

## Comments on article by Arun Agrawal

In his article ['Indigenous and scientific knowledge: Some critical comments'](#) Dr Agrawal maintains that most of the writings on indigenous knowledge contain a number of contradictions and conceptual weaknesses. The main thrust of Agrawal's argument rests upon the following points:

- Distinguishing 'indigenous' and 'Western' as two types of knowledge is not only potentially ridiculous, but also counterproductive for those who believe that indigenous knowledge has a contribution to make to sustainable development;
- There is actually nothing new about the rhetoric and practice of indigenous knowledge;
- The strategy of archiving and disseminating indigenous knowledge runs counter to the very concept of indigenous knowledge.

In the following pages, several reactions to Dr Agrawal's article are published. It will be clear that there is no consensus on either the necessity and usefulness of distinguishing between indigenous and scientific knowledge, or on Dr Agrawal's basic assumptions. In the August issue we would like to give a follow-up to the discussion. ([See editorial](#))

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### Dr Thomas Heyd

There are good reasons to agree with Agrawal's concerns about the *ex-situ* conservation of indigenous knowledge, and with his analysis of the social consequences of archiving and disseminating indigenous knowledge, insofar as it affects the welfare of economically marginalized indigenous peoples. However, his critique of the distinction between indigenous and scientific knowledge cannot be accepted out of hand. Many of the alleged distinctions between indigenous and scientific knowledge are indeed without solid foundation\*\*1. Nonetheless, there are a number of differences which Agrawal fails to point out.

The fundamental source of confusion in Agrawal's analysis lies in the fact that he equates 'scientific' knowledge with 'Western' knowledge. All scientific knowledge clearly is not Western (many non-Western regions of the world are sources of scientific knowledge), nor is all Western knowledge scientific (much ordinary knowledge common to people in the so-called Western world is not the result of scientific investigation). Strangely enough, the confusion between the two categories leads Agrawal to present the correct beliefs of Hume, Foucault and Said as representatives of scientific knowledge. More seriously, this confusion makes comparison impossible, due to the extreme vagueness of the term 'Western knowledge'. (Is my belief that the sun will rise tomorrow part of 'Western knowledge'? Does such knowledge include the correct beliefs of a Hong Kong scientist, or the true justified beliefs of a Moorish merchant in France?)

Moreover, Agrawal, repeatedly confuses scientific knowledge with the technical applications of science. He notes the penetration of science-based, technical applications into everyday 'life in the West', and concludes from this that indigenous knowledge cannot be distinguished from scientific knowledge in its specific attention to the 'immediate and concrete necessities of people's daily livelihoods'. However, I believe that we should distinguish between the motivating factors for the development of knowledge and those underlying the application of that knowledge.

No one would dispute the fact that findings which emerge from one area of research are frequently applied in new, often unrelated, areas. Hence, the various applications of indigenous and scientific knowledge cannot serve as distinguishing marks between the two. However, the motivation behind the development of these two sorts of knowledge does represent a distinction between them--interestingly, precisely in terms of the concrete life context alluded to by Agrawal. For example, the development of iatrobotanical knowledge by Canadian West Coast indigenous peoples (e.g., on Vancouver Island's Clayoquot Sound) is clearly motivated by 'immediate and concrete necessities', while the development of certain aspects of knowledge concerned with particle physics by Canadian West Coast scientists (at Vancouver's TRIUMF facilities) is not.

Agrawal also questions the distinctive significance of the rootedness of indigenous knowledge in specific local contexts or environments, by comparing it--somewhat incongruously--with the dependence of scientific findings on the contexts of scientific practice. It is quite true that sociology of science ('Strong Programme') and certain strands of the philosophy of science have proposed that particular scientific claims are explicable by means of factors like historically specific beliefs and equipment. These various enabling factors can be seen as the 'environment' that made possible certain findings. There is, however, a qualitative difference between the dependence of these scientific findings on their 'environment' and the dependence of indigenous knowledge on its 'environment'.

Physicists' knowledge of particle physics is the result of focusing on certain discipline-internal questions within their subculture and microenvironment, and is largely independent of the broader culture and background of the practitioner. A particle physicist may be a Muslim from Indonesia or a Mormon from Utah. The iatrobotanical knowledge of the Canadian West Coast Nuuchah-nulth, in contrast, developed in direct interrelationship with their traditional culture and their ancestral places. In the latter case, 'environment' encompasses the full context of lived experience, as qualified by the broader culture and its values, and the moulding power of place.

Agrawal is nonetheless quite right in his concerns regarding *ex situ* conservation. It is uncertain\*\*1 whether in the long run *ex situ* conservation will benefit indigenous peoples. I also agree that if the well-being of economically--and politically--marginalized indigenous peoples is really of primary concern, there may be more direct ways in which their interests can be furthered. Notably, indigenous peoples might find 'a greater voice', and ultimately achieve the *in situ* preservation of their indigenous knowledge, if management proposals made by them on the basis of their indigenous knowledge were accorded full legitimacy in policy decisions affecting their land, resources and communities.

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**Endnote**

\*\*1 See also Heyd, T. (1995) 'Indigenous knowledge, emancipation and alienation', *Knowledge and Policy* 8(1):63-73.

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**Dr D. Michael Warren**

In 1980, David Brokensha, Oswald Werner and I were struggling to find a term that could replace 'traditional' in the designation 'traditional knowledge'. In our view, 'traditional' denoted the 19th-century attitudes of simple, savage and static. We wanted a term that represented the dynamic contributions of any community to problem solving, based on their own perceptions and conceptions, and the ways that they identified, categorized and classified phenomena important to them. At the same time Robert Chambers and his group at Sussex were struggling with the same issue. Independent of each other, we both came up with the term 'indigenous'.

Now, 16 years later, it is clear that the term 'indigenous' has its own set of problems and misinterpretations, as it is translated into a growing array of languages, and a wide variety of academic disciplines get involved in recording knowledge systems important to them. Many of those interested in the role of indigenous knowledge in development have not had an opportunity to explore the roots of this paradigm shift in international development, or the various methodologies being tested to record these systems. These constraints are being tackled by nationals running their own centres for their own people, and controlling the use of the recorded systems in ways that they feel are necessary and appropriate.

Many case studies exist that have been recorded by persons from a given community or ethnic group. These studies reflect the rich indigenous knowledge resources that have not yet been adequately recognized as contributions to global knowledge. Indigenous knowledge represents generations of creative thought and action within each individual community, as it struggles with an ever-changing set of conditions and problems. All case studies indicate that the mechanisms for changing knowledge systems at the local or ethnic level are identical to those that drive the global knowledge systems. Individual local-level creativity reflects reactions to perceived problems, as well as the incorporation of external knowledge, technologies and methodologies into the local knowledge system. Each system has its own relative strengths and weaknesses that are abundantly clear to members of the particular community. Although all of these systems exist *in situ*, very few have been recorded so they can be shared with the global community. Local people are in a position to define which knowledge can and should be shared with outsiders, and which specialized knowledge should remain within the local domain.

An understanding of the ways that Yoruba farmers in Nigeria and Benin identify, define, categorize, classify and manage soils as an important natural resource is of great interest not only to Yoruba farmers, but to Nigerian students of soil science, and extension agents from other parts of the country working with Yoruba farmers. This is knowledge that can be--indeed has been--compared and contrasted with the categories developed by various scholars active in the academic discipline of soil science in Nigeria. They find it of interest, their students find it of interest, and many of us in Iowa also find it of interest. It is available *in situ* but it is also available *ex situ* in the documentation units and on the Internet.

Thus we are talking about a knowledge system that is now available globally. It will be clear that this is a comprehensive and sophisticated system, comparable to national and international systems of soil taxonomy. It is a contribution to global knowledge, and as such it should be available in libraries, alongside the millions of other studies by societies with written traditions which exist in *ex situ* form. These systems are not part of the global knowledge system until they have been recorded and made available to the global community. They are not inferior to the global system, they have just been generally unavailable. They represent contributions to global knowledge, but until they are recorded no one from outside the particular language group, local community or ethnic group will even know of them. These knowledge systems continue to be devalued in the 1990s.

Agrawal's presentations are very valuable. The only disappointment lies in his statements that the distinction between indigenous and global knowledge is 'ridiculous' and a 'sterile dichotomy', that *ex situ* storage of knowledge systems creates a mausoleum for knowledge fixed in time and space, that those of us working in this area are interested only in the 'knowledge of the marginalized poor', and that 'Western science is ... condemned'. Most of us working in this arena have been trained in the scientific method, if not in the sciences. We certainly do not condemn Western science or the development process. We are interested in seeking the universal characteristics of all knowledge systems, of providing a mechanism that will value the contributions of every community to global knowledge, and will change attitudes in such a way that nation states will begin to recognize the most important resource they have--the knowledge generated, but usually ignored, by their own citizens. What is to be recorded and made available *ex situ* for the citizens of the country of discovery and those of other countries, and what is to remain *in situ* and possibly not even recorded in print must be determined by citizens of those communities and nations. This is one of the most important roles of indigenous knowledge resource centres in the various countries. By recording knowledge, and making it available to the global community, I am confident that community-based knowledge systems will in the near future begin to be regarded as contributions to global knowledge. Then, at last, the dichotomy between indigenous knowledge and scientific knowledge will indeed be regarded globally as ridiculous.

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**Dr Kate B. Showers**

The utility of a distinction between indigenous knowledge and scientific knowledge for environmental researchers is not entirely clear. Most environmental problems took many years to develop and are the result of unimagined interactions among highly diverse factors. To analyze these problems, Western science requires

quantitative descriptions of the events and processes involved. Yet many environmental components have not been measured, which means that there are no quantitative data from which to construct a baseline. Without baseline data, calculations of rates of change are complicated and highly contentious. Without a clear baseline, it is difficult to distinguish between normal variation and an absolute change in environmental conditions. This situation is perceived as problematic in North America and Western Europe, and virtually insurmountable in the rest of the world. The complaint 'There are no data' supports the claim that in most nations environmental impact assessments cannot be implemented.

This calls up the question of whether quantitative descriptions are the only--or even sufficient--forms by which to describe the environment. If they are, then the past environmental function of vast areas of the earth's surface is unknowable. If they are not, researchers should explore alternative sources of information. Local environmental knowledge and indigenous knowledge have the potential to supply accurate descriptions of visible environmental processes.

When a human intervention in the landscape causes a new phenomenon, there is no indigenous knowledge available concerning its management or prevention. However, the origin and development of the phenomenon may have been observed and indigenous experimentation carried out to deal with the consequences. Archival material often provides data which support or adjust environmental information derived from local sources. Using these sources of information, the range of expected variability in the pre-disturbance environment can be described. The resulting description can help us to understand the significance of the intervention. This description also provides a basis for monitoring and remedial action.

A framework for understanding human-induced environmental change using local environmental knowledge is provided by historical environmental impact assessment (HEIA). HEIA is patterned on the steps involved in an environmental impact assessment, but reconstructs the effects of past interventions in landscapes (Showers 1995/1996). HEIA favours neither Western science nor indigenous knowledge. Instead, these two systems of data collection are seen as complementary, in the sense that each has its own strengths and limitations. HEIA assumes that knowledge systems are in a constant state of change and requires that practitioners clarify what was known at different points in time. People 'back then' cannot be blamed for ignorance of what we know today.

The environmental consequences of indigenous land use systems have been discussed from the early years of this century. Documents which demonstrate the sustainability of indigenous systems and the degradation resulting from European land use practices and policies in various parts of the world have not been widely disseminated. And yet these findings have been discussed at government meetings and regional and international conferences. Moreover, this documentation is a source of material for historical environmental impact assessments and the construction of historical baselines.

Today the debate on the importance of indigenous knowledge and indigenous land use practices is more public than in the past. Proponents of indigenous knowledge systems remain in the minority. The content of the debate, however, has been remarkably constant: economic necessity vs. local traditions and cultural continuity. But the tide may be turning. The effectiveness of the short-term technical solutions once thought to be so effective have had unforeseen negative consequences in the long term. Historical environmental impact assessments facilitate the examination of these long-term effects, and can be used to develop new measures based on indigenous knowledge.

The collection and use of indigenous and local environmental knowledge in environmental research should not denature the knowledge systems. Both indigenous knowledge and Western science are an attempt to characterize and understand the 'universe' of a given society. At any given point in time that knowledge represents a 'best estimate', which will be modified when further evidence is obtained. This means that both knowledge systems are in a constant state of evolution. Both systems have also been developed for their own 'universe', and thus are characterized by areas of greater and lesser expertise. While environmental problems require a general understanding, many environmental questions depend upon non-generalizeable site-specific details. This is where indigenous knowledge can make a great contribution. Both indigenous and local environmental knowledge have the potential to advance people's understanding of the environment in all societies.

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**References**

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**Dr R.C. Serrano**

I agree with Agrawal that indigenous knowledge should not be distinguished from Western or scientific knowledge. A major characteristic of indigenous knowledge is the fact that it has evolved over a considerable period of time, and that it is identified with a given culture or society. According to this definition, we can say that indigenous knowledge systems and practices must exist among Western cultures, just as in other societies, in particular among so-called indigenous peoples (IPS).

The distinction between indigenous knowledge and Western knowledge is misleading, as is the designation of Western knowledge as 'scientific', which implies that indigenous knowledge is 'unscientific'. The findings of research carried out in the Philippines show that there is scientific significance in many of the knowledge systems and practices of our peoples. While they may not be as elaborate or as eloquently expressed as those encountered in formal science, this does not mean that IK and IK practices are not scientific. In fact, interesting partnerships are now being established between scientists and indigenous farmers, in order to learn from each other and promote fruitful joint undertakings, for example, in the areas of agriculture and natural resources management.

There is evidence of a worldwide snowball effect, as interest in the documentation and preservation of indigenous knowledge systems increases. It must be said that it was not the IPs themselves who conceived the idea of studying their knowledge systems, nor did they attempt to share their knowledge with outsiders. In fact, over the years, these knowledge systems and practices have come under threat through the interference of outside dominant cultures.

While it is logical to want to preserve and document these IK systems and practices, there is a protocol that must be followed by those involved in the electronic documentation of such information. In the first place, they must secure the consent of the indigenous peoples to whom this intellectual property belongs. This is an urgent issue, one that must be settled in an international forum consisting of representatives of IPs, the scientists involved in the documentation of IK, and those responsible for policy and legislation. Like scientific discoveries and inventions, which are usually patented or copyrighted, indigenous knowledge systems can and should be treated as someone's property. Outsiders are not free to make use of them as they see fit; appropriate permission should be secured and due arrangement made with the owners, whether a small group, a community or a society. While regional and global development are noble motives, intellectual property rights must be duly respected, especially in the light of the General Agreement on Tariff and Trade (GATT). The owners' permission should be requested beforehand, and where required, royalties or a remuneration of some kind should be paid. I also agree with Agrawal that if indigenous peoples are to be able to preserve and apply their knowledge systems and practices, governments must respect their culture, creating a political atmosphere in which they have sufficient control over their land and resources, and the freedom to decide how and by whom their knowledge is used.

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Dr Agrawal's questions are important and relevant to me as an IK theorist and an educator of indigenous peoples. While teaching in post-independent Tanzania, I struggled like many teachers in African schools to develop relevant and meaningful lessons which met the local needs of students, drawing on examples of the wisdom and history of local people, parents, and grandparents. The distinction between indigenous/African and Western/European education was clear. The dichotomy between these knowledge systems did not glorify the similarities. On the contrary, Africans had to find a way to accommodate and make sense of both systems, and as a result the two competed for attention.

As an educator, I am on the front line of the production and reproduction of knowledge in classrooms. Today the 'rhetoric' of indigenous knowledge is important, because it encourages a discussion that has been

suppressed for many years by dominant European-centred educational systems. IK 'rhetoric' also stimulates the development of relevant curricula in the area of indigenous knowledge. When I say that curriculum development is concerned with the production of knowledge, I realize that this is a view which goes beyond traditional notions of curriculum as simply a course of study, a compilation of data to be learnt. In the sense I mean here, a curriculum devoted to indigenous knowledge encompasses not only epistemological questions related to both the production and consumption of knowledge, but also the relationship between culture and what is defined as successful learning, the competition between all forms of knowledge production, and the purpose of education itself. I suggest that curriculum studies/curriculum development should devote attention to the process involved in the generation and validation of curricular content, and the fact that some groups of people benefit from the 'certification' of certain forms of knowledge, while other groups do not.

In an age of rapid change, marked by dramatic conflict between the collective good and individual rights, the discussion on values is becoming an increasingly complex and daunting affair. No knowledge system can exist in a cultural, economic or political vacuum! On the understanding that power relations cannot be separated from knowledge production, theorists must take seriously indigenous--as opposed to Western-- forms of knowledge, avoiding the false distinction between school and community. For example, Tanzanian schools inherited from the British a colonial system of education, which devalued local knowledge systems as 'primitive', and taught students to believe that they were inferior and thus should be satisfied with subservient roles in society\*\*1. This orientation also encouraged students to look outside the community for solutions to problems that were endemic among indigenous peoples--from food and medicine to irrigation systems, from insecticides to mouse traps. Following independence, this orientation had to be done away with if the new nation was to become self-reliant. Nyerere\*\*2 points to the contrast between indigenous (local/traditional) and colonial (Western/European) knowledge systems, which in effect represent two separate realities. On the one hand, African students are immersed from birth in a cultural setting that values the authority of elders and emphasizes practical knowledge. On the other hand, they are schooled in a system in which teachers do little to make classroom lessons relevant to life in African village communities, and in which the authority of elders is devalued and undermined. Is it not ridiculous to deny that these are two separate realities?

Since Nyerere's day, this dilemma has not only remained unresolved, it has become further entrenched in the system of schooling. It is the crux of local and global debates about the value of schooling in the context of dissipating ethnic and cultural conflict, and at the heart of the discussion about the possibilities for indigenous communities to participate effectively in their own education programmes. The question reflects the dilemmas created by the concept of indigenous knowledge and the way it competes with other knowledge systems. It makes perfect sense for me as an educator to distinguish indigenous knowledge as a category when examining educational systems as pedagogical sites of knowledge production. This category is made possible by identifying the producers of knowledge as distinct actors. The knowledge so produced is neither neutral nor universal. Even though the literature is imprecise when it comes to defining IK in all the contexts within which it is produced, the grassroots research emerging from the agricultural sciences, education, geography and the natural sciences all point to a new awareness and appreciation of local knowledge. African knowledge and its incorporation into the solution of ecological problems is a move away from the colonial legacy, which looks outside Africa to the countries of Europe and North America for solutions to problems endemic to local communities. In this new orientation, which places a high value on local knowledge, indigenous education is characterized as local, i.e., circumscribed by local history, environment, language and traditions, as well as by African culture. The dilemmas we face in defining IK are central to the post-colonial debate on the origins of knowledge and the manner in which it is produced, archived and retrieved. Advocates of indigenous knowledge, far from assuming that the knowledge of the individual defines nature for



all time, are the ones who have finally recognized that the distinction has in fact been historically created by the West, and is not rooted in ahistorical traits of humankind.

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\*\*1 M. Bray, P.B. Clarke, D. Stephens (1986) *Education and society in Africa*. London: Edward Arnold.

\*\*2 J.K. Nyerere (1968) 'Education for Self-Reliance,' pp. 278 in *Freedom and Socialism/Uhuru na Ujamaa: Essays on Socialism*. New York: Oxford University Press.

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**How to convert the indigenous knowledge debate into something positive .... or how we can have our cake and eat it too.****Dr I.U. Köhler-Rollefson**

Indigenous knowledge has been 'in' for several years now, as witness publications like the *Indigenous Knowledge and Development Monitor*, a network of research centres and data banks, and much more. Now we find Agrawal taking us to task for all this. In his articles\*\*1 he blasts us for appropriating this knowledge and paints a hopeless picture of the future of indigenous peoples. In many ways he is right on track, and the things he has said needed to be said. The widely propagated paradigm that it is to everyone's benefit to feed knowledge about everything from indigenous plant use to indigenous animal breeds into data banks and then make them accessible to 'all' (i.e., those of us in the developed world who have access to the Internet), is touchingly naive. As Arun Agrawal rightly points out, indigenous knowledge is highly varied and location-specific. What good it is to a Vietnamese farmer to know what his Peruvian colleague is doing is beyond me. Similarly, how the setting up of a data bank on animal genetic resources will actually save a single threatened livestock breed has yet to be explained. It seems that information agglomeration has evolved into a neat figleaf to camouflage our impotence in the face of seemingly unsurmountable problems. Good for scholars, but it is action and practical involvement at the grassroots level that are required to solve the problems of the planet. This brings us right to the central point. Arun Agrawal focuses on the problematics of the IK concept--or the lack of it.

However, it seems to me that by asserting that indigenous and 'western' or 'scientific' knowledge have been

depicted as opposites, he is setting up a strawman for subsequent dismantling. Indigenous knowledge is the practical knowledge and experience of people who still have a direct link to the 'soil' and their immediate environment. This is why contrasting indigenous and Western knowledge is moot; it is like comparing apples with oranges. For one thing, it implies that there is no indigenous knowledge in Western cultures, and that non-Western cultures have no scientific or 'book' knowledge. Where in such a classification system would we place the kitchen garden skills of German farmwomen or ayurvedic medicine and acupuncture?

What term indigenous knowledge usually signifies is exotic practical knowledge, i.e., practical knowledge encountered in cultures not our own. It is significant that the term indigenous knowledge was coined by social scientists, i.e., anthropologists who were apparently astounded that the people they were dealing with knew many things they themselves had never been exposed to, such as practical knowledge about the earth and the environment, and were able to make plants and animals grow and flourish. As good anthropologists they projected this aspect of traditional cultures, and in the process it became surrounded by a certain mystique. By contrast, graduates of practical disciplines such as agriculture and veterinary medicine have always been aware of the existence of a vast body of local knowledge and folk wisdom. However, they have rarely appreciated it, viewing it more as something to be eradicated.

As a rule, there is nothing mystical about indigenous knowledge; it may appear so because it entails the honing of sensory skills that are not exercised in the course of academic study; they therefore degenerate or never develop in the first place. Indigenous knowledge is gained by experience, practical immersion, and often back-breakingly hard work, within a context of repetitive boredom. It is a prerequisite for survival for the majority of the world's rural population; it is learned by doing, not by reading or following a course. It is knowledge that is subject to permanent testing and refinement, and must constantly prove its worth. All this sets it apart from book knowledge which may just sit there for hundreds of years without ever being put into practice. Thus practical knowledge is a *sine qua non* for anyone who lives off the land. With practical knowledge alone a farmer can survive, whereas mere book knowledge will not enable anyone to grow crops or raise livestock. This is why indigenous knowledge will always be fundamental to rural development, and why any effort to dispense with it will fail. The problems arise when people with book knowledge think that they know it all--a situation which is perpetuated by universities and institutions of higher learning.

If I am getting somewhat hot under the collar over this, it is probably because of my recent experiences in the context of a camel husbandry development project for pastoralists in India. The aim was to find ways to better the economic situation of the traditional pastoralists, and at one point we hit on the brilliant idea of availing ourselves of the services of a conventionally trained veterinary doctor who could help us to improve the health of the animals. A bitter disappointment awaited us. The yawning gap between the representatives of academe and the protagonists of indigenous knowledge became obvious as soon as they set eyes on one another. The first comments made by one vet on seeing a migratory camel herd were predictable: 'Why are these people keeping their camels in an open field? Are they not giving them any housing?', followed by 'These people are not giving their animals a balanced feed. If they don't know how to calculate a ration for their camels, how can we help them?' Little did the vets know that the Raikas distinguish some one hundred different forage plants; they know the different effects they produce in terms of milk yield, and in fact base their migrations on the seasonal availability of such plants. The vets themselves lacked the necessary training to identify even one of the crop plants grown in the area. Another vet tried to mesmerize me by rattling off long lists of Latin plants names (getting them all wrong), even though he could not tell a lentil from a linseed. This is not an exaggeration. We had to stop bringing in the academics, because they proved too much of an embarrassment to the project.

All this ignorance would not be so bad--it can, after all, be remedied--if it were not coupled with a quite startling degree of arrogance. I could not concur more totally with the comments of Dr Kroma (1996:13-16) to the effect that book knowledge and schooling undermine the appreciation of practical indigenous knowledge. However, although indigenous knowledge will always remain basic and fundamental to sustainable land utilization, we must also be aware that it has its limitations, and that there are many situations in which it is not actually useful. For instance, certain major animal diseases cannot be brought under control using traditional methods alone. There is a clear need for the discriminating merger of indigenous knowledge with scientific academic knowledge.

What all proponents of indigenous knowledge must work on is constructing this interface between the two knowledge systems. This will entail making room in the academic curriculum for exposure to indigenous knowledge and getting academics to respect indigenous knowledge. More interaction between the converted (anthropologists) and the conservative (agricultural scientists, etc.) is also required. At the same time, we must download useful aspects of academic/scientific knowledge, and make it not only applicable, but also palatable to local people. There is nothing wrong with studying indigenous knowledge if at the same time we reciprocate in kind, taking the time to impart relevant parts of our own knowledge system. Communication with indigenous peoples must be a two-way affair.

If we all try to do this within the various scenarios open to us, then I believe that this may be useful to all those concerned. In this sense, we may be able to have our cake, and eat it too.

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### **Reference**

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### **Endnote**

\*\*1 *Development and Change* (1995) 26:413-439 ; *The Common Property Resource Digest* (1995) 36:3-5 ; *Indigenous Knowledge and Development Monitor* 3(3):3-7.

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**Farmers, extensionists and the relation between indigenous knowledge and scientific knowledge in extensive livestock production: experiences from Latin America.**

### **Katrien van 't Hooft**

Agrawal's statement that we must move away from the sterile dichotomy between indigenous and scientific knowledge is absolutely valid for farmer groups in both Bolivia and Nicaragua. In their extensive livestock

keeping, the six farmer groups studied<sup>\*\*1</sup> all combined indigenous knowledge and scientific knowledge in some way or other.

On the other hand, for the farmers involved there is a clear distinction between indigenous and scientific knowledge and practices. This has to do with the availability of the products involved in each of these practices. Indigenous knowledge is based mainly on locally available products which, while they have a certain market value, can also be obtained within the traditional market system. Products which are rooted in scientific knowledge require a monetary investment, must be introduced into the capitalist market system, and are depended on manufactured products. In short, to obtain these articles, one must enter a shop and pay money for them.

Today many rural communities in the Third World are facing changes and many kinds of insecurities: economic, cultural, market, social, political and ecological. Moreover, the move towards a market-oriented economy, which constitutes a political decision by governments in many countries, is accompanied by high costs for the rural communities. An increase in the 'modern' aspirations of farming families is part of this reality, resulting in a growing desire for a cash income. Massive migration to other ecological zones or urban areas is one of the options.

Other possibilities include adapting one's agricultural strategy. Against this background, the balance between indigenous knowledge and scientific knowledge in agricultural production is starting to change, as farmers begin to experiment with new possibilities. This is a process which will have different results for each farmer, depending on his individual interests and possibilities. Thanks to these experiments, farmers are now realizing that it is possible to combine their indigenous knowledge with elements of scientific knowledge.

Outsiders such as technicians and extensionists should focus on assisting farmers in this process of finding a new balance between indigenous and scientific knowledge in their production strategy. Together they should analyze the available options, leaving the actual decisions to the farmers, and giving them an opportunity to experiment. Technicians in the service of farmers and farmers' organizations should strive to optimize the relationship between the two knowledge systems within agricultural production. In this approach, the role of the technician or extensionist does **not** consist in acquiring and evaluating as much knowledge as possible (whether indigenous or scientific), deciding on the strategies to be followed, and finally returning these to the farmers as a package, which they are free to adopt or reject.

Instead, while technicians should contribute their own--predominantly scientific--knowledge to the strategy discussion, it is ultimately the farmers who will evaluate the completed experiments and decide on new ones. The results will be different for each case, each situation, each family and each individual. The fact that technicians offer farmers scientific knowledge is not in itself a bad thing, and many farmers are eager to learn from them. However, the technicians or extensionists are only one of many possibilities for farmers to gather knowledge and make decisions, and they must see themselves in this perspective.

Although it is not my intention to question the value of indigenous knowledge, I would like to stress the importance of elements of scientific knowledge in combination with indigenous knowledge. This is especially true in extensive livestock production, where indigenous knowledge is often powerless to deal with the high mortality rates. The experiments of the farmers show us the way. However, the scientific world in Latin America is not entirely ready for this change. For example, it is often difficult to find formal research findings on infectious and parasitic diseases of the species used in extensive livestock production. Moreover, in both

Nicaragua and Bolivia, the oral vaccine against Newcastle disease (major infectious disease among chickens), which is suitable for small-scale chicken production is not available on the market.

Moreover, in spite of certain positive developments, the curricula of agricultural schools and universities in many Latin American countries remain basically scientifically oriented, and based on Northern--thus intensive--methods of livestock keeping. Elements of family-level extensive livestock keeping and indigenous knowledge are more often ridiculed than welcomed, while the role of the technician is automatically considered to be superior to that of the farmer.

Therefore, I agree with Arun Agrawal that 'it is necessary to attempt to reorient and reverse state policies to permit members of threatened populations to determine their own future', but not only with the objective 'to facilitate the *in situ* preservation of indigenous knowledge'. I argue that state policies should also stimulate scientific knowledge which is adapted to small-scale agriculture and livestock production, both in agricultural education and research. At the same time, farmers' organizations and technicians should start working on improving the balance between indigenous and scientific knowledge, in order to leave decisions where they belong: in the hands of the farmers.

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### **Endnote**

\*\*1 Van 't Hooft, K. (1995) *Interface between local knowledge and western scientific knowledge in extensive livestock keeping*. MSc thesis, MAKS course '95.

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## **Indigenous knowledge and development**

### **Dr Carmen G. Hess**

In his article Agrawal tries to uncover contradictions and conceptual weaknesses in the literature on indigenous knowledge (IK) and scientific knowledge (SK). I welcome this opportunity to review and synthesize IK research, which is based on the perspectives of numerous disciplines, and experiences in many

countries. However, the usefulness of Agrawal's critique is seriously hampered by two shortcomings. First, he misrepresents the contributions of IK research by placing it in opposition to the so-called 'hard sciences' and, second, he bases his argument on an erroneous definition of IK.

In discussing SK, Agrawal draws upon debates on the history and philosophy of science, which are concerned with the so-called hard sciences, such as astronomy, astrophysics, chemistry and biology. But, the SK involved in development is also rooted either in the environmental, agricultural, veterinary and economic sciences, or in nutrition, forestry, engineering, pedagogy and health care. These disciplines differ from the hard sciences in that they cannot pin down complex social realities in laboratory experiments, or achieve the required predictability and control of events and processes (Schoenhoff, 1993:37). IK research scrutinizes the utility and the role of development-related sciences, which must take into account social and cultural factors. Thus the attention of IK research is directed towards the encounter between the softer sciences and local expertise.

My second bone of contention is that Agrawal's characterization of IK as closed, non-systematic or fixed knowledge does not correspond to contemporary--or even past--definitions. In a collection of essays on indigenous knowledge systems edited by Warren et al. (1995), IK is defined as 'basically local knowledge that is unique to a given culture. It is the information base for a society which facilitates communication and decision-making. Indigenous information systems are dynamic, and are continually influenced by internal creativity and experimentation as well as by contact with external systems.' (Flavier et al., 1995:479)

Both contentions are fundamental to my criticism of Agrawal's argumentation. I suggest that further discussion of IK research can best be advanced by focusing on the relationship between IK and development. First, I regard the term IK as a contribution to development thinking. In comparison with such labels as 'beliefs', 'customs', 'traditions' or 'modes of thought', the term 'indigenous knowledge' respects the expertise of indigenous peoples. The evidence that indigenous knowledge is often scientifically correct (e.g., Richards, 1985), has helped to legitimize it. However, this is not the only argument that can be put forward to demonstrate that poor people are knowledgeable. IK theory is indebted to Freire's pedagogy of liberation (1984) for the recognition that the acceptance of people's views is a precondition for true dialogue and cooperation. This insight, together with the failure of technocratic and econometric approaches, has toppled the once dominant concept of technology transfer. Instead, there is growing awareness that researchers and extensionists should be facilitating the generation of local solutions to local problems.

Second, the importance of local expertise and culture stimulates the creativity of IK methods and objectives. Pretty (1995), for example, emphasizes the need for 'new systems of learning' and 'new systems of action' aimed at fostering sustainable agriculture. In the same vein, Cernea (1995) argued in his Malinowski award speech that social scientists need 'knowledge for understanding' as well as 'knowledge for action', if they are to make useful contributions. Pérez de Cuéllar (1995:4-5), in a recent report of the World Commission on Culture and Development, maintains that 'the challenge to humanity is to adopt new ways of thinking, new ways of acting, new ways of organizing itself in society, in short, new ways of living.'

Participatory IK research methods can be instrumental in improving our capacity for understanding and cooperation across cognitive and cultural differences. It is also important to devote more attention to improving our communication skills. Cultural and communicative competencies are crucial when it comes to generating consensus and momentum for joint action (Freire, 1984; Habermas, 1984; Hess, forthcoming). A certain amount of soul-searching on the relation between knowledge, communication and action will help us

to further strengthen the role that indigenous peoples and indigenous knowledge play in fostering innovative paths to development.

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## Bertus Haverkort

To a large extent I agree with Agrawal when he says that both types of knowledge have elements that go beyond the simple day-to-day activities; that both types can be handled as open or closed, and that it is the context of any knowledge that determines its value or bias. Efforts to document, archive, assess, validate, classify and disseminate indigenous knowledge, however well intended, not only fail to do justice to indigenous knowledge, but also contradict the dynamic nature of knowledge in general (whether Western or otherwise). Information can be managed, but knowledge is a creative process in the minds of people: it has its own dynamics and is largely uncontrollable, due to the important role played by values, learning experiences and inspiration.

Although large parts of the world have been affected by Western science and technology and the Western political and economic system, we must not forget that in many societies, both Western and non-Western, people adhere to their own social and spiritual system. Many people, educated as well as uneducated, go to a doctor trained in the West as well as to a spiritual or traditional healer; many farmers in the West as well as in the South, apply technologies such as fertilizers, but continue to perform age-old rituals in honour of their gods, ancestors and spirits; many scientists take an interest in art or religion. This blend of reductionistic materialism/rationalism and holism is more widespread than conventional science is perhaps aware, as its measuring instruments are only equipped to observe, process and interpret the material aspects of such developments.

The worldwide impact of the application of Western science and technology in terms of welfare, health and ecological sustainability has not been exclusively favourable. Western societies have gained material welfare, but are also faced with social alienation, mental health problems and environmental pollution. Problems such as population growth, poverty, overexploitation of natural resources, and the disintegration of institutions, also occur in non-Western societies. No knowledge system has yet come up with the ideal ingredients for shaping technology development or creating the ideal society. Humankind has a limited potential to comprehend the complexity of reality: there are simply too many variables.

In my view, neither romanticizing indigenous knowledge nor condemning Western knowledge--or the other way around, for that matter--is a constructive way of coping with present-day problems. And neither *in situ* preservation nor *ex situ* conservation of knowledge appears to be an attractive prospect. All knowledge, whether it originated in the West, East, South or North, has its own dynamics. And everyone has the capacity to learn, un-learn, interpret, re-interpret, and form and revise opinions. Thus the basic challenge is not conservation, preservation or a shift in power relations from one extreme to the other. One of the lessons to be learned from an evaluation of the myriad applications of science and technology worldwide is the need to exercise restraint in the expression of our convictions; this means that we should be prepared to listen to and learn from others. Rather than the conservation or preservation of knowledge, be it *in situ* or *ex situ*, I advocate an intercultural dialogue between scientists, spiritual leaders, technicians, managers and users of natural resources, and political leaders. An open dialogue on the cosmovision, scientific methods, and criteria for technology development between traditional communities in Africa, Europe, America, Australia or Asia, between spiritual leaders and scientists, between reductionist and holistic scientists, would seem more appropriate than a debate on Western versus non-Western science.

Does Western/modern science occupy a special position? I believe it does. In the past few decades enormous effort has been devoted to enhancing Western knowledge, and the application of Western



technologies throughout the world has been extensive. The colonial and post-colonial periods have led to huge surpluses, which have in part been reinvested in the development of science and technology. The results cannot be disregarded. Instead of being further enhanced and enriched, many non-Western knowledge systems have been neglected. They have received less attention and earned less prestige, major elements have been lost, and in some cases these systems have been marginalized.

It is my view that Western knowledge systems can learn a great deal from their non-Western counterparts, as well as vice versa. The debate between Western and indigenous knowledge is irrelevant where it focuses on documentation with a view to conservation, or is limited to descriptions of technologies, without regard for the values and internal logic of local farmers or traditional leaders. The issue of diverse sources of knowledge should rather be seen as an opportunity to learn from each other, and work towards the synergy which flows from intercultural dialogues.

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The article raises crucial issues that need to be seriously considered. It is right for such views to be expressed from time to time, in order to 'shake up' established thinking on indigenous knowledge.

The initial distinction between indigenous knowledge and scientific knowledge made by IK theorists may be seen as the first step. Such a distinction is not rigid, but rather stresses the importance of sound, useful and relevant knowledge that has been ignored for many years. Not only is the distinction between indigenous knowledge and scientific knowledge a vital step forward in focusing attention on the importance of indigenous knowledge, it also opens the way for a further investigation of the complementarity of the two categories of knowledge, and the differences within each.

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**Dr D.W. Brokensha**

The main conclusions in the article would be more valid in an ideal world than in present-day reality. For example, Agrawal questions 'the presumed distinction between indigenous and Western knowledge', advocating a 'move away from (this) sterile dichotomy'. My reservation stems from the fact that nearly all the main actors in development, such as agronomists, economists, foresters, lawyers, 'mission directors', project managers, and their counterparts in the developing countries are still convinced of the superiority of Western knowledge. When a weak company is merged with a powerful institution, the weaker one disappears, or loses its identity. In the same way, if the distinction between indigenous and Western knowledge were to be 'removed' (how this would be done is unclear), then there is no doubt that indigenous knowledge would be the loser, and would virtually cease to exist.

Agrawal also states that 'those who... possess indigenous knowledge must also possess the right to decide on how to conserve their knowledge, and how and by whom it will be used'. My point is that there is, alas, no *must* here. We may all agree that this state is desirable, but all we can say--weakly--is that such people *should* have that right.

Perhaps inevitably, in such a summary article, both indigenous knowledge and Western knowledge are treated as homogeneous entities. All the multiple gradations in each--differences in validity, applicability, sophistication, universality, etc.--are ignored.

Finally, I regard those of us who promote indigenous knowledge as missionaries, people with a mission to convert the 'heathens', those who do not accept the value of indigenous knowledge nor its potential contribution to development. I held this view thirty years ago, and Agrawal has not persuaded me that I should change it now.

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