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## Rethinking The Epistemological Divide Between Science And Other Knowledge Forms In Environmental Studies: An Anthropological Review

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### **Abstract:**

*The discourse on science and other knowledge divide commonly known as the 'indigenous knowledge' (IK)-Science divide is highly dynamic and has stirred controversies of epic proportions in conservation sciences, environmental anthropology, and science studies. Given the tenuous nature of indigenous knowledge systems (IKSs) coupled with the different interpretations evoked by the deployment of the concept across different disciplines, a vigorous comprehension of the concept calls into question its practical manifestations and application in particular situated contexts, particularly those of conservation sciences, knowledge studies and environmental sciences. More often than not, in these contexts, positivist scientists and modernists tend to favour science, and undermine the potential contribution of IK in complementing efforts by science. In recent years, however, the failure by science to solve all human problems, environmental problems included has provoked critical researchers to rethink the IK-science dualism. It is in this view that this paper critically responds to the arguments by some scholars in conservation sciences and environmental anthropology in terms of how they consider the "IK-science" divide in relation to environment conservation and management. The thesis of the paper is that sound, intelligible deployment of IK and the harmonisation of IK with science ideally present impeccable opportunities for productive appropriation of environmental sciences and renders a vantage point for deep pragmatic engagement with the environmental problems the world is currently facing.*

**Key words:** IKS, science, environment, conservation, management, dialogue

### **1. Introduction**

Debates in conservation sciences and environmental anthropology, particularly on the so-called "indigenous knowledge (IK)-science" divide remain highly volatile and a potentially explosive terrain. Consequently, a manifold of interpretations and constructions of the relationship between IK and science has become a routine thereby making the interpretations even more complex than ever. The complexity of establishing a definitive, concrete solution to the "divide" is summed up in Green's (2012) assertion that although Euro-American philosophy cannot possibly be considered the sum of human intellectual heritage, the contrary remains the dominant assertion in most university-based scholarship. This is further compounded by the "distinction between belief and knowledge which enabled the origins of science as we know it, and is at the core of the division between the sciences and IK" (Green 2008: 155), nature and culture. In philosophy quarters, attempts by logical positivisms of the 1920s that for decades outlawed and relegated as nonsense all locally generated knowledge –the so-called "indigenous" knowledge systems– that cannot be verified through expert science (Mawere 2010) like most, if not all, "indigenous" knowledge systems also impacted drastically the "IK-science" divide. It is however curious to note that the failure by science to solve all human problems, environmental problems included, has provoked critical researchers to rethink the IK-science and nature-culture dualisms. That said, this paper constitutes a theoretical review that contributes to this debate by grappling with the discourses on IK-science divide, rationale for their hyper cycles including their often incoherent, non-systematic integration into mainstream conservation sciences and environment anthropology. Taking the contemporary global environmental problems into consideration, the paper argues for the reframing of debates in conservation sciences and environmental management in such a way that promotes knowledge pluralism if sustainable environment conservation and management are to be successfully met.

### **2. Understanding Indigenous Knowledge Systems**

Indigenous knowledge systems (IKSs) are a phenomena pervasive in any human society the world over. In Africa, IKSs have always been used for various ends depending on the needs and aspirations of the society in question. This suggests that IKSs are quite enduring (but also dynamic) such that they have survived the test of time and history. In view of this understanding, IKSs can be conceived as local knowledge(s) that is unique to a given culture or society (see <http://www.sedac.ciesin.columbia.edu> website). They are knowledge forms that have failed to die despite the racial and colonial onslaughts that they have suffered at the hands of western imperialism and arrogance (Altieri 1995). The two definitions given above suggest that IKS as a form of knowledge is intergenerational, that is, it is passed on to future generations by those who hold it. Also important to note from the

aforementioned definitions is that IKSs have originated naturally and locally. However, a critical question that deserves a genuine answer arises here: 'What does it mean to be local?' In relation to the second definition, another question can be raised as well: 'Does IKSs as knowledge forms only exist in formerly colonised areas?' Considering these two possible critics, my conception of IKSs identifies with Ocholla who perceives IKS as "a complex set of knowledge and technologies existing and developed around specific conditions of populations and communities indigenous to a particular geographic area" (Ocholla 2007: 2). The complexity of IKS results from the logical qualification with the word 'system' as it suggests generations of creative thought and practice as well as a network and 'meshwork' of processes with different components such as knowledge, belief and technology. On the other hand, IKSs are 'indigenous' because the meanings as well as the categories of sense making are deeply context-bound in so far as they are generated internally within a cultural community and are/were produced through 'indigenous' thinking or exploration whether material, philosophical, religious or linguistic. This means indigenous knowledge can also be understood (if you like) as local knowledge (Kargbo 2005), traditional knowledge (IDRC), local technical knowledge, indigenous and traditional knowledge (Kawooya 2006), community knowledge and in some cases, even folkloric knowledge (Kargbo 2005). Given that we cannot sensibly talk of IK without mentioning IKS from which the former derives its meaning, in this paper, the terms indigenous knowledge system (IKS) and indigenous knowledge (IK) are applied to mean one and the same thing, and therefore used interchangeably. In this light, I underscore that what commonly underlies all these bodies of knowledge known as IKSs is the fact that they are developed through the processes of acculturation and through kinship relationships that societal groups form, and are handed down to the posterity through oral tradition as well as cultural practices such as rituals and rites. Also, IKS remain the adhesives or epoxy resin that bind and harmonise society as they constitute communicative processes through which knowledge and moral values are transmitted, preserved and acquired by humans in a given society.

Yet, while up to this point, the conception of IKS seems easy to unpack, it becomes somehow difficult to conceptualise as soon as certain elements from other cultures are assimilated over time. Against the difficulty assimilation brings into the concept of IKS, I argue that the dilution of indigenous knowledge systems by way of assimilation does not negatively alter its understanding. In fact indigenous knowledge need not essentially be traditional in nature for it to be considered indigenous. Knowledge thus is still considered 'indigenous' despite being contemporary. Contemporary knowledge serving indigenous ends, or using indigenous materials or processed through indigenous rules or heuristics can also be part and parcel of IKSs provided it is interpreted through local cultural meanings. A fine example is India's knowledge of tea growing and manufacturing. It is a well-known fact that until two hundred years ago, India did not cultivate tea bushes. But, today India is one of the biggest consumers of tea in the world. This example makes clear my argument that a lot of indigenous knowledge systems has evolved all over the world in much the same way those around the tea plants, tea manufacturing and the use of the waste and used tea leaves have evolved.

### **3. Indigenous Knowledge – Science Divide: Clearing The Mist Around The Divide**

As highlighted in the introduction, the so-called "IK-science" divide and/or the culture-nature dualism, in conservation sciences and environmental management has attracted the attention of many academicians and researchers alike in the recent years. Different positions and interpretations have been conjured, yet without achieving any concrete solution on how science and IK, nature and culture should relate and inform our understanding of conservation and management of the natural environment. Instead, anthropological challenges that require new responses to environmental problems have been posed thereby inciting even more intense debates around science-IK and culture-nature dualisms. As such, the next paragraphs of the current study examine how some scholars have grappled with science-IK divide within the nature-culture framework and in terms of the environmental problems faced in some parts of the world. Though these scholars are many, the studies by Mario Blaser (2009); Fairhead and Leach (1995); Mawere 2012; and Paul Little (1999), among others, shall receive more attention as they offer the immediate data required for this study.

Grappling with the question of IK-Science divide with reference to conservation, Mario Blaser (2009: 10) in his article, "The threat of the Yrmo..." examines a range of misunderstandings and conflicts encountered in attempting to integrate IK into development and conservation agenda by some scholars in political economy and political ecology. Using the notion of "political ontology", Blaser examines how and why in 1999, a sustainable hunting program that was put in place for the Yrmo indigenous communities of Northern Paraguay flopped. By political ontology, Blaser mean "a framework built on the multinaturalist understanding that there are many kinds of natures as opposed to the political economy and political ecology framework built on the modern multiculturalist understanding that we exist in one nature and many culturally situated perspectives of it" (see p. 11). Blaser explains that though hunting permits [which were granted by Prodechacho in partnership with Yshiro federation], were issued on condition that hunting had to be done sustainably, two months after the launch, the program turned into depredation and devastation and flopped. Making an analysis of the "political ontologies" that accounted for the failure, Blaser comes to the conclusion that the program failed due to two major reasons: 1) a misunderstanding of how hunting can be achieved, a misunderstanding which at another level is that of the relationship between nature and culture and, 2) conflicts associated with attempts to integrate IK into development and conservation agenda or rather integrating IK and science in development and conservation agenda. In explaining the source of the misunderstandings and conflicts surrounding the failure of the program, Blaser points out that integrating "indigenous" and modern scientific knowledge the way it was done in Paraguay, turned the project to be an instance of what Viveiros de Castro calls "uncontrolled equivocation" (Castro 2004). Uncontrolled equivocation is a type of communicative disjuncture where the interlocutors are not talking about the same thing, but unconscious of this. In the case of the sustainable hunting program in question, the meaning of "sustainable hunting" and of "nature" assumed by the Yshiro [indigenous people] and the Prodechacho [bureaucrats and experts in science] in the agreed program were different. To be more elaborate, the Yshiro understood humans and nonhumans or rather culture and nature as interdependent on each other for subsistence, existence and livelihood to the extent that they could hardly separate the two. On the other hand, the

Prodechacho/scientists understood nature [natural construct] as distinct and separate from culture [social construct]. As a matter of consequent, the Yshiro perceived their territory-the Yrmo/nature/cosmos as part of them. According to the Yshiro elders, Yrmo [cosmos/nature] is “governed by the principle of relationality or mutual dependence between all entities that co-constitute it to keep the flow of energy that sustains it [the Yrmo]” (Blaser, 2009: 13). Yet the Prodechacho understood nature as a separate and distinct entity that could be threatened by the Yrmo’s [indigenous people] cultural activities like hunting. Throughout his study, Blaser shows the multiple faces of the problems encountered in an attempt to integrate IK and science and thereof nature-culture in conservation and management of the natural environment. To overcome these problems, Blaser, though didn’t explicitly say this in his abstraction emphasises coordination and distribution of performances between knowledge forms, in this case, between science and IK in a way that keeps different performances apart and encourages knowledge plurality so that inconsistencies between them do not turn into direct clashes/conflicts.

Paul E. Little (1999) is another scholar who grapples with the science-*IK* divide within the nature-culture discussions and current global environmental problems. In his piece, “Environments and environmentalisms in anthropological research...”, Little uses the concept of “environment” to explore the science-*IK* divide in environmental anthropology. For Little, the term “environment” in common usage is often used as a synonym for nature (i.e. the biophysical or nonhuman environment), but this usage creates great conceptual confusion because the environment of a particular human group includes both cultural and biophysical elements (Rappaport 1979). Taking into account this observation, Little uses the term environment as often used in environmental anthropology to refer to “an explicit, active concern with the relationship between human groups and their respective environments” (Little 1999: 254). He distinguishes two major areas of environmental anthropology; ecological anthropology [which uses ecological methodologies to study man-environment relationships] and environmental anthropology [which uses ethnographic methodologies to study environmentalism as a type of human action] which differ in methodology and objects of study. Using a case study of the tropical rainforests, particularly the Amazon, Little observes a sharp increase in environmental concerns and activism/movements of environmental justice over the past two decades. He attributes the increased environmental concerns to a conflict over “the increase in deforestation, the increase in size of the hole in the ozone layer, global warming, the biophysical and social impacts of the El Nino ocean current” (p.261) between capitalists [science] and peasants [activities by local people]. He acknowledges that some studies place the agency/action of the rural peasant at the forefront of environmental destabilisation and degradation [in southern Honduras] based on their strategies for survival and others place capitalist relations of production and forces of production as impairing and destroying the local communities’ (natural environment included) own social and material conditions of production. In this light, the debates on *IK*-science divide within the natures/cultures framework can be perceived of as a confrontation between indigenous ways of production and knowledge vs. capitalistic ways of production and scientific knowledge or simply a “science vs. *IK* war”. Little points out that these are problems which though anthropology is strategically situated to resolve remain controversial due to the “radicalisation of nature/culture dualism during the 1990s” (p. 257) in respond to the global environmental crisis. However, Little proposes that the development of an ecological theory that incorporates natural and cultural dimensions within a single, broad paradigmatic framework is necessary if the current global environmental crisis is to be successfully conquered. This suggestion relates with Gellner (1995: 252) who argues that “the social construction of reality needs to be complemented by the natural construction of society”. Little invites us to consider the example of the rubber tapers of Brazilian Amazonia who “gained worldwide attention through their political strategies that combined local direct action with international environmental campaigns” (p. 265; Hecht and Cockburn 1989: 357). In view of his proposition, Little is however quick to acknowledge the problems faced by ecological theorists to address both natural and social phenomena within a single explanatory framework. Some scholars like Law (1987), Vayda and Walter (1999), for example, regard the interface between natural and social systems yet others like McKibben (1999) believe this would result in disharmony- “the end of nature” whereby parts of nature are modified or invaded by human action. These contrary positions have made it difficult to provide a solution on how nature and culture and thereof science and *IK* should relate, especially in view of environment conservation and management. In acknowledging this tantalising difficulty, Little though argues for an expanded anthropology of environment that offers new possibilities of uniting empirical research with the political and environmental project, opens the challenge to build “a new bio-cultural synthesis” to biological and cultural anthropologists. Yet Little’s study remains useful in that: 1) It enhances our understanding of how humans have been affected by their natural environment through time and, conversely, how they have affected that environment and with what results. 2) It invites us to reevaluate the past and present impacts of human beings on landscapes previously considered as pristine or as landscapes only minimally modified by past inhabitants including specific indigenous peoples or unknown Paleo inhabitants. 3) It calls for “a balance and loci of power in decision making process” in environmental issues between local communities (who represent *IK*) and the international community (which represents science). This relates with the argument raised by Green (2012) that to attend to the continued marginalisation of *IK*, the debate on science vs. *IK* is needed in the universities in both the sciences and humanities. Such a position has the merit that “environmental rights” of all people will be respected at all levels (from grassroots level to international level). By environmental rights, we mean the complex domain of environmental anthropology that refers to those cases where the claims and entitlements of “indigenous/first people” (Burger 1990) to territories and natural resources they historically occupied and continue to use (Miller 1993). Thus to a larger extent, Little successfully the concept of “environment” as a powerful tool with which to open dialogue between all knowledge forms (such as science and *IK*) concerned with the natural environment.

#### **4. Indigenous Knowledge Systems And Sustainable Conservation: Some Case Studies**

There has been ample evidence in literature on environment studies that point out how indigenous knowledge systems have been used in some parts of the world to promote sustainable conservation of the environment (Mawere 2012; Faihead and Leach 1995). Brief case studies by these scholars on the institution of *IK*SS in fostering sustainable conservation and management of the

environment serve as a 'melting pot' for a stunning, nuanced grasp of the potentialities of IKSs. They also advances the thesis of this paper that a sound, intelligible exploitation of IKSs ideally presents impeccable opportunities for their productive appropriation and renders a vantage point for deep pragmatic engagement with current problems troubling the conservation sciences.

In my recent studies in southeastern Zimbabwe, for example, I have reported how the Norumedzo people, the VaDuma of *moyo* (heart) totem still employ traditional restrictions in promoting sustainable conservation of a big forest known as *jiri* (see Mawere 2012; Mawere 2013). Further, I reported that, the Norumedzo Communal Area comprises 44 [registered] villages is rich in edible stinkbugs (*Encosternum delegorguei* Spinola) locally named *harurwa* [in Shona vernacular] and wild loquats (*mazhanje*) which exist in the thicket forest/grove (*jiri*) that was set aside for its natural resources - *harurwa* and *mazhanje* - to flourish for centuries now. The *jiri*, which is about 7 km<sup>2</sup> is the 'natural' environment being sustainably conserved by the locals under the traditional jurisdiction of chief Norumedzo, and is believed to be sacred. Both the locals and strangers are constantly advised by the chief through headmen and village 'policemen' not to tamper with it as tampering with the *jiri* or unsustainably exploit resources therein for this is believed to anger ancestors who in return might cause *harurwa's* extinction and curse the *mizhanje* (loquats trees) not to produce fruits. In fact, it is during the exploitation of resources from the *jiri* that the people in this region demonstrate their highest level of *unhu/ubuntu* (humaneness) and capability to sustainably manage their environment. To ensure sustainable exploitation of resources from the *jiri*, anyone who wants to exploit resources from the *jiri* is obliged to first of all seek permission from the village authorities. Villains (those who tamper with or unsustainably exploit resources in the *jiri*) are tried and convicted by Chief Norumedzo's traditional court. Thus through traditional restrictions or institution of IKSs, the *jiri* is flourishing, a clear testimony that IKSs can be successfully instituted to promote sustainable conservation of the environment, particularly of natural resources.

In another case study, Fairhead and Leach (1995) in their piece: "*False forest history, complicit social analysis.....*", examine, how over the years, social science has explained the rapid and recent deforestation supposed to have occurred in Guinea, West Africa so as to inform policy responses to it. Using two case studies namely, forest island of Kissidougou and Ziam forest reserve, Fairhead and Leach explore "the production of applied social science knowledge about people-environment relations in Guinea which exemplify the type of social analysis often brought to bear to explain environmental degradation in Africa" (p. 1023). For the duo, these two case studies clearly expose common assumptions on which social science research on Africa tend to draw. To a greater extent these assumptions have strengths and credibility due to their systematic logic in writing and justification. However, "once dissected from the reality they seek to construct, these explanations reveal instead how the applied social sciences can be used to lend weight to popular Western perceptions about African society and environment - a mythical reality which development interventions are acting to recreate in vain" (p. 1023). For this reason, Fairhead and Leach argue for the need to rethink people-environment relationships in Guinea. To justify their case, Fairhead and Leach sought to carry out a research in the two areas mentioned above, Kissidougou and Ziam.

Fairhead and Leach's (1995) study reveals that social scientists and policy makers or rather "foreign observers" today tend to date [all] socio-environmental disruption [in Kissidougou and Ziam like socioeconomic change, increasing mobility/migration, weakening of traditional authority, individuated farming/shifting cultivation, cultural decadence, alienation of local resource control to state structures, commercialisation of local charcoal, fuel wood and timber, and population growth] to the notorious regime of Guinea's first republic (1958-84) under SCKou Tour and imaging the colonial period as environmentally friendly, while nationals tend to look to the pre-colonial period to find "good' society and environment" (p.1024). To substantiate the "misconstrued" conception by social scientists, Fairhead and Leach cite Project Kan 11 scientists (1992) who reported that: "At origin, the forest between Kissidougou and Kankan was... a dense, humid, semi-deciduous forest. The trigger of degradation is... the farming system" by their shifting cultivation and fire-setting practices, preserving only the belt of forest around their villages to protect their settlements from fire and wind.... and to provide seclusion for secret ritual activities." (see Fairhead and Leach 1995: 1024; Chevalier 1909, 1933). Fairhead and Leach also cite recent research results by professional social scientists on environmental issues in Kissidougou which attributed the "the deterioration of the environment, to "erosion and soil impoverishment, the drying up of water sources, the origin and nature of forest destruction which all result largely from 'the origin of perverse use of bush fire... and socio-economic, political, religious break-ups" (Projet Kan II 1992).

Contrary to these studies, Fairhead and Leach's study identifies with Zerouki (1993) and Fofana (1993) who note that "degradation seems to be recent and the twin project of colonialism and 'modernity' is responsible for disrupting the once successful integration of fire control within diffuse sets of intra- and inter-villages social, cultural and political relationships" (p. 1025). This difference between researchers on agency for environmental degradation makes the whole question of culture and origin more complex and ambiguous. For Fairhead and Leach, this complexity makes it paramount to "examine how vegetation has actually changed in Kissidougou [using historical data sources ignored or deemed unnecessary by social analysts such as aerial photographs, oral history, earlier documentary sources like explorers' reports, reviewed descriptions and maps] is a necessary first step in evaluating these social science analyses" (p. 1026). These sources have the merit that they put to question the actual relationships between society, demography and the environment. Also, they take into account the fact that local land use [which incorporate locally generated knowledge] can be vegetation-enriching as well as degrading [if uncontrolled]. Using these data sources in 27 of the 38 villages investigated, Fairhead and Leach produce a counter-narrative [of social scientists and policy makers] which establishes that the forest history of Kissidougou and Ziam regions documented by social scientists and policy makers was false and ill-founded; "it is an explanation for forest loss which has not actually been taking place" (p. 1027). The duo observed that there has been a broadly positive relationship between the peopling of Kissidougou and Ziam and their forest cover as settlements are associated with the formation of forest islands- more villages mean more forest islands. For this reason, "recent approaches by state agencies [and foreign organisations], which focus on decentralising resource control by

establishing village-level organisation and environmental management plans, actually risk undermining the existing flexible, diverse constellation of resource management relations” (p. 1028). Fairhead and Leach thus argue for a counternarrative with environmental policies that emphasise support to proven local practices and environmental knowledges.

This position relates with Green’s (2012) deconstructionist project and Visvanathan’s (1997) concept of “cognitive justice” with which he argues for the democratisation and plurality of knowledge. This is critical as emphasis has to be placed on the need to gain the participation, acceptance and support of local populations if conservation is to be sustainable (see Fairhead and Leach 1995: 1030); otherwise “foreign and externally enforced” environmental management face resistance. Fairhead and Leach’s position thus, has the merit that unlike other researches [like Xaba’s (2008)] that exhaust more energies on denigrating other forms of knowledge and practices [for example, denigrating “indigenous” knowledge forms or science], it looks at locally generated environmental management practices as alternatives to scientific environmental management practices. As Fairhead and Leach (1995) aver, counter narratives such as theirs “provide different and more appropriate guidelines for policy and present socio-environmental change in a way which better fits local experience; it provides a more effective basis for dialogue and participatory development work with local populations” (p.1033). This way, Fairhead and Leach’s project to democratise knowledge is viable as it opens dialogue between nature and culture or rather between forms of knowledge such as IK and science; it acknowledges that both locally generated knowledge forms [IKs] and scientific environmental management systems can benefit from each other in the whole process of environmental management and preservation. Such a position is indeed positive because:

- 1) It avoids the undesirable habits of “Othering” and “Saming” that cultivate “hierarchical and stereotypical thinking” (Lacan 1964) which in turn amounts to a narrow way of understanding and interpreting societal/and cultural realities and,
- 2) It acknowledges that advancement in knowledge can only be successfully achieved if particular forms of knowledge are viewed as relative and not judged by one’s values or viewpoints and, if there is dialogue between different knowledge forms. There should be no notions in a “good” knowledge project of one form of knowledge being better or worse than another.

## 5. Conclusion

This paper has theoretically and critically examined the arguments by some scholars in conservation sciences and environmental anthropology in terms of how they consider the “IK-science” divide within the nature-culture discourse on environmental conservation and management. Taking global contemporary environmental crisis into account, the paper has argued that debates in conservation sciences and environmental management should be reframed if “sound and sustainable environmental conservation and management” (Mawere 2011: 874) are to be achieved.

More importantly, the paper has argued that science and IK should not be viewed as mutual enemies, but as complements- distinct and separate knowledge forms- that can benefit from each other and help us advance the frontiers of knowledge/understanding. This is what Shiv Visvanathan (2009) calls “cognitive justice”, that is “a democratic and sustainable dialogue between science and other forms of knowledge” (Boaventura de Sousa 2007) or what Green (2008) calls an opening up for other epistemologies in order to advance understanding. To this end, the paper has argued in view of extant debates on “science vs. IK dualism” that either science or IK can successfully progress in resolving our environmental problems if complemented by each other; that both science and IK can benefit from each other in the whole process of environmental conservation and management; that debates in conservation sciences and environmental management should be reframed if sustainable environmental conservation and management is to be met with success.

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