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An Overview of The Studies on Indigenous Knowledge (IK)

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Introduction

Sophisticated knowledge of the natural world is not confined to science. Human societies across the globe have developed rich sets of experiences and explanations about the environments in which they live. These 'other knowledge systems' are often referred to today as traditional, indigenous, or local knowledge. They encompass the sophisticated arrays of information, understandings and interpretations that guide human societies around the globe in their innumerable interactions with the natural milieu: in agriculture and animal husbandry; hunting, fishing and gathering; struggles against disease and injury; naming and explanation of natural phenomena; and strategies to cope with fluctuating environments (Nakashima, Prott & Bridgewater, 2000).

Conceptual Framework

Any knowledge that is particular to a community is indigenous knowledge. It is not documented knowledge. Usually, it is passed down from one generation to the next, which makes it challenging to identify the owner of the knowledge. Indigenous knowledge is commonly found in Africa. Indigenous knowledge can be defined as "A body of knowledge built up by a group of people through generations of living in close contact with nature" (Johnson, 1992). Generally speaking, such knowledge evolves within the local environment, becoming adapted to the needs and conditions of local people. It is also creative and experimental, constantly incorporating external influences and internal innovations to adapt to new conditions. It is usually a mistake to think of indigenous knowledge as 'old-fashioned,' 'backwards,' 'static, or 'unchanging Indigenous people are the original inhabitants of a particular geographic location, who have a culture and belief system distinct from the international system of knowledge (e.g. the Tribal, Native, First, or Aboriginal people of an area). Some feel that such a definition is too narrow because it excludes people who may have lived in an area for a long time but are not the original inhabitants. This has led to the widespread use of the term "local knowledge," a broader concept referring to the

knowledge possessed by any group that has long lived off the land in a particular area. Under this approach, it is not necessary to know if the people in question are the original inhabitants of an area; the important thing is to learn how people - aboriginal or non-aboriginal - in a particular area view and interact with their environment, in order that their knowledge can be mobilised for the design of appropriate interventions (Johnson, 1992). Indigenous knowledge is the local knowledge that is unique to a culture or society. Other names for it include: 'local knowledge', 'folk knowledge', 'people's knowledge', 'traditional wisdom' or 'traditional science'. This knowledge is passed from generation to generation, usually by word of mouth and cultural rituals, and has been the basis for agriculture, food preparation, health care, education, conservation and the wide range of other activities that sustain societies in many parts of the world (Nakashima, Prott & Bridgewater, 2000) Indigenous people have a broad knowledge of how to live sustainably. However, formal education systems have disrupted the practical, everyday aspects of indigenous knowledge and ways of learning, replacing them with abstract knowledge and academic methods. Today, there is a grave risk that much indigenous knowledge is being lost, along with valuable knowledge about sustainable ways of living. Indigenous knowledge (IK), generally speaking, is the knowledge used by the locals of an area or community to make a living in a particular environment. It could be knowledge of herbs used to heal a particular ailment, beliefs, innovations, acts, or other forms of cultural experience and expression that belong to the group. Terms used in the field of sustainable development to refer to this concept include indigenous technical knowledge, traditional environmental knowledge, rural knowledge, local knowledge, and farmers' or pastoralists' knowledge. Indigenous Knowledge (IK) can also be broadly conceptualised as the knowledge that an indigenous (local) community accumulates over generations of living in a particular environment. This definition encompasses all forms of knowledge, technologies, know-how, skills, practices, and beliefs that enable the community to achieve stable livelihoods in its environment. Indigenous, traditional, or local knowledge is knowledge unique to a given culture or society. It is local know-how and cultural practices that belong to a community and are transmitted orally from generation to generation.

Indigenous Knowledge Management (IKM)

The concept of IK management involves the identification, collection, codification, documentation, organisation, preservation, transfer, linking, application, dissemination and sharing of knowledge on indigenous community livelihoods and ecosystems, for sustainable development. According to Kaniki and Mphahlele (2002), most knowledge management principles can be applied to IK management,

although several issues must be addressed to ensure effective management for the benefit of all. One issue to consider is that, since IK was marginalised and at times treated with suspicion, there is a need to raise awareness of its importance; society will recognise its usefulness and thus warrant allocating resources to it. Another issue to address in IK management is that, unlike Western knowledge, which is packaged in a form ready for collection and housing in libraries, IK is primarily the property of communities and is shared and passed down in appropriate situations and according to certain rules. Individuals go through lifelong training in their particular environments, learning to subdue and coexist with nature (Mumba, 2002). There is a need for information professionals to define, recognise, and manage this information. The time has come to realise that the problem is not the user's lack of interest in using IK, but rather the need to align with what users reasonably want and need, and in what form they require it (Mumba, 2002). Another important issue in IK management is that, when managing knowledge, one must be well-positioned to understand the desired goals of IK management and the people the knowledge is meant to benefit. The aim of IK management can be diverted from its original purpose if no desired goal for IK management is spelt out (Mumba, 2002). Owing to its unique nature, IK requires innovative methods for definition, collection, and dissemination. However, particular care needs to be taken to ensure that the final product is enjoyed fully by the originators of the knowledge (Mumba, 2002). That means the originators of the knowledge need to be fully acknowledged. Management of knowledge is extremely important. To have knowledge only is not sufficient, but connecting knowledge with its application empirically, conceptually, or even philosophically to desirable social ends is essential. IK systems generally provide a way of connecting a way of knowing, a way of feeling and also a way of doing. Like scientific knowledge, indigenous knowledge also needs to be managed on a technical basis. The essential steps, as mentioned by Gorjestani (2000), are: recognition and identification; validation; recording and documentation; storage in retrievable repositories; and transfer and dissemination. These steps can be further elaborated as follows: Recognition and identification: Some IK may be embedded in a mix of technologies or cultural values, making them unrecognisable at first glance to an external observer (technical and social analyses may therefore be required to identify IK). Validation: This involves an assessment of IK significance and relevance (to solving problems), reliability (i.e., not being an accidental occurrence), functionality (how well does it work?), effectiveness and transferability. Recording and documentation: Recording and documenting IK is a major challenge because it is tacit (it is typically exchanged through personal communication, from master to apprentice, from parent to child,

etc.). In some cases, modern tools can be used, while in others it may be appropriate to rely on more traditional methods (e.g., taped narration or drawings). Storage in retrievable repositories: Storage is not limited to text documents or electronic formats; it could include tapes, films, storytelling, gene banks, etc. Transfer: This step goes beyond merely conveying knowledge to the recipient; it also involves testing that knowledge in the new environment. Pilots are the most appropriate approach in this step. Dissemination: Disseminating to a wider community adds a developmental dimension to knowledge exchange and could promote a broader, deeper ripple effect of the knowledge transfer. We presume that awareness, pilot applications, and "mainstreaming" are necessary steps for the successful integration of IK into the development process, which could help manage indigenous knowledge. Higher education institutions need to play a role in harnessing and disseminating indigenous knowledge for sustainable development, providing the knowledge base and transmitting new skills. Libraries can be used to collect, preserve, and disseminate indigenous knowledge. Incorporating IK into an educational environment can help students feel ownership of the knowledge they bring to learning environments. IK needs to be addressed and integrated into educational programs and learning environments, and students who are better connected to the material taught can become a major source of knowledge for their community's sustainable development. To manage indigenous knowledge, the following four factors are important: disseminating information, facilitating the exchange of IK among developing countries, applying IK in development processes, and building partnerships.

Types and Components of Indigenous Knowledge

Indigenous knowledge is considered cultural knowledge in its broadest sense, encompassing the social, political, economic, and spiritual aspects of a local way of life. Indigenous knowledge is embedded in a dynamic system in which spirituality, kinship, local politics, and other factors are tied together and influence one another.

Various scholars have identified several categories of Indigenous Knowledge (IK). Below are some categories. Tavana (2002) identified two types of indigenous knowledge: explicit and tacit.

a. Explicit Indigenous Knowledge Explicit knowledge consists of "facts, rules, relationships and policies that can be faithfully codified in paper or electronic form and shared without need for discussion" (Wyatt, 2001). Furthermore, Smith (2001) defines explicit knowledge as "academic knowledge or 'know what' that is described in formal language, print or electronic media, often based on established work processes, use people-to-documents approach". Explicit indigenous knowledge refers to

traditional knowledge that is easily articulated, expressed, communicated and recorded. According to Tavana (2002), examples of explicit indigenous knowledge include the names of reef fish, the breeding times of birds, and the ways to use certain plants for medicinal purposes. The nature of explicit knowledge is that it is easy to store, transfer and communicate with others. As the erosion of explicit IK and indigenous communication increases, the need to transfer, store, and retain this knowledge within indigenous communities is greater than ever (Mehta, Alter, Semali, and Maretzki, 2013; Tikai & Kama, 2010).

b. Tacit Indigenous Knowledge. In contrast to explicit knowledge, tacit knowledge refers to the "practical, action-oriented knowledge or 'know-how' based on practice, acquired by personal experience, seldom expressed openly [and] often resembles intuition" (Smith, 2001). Tacit knowledge is often difficult to express in words because it involves doing something without having to think about it, such as riding a bicycle. The very nature of tacit knowledge is that it is difficult to extract from the heads of individuals. It is very seldom found in books, manuals, databases, or files because it is derived from mental models, values, beliefs, perceptions, insights, experiences, and assumptions (Smith, 2001). Tacit indigenous knowledge refers to traditional knowledge that cannot be easily expressed or articulated to outsiders (Tavana, 2002). Tacit IK is primarily based on an individual's emotions, experiences, insights, observations and perceptions. Examples of tacit indigenous knowledge include Samoan tacit indigenous knowledge, such as the deep respect indigenous people have for their elders and the process of reaching unanimous consensus within their society (meeting). Moreover, while IK research initially emphasised indigenous technical knowledge of the environment, it is now accepted that the concept of IK goes beyond this narrow interpretation. IK is now considered cultural knowledge in its broadest sense, encompassing all social, political, economic, and spiritual aspects of a local way of life.

Sustainable development researchers, however, have found the following categories of IK to be of particular interest:

a. resource management knowledge and tools;
b. techniques, practices and rules related to pastoralism,
c. agriculture, agro-forestry, water management and the gathering of wild food;

d. classification systems for plants, animals, soils, water and weather; v. empirical knowledge about flora, fauna and inanimate resources and their practical uses; and the worldview or way the local group perceives its relationship to the natural world.

With respect to its nature and holders, IK can broadly be classified by the United Nations Environment Programme as:

a. Community Indigenous Knowledge indicates information that is not known to all but known only to a small group of people, e.g. Tribal Knowledge. This knowledge is generally transmitted only verbally to community members.
b. Publicly known indigenous knowledge refers to the information commonly known and used by the people, with or without documentation. The medicinal use of Neem, mahogany, and other trees exemplifies this class.
c. Individual indigenous knowledge is available only to an individual or to a specific family member. Usually, this information is handed over orally from the elder to his successor.
d. Documented indigenous knowledge means information that is well documented and available to the public.
e. Vocal indigenous knowledge covers knowledge which is unwritten but preserved and handed over through generations orally.
f. Sacred indigenous knowledge encompasses both tangible and intangible sacred rights. Sacred tangible rights refer to property rights in tangible objects used in or about something sacred. The community's right over sacred sites is an example of this category. There are also sacred intangible rights, including intellectual property, applicable to the costumes, choreography, and photographs of the community's traditional sacred dance.
g. Secular Indigenous Knowledge refers to the communities' right over arts and crafts. In this context, it includes materials suitable for commercial exploitation, such as family crests used on clothing, masks, and dance screens. It also includes rights in photographs, choreographies, music or audiovisual productions used in non-sacred events and ceremonies.

Three (3) tiers of Indigenous Knowledge were identified by Bolhassan, Cranefield, and Dorner (2014), including

a. Tier 1: Base Indigenous Knowledge

This first tier of indigenous knowledge is shared publicly within the indigenous communities. According to the participants, this knowledge is accessible to everyone and does not require asking for it. This knowledge is imparted during communal events where everyone can observe, listen, or partake. It is the duty of elders to impart

essential life skills and knowledge to family and community members. The intangible TCEs used during these events include music, dance and chants, while the material TCEs include gongs and the paraphernalia appropriate for the events. When communal participation is the norm in event processes, this is the time to share and transfer knowledge. It is during socialisation among community members that this type of knowledge becomes accessible to all, for people to observe, and for participation by those who are willing. This first tier provides the foundation for anyone interested in pursuing this knowledge further. Communal events described by the participants include rites of passage, such as birth ceremonies, betrothals, funerals, and the commencement of building a house. These events also include community celebrations, such as those connected to beliefs and legends, which usually require the full involvement of community members, young and old, across the community's structure. The first tier of the knowledge category also includes 'unspoken' knowledge associated with TCEs, such as identity or status indicators. For example, the Orang Ulu group uses hornbill feathers in men's ceremonial hats to indicate different strata within their community. The significance of the feathers as a TCE lies in their role as an identity marker: the number of feathers conveys intrinsic knowledge of the wearer's status, authority, and identity. Observing these events provides the community with shared knowledge that everyone has, and it improves with repeated exposure. Ingraining such knowledge in the community requires a conscious effort by community members. This is a shared responsibility. Sharing of base knowledge also provides knowledge of 'who knows what' and 'who knows who' in the community. Those interested in the second tier of knowledge need to know these points of reference.

b. Tier 2: Ceremonial and Ritual Indigenous Knowledge. Once a person has a grasp of the basic knowledge, if they choose to pursue it further with the knowledge holder, they will have to undergo an apprenticeship under the holder's guidance. Tier 2 comprises knowledge accessible to those who want to be an understudy of a master knowledge holder. This deeper level of knowledge was shared and transferred by the master knowledge holder to their understudy through tutelage and observation of the knowledge holder's hands-on practice. To gain this knowledge, knowledge seekers had to be proactive in seeking it from the knowledge holder. Tier 2 involved active knowledge sharing and transfer.
c. Tier 3: Sacred Indigenous Knowledge. The final tier of knowledge requires fulfilling requirements that almost always involve a 'third' dimension, i.e.,

spiritual or 'divine' intervention. Certain types of knowledge in this category must be sought from the knowledge holder.

Another type of knowledge is bestowed upon a recipient whom the knowledge holder chooses. Some knowledge is not to be shared at all. This type of knowledge is at the top tier of indigenous knowledge and is not accessible to all. There are specific sacred requirements for carrying out the processes of using knowledge. As such, these requirements must also be met when sharing or transferring such knowledge. For this level of knowledge, one can ask to acquire this knowledge from the knowledge holder, or the knowledge holder chooses one to be the person to pass on the knowledge to. There are also situations where knowledge seekers of these kinds of knowledge were turned away or not 'granted' the knowledge. This could be due to several factors, such as age, gender, suitability, or even genealogy. According to the informants, there are types of knowledge in this tier in which the knowledge holder does not decide the recipient. It would be the decision of the 'spiritual owner' of the knowledge, conveyed to the knowledge holder through dreams or visions. In this example, the knowledge holder is just the 'knowledge keeper'. This final tier of indigenous knowledge is limited to a special kinship or circle of the community, confined to a small group of knowledge holders. This limitation affects the sharing and transfer of such knowledge, as it is not always limited to the knowledge holder and the knowledge receiver; it also involves an additional element in the knowledge process: the 'divine' or 'spiritual' intervention.

Scope and Importance of Indigenous Knowledge (IK)

Indigenous Knowledge has been used for centuries by indigenous and local communities under local laws, customs and traditions. It has been transmitted and evolved from generation to generation. IK has played, and still plays, an important role in vital areas such as medical treatment, food security, and agricultural development. IK is also the source of a wide variety of artistic expressions, including musical works (juju music of Southwestern Nigeria and Egwu Ogene of Eastern Nigeria) and handicrafts (brass and bronze works from Benin and Bida).

Scope of Indigenous Knowledge, as stated by Martine (1998), comprises the ancient knowledge of humanity, the deepest layer on which our science and culture have developed, and the local solutions that have enabled the creation and management of ecosystems and cultural landscapes across the entire planet. It enables the development of solutions that use low energy and resources, adapt to environmental variability, and respond to emergencies and catastrophes in flexible, multifunctional ways. Today, as entire planetary systems risk ecological collapse, IK shows how to interact with the environment to enhance resource potential without depleting

resources. In addition, it cannot be excluded that traditional knowledge might have an industrial application, even if the tangible object to which the intangible knowledge relates has not been subject to any scientific interference or modification. IK is thus a valuable source of knowledge. IK may help to find practical solutions to current problems, sometimes in combination with modern scientific and technological knowledge.

IK encompasses a wide range of knowledge. These may be distinguished by the elements involved, the knowledge's potential or actual applications, the level of codification, the individual or collective form of possession, and its legal status. The desire to protect IK has generated a significant body of literature and numerous proposals for regulation and action across various international fora. Precisely how IK is defined has important implications for the kind and scope of a possible protection regime. IK includes, for example, information on the use of biological and other materials for medical treatment and agriculture, production processes, designs, literature, music, rituals, and other techniques and arts. This broad set includes information of a functional and of an aesthetic character, that is, processes and products that can be used in agriculture or industry, as well as intangibles of cultural value. Mainly, IK comprises knowledge that has been developed in the past and continues to be developed. Most IK is, in effect, non-contemporary; it has been used for generations and, in many cases, collected and published by anthropologists, historians, botanists, or other researchers and observers. However, IK is not static; it evolves and generates new information through improvements and adaptations to changing circumstances. The context of IK varies significantly, and its forms of expression. Some IK is codified, that is, formalised in some way (e.g. textile designs, Ayurveda traditional medicine). A significant part of IK, however, is non-codified or tacit, such as "folk", "tribal" or "indigenous" medicine, which is based on traditional beliefs, norms and practices accumulated during centuries-old experiences of trial and error, successes and failures at the household level, and passed to successive generations through oral tradition (Martine, 1998

IK may be possessed by individuals (e.g., healing practices and rituals), by some members of a group, or be available to all members of a group (common knowledge), for example, knowledge of herbal home remedies, which is held by millions of women and elders. When its application, and in particular the delivery of IK-based products, can be made through commercial channels, IK may have commercial value. While some IK can be used and understood outside its local/traditional/communal context, this is not always the case. There are often spiritual components in IK that are peculiar to each community. Knowledge that cannot be used beyond its communal

context has little or no commercial value, despite its value to the originating community (Martine, 1998).

Importance of Indigenous Knowledge

Indigenous Knowledge is a key element of the "social capital" of people experiencing poverty; their main asset for investing in the struggle for survival, producing food, securing shelter, and achieving control over their own lives. Owing to its dynamic nature, it changes character according to people's needs and gains vitality from being deeply entrenched in people's lives. Consequently, IK has the potential to translate into commercial benefits by providing leads and clues for developing sound practices and processes that benefit humanity. Indigenous Knowledge is an integral part of the development process of local communities. Moreover, IK is an important resource in the development process, and sharing IK within and across communities can help enhance cross-cultural understanding and promote the cultural dimension of development. For example, the Argungu fishing festival in the North-Western part of Northern Nigeria brings people of different cultures together. According to The World Bank Group (1998), the importance of IK is stated below: a. It provides problem-solving strategies for local communities, especially for people experiencing poverty. b. It represents an important contribution to global knowledge on development. c. IK systems are at risk of becoming extinct. d. IK is relevant for the development process. e. IK is an underutilised resource in the development process.

Pointedly, the following are a few more important aspects of Indigenous Knowledge to Communities.

a. Connecting to the past: IK represents a powerful link to a community's past. It offers information about a people's history, the land they have lived on, how they procured and processed resources and their relationships to other communities, other species, and the cosmos.

b. Expressing the present: IK informs a community's self-identity—how they understand themselves, one another, and their place in the wider world. To know how one's ancestors lived, what they valued, and what they knew is vitally important to understanding who one is in the present. In many cases, practices based on IK—from harvesting plants to telling stories—connect generations, both living and long gone.

c. Anticipating the future: Retaining and using IK may contribute to a community's future well-being. Skills learnt from IK can contribute to concrete endeavours such as asserting land claims, protecting traditional territory and natural resources, and continuing cultural practices of living on

the land. IK can also be a key to affirming culture, particularly for indigenous communities living in colonial contexts. IK is the foundation of efforts to keep indigenous languages alive, enrich cultural expressions such as visual and performing arts and share community cultural values with the broader world.

d. Benefits for Local People: Local people must benefit from recording their knowledge. Beyond contributing to project goals, documentation and storage of IK can benefit local people in the following ways:
   a. IK can be preserved for future generations so that it does not disappear with the passing away of Elders.
   b. IK can be legitimised in the eyes of younger generations by presenting it in a format that places it on equal footing with the international knowledge system they are exposed to in state-run schools and through television and radio.
   c. IK can be taught to younger generations in schools or other settings as part of a regular program.
   d. IK can be made available to the least knowledgeable in a community. People can draw on research or their own experience to deepen their understanding of IK and pass it on to others. Problems and solutions can be identified through IK analysis, leading to further projects that benefit the community.

Indigenous Knowledge is not only important in its own right, but is also important for the benefits it brings to the following people:

a. The indigenous people who own and live it;

b. All the other people around the world who can learn lessons for living sustainably from it; and

c. The Earth would be treated more carefully if indigenous knowledge and values were followed more widely.

The importance of shared context in the nature and features of Indigenous Knowledge

Thus, in the broader sense, the term IK refers to knowledge possessed by indigenous people, in one or more societies and in one or more forms, including, but not limited to, art, dance and music, medicines, expressions of culture, biodiversity, knowledge and protection of plant varieties, handicrafts, designs, and literature. It also embraces information on the use of biological and other materials for medical treatment and agriculture, production processes, rituals, and other techniques. IK is an

encompassing notion which covers several, if not many, areas of human creativity. However, IK evolves and generates new information through improvements and adaptations to changing circumstances.

In context, indigenous Knowledge Vis-À-Vis Formal Knowledge shows that Indigenous knowledge of the Earth is based on thousands of years of experience. It has been developed and preserved by local and indigenous communities for centuries as a strategy for their survival in the biosphere. IK is often part of the social fabric and everyday life of a community. It is generally not seen as a distinct body of 'knowledge' separate from the community's culture, but rather as integral to it. Most often, the IK is known to the entire community and remains within it, though occasionally knowledge of a special skill or art is limited to a few members. However, within society, the knowledge is in the public domain. This knowledge and its components are typically required in everyday life. It is passed down through generations while still retaining its original individuality. Since its generation, preservation and transmission are based on cultural traditions, IK is essentially culturally oriented or culturally rooted, and it is integral to the cultural identity of the social group in which it operates and is preserved.

Indigenous Knowledge IK differs from formal knowledge in several aspects, such as ways of acquisition, storage, and transmission.

According to UNDP, IK is acquired through past experiences and observation. It is usually a collective property of society. Many members of the society contribute to it over time, and it is modified and enlarged as it is used. This knowledge is transmitted from generation to generation. IK is holistic and passed down through generations. It has evolved from both personal and collective innovations. On the other hand, formal knowledge is produced through formal institutions of learning, such as schools, colleges, universities, and research institutes. IK does not have a special institution to administer it, whereas formal knowledge is administered through various institutions of learning and practices. However, various modern developmental processes either marginalise or integrate indigenous communities, making them abandon their unique indigenous knowledge acquired over the years.

IK is a means of cultural identification for indigenous or local communities. Moreover, IK is seldom found in written form or expressed formally; it is transmitted orally and through practice. However, these aspects do not diminish the validity or value of this knowledge. IK is dynamic and a system of constant evolution, modifying and perfecting existing knowledge in a unique Indigenous way. IK does not necessarily imply that this knowledge is old. Recently established knowledge, which is based on existing knowledge, can also be indigenous knowledge. What is

Indigenous about the IK is not its antiquity but the way it is acquired and used. The social process of sharing knowledge, unique to each indigenous and local culture, lies at the very heart of its indigenousness. Though IK may not be antique, it has a unique social meaning. Indigenous knowledge is collective and is often considered the property of the entire community rather than belonging to any single individual. It is transmitted through specific cultural and indigenous information exchange mechanisms, for example, maintained and passed on orally by elders or specialists such as breeders and healers, and often to only a select few within a community. A few varieties of IK are formalised or codified. However, the lion's share of IK is non-codified and is being passed to successive generations through oral tradition.

However, another category of IK, which is only with the 'elder' of the particular community, may be uncanny to the rest of the world. IK may be thus possessed by specific individuals or by some members of a group, or by all members of a group/indigenous community. Indeed, the number of 200 persons holding the knowledge does not affect the extent to which this knowledge is distinct and new to the outside world. However, indigenous knowledge can also be spread widely around the world, connected, inter alia, to the spread of genetic resources.

Further to the above analysis, some characteristics of indigenous knowledge include:

a. indigenous only to the extent that its creation and use are part of the cultural traditions of a community;
b. it does not necessarily mean that the knowledge is ancient or static, representative of the cultural values of people, and thus is generally held collectively; and
c. is not limited to any specific field of technology or the arts, and d. is owned by a community and its use is often restricted to certain members of that community.

IK, in its various forms, though initially developed in ancestral times, has been modified, improved, and adapted to the contemporary demands of an ever-changing society and continues to evolve. Thus, IK is, in effect, non-contemporary; it has been used for generations and, in many cases, collected and published by anthropologists, historians, botanists, or other researchers and observers. IK expressed in various documented and non-documented forms may possess commercial value depending on its potential or actual use. When IK can be used and understood outside its local/ communal context, it acquires commercial value. Different industries make different use of indigenous knowledge. In the pharmaceutical industry, indigenous knowledge is often used only after an active compound has been identified, for subsequent research. In the seed industry, indigenous knowledge is not often used directly;

instead, much of it is incorporated into the germplasm that companies acquire from other organisations. When its application, and in particular the delivery of IK-based products, can be made through commercial channels, IK can have commercial value. Knowledge that cannot be utilised beyond its communal context has little or no commercial value, despite the value that such knowledge may have for the life of the originating community.

Kihwelo (2006) says that IK differs from formal knowledge in various ways, including acquisition, storage and transmission. Warren (1991) characterises IK as follows:

a. IK is an important natural resource that can facilitate the development process in cost-effective, participatory, and sustainable ways.
b. Local knowledge is unique to a given culture or society.
c. IK contrasts with the international knowledge system generated by universities, research institutions and private firms.
d. It is the basis for local-level decision-making in agriculture, health care, food preparation, education, natural resource management, and many other activities in rural communities.
e. Such knowledge is passed down from generation to generation, in many societies, by word of mouth.
f. IK has value not only for the culture in which it evolves, but also for scientists and planners striving to improve conditions in rural localities. Kolawole (2001) says that IK is related to a people's entire culture, including their identity and spiritual and religious beliefs.

Other significant features of IK are as follows:

a. It is not limited to tribal groups, the original inhabitants of an area, or rural people. Any community possesses IK, whether rural or urban, settled or nomadic, and whether composed of original inhabitants or migrants (IIRR, 1996).
b. It is based on ideas, experiences, practices, and information generated locally or elsewhere, and transformed by local people and incorporated into their way of life (Ina Hoi Riwa Foundation, 2000).
c. It is expressed in local languages (Langill, 1999). d. IK is difficult to communicate to those who do not share the language, traditions, and cultural experiences (SARDC, n.d.).

According to the World Bank report, the WCIP also named other important features of IK:

a. IK is exclusive to a given culture or society;

b. it cannot be easily codified for fear of losing some vital properties;
c. IK is fluid and does not work in formal organisations because it is too unstructured.
d. IK is the lifeblood of a community (World Bank, 1998).

Similarly, Agrawal (1995) uses a knowledge system framework to explain the following features of IK:

a. IK is embedded in a particular community and exclusive to that community.
b. People are dependent on this knowledge for survival.
c. This type of knowledge does not conform to specific situations because indigenous people adhere to a set of standards or ideals.
d. There are no contradictions in what the indigenous people believe; there are no opposing or conflicting ideas in their belief system.
e. These people are committed to and practice their knowledge systems daily. They live by these rules and laws and are governed by the community elders. These laws and rules do not change over time to suit the situation, as they are deeply rooted in the indigenous people's belief system.

Chisenga (2002) identifies the major features of IK as follows:

a. IK is held by any community, whether rural or urban.
b. IK is based on experiences, practices, and information imparted by local people and integrated into their way of life.
c. IK is conveyed in local languages.
d. It is challenging to communicate IK to those who do not share or understand the language, tradition and cultural experiences involved.

Raseroka (2002) lists the following features of indigenous knowledge:

a. IK is generated within communities.
b. It is location and culture-specific.
c. It is the basis for decision-making and survival strategies.
d. It is not systematically documented.
e. It covers critical issues: primary production, human and animal life, and natural resources management.
f. It is dynamic and based on innovation, adaptation and experimentation. Indigenous Knowledge is Adaptive: it is based on historical experiences but adapts to social, economic, environmental, spiritual, and political changes. Adaptation is the key to survival.
g. Cumulative: It is a body of knowledge and skills developed from centuries of living in proximity to nature.

h. Dynamic: It is not rooted in a particular point in history; it has developed, adapted, and grown over millennia and is not static.
i. Holistic: All aspects of life are interconnected and considered as part of the whole, not in isolation. The world is believed to be an integral whole. Indigenous knowledge incorporates all aspects of life - spirituality, history, cultural practices, social interactions, language, and healing.
j. Humble: Indigenous knowledge does not dictate how to control nature but how to live in harmony with the gifts of the Creator.
k. Intergenerational: The collective memory is passed within a community from one generation to the next, orally, through language, stories, songs, ceremonies, legends, and proverbs. Invaluable: It has been argued that indigenous knowledge, not capital, is the key to sustainable social and economic development.
There is a growing recognition and respect for IK and a desire to collaborate with Indigenous communities on environmental monitoring projects. Irreplaceable: There is nothing Western science can do to replace or replicate indigenous knowledge. An aspect of indigenous knowledge that scientists sometimes overlook, and others, is the critical connection between IK and language. Meanwhile, indigenous languages are in decline, and as languages die, so does the indigenous knowledge embedded in them and the collective memory of their speakers.
l. Moral: There is a morality in indigenous knowledge - a right and wrong way to interact with nature; there is a responsibility given from the Creator to respect the natural world.
m. Relative: Indigenous knowledge is not embodied to the same degree by all community members. Elders will obviously carry more knowledge than younger community members. Responsible: Indigenous Peoples generally believe they are responsible for the well-being of the natural environment around them.
n. Spiritual: Indigenous knowledge is rooted in a social context that views the world through social and spiritual relations among all life forms. All parts of the natural world are infused with spirit. Mind, matter, and spirit are perceived as inseparable.
o. Unique: Indigenous knowledge is unique to a given culture or society. While there may be many similarities of IK between communities, it is the lived experience of each community that informs IK.

p. Valid: It does not require validation by Western science. Indigenous groups around the world have distinctive cultural belief systems that demonstrate their immense knowledge and respect for the earth. These systems contain rules that define how the environment should be treated. Their various rituals, ceremonies, and prohibitions regulate the use of natural resources and resource management, aiming for a balanced ecosystem. Indigenous people are the custodians of the earth's invaluable biological and genetic wealth. Indigenous knowledge is collective and is often considered the property of the entire community rather than belonging to any single individual.

Challenges Associated With Indigenous Knowledge Management

Knowledge management, as pointed out by Kaniki and Mphahlele (2002), facilitates knowledge generation, sharing and re-use. The main challenges in managing IK include identifying it, accessing it, intellectual property rights, and media and formats for preserving it. Another challenge is the debate over whether to use the Western paradigm for preserving IK. Ngulube (2002) contends that the collection of IK should be left to ethnographers, anthropologists, oral historians and other related professionals. According to Lawas and Luning (1996), the collection of IK is laborious, time-consuming and costly. Thus, proper storage and management must be ensured if the knowledge is to be made available and accessible to benefit humankind. Knowledge management in general is expensive because it requires financial, material, human, and other resources to be successful (Davenport, 1988).

Steps in Indigenous Knowledge Management (IKM)

The following are significant steps in the management of IK as discussed by Mabawonku (2002):

a. Collection: In collecting IK, there is a need to define the knowledge to be collected and the likely inhibitors (that could disturb the collection of IK). The culture and knowledge systems must be identified, and taboos considered. The resource person (IK holder) must be identified, and the documentation media must be specified. The resource person or IK holder is the key figure in documenting IK. It is therefore important that they are not only knowledgeable but also seen as a reliable source. This is to ensure that the IK collected is reliable and authentic. Having more than one resource person would be an advantage, especially if there are divergent opinions, vital links, or if the knowledge has been distorted in some way (Mabawonku, 2002). Some IK is best collected at specific times or seasons. For example, IK from ceremonies can only be collected during the ceremony; collection

should coincide with the most appropriate period to ensure successful collection (Mabawonku, 2002).

b. Organising: If the IK has been recorded on cassettes and/or videotapes, the next step is to edit the tapes and produce pictures and graphics. The content of the recording should then be summarised in writing, either on a computer or in a notebook, in languages such as English. Tapes must be labelled with labels that contain the bibliographic description and subject classification of the content (Mabawonku, 2002).
c. Storage: The collected IK should be stored in ample cupboards in an air-conditioned room. More copies of the IK should be made on audio and/or video cassettes and circulated to other departments for borrowing if needed (Mabawonku, 2002).
d. Dissemination of IK is very crucial in its management. This, as Mabawonku (2002) says, is because knowledge gained but unavailable to others is wasted. IK dissemination should begin by distributing the collected IK to the respective indigenous groups (IK holders) and by handing out copies of their recordings to others. Abstracts and indexes that would create awareness of the collected IK should be compiled and made available (Mabawonku, 2002).

Challenges Associated with Indigenous Knowledge Management (IKM)

One significant problem associated with indigenous knowledge management is what Barnhardt and Kawagley (2005) identified as "lack of indigenous people with advanced indigenous expertise and western research experience to bring balance to the indigenous knowledge enterprise". Indigenous knowledge is a form of tacit knowledge, primarily held in people's minds. Hence, it is difficult to record, transfer, and disseminate. Moreover, indigenous people are reluctant to share their knowledge. No adequate intellectual property rights are in place. Indigenous knowledge is often regarded as pseudo-science or anti-science.

a. Information Accessibility Afolabi (2003) argued that "information is indispensably an ingredient for social, economic, industrial, political and technological advancement as it is apparent in every facet of human endeavors that no meaningful and enduring development can be achieved without it". Sturges & Neil (1990) reported that "rural inhabitants of Africa are increasingly appreciating the usefulness of relevant information to their development like their urban counterparts, due to convenient information transfer mechanisms such as associations, traditional institutions, age grades, community leaders and others". Opeke (2000) believed that "the world has entered an era where the source of wealth and power is increasing from

information and human mental creativity as compared with physical resources".

b. Intellectual Property Ownership is the "ultimate and exclusive right conferred by a lawful claim or title, and subject to certain restrictions to enjoy, occupy, possess, rent, sell, use, give away, or even destroy an item of property" (BusinessDictionary.com). In other words, ownership involves determining who has rights and duties over specific property. Schnarch (2004) referred to ownership as "the relationship of a community to its knowledge or information". The principle of ownership, according to him, states that "a community or group owns information collectively in the same way that an individual owns their personal information. Hence, gathering or managing knowledge through an institution that is accountable to the group is a mechanism through which ownership may be asserted" (Schnarch, 2004). According to the Democratic Alliance (2011), "indigenous knowledge seldom has an identifiable author; it is passed down from generation to generation. It is often not recorded, or even impossible to record, and exists only in a community's mind. It needs to be protected in perpetuity: protections should exist as long as the community exists." However, Sahai (2002) warned that "diverse forms of indigenous knowledge have been appropriated by researchers and commercial enterprises, without any compensation to the knowledge creators or possessors". In view of this, Simeone (2004) suggested that "indigenous knowledge needs to be protected because the creators or possessors have the right to receive a fair return on what the communities have developed". Protecting indigenous knowledge will also facilitate continuity, ensuring it can be passed from generation to generation. Taken together, these call for the enactment of the Intellectual Property Bill to protect indigenous knowledge, so that such communities can benefit from financial support from developed countries.

c. Motivating Indigenous People Indigenous people's right to self-determination must be ensured. In other words, they have the right to determine their political status freely and to pursue their economic, social, and cultural development freely. Indigenous people must enjoy environmental security in relation to their hunting, fishing, and other activities. Health is wealth, as a popular saying goes. The perfect health of indigenous people must be guaranteed. Equal access to relevant local knowledge for all community stakeholders must be ensured. Indigenous

people will remain proactive once their knowledge is protected and they are adequately compensated for its release.

Conclusion

It is now accepted that the concept of IK goes beyond tradition. IK is now considered to be cultural knowledge in its broadest sense, including all of the social, political, economic, and Indigenous Knowledge (IK), Cultural IK, Artistic IK, Medicinal IK, Biodiversity/ Natural Resources IK, Agricultural IK, Sacred IK, and spiritual aspects of a local way of life. However, the types of IK depend primarily on the nature of the knowledge and the perspective of IK holders.

IK includes information of different kinds and functions, developed in ancestral times but subject to contemporary improvement and adaptation. It is expressed in various documented and non-documented forms and may possess commercial value depending on its potential or actual use. IK is a central component of the daily life of millions of people in developing countries. Traditional Medicine (TM) serves the health needs of the vast majority of people in developing countries, where economic and cultural factors limit access to modern health care services and medicines. It is often the only affordable treatment available to poor people and in remote communities.

Indigenous knowledge is a profound, detailed, and shared body of beliefs and rules regarding physical resources, social norms, health, ecosystems, culture, and the livelihoods of people who interact with the environment in both rural and urban settings. It has been the basis for local-level decision-making in agriculture, health care, food preparation, education, natural resource management, and many other activities. IK represents an important component of global knowledge.

No doubt, the management of IK is necessary in every society, given its relevance to the cultural and socio-economic development of indigenous people and society at large. Indigenous knowledge (IK), generally speaking, is the knowledge used by the locals of an area or community to make a living in a particular environment; it could be knowledge of herbs used in healing a particular ailment or beliefs, innovation, acts, or other forms of cultural experience and expression that belong to the group.

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