

Managing People's Knowledge

An Indian Case Study of Building Bridges from Local to Global and from Oral to Scientific Knowledge

YOGESH GOKHALE, MADHAV GADGIL,
ANIL GUPTA, RIYA SINHA, AND K. P. (PRABHA) ACHAR

Humans owe their domination of the living world to their occupation of what has been termed the “knowledge niche.” They have been acquiring, organizing, and using knowledge for hundreds of thousands of years. Knowledge is power, and since time immemorial people have exercised control over who accesses what knowledge. Thus, dispensers of herbal medicine have often shared their knowledge only with a select group, such as their eldest sons. This is equivalent to the intellectual property rights (IPR) system of trade secrets. Knowledge began to be organized more systematically with the invention of agriculture, the growth of villages and towns, and the discovery of writing.

Similarly, the classical Indian system of medicine, Ayurveda, grew out of a collation of folk knowledge of herbal medicine. Indeed, Ayurvedic texts urged healers to absorb the knowledge of hunters, herders, and forest-dwelling people subsisting on tubers. At the same time, Ayurvedic practitioners attempted to establish a monopoly over this knowledge by forbidding the study of Sanskrit, the language of Ayurvedic texts, to castes lower in social hierarchy.

The growth of knowledge sped up with the elaboration of the scientific method beginning during the sixteenth century in Europe. The growth of scientific knowledge depended on broad access to scientific information and the ability of people from all sections of society to contribute to the scientific enterprise. At the same time, commercial interests wanted monopoly over

applicable knowledge. These conflicting interests led to the development of a new system of IPRs called patents. Patents allowed for knowledge to be shared (and, indeed, demanded that it be made public) in the form of specifications accompanying a patent application. At the same time, it permitted monopoly rights to the patent holder over the commercial application of the patented knowledge for a limited period.

The patent system permits monopoly rights over specific, limited knowledge that is claimed to be novel, nonobvious, and applicable. This excludes anything already known in the so-called public domain. It also excludes anything that is not codified, such as orally transmitted knowledge. As a result, a pharmaceutical company may build on orally transmitted, community knowledge of medicinal uses of an herb and then establish its own monopoly rights over the application of the knowledge.

Such expropriation of knowledge that is outside the system of modern science and technology and that is not explicitly protected through establishment of intellectual property has, of course, been going on for a long time. A well-known Indian case in this context is the development of a drug to treat hypertension, reserpine, from *Rauwolfia serpentina* (Gupta 2000). Another recent case is the successful defeat of a U.S. patent application on a cream prepared from turmeric on grounds that such an application is not novel, being already documented in several classical Ayurvedic texts.

Combating Biopiracy

Recent years have witnessed a growing perception that such expropriation of knowledge, sometimes labeled “biopiracy,” is unfair. A measure to recognize and reward community knowledge of sustainable uses of biodiversity was incorporated as Article 8(j) of the international Convention on Biological Diversity (CBD), in force since 1993. This is a very significant measure for a country like India, which is rich in knowledge of biodiversity both in the form of such classical medical systems as Ayurveda, Sidha, and Yunani, and in folk knowledge of uses as pharmaceuticals, nutraceuticals, dyes, pesticides, and others. Attempts to document such knowledge in the parlance of modern science began with early contacts of Europeans with India. *Hortus Malabaricus*, composed between 1678 and 1703 by van Rheede, a Dutch resident of Kochi, documented the knowledge of four local physicians (Manilal 1980). In the

nineteenth century, the British organized the systematic explorations and documentation of uses of Indian biodiversity, culminating in the "Wealth of India" series. Many other texts and research papers on these topics continue to be published, by and large without assigning any credit to knowledge providers. At the same time, the documentation serves to bring this knowledge into the public domain. Technopreneurs can then add a small element of a novel application to such knowledge and establish their IPRs over it.

Rewarding People's Knowledge

It is against this background that an initiative called the Honeybee Network was launched in the late 1980s. The Honeybee Network aims to document people's knowledge by assigning full credit to knowledge providers and then to disseminate it widely (Gupta 1999). Its emphasis is on sharing, not on assertion of any intellectual property rights over the knowledge. However, in the 1990s, it began to examine issues relating to IPRs, eventually leading to the establishment of a new initiative called the National Innovation Foundation (NIF). In the 1990s too, after the ratification of the CBD but before passage of India's Biological Diversity Act, the Tropical Botanical Garden and Research Institute (TBGRI) in Thiruvananthapuram in Kerala volunteered to share benefits with providers of orally communicated, community knowledge of Kani tribals. Two members of the Kani tribe had informed TBGRI scientists of certain therapeutic properties of the forest-floor herb *Trichopus zeylanicus*. Using this as a starting point, TBGRI developed a commercial product for which a pharmaceutical company paid Rs. 10 lakh (about US\$23,000) to the institute. TBGRI deposited half this amount in a trust established for the purpose of benefit sharing with the Kanis of Kerala (National Innovation Foundation 2002).

This experiment, which at that time had no legal framework to support it, raises several questions. Some of these open questions relate to defining the appropriate set of knowledge holders with whom benefits should be shared. The benefits were to be shared with Kanis of Kerala, but members of the same Kani community occur in the neighboring state of Tamil Nadu. It is also likely that members of other local communities may have shared this knowledge. In the absence of any systematic documentation, these issues cannot be resolved.

Documenting People's Knowledge

Many attempts have been made to systematically document folk knowledge of biodiversity, beginning possibly with the initial codification of Ayurveda at least two thousand years ago, and continuing through *Hortus Malabaricus*, the Wealth of India series, and a national project on ethnobiology in the 1980s, all without explicitly acknowledging the contributions of knowledge providers until the efforts of the Honeybee Network.

An organization called the Foundation for Revitalization of Local Health Traditions (FRLHT) initiated a somewhat different attempt in the 1990s beginning with the preparation of "community biodiversity registers." Through this medium, as well as through many assemblies of folk healers, FRLHT has developed a large database on medicinal uses of herbs in the folk traditions. However, it has made little progress in sharing this knowledge or in disseminating any benefits to knowledge providers. More recently, it has begun to execute prior informed consent (PIC) statements with knowledge providers. While these PIC declarations ensure that the folk knowledge providers are made aware of what is happening, FRLHT does not accept any specific responsibilities over how it will use this knowledge, how the knowledge providers can participate in the use of the knowledge, or how the knowledge providers may benefit from the use of the knowledge.

People's Biodiversity Registers

Documentation of knowledge associated with biodiversity is clearly pertinent in the context of the provisions of CBD for equitable sharing of benefits with knowledge holders. To support this objective, the Indian Institute of Science, Bangalore, broadened the scope of the FRLHT's community biodiversity register, creating "people's biodiversity registers" (PBRs) to include documentation of local biodiversity, relationships between biodiversity resources and people, people's knowledge of biodiversity in the context of medicinal as well as other uses, their ecological knowledge, and their perceptions of ongoing and desired patterns of biodiversity management.

Beginning in 1996, a series of PBRs has been prepared with the help of networks of environment-oriented nongovernmental organizations (NGOs) and high school and undergraduate educational institutions. With experience, and the growing availability and capability of tools of modern information and communication technology, the program has been refined so that much of the

information so generated can be pooled together and organized with the help of a relational database management system. In 2002, the Ministry of Environment and Forests, government of India, proposed that these exercises be made a part of the Millennium Ecosystem Assessment (MA). This proposal has been accepted, and the exercises have served as the Indian contribution to the subglobal assessments component of the MA.

People's Knowledge

The PBR exercises have not actively sought to document knowledge of uses of biodiversity, since the legal and institutional framework for the management of such knowledge has yet to be put in place. However, at one PBR site, that of Mala village of Karkala taluk (part of a district with a typical area of about a thousand square kilometers), of the Udupi district in the state of Karnataka, such documentation was undertaken by an associate of the PBR program, Dr. Satyanarayana Bhat, a professor in an Ayurvedic college in Bangalore. Dr. Bhat was prompted to undertake this exercise in 1994–95 because of Mr. Kunjira Moolya, a resident of Mala and a highly respected dispenser of herbal medicines.

Dr. Bhat extensively documented the various medicinal formulations employed by Mr. Moolya, the methods of administration, and the symptoms of maladies for which these remedies were used. However, the group involved in preparing the PBR at the Indian Institute of Science advised Dr. Bhat that he should not make this documentation public until clear measures were in place for protecting Mr. Moolya's IPRs. Some additional material on medicinal uses of plants was also collected later from the following seven practitioners at Mala: (1) Ms. Indira Anantha Marate, (2) Mr. Ganesh Joshy, (3) Mr. Govinda (Menpa) Hegde, (4) Ms. Mutthu Poojarthi, (5) Ms. Muddu Merthi, (6) Mr. C. J. Michael, and (7) Mr. Shrinivasa Prabhu Kadari. All this material was maintained as confidential with the Indian Institute of Science until March 2004.

Biological Diversity Act

India acceded to the CBD in March 1994. Two of the CBD's provisions—(1) sovereign rights of countries of origin over biodiversity resources, and (2) the need to share benefits from commercial utilization of nonformal, often oral knowledge of sustainable use of biodiversity resources of communities or individuals—are of particular interest to India. The process of drafting a

Biological Diversity Act to provide a legal framework for implementing these two provisions was initiated in India in 1996, and a draft act was produced for public discussion in 1999. This process was significant because normally any such legislation to be brought before the Parliament is treated as an official secret until it is tabled in the Parliament. In this case, however, the minister obtained special cabinet approval to place the draft before the public for feedback. The act was tabled before the Parliament in 2000 and was finally approved by the president in 2003.

Institutional Framework

The Biological Diversity Act provides for the establishment of a National Biodiversity Authority (NBA), state biodiversity boards (SBBs) in all states of the Indian Union, and biodiversity management committees (BMCs) at the level of all local bodies, namely village and town councils and city municipalities. Approval by NBA is mandatory for any foreign agency or individuals engaging in research or bioprospecting for commercial use of Indian biodiversity resources and associated knowledge. NBA is also to screen all patent applications in India based on Indian biodiversity resources and associated knowledge and will permit them to be processed only after ensuring that they:

- provide due acknowledgement to the resources over which India has sovereign rights as the country of origin and associated knowledge of Indian origin
- agree to equitable arrangements for sharing of benefits with resource and knowledge providers.

NBA is expected to consult the concerned BMC whenever agreeing to any foreign agency accessing Indian biological resources and associated knowledge as well as when agreeing to any patent application.

A concrete information base needs to be created to permit meaningful consultation by NBA with the tens of thousands of village and town councils and city municipalities that cover India. To this end, the act provides for chronicling of biodiversity resources and associated knowledge by all local BMCs. The rules promulgated under the act further state that preparing this documentation in the form of PBRs constitutes a major function of BMCs. The BMCs are also authorized to regulate access of all outside agents, Indian as well as foreigners, to local biodiversity resources and associated knowledge, and they have the authority to levy collection charges for this purpose.

Safeguarding Intellectual Property

An important issue that arises in this context is the protection of people's intellectual property rights over knowledge with potential commercial application that may be documented during the process of preparing PBRs. If all this documentation were made available to the public, there would be no way to ensure the flow of benefits to people in cases where the products are developed and sold in markets outside India. There is no international agreement in place to permit India's National Biodiversity Authority to persuade foreign enterprises operating outside of India to share benefits in such a contingency. Neither is such an international agreement likely in the near future, especially since the United States has refused to ratify the CBD.

It is therefore vital that details of such knowledge are kept confidential. One possible agency to do this is NIF, established by the government of India in March 2000. NIF has grown out of the Honeybee Network's activity as an agency to promote green grassroots innovations and traditional knowledge. It is presided over by the head of India's Council for Scientific and Industrial Research, with involvement by the Honeybee Network activists. It maintains an information base called the National Register, a repository of all socially and environmentally acceptable information flowing to it from multiple channels, including village-level exploratory trips. A provision exists to maintain the confidentiality of some of the information lodged with the National Register.

The governing body of NIF has decided that NIF will set up an additional database to be named the People's Knowledge Database (PKD) to supplement the existing National Register. The PKD will serve as an electronically searchable, multilingual, and multimedia repository of all people's knowledge recorded through PBRs and other means. It will be maintained either as publicly accessible or as confidential knowledge, as specified by knowledge providers, giving full credit to the individuals or communities concerned. All entries in the PKD will be scrutinized, and those components that meet the criteria evolved by NIF pertaining to environmental and social sustainability will be transferred to the National Register, again maintaining specified restrictions on access and indicating the content to the public in a synoptic form. Entries not accepted for inclusion in the National Register will continue to be maintained in the PKD. The PKD and National Register will form part of a distributed biodiversity information system (BIS), which will also incorporate other relevant

scientific, technical, IPR, and market-related information and serve as a knowledge base for NBA, the SBBs, and the BMCs.

Memorandum of Agreement

The Indian Institute of Science has maintained an active dialogue with NIF to explore the use of the National Register as a repository of confidential information pertaining to uses of biodiversity provided by communities or individual knowledge providers in the course of PBR preparation. As a test case, it has employed the information on medicinal uses of plants collected from Mr. Kunjeera Moolya and other knowledge providers of Mala Village. A model of information management for this purpose was evolved during a brainstorming session at the governing body of NIF on March 9, 2004 (figure 13.1).

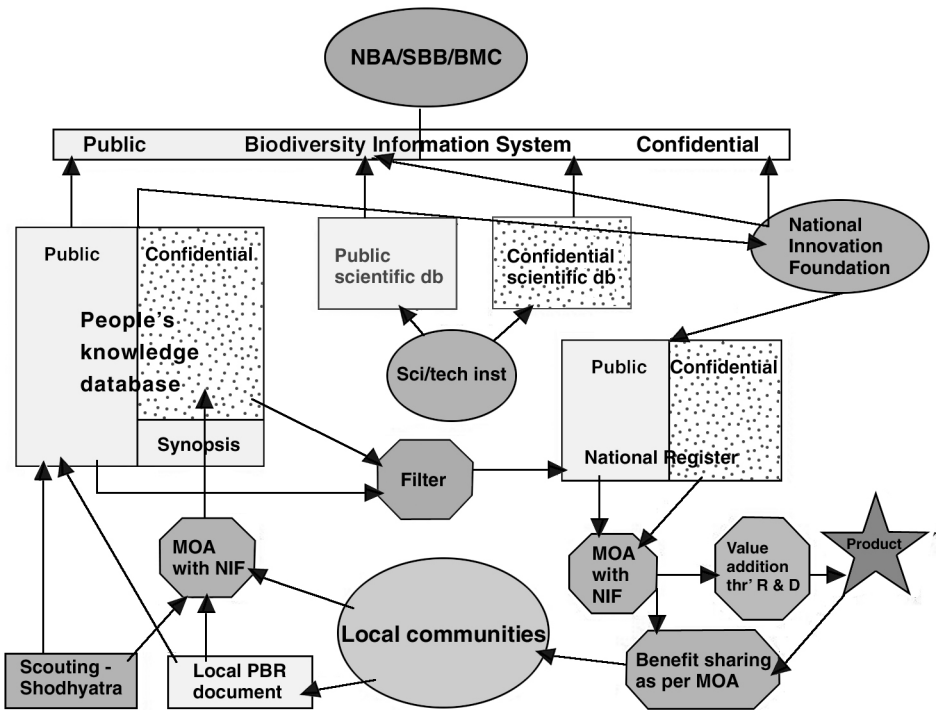
This model proposes that NIF execute a memorandum of agreement with the knowledge providers, in place of a simple prior informed consent (PIC). The memorandum would acknowledge NIF's acceptance of certain conditions established by knowledge providers under which their knowledge may be shared with third agencies. These third agencies would primarily be research and commercial organizations interested in developing products based on the knowledge. The knowledge providers may specify the kind of agencies that may be allowed access to their knowledge, how these agencies may further manage this knowledge, and the expected benefits from these agencies. NIF may make their knowledge available only after these conditions are met.

Of course, outside agencies need an indication of the nature of the knowledge being held as confidential in the National Register to enter into an agreement with NIF for access to any particular item of knowledge. For this purpose, the National Register would provide a synopsis of the nature of the confidential knowledge. Such a synopsis may, for instance, mention the symptoms of a disease that can be treated with an herbal remedy, while withholding the name of species and other details. If such an arrangement works, it would be an excellent way to bridge the gap between local and global scales and between folk and modern scientific knowledge.

Following the elaboration of this model at the governing body meeting of NIF, a series of discussions was held with the knowledge providers of Mala village as a part of the Indian Institute of Science's activities under the subglobal component of the MA. These discussions, which focused on the form of a memorandum of agreement acceptable to them and to NIF, led to the drafting of a

Figure 13.1

A framework for managing formal and informal knowledge.



mutually agreeable memorandum. The appendix to this chapter lists the main clauses of this memorandum, which was signed by the knowledge providers and NIF on June 14, 2004, with full concurrence of the village council.

The example of this memorandum of agreement could be a very useful first step in tackling the significant challenge of bridging local and global scale, and folk and modern scientific knowledge. However, a number of issues still need to be addressed. NIF has to develop a good system of links with government, academic, and commercial research and development agencies to help add value to such knowledge. It also has to ensure that the confidentiality of the knowledge in its repository is not violated during the process of collecting and storing the knowledge elements. Moreover, NBA has to decide how it will organize a countrywide BIS, including the mechanisms for maintaining the confidentiality of, while at the same time promoting value addition to, the

knowledge flowing from village councils through SBBs to the national level. NBA must also decide on the possible role of NIF in this process. These and many other challenges will need to be addressed in the days ahead.

Acknowledgments

We are thankful to the Ministry of Environment and Forests, government of India, for long-term and flexible financial support as well as for involving the Indian Institute of Science in a pilot project on implementing the Biological Diversity Act. Several other agencies of the government of India, in particular, the Council for Scientific and Industrial Research, have provided vital support to the National Innovation Foundation. Above all, we appreciate the vital inputs and collaboration of traditional knowledge holders from all over the country, and especially from the village of Mala. We also acknowledge financial as well as intellectual inputs from the Millennium Ecosystem Assessment program.

References

- Gupta, A. 1999. Conserving biodiversity and rewarding associated knowledge and innovation systems: Honey Bee perspective. Invited paper for the First Commonwealth Science Forum—Access, Bioprospecting, Intellectual Property Rights and Benefit Sharing and the Commonwealth, Goa, India, September 23–25.
- Gupta, S. K. 2000. Rustom Jal Vakil (1911–1974)—Father of modern cardiology. A profile. *Indian Academy of Clinical Medicine* 1 (2, July/September).
- Manilal, K. S. 1980. *Hortus Malabaricus with annotations and modern botanical nomenclature*. 12 vols. Thiruvananthapuram, India: University of Kerala.
- National Innovation Foundation. 2002. Value addition to local Kani tribal knowledge: Patenting, licensing and benefit sharing. A case study based on the data collected from Kani tribe, Kerala, India. W.P.No.2002-08-02 (August).

Appendix

Salient Features of Memorandum of Agreement (MoA)

1. MoA between individual knowledge holder/community with NIF to include information in PKD and also possibly in the National Register being prepared by NIF. This will help knowledge holder/community to retain the claim and confidentiality, if needed, over the knowledge deposited with NIF without changing right of knowledge holder/community over it. This does not mean that this traditional knowledge or innovation or practice may not

- have been reported by some third party already or may not be reported directly later or may not already have been put in public domain.
2. MoA highlights need of differentiating between information already in public domain/documented without the consent of the knowledge holder/s and the documentation with mutual agreements such as MoA/PIC.
 3. NIF is engaged in scouting, documenting, augmenting, and adding value to the innovations and traditional knowledge of the innovators at the grassroots level. NIF is mandated to develop a National Register of traditional knowledge and contemporary unaided grassroots innovations. NIF is also engaged in strengthening R&D linkages between the scientific institutions and grassroots innovators and traditional knowledge holders so as to promote commercial and non-commercial applications of grassroots innovations and traditional knowledge.
 4. NIF also wishes to enter into an agreement with the traditional knowledge holder/community so as to add value, wherever possible, to the people's knowledge, innovations and practices of both contemporary and traditional origin and disseminate the same, protecting *inter-alia* the intellectual property rights of the knowledge holders as applicable in each case and ensuring equitable share of benefits wherever applicable.
 5. Now therefore both the parties hereto agree as follows:
 - a) That the traditional knowledge holder will provide the complete information/particulars to NIF in order to enter the traditional knowledge in its data base (PKD) and if possible in the National Register. NIF may also consider the traditional knowledge to be included in the list for the award in the next and subsequent biennial competitions.
 - b) That the traditional knowledge holder/community has agreed for publishing indicative information of traditional knowledge along with contact address on the internet/Honey Bee magazine or any other media with the precaution so that their detailed traditional knowledge does not become public.
 - c) That the traditional knowledge holder/community has agreed to share the traditional knowledge with the third party(s) on exclusive and /or non exclusive basis only if the written consent from traditional knowledge holder(s)/community for sufficient amount of money is received in return as per the milestones of value addition and/or commercialization where applicable. However the traditional knowledge holder(s)/commu-

- nity can share the traditional knowledge for individual use and/or for further R&D in order to add value to it.
- d) That the traditional knowledge holder/community has agreed to allow NIF to use the information for product research and development purpose so long as the intellectual property rights are intact/protected and traditional knowledge holder(s) is/are going to receive the benefit out of it. NIF will take care that in any circumstances, the confidentiality of the knowledge is maintained by research team involved in the product research and development process.
 - e) That NIF will add the information/particulars, pertaining to a specific traditional knowledge to People's knowledge database and/or National Register if found suitable. The information can be made available to a third party only with informed written consent of the traditional knowledge holders(s) (or in case he/she has expired, his/her legal heirs) and on the terms and conditions including benefit sharing indicated by the traditional knowledge holder/community.
 - f) That the benefits, arising from the possible commercialization of the traditional knowledge being improved by NIF on the basis of the basic information provided by traditional knowledge holder/community, will be shared among various stakeholders (including other communities providing same or similar information, third party researchers/business plan developers) as per the terms and conditions agreed upon by the concerned innovator(s)/traditional knowledge holders in consultation with NIF.
 - g) NIF can facilitate IPR in cases where applicable.
 - h) That in case of substantial improvement being done by the scientist(s) contracted by NIF, the concerned scientist(s) may be named as the co-inventor and a part of the benefit may be shared with him/her as well as other stakeholders such as the institutions like GIAN, NIF or their sister institutions, for meeting institutional overheads or for conservation of nature or community development or innovation fund for helping other communities or innovators etc. as per the mutual consent of the traditional knowledge holder/community and the concerned person/s and NIF.
 - i) That in the case of the publication of the outcome of the research and development the prior informed consent will be taken from the traditional knowledge holder(s)/community and in the publications due credit will be shared with the traditional knowledge holder(s)/community.

6. That both parties shall indemnify, defend, protect and hold harmless each other and its respective successors in case any of the party fails to discharge its obligations.
7. The MoA shall remain in force for a period of TWO years, and can be renewed for two additional terms of two years each that is for six years after which it will be reviewed. Review can take place earlier also through mutual consent. It is however assured that the confidentiality of the knowledge deposited with NIF on conditions specified will be respected in perpetuity unless otherwise agreed upon in writing by the knowledge holder(s)/community regardless of this process of review. It is possible that knowledge provided by a particular individual/community may have been communicated by another individual(s)/community(ies) directly to NIF or may already exist in public domain due to prior documentation by third party. In such cases NIF may share such knowledge as per the existing conditions but without sourcing the community which has provided knowledge in PBR unless so authorized.
8. That all disputes arising out of this agreement shall be settled through conciliation by a mutually agreed person, and shall be governed by the provisions of the Arbitration and Conciliation Act 1996. The place of conciliation shall be at Ahmedabad, Gujarat, India.

*Signed by Traditional knowledge holder, NIF representative
and BMC Chairperson/Panchayat Secretary.*