

'Indigenous Knowledge' and 'Science' in the Age of Globalization

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Abstract

Globalization accentuates the local, as seen in the increasing emphasis on 'indigenous knowledge' in the discourse of governments, universities and international organizations. This essay explores the categories of 'indigenous knowledge' (IK) and 'science'/'Western science' (WS) as used by scholars in science policy, anthropology and the history of science, and examines how the similarities and differences between IK and WS have been understood. It argues that IK is an imprecisely formulated term, and highlights recent scholarship that sees IK and WS as constructed categories that emerged in particular historical circumstances. It concludes by discussing briefly the notion that these mutually exclusive labels should be avoided, so as not to privilege some forms of knowledge over others.

Keywords

Indigenous knowledge, science, rationality, science policy, colonialism, globalization

Introduction

It is now a truism in public discourse that we live in an era of globalization, and that science and technology are essential features of the globalized world.¹ Yet one of the paradoxical features of globalization is that it accentuates the local, so that alongside the conception of an all-encompassing, international science, increasing attention is being paid to more local forms of knowledge. Specifically, 'indigenous knowledge' is now a prominent feature of science policy discourse across the world. V. V. Krishna suggests that as science in the age of globalization becomes more commercial and patent-driven, there is an active interest in seeking out (if only for commercial gain) local forms of knowledge (Krishna, 2013, pp. 12–13). The United Nations Educational, Scientific and Cultural Organization (UNESCO) lists as a 'priority area' its programme on 'local and indigenous knowledge systems' (LINKS), which aims to promote such systems and utilize them in environmental conservation efforts.² A recent policy note brought out under the aegis of the UN's Office

for Disaster Risk Reduction (UNISDR) and other institutions addresses the use of indigenous knowledge in managing natural and other disasters (Shaw, Takeuchi, Uy & Sharma, 2009). In 2011, the Botswana government was reported to be 'developing a policy to protect, preserve and promote its indigenous knowledge and mainstream it into the country's macro-economic framework' (Makoni, 2011). In Australia, the Charles Darwin University has set up a School of Indigenous Knowledges and Public Policy, which aims 'to ensure and safeguard the advancement, transmission and preservation of Indigenous knowledge systems'.³

The frequent invocation of indigenous knowledge, and the many exhortations to 'preserve' and 'mainstream' it, make it important to ask what exactly is meant by the term. Important theoretical questions lie at the root of this discussion. Is 'indigenous knowledge' different from science, and if so, how? What is meant by 'science' itself? Is there such a thing as 'modern' science, and is it the same as 'Western' science? In this article, I shall examine how the term 'indigenous knowledge' (often shortened to IK) has

been used in policy circles, by historians of science and by anthropologists, and argue that the concept of IK has long been an imprecise one. Further, recent scholarship suggests that ‘indigenous’/‘traditional’ knowledge, on the one hand, and ‘modern’ science, on the other, are to a large extent constructed categories that emerged in particular historical circumstances. I conclude by discussing briefly the notion that if indeed IK and what we call ‘science’ are comparable forms of knowledge, we need a change in terminology to avoid privileging the latter over the former.

Some Conceptions of Indigenous Knowledge

Policymakers and historians have conceptualized IK in a number of different ways: as orally transmitted knowledge among ‘tribal’ or ‘aboriginal’ societies; as the knowledge behind everyday rural practices; as ancient, scriptural knowledge in non-Western societies; and as live and ongoing systems of knowledge running parallel to ‘Western’ science.

For the first view of IK we return to recent science policy formulations by international bodies. The need to protect IK has been articulated in various forums under UNESCO for at least three decades. A study of these articulations as summarized by Nakashima (2010) reveals that ‘indigenous’ or ‘traditional’ knowledge is largely seen as orally transmitted knowledge, related to activities such as hunting and navigation, among ‘indigenous peoples’ or ‘indigenous communities’. While the UN does not have an official definition of ‘indigenous peoples’, it appears to have in mind mainly communities (‘aboriginal’, ‘tribal’, ‘adivasi’) that have had minimal contact with mobile, urban populations.⁴ Similarly, D. M. Warren’s definition, quoted by the World Bank, associates IK with rural areas:

Indigenous knowledge (IK) is the local knowledge—knowledge that is unique to a given culture or society. IK contrasts with the international knowledge system generated by universities, research institutions and private firms. It is the basis for local-level decision making in agriculture, health care, food preparation, education, natural-resource management, and a host of other activities in rural communities.⁵

A second and quite different conception of IK is as a body of scriptural knowledge that existed in the past. This is a conception implicit in the work of some historians of science in colonial India, who have been particularly concerned with challenging an earlier paradigm in the

history of science called diffusionism (see Kapila, 2010; Raj, 2013; Ramnath, 2012, Chapter 1). The diffusionist view saw science as arising in the Europe of the sixteenth century onwards, before spreading to other, ‘nonscientific’ regions of the world, where it then took root gradually in a multi-stage process (Basalla, 1967). Historians of science in India, in contrast, have challenged this position for its Eurocentric assumptions, its simplistic view of science as an unchanging entity, and its characterization of non-Western regions as historically lacking in scientific knowledge. Largely in order to counter the notion of ‘nonscientific’ recipients of knowledge diffusing from the West, these authors have drawn attention to ‘the multifarious nature of exchange between modern science and so-called traditional knowledge forms’ (Habib & Raina, 2007a, p. xxiii). They refer in particular to the revivalist reinterpretation of ancient Indian knowledge by Indians in the colonial era—the writings of Indian elites who, in reaction to the perceived modernity and objectivity of the science associated with the colonial state, examined Indian scriptures and ancient history to identify elements that seemed to anticipate or agree with this ‘modern’ science. Examples include the cases of Ramchandra, a mathematician who attempted to derive the differential calculus from the traditional *Bija-Ganita* of Bhaskaracharya; Raja Rammohan Roy, the Bengali reformer, who ‘translated the Sankaritic Vedanta into the language of Cartesian rational theism’; and the Edinburgh-trained Bengali chemist P. C. Ray, who wrote a history of Hindu chemistry and found that experiment and observation underpinned the *Rasendra Chintamani* and the *Rasaparakasha-sudhakara*, Hindu texts dating from around the fourteenth century (Arnold, 2000, Chapters 5 and 6; Chakrabarti, 2004, Chapter 7; Habib & Raina, 2007b, pp. 238, 243, 246, quoted text on p. 238; Prakash, 1999, Chapter 4).

Yet ‘traditional knowledge forms’ (which asserted their difference from official ‘colonial science’) were more than an intellectual pool of ideas for elites to dip into in their discourse. At least in some instances, they continued to be actively pursued through the colonial period, indeed well into the twentieth century—the best example being the case of medicine (especially the Ayurvedic and Unani systems).

This constitutes a third understanding of IK. Thus, David Arnold argues that the colonial medical establishment began with an Orientalist engagement with the texts of these ‘indigenous’ systems of medicine and a selective appropriation of Indian *materia medica*. Although its rhetoric grew progressively more authoritative, Arnold

suggests that Western medicine’s aims to displace ‘indigenous’ medicine, at least in the nineteenth century, were never close to being fulfilled (Arnold, 1993, Chapter 1). Elsewhere, Arnold (2000, Chapter 6) points to the continued development of ‘indigenous’ medicine parallel to state-sponsored learning—a School of Indian Medicine was set up in Madras Presidency as late as 1924. Viewing ‘indigenous’ systems of medicine through the eyes of the practitioners themselves (as opposed to those of the colonial state), Kavita Sivaramakrishnan (2008) has depicted a rich and active culture of Ayurvedic medicine in twentieth-century Punjab.

It is apparent, then, that the second and third conceptions of IK differ considerably from the present-day UNESCO usage: neither the hoary texts that P. C. Ray turned to, nor the continuing tradition of Ayurveda, was limited to any rural, localized or endogenous community.

It is also crucial to note that Ayurveda was not indigenous in the sense of being a purely subcontinental construction—it interacted with other systems and sourced ingredients from across the world (see Arnold, 2000, p. 71)—but in terms of pre-dating the colonial era.⁶ It was also indigenous in another sense: it was that which was *not* the official medicine of the colonial government.⁷ This draws attention to the label ‘Western’ medicine in the context of colonial India. Although there were (limited) borrowings from and interactions with local practices and knowledge, this medicine remained recognizable as ‘Western’ primarily because of its association with the colonial state apparatus. Can we then conclude that in discussions of science in a colonial location, ‘Western’ means ‘official’ or ‘that of the state’, while ‘indigenous’ means ‘pre-colonial in origin’ and ‘unofficial’? This would accord with Warren’s definition cited above: indigenous knowledge is that which is not part of an international (here colonial) network of institutions. Yet there are difficulties with such a definition. Is yoga in today’s world—supported as it is by international organizations—indigenous, Western, or some other kind of knowledge? What of Ayurveda and Unani in present-day India, which are taught in state-approved colleges?

There is, then, considerable ambiguity about the term ‘indigenous knowledge’, which appears to refer to different things in different contexts. Yet some common threads may be discerned in the historiographical conceptions of IK discussed above: they all refer to colonial contexts; and most of them involve a reference to IK’s ‘other’, namely ‘Western’ science. Each of these conceptions also has an implicit view of where IK stands with respect to

‘Western’ science (which we shall refer to, for convenience, as WS). We have seen, for instance, that WS is often institutionalized where IK is not. But do IK and WS differ *epistemologically*?

How is Indigenous Knowledge Different?

One parameter which has long been the basis of comparison between IK and ‘Western’ science is ‘rationality’. In a stimulating essay published some decades ago, anthropologist Robin Horton attempted to debunk the idea that African ‘traditional religious thought’ is ‘mystical’ and ‘non-empirical’ as opposed to ‘rational’ and ‘empirical’ (Horton, 1967a, p. 69). There were considerable similarities between IK and WS: traditional thought, Horton contended—even that of a religious nature—is as interested in natural causes of phenomena as is Western scientific thought; entities such as gods and spirits (in explaining somebody’s illness, for instance) perform the same theoretical function as scientific abstractions such as atoms and waves do in explaining physical phenomena (Horton, 1967a, p. 58).

Others have striven to show that indigenous (read non-Western) epistemologies have a rational basis, though the exact nature of this rationality is disputed. This came to the fore in a 1990s debate between two prominent anthropologists. Gananath Obeyesekere (1992) took objection to Marshall Sahlins’s thesis that the voyager James Cook was honoured as a god by the local Hawaiians when he landed on their island in the late eighteenth century, and endeavoured to show that the ‘apotheosis’—that is, the deification of Cook—was a myth of Western making. Sahlins (1995) rebutted this view spiritedly.

For Sahlins, it is perfectly understandable that the native Hawaiians, given the circumstances of Cook’s circuit of Hawaii in 1778–1779, should have believed him to be their god Lono. Their system of making sense of physical events was determined by their culture; within the framework of their culture it was a perfectly reasonable belief. Sahlins shows that the time of Cook’s arrival at the island almost certainly coincided with the observance of the Makahiki festival, in which the ‘annual rebirth of nature [was] configured as an elemental cosmic drama’ (p. 21). According to Hawaiian tradition, the god Lono circled the island of Hawai’i (on land) for the majority of the island year’s last month, ‘effect[ing] the regeneration of nature together with the renewal of the kingship and human society’ (p. 22). As it happened, Cook’s ships,

Resolution and *Discovery*, circled the island for several weeks at this time. Cook's arrival, then, fit—if not quite like a glove—the expected advent of the god Lono. Sahlins (Chapter 1) goes on to show, using narratives from the sailors in Cook's party as well as later local Hawaiian histories, that the honours accorded to Cook soon after this indicate clearly that to the Hawaiian people he was Lono.

For Obeyesekere, this is an untenable position. Based on his experience of Sri Lanka and South Asia, he writes, his instinct rebelled against the proposition that the Hawaiians deified Cook (Obeyesekere, 1992, pp. 8–9). Perceptions may be mediated by cultural values, but this does not mean that one can 'deny the physical and neurological bases of cognition and perception entirely' (p. 60). Instead, he believes in a universal 'practical rationality', which he describes as 'the process whereby human beings reflectively assess the implication of a problem in terms of practical criteria' (p. 19). The Hawaiians would have been in a position to reflect on the arrival of Cook, and be flexible and practical enough to understand this event without having to fit him into their cultural cosmology by assigning him the role of the god Lono.

It is ironic that both Sahlins and Obeyesekere, while holding widely divergent views, should clutch at the same word—rationality. What, then, is rationality, and is it a useful criterion in comparing IK with WS? The *Concise Oxford Dictionary* defines 'rational' as 'based on or in accordance with reason or logic'. 'Reason' is 'the power of the mind to think, understand and form judgements logically'. Not surprisingly, the triangle is completed by 'logic', which is 'the ability to reason correctly' (Pearsall, 2001). To make the issue knottier, we need only look for the etymologies of 'rational' and 'reason'—we find that both arise from the *same root*, the Latin *ratio(n-)*, which in turn is from *rerī* ('consider') (Chantrell, 2004). We are no closer to understanding what rationality means, except that if its definition is so circular, it must be a highly relative quality, depending on who is doing the judging. This is, of course, Sahlins's (1995, p. 14) position in a sense—'[d]ifferent cultures, different rationalities'—and his demonstration of how the honouring of Cook as Lono could be seen as fitting within the Hawaiians' cultural cosmology is in accordance with this position. However, this leaves us in a peculiar position. Rationality is defined—insofar as it can be defined—*with reference to a particular culture*. It follows that the irrational action or belief is one that does not fit the framework of a particular culture—and even then, it is only

necessarily irrational from the point of view of that culture. What this means is that whole cultures—or systems of thought representative of particular cultures—cannot, by definition, be irrational. To speak of the rationality or otherwise of (for instance) traditional African thinking borders on the meaningless.

If rationality does not help us to differentiate between IK and WS, scepticism is another criterion which has been proposed. Let us return to Robin Horton, who argues that while traditional African thinking has several similarities to WS, it is different in two respects: first, it does not share the scientific thinker's awareness that there may be a better theory than the one he or she currently possesses; and second, it is characterized by a fear of the chaos that would ensue were an existing theory to be superseded by a new one (Horton, 1967b). Yet while this may apply to some forms of religious thought, it cannot be entirely true of knowledge related to, for instance, plants with healing properties: unless a society has a way of ruling out existing but ineffectual remedies, it is unlikely to arrive at the effective ones.

So far we have seen the difficulty of specifying the difference between IK and WS. But when we move from the realm of theory to practice, the differences between traditional/indigenous knowledge and WS become somewhat easier to articulate. For instance, Shetty (2010, Table 2) lists a number of ways in which 'traditional' and 'modern' medicine differ. Traditional medicine is '[o]pen access' whereas its modern counterpart is covered by a patent system; it is rarely regulated; techniques and medications are not systematically tested; and the knowledge tends to be handed down from generation to generation as opposed to obtained in an educational institution. Yet these are not incommensurable differences, as is evidenced by the increasing emphasis on the 'integration' of traditional and 'modern' medicine. One way in which this occurs is through the subjecting of traditionally used plant- or animal-based medicines to clinical testing to determine effectiveness (Harikrishnan, 2014; Shetty, 2010). Some drugs that have emerged from traditionally used medicines include artemisinin, derived from a Chinese herb and used to treat malaria; cromoglycate (preventive medicine for asthma), from khellin/khella plant, traditionally used in Egypt and the Middle East; and etoposide (for cancer treatment), derived ultimately from the mandrake plant, traditionally used in China and Japan (Shetty, 2010, Table 1). That such 'integration' can occur at all suggests that there must be common features to 'indigenous' and 'Western scientific' knowledge.

'Indigenous' and 'Western' as Constructed Categories

If there are so many similarities and overlaps between what we call IK and WS, why did we begin to see the two as separate categories? Two recent essays dwell on the historical circumstances under which the concepts of IK and 'Western' science emerged at the peak of colonialism across the world. Marwa Elshakry argues that in nineteenth-century Egypt and China, European and local forms of knowledge were not seen as incommensurable. In Egypt's institutions teaching 'medicine, music, geography and translation', instructors simultaneously included military and civilian experts from European countries, and 'ulama from the prominent *madrassa*, al-Azhar. In post-Opium War China, government authorities and Western missionaries alike used language that stressed the existence of common features between Western and Chinese learning. In China, the text *Evolution and Ethics* (by Thomas Huxley) was interpreted in light of earlier Confucian and Daoist traditions; in the Arabic world, Darwinian theory was explained by 'appealing to older, medieval discussions of transformism' (Elshakry, 2010, pp. 101–104; quoted text on p. 104).

It was only around the time of the First World War, Elshakry argues, that this 'syncretic' view of science began to take a back seat. In this period, the dominant ideology of which was internationalism, science had to be portrayed as a unique, universally applicable body of knowledge that could erase differences between different parts of the world. In addition, this was the time when the concept of the 'Scientific Revolution' gained traction. This view of science as emerging in post-Renaissance Europe simultaneously reified its 'Western' and 'modern' nature: Western because the Scientific Revolution was traced to Europe, and modern because it represented a rupture with the thinking of the Middle Ages (Elshakry, 2010, pp. 104–105).⁸

If science as Western and modern is a relatively recent conception, so is the distinction between science and IK. Helen Tilley has argued that a number of related developments in the period 1860–1940 resulted in the increasing interest in 'primitive knowledge' as an object of study. Chief among these were the rise of anthropology as a professional discipline, with its practitioners encouraged to study the knowledge systems of various (non-Western) peoples; the rise of colonialism, and the impulse for colonial states to conduct 'ethnographic research' in the regions they controlled; and the efforts of elites among

the 'colonized and marginalized' to draw attention to the knowledge systems of their regions (Tilley, 2010, quoted text in Abstract). In summary, world historical developments, in particular colonialism, caused, on the one hand, the construction of a very specific meaning for the term 'science'; and on the other hand, brought into existence this science's Other. Knowledge which did not fit the specific conception of science then became 'traditional' or 'indigenous'.

This leads us to an emerging school of thought among historians that does not stress IK's difference from 'Western' science; instead, it emphasizes the difficulty of a neat separation of different types of knowledge. This view arises out of the recent 'global turn' in the history of science (Fan, 2012). Scholars, instead of studying science within a fixed geographical region or nation, have begun to pay attention to the transregional nature of the personnel and activities that constitute science—experts, administrators, instruments—and their multidirectional movements (see Fan, 2012). In a recent work, Kapil Raj, a prominent exponent of this approach in the historiography of subcontinental science, presents several case studies, including a late-seventeenth-/early-eighteenth-century botanical treatise developed along the lines of European treatises by a Frenchman working in India in collaboration with local informants and artists; and the creation of a legal text, Jagannatha's *Vivadabhangarnava*, 'constructed through a negotiation between legal experts belonging to two distinct cultures' and 'used by court pundits and British judges alike' (Raj, 2007, pp. 134–135). While he is careful to point out that hierarchies and power relationships existed,

South Asia was an active, although unequal, participant in an emerging world order of knowledge...the contact zone was a site for the production of certified knowledges which would not have come into being but for the intercultural encounter between South Asian and European intellectual and material practices that took place here. (Raj, 2007, p. 13)

In this reading, IK is not only commensurable with other forms of knowledge, but also interacts with them, resulting in the creation of a new, hybrid form. Note that here the focus is not necessarily on scientific institutions and laboratories but on 'bounded spaces' that may range from 'trade and commercial networks' to 'state-run institutions' (Raj, 2013, p. 345). The 'circulation' approach, like any other, has its limits: it has been criticized for stressing what seem like unhindered exchanges, when, in fact, such movement of personnel, artefacts and texts may have been accomplished only in some cases, and with great

difficulty (Fan, 2012, p. 252). Nevertheless, the concept of circulation is an example of recent historiographical approaches that enable us to see ‘Western’ and ‘non-Western’ science in the past as categories that were not disjoint, but overlapped and interacted with each other.

Towards a New Nomenclature?

The literature on issues surrounding IK and ‘science’ is vast, and this article makes no claim to being an exhaustive survey. However, I have tried to highlight some of the major ways in which IK, WS and their relationship have been conceptualized. One of the main points to emerge from the foregoing discussion is that the categories of IK and WS often had their origins in colonial periods. That is to say, the idea of ‘Western science’ as a universally applicable system of knowledge coincided with the spread of Western political influence across the world in the era of imperialism; and in turn, the local systems of knowledge in non-Western regions, broadly speaking, were seen as somehow different. Perhaps, then, the key to understanding why IK refers to more than one thing is to recognize that when one speaks of ‘indigenous’ knowledge, one is always referring to ‘non-Western’ knowledge—and that can be of many types.

Why, then, the increasing emphasis on IK in public discourse? First, just as an imperial world saw IK and WS as opposing categories, today’s ‘globalized’, multipolar (in normative terms if not entirely in practice) world order is closely associated with a discourse that does not treat ‘Western’ knowledge as *sui generis*. Second, many of the contributions of IK have been found to have considerable utility. And third, as our discussion has indicated, it is increasingly recognized that IK and WS are not mutually exclusive in character and content. There are several overlaps; it is difficult to call one more rational than the other; the two types are capable of being ‘integrated’, as in the case of traditional remedies being developed into pharmaceutical drugs.

Such being the case, is it time to rethink the terms ‘indigenous knowledge’ and ‘science’ (with the adjective ‘Western’ or ‘modern’)? The word *science*, originally from the Latin *scientia* (knowledge, to know), is no longer neutral. Over the past couple of centuries, it has come to signify a system with a pre-eminent claim to understanding the physical world. If, as policy discourse suggests, the time has come to understand and utilize a plurality of knowledges, it is also time to tackle the implicit hierarchy between those types of knowledge. If ‘indigenous know-

ledge’ is as legitimate a way of understanding the world as institutionally generated knowledge, we must cease to reserve the term ‘science’ for the latter.⁹

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Notes

1. For example, the *International Journal of Technology and Globalisation*, brought out under the aegis of the Belfer Centre and the Center for International Development at Harvard University, focuses ‘on the interactions between technological innovation and globalization’. <http://www.inderscience.com/jhome.php?jcode=ijtg> (last accessed on 4 February 2014).
2. Local and Indigenous Knowledge Systems, United Nations Educational, Scientific and Cultural Organization (UNESCO) (<http://www.unesco.org/new/en/natural-sciences/priority-areas/links/related-information/about-us/>).
3. School of Indigenous Knowledges and Public Policy, Charles Darwin University, Australia (<http://www.cdu.edu.au/sikpp>).
4. Who Are Indigenous Peoples? Factsheet, United Nations Permanent Forum on Indigenous Issues (http://www.un.org/esa/socdev/unpfii/documents/5session_factsheet1.pdf).
5. Quoted in: What Is Indigenous Knowledge? Regions: Sub-Saharan Africa, The World Bank Group (<http://www.worldbank.org/afr/ik/basic.htm>).
6. J. M. Flavier et al. note that ‘[i]ndigenous information systems are dynamic, and are continually influenced by internal creativity and experimentation as well as by contact with external systems’. Quoted in: What Is Indigenous Knowledge? Regions: Sub-Saharan Africa, The World Bank Group (<http://www.worldbank.org/afr/ik/basic.htm>).
7. David Arnold (1993, pp. 13, 14), writing specifically on medicine, draws attention to the complex ‘relationship between what for convenience we call “indigenous” and “Western” medicine (as if they were totally independent and internally homogeneous systems of thought and practice)’, and argues that it ‘needs to be looked at in more pluralistic and dialectical terms, terms that allow for a continuing interaction between the two during the long history of colonial rule in India ...’.
8. Fa-ti Fan (2012, p. 250) makes a similar argument—that mid-twentieth-century history of science became narrow owing, among other things, to ‘the brilliance of Alexandre Koyré’s work ... and the narrowing of language training’.
9. See, for instance, a recent article by Sahai (2013), the title of which argues that ‘indigenous knowledge is a form of science’. The value judgement implied in the use of terms such as *indigenous knowledge* has been noted and challenged by scholars in the past, as reported by Sillitoe (2009, p. 9). One possible alternative nomenclature is suggested by the title of Sillitoe’s edited volume: *Local Science vs. Global Science*.

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