knowledge of the medicinal and nutritional properties of plants has been a source of commercial gain for multinational companies through bio-piracy which imperial logic seems to have justified. The challenge is the recognition of the diverse African knowledge system's capacity to create wealth by formal institutions like schools, universities and work places. From a historical perspective, the study confirmed that indigenous knowledge has been and remains an integral part of the local ecosystem, a key element of the 'social capital' of the underprivileged and the main asset to invest in Zimbabwe's struggle for survival.

Key words: Indigenous Knowledge Systems, Inventive Ingenuity, Wealth Creation, Bio-Piracy.

Introduction

In an effort to remap knowledge to foster sustainability, the biggest challenge is whether the Africans and Zimbabweans in particular can recapture the 'golden age' of their culture which preceded European contact. The so-called African intellectual heresies appear to be perishing into unrecorded oblivion as if African intelligence is inferior. Missionary accounts and exotic literature have projected European pride and prejudice. It is in Africa that Europeans extolled most loudly their own colonial project, deployed

most skillfully their own justification for enslaving and exploiting Africans thereby justifying their own sense of racial superiority. Before colonialism, indigenous cultures had their own checks and balances which need to be retrieved from obscurity. The new forms of organisation which have engulfed society through the European mentor are largely incompatible with the traditional ways of earning a living. In needs and deeds, Zimbabweans are like bats: neither birds nor mice, neither Africans nor Europeans. The potter is no longer so active where the trader has tin-ware for sale, the highly nutritious traditional dishes have given way to refined foods and numerous trades are everywhere giving way to European articles. The study argues that just repeating shibboleths of modern educational needs with little attempt towards applying the underlying indigenous knowledge principles to the present development efforts is not sustainable and yields a façade of advancement. While endowed with rich resources, Zimbabwe's economy is not growing and continues to show signs of further shrinking. Hence, to ensure sustainability, this study throws some light on African scientific ingenuity which can still be incorporated in applied development efforts in areas such as agriculture, health, nutrition and natural resource management among others.

Although missionaries and pioneers of African anthropology were the products of their colonial times, it does not follow that there is no merit to their work. Admittedly, they have produced first-rate accounts of the societies among whom they worked. The difficulty, as Mazrui (1986) argues, resides not in casting the anti-colonial stone but in determining the extent to which their work impacted upon the methods and content of indigenous education. Thus, the spirit behind this study is not just a hankering for a return to pre-industrial practices but rather an effort to explore avenues for wealth creation through the use of local resources and expertise. The fulcrum of the argument is the need to retrieve, revive, resuscitate or resurrect and protect the cultural aspects of decolonization which seem to have been neglected as the increasing demand for knowledge and skills born of industrialism is increasingly being associated with 'schooling'. By working with and through existing indigenous systems, the study argues that change agents can facilitate the transfer of technology generated through research work to improve local systems and foster sustainability.

Conceptualizing Indigenous Knowledge Systems (IKS)

Matsika (2012) has defined indigenous knowledge as the traditional and local knowledge that exists and is developed through the experiences of the local community in the process of managing the conditions or contexts that challenge the people's everyday life. For Ndangwa (2007) indigenous knowledge denotes the complex set of knowledge, skills and technologies existing and developed around specific conditions of populations and communities indigenous to a particular geographic area. Larsen (1998), in Ntsoane (2002:72) sees indigenous

knowledge systems as 'concepts, facts, perceptions, beliefs, information and values, as well as particular economic, social and traditional political arrangements' associated with any given community. Indigenous knowledge Ntsoane (2002:72) argues, is a fusion of both traditional and local with a heritage component, implying that as Africans, we have inherited knowledge systems from our ancestors. In as much as indigenous information systems are dynamic, and are continually influenced by internal creativity and experimentation as well as by contact with external systems, Ntsoane (2002:70) warns that we desist from searching for a definition based on the colonizer's language and culture. Instead, he makes a clarion call that the conceptualization and rationalization of indigenous knowledge be based on the need to reintroduce an Afro-optimistic approach to knowledge production given that indigenous knowledge embraces both the physical and metaphysical worlds. Despite the fact that the metaphysical is non-technical or intangible, it carries insights, wisdom, ideas, perceptions and innovative capabilities that pertain to ecological, biological, geographical and physical phenomena.

Indigenous knowledge thus has to be understood as local knowledge that is unique to a given culture or society usually orally passed on from generation to generation. This contrasts from knowledge systems generated through the global network of universities and research institutes, government research centres and modern private laboratory research initiatives. An undiluted consideration of IKS refuses to accommodate the superimposition of a Western conceptual model on the African notion of an educated person. Thus this study considers indigenous knowledge as the umbrella term under which varied dimensions of ethnosystems which encompass ethnoveterinary medicine, ethnobotany and general ethnosciences are discussed. This corroborates Mazrui (1983:144)'s postulation that indigenous knowledge systems should resonate greater utilization in Africa of African personnel and African resources, technology and knowhow. The 'back to the future' approach for sustainable development advances that an African orientation through the informal teaching of indigenous knowledge systems can bring about an attitudinal change that will aid our developmental drive. Even witchcraft and sorcery remain a vast and 'impenetrable' maze of African life worth researching. Whether inherited or acquired, an unbiased voice of scientific fact asserts that all human knowledge and power (even modern science) can be used for immoral and anti-social purposes, so the specialist in magical knowledge and power may put his or her secret methods to dark and evil uses.

Methodology

Qualitative research was considered effective in obtaining culturally specific information about the values, opinions, beliefs and social contexts of the target

population. The qualitative approach also provided a participatory platform for the researcher. The research tools used, namely interview and observation made it possible to explore the material cultural history of the people, which existed, mostly in oral tradition. Thus data collection methods consisted of interview protocols involving randomly drawn groups of herd boys (who provided an amazing inventory of trees, grasses and other plants of medicinal value) and some elderly persons in the Gutu district of Zimbabwe. Secondary data sources including already published works in related literature were also consulted.

How our future lies in the past.

Many people in developing countries, including Zimbabwe, depend on their environment, the veld, to meet basic needs such as fuel, health, food and shelter. Fanon (1963:27) argues that for the Africans to recognize and appreciate the African past and present, as well as its striking indicators of African scientific ingenuity, there is need to 'decolonize the mind'. Balogun (2008:121) has added that the big question in the decolonization debate has been the extent to which the concept of an educated person has picked cultural colourations. There are some unscientific frames of mind which have associated skin pigmentation, hair colour and the shape of nose with intelligence. Others have sentimentalized the Biblical aspect of the arguments for race inferiority. As a result, many Europeans and even Africans alike have come to relate racial purity with achievement assuming that the interests of Whites and Blacks were hopelessly antagonistic and mutually incompatible.

The Western conception of an educated person should neither be a paradigm for Africa, nor can an African paradigm be a yardstick for the West. To this end Fafunwa(1982:17) argues that 'in old Africa, the warriors, the hunters, the noble person, the man of character or anyone who combined the latter feature with specific skills was adjudged to be well educated'. To be ideal, cultured or educated was thus a function of an aggregate of processes in which a person acquired community cultural knowledge, skills, attitudes, values, beliefs, norms and habits for the survival of society (Balogun 2008:122).The Western idea of an educated person lays emphasis on the cognitive aspect of the person, based on knowledge and understanding to the neglect of a whole complex of material, non-material, emotional, spiritual and other capabilities. In other words Africans came to regard formalized education as the end and not as a means to an end and yet every culture contains a large number of guidelines that direct conduct in particular situations.

The extent to which modern packaged medicines like the aspirins, sedatives and other nostra which are replacing the indigenous stock-in-trade seem to be sounding

the death-knell of African medicine. Watt and Breyer-Brandwijk (1950) admitted that a proper study of so-called 'native medicines' and poisons added new remedies to Europe's modern armamentarium. Sir Thomas Fraser in Edinburgh worked out the cardiac effects of a poison scraped from some Central African arrows. This proved to be a new advance in cardiac therapy. The botanic identity of the source of the poison was *Strophanthus kombe Oliv*, a plant whose seeds are used to this day in preparing Western medicine (Watt and Breyer-Brandwijk 1950:73). *Curare*, discovered as an arrow poison in South America is now used for its beneficial effects in anesthesia. Cocaine used to sustain runners in South America is still in common use despite the introduction of many synthetic competitors. Ephedrine derived originally from the folks-medicine of China is a cure for hay fever and asthma. The use of hyraceum (*klipsweet or dassiepis*) the inspissated urine of the rock rabbit (*Procavia capensis*) as a remedy for hysteria and epilepsy is not far removed from the present -day use of mare's urine as the source of a hormone remedy. Moruakgomo (1996) shows that veld products such as *Artemissia Afra*, (*Lengana* in Setswana) are supplementary sources of medicines. In the Transkei (South Africa), for example, the plant is used commercially to cure a number of ailments such as swelling and sweating of the feet, and gout (Ntsoane (2002). Clinical experiments carried out in the United States of America have demonstrated that the right amount of garlic in food can offer protection against certain types of cancer (Sosa Gomez 2004). In Egypt, garlic is an effective treatment for stomach disorders, skin problems, respiratory illnesses and numerous other medical difficulties just like *tsangamidzi* (ginger) in Zimbabwe. The examples given above confirm that although many of the newer drugs were discovered in the laboratory, some of them had originally been discovered in use as 'native medicines' or 'native poisons'.

Africa's indigenes had a great deal to teach European scientists about the utility of plants. According to Harries (2007:138), on several occasions, Junod 'invited natives to his museum where they supplied him with the local names and uses of plants in exchange for a shilling'. Junod admired African old women and specialist medicine-men who exhibited an encyclopedic knowledge of the medicinal, nutritional and magical properties of plants. The *n'angas* or medicine-men, Harries (2007:138) notes, 'were familiar with real, powerful drugs which they administered in conjunction with therapeutic practices'.

Githens (1949) established that over 14 000 drug plants in Africa are vanishing at an alarming rate and as Read (1951:366) has argued, formal education has transformed Africans to gradually accept new ideas and new ways of living, rejecting certain traditional ideas and despise their past. The so-called "White men's burden" to civilize Africans and the popular 3 Cs- Commerce, Christianity and Civilization enabled the Europeans to re-name, re-define and control people,

places and things. The problems associated with the superimposition of foreign definitions on African indigenous conceptual schemes have consequently led to conceptual colonisation. Book learning is essential, but its emphasis on literacy and the foreign content has seriously alienated the Africans from their traditional environment and culture. That African discoveries were not documented does not mean that Africa had no history of scientific knowledge to share. Europeans seized the opportunity to establish themselves as custodians of great scientific discoveries and they introduced pharmaceuticals which manufactured drugs from medicinal plants and medical knowledge that they had pirated from Africa. The result was that in writing African history, 'African happenings were incidental appendages to the tale of European occupation and the establishment of the colonial system (Herskovits 1962:457) According to Mazrui (1986:76), because the archival tradition was very weak in Africa, 'the scientific tradition became weak, as languages atrophied and so did philosophical tradition-with ghastly consequences for Africans'.

The Historicity of Indigenous Technologies

The purpose of this section is justifying the clamour to go 'back to the future' by highlighting indicators of African scientific ingenuity through indigenous technologies (the techniques, crafts and practical skills rooted in local traditions and customs passed on from one generation to another). The claim by Kriel (1975:111) that the old Africans were not interested in chemistry and physics, or even new methods of agriculture is not a truism. Instead, Africans valued knowledge in both scientific and interpersonal fields. Hiram Wild (1952:iii) saw 'the average Rhodesian native as a first-class field botanist, largely because he made use of so many indigenous species in medicine, witchcraft, for building materials, cordage and for food'. These indigenous technologies can be organized into those exhibiting weather forecasting techniques, chemical, constructions, biological and mathematical processes among others.

Weather forecasting is not a new phenomenon that transcended into existence when the Europeans came. Africans have always possessed excellent expertise in interpreting weather through observing the behavior of animals, birds, astronomy, without any special instruments or machinery from European invention. Traditional knowledge of the celestial bodies particularly the movement of the moon and the stars has been used to predict the weather and farming prospects. Time among the Shona would refer to animals, for example *Jongwe rechina* or the forth cockcrow, that is around 4.00am when it is time to rise or *mashambanzou*, when the elephants wash, when it is getting light (McCosh 1979:30). According to Kubiku (2012), 'time in traditional societies is not a collection of hours, minutes and seconds but a sequence of experiences'. The moon was given more attention

because of its association with the menstrual cycle. The regular appearances of the new moon (*mwedzi wagara*) heralded the beginning of each lunar month when the pregnant mother added a knot or a clay bead to her string to remind her when to call the *muchingi/mbuya nyamukuta* or midwife. The Shona do not distinguish by name between planets and fixed stars, but have always been aware of some of the planets for example, Venus or *hweva* derived from *kukweva* 'to pull' as it is believed that it pulls up the sun at dawn in some form of an astronomical tug. Jupiter is also believed to be the evening star *vhenejera tsvimborume*, which 'gives the light to the bachelor' to see his way clearly to his girlfriend. Another early morning star in the east is *nyamasase* believed to be Mercury (McCosh 1979:35). The society's obsession with sky and calendar was a measure of the status of their civilization.

Howman (1942)'s whimsical conclusion that the idea of a good meal for an African was a full stomach without dietary considerations needs further scrutiny. He claimed that the basic food for an African was deprived of nutritive content and that the African's selection of the chemical substances was dietetically unsound and had an eroding influence on his physical and mental make-up. Howman's pronouncements were however refuted by Berlyn (1968:59) who counter-argued that in terms of the caloric values of foods and the pursuit of Vitamin B, African traditional dishes were extremely nourishing and well adapted to the needs of the population. For health the Africans consumed varieties of vegetables and greenstuffs for example pumpkin leaves (*murivo wemanhanga*), spinach (*mowa*), bean leaves (*murivo wenyemba*) edible weeds (*munenzwa, tsine, chirevereve*), sweet potatoes (*mbambaira, mabura*) mushrooms and edible fungi (*nhedzi, mbudzihuru, dindindi, nzeve yambuya, firifiti*), caterpillars (*madora, magandari, harati*) locusts, flying ants (*ishwa*). Locusts, flying ants and caterpillars are great delicacies with higher protein content than meat. Another edible variety of wild fruits includes *mazhanje, chakata, nhunguru, matohwe, matamba, maguyu, nhengeni, maroro, shavhi*, and *mazambiringa* among many.

Howman (1942:14) also scorned at the insistence by Africans that a child must be fed 'from the breast whenever it cries, at anytime, anywhere-while working, while talking, even during a case in the court the breast was never withheld'. He held that the 'native babe' learnt no discipline, no routine, no denial as opposed to the European child who from birth would be subjected to disciplinary influences like feeding at regular intervals and received prescribed amounts. Probably unknown to Howman was that breast milk is a unique nutritional source that cannot adequately be replaced by any other food, including infant formula and that it helps equip the baby to fight off disease and infection. For the Shona people, a strong man (*hamburamukaka yerume*) is one who was adequately breast-fed at infant stage. Even the campaign for male circumcision which has taken Zimbabwe by storm is not a new discovery. Among

the Shangaan male circumcision is a rite of passage which early European social anthropologists castigated as barbarism. In what could be termed 'veneered barbarism' modern scientific researchers have shown evidence that circumcision has health benefits which include a decreased risk of urinary tract infections, protection against penile cancer, among others. This explains why Farquhar (1946) argued that 'the education which took Europeans 2000 years to reach or become civilized might be arrived at by the native within a few years, or even weeks'.

In the gun trade the Njanja had become celebrated for their repairs, for the forging of bullets in their *chidos*, and even for the sale of gunpowder manufactured from the manure of rock rabbits mixed with the ash of certain burned woods, and sometimes with powdered slag from the furnaces (Mackenzie 1975: 215). The Njanja people demonstrated entrepreneurial acumen and until the First World War they continued to manufacture hoes and other implements from some surviving blocks of smelted iron. Njanja fame as iron-workers was perhaps the most remarkable of pre-colonial industries in Zimbabwe which died partly by administrative action and overwhelming competition from outside. Upon visiting the remains of the habitat (*dongo*) from which the Rozvi Chief Mushayavanhu had been driven by the vaGumbo in what is now the country of Munyikwa of Gutu, van der Merwe (1936:72) found several clay moulds used for iron smelting.¹²In 1891, a Methodist Missionary, Isaac Shimmin, visited Njanja country and described it as "the Wolverhampton of Mashonaland" where the manufacture of iron implements went on from dawn till dusk. Njanja traders traversed the Gutu and Chibi (Chivi) areas which had their own blacksmiths but these achieved acceptance and extraordinary expansion not through success in warfare, but by remarkable entrepreneurship. Large quantities of hoes, axes, adzes knives were produced and traded. Smaller luxury items like arm and leg bands, hooks, needles, badges for chiefs, and razors were manufactured. The iron industry was in full swing and the hoe industry lasted until 1900 when the imported articles from Birmingham put an end to it (Thompson 1942:76-86). Chika Onyeani laments:

Africans cannot produce the pins they use, the needles to sew, the radio we listen to ; we do not produce the television we look at., we do not produce the cars we drive, we do not produce the guns we use in killing one another, we do not produce the wires we use in carrying the electricity to our homes, we do not produce the telephone gadgets we use in talking, the money we use, we do not produce the machinery used in engraving them ...' (Chika Onyeani,2000: 68).

That as it may, this study makes an effort to show how technologically rich Africa's past has been. For example, pottery reflects wonderful craftsmanship.

One cannot deny the application of mathematical concepts like diameter, circumference, sphere (from the spherical bowls), the cone, triangles, rectangles and squares from the delicate incised decorations or patterns on the necks of varied pots and even the chemistry involved in the manufacture of different paints like red ochre (*mukura*). The many styles and sophistications in the various features show evidence of a highly developed indigenous system of arithmetical ideas. It would be missing the point to claim that arithmetic, calculation or the manipulation of numbers has found its way into the curriculum dating back to the earliest days when missionaries started schools. The European approach obviously had little utility value for Africans. Precisely it can be argued that the 'arithmetical' ideas were changed or extended by the contact especially with the rapid commercialism and industrialism, resulting in a breakdown of the barter system and the gradual substitution of the money system with its arithmetical accompaniments and implications.

Nowadays architects are turning to traditional architecture for inspiration, not because they wish to repeat the structures they find but because it is recognized that these structures obviously satisfied their communities' psychological needs far better than most modern suburban settlements do. The materials and technology are evident in the gazebos thatch which has been largely associated with places of tourist attraction or holiday resorts. It must be stressed here that even the simplest dwelling we see today is the product of a whole multitude of economic, social, political, physical and technological forces. On architectural styles, Africa has suffered from interpretations often apparently founded more in ideology or emotion than in careful study, put forward by generations of outsiders. Modernization brought with it drastic changes in habitation arrangements, the drift towards towns meant that homesteads were left to crumble, the introduction of new building materials from Europe (the corrugated iron sheeting and cement have had perhaps the greatest effect) colonial governments also thought that hill-dwellers would be easier to administer on the plains, all of which influenced architectural considerations. In holiday resorts, where few Africans afford to go, business magnets have tried to emulate traditional shapes in modern materials or to use traditional materials in modern shapes.

In craftwork, Africans were very creative. They would practise basket making, spinning and weaving. Animal skins were made into clothing, shields, bags and bellows. The horns were used as holders of medicine, or converted into musical instruments, pipes and snuff boxes while their bones and tusks were made into ornaments of various kinds, their teeth and claws were used for necklaces and other ornaments, and the hair was made into ornamental headdresses.

African stone games like *nhodo* and *tsoro* were rich in mathematical applications of addition and subtraction. Matthews (1964:65) observed that *tsoro yamutwelve* was found to be identical with the Teochin Chinese game of Dig Dig. Though regarded as a kind of the poor man's chess, *tsoro* was found to bear some resemblance with games played by European children.

Discussion of Findings

While visiting various places in Gutu, I commenced a collection of indigenous technologies which used to be very popular but are gravitating into oblivion and also those technologies being applied in everyday experiences. Below is a narrative by an informant on making salt:

We used to collect a small shrub called *mushangidze*, which we burnt and collected its ashes. The ashes were then boiled in water until a great deal of water had evaporated. The remaining water was poured into a small pot called *surudzo* with two or three small holes in the bottom. The residue of the ash would be left in the top pot and the liquid collected below. This liquid was further distilled and this was the *munyu* which could be used in its liquid state (Ruponeso Mugariwa 2013).

Another method which proved popular with herd boys involved the collection of soil from the salt licks used by the animals, for example sheep and goats. The earth is dissolved in water and treated in the same way as the ash of the *mushangidze*.

Gutu has one referral hospital at Gutu Mission and several clinics which service people in the remote parts of the district. Although some clinics have been built the greatest challenge remains the supply of drugs. Winfrida Motoro a nurse at Chin'ai clinic in the Munyikwa area acknowledged that while people were coming for treatment, the majority still preferred their own herbal treatments and would only come to the clinic as a last resort. 'You rarely find a person suffering from stomach complains and minor injuries coming here. They have herbal remedies in their home areas' (Winfrida Motoro 2013). Popular medicines for stomach complains were the sap from the crushed leaves of the *mususu* and *musekesa* trees. The green leaves are crushed and mixed with water. The patient would then drink the water. The same trees were mentioned in the Mataruse and Chingombe areas of Gutu.

The latex from the *chisimboti* tree, mixed with ground-nut-oil then boiled in a pot over the fire produced a rubbery substance called *urimbo*. This ductile substance or birdlime would be placed where birds congregate - on the trees near a threshing floor or on the trees round the water holes. Birds would be caught upon perching

on the lime. A good catch would amount to more than 100 quella birds during a successful afternoon. Dixon Mhuru from Mutombwa area sells his catch at Birchenough Bridge business centre where he realizes an average of seventy dollars a week. Dixon added, 'I make a living out of selling birds and I am making efforts to experiment in the manufacturing of domestic and commercial contact adhesives using this latex (Dixon Mhuru 2013).

Mbuya Machakanja explained how she brewed and continues to brew some beer whose revenue has largely been channeled towards the education of her orphaned grandchildren. In defiance of her age (72 years), she carries a vision of having her *ngoto* or *ngome* packaged for sale now that some companies have also gone into packing *maheu* (Machakanja 2012). Prisca Chidzanga has used the leaves of the prickly pear (*Opuntia vulgaris*) to manufacture detergents which have proved popular with rural salariables, among them teachers, business people and agricultural extension officers. The Zanoredu Cooperative Society in the Chinyika area has established a market outlet which specializes in selling traditional foods like *mufushwa*, rapoko and millet mealie-meal, peanut butter, roasted nuts and many other products at Mupandawana growth point.

Vhunzisai Munozogara described how sundry foods like baobab, *mukwakwa* and *mutondo* seeds were and are still used during times of famine:

The pod (*wuyu*) is broken and the seeds therein collected and pounded in a mortar until they form a meal. This meal can then be made into a thin porridge resembling *bota*, or can be mixed with other vegetables and eaten as relish (*usavi*). The kernels of the fruits from the *mutondo* tree (*Berlinia globifera*) are cracked and the contents eaten in their natural state, or they can be roasted. My uncle who is diabetic buys these in large quantities (Munozogara 2013).

The aloe plant is widely used in the Gutu area of Masvingo to treat abdominal pains, fowl-pox (infusion put in fowls' drinking water), asthma (through the infusion of ashes to which some salt is added and taken orally), (*dungurira*) constipation, wounds (by rubbing the juice on wounds). In the wake of expensive modern medicines, rural people have relied increasingly on the easily accessible, relatively cheap herbal medicines from their own familiar environment largely used for health maintenance and the preparation of home remedies. Mutoro reiterated that midwives (*vana mbuya nyamukuta*) are the villagers' 'barefoot doctors' who know medicinal plants like *nhanzwa* to lubricate the birth canal for women in labour. Many women are still giving birth in their homes without any complications. How they treat *nhova* and *ruzoka* are other unique grassroots-movements of self-reliance in primary health care. Herd boys made their mouth-wash from the tree they identified as *munhengeri wemakudo* and made their

toothbrushes from the *mudziviradhiramhu* twigs. This shows the extent to which individuals are able to maintain their health within the context of available resources. Maxwell Foti bragged that people in the rural areas were more self-reliant and lived in fairly hygienic environments than the urbanites who cleaned their teeth with colgate but rinsed the mouth with industrial waste (Maxwell Foti 2012).

Among the farmers, the preservation of seeds through smoking is still very popular. Getting into the kitchens, the researcher observed some seeds of sorghum (*mapfunde*) and *ipwa* dangling from the roof and black with soot. At the height of Zimbabwe's liberation struggle in the mid 1970s dip tanks were closed but people treated their domestic animals employing herbs and magical therapies with astounding success. The indication is that before veterinary services were available, stockowners depended entirely upon their own resources for curing their animals and protecting them from disease. Batanidzo Mugwambani (2013) had this to say:

We crashed pomegranates (*matamba*) as eyewash for sheep and cattle. The *murumanyama* tree would be crushed and mixed with water and then have the mixture sprinkled over the cattle to rid them of ticks and skin wounds. Indigenous materials used to suture wounds and fractures on animals would include the bark of the *mugwatikwati* tree and the leaves of *mufuta*, a plant which grows near cattle kraals. The aloe plant (*gavakava*) would also be crushed, mixed with water followed by a forced ingestion of the liquid as a traditional remedy against gastrointestinal parasites of sheep, goats and cattle.

All these indigenous techniques were and are indeed effective. As Fanoti Makura (2013) hinted, during Zimbabwe's serious economic meltdown from 2007 to 2008, people reverted to the traditional medicines in the absence of cattle dip and other modern pesticides. In as much as modern scientists would claim that the ethnobotanical medicines produced undesirable effects such as swelling and inflammation, the challenge then is for the modern scientists to carry out laboratory and field tests to confirm the efficacy of these indigenous pharmaceuticals. Stockowners and social and biological scientists need to work together to test and enhance traditional herbal therapies for animals so that people can prepare more reliable home remedies – thus freeing themselves from alien, uncertain, and impossibly expensive external sources of veterinary inputs. According to Chavhunduka (1984), such initiatives can also give rise to new rural industries or reinforce existing ones. An improved utilization of ethnoveterinary medicine would include identification of traditional medicinal plants, laboratory and clinical evaluation of these plants' pharmacological activity and effectiveness, participatory

field testing of improved home remedies, integration of traditional veterinary medicine into formal veterinary services and training in ethnoveterinary medicine for both stockowners and veterinary students and professionals. For sustainable development, local terminology and technology, then the cultural and social systems pertaining to animals need to be understood.

Ben Makovere a traditionally trained 'hydro-geologist' explained his road to success: My uncle taught me how to use pieces of wood from the *mutondo* and *mupangara* trees to identify water sources and mineral deposits. I identified water sources leading to the drilling of eight boreholes in Gutu East. The then Member of Parliament Ephraim Marwizi introduced me to the Gutu Rural District Council authorities who later hired my services upon realizing the striking similarities between my surveys and those of a professional hydro-geologist hired from Harare. Since then I have worked with mining companies and individuals in exploring mineral deposits and as a consultant with a borehole drilling company in Kwekwe (Ben Makovere 2012).

Conclusion

The study has shown how numerous aspects of African scientific ingenuity were directly affected by contact with Europeans. The resultant changes are most readily found in technology where domestic industries have gradually decayed. Ironwork, formerly a specialist craft, has almost wholly died out. Pottery, basket work and woodwork are all becoming more restricted in practice and scope. Iron cooking pots and tin cans are replacing the more fragile pots of clay; enamel basins and plates are used by many instead of basket and wooden eating-bowls and hardware buckets are preferred to wooden milk-pails (*hwedza*). The contact between the Europeans and Africans has seen the sterilization and marginalization of African indigenous technologies. Literally, the black and white notes of the piano have not been played to produce harmony. As a result, the local educated elite have not been very keen to explore the windows of opportunity available in indigenous technologies to propel themselves to greater scientific discovery heights.

Today our streets are flooded with herbal medicines from the Western and Eastern worlds and yet encouraging the use of proven herbal medicines among people who do not have access to pharmaceuticals can improve rural health care in many areas. Forests have been and continue to be destroyed without any experimental research going on to learn the pharmacological properties of some plants. Instead institutions of higher learning should reach out and harness the indigenous knowledge before it gravitates into oblivion. With the older generation passing on from this life, there is a crying need to acquaint the younger generation of this

important aspect of African scientific ingenuity for purposes of fostering sustainability.

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