

Community Registries of Biodiversity-Related Knowledge

The Role of Intellectual Property in Managing Access and Benefit

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I. Introduction

This paper explores the promise and peril of using registries of knowledge as tools for the people of local and indigenous communities to employ for the conservation, sustainable use and sharing of benefits from their biological diversity, biological resources, and associated traditional knowledge. In particular, the paper explores the impact of applying intellectual property rights and other tools for controlling ownership and access to registries. It includes brief preliminary case studies reviewing current efforts.

Much of the world's surviving biological diversity is found in areas inhabited by indigenous and local communities that are relatively impoverished and marginalized within both political and economic systems. Yet these communities typically have rich traditions of knowledge associated with their biodiversity and biological resources (together termed "bioresources"), as well as practices relating to those resources.¹ This knowledge and these practices are often referred to by the shorthand phrase "traditional knowledge." While we follow that protocol in this paper, we emphasize that the

¹ The Convention on Biological Diversity defines biological diversity as "the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems." It defines "biological resources" to include "genetic resources, organisms or parts thereof, or any other biotic component of ecosystems with actual or potential use or value for humanity."

knowledge held by these cultures is dynamic and includes a constant stream of innovation -- the knowledge systems may be “traditional” but the results of the systems’ operations are constantly changing.²

Traditional knowledge is valuable in several ways. It informs resource management systems and practices of resource use that often have relatively low impacts upon bioresources. The existence of these systems and practices explains in part why these peoples are the custodians of much of the world’s richest stores of biodiversity. Traditional knowledge also comprises extensive knowledge of the practical uses of these resources, as sources of medicines, foodstuffs, and other goods. As a result, traditional knowledge is itself a valuable resource not only for these communities but also for outsiders, including academic researchers, government agencies, and commercial firms, both foreign and domestic. Traditional knowledge has been used in many industries as a starting point for new product development, in sectors such as specialty food and beverage, pharmaceutical, agriculture, horticulture, and personal care and cosmetics. It remains an important resource for many commercial research and development programs.

Traditional knowledge is also important to its holders as an integral part of their cultural heritage. As such, its protection is important for ensuring the enjoyment of the right to maintain and take part in cultural life recognized under international human rights instruments.³ Similarly, there is growing recognition that indigenous peoples have rights to control and protect this traditional knowledge as a form of intellectual property, as recognized in the UN Draft Declaration on Indigenous Rights. Because the structure and content of traditional knowledge is intimately linked with local bioresources and ecosystems themselves, the protection of rights to cultural heritage is closely linked to the protection of the environments and living resources of indigenous and local communities (Erica Daes 1993).

The Convention on Biological Diversity (Biodiversity Convention) recognizes the close relationship and dependence of local and indigenous communities on biodiversity. The Convention also recognizes the significance of the knowledge relating to biodiversity developed and held by indigenous and local communities. Article 8(j) of the Convention, for instance, requires governments, subject to national legislation and as far as possible and as appropriate, to:

respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the

² See, e.g., Utkarsh, et al., 1999. The language of Article 8(j) of the Biodiversity Convention reflects the evolving nature of these communities’ cultures, providing that Parties to the Convention must respect, preserve and maintain not simply “traditional knowledge” but “knowledge, innovations and practices” of indigenous and local communities “embodying traditional lifestyles” (emphasis added).

³ See, for instance, Article 27 of the Universal Declaration of Human Rights, and Article 15 of the International Covenant on Economic, Social and Cultural Rights.

approval and involvement of [their] holders . . . and encourage the equitable sharing of the benefits arising from [their] utilization.

Both the potential for these communities to manage their knowledge and benefit from it, and the risk that they will lose control over it and benefits derived from it, are changing dramatically with the rapid development of new technologies for processing and storing information. Equally important has been the expanded use of the Internet, which allows increasingly cheap, rapid and wide distribution of documents, images, and other information.

Registries of knowledge are ordered collections or repositories of information. Registries are increasingly being developed by indigenous peoples and local communities as tools to promote, protect, and either claim rights over or prevent appropriation of traditional knowledge. Registries typically take the form of databases — “compilation of data,” in the terms of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) of the World Trade Organization (WTO).

Such registries are compiled by communities or by community groups, for the benefit of the communities. They are generally intended to protect local or indigenous rights over traditional knowledge. Where those outside the community have access, there is typically an effort to control access so as to define the terms on which the knowledge is used, including provisions for sharing of benefits from use with the providers.

It is argued by some that registries can support the implementation of the Biodiversity Convention’s obligations to preserve traditional knowledge, and promote its wider application with equitable sharing of the benefits. It should be noted, however, that the transfer of knowledge from oral into written, printed, and electronic forms requires movement across cultures and symbolic translations of ideas. Each “expert” along the way, and their associated “community of belief,” will leave a mark on the “knowledge” thereby documented. The medium in which an item, complex or system of knowledge is embedded, expressed or recorded, arguably shapes and changes the nature of the knowledge itself and the way in which human beings interact with it. As a result, the extent to which the final electronic form and the original oral form of the knowledge relate to each other can be questioned, which in turn raises questions about the value of databases and registries as a tool for the conservation of culture and knowledge (Schoenhoff, 1993).

Having said this, a number of indigenous and local communities have found registries and databases to be useful tools for organizing their knowledge in a way that allows protection and improved management of their resources and intellectual and cultural heritage, in the face of external economic, cultural, and social pressures.

Part II below reviews the nature of registries. Part III discusses the intellectual property rights that are relevant to protection of registries and the knowledge contained in them, including sui generis systems of protection. Part IV discusses illustrative cases of registries of knowledge and steps taken to protect information, including the People

Biodiversity Registers and the Honey Bee Database, in India. In conclusion, Part VI considers advantages, disadvantages, and trade-offs of various approaches. It suggests possible packages of measures that might be used to guard the interests of registry owners, including agreements, charters for establishment, national and international law, and the wider “best practice” standards set in the scientific and commercial sectors.

II. Background on Registries and Databases

A registry is an ordered collection or repository of information. The term registry typically has the connotation of a repository or list of information that has an official status. The inclusion of a record within a registry confers some legal status upon the record. That is, a registry is not merely a list or database designed to provide information to users. It is a list or database into which people put information in order to gain legal rights relating to that information. “Registering” something in a registry “puts it on the record” and puts the public “on notice” that the registrant asserts a claim. For instance, offices of land title include registries in which claims of ownership of land are recorded. Claimants gain certain rights of priority by filing their claim in the land title registry. Similarly, intellectual property systems typically require applicants to register trademarks in a public registry so as to preserve their rights and put future claimants of the symbol or name on notice that it has already been registered.

Registries of knowledge have been developed by groups in India, under the People Biodiversity Register project, and through the Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI), which has established a Honey Bee database of farmers’ innovations and creative practices (See Case Studies). The Inuit of Nunavik and the Dene in Canada, have also develop databases of traditional knowledge, in order to better define research priorities and strategies for their lands (IUCN, 1997:118). The Inuit of Nunavik database contains information on their use and knowledge of the land base and resources. Begun more than 15 years ago, documentation has involved systematic interviewing of Inuit concerning their knowledge and understanding of their land and resources, and the database has allowed decisions to be made relating to commercial fisheries, tourism, and environmental impact assessment methodologies. The Inuit Nunavik established the data collection system, manage it, and control the resulting database, with the first priority being local use of this knowledge for management purposes (Simon and Brooke in IUCN, 1997: 122).

As discussed, registries being developed for traditional knowledge today are typically in the form of databases. The TRIPS Agreement defines databases as “compilations of data or other material, whether in machine readable or other form, which by reason of the selection or arrangement of their contents constitute intellectual creations.”

III. Intellectual Property Rights Relevant to Registries

Intellectual property relating to databases is currently the subject of debate. Part III.A briefly reviews some of the policy concerns. Part III.B surveys the existing framework of relevant intellectual property rights.

A. Relevant Trends in Intellectual Property Law

Concerns about databases related to intellectual property law have intensified because of two concurrent trends. First, the power of technology to manage, to store, to manipulate, and to process information in meaningful and useful ways, that add value to the raw facts, has increased tremendously. Second, the power of technology to *copy* and to *transfer* this information has also increased dramatically.

Consequently, private firms that invest in the creation of such databases feel increasingly threatened by the risk that others will copy some or all of the structure and contents that they have created. Yet conventional intellectual property law grants only limited property rights over the contents of such information structures, as the contents themselves usually consist either of facts, or of creations and inventions made by someone else or in the public domain because the patent or copyright have expired. Thus, the elements contained in the database rarely have the originality or novelty that would qualify the database owner to obtain patents or copyright.

As a result, there has been growing pressure from some parts of the private sector to modify existing intellectual property rights, or create new forms of intellectual property -- typically termed *sui generis* or “of its own kind” -- that will protect this kind of investment in organizing information. In response, the European Union has passed a directive requiring member countries to establish a *sui generis* database right.⁴ International negotiations hosted by the World Intellectual Property Organization (WIPO) on whether to include such a right in an international treaty failed to reach agreement in December 1996. This was due in part to opposition from scientists, academics and sectors of industry that frequently use databases and rely upon a thriving public domain of information for the free exchange of ideas needed for further innovation and creativity.

B. Background on the Existing Legal Framework

The forms of intellectual property most relevant to databases in general are copyright, patent, and trade secret, plus *sui generis* rights for databases where applicable and with trademarks having some relevance as well. Generally, patents protect novel

⁴ Directive 96/9/EC of the European Parliament and of the Council of 11 March 1996 on the Legal Protection of Databases, Chapter III.

ideas or inventions, copyrights protect original expressions (art, literature, music, etc.), trademarks and geographical indications protect symbols and names used in commerce, and trade secrets protect proprietary business information of all kinds from improper acquisition and use.

Intellectual property laws do not, as a general matter, protect "generic" ideas and concepts, principles of nature or scientific fact, or (except for geographical indications) ideas, names or expressions which are already in widespread public use. For patents, copyright and trademarks, protection is afforded to a specific individual person or corporate entity, is limited in duration, and has the primary goal of creating economic rewards for creators and inventors, through market transactions involving the intellectual property right or its subject matter.

Intellectual property standards are relevant for databases/registries in two ways. First is the question of what kind of intellectual property protection is available for the databases themselves. Generally, a registry or other database as a whole is protectible under copyright. Software or hardware that is used to create or structure a database may be patentable in some countries.

The question that is generally most pressing for registries, however, is whether protection is available for the *contents* of a database, that is, the separate items of data catalogued within it. Classically, copyright protection extended to the contents of a database only if those contents were protectible as creative expressions independent of their inclusion in the database. Similarly, a patent would be available only for information that disclosed a new and useful invention not already in the public domain. Thus, much traditional knowledge contained in a registry would not qualify for protection. However, more limited intellectual property rights such as trade secrets may afford some protection. Furthermore, *sui generis* rights protecting databases adopted in the European Union and proposed elsewhere could afford additional protection to registry owners for their investment in creating their databases.

Copyright. Copyright protection is available for original works of authorship in whatever form or mode of expression.⁵ Under this general rule, "[c]ollections of literary or artistic works such as encyclopaedias and anthologies, which, by reason of the selection and arrangement of their contents, constitute intellectual creations shall be protected as such, without prejudice to the copyright in each of the works forming part of such collections."⁶ In the United States, for instance, compilations and derivative works may be protected under copyright, but the copyright on the compilation does not affect

⁵ Berne Convention for the Protection of Literary and Artistic Works (1971), Article 2. Under the TRIPS Agreement, WTO Members must comply with the requirements of Articles 1-21 of the Berne Convention. In some countries, such as the United States, works must be fixed in a tangible medium of expression to be eligible for copyright. See 17 U.S.C. § 102 (1998).

⁶ Berne Convention. The Convention defines the term "literary and artistic works" broadly to include "every production in the literary, scientific and artistic domain, whatever may be the mode or form of its expression." Article 2.

the copyrights held by others on preexisting materials included in the compilation (17 U.S.C. § 103 (1998)).

Traditionally, database collections have been treated in the same way. To the extent that they constitute original works through selection and arrangement, they may be protected, but the information itself does not receive copyright protection beyond any copyright protection that may protect individual works contained within the database. Thus, in the United States, the Supreme Court ruled that a collection of information is eligible for copyright only to the extent that the database creator uses originality and creativity in selecting and arranging the data.⁷

As for the contents of a registry, copyright will not often be relevant to the information found within the registries under discussion here, as they tend to which relate to scientific or technological matters. Copyright is designed primarily to cover original works in the arts, broadly defined, such as painting, music, and literature.

Sui Generis Protection. As mentioned above, there is no intellectual property right for the contents of databases per se at the international level. The European Union, however, has established a 15 year sui generis protection for databases in Europe and in countries that offer reciprocal protection, in Directive 96/9/EC of 11 March 1996 on the Legal Protection of Databases, effective as of 1 January 1998. The EU established the sui generis right to confer a right on database producers over database contents that were not protectible under copyright. In contrast to patent or copyright, the protection is not contingent on any creative or unique contribution of a database owner. Instead, Article 7 provides that a database owner must demonstrate

that there has been qualitatively and/or quantitatively a substantial investment in either the obtaining, verification or presentation of the contents to prevent extraction and/or re-utilization of the whole or of a substantial part, evaluated qualitatively and/or quantitatively, of the contents of that database.

If the database maker makes substantial changes to the database, he or she can receive an additional 15-year period of protection extending from the date of the change.

The directive defines the databases to be protected as “collections, sometimes called ‘compilations’, of works, data or other materials which are arranged, stored and accessed by means which include electronic, electromagnetic or electro-optical processes or analogous processes,” including “non-electronic databases.” Such databases include “literary, artistic, musical or other collections of works or collections of other material such as texts, sound, images, numbers, facts, and data” that constitute “collections of independent works, data or other materials which are systematically or methodically arranged and can be individually accessed.”

⁷ Feist Publications, Inc. v. Rural Telephone Service Co., 499 U.S. 340 (1991) (ruling that a telephone directory, which merely listed facts, was not protected by copyright).

A lawful database user is allowed to "extract and/or re-utilize" only the parts of a database authorized by the database owner. Member states may allow extraction of non-electronic databases for "private purposes." However, "private purposes" are not defined. Database extraction for teaching or scientific research is allowed only if proper credit is given and the use has a non-commercial purpose; scientific research is defined to include both the "natural" and the "human" sciences. Moreover, the Directive does not address non-scientific research such as historical research. Thus, some member states may protect such uses while others may not.

Patents. Patent protection is a very strong intellectual property right that is available to the inventor of an invention that is new, involves an inventive step and is capable of industrial application (TRIPS Agreement, article 27). A patent gives the inventor the right to exclude others from making, using, or selling a product, and the right to exclude others from using the process or using or selling the product produced by that process (TRIPS, article 28). The patent shall last for at least 20 years from the filing date (TRIPS, article 33). Inventions that are already known publicly before a patent is applied for are considered "prior art" and not eligible for a patent.

Generally, patent protection has not been available for many forms of computer databases, because these were viewed as either a method of doing business or as merely a mathematical algorithm. However, recent U.S. patent cases have held that patents may be available for data processing systems that implement a computer readable algorithm that performs a useful function, including systems that constitute methods of doing business.⁸ Thus, in at least some countries, it may be possible to patent the computer software program that runs or maintains a computer database compilation of traditional knowledge, provided that the software perform a useful function or has practical utility.

As for the more important question of the contents of a registry, patent protection may be available for innovations created by individuals recently in rural communities (Gupta 1992). Much of the body of traditional knowledge will not, however, be protectible. This is either because a specific inventor cannot be identified (Axt, et al. 1993:58), or because the knowledge consists of knowledge about the characteristics of natural substances or organisms rather than an invention (Gollin 1993), or because it has already been put in the public domain through written publication.⁹

Trade Secrets. A trade secret is information that the owner takes reasonable steps to keep secret, that has commercial value because it is secret, and that is not generally known (TRIPS, Article 39). Under TRIPS, governments must provide mechanisms to trade secret holders that permit them to prevent disclosure of such secrets "in a manner contrary to honest commercial practices" without their consent (Article 39).

⁸ See *State Street Bank & Trust Co. v. Signature Financial Group, Inc.*, 47 USPQ2d 1596 (Fed. Cir. 1998).

⁹ Further, under some patent laws such as US law, it is possible that knowledge may enter the public domain through oral traditions of communities found within national jurisdiction, without written publication.

Trade secrets have limited utility with respect to protection of the database as a whole, but may be significant for protecting a registry's contents. Protection of computer source code that is used to write the program for the database might be protectible as a trade secret, or alternatively covered under patent (see *State Street Bank*, above) or copyright. However, analogous to copyright, it is unclear that this would have significant practical utility for the typical database of traditional knowledge, which is most likely to be interesting because of its contents, not because of its innovative structure or design.

In that respect, trade secrets may have some utility in protecting the contents of a registry. As discussed, a trade secret consists of information that confers a market advantage upon its holder as long as it is held secret. The holder has the right to prevent others from wrongfully obtaining the information, as long as the holder takes reasonable measures to keep the information secret. Thus, the holder of a secure database might require users to sign an agreement pledging to treat traditional knowledge obtained from the database as secret. They would be liable for legal action if they revealed the information to others. This offers the possibility of enforcing controls on use of traditional knowledge in a registry even if it is not protectible under copyright or patent. The drawbacks of such an approach is that trade secrets, even when explicitly recognized in such agreements, are difficult to enforce, and if they were enforced it would reduce the public dissemination of the information and public recognition of the value of the knowledge. As the primary measure available, however, this is the approach which traditional knowledge registries use most commonly today.

Recent United States legislation provides for unusually strong criminal penalties to enforce trade secret protection, including fines up to US \$10,000,000 for organizations and up to \$500,000 for individuals who misappropriate such trade secrets, as well as possible imprisonment of those convicted and forfeiture of property used or derived from a misappropriated trade secret (U.S. Economic Espionage Act of 1996, 18 U.S.C. § 1834). This legislation might be of use to US-based indigenous groups maintaining databases of traditional knowledge, although proof of commercial value might sometimes be difficult.¹⁰

Trademarks. Generally speaking, trademarks or service marks are not applicable to databases or the information they contain. Of course, a brand name or company name that identifies a database or its owner can be protected as a trademark, and such trademarks indeed may convey the sense of goodwill or reliability that is developed by a provider. One well known example is the Lexis7 brand owned by Reed Elsevier, Inc., a provider of legal research database services.

¹⁰ In the U.S., state theft statutes also may be useful in protecting such trade secret compilations. However, the EEA, as a criminal statute with investigations conducted by the Federal Bureau of Investigation (FBI) and prosecution by U.S. Department of Justice, may under certain circumstances be preferable to a civil action under state misappropriation provisions.

Trademarks and geographical indications are not particularly relevant to database contents, as they protect the right to use a certain term or symbol to market a product, rather than the right to use or duplicate a certain piece of information or set of data.

V. Illustrative Case Studies

1. Case Study: People's Biodiversity Registers

The People's Biodiversity Registers program is sponsored by WWF India as part of its Biodiversity Conservation Prioritisation Project. The program's name was changed from "Community" to "People's" Biodiversity to reflect that not all local knowledge is communally-generated and shared freely among community members.¹¹ The program also involves two institutions in Bangalore, the Centre for Ecological Sciences of the Indian Institute of Science, and the Foundation for Revitalisation of Local Health Traditions. The program's purposes are:¹²

- To provide a record of local knowledge for the use of present and future generations of village community people.
- To promote the revitalisation of local knowledge by: (a) recognising the range of such knowledge; (b) rewarding outstanding knowledge, skills, techniques and conservation practices; (c) validating and promoting sound local knowledge and resource management traditions; and (d) promoting inter-community transfer of knowledge for capacity enhancement.
- To alert conservationists about the need for action concerning threatened resources and the need for protection of local resource rights.
- To protect local biodiversity and knowledge from misappropriation by companies such as through patenting of modified products, processes and biological resources.

The planners envisaged a decentralised system and a bottom-up approach recognizing the fact that people must be given incentives to participate in the documentation of local knowledge. Promotion of traditional biodiversity-related knowledge primarily for the benefit of local communities is emphasized. Regulation of outsiders' access to information in the registers is considered a means to achieve this, rather than an end in itself. In the long term it is intended that a network of decentralized databases will be created, all linked to "a consolidated national database which would give full credit to the origin of information at the level of an individual, a community or a village council" (Gadgil et al. 1998).

¹¹U. Ghate, pers. comm. to G. Dutfield, 1998.

¹² These goals for documenting local biodiversity-related knowledge were agreed by the sponsoring organisations and a large number of other local organisations at a meeting in Bangalore in April 1995 (Foundation for Revitalisation of Local Health Traditions, 1995).

Documents are currently in preparation for 57 different village clusters in six Indian States and one Union Territory, comprising Assam, Orissa, Karnataka, Rajasthan, Madhya Pradesh, Bihar and the Andaman and Nicobar Islands. Each study involves a year-long process of talking to local individuals, groups of local people and public meetings known as gram sabhas. The documentation is carried out mostly by local educational institutions (teachers and students), voluntary organizations, and other local individuals. Areas are selected so as to represent a thorough cross-section of India and State-wide landscapes, ecosystems, social groups and natural resource-based livelihoods. The first People's Biodiversity Register (PBR) was completed and released in 1997.

According to Prof. Madhav Gadgil of the Centre for Ecological Sciences, records in PBRs include ten categories of information (Gadgil 1998):

- Types of user groups using local biological resources (the "Peoplescape");
- Mapping the mosaic of ecological habitats of the study site (the Landscape);
- Ecological history of the study site;
- Extent and distribution of local collective and individual knowledge about different species of plants and animals and their uses (i.e. the knowledge base)
- Abundance, scarcity and distribution of living organisms;
- Patterns of economic (subsistence and commercial) utilization of living resources
- Efforts to regulate uses of living resources or to conserve them, both by government agencies and local communities;
- Development aspirations of local communities and how these relate to local biodiversity;
- Divergences and agreements among the various local groups concerning management of natural resources;
- Emerging options for managing the natural resources of the study site, with particular focus on biodiversity conservation.

When completed, copies of each PBR will be held locally by *panchayats* (local-level elected councils), by educational institutions, and by proposed district level "biodiversity cells" that will serve as repositories of computerized collections of the PBRs produced within the district (Ghate 1997). With the advice and support of these cells, which would comprise representatives of all stakeholders, the validity of the information in each PBR will be checked and the PBRs will be periodically updated.

The legal status of the PBRs is unclear from the documents written by the planners and proponents of the system. However, a draft law being considered by the State legislature of Karnataka would vest legal ownership rights over PBRs in "biodiversity cells," composed of stakeholders and formed at the district level, not in the *panchayats* (see box). Some people who support the intellectual property rights of local communities may regard this as problematic. *Panchayats* would, however, be empowered to collect fees from bioprospectors wishing to access their PBRs, under a

system of material transfer agreements and information transfer agreements as proposed in the Karnataka draft biodiversity law (see box).

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**Box: Legislative Frameworks for Peoples' Biodiversity Registers
Karnataka's draft biodiversity conservation law**

The South Indian State of Karnataka has developed a draft Biodiversity Conservation Order which awaits legislative approval before becoming law. At the center of this system is the People's Biodiversity Register (PBR), which will be developed by traditional communities in collaboration with high school and college students and local non-governmental organizations (NGOs).

At the highest level, a State Biodiversity Board (SBB) would be established comprising individuals representing government departments, traditional communities, NGOs, the scientific community and the private sector. Its functions would include the registration of agreements that involve transfer of biological material or biodiversity-related information. These include Material Transfer Agreements (MTAs) and Information Transfer Agreements (ITAs). It is unclear what legal effect registration of these agreements would have. The Board would also monitor compliance with MTAs and ITAs, providing support for redress in cases where they are violated. The nature of such support is also unclear.

The SBB would also establish a State Biodiversity Cell (SBC). Activities of this institution would include some or all of the following:

- conducting research and field investigations on biological resources and related knowledge;
- maintaining *ex situ* collections of resources and knowledge;
- entering into agreements with private or public enterprises transferring resources or knowledge from these collections subject to mutually agreed terms including benefit sharing. Such agreements are not allowed in case of information or material mentioned in any PBR; and
- entering into agreements with local holders of knowledge contained in PBRs for access to that knowledge.

At the local level, District Biodiversity Councils would be set up. Like the SBB, these would include representatives of the various stakeholder groups. In turn these Councils would create District Biodiversity Cells, whose activities they would oversee. These Cells would compile and verify PBR data. The proposed law would give them rights as lawful owners of the data. Access to the data would require the payment of fees, an MTA or an ITA. The District Biodiversity Cells would also be required to lend technical, scientific support and advice to the *panchayats*, including methodologies, formats and training for documenting PBRs, although they may set up Regional Biodiversity Cells to carry out these functions in a more decentralized manner.

Copies of PBRs would be maintained by each *panchayat* and local educational institutions. With the advice and support of Regional Biodiversity Cells, the validity of the information in each PBR would be checked and the PBR itself would be annually updated. *Panchayats* would be allowed to collect fees from bioprospectors. It is unclear what kind of guidance they would receive in negotiating access agreements or setting fees. They would also

receive financial support from District Biodiversity Funds. The amount of support could vary so as to provide incentives for communities to document their knowledge and resources effectively.

2. Case Study: SRISTI's Honey Bee¹³

The Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI) is a non-governmental organization established in 1993 and based in Ahmedabad, Gujarat, India. Its goal is to “strengthen the capacity of grassroots inventors, innovators and ecopreneurs engaged in conserving biodiversity and developing eco-friendly solutions to local problems.” SRISTI pursues these goals by:

- “Protecting the intellectual property rights of grassroots innovators, and generating models for recognizing, respecting and rewarding creativity;
- Experimenting in order to add value to their knowledge;
- Embedding the insights learned from technological and institutional innovations developed by individuals as well as communities in the educational systems so that conceptual and cognitive space for these innovations expands with passage of time;
- Developing entrepreneurial ability in order to generate returns from this knowledge, and enriching people's and providers' (scientists, leaders, and administrators) cultural and institutional basis for dealing with nature.”

One of SRISTI's leading projects has been its newsletter, *Honey Bee*, “A Newsletter of Creativity and Innovation at the Grassroots.” Honey Bee “embodies and promotes a global movement to conserve biodiversity through documentation, experimentation and value addition and dissemination of local innovations by farmers, pastoralists, artisans, horticulturalists et al.” Published several times a year, in a number of different languages of India as well as English, Honey Bee includes numerous short reports on specific innovations by individuals.

The name “Honey Bee” signifies a philosophy of information sharing and learning which leads to an equitable exchange among the participants, including both the informal innovators at the local level and the organizers of the information exchange at the regional, national and global levels:

Honey Bee collects pollen without impoverishing the flowers, and it connects flower to flower through pollination. The idea is that when we collect knowledge of people we should ensure that people don't become poorer after sharing their insights with us. Further, we should also connect one innovator with another through feed back, communication and networking in the local language. We have to share . . . with the providers of the knowledge what we did with the knowledge. If we generate

¹³Sources: SRISTI web pages reviewed September 1998: <<http://csf.Colorado.EDU/sristi/info.html>>, <<http://csf.Colorado.EDU/sristi/databases.html>>, <<http://csf.Colorado.EDU/sristi/honeybee.html>>.

consultancies or other sources of income by writing on people's knowledge, a fair share of this income must accrue to the providers in as explicit a manner as possible.

SRISTI has developed two databases. One is the Honey Bee Database. It is a database of information on farmers' innovations and creative practices that SRISTI have been documenting over a long period of time. Much of this information has been published in past issues of Honey Bee. SRISTI is considering posting at least part of the database on the Web, but at time of writing had not yet done so. When available, the database will require users to agree to the following terms:

The use of this database pre-supposes your agreement with the following conditions:

a) any knowledge, innovation or practice given here will be used with due acknowledgement and without violating the intellectual property rights of the grassroots innovators.

b) if any commercialisable product is developed through value addition in any of the innovations given here, a reasonable share of the profit would be given to the innovators and their communities through SRISTI.

However, there is concern that available legal and other tools are not adequate to ensure that those who gain access to the database share benefits from the use of the knowledge according to these requirements.

A second database is the "Institutional Innovations Database." It is "a database of indigenous ecological institutions for managing common property resources drawn from 22 countries." SRISTI solicits "published or unpublished literature on the subject for inclusion in the database." This information will be made available to any access seeker who "agrees to share it in turn with local communities in the local language." SRISTI explains that "[t]his is a part of a knowledge network of sustainable technologies and institutions creates at SRISTI to link creative communities and individuals around the world." At time of writing the database was still being put into a searchable format.

Sources for case study: *SRISTI web pages reviewed September 1998:*
<<http://csf.Colorado.EDU/sristi/info.html>>,
<<http://csf.Colorado.EDU/sristi/databases.html>>, <
<http://csf.Colorado.EDU/sristi/honeybee.html>>; *pers. comm., Anil Gupta, February 1999.*

V. Preliminary Conclusions

A. Options Under Existing Law

Options for managing registries of traditional knowledge under the existing framework of law and policy are limited, and force difficult tradeoffs. Both the advantages and the

disadvantages of a registry are maximized by making the registry as open and transparent as possible. These advantages and disadvantages are:

- *Advantage:* A registry promotes documentation, maintenance, and preservation of traditional knowledge -- as well as communication of its value -- for the use and education of present and future generations of those in the community, as well as neighboring communities, the scientific community and the public generally. This is an important value that is emphasized in the Honey Bee and Peoples' Biodiversity Register examples.
- *Disadvantage:* Under existing law, registries will generally not be able to perform the classic function of a registry, which is to put on record and give notice of a claim of legal right by a community or individual over an item or body of knowledge. Under the current system found in most jurisdictions, a registry will not establish a legal claim for much indigenous and local knowledge. This is because intellectual property rights do not generally extend to traditional knowledge which is not novel, does not have a distinct individual inventor, and is often already in the public domain. The draft legislation in Karnataka establishing people's biodiversity registers does not establish such a property right or empower registers to legitimize it. Even if the Karnataka law did establish such a legal right, it would not be enforceable outside of that state. However, in jurisdictions such as the EU, which have established sui generis database rights, the registry owner may have the right to prevent extraction or use of a substantial part of the database's contents, even if the contents themselves do not qualify independently for conventional intellectual property protection. Most countries do not, however, provide for such rights.
- *Advantage:* While inclusion and publication in a registry will not typically confer positive legal rights (except under sui generis database legislation as noted), nevertheless it could make it more difficult for *others* to claim intellectual property rights over the knowledge by establishing a record that it is "prior art" — that is, information that was already part of the public domain and therefore not patentable. In some jurisdictions, publication in the registry would have a practical impact if not a legal one. In Europe, for instance, Article 54 of the European Patent Convention provides that a patent cannot be obtained for something that is "part of the state of the art," which is defined as "everything made available to the public by means of a written or oral description, by use, or in any other way." Thus, knowledge held in an oral tradition anywhere in the world could in principle be prior art. Yet including it in a registry makes it more likely that patent examiners in Europe will become aware of the existence of the knowledge and thus refuse a patent. In the United States, in contrast, "prior art" includes oral traditional knowledge held in the United States but does not include such knowledge held outside the country. *See* 35 U.S.C. § 102(a) & (b). Thus, an outsider who obtained such knowledge could gain a patent in the United States. Inclusion of knowledge in a publicly accessible database would have the legal result in the United States of ensuring that its status as prior art was on the record and it could not be patented by another. Under either rule, as a practical

matter, patent offices are more likely to check for prior art in the form of traditional knowledge if they have easy access to registries of traditional knowledge.

- *Disadvantage:* In the absence of intellectual property protection for traditional knowledge per se, legal mechanisms for restricting use once access is obtained are limited. Technology in the form of Internet connections and password protected entry allow a database owner to set up an efficient system for requiring users to agree to terms of access that include benefit sharing. Thus, form contracts of the kind proposed for the Honey Bee database could define specific and strict benefit sharing requirements. However, it is difficult as a practical matter to enforce such contractual obligations. The TRIPS requirement that WTO Members protect trade secrets and provide legal procedures for enforcing them provides some support for registry owners, but enforcement is still expensive, slow and difficult, and because of phase in periods (developing countries have until 2000, least developed countries until 2005) many countries are still not obligated to provide such protection.
- *Disadvantage:* Open databases make knowledge available to outsiders who might seek to exploit the information without acknowledging or compensating those who provided it. Because of the limited legal protection in most jurisdictions for much of the traditional knowledge likely to be included in a database, this is a significant drawback. This is probably why SRISTI hesitates to post the Honeybee database on the Web. The EU might be an exception in that database owners based within its jurisdiction have rights to control extraction and reuse of substantial parts of the database.
- *Tradeoff:* The more public the registry, the more effectively it will advance the goals of enhancing recognition of the value of traditional knowledge, supporting its preservation, encouraging exchange and cross-fertilization among different communities, encouraging the dissemination of knowledge about sustainable uses, establishing that traditional knowledge is prior art and not patentable by others, and encouraging the sharing of benefits by users willing to abide by contractual requirements for access. However, the more public the database the more likely that users unwilling to comply with benefit sharing requirements can gain access to and use the information. If the registry is confidential, however, interested members of the public, such as scholars, scientists, and potentially even the members of the indigenous and local community themselves, will not benefit from learning about, sharing, and republishing indigenous or traditional knowledge and public authorities will be reluctant to participate in supporting or sharing information with the database (Ruiz 1998).

Each registry compiler will need to find its own solution to these tradeoffs. Yet practical solutions are difficult to design. SRISTI, for instance, plans to require database users to commit to negotiating benefit sharing agreements with providers (represented by SRISTI) whenever the users employ the knowledge commercially. They also require acknowledgement of the source of the information whenever the user applies the

information in any public way, whether or not it is a commercial application.¹⁴ Finally, if the user incorporates the knowledge into a publication or innovation, the user must reciprocate by sharing that product, in some sense, with the providers of the information from the database, in their local language. It is unclear, however, how this requirement would be implemented in practice. The financial and logistical costs of putting the derived information into a format understandable by the local people, and locating, supervising and paying a translator, and distributing the translation to the local community, could be significant, especially if a researcher were compiling information from a number of communities.

Implementing these general principles will require further analysis and discussion. For instance, in what form should users share information that incorporates or relies upon traditional knowledge with the traditional knowledge holders? What if a user obtains the same traditional knowledge as found in a database from another community that does not participate in the database? What if a community provides knowledge to a database, a user gains access to it on condition of sharing benefits, the user creates a commercial product and then shares benefits with the providing community, and then it is found that another community also holds the same knowledge? Does the second community also have rights to benefits?

B. Considerations for Future Law and Policy

As discussed, making databases public creates risks that their contents will be used in ways that the knowledge providers do not approve, without sharing of benefits, and without acknowledgement. Contract obligations agreed to by users can be difficult to enforce. Thus, many traditional knowledge holders may not be willing to make their databases of knowledge available until changes are made to the legal system that make it easier for them to manage how their knowledge is used.

Responding to this dilemma through policy changes must consider a broader context of societal needs and interests. As the evolution of the sui generis database right suggests, principles of intellectual property evolves over time, and intellectual property rights take different forms in different places, in response to claims of right or arguments about social welfare. Whether defining the boundaries of existing intellectual property rights, or defining new ones, lawmakers must balance competing interests and values in an attempt to achieve broader social benefits. As the United States Supreme Court expressed it in a decision involving copyright:

¹⁴ Legal precedent for a rule requiring acknowledgement of the source may be found in the author's moral right, recognized under laws of a number of European countries (Downes 1997). The author has the right to insist that reproductions of her work are attributed fairly to her, and in some countries has the right to insist on accurate, uncorrupted reproduction of the work. Ethical precedent may be found in standards for scholarship in the sciences and humanities, in which there are detailed, strict codes for citation to the source of ideas, facts and expressions.

[t]he limited scope of the copyright holder's statutory monopoly, like the limited copyright duration required by the Constitution, reflects a balance of competing claims upon the public interest: Creative work is to be encouraged and rewarded, but private motivation must ultimately serve the cause of promoting broad public availability of literature, music, and the other arts. The immediate effect of our copyright law is to secure a fair return for an 'author's' creative labor. But the ultimate aim is, by this incentive, to stimulate artistic creativity for the general public good.¹⁵

Thus, any future steps to define legal rights relating to traditional knowledge in databases will need to respond not only to concerns about protection of database makers' interests — and not only to concerns about protection of indigenous and local communities' interests in their knowledge — but also to concerns about the broader interest of all social groups in access to and exchange of information.

An additional problem is that the sui generis rights desired by database owners extend beyond the conventional scope of copyright, such that owners would have rights to prevent others from using information even when that information is not creative or new, simply because it is contained in the database. Similarly, indigenous and local communities' interest in traditional knowledge extends beyond protection of new information to encompass protection of knowledge that has been held for as long as centuries, simply because it is held by the given community. A corresponding expansion of intellectual property rights could take a great expanse of information out of the public domain. While specific database owners and communities might benefit from such protection, society as a whole — including indigenous and local communities — might suffer from vastly expanded restrictions on access to the growing amount of information taken out of the public domain. If nothing else, special measures to protect indigenous and local communities' knowledge should be designed carefully so that they respond specifically to the interests and values relating to such knowledge and communities, and do not go farther.

One partial answer is to incorporate guidelines for the design and the enforcement of such contracts in national legislation implementing the Biodiversity Convention's requirements on genetic resources and traditional knowledge. National law could provide for expedited procedures for registry owners seeking to enforce the contracts. They could specify damages or penalties that would encourage compliance (although there is a risk that the result might also be to discourage users from seeking access in the first place). One limitation is that such measures would likely not be enforceable in other jurisdictions. In addition to legal measures, professional codes of practice and institutional policies will also be useful in setting standards and encouraging compliance with them.

Developing legal and other measures that apply beyond specific cases will be challenging. For one thing, indigenous and local communities are tremendously diverse.

¹⁵ Sony Corporation of America v. Universal City Studios, Inc., 464 US 417, 432 (1984) (quoting Twentieth Century Music Corp. v. Aiken, 422 U.S. 151, 156 (1975)).

They have a wide range of views and values relating to the use, acknowledgement, and sharing of benefits from knowledge (Cleveland & Murray 1997). Thus, achieving agreement on the terms for access to databases will take a great deal of discussion and negotiation among these groups. This will be necessary in order to share information among these groups, to achieve common formats for databases which will facilitate information sharing, and also to network or consolidate databases in order to increase efficiency, lower costs, and enhance access for all. This sort of cooperation will probably have to evolve slowly from local to regional to national and international approaches. Indeed, that appears to be happening in practice, for instance with Honey Bee, which began in Gujarat, then branched out into other parts of India and abroad, as well as with the Peoples' Biodiversity Registers.

Yet negotiations among indigenous and local communities with their diverse values is only the beginning. Traditional knowledge databases also seek to enhance wider recognition of the value of traditional knowledge, and to disseminate traditional knowledge to other users outside the community (on terms that provide for benefit sharing and acknowledgement). This will require negotiation with user groups such as academic and commercial researchers, publishers, other database owners, museums, and libraries. As a practical matter, whatever protocols are agreed upon will need to reflect, to some extent, the various values and goals of these diverse groups, many of which are increasingly articulated in writing in the form of codes of conduct, institutional policies and other documents.

At the same time, in a global economy, users will frequently come from countries other than the countries of the providers of the information. Thus, protocols for access and benefit sharing will also need to reconcile differing viewpoints from different countries into some shared understanding supported by some kind of international framework. Ultimately, this framework will probably need a legal component to support enforcement of norms and compensation for violations, just as holders of conventional intellectual property rights have sought the protection of international treaties such as the TRIPS Agreement. Yet the path to modifying intellectual property rights or creating new ones under international law is a very long one. Initially, experimentation will be needed at the national level to identify best options and establish precedents.

Legal reform at the international level might best be promoted through pilot activity in the non-governmental sector. Perversely, the creation and modeling of progressive terms for access and sharing by database holders is also probably a good way to promote legal change in the long run, even though the release of data on such terms without legal backup is relatively insecure. As a first step, community-oriented databases of traditional knowledge might need to organize internationally. Then they could sit down with representatives of other groups and begin working out the terms for a multistakeholder institution. That institution then might adopt principles and criteria for equitable benefit sharing, terms of access, acknowledgement of source, and so on. The institution could also link with relevant international institutions such as the Biodiversity Convention Clearing House Mechanism, UNCTAD's Biotrade Initiative, WIPO,

UNESCO, and the WTO TRIPS Council, as well as national institutions such as patent offices.

In any case, the starting point must be the customary laws and values of the people who have custody of the knowledge in question. Their concepts of ownership and the appropriate use of community knowledge will set the boundaries for development of the details of protection and exploitation. In other words, the boundaries of ownership and control will be defined through a process of dialogue with the people who hold the knowledge. In addition, the sovereign and/or self-determination rights of these societies must be recognized, and the societies must be empowered to coordinate the protection process and establish their own forms of protection in cooperation with other governments and organizations.

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Sources

Axt, Josephine R. et al. 1993. *Biotechnology, Indigenous Peoples, and Intellectual Property Rights*. Washington, D.C.: Congressional Research Service, Library of Congress.

Centre for Science and Environment (1996). "Defining rights." *Notebook*, 5, 7. CSE: New Delhi.

Daes, Erica. 1993. *Protection of the heritage of indigenous people. [Final report of the special rapporteur, Mrs. Erice Irene-Daes, in conformity with sub-commission resolution 1993/44 and decision 1994/105 of the Commission on Human Rights.]* United Nations Economic and Social Council, Commission on Human Rights, E/CN.4/Sub.2/1995/26. 21 June 1995.

Downes, David R. 1997. *Using Intellectual Property as a Tool to Protect Traditional Knowledge: CIEL Discussion Paper*. Washington, D.C.: Center for International Environmental Law. November 1997 discussion draft.

Foundation for Revitalisation of Local Health Traditions. 1995. *Beyond the Biodiversity Convention B empowering the ecosystem people*. Bangalore: Foundation for Revitalisation of Local Health Traditions.

Gadgil, Madhav. 1998. "Conserving India's biodiversity: let people speak." *Hindu Survey of the Environment B 1998*.

Gadgil, Madhav, Seshagiri Rao, P.R., Utkarsh, G., Pramod, P. (1998) 'New meanings for old knowledge: the people's biodiversity registers programme'. *Ecological Applications* (forthcoming).

Ghate, Utkarsh. 1997. *Village biodiversity registers: promoting sustainable use and equitable sharing of benefits in the context of GATT, UPOV and CBD*. Draft paper.

Gollin, M. A. 1993. "An Intellectual Property Rights Framework for Biodiversity Prospecting." In W.V. Reid, et al., eds. *Biodiversity Prospecting: using genetic resources for sustainable development*. [Washington, D.C.]: WRI, INBio, Rainforest Alliance and ACTS.

Gupta, Anil. 1992. *Debate on Biotechnology and Intellectual Property Rights: Protecting the Interests of Third World Farmers and Scientists*. Ahmedabad, Gujarat, India: Indian Institute of Management. W. P. No. 1057.

IUCN. 1997. *Indigenous Peoples and Sustainability: Cases and Actions*. IUCN Inter-Commission Task Force on Indigenous Peoples. The Netherlands: International Books.

Ruiz, Manuel. *Protecting Indigenous Peoples' Knowledge: Policy and Legislative Developments in Peru*. Draft Paper for the International Conference on Medicinal plants, Bangalore, India, February 1998.

Schoenhoff, Doris M. 1993. *The Barefoot Expert: The interface of computerized knowledge systems and indigenous knowledge systems*. Westport, CT and London: Greenwood Press.

Simon, M.M. and L. Brooke. 1997. "Inuit Science: Nunavik's Experience in Canada." In. IUCN. 1997. *Indigenous Peoples and Sustainability: Cases and Actions*. IUCN Inter-Commission Task Force on Indigenous Peoples. The Netherlands: International Books.

The Tai Farmer Group Planting Jasmine Rice at Tung Ku-la-rhong-hai and the Traditional Plant Network, Thailand. 1998. *Open letter from Thai Farmers to the United States Government Regarding American Intellectual Property Claims to Jasmine Rice*. 22 July, 1998. Bangkok, Thailand.

Utkarsh, G., M. Gadgil, and S. Dasgupta. 1999. *Protecting People's Knowledge in the Emerging Regime of Intellectual Property Rights (IPRs)*. [Bangalore: Centre for Ecological Sciences, Indian Institute of Science.] Manuscript in the possession of the authors.

Vogel, Joseph. In press. *The Biodiversity Cartel*. Manuscript in the possession of the authors.