

Promotion of Public Health Care Using African Indigenous Knowledge Systems and Implications for IPRs: Experiences from Southern and Eastern Africa

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Acronyms

AIKS	African indigenous knowledge systems
ASF	African swine fever
CBD	Convention of Biological Diversity
CSIR	South Africa's Council for Scientific and Industrial Research
ECF	East Coast Fever
EVM	Ethno Veterinary Medicine
FAO	Food and Agriculture Organization of the United Nations
ICT	Information Communication Technology
IK	Indigenous Knowledge
IKS	Indigenous Knowledge System
IP	Intellectual Property
NEPAD	New Partnership for Africa's Development
NGOs	Non-governmental organizations
SANBio	Southern African Biosciences Network
STDs	Sexually Transmitted Diseases
TAWG	Tanga AIDS Working Group
TB	Tuberculosis
TB	Tuberculosis
THETA	Traditional and Modern Health Practitioners together against AIDS
UDHR	Universal Declaration of Human Rights
VPH	Veterinary in Public Health
WHO	World Health Organization

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Introduction

There are various definitions of Indigenous Knowledge (IK). The term refers to a distinctive body of knowledge and skills including practices, technologies that have been developed over many generations outside the formal educational system, and that enables communities in their specific environments to survive (Mascarenhas, 2004). IK contrasts with the international knowledge system generated by universities, research institutions and private firms in that:

- IK is generated within communities
- IK is location and culture specific
- IK is the basis for decision making and survival strategies
- IK is not systematically documented
- IK concerns critical issues of human and animal life: primary production, human and animal life, natural resource management
- IK is dynamic and based on innovation, adaptation, and experimentation
- IK is oral and rural in nature

In the past, African indigenous knowledge systems (AIKS) were neglected and marginalized because of the periphery nature of Africa in the global economy. The role of AIKS in household food security and nutrition, as well as in coping with evolving public health problems in Africa, such as the impact of HIV/AIDS, tuberculosis (TB), malaria and other dreadful diseases have, until recently been poorly recognized and supported by governmental and non-governmental organizations (NGOs). However, in spite of this marginalization of AIKS, a large proportion of the African people rely on IK systems for their daily lives. In various sectors of life, people have not adopted the modern western knowledge and technology systems because they cannot afford them and they are also unsustainable (Kaya and Materechera, 2004).

In recent years, there has been a dramatic increase in interest in the role that AIKS and technologies can play in sustainable development. This interest is reflected in a myriad of community based activities utilizing AIKS for public health care including human resource capacity building in his area. The World Health Organization (WHO) (2002) defines public health as an aspect of health services concerned with threats to the overall health of a community. It generally includes surveillance and control of infectious diseases and promotion of health behaviors among members of the community. Public health promotes not simply the absence of disease but mental, physical, and emotional well-being.

Furthermore, the globalization process has made it imperative that AIKS cannot be ignored as they are increasingly seen as part of the global body knowledge. It was in recognition of this important role of IKS in sustainable development that it was identified as one of the flagship programmes of the New Partnership for Africa's Development (NEPAD) Southern African Biosciences Network (SANBio) Initiative. The Initiative is establishing biosciences networks of centres of excellence involved in research and development in the region. The holistic nature of IKS and its interface with the other flagship areas (biotechnology & biodiversity & technology) was recognized as an important tool for addressing the diverse challenges facing the region including public health care issues.

The challenge for African policy makers and researchers is to create the right environment for more research on the role of IKS in promoting public health care issues and sustainable development. They should take advantage of the forces of globalization, such as the information and communication technology (ICT) to promote collaborative research and networking.

Using documented examples from various countries in Southern and Eastern Africa, the paper shows the role of African indigenous knowledge in promoting public health care and associated human resource capacity building. African indigenous knowledge and technology systems are used in the mitigation of human and animal diseases; and in promoting community food security and nutrition. The paper also presents examples of the interface between African indigenous knowledge and Western knowledge systems in promoting public health care; and the implications for intellectual property rights (IPR).

2. African Indigenous Knowledge and Technology Systems in the Mitigation of Diseases

The knowledge of and uses of specific plants and animals for medicinal purposes (often referred to as indigenous or “traditional medicine”) is an important component of African indigenous knowledge systems (AIKS). Saray (2001) shows that in most African countries, traditional medicine is used by roughly 70-80 percent of local populations to deal with their basic health care needs. Like in the other regions of the continent, the Eastern and Southern African regions have some of the richest flora and fauna in the continent. Lowlands, highlands, inland lakes and a variable climate produce a multitude of biotopes: semi- deciduous or humid forests, savannah and steppe, Miombo forests, all contribute to this exceptional bio-diversity of these regions. As will be shown in the following sections some of the plant species have considerable economic, medicinal and nutritional values for the rural populations.

Both Eastern and Southern African regions have been severely affected by the HIV/AIDS pandemic. Various efforts including the use of AIKS are currently being promoted in various countries to mitigate the spread of the pandemic. For instance, a documentation of the activities of traditional healers in various parts of Tanzania involved in HIV/AIDS mitigation indicates that the immune system of HIV/AIDS patients could be boosted by indigenous medicinal plants with enzyme rich food stuffs. These include oils from plants, such as soya, cashew and shea butter saturated fats, and wild fruits.

Vegetables with high fibre content that patients were encouraged to consume were helpful in cleansing the body system. Though these diet and nutritional therapies did not cure the disease, they, however, improved the immune system of the patients. The therapy also involved the elimination of stress bound foods and liquids from patients’ diet, such as coffee, black tea, sugar, salt, white flour as well as concentrated carbohydrates, such as white rice. Experience shows that the treatment helps to reduce the physical and psychological symptoms that go with the AIDS disease, such as rashes, blisters, respiratory syndromes and stress/depression. The documentation also shows that natural juices, and traditional foodstuffs and medicinal preparations can improve the immune system of AIDS patients and may be far less tedious in relation to their effects and cheaper than a treatment based purely on western- oriented medication (Marecik, 2002).

Tanzania is one of the countries in Africa most affected by the HIV/AIDS pandemic. For many years there have been no drug for the management of the disease. Therefore, due to scarcity of drugs for the management of the disease many people, in both rural and urban areas, opt for African indigenous health and medical services for the control of the disease. For example, Muhanse M4® is a traditional

herbal preparation prescribed by the Munufu Traditional Medicine Research Clinic in Dar es Salaam. Muhanse M4[®] has a long history in herbal medicine for boosting the body immunity of people in various parts of Tanzania, particularly in Mufindi and Kilombero districts. Muhanse M4[®] is just a standard infusion or weak decoction of ready prepared powder from whole plant or its parts. It has been in use since 1987. In spite of the current availability of modern anti-retrovirals (ARVs), this indigenous medicine is in continual use among local communities due to its affordability (Mhame, 2004).

In South Africa, an indigenous African potato (*Hypoxis*) that is a medicinal plant growing in KwaZulu-Natal Province among the Zulu people is traditionally used to treat chronic viral and bacterial diseases. Traditional healers have been using it to treat cancer of the bladder and prostate, and sexually transmitted diseases (STDs). Studies done on the plant have shown that it contains two substances called sterols and sterolins that are essential dietary fats or lipids. The plant has helped many people to recover quicker from chronic and other diseases. It is a partly poisonous root, but with the right preparation and dosage, it is an approved immuno booster to assist the body's natural defence system. The University of Stellenbosch (South Africa), for instance, has conducted extensive research on this traditional medicinal plant and has developed easy to take tablets. There are indications that although the potato is not a sufficient treatment on its own, it could be extremely helpful when combined with other forms of treatment. Studies in the same university on HIV care revealed that the plant had shown the ability to increase CD4 counts (the amount of white blood cells in the body); stabilise the patient; increase the weight of patients; and decrease the amount of HIV in the body (de Klerk, 2004).

Malaria is another dreadful disease killing millions of people, especially children, in many parts of Africa. The Tugen people in Kenya, who are part of the Kalenjin ethnic group living in the Rift Valley Province, believe in natural and non-natural causes of illness. Some of the Tugen, for example, believe that malaria is caused by *Cheko che makiyo* (fresh unboiled milk), dirty water, and ikwek (vegetables), such as *Solanum nigrum* and *Gynadropis gynadra*. Tugen aetiological beliefs on malaria are logically valid, especially within the ecological context in which they live. The *kipsaketinik* (herbalist) generally prescribes and dispenses aqueous medicines prepared from roots, leaves, bark, and other plant or animal part. According to the Tugen indigenous diagnoses, *esse* (malaria) is the result of excess bile in the body. The bile has to be expelled before healing can take place. Thus purgation is regarded as the key treatment regimen for malaria. On the basis of this knowledge, different forms of herbal medications are prescribed according to the severity of the illness (Aman, 2000).

In Tanzania, indigenous people are actively involved in a malaria control research project in Mtwara and other areas of the country. They assist in identifying the type of trees whose leaves, barks or roots are used as medicine to cure malaria. They also identify plant species that are repellent to mosquitoes (mosquitoes are vectors of malaria parasites). This is based on the acknowledgement that many indigenous groups have excellent knowledge of cures and treatments for some of the most common diseases that afflict them, and should be involved in studies regarding these diseases (Saifert, 2005).

As already indicated, traditional medicine plays an important role in public medical and health care in Africa because most people cannot afford Western medical services. In most rural and urban areas of Eastern and Southern Africa, traditional medicine vendors are a common scene in the marketplace where they are traditional healers and pharmacists. They are the local population's main medical resource. They are known to possess a special connection to plants, and for their knowledge of sacred artefacts used to invoke their healing power. Their knowledge comes from experience, from trial and error with plant remedies, from methods passed down from generation to generation. Thus, for example, the Maasai in East Africa use vine to deaden pain; the bark of the baobab tree that is boiled down to a broth to relieve back pain. Since the baobab tree is held sacred, only the needed portion of the bark is cut. Moreover, the leaves and barks of certain trees are used to stimulate gastric juice secretion in the treatment of digestive disorders. In addition, building on local traditional medicinal knowledge, a tea made of dried stem barks of 'Strychnos myrtoides', is used by the Zigua, Ndorobo and Maasai in East Africa to enhance the action of chloroquine against resistant parasite in the treatment of malaria (Kindamba, 2002).

African indigenous knowledge is also widely used in other areas of public health in the two regions. Saifert (2005) observed that the Sambia and Zigua in Tanzania and Zulu people in South Africa use plant-based contraceptive methods dating from ancient times. The local people in these ethnic groups are sensitive to the issue of unwed-mothers who would tarnish the family image, and are also concerned about women's health. Women are considered an essential pillar in the family structure. For these reasons, girls are forced by their parents into practicing traditional forms of birth control. They are given herbal preparations to take on their first menstruation day each month. This plant-based medicine is also used by women who have just given birth to assist their recovery and for the practice of child-spacing. A number of elderly women in these ethnic groups have been the keepers of this knowledge for generations.

In Ethiopia, local communities in both rural and urban areas use a mixture of coffee powder and honey, known as, *mar ba buna*, prescribed by local healers throughout Ethiopia as a medicine to treat diarrhoea, and is reported to be efficient. The coffee has to be roasted and grounded, and the honey is supposed to be taken from bees preferably in October, when most varieties of flowers flourish. About 50 to 100 grams of freshly grounded coffee powder are mixed with an equal amount of honey in a cup. The patient takes the mixture orally. It is said that diarrhoea stops after taking one dose of this traditional medicine. This is an easy-to-prepare and cost-effective traditional medicine that could be transferred to other African communities.

Illnesses of the lung, such as asthma, pneumonia, tuberculosis are known by traditional healers in many parts of Southern and Eastern Africa and treated as such. For instance, there are two types of healers in Ethiopian countryside treating various types of diseases: The bone setter called *wogasha* who treats fractures, and the medicine man or knowledgeable person called *medihanit awakge* (*medihanit* means medicine, *awakge* means wise) who treats other common illnesses and dispenses herbal remedies. The *medihanit awakge* provides herbal medicine to treat asthma. Asthma is distinguished from colds, pneumonia, tuberculosis and other illnesses of the lung by Ethiopian

(Amharic) traditional healers. Pneumonia is very common, associated with exposure to cold air, and treated with cupping in the home. Tuberculosis or *samba nkersa* (*samba* means lungs, *nkersa* means cancer) is recognized as a more serious and severe illness, treated by isolation due to its communicability. There is no stigma or taboo associated with asthma. People are aware that one can die from asthma. Although it is occasionally seen among children, it is more common among the elderly. Children are also thought to grow out of their symptoms. The etiology of asthma is unclear. Some think it is contagious to some extent because it is associated with tuberculosis (TB) that is known to be communicable. Asthma is dealt with by changing residence and moving away from a climate or environment; this makes it worse. It can also be prevented, according to the healers, by avoiding dust and pollen that make it worse (dust, pollen). It is treated by using a special honey called *tazma mar*, also used for other types of cough. The healing secrets of the *medihanit awakge* are passed down from generation to the next (ZIRCİK, 2002).

The Suri of the Kāfa Region in the Ethiopian Southwest use the crushed leaves of the *Evolvulus alsinoides* (L.) plant, (locally known as, *kéya-guy*) to apply to fresh burns. Young Suri children often fall into the fire in the centre of the dark Suri hut. Therefore, this is a common community problem. The Suri and other ethnic groups also use the *Rhus natalensis* Bernh. ex Krauss plant, (locally known as *keyáy*) leaves as medicine for bleeding wounds. The leaves are chewed and mixed with saliva and then applied to the open wounds. This indigenous medicinal practice is also used for similar treatment of wounds by other ethnic groups in both Eastern and Southern Africa such as the Zigua and Sambia in Tanzania, the Shona in Zimbabwe and Tswana and Zulu in South Africa.

The Giriama community in Eastern Kenya depend on “Arabuko-Sokoke” coastal forests for their supplies of medicine and food security. They use plant species to prevent or treat infectious diseases for wounds, boils, scabies, diarrhoea, dysentery, gonorrhoea, and syphilis. Annonaceae, Fabaceae and Vitaceae are the most commonly used plant families. Laboratory tests confirmed that most of the plant species used traditionally to manage bacterial and fungal infections showed strong effects against tested pathogens. The unique Arabuko-Sokoke forests are an endangered biotope due to expanding settlements and other utilization. In the case of its disappearance, the Giriama could lose a source of medicinal plants and several unique species of fauna and flora would lose their habitat too. The knowledge of the habitat by the Giriama is useful for managing the endangered resource and provides the basis for its sustainable use (Marecik, 2002).

3. African Indigenous Knowledge and Technology Systems in Food and Nutrition Security

Like in other parts of the Africa, food insecurity and malnutrition are major problems facing most of the countries in the Southern African and Eastern regions. This is partly due to the arid and semi conditions that exist in most of these countries. The average annual rainfall is less than 600mm. These arid conditions have adverse effects on food production and expose many households to problems of food and nutritional insecurity. However, local communities in these countries have over the years developed different food security strategies and mechanisms for surviving in these conditions. These strategies include various technologies of food production, processing, preservation and storage that have not received much attention from policy makers and extension workers. They tend to be underrated and their potential has not been documented and exploited for sustainable community livelihood (Sibanda, 2004).

Indigenous vegetables, for example, often referred to as traditional vegetables, are a common household food in most of the Southern and Eastern African countries. The majority of the local farmers cannot always produce and eat exotic vegetables, such as cabbages, carrots, or beet roots due to unavailability of seeds and/or high production costs associated with these exotic vegetables. They, therefore, depend on traditional vegetables as a regular side dish or sauce accompanying the staple foods, such as maize, cassava, sweet potatoes, millet, and sorghum. The staple foods provide calories needed for the body energy but are very low in other nutrients, while traditional vegetables, such as *Amaranthus*, *Solanum aetiopicum*, *Manihotesculenta* (cassava leaves) and *Ipomea batatas* (sweet potato leaves), have high nutrient nutritive value (World Bank, 2004).

Most of the indigenous vegetables are produced mainly in home gardens tended by women and children. These home gardens are characterized by intercropping systems. This cropping system has several advantages to the farmer and the community: it extends the harvesting period and helps to alleviate seasonal food shortages, thus enhancing the stability of household food access; they reduce erosion risks by providing increased soil cover and additional crop residues for use as green manure and mulch. Such characteristics offer gains in sustainability and in stability for the food supply system; the choice of intercrops usually includes legumes and/or oilseeds such as melon seed, groundnut, soybean or sunflower, together with cereals as the dominant crop. In dietary balance, grain legumes, or pulses, contain more protein than cereals and about ten times as much protein as most roots and tubers (FAO, 1991).

Sun drying of fruits, vegetables and edible insects are common indigenous knowledge and technological practices in most of the Eastern and Southern African countries. In Zimbabwe and Botswana, for example, sun drying of food is usually done in two main ways. One method (commonly used for vegetables) is to immerse the fresh vegetables in salty boiling water for a few minutes to avoid nutrient loss. The vegetables are then dried in the sun for about three days and stored in a safe dry place. This method is also applied for drying caterpillars, termites, white ants and other edible insects. Another method is to directly spread the food in the sun. The food is first salted if there is danger of decaying during the drying process as in the case of mushroom or tomatoes. Food drying is an important activity for women as they bear responsibility for food preparation even during winter times and the dry seasons. Sun drying is an affordable technology requiring little or no intervention under most conditions. Elderly women are the bearers of this knowledge (Zanini, 2002).

In Kenya, the National Museums of Kenya implemented the Indigenous Food Plants Program that also involves human resource capacity building and awareness in 1989. Local communities in coastal, central, north-western and western of the country have taken it up as a response to communities' concern over the future of local food resources. Poverty, famine, and malnutrition are common in most rural areas despite the fact that local foods are readily available due to the limited awareness among individuals and households about the nutritional value or cultivation potential of indigenous edible plants. The younger generation, particularly, tend to reject their traditional foods in favour of exotic and more 'modern' foods that most community members cannot afford. In addition, several important species, or varieties of species, are on their way to extinction due to deforestation, overgrazing, burning drought, desertification and bio prospecting.

The Indigenous Food Plants Program in Kenya also promotes the cultivation, consumption and marketing of African indigenous foods through field demonstrations, educational materials and the media. Local communities wanted to determine which species could be consumed, draft guidelines on nutrient content and methods of propagation, assess the general value of the species, and document the vernacular names. A database containing detailed information on more than 850 indigenous food plant species of Kenya is now available to researchers. Local fruits and vegetables can now be sold at the marketplace, which encourages their cultivation and enhances the local economy. By raising the status of indigenous knowledge in the eyes of local communities, the practice not only helps to alleviate poverty but also increases people's respect for their own culture (Saifert, 2005).

4. Ethno Veterinary in Public Health

In 1999, the World Health Organization (WHO) convened a conference of experts from industrialized and developing countries in Teramo, Italy, in collaboration with the Food and Agriculture Organization of the United Nations (FAO). The major purpose of the conference was to consider the contributions on a global basis of Veterinary Public Health (VPH) programmes to human health, with a particular emphasis on the future contributions that VPH could make in developing countries. The consensus definition of VPH at the Teramo meeting was:

“The contributions to the physical, mental, and social well being of humans through an understanding, and application of veterinary science”.

This definition, therefore, replaced the original definition of VPH in the 1975 joint FAO/WHO technical report ‘The veterinary Contribution to Public health Practice’(2) “ as a component of public health activities devoted to the application of professional skills, knowledge and resources to the protection and improvement of human health.” It was believed that this new definition was more consistent with the original WHO definition of health and also with the values, goals, and targets of the WHO vision ‘Health for all in the 21st century’. The scope of VPH was seen to be multidisciplinary, involving not only veterinarians in government and non-governmental sectors, but other health professionals and scientists as well as paraprofessionals who treat, control or prevent diseases of animal origin.

However, one area that tends to be neglected is the contribution of ethno veterinary to public health. Ethno veterinary medicine (EVM), for instance, knowledge in African countries is largely contained within oral tradition. Past prejudice has prevented this indigenous knowledge system from becoming the subject of scientific investigation. In other parts of Africa, such as Cameroon, substantial benefit to resource-poor farmers has been shown to be achievable through the evaluation of traditional medicines and the subsequent delivery of appropriate information to farmers/livestock managers (Martin, 2003).

In Eastern and Southern African indigenous knowledge and technologies are used to address the problem of expensive and erratic supply of veterinary drugs and services to seek a sustainable way of improving animal and human health by a complementary utilization of indigenous and orthodox medicines. Benefits are a reduction of dependency on imported drugs and supplies, the possibility of discovering new drugs and the use of natural drugs with fewer side effects. The communication and contacts between livestock owners and veterinarians have improved.

As is the case with other Southern African countries, Malawi suffers from major cattle health problems viz East Coast fever (ECF), babesiosis, anaplasmosis, heartwater, and endoparasites. ECF accounts for up to 50% mortality in calves in the Central Region of Malawi and up to 60% losses in calves and weaners in the Mzuzu area. In chickens the major constraints are Newcastle disease and ectoparasite infestation. Control of these health problems using Western drugs by local farmers is not a viable option because of the high cost. Although the Malawi government supplies some veterinary services to the farmers, modern veterinary sector is plagued by numerous constraints, including the erratic supply and prohibitive expense of veterinary drugs and supplies, poor communication facilities, and a shortage of manpower.

Therefore, besides the existing veterinary support services, farmers in these rural areas use traditional medicines to treat livestock. In the northern region of Malawi, local farmers crush local plants or parts of them and mix them into drinking water for chickens to prevent or cure Newcastle disease and diarrhoea. They also used *Mucuna puriens* and *Tephrosia vogelii* as insecticides against external parasites, such as fleas in chickens. The farmers use leaves, barks, roots or whole plant as medicinal materials that they claim to treat 17 of the 29 animal ailments. However, the farmers were unable to treat tuberculosis (TB), pneumonia, rabies, and poisonous caterpillars in ruminants and stillbirth and African swine fever (ASF) in pigs.

Indigenous veterinary remedies are mainly made from plants, but also from animal parts, salt, and soil. The materials are commonly used in combinations; remedies made from only one ingredient were rare. The local farmers expressed concern that since plants are the most common ingredients, scarcity of plants may decrease the usage of indigenous veterinary remedies. Hence, there is need to encourage the conservation of medicinal plants by both farmers and institutions by establishing botanical gardens.

The local farmers in the area claimed that ethno veterinary was a common practice in most parts of Northern Malawi. Most of the community members have a wide knowledge of indigenous veterinary remedies. They learn about the remedies from parents or relatives including ancestors. Association with ancestors made it difficult for some of the farmers to reveal knowledge about the remedies because of fear of being cursed by the spirits of their ancestors. Interviews with some of the farmers indicated that they have been using these remedies for many years. Some of them could not remember when they started using these remedies. The practice was part of the community life. The elders are concerned that this knowledge will be forgotten as more and more young people go to school and stop using or collecting the indigenous medicines (Kambewa, 1997).

The pork tapeworm, *Taenia solium*, is a zoonotic tapeworm and increasingly recognized as a public health challenge worldwide. This disease is considered one of the neglected diseases by the World Health Organization (WHO). Though WHO identified it as a potentially eradicable disease, it is now becoming prevalent disease in Eastern and Southern Africa.

The rural people in various parts of the two regions use numerous ethno veterinary plants for the treatment of worm diseases in livestock and in humans in the developing world. Plants, for example,

are used for the removal of the pork tapeworm (*Taenia solium*). This parasite causes a serious disease in humans, neurocysticercosis, and results in epilepsy and often death. The highest prevalence of juvenile neurocysticercosis in the world is in the Eastern Cape Province of South Africa. Porcine cysticercosis affects pigs and is a serious agricultural problem in the same province (Kindamba, 2002).

There are several recent reports of indigenous plants used by resource-poor farmers in Tanzania and Kenya to treat cysticercosis in pigs and the adult stages of *T. solium* in humans. One example is *Iodwa* (*Embelia schimperi*) given by farmers in the treatment of this disease in Tanzania. The Masai people crush the seeds of this plant and drink it in milk. *Embelia* spp. also grows in South Africa and the status of its use by local farmers needs investigation. There are also reports in Tanzania of a root being used by farmers to “cure” their pigs of infection with cysts (Ngowi, 2003),

5. The Role of Traditional Belief Systems in Public Health

The role of African traditional belief systems in public health care tends to be neglected by individuals, government and development agencies. They often dismiss beliefs and social behaviour as superstitions and overlook their intrinsic values and functions. In many cases, the superstitions or taboo are not meant to convey 'scientific' facts but to shape thinking, and to control behaviour. Taboos are 'social' rules engrained through the socialization process. Fear is meant to develop owing to the belief that violation causes infliction of punishment. In various parts of continent, for example, there are taboos "regulating" the extraction medicine from plants. These are meant to protect and preserve medicinal species from extinction.

In central and eastern Zimbabwe and Western Mozambique, there are various indigenous ways and belief systems of protecting water sources. One of them is to prohibit members of a community to indiscriminately use their household utensils to fetch water from a source. It is not allowed to use pots, cups, or buckets from the users' homes. Rather, members of the community use a special gourd, *mukombe*, that is permanently kept at the spring for only this purpose. *Mukombe* has a very long handle that safely prevents the hands or fingers (of the person fetching water) from dipping into the spring, thus avoiding a potential contamination hazard. Taboos and customs enforce compliance (Sandomba, 2002).

Among the Zigua and Ndorobo in Tanzania, there is a belief that the bark of a tree for use as medicine should be removed from the sides facing the East and West of the tree only. Extracts from other sides of the tree are believed to be ineffective because of breaking this rule. This protects the tree from total destruction and hence it survives the extraction.

6. Interfaces between African Indigenous Knowledge and Western Knowledge System in Public Health Care

As already stated, due to commercial and sustainable development reasons, African indigenous knowledge systems (AIKS) are increasing becoming an integral part of the global body of knowledge. Granier (1998), states that indigenous knowledge systems (IKS) can be compared and contrasted with the counterpart global knowledge system to uncover mechanisms for evaluating the strengths and weakness of each system. This interactive flow has already resulted in mutually beneficial exchanges of knowledge that have enhanced the capacity of the formal research system to solve priority problems identified within local communities. Both multilateral and bilateral donor agencies are now recognizing the role of indigenous knowledge in sustainable development including the promotion of public health care.

Anand (2005) explains how in most African countries, modern Western systems of thought and life, exist alongside African indigenous knowledge systems. Both systems can be found in all sectors of society, including agriculture, public health, political organizations, conflict transformation, culture, education, technology and even lifestyle. As a result of its affordability and easy access in most local communities, indigenous knowledge continues to provide the building blocks for development and public health in most African countries, while seeking cooperation with modern knowledge for the mutual benefit of the two systems. The following examples from various parts of the two regions show this interface between African indigenous knowledge and modern western knowledge systems.

The Tugen people in Kenya treatment of malaria is based on a several interlinked elements: beliefs related to causation, the action of effectiveness of 'modern' medicines, and the availability of plant treatments. In the treatment of these two diseases, the Tugen also use Western-based health care facilities and over-the-counter medications. The use of the different forms of treatment is complementary. In some instances, retail drugs are displayed for sale alongside herbal medicines. The fact that these divergent forms of treatment are sold and used either concurrently or alternately, suggests that there is no perceived conflict between the two traditions. Tugen indigenous medicine has weathered the test of time, especially in view of the widespread Western forms of treatment. And as long as the Tugen culture exists as an identifiable cultural entity, this autonomous body of indigenous knowledge for the treatment of disease will remain, because it is both culturally relevant and efficacious.

In Northern Malawi, local farmers practicing ethno veterinary work in collaboration with research and academic institutions, such as Bunda College of Agriculture (University of Malawi) and the

National Herbarium in Zomba for botanical identification of the indigenous medicinal materials. They collaborate on trials that can verify the claims of the farmers by using Western scientific methods. The main goals of the collaboration are to promote the complementary use of indigenous and conventional veterinary medicine for sustainable livestock production, and to promote the conservation of medicinal plant resources. The practice and collaboration is considered a 'best practice' because ethno veterinary knowledge provides an integrated approach to livestock health care that is sustainable economically, environmentally and culturally.

In Tanzania, The Tanga AIDS Working Group (TAWG) strives to alleviate suffering of HIV/AIDS patients by using indigenous knowledge. The group has treated over 2,000 AIDS patients with herbs prescribed by local healers since it started in 1990. The advantage of the traditional healers is that they are more accessible to local people and have gained their communities' trust through past experiences. Traditional healers, modern physicians and health workers have joined forces in TAWG's programs to effectively treat patients with HIV/AIDS. The impact has been most significant in alleviating the opportunistic diseases brought on by the AIDS virus. The patients who have responded most positively have lived longer, by up to five years.

The Tanga regional hospital has allocated a floor to TAWG workers to enable them to test patients for HIV, treat them and provide counselling. They have also set up an information centre in town that conducts active AIDS awareness campaigns and offers a support network to people living with AIDS. TAWG plans to involve their healers, people living with AIDS and staff working with patients to provide medical care and alternative income generating opportunities, in exchanges of IK with similar communities in Tanzania and possibly Kenya and other parts of the continent. Integrating local healers in AIDS prevention and mitigation strategies increases effectiveness of approach and access for poorer patients.

Prometra Uganda is an Association for the Promotion of Traditional Medicine and is promoting traditional medical knowledge and practices for improved health through mutual co-operation among health care systems. The organization strengthens collaboration between traditional and other health care practitioners to encourage knowledge sharing. They advocate and disseminate traditional knowledge while fighting against harmful practices through local educational programs.

The Traditional and Modern Health Practitioners Together against AIDS (THETA) is another organization in Uganda where traditional and modern health care practitioners work together to fight AIDS and other diseases. Traditional healers are trained as community counsellors and educators to assist with basic HIV/AIDS patient care. The organization processes and packages herbal medicines and also maintains a herbal garden. THETA also hosts a library, publishes a newsletter, organizes monthly speakers and advocates for traditional medicine.

A World Bank-supported initiative in Zambia working to conserve biodiversity for HIV/AIDS treatment established botanic gardens and forest reserves for medicinal plants. Some of the seeds come from spiritual forests that have been preserved because of the traditional values, norms and taboos

associated with them. In addition, training and capacity building activities for traditional healers focus on behaviour modification in relation to HIV/AIDS, understanding eco-systems and legal training. Knowledge of biodiversity and HIV/AIDS is disseminated through newsletters, radio, TV and theatre. The project includes an electronic database on medicinal plants and publication of a handbook for traditional healers to be used in their practice. A literacy program helps illiterate healers register their patients and document their indigenous knowledge for future dissemination.

7. Implications for Intellectual Property Rights

The above discussion and examples from the various countries in the two regions show the great contribution and potentiality of African indigenous knowledge and technology systems in the promotion of public health care. Like in other parts of the world, African Indigenous people put great importance in the use of biological materials for medical treatment and food security, conservation and sustainable use of natural and genetic resources, and a wide range of cultural practices and innovations (Harte, 1996).

Since the adoption of the Universal Declaration of Human Rights (UDHR) in 1948, intellectual property (IP) has been considered a fundamental human right for all peoples. Article 27 of the Declaration states that everyone has the right “to the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author.” Since 1948, many international human rights instruments and documents have reinforced the importance of IP as a human right.

Intellectual property rights (IPRs) are the legal protections given to persons over their creative endeavours and usually give the creator an exclusive right over the use of his/her creation or discovery for a certain period of time. IP protections may include patents, copyrights, trademarks, and trade secrets. IP is codified at an international level through a series of legally binding treaties (Fourmille, 1996; Petern, 1995).

As interest in traditional medicine is increasing, worldwide, indigenous knowledge of the cultivation and application of genetic resources is becoming exploited at an alarming rate. World sales of herbal medicine alone were estimated at US\$30 billion in the year 2000. IPRs should guarantee both an individual’s and a group’s right to protect and benefit from its own cultural discoveries, creations, and products. But Western IP regimes have focused on protecting and promoting the economic exploitation of inventions with the rationale that this promotes innovation and research.

Western IP law that is rapidly assuming global acceptance, tend to facilitate and reinforce a process of economic exploitation and cultural erosion. It is based on notions of individual property ownership, a concept that is often alien and can be detrimental to many local and indigenous communities. An important purpose of recognizing private proprietary rights is to enable individuals to benefit from the products of their intellect by rewarding creativity and encouraging further innovation and invention. But in many indigenous world-views, any such property rights, if they are recognized at all, should be

extended to the entire community. They are a means of maintaining and developing group identity as well as group survival, rather than promoting or encouraging individual economic gain.

Problems experienced by indigenous peoples in trying to protect their knowledge systems under IP laws stem mainly from the failure of indigenous knowledge to satisfy requirements for intellectual protections. Alternatively, where IP protection could potentially apply to such knowledge, the prohibitive costs of registering and defending a patent or other IP right may curtail effective protection. There has been a clear bias in the operation of these laws in favour of the creative efforts of corporations, for example, pharmaceutical and other industries in industrialized nations. Within the context of scientific progress, modern IP laws have allowed these industries and companies to monopolize the benefits derived from their use of indigenous knowledge with disregard for the moral rights and material (financial) interests of indigenous peoples themselves.

Most of the governments in the Southern and Eastern African regions are working both domestically and internationally as part of increasing efforts to identify effective means of preserving and protecting these indigenous knowledge systems (IKS) for future generations, promoting their broader adoption, and protecting them from unauthorized appropriation and commercialization.

On-going discussions in various countries are considering, as one possible approach, the appropriateness of protecting certain kinds of indigenous knowledge systems as a form of IP and, if appropriate, the best means of applying IPR. On March 24, 2003, for example, after years of negotiations and uncertainty, representatives of the San peoples of southern Africa and representatives from South Africa's Council for Scientific and Industrial Research (CSIR) signed a benefit-sharing agreement for a drug being developed from a traditional mainstay of the San diet, that is, the Hoodia plant.

The Hoodia has been traditionally used by the San to treat stomach pain and eye infections, among other applications. On long hunting trips through the desert, the San chewed on the stem of the Hoodia to suppress their hunger and thirst and boost their energy. In 1995, CSIR researchers discovered its qualities as an appetite suppressant, isolated the compound, called P57, in the plant that curbs hunger, and obtained a patent for it in 1996. The San pointed out that the Hoodia's distinctive properties were the exclusive traditional and communal knowledge of the San, passed down for centuries. Seeking acknowledgement of this fact, and of the collective ownership of this knowledge by the broader San community, they sued in 2000. This began a long process of negotiation with CSIR that only recently succeeded. The San stand to receive six percent of all royalties when the drug reaches the market. They plan to invest the money, and only tap into the interest generated to fund community projects. This benefit-sharing agreement between a local research council and the San people represents enormous potential for future collaboration, not only for the San but also for other holders of traditional knowledge (Stahl, 2004).

8. Conclusion and Recommendations

The above discussion and examples from the various countries in the two regions show the great contribution and the potentiality of indigenous knowledge and technology systems in the promotion of public health care, in both human and animal health. The access of the poor local communities to their biodiversity including the use of their indigenous knowledge (IK) is the primary means of their livelihood and health security. Therefore, the 'piracy' of their indigenous biological resources and innovations through patents and the diversion of their biological resources to global markets undermines their livelihoods. It also threatens the biodiversity base that they have protected over years because their survival has depended upon it.

The Convention on Biological Diversity (CBD) as an international legally binding agreement recognises the sovereign rights of countries to their biological resources and also the indigenous innovation by communities. The CBD gives governments an opportunity to change the regime of bio piracy at the global level and replace it with a sustainable and just system in which biodiversity and diverse knowledge systems, and rights of communities whose survival depends on this biodiversity and knowledge are simultaneously protected.

The paper recommends the following:

- ❑ The importance of increasing in country, regional and continental research and documentation of the various uses and commercial value of underutilized plants and other biological resources including their contribution to the promotion of public health, food security and income generation for rural communities
- ❑ The country examples stipulated above show that indigenous medicine and knowledge at large are both culturally relevant and efficacious. They should be officially recognized and given the status they deserves; need to combine Western and traditional medicines in treating terminal illnesses to develop developing efficient treatments;
- ❑ There is need to recognize certain African belief systems that could play an important role in promoting public health. Communities could consider developing new taboos for the management of natural resources that have become scarce
- ❑ It is important to develop and harmonize the country's IKS policies for promoting sustainable development and public health
- ❑ There is need for countries to develop and promote regional and continental IKS in the biosciences networks for researchers and other stakeholders to share experiences.

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