Environmental Conservation: Espousing Indigenous Knowledge System as a Model for Caring for the Earth

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Abstract The earth is presently experiencing dramatic changes in both social and physical environments; consequent upon this, the human race is faced with grave environmental problems and challenges. Towards the resolution of these grave environmental problems, indigenous knowledge has been cited as an important approach for shaping value, orientations, social action and in mobilizing people (including indigenous peoples), to be interested in our environment, to learn about it as well as taking action to protect and preserve it. This is because indigenous people and their communities have an historical relationship with their lands and are generally descendants of the original inhabitants of such lands. As a result, they have developed over many generations a broad knowledge of how to live sustainably. In this paper, efforts are made to establish the potentials of indigenous ways of knowledge as a coherent and potent approach towards promoting sustainable living and environmental sustainability. The article also points out that traditional ecological knowledge or local indigenous environmental knowledge is capable of bringing forth a rich legacy of intergenerational and contextual knowing which have proved invaluable in the management of environment for many centuries before colonial period, as well as learning about not only the earth but also of the cosmos. On the other hand, this paper argues that the difficulty in adequately addressing environmental degradation, unsustainable means of production and living stems from the anthropocentric nature of sustainable development and preference for modernist, ethnocentric (Euro-centric) paradigms for acceptable knowledge and practice (Coates, Gray, & Hetherington, 2006). This article disagrees with the notion that adaptation to the rapid environmental challenges like climate change, specie and biodiversity loss, desertification and their adaptation will evolve through trial error.

Keywords: indigenous knowledge, indigenous environmental knowledge, sustainable living, anthropocentric, sustainable development, environmental wisdom.

1. Introduction

The earth is presently experiencing dramatic changes in both social and physical environments; consequent upon this, the human race is faced with grave environmental problems and challenges. The depletion of the world's ozone layer is continuing and many medical researchers believe that the incidence of potentially lethal skin cancer is likely to increase, with many species of plants and animals containing substances with medicinal values disappearing at alarming rate.
As noted by Cullen, Pretty, Smith, and Pilgrim (2007) and UNEP (2006) all humanity depends on the earth's ecosystem and the goods and services they provide. Sadly, this dependence over 50 years has brought about swift and comprehensive change in the ecosystem than witnessed in any other comparable period. In a devastating manner, these changes have resulted in the biodiversity loss, the maintenance of which is crucial to the continued well being and survival of all humanity (MEA, 2005; Norse, 1993; Sala & Knowlton, 2006).

Towards the resolution of these grave environmental problems, the World Commission on Environment and Development (WCED) has called for the inclusion of indigenous knowledge of "traditional" people and communities as a significant variable and critical factor in achieving environmental protection and sustainable development. Descriptively, indigenous knowledge system refers to the local knowledge that is unique to a culture or society. According to Dei (2002) indigenous knowledge have moral and cognitive conceptions about the nature and society that may be compatible with western scientific knowledge. Historically, indigenous people are known to have developed a broad knowledge of how to live sustainably, over many generations a holistic traditional scientific knowledge of their lands, natural resources, and environment (Agenda21, 1992: chapter 26).

Sustainable development has unarguably played a prominent role in the motive guiding thinking about earth and its general environment. Within this context, humanity is expected to make ongoing, flexible adjustments to the vicissitudes of this changing world. The context of these adjustments includes the use of indigenous knowledge as a way to bridge the complex interactions between the rich and varied contributions of indigenous forms of knowledge and the forms and content of western knowledge. In this paper, efforts will be made to establish the potentials of indigenous knowledge

system as a coherent and potent approach towards sustainability and improving the capacity of the people to address environment and development issues in Africa.

2. Sustainability, Development and Environmental Protection

This section offers a theoretical overview of sustainable development (environmental sustainability) as a tool for social change. An understanding of environmental sustainability requires its consideration in relation to global environmental management. The complex and manifold connections of the global environmental crises that characterize our world today have resulted in human apprehension, worries and palpable fear. Consequently, there is a general recognition that the profligate, extravagant and inequitable nature of current patterns of development, when projected into the not too distant future, lead to biophysical impossibilities. In order to address this issue the United Nations World Commission on Environment and Development (WCED) produced a report, entitled *Our Common Future*, better known as the *Brundtland Commission Report* (World Commission on Environment and Development 1987). The *Brundtland Commission Report* contains the most commonly employed definition of sustainable development.

Sustainable development is defined as "development which meets the need of the present without compromising the ability of the future generation to meet their own needs" (World Commission on Environment and Development , 1987, p. 8). It is a term that grew out of environmental / conservation movement of the 1970s and it offers a general objective and a foundation for a materially reasonable and ethically justifiable use of nature by humankind. It focuses attention on the urgency of managing natural resources by attempting to maximise benefits from using these resources without endangering their existence, reproduction and use by all people present and in the future (Ahmed, 1994). Despite the clarity of the Commission's definition, in terms of the purpose and goals of sustainable development, it is still a subject of challenge and contestations (Disinger, 1990; IDRC, 1992; Orr, 1992; Plant, 1995; Sauve, 1996). Some authors argue that sustainable development means total development. As Blackburn (2000), explains the concept of sustainable development consists of many elements. These include, at the very least, a consideration for the future generations, a fusion of economic, ecologic and community issues and the development of cooperative structures for dispute resolution and for daily living.

Conversely other scholars have argued that sustainable development / sustainability is anthropocentric, that is, it seeks to elevate human values and experiences, privileging human self-interest above ecological systems (Jickling, 2001). To some, the term sustainable development is an oxymoron – a self contained non sequitur between noun and modifier (see Disinger, 1990, p. 3). Slocombe and Van Bers (1991) on their part reminded us that this term is only a concept and that it is characterized by a paucity of precision. Furthermore as Daly (2006) argues, while future generations should be at least as well off as the present in terms of the flow of nature's resources through the economy and back to nature in a non-declining manner, this flow-back process which guarantees sustainability or the endless continuity of resources is lacking in the current definition of sustainable development.

Goodland (1997), on the other hand, argues that focusing on the future diverts attention from today's lack of sustainability. In Goodland's view, "rather than focusing on the intergenerational equity concerns of environmental sustainability, the stewardship approach of safeguarding life support systems is preferable for intra-generational sustainability" (p. 69). In the same vein, according to Bartlett (2006), it is impossible to maintain sustainable economic growth without an increase in the consumption rates of non-renewable resources. Theorists, such as Beckerman (1992) and Dasgupta and Maler (1995), also challenge the concept of sustainable development and view it as morally indefensible and devoid of operational value, because no clear criteria exists to distinguish between "sustainable" and "unsustainable" economic activities, or for balancing the interests of present and future generations. Others scholars view this concept as utopian; they point to inherent and irreconcilable contradictions between "development" and "sustainability" (Blewitt, 2006; Langehelle, 1999; Robinson, 2004).

Given this critical contradictions, Robinson (2004: 370) redefines sustainability as a process that focuses on the ability of the humans to continue to live within environmental constraints. According to Goldie, Douglas and Furnass (2005), sustainability refers to the capacity of the biosphere to provide for the full range of human concerns in the long term. To Schreuder, Reddy & le Grange, (2000), the word sustainability refers to an activity, which can endure or persist. Rauch citing Fien (1996), Brundtland Report (1987) and the Agenda 21 (UNCED, 1992) explained that the notion of sustainability implies the use of resources in a manner which does not jeopardise the environment, the well being of humans, and does not destroy the capacity of future generations to satisfy their needs adequately (Rauch, 1998). A key aspect of sustainability is the focus on future human needs or intergenerational equity. Sustainability, therefore suggests a strong bias towards the moral and ethical responsibility of the present generation for the sustenance of the global environment and its resources so that current development will not "deprive the future generation of the ability to attain a

level of well being equivalent or superior to that achieved today" (Drummond & Marsden, 1999: p. 8). Implicit in this notion of sustainability is the realization that we are "a part" of the planet, rather than "apart" from it. Based on this, sustainability could be the destination, the end-goal, while sustainable development is a means of getting there.

3. Understanding Indigenous knowledge Systems (IKS)

According to Havekort (1991), indigenous knowledge is the actual knowledge of a given population that reflects the experiences based on traditions and includes more recent experiences with modern technologies (cited in Bray & Els, 2007). It embodies the philosophy that being one's own is a result of the place or circumstances of one's birth, which encompasses being a member of the original inhabitants or lifelong resident of a particular place (Bray & Els, 2007). Indigenousness according to Dei (2002), "may be defined as knowledge consciousness arising locally and in association with the long-term occupancy of a place". The notion of 'indigenousness' he adds "highlights the power of dynamics embedded in the production, interrogation, validation and dissemination of global knowledge about international development". It recognises the multiple and collective origins and the collaborative dimensions of knowledge, and underscores that the interpretation or analysis of social reality is subject to different and sometimes oppositional perspectives. He argues further that 'Indigenousness' emerges from an indigenous knowledge system that is based on cognitive understandings and interpretations of the social and physical/spiritual world (Dei, 2002).

Knowledge may be defined as 'the state or fact of knowing something with familiarity, awareness, or understanding gained through experience or association' (Merriam-Webster, 2006). The word knowledge refers to a universal heritage and a universal resource, which is diverse and varied. 'Indigenous' on the other hand refers to the root, something natural or innate and also an integral part of culture (Hoppers, 2005). Knowledge, as defined above, may be interpreted as an indigenous 'science', seeking to understand, explain and organize aspects of reality. As pointed out by Bray and Els (2007) knowledge systems are systems through which people make sense of and attach meaning to the world in which they live. These are views and perceptions originating within a specific community or culture and are handed down from generation to generation (Kok, 2005), resulting in personal experiences and wisdom being transferred to younger people. These knowledge systems reflect the dynamic way in which the residents of a community come to understand themselves in relation to their natural environment and how they organize that knowledge of flora, fauna, cultural beliefs and history to enhance their lives. These personal experiences, wisdom and order of knowledge represent the mechanisms that ensure the minimal livelihoods of people (Dei, 1999).

Broadly speaking, indigenous knowledge systems refer to the complex set of knowledge and technologies existing and developed around specific conditions of populations and communities indigenous to a particular area (Bray & Els, 2007). These indigenous knowledge systems provide 'an everyday realization that rewards individuals who live in a given locality'. From another perspective, a study by Loubser (2004) on indigenous knowledge systems describes 'indigenous' as being 'communities that inhabit the country at the time of conquest or colonization'. 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.

For the purpose of this paper however, the working term shall be indigenous knowledge systems, it refers to a combination of knowledge system encompassing technology, social, economic, philosophical learning/educational, legal, and governance systems. Indigenous knowledge systems involve transmission of traditional information, and all forms of knowledge or knowing is transmitted through several mediums such as stories, wise - saying, idioms, poems, praise singing and fables. This knowledge according to Ahmed (1994) is composed of people's "do-how", know-how and accumulated experiences over economical, social, cultural, ideological, and belief systems in which it is found. An indigenous knowledge system is characterised by its being embedded in the cultural web and history of a people including their civilisation, and forms the backbone of the social, economic, scientific and technological identity of such a people.

4. Indigenous Knowledge and Sustainability: The Nexus

Renewed interest in indigenous knowledge and practices is widespread and global (Nakata, 2002, 2007). This interest has emerged in times of "new configuration in global relations where the centrality of knowledge is the emerging currency in that relationship" (Hoppers, 2000, pg. 283). The global discourse on IK has run into and across a range of interest such as sustainable development, biodiversity and conservation interests (Nakata, 2007). For instance, in 1987, attention of the world was drawn to potency and viability of harnessing indigenous knowledge system for sustainable development in

a Report of the World Commission on Environment and Development (WCED). The Report observed that most people base their understandings of environmental process and development on information provided by conventional education, and a consequence, many have remained ignorant about the ways in which they could improve traditional production practices and better protect the natural resource base (WCED, 1987: 111 and 113). On the strength of this observation, WCED (1987) called for the inclusion of indigenous knowledge of "traditional" people and communities as a significant variable and critical factor in achieving sustainable development.

The importance of this call is based on the fact that the indigenous communities and its peoples have over centuries through their traditional skills protected our complex ecological subsystems (WCED, 1987) and contemporary societies have much to learn from them (Bean, 1992: 16). Additionally, chapter 26 of the Report of the United Nations Conference on Environment and Development, which held in 1992, also stresses the need for recognition and strengthening the role of indigenous people and their communities as well as harnessing indigenous knowledge of the people towards sustainability. As noted by Mwaura (2008) indigenous knowledge can be summed up as the wisdom of a people for survival in their own environment. It is a broad concept that covers all forms of knowledge of a particular community living in a particular area. It is dynamic and continually evolving. Traditional communities rely on traditional knowledge and it is necessary to integrate their knowledge systems with scientific knowledge and emerging technologies (Mwaura, 2008).

As Cajete, (2000: 281) rightly points out the accumulated knowledge of the remaining indigenous groups around the world represents an ancient body of thought, experience and action that, if honoured and preserved as a vital storehouse of environmental wisdom, can form the basis for evolving the kind of cosmological reorientation that is so desperately needed. For Nakashima, Prott and Bridgewater (2000) sophisticated knowledge of the natural world is not confined to science, human societies all across the globe has developed rich sets of experiences and explanations relating to the environments they live in. These 'other knowledge systems' are today often referred to as traditional ecological knowledge or 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 et al., 2000: 12).

The realisation and recognition of the potency of indigenous knowledge as a tool to mobilise indigenous peoples for environmental sustainability is set forth in the Principles of for Environmental Education for Equitable and Sustainable Societies adopted at the International Government forum at the Earth Summit. For instance, Principle 7, of Agenda 21 maintains that "environmental education must recover, recognise, respect, reflect, and utilise indigenous history and local cultures, as well as promote cultural, linguistic, and ecological diversity. This implies acknowledging the historical perspective of native peoples as a way to change ethnocentric approaches, as well as the encouragement of bilingual education". Likewise Principle 22 of the Rio declaration states: "Indigenous people and their communities and other local communities have a vital role in environmental management and development because of their knowledge and traditional practices" (Agenda21, 1992).

Furthermore, the use of indigenous knowledge is linked to the strategies which the culture has devised for coping with risks. These micro-level practices protect against vicissitudes in climate, attack from pests and genetic erosion, through maintaining diversity, in the ecological system, in crops and genetic materials. The components of these strategies allow a sustainable system to be reproduced in which biological nutrients are conserved, and food consumption meets different nutritional needs. Another feature of indigenous knowledge that proves useful for sustainability is its principle of ecological integrity and health which is founded on the belief that, the health of the planet is the primary context for the health of all life on it; the support systems of the Earth are severely threatened; what we do to the planet, we do to ourselves (Colorado, 1988; La Duke, 1995; Rosenberg, 2002).

In relation to environmental protection, IK is viewed as a means to an end, involving social responsibility, environmental ethics, plant biology, scientific knowledge, agricultural, technical and ecological knowledge, including cultigens, medicinas, and rational use of flora and fauna (Battiste, 2005; Daes, 1993). Furthermore, the need to protect the earth's biological diversity, ecosystem, and the inherent value of IK as a medium, the United Nations Convention on Biological Diversity has recognized the importance of IK to the conservation and sustainable use of biological diversity. The Convention also acknowledges the contributions of IK for its valuable and innovative approaches to environmental and conservation studies, sustainable development as well as the validity of indigenous science (Battiste, 2005).

In closing, it is worth mentioning that it has been postulated that the indigenous peoples and communities are bound to experience severe challenges in their attempt at coping with the evolving rapid changes in their environment given their close relationship with the land and the processes that shape it (Löf & Carriere, 2010). For example, the

connection between climate change and livelihood and survival is far more than statistics and trends, however, uncertainties and major knowledge gaps may constraints local level application of projected climatic and environmental impacts (Löf & Carriere, 2010; McBean et al., 2005). This article disagrees with the notion that adaptation to these rapid environmental challenges like climate change, specie and biodiversity loss, desertification and their adaptation will evolve through trial error. On the contrary, this article maintain that since, the comprehension and communicating of these environmental challenges will be transmitted and translated in indigenous language, it could be located in an already established local ecological practices and mores or norms. Further, environmental sustainability includes new configuration such as ecological, economic, cultural and social components. These are perceived as strong indices towards ensuring an environmentally sound and economically prosperous future. This implies that environmental sustainability like indigenous knowledge is a lifelong process, strongly embedded in the values of an individual and the culture he/she is living in (Hynninen & Ilmavirta, 1998: 288). Located in this process is the understanding of the values and ethics needed to develop informed attitudes and experiences for fostering environmental sensitivity/concern aimed at a sustainable planet. Accordingly, it should prepare the individual for life through an understanding of the major problems of the contemporary world, and the provision of skills and attributes needed to play a productive role towards improving life and protecting the environment with due regard given to ethical issues (UNESCO, 1977).

5. Notion of Care and Stewardship and its place in indigenous environmental Conservation

According to Merriam Webster Dictionary define care as "to feel interest or concern" while stewardship is described as the act of "conducting, supervising, or managing of something; *especially*: the careful and responsible management of something entrusted to one's care (*stewardship* of natural resources). The term 'care' and 'stewardship' as used in this paper in the holistic sense as the totality of concerns, values, and the quantum of feelings towards the maintenance and protection of the commons. The commons in this sense will mean the overall environment and the resources available for everyone in the society. In this respect, it speaks to how we relate within our society and surroundings as well as the roles, expectations and responsibilities bequeathed to all within a cultural setting by encouraging harmonious living with the earth. In relation to caring for the earth, the term "natural resources conservation" is a western management term not reflective of the relationship of indigenous cultures to their environment. Its anthropogenetic concept of care and stewardship is derived from the need to preserve the natural resource for its use and ultimately exploitation.

Indigenous stewardship and care on the other hand, suggest living and being part of the natural environment. According to the United States Department of Agriculture Guidebook, published in 2010, traditionally, indigenous cultures express and reinforce their relationship with the nature through ceremonies and prayer. Thus as mark of respect for the land and its resources, since according to the indigenous elders, everything is first created spiritually (inside), then secondly it is made manifest in the temporal realm (outside) (United States Department of Agriculture, 2010).

Meanwhile, indigenous stewardship methods (ISM) explain the purpose and methodology of creating this guidance and describe key concepts and items of consideration for how to work with, and learn from, Tribes and indigenous peoples (USDA, 2010). ISMs are the ecologically sustainable use of natural resources within their capacity to sustain natural processes, while honouring the wisdom of past generations, and ensuring that the use does not diminish the potential to meet the needs and aspirations of future generations. ISM is perhaps a subset of *Traditional Ecological Knowledge* (TEK), in which indigenous peoples acquired the knowledge base over hundreds of years through direct experience and contact with the environment (USDA, 2010). The guidebook pointed out further that ISM is the physical, spiritual, mental, emotional, and intuitive relationship of indigenous peoples with all aspects and elements of their environment. Its use is encapsulated in the following quotation from *Our Common Future*, the report of the World Commission on Environment and Development

Tribal and indigenous peoples'…lifestyle can offer modern societies many lessons in the management of resources in complex forest, mountain and dryland ecosystems… These communities are the repositories of vast accumulations of traditional knowledge and experience that link humanity with its ancient origins. Their disappearance is a loss for the larger society, which could learn a great deal from their traditional skills in sustainably managing very complex ecological systems (World Commission on Environment and Development1987).

6. Lessons from Indigenous Approaches to Sustainability and Ecological Care in Africa

Like other indigenous cultures across the world, the African indigenous people have their peculiar approaches, traditions, mores and norms, which have over centuries played a huge role in their management of the environment and sustainability practices. The uniqueness of their indigenousness is coded such that it is passed from one generation to

another in a manner referred to as unwritten curriculum (see Sitthiraksa, 1993). This knowledge therefore forms the basis of their science, agriculture, technology culture, tradition and livelihood and it reflects many generations of experience and problem-solving by ethnic groups at the local level, and no experience of one country can exactly replicate another.

The importance of indigenous knowledge system in ecosystem management is echoed in Berkes, Colding, and Folke's (2000) case studies which revealed that there exists a diversity of local or traditional practices for ecosystem management. These include multiple species management, resources rotation, succession management, landscape patchiness management and other ways of responding to and managing pulses and ecological surprises. Social mechanisms behind these traditional practices include a number of adaptations for the generation, accumulation, and transmission of knowledge; the use of institutions to provide leaders/stewards and rules for social regulation, mechanisms for cultural internalization of traditional practices; and the development of appropriate world views and cultural values. These traditional systems had certain similarities to adaptive management with its emphasis on feedback learning, and its treatment of uncertainty and unpredictability intrinsic to all ecosystems.

Building on Berkes et al (2000) and Fagbohun's (2011) discourse on cultural legitimacy and social behaviour among African traditional communities and how traditional knowledge system have been tapped for ecosystem and sustainability management. This section of the paper discuses indigenous practices among selected African communities with respects to ethics and logic of care, within the traditional Yoruba community in Nigeria and traditional Ngoro system of environmental conservation common to indigenous farmers in Kenya, Swaziland, Tanzania and South Africa. Through poems and idioms many indigenous groups in Nigeria engage in caring for the earth. For example, Yorubas, a cosmopolitan indigenous group located in the south western part of Nigeria acts as steward through poems which dwells on environmental protection, humane and environmental ethics as well care for other creatures and the diversity of species around them.

Yi ese re si apa kan
Ma se pa kokoro ni
Kokoro ti iwo ko le da
Olorun lo le daa
Ma se da 'gi l'oro
Ma se gbo iyepe di odo
Gbogbo won l'oni ise ti won

Translated literally to English from Yoruba:

Turn your feet to one side
Thou shall not kill that insect
An insect which thou cannot create/make
Only God can create/make
Don't be wicked to plants
Do not block the rivers and streams
They all have their functions/purposes.

The lesson of this poem suggests that the indigenous ethics of care and stewardship espoused above can form the basis of efforts towards sustaining the planet and protecting its biodiversity if promoted alongside western scientific knowledge such that the interplay of local knowledge, of cultural, social and ecological systems are taken into consideration (Fagbohun, 2011).

Another example can be found in a study by UNEP of four countries namely, Kenya, Swaziland, Tanzania and South Africa in the Southern Africa region. The study examined the repertoire of indigenous knowledge that communities in the study areas draw on to promote a variety of innovative, effective, and in some cases unique indigenous knowledge approaches known as *Ngoro* system to environmental conservation. According to the report, the *Ngoro* system illustrates the multipurpose function of many of the indigenous knowledge approaches to environmental conservation. The Ngoro system of environmental conservation included such technologies and practices as shifting cultivation, mixed cropping or intercropping, minimum tillage and agro-forestry, as well as transhumance. These technologies and practices were commonplace and were used with various other methods of land use and management to promote higher yields while at the same time conserving the environment. For instance, mixing or intercropping maize with other crops such as beans

promoted not only efficient labour utilization but also lessened the risk of total crop failure since chances were that if one of the crops succumbed to environmental stress others would survive. Mixed cropping or intercropping stabilized yields, preserved the soil and made it possible to harvest different crops at the same time. Other advantages were a reduction in susceptibility of the crops to pests and diseases and a better use of the environment where the combination of species grown had different light requirements or explored different depths of soil. The system also tended to provide a complete vegetation canopy at different heights and thus broke up heavy rainfall and protected the soil.

Furthermore, the effects of indigenous knowledge conservation measures and technologies also tend to pervade the entire environment. For instance, in many of the communities certain forests were protected as shrines to be used for worship and other rituals. Such protected areas in fact ended up having multirole functions as they also influenced other elements of the environment, like biodiversity, forest conservation, land use and management, and so on. Because of this interconnectedness and "cross-cutting" nature of indigenous knowledge, it is convenient to describe the different indigenous knowledge measures for environmental conservation regardless of their intended or perceived purpose and examine how they relate to all areas of conservation including land management and use, forest, wetlands and biodiversity conservation (Mwaura, 2008). Summarizing the importance and viability of indigenous practices Dirwai (2007) pointed out that the traditional methodologies were cleaner and less harmful to the environment in that they assured a harmonized use of the environment and hence were quite sustainable. He also argued that learning should become ethno based such that assessment could become relevant to the communities. The successful application of this knowledge is based on good prognosis, close observation and a thorough understanding of the local environment (Fagbohun, 2011; Mwaura, 2008).

7. Conclusion

Crispen Dirwai (2007) observed that indigenous groups all over the world have developed cultural belief systems that demonstrate knowledge and appreciation of the Earth. According to him, these cultural belief systems embody cultural rules about how the various components of the environment should be treated for the good of the present and future generations (Fagbohun, 2011). The tendency to fall back on traditional knowledge and cultural practices has in several instances yielded positive dividends over the years. Traditional ecological knowledge has further been made popular through the work of the International Conservation Union (IUCN). In this article, I reviewed critically the concept and development of environment and sustainability and indigenous knowledge in particular. In the context of this article, a wide and broader attempt was made to define sustainability/sustainable development and indigenous knowledge, taking into consideration the conceptual debate on sustainable development and indigenous knowledge as well as the interconnectedness of the goals and outcomes of these two issues. In order words, the lessons learned from indigenous environmental conservation practices and care offers valuable insight for developing the broader notion of sustainability. The article also points out that sustainability includes new configuration such as ecological, economic, cultural and social components. These are perceived as strong indices towards ensuring an environmentally sound and economically prosperous future.

Indigenous knowledge systems on the other hand involve the transmission of traditional information, and all forms of knowledge or knowing is transmitted through several media such as stories, wise-saying, idioms, poems, praise-singing and fables. Indigenous knowledge has been passed down from generation to generation through traditional education, with adults teaching practical knowledge of culture, the environment and survival through demonstrations and through a wide range of ceremonies, stories, songs, village meetings and taboos. Therefore, they possess a deep appreciation of the environment and its underlying processes, which forms the foundation for decision making in most day-to-day activities. Maurice Strong (1990) in a foreword to the book, *The Gaia Atlas of First Peoples* shows that indigenous knowledge is not only important in its own right, but is also important for the benefits it brings to; the indigenous people who own and live it; all the other people around the world who can learn lessons for living sustainably from it; and the Earth which would be treated more carefully if indigenous knowledge and values were followed more widely (Burger, 1990).

The acceptance of these alternative knowledge systems has created a 'welcoming and inclusive context enabling the celebration of diversity, and the sharing of knowledge' (Coates et al., 2006; Gray, Coates, & Hetherington, 2007). Person-in-environment expands to assume an interdependence and relatedness of all life, connectedness with nature, and the importance of place. These values are not only consistent with more traditional Indigenous knowledge systems, but also provide an accepting environment for Indigenous forms of healing and helping. Conclusively, in this article I have been able to point out that it would be inaccurate to assume that sustainability and environmental conservation is the sole prerogative of western knowledge system, anchored on Eurocentric values and norms. Therefore it should be

remembered that, if real sustainability is to become increasingly meaningful and mainstream, rather than devalued and marginalized as acknowledged by Sterling (1996), we need to embrace the epistemologies of indigenous people, including their ways of organizing their knowledge of their environment (Redclift, 1987).

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