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Knowledge

FEW ASPECTS OF human adaptation are as instrumental, and at the same time as difficult to define, as indigenous knowledge. The concept is knowledge with a technical and/or environmental component, which has been labeled by the overlapping terms *traditional environmental knowledge, indigenous technical knowledge, ethnoecology, folk science,*

and *local knowledge*. These terms all refer to locally constituted understandings, innovative capacities, and environmental practices utilized by indigenous groups. These terms recognize a category of knowledge apart from that generated and disseminated by professional researchers, policy makers, marketers, or development personnel. It generally excludes the use of information delivered from formal institutions of knowledge. Day-to-day interaction of people with their environment shapes problem-solving strategies for indigenous populations and guides practices as varied as agriculture, resource management, health care, and environmental conservation.

The concern for indigenous knowledge arose largely as a reaction to the ignorance, misunderstanding, and dismissal of indigenous practices. One reason was simple ignorance: explorers, missionaries, colonial officials, and even development experts consistently misunderstood the logic of indigenous practices and hence dismissed them. A classic recurrent example is swidden (slash and burn) cultivation, widely believed to an indigenous practice ignorant of its environmental effects (deforestation). While swidden cultivation can sometimes lead to deforestation, it is now known that it was practiced productively for millennia in many places, guided by indigenous knowledge of fallow land management.

Corporations selling inputs such as hybrid seeds, pesticide and fertilizer, and development projects benefit from the image of hapless producers lacking knowledge. It is also convenient for commercial ventures and even local governments to neglect indigenous claims to the genetic resources they manage for commercial gain or funding.

Interaction with the environment shapes strategies for indigenous populations in areas such as agriculture.

SOCIAL SCIENCE RESEARCH

Early studies of indigenous knowledge were conducted primarily by anthropologists and other social scientists, and were aimed at documenting and understanding the nature, structure, and value of non-Western knowledge systems. It revealed an often surprising depth of knowledge and cohesiveness of the resource management strategies and world-views of indigenous groups. In the 1960s and 1970s, key works in cultural ecology lauded the knowledge underlying indigenous production systems; they also showed how ecological knowledge became culturally institutionalized. For instance, Kofyar cultivators in Nigeria knew how to maintain high levels of fertility on annually cropped infields, while their institutions of household formation and festive work parties "knew" how to mobilize labor to exquisitely match the demands of local ecology. By the 1980s, indigenous knowledge emerged as a major topic in its own right, and since then, there has been an outpouring of research on indigenous knowledge.

Several salient themes have emerged from this work. One is that there is a vital social component to indigenous knowledge. Within many indigenous populations, knowledge is widely shared among

members of the group, and a tendency for relatively high agreement on, for instance, ethnobotanical knowledge. Indigenous knowledge is also closely linked to social institutions. The household tends to assume center stage in intensive smallholder cultivation systems, in large part because it is well suited to the knowledge-intensive techniques required by this form of cultivation. Indigenous knowledge may even be embedded in cultural institutions that individuals themselves do not fully understand. For instance, in Alpine Switzerland, researchers documented a complex mountain-wide system for managing irrigation schedules that no individual irrigator could describe.

Indigenous knowledge tends to be more holistic and experiential than the professionalized knowledge to which it is often contrasted. However, some criticize this view on the grounds that it constructs a false dichotomy between Western/scientific and indigenous epistemologies. Such a dichotomy holds Western science as the standard of comparison, while ignoring that all systems of knowledge are culture-bound. Furthermore, attempts to define the boundary of knowledge systems typically fail because knowledge and its reproduction are dynamic and cannot be fixed. There is also considerable diversity among indigenous knowledge systems, and just as many similarities as differences between indigenous and Western/scientific epistemologies.

It has become increasingly clear that indigenous knowledge systems tend to be hybrid, incorporating elements of Western/scientific knowledge. This hybridity is not, in general, a recent phenomenon. Some of the most insightful work on indigenous knowledge in recent years has provided historical analyses of how indigenous production systems have selected, altered, and adopted elements from Western scientific knowledge. Examples are work on Kenyan intensive terrace-farmers and Indonesian rubber cultivators.

POLITICS OF INDIGENOUS KNOWLEDGE

Several factors have led to a surge of interest back towards treating indigenous knowledge as a distinct, and even ownable, entity, and encompass and intersect theories of rural development, bioprospecting, and changes in intellectual property regimes.

Bioprospecting

The move to capitalize on indigenous knowledge contributed to a rise in "bioprospecting" ventures, in which scientists from industrialized countries collected and analyzed plants from tropical areas in search of medically valuable compounds. Bioprospecting endeavors frequently culled the potential value of indigenous knowledge of local plants and animals by working directly with indigenous farmers and herbal healers. Indigenous groups were rarely provided financial compensation for their contribution to these ventures. In response to this development, The United Nations Convention on Biological Diversity (1992) promoted equitable sharing of the economic and commercial benefits associated with the use of indigenous knowledge and genetic resources.

These developments coincided with an international movement towards strengthening intellectual property rights, at the center of which was the 1995 emergence of the World Trade Organization with its stipulation that all member nations provide patent (or comparable) protection for plant varieties. This nexus of rural development, bioprospecting, and intellectual property rights engendered a forceful international response that labeled this enterprise as "biopiracy" and intellectual property theft. This left indigenous knowledge at the center of a complex and hotly contested battle of globalization, with a range of disparate but important effects.

One effect was a trend by writers and nongovernmental organizations (NGOs) to reify and romanticize indigenous knowledge. Environmental campaigns have widely touted indigenous peoples as living in pristine harmony with their land. Such idealized depictions obscures the complex realities of people–environment interactions and belies the critical role indigenous knowledge plays in the survival of many minority groups. Romanticized images also undermine the economic and political interests indigenous groups may have in the use and regeneration of their knowledge.

Theories of rural development have changed considerably over time. From the 1960s until the 1990s, development initiatives were primarily oriented towards technology transfer and "top-down" approaches. Characteristically, these approaches saw practices based on indigenous knowledge as an impediment to development, or at best, "festive and folkloric dimension of cultural performance for tourist development." For instance, Green Revolution development programs undermined the temple-based rice fallowing system in Bali. However, the early 1990s saw the advent of the International Cooperative Biodiversity Group (ICBG), a grants program supported by the U.S. National Institutes of Health, National Science Foundation, and Agency for International Development. One of the program's goals was to foster development that capitalized on indigenous knowledge, especially of biodiversity.

DESKILLING AND DEMISE

Indigenous knowledge may be threatened, and in some cases severely disrupted. Environmental destruction and the cultural pressures of modern nation-states threaten the lifestyles and knowledge systems of indigenous peoples. The introduction of poorly understood technologies to indigenous cultivation systems may also prove destructive.

For example, researchers examining the effects of the spread of hybrid maize in the United States have suggested that this development led to "deskilling" of farmers, or an interruption of knowledge regeneration processes. Recent ethnographic studies among Telugu farmers in Andhra Pradesh, India, shows that agricultural deskilling is quite different from the natural replacement of one body of indigenous knowledge by another. Farmers need to be constantly acquiring and revising their knowledge to inform their decision making, and several key factors can disrupt this process. In the Andhra Pradesh case, the disruption occurred in cotton cultivation, and the culprits were reliance on hybrid seeds (which normally have to be repurchased each year) coupled with an anarchic cotton seed market. As farmers found themselves planting seeds of questionable identity and unpredictable performance, they found it increasingly difficult to acquire the requisite knowledge. Eventually, farmers turned to more or less indiscriminate mimicry of each other's cultivation practices, regardless of their efficacy.

Researchers probing the relationships between environmental and cultural change among indigenous groups advocate allowing indigenous peoples to preserve and regenerate knowledge *in situ* in their local environments, rather than documenting knowledge *ex situ* in computerized databases. Reflecting the considerable diversity of indigenous groups and cultural practices worldwide, indigenous peoples range widely in their views regarding how best to regenerate their knowledge systems, and moreover, how the ownership rights of knowledge and the genetic resources it manages should be determined.

Documenting Knowlege

There has been a surge in efforts to document and preserve indigenous knowledge. Discovery of the usefulness of indigenous knowledge, and the recognition that indigenous cultures are rapidly disappearing, have prompted governments, NGOs, commercial researchers, and indigenous groups to lead campaigns to document indigenous knowledge, particularly ecological knowledge, in computerized databases. These organizations offer competing views on their purpose and method of documentation, including codifying and documenting knowledge for general use, preserving it for future generations of indigenes, or to stake claim to patent rights on genetic resources for indigenous groups.

One critique is that this form of data preservation effectively divorces indigenous knowledge from the very context in which it has been useful for indigenous groups. The codification of knowledge into databases also suggests the existence of a definable body of knowledge that is timeless and unchanging. Other controversies have arisen from attempts by local groups to exert political and economic control over indigenous knowledge in the face of bioprospecting projects.

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