

MONEY or PRIDE?

On the Why and How of Traditional Knowledge Protection in India and China

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Abstract. *The interest in traditional knowledge (TK) and its importance as a source for innovation in science and medicine have been rising and so have conflicts around it. In this article, the policies on TK of India and China are reviewed and analysed. While India put emphasis on preventing the unauthorized use of its TK, China is mainly concerned about integrating its TK into modern Western science. China's economy and research facilities are growing at a faster pace and TK policy is centred on traditional Chinese medicine. In turn, India has a great variety of equally important TK traditions, which are more vulnerable to misappropriation thus explaining the differences between the two countries' policies.*

Introduction

For many centuries, people in India have been brushing their teeth with twigs of the neem tree using its antibacterial properties to protect their teeth. Neem had also been traditionally used as a natural pesticide in agriculture on Indian fields. In 1985, however, the first U.S. patent on a neem-based solution was granted and since then more than 150 patents all over the world have followed using Indian traditional knowledge (TK) as a starting point for their inventions (Mathur, 2003, p.4473). A few neem patents were revoked in reaction to protests of activists and international NGOs, such as in 2000 when the European Patent Organisation decided that the use of neem as a pesticide could not be considered novel (CIPR, 2002, p.76).

The case of the neem tree has been cited many times to illustrate how Western intellectual property rights (IPRs) can be used by multinational companies for misappropriating

TK, which usually originates from developing countries. Moreover, it has caused a lively debate on the appropriate protection of TK in the media, among activists and NGOs, in the scientific community, and within states and international organizations. Without an international agreement in place, national rules and protection systems are the decisive factor when it comes to the protection of TK (WTO, 2006, p.5). Focusing on that issue, this article tries to illuminate why TK protection is in place and how it is designed. It does so by reviewing the different national policies concerning TK protection in two of the most important TK holder countries, namely India and China. As no comparison of the two countries' policies has been undertaken yet, this article proceeds in a rather exploratory way aiming at identifying possible explanatory factors for national differences. The author explicitly takes a political science perspective as the interests and preferences of

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those actors involved in the policy-making process with respect to strategies of TK protection have not been systematically addressed so far.

At first, a brief introduction to the basic terms, i.e. TK and its protection is given, which is then followed by a short overview of possible policy options and the current international legislation on TK protection. The second part deals with India's and China's approach to protecting TK. Various factors explaining national differences are proposed and discussed, namely economic interests, the unique characteristics of each country's TK, the ethnic composition of each society as well as the public opinion and general awareness of the issue as a whole. In addition, national TK protection policies are put into a larger context of China's and India's general foreign policy interests.

Characteristics of traditional knowledge and its protection

In spite of intensive discussions a generally accepted definition of TK has not yet been agreed on (Mugabe et al., 2001, pp.2-3). This is largely due to the extremely broad use of the term, which has rather evolved from everyday use and common sense than from a clearly-defined scientific concept. TK is usually applied for any knowledge generated outside the context of modern Western knowledge and covers a large amount of distinct subcategories, which in extreme cases might have little to nothing in common (Correa, 2001, p.4). TK can involve cultural expressions, ecology, agriculture or medicine. It can be held by individuals, communities or society as a whole. It might be written down or preserved only orally. Some of it is centuries-old, and some is the result of recent research (CIPR, 2002, p.75). It is important to keep this diversity in mind as policies on TK

protection may have different effects according to its nature, its content, its number of holders, its accessibility or its age. Having discussed the complexity of the term *traditional knowledge*, it is important to clarify the term *protection*. The protection of TK comprises concepts like equity, preservation, prevention of misappropriation, self-determination and promotion (Correa, 2002, pp.25-26). Equity refers to the problem of unequal treatment of TK compared to modern knowledge by legal institutions. This is a result of its unclear status (ibid., p.26). Preservation is an important objective for TK, especially if it is held only orally by small communities or individuals (ibid., p.30). Prevention of misappropriation of TK is better known as the fight against bio-piracy if biological knowledge is involved. It is the use of TK for economic reasons without authorization or compensation of its original holders (ibid., p.36). Self-determination means that TK holders decide themselves on the fate of their TK (ibid., p.45) while protection for promotion refers to encouraging the use of TK for commercial exploitation (ibid., pp.47).

The protection of traditional knowledge

Defensive or positive protection? – A typical policy decision dilemma

If a national government needs to decide on how to protect TK, there is a range of possible options spanning from defensive to positive protection of TK – or the choice between money and pride. While *defensive* protection involves the prevention of unauthorized use of TK by actors outside the holder group, *positive* protection refers to a term used by the World Intellectual Property Organisation (WIPO) for all the means that allow the exclusive use of TK either by the community itself or external actors to promote its application. Generally, the promotion refers to the commercial-

ization of TK (WIPO, n.d.). Indigenous, local or rural TK holders usually call for defensive protection as this avoids their TK being exposed to the public domain, which may benefit other members of society, but not them. This also involves further risks as the original holders of TK lose their control of it. By contrast, companies usually prefer positive protection because it allows the legal use of TK (van den Daele et al., 2003, p.6). Thus, in general national governments can choose any policy on the continuum between those two extreme points.

Existing international legal framework

The Convention on Biological Diversity (CBD) of 1992 is the “most authoritative international instrument” on the protection of TK” (Ogumanam, 2006, p.5). It codifies the international consensus that a protection system for TK is needed and proposes legal mechanisms towards this objective. For example, it requires “approval and involvement” of the holders of TK for its use and “equitable sharing of the benefits arising from the utilization” of TK. These instruments have to be implemented nationally by its signatories (Löffler, 2001, p.77).

It has to be recognized, however, that its success is rather limited and its international implementation is weak (ibid., p.12). It is also worth noting that the CBD is restricted to traditional ecological knowledge of indigenous or local communities and therefore excludes knowledge of other areas, such as traditional cultural knowledge or traditional medicinal knowledge (TMK) that is not related to biological resources. Moreover, codified or common TK being held by entire countries is not covered by this agreement either.

It is telling for the status quo of TK protection that a weakly enforced and implemented treaty covering a limited range of TK is considered

to be the most important international tool to protect TK. This is why possibilities to protect TK under the well-established Western Intellectual Property Rights (IPR) system have been explored intensively. The most relevant international agreement is the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS), signed in 1994 by WTO member states. Under this treaty, signatories are requested to assure the protection of patents, copyright, new plant varieties, geographical indications, trademarks, and trade secrets, among others (CIPR, 2002, p.3). TK is not mentioned in the treaty, but in specific cases it can be protected under some of those IPRs.

Possible policy options to protect traditional knowledge

Internationally, the easiest and most effective way to assure TK protection would be adapting the TRIPS agreement to the special characteristics of TK. This would be in line with the 2001 Doha Declaration of the WTO Ministerial Conference, which calls for examining TK protection. The TRIPS agreement could provide a legal framework for an equitable treatment of TK and modern knowledge (Gervais, 2005, p.163). It has been proposed that patent applicants of inventions, which are related to genetic resources, have to disclose its source and origin. This would create a legal framework that prevented the use of TK without prior informed consent and allowed for benefit sharing with TK holders. A similar rule would have to apply for any other invention based on TK (Ogumanam, 2008, p.518).

The protection of traditional knowledge in India and China

Status quo of traditional knowledge protection in India

India does have comparatively strong policies to protect TK and has many times been characterized as an international pioneer in this field. The country has especially focused on means to prevent the misappropriation of TK (Correa, 2002, pp.29-30). Under the Patent Second Amendment Act of 2002 it is explicitly forbidden to file patents on existing TK, while the Biological Diversity Act 2002 dictates that source and origin of any biological material used for an invention have to be disclosed when applying for a patent. Furthermore, this act stipulates that IPRs on biological resources from India can only be granted with the approval of the National Biodiversity Authority (NBA), which, in turn, should organize benefit sharing with holders of related TK. This way India complies with its duties of implementing the CBD. Additionally, the NBA's task is to prevent the granting of any biodiversity-related IPRs to foreigners (WTO, 2000).

In the field of TK protection, India has become famous for its Traditional Knowledge Digital Library (TKDL) project. TKDL is a database containing ancient knowledge on the use of plants for medicinal and other purposes. This knowledge, stemming from Ayurvedic, Unani, Siddha, and Yoga traditions, has been translated from its original languages such as Hindi, Urdu, Sanskrit etc. into English, German, Spanish, French, and Japanese to make it available for Western patent examiners in their search for prior art. A modern TK Resource Classification system has been developed as well, which has been linked with the International Patent Classification system. This system is used by more than 100 countries and several international organizations (Oguamanam, 2008, pp.499-503). The TKDL has already led to the withdrawal of about 40 patent applications

while its real impact can hardly be estimated (TKDL, n.d.).

India's traditional systems of medicine are not only wide-spread in the country, but are also part of the public health system. By contrast, regional TK, while being threatened with extinction, is currently being collected in local databases on the initiative of regional governments and NGOs (Krishnaswamy, 2009, p.10).

Status quo of traditional knowledge protection in China

While it has been stated that China is "highly concerned about [...] TK protection" (Cui, 2009, p.1), the country proceeds very cautiously in taking measures towards this objective, as this issue is being considered a very complex one. Access and benefit sharing laws concerning the use of genetic resources and related TK that would put CBD into practice are still being developed. A draft Patent Act of 2007 refers to rules for access and benefit sharing while the Chinese State Environment Protection Administration is developing a sui generis system for this purpose (ibid., pp.1-2). China's policies have mainly focused on assuring the integration of its TK into modern Western scientific knowledge (Oguamanam, 2008, p.505; Liu, 2008). The only possibilities for TK to be protected legally are patents or a registration under the Regulations on Protection of Traditional Chinese Medicines of 1992. This act aims at improving the quality of traditional Chinese medicine (TCM) and promoting research and development in this field. In sum, these regulations do only protect TK that has recently been invented. All other forms of China's TK are considered to be in the public domain (Cui, 2009, pp.28-29; p.31). The Chinese State Intellectual Property Office has developed the Traditional Chinese Medicine Patent Database to aid patent examiners, which contains about 32,000 formulas which have been patented and are

therefore not in the public domain (WIPO-IGC, 2005, p.2).

With respect to preservation of TK, there are immense differences between the two largest branches of TK in China. TCM is widespread and there are many companies producing for its market of RMB 95.4 billion (EUR 9 billion in 2005). It is also used a lot outside China (Cui, 2009, p.8; p.10). Moreover, doctors specializing in the field of TCM have to obtain a license to practice TCM and there are many schools specialized in the teaching of TCM. The other branch is traditional indigenous knowledge (TIK), which has a status comparable to TIK in other parts of the world. It is usually held by small communities and is inaccessible due to its non-codified status (Li Li, 2007, p.127). For now, TIK is rather marginalized and little is done for its preservation. However, the Chinese government has for example sent a research team to southeast Guizhou, a region with a high number of ethnic minorities, to conduct a field study on TIK (Cui, 2009, p.7). The reason for this might be found in the internationally rising importance of TK in facilitating the development of new pharmaceutical or agricultural products.

Analyzing the differences between Indian and Chinese traditional knowledge protection

The literature on the protection of TK is dominated by legal scholars. Only in the case of TIK anthropologists, ethnologists, and sociologists have contributed to research in this field. However, there are virtually no publications by political scientists, and less so for the specific cases of India and China. Therefore, this article has to rely on sources which, in the majority of cases, put a strong emphasis on technical details of legal processes and possible law reforms. The interests and preferences of actors directly or in-

directly involved in the formulation of the laws of interest have not yet been systematically explored.

In this section, factors which are likely to affect policy making in the arena of TK protection and, thus, are hypothesized to contribute to differences between China and India are proposed. Generally, five distinct dimensions are differentiated here (see table 1); this systematization is one of the key contributions of this article. It is the result of a brain storming process of the author. This approach contributes substantially to the debate as existing literature usually proceeds with a different focus. For example, some authors offer in-depth case studies (see e.g. Cui, 2009; Krishnaswamy, 2009), while others develop general legal mechanisms to protect TK (see e.g. Gervais, 2005). In addition to scientific articles, key documents from international organisations dealing with intellectual property, such as reports or statements made at WIPO and WTO, have been considered.

Economic interests

Why do China's policies focus on protecting innovations on TK, rather than on the protection of TK itself, with the objective of integrating TK into modern Western science? Most probably, economic interests are one of the key drivers. As already mentioned, the domestic market for TCM is enormous. Similarly, marketing potential of TCM products is also rising in other countries. Yet, Chinese firms have to compete with Japanese and Korean companies, which are international market leaders (Cui, 2009, p.10). For strengthening domestic TCM producers, research and development incentives such as the Regulations on Protection of Traditional Chinese Medicines are appropriate instruments.

Indian capacities for research and development are considerably smaller than those of the Chinese. For example, in 2009 the num-

bers of patent applications and patents granted in China were about sixty times higher than those in India (WIPO, 2011). A strategy based on patenting TK would rather benefit foreign companies which make innovations based on Indian TK quite frequently but outside India. As India does not profit from those inventions, it appears to be rational that the country tries to prevent the transmission of TK and related genetic resources to foreign countries. Moreover, benefit sharing mechanisms, established by the Biological Diversity Act that are aided by strict disclosure requirements for patents related to genetic resources, create economic advantages for India. Anyone who wants to profit from TK related to Indian biodiversity by receiving a patent for an invention based on it has to obtain permission from the NBA first. The permission then establishes the terms and conditions for the compensation of TK holders (WTO, 2000). Thus, even if a foreign company benefits from India's TK heritage, this mechanism ensures the inflow of money into the country.

Characteristics of traditional knowledge itself

The characteristics of TK in each country also certainly shape the margin of choice of decision makers. For the case of China, the most important type of TK is TCM. TCM stems from ancient traditions, but it has always been written down in Chinese and is therefore accessible for anyone able to read Chinese. Enforcing any kind of benefit sharing mechanism would not make sense for TCM, because it is part of the common heritage of more than a billion people. Thus, as Cui has pointed out, most legislative proposals for TK protection in China are lacking a convincing legal logic and, consequently, appear to be more "like a kind of propaganda" (2009, p.30). A second reason that renders legal protection of TCM almost impossible is its presence in other Asian countries,

such as Korea and Japan with both countries sharing a long history of TMK utilization with China. If TCM were to receive any kind of protection in China, it could still be freely used in those countries, thus generating a strong comparative advantage for Korean and Japanese companies (*ibid.*, pp.34-35). Because TIK was only of regional importance, it has not been an issue on the public agenda for a long time. However, industries for TMK products of ethnic minorities are rapidly growing (Zhang Li, 2007), which might explain the government's current interest in developing benefit sharing laws.

In India, equally anciently codified TMK systems exist, which can be compared to the status of TCM in China. However, this TK is written down in a wide range of different languages. Only a few of these languages are still spoken today. Unlike TCM, this knowledge was therefore rather inaccessible in its entirety, which made it vulnerable to misappropriation by companies because patent examiners lacked the possibility to screen it in their prior art searches. Moreover, obtaining the revocation of a once unjustly granted patent is difficult and costly. The creation of the TKDL can be seen as a direct reaction to these properties of traditional Indian knowledge (Oguamanam, 2008, pp.498-499). India also has large amounts of local and indigenous TK that is often of vital importance to its holders (Sahai, 2003, p.166). This might explain why India has been among the first countries to amend its benefit sharing legislation.

Ethnic composition of society

The role of ethnicity in each of the two countries is very closely related to the findings proposed in the previous section. Usually, ethnic boundaries also define holder groups of TK. In India, there are 22 regional official languages and many more tribes which also possess an official status. Although some knowledge sys-

tems have reached a predominant position (e.g. the Ayurvedic medicinal knowledge), there are many other TK systems which are of similar importance, at least at a regional level (Sahai, 2003, p.166). As the Indian state is built on the concept of multi-ethnicity and respect for the rights of indigenous communities, some recognition is also given to the TK of ethnic groups; theoretically, it is well protected under India's Biological Diversity Act. In sum, the ethnically diverse Indian society has managed to create protection mechanisms for all of its different kinds of TK, i.e. for mainstream TK as well as local or indigenous TK.

By contrast, while China is also an ethnically diverse country, its society is dominated by one single ethnic group, the Han Chinese. This ethnic group makes up 92 percent of the total population of the country. In addition, there are 56 officially recognized ethnic groups in China, but the majority Han generally hold them in low esteem, characterizing them as "backward", "lacking culture" or "stuck at earlier levels of social evolution" (Hathaway, 2010, p.307). The absence of a written account of their knowledge is considered to underpin their derogative assumptions (ibid.). It is plausible that China's ethnic structure has influenced the country's strategy on TK. The strategy addresses the needs of TCM industry, but largely neglects TK of ethnic minorities.

Public opinion and general awareness of the issue

Because China is to a large extent dominated by one ethnic group, one can assume that public opinion on TK protection is mainly concerned about *their* TK, i.e. TCM. This is facilitated by the ample infrastructure of TCM. There have been several reports on cases of misappropriation of TCM in the Chinese media. However, some of the most important allegations have proven to be baseless (Cui, 2009,

p.21). Most Han Chinese are probably not concerned with TIK protection, which contributes to its marginalization. Nevertheless, there are some regional NGOs in the southeast of China, where a large number of ethnic minorities live, which try to conserve and protect TIK (Hathaway, 2010, p.305).

In India, the situation is quite different. A large number of very well-organized NGOs exist at the national and local level. This was probably induced by several grave cases of bio-piracy which India suffered. In any case, these instances of misappropriation have decisively shaped public opinion on this issue in India. There was extensive international media coverage on these cases supplementing the call for TK protection by scholars, IGOs and NGOs around the world. Being aware that local TK is severely endangered, many regional NGOs collect it and register its holders. This provides a solid basis for future benefit sharing agreements while cooperation between state authorities and these NGOs already exists (WTO, 2000).

Foreign policy interests

Finally, foreign policy interests of the two countries can be suspected of being driving forces for the choice of national strategies on TK protection. India, jointly with Brazil and other Latin American countries has taken a leadership role in this arena by making proposals in several IGOs to include obligatory benefit sharing mechanisms and disclosure of source and origin requirements into the TRIPS agreement. Although China has sometimes joined these groups, its political leaders have not appeared to be very convinced of these proposals. They seem to prefer the status quo to any "immature rule that would surprise interested industries" (Cui, 2009, p.2; p.30). By contrast, in a discussion on the protection of TK in the WTO's TRIPS Council, the representative of India made about 20 statements argu-

ing in favour of including the above-mentioned rules into TRIPS, his opponent being the representative of the United States. China's representative only made one statement in which he agreed with the United States, but also with some of the developing countries' critique (WTO, 2005). Furthermore, until 2005, India had participated in the submission of 13 documents relating to TK protection within the WTO, while China entered the debate with only one submission (WTO, 2006, pp.20-24).

Arguably, it can be assumed that economic interests, as well as national differences such as the characteristics of TK itself, the ethnic composition of society, and the public opinion and general awareness of the issue add up to each countries' international position. Nevertheless, their proceedings are coherent with superior foreign policy interests. China is a hybrid of a developing and a developed country as there are enormous differences within the country (CIPR, 2002, p.2). To define China's position in the field of TK protection, one can locate the country in the middle of a continuum of *no concern or initiatives in the field to high concern and many initiatives in the field*. The first extreme applies to the United States, which is the only relevant country not having signed the CBD. The other pole applies to India, which was among the first countries to sign CBD and to amend national legislation to implement it. China is situated in-between these two extremes, because it has intended to protect TK, but is currently only developing its own national legislation in this field. In this sense, it is safe to argue that India is several years ahead of China with respect to TK protection. This strategy ensures that China can keep its median position between developed and developing countries while avoiding offending either group. On the contrary, India has clearly positioned itself as an advocate of interests of developing countries and has been active in exporting its TKDL

model to other developing countries (Ogumanam, 2008, p.504). One can suppose that India's history of colonization has played a crucial role within this development to a more conflictive attitude towards the so-called first world. Hence, bio-piracy by Western companies has many times been labelled as *Western colonization of our times* by Indian activists (Shiva, 1997, p.5).

Conclusions

"India scored a stunning victory over China [...] on a turf that is likely to become a major battleground - bio-piracy or the theft of traditional flora, fauna and knowledge forms." (Chaulia, 2010) This recent quote of an Indian associate professor of world politics on two Chinese patents on medicinal herbaceous plants that were revoked by the European Patent Office highlights the relevance of this article. Conflicts on the utilization of TK are still to reach their peak and India and China are central actors on this "battleground". The use of the above-mentioned plants have been described in more than one thousand years old Ayurveda texts, which were made accessible to European patent examiners via the TKDL (ibid.). On the one hand, this means that India has been successful in its anti-appropriation strategy. On the other hand, the Chinese company which had filed for these patents has proven to be at the same level of development like its Western counterparts. This is the declared aim of China's political elite and this is also reflected in China's TK protection strategy of promoting innovation and integration of TCM into modern Western science. The aim of this article has been to propose explanatory factors for the differences between the Indian and Chinese strategies in the field of TK protection. The analysis of the differences between these two countries could not be based on reliable sta-

Table 1: Differences in national policy choices with respect to TK protection in India and China and possible explanatory factors

Country	Strategy	Characteristics				
		<i>Economic Interests</i>	<i>Characteristics of TK itself</i>	<i>Ethnic composition of society</i>	<i>Public opinion and general awareness of the issue</i>	<i>Foreign policy interests</i>
India	Defensive protection of TK, anti-appropriation strategy	Low international competitiveness (with respect to research and development)	Diverse, inaccessible	Diverse	High awareness and understanding of the issue, high number of NGOs	Representing developing countries' interests
China	Positive protection of TK, strategy of integrating TK into Western science	High international competitiveness (with respect to research and development)	Dominance of TCM, accessible	Dominance of one group	Some awareness, but less understanding of the issue, few NGOs, focus on TCM	Representing neither developing nor developed countries' interests

tistical data, as the topic is far from being well-explored and lacks literature with a clear political science focus. This article should be considered as a first step on the way of analysing interests and processes in the context of TK protection. Further research is therefore highly desirable to verify the findings presented in this article. Particularly field studies and data collection on public opinion, the misappropri-

ation of TK, as well as on its economic and social relevance seem to be a promising path for future research. This would not only allow to explicitly taking up a political science perspective on this topic, but also to answer the question whether it is money or pride that motivates governments and people to protect TK.

References

- Chaulia, S. (2010). India scores bio-piracy victory. Asia Times Online. URL: http://www.atimes.com/atimes/South_Asia/LF29Df01.html Accessed 5/2011.
- Commission on Intellectual Property Rights = CIPR (2002). Integrating intellectual property rights and development policy. London: Commission on Intellectual Property Rights.
- Correa, C. M. (2001). Traditional knowledge and intellectual property: issues and options surrounding the protection of traditional knowledge. Geneva: QUNO.
- (2002). Protection and promotion of traditional medicine: implications for public health in developing countries. South Perspectives. Geneva: South Centre.
- Cui, G. (2009). A review of the status quo of genetic resources and traditional knowledge protection in China. URL: <http://ssrn.com/abstract=1458890>.

- Gervais, D. (2005). Traditional knowledge & intellectual property: a TRIPS-compatible approach. *Michigan State Law Review*, 1, 137-166.
- Hathaway, M. (2010). The emergence of indigeneity: public intellectuals and an indigenous space in Southwest China. *Cultural Anthropology*, 25(2), 301-333.
- Krishnaswamy, S. (2009). Regulating access to knowledge: traditional knowledge policy in India. URL: <http://ssrn.com/abstract=1437015>.
- Li, X. & Li, W. (2007). Inadequacy of patent regime on traditional medicinal knowledge: a diagnosis of 13-year traditional medicinal knowledge patent experience in China. *The Journal of World Intellectual Property*, 10(2), 125-148.
- Liu, C. (2008). 中知法律保的在需求 [Traditional Chinese medicine and its legal protection]. *World Science and Technology – Modernization of Traditional Chinese Medicine and Materia Medica*, 10(4), 101-104.
- Löffler, K. (2001). Genetische Ressourcen: Biodiversitätskonvention und TRIPS-Abkommen [Genetic resources: Convention on Biological Diversity and TRIPS agreement], (FS II 01-405). Berlin: WZB.
- Mathur, A. (2003). Who owns traditional knowledge?. *Economic and Political Weekly*, 38(42), 4471-4481.
- Mugabe, J., Kameri-Mbote, P. & Mutta, D. (2001). Traditional knowledge, genetic resources and intellectual property protection: towards a new international regime. IELRC Working Paper 2001-5. Geneva: IELRC.
- Oguamanam, C. (2006). International law and indigenous knowledge: intellectual property rights, plant biodiversity, and traditional medicine. Toronto: University of Toronto Press.
- (2008). Patents and traditional medicine: digital capture, creative legal interventions, and the dialectics of knowledge transformation. *Indiana Journal of Global Legal Studies*, 15(2), 489-528.
- Sahai, S. (2003). Indigenous knowledge and its protection in India. In: C. Bellmann, G. Duffield & Ricardo Meléndez-Ortiz (Eds.), *Trading in knowledge: development perspectives on TRIPS, trade and sustainability*, (pp.166-174). London/Sterling, VA: Earthscan Publications Ltd.
- Shiva, V. (1997). *Biopiracy: the plunder of nature and knowledge*. Boston, MA: South End Press.
- Traditional Knowledge Digital Library = TKDL (n.d.). TKDL Outcomes against bio-piracy. URL: <http://www.tkdl.res.in/tkdl/langdefault/common/outcome.asp?GL=Eng>.
- van den Daele, W., Döbert, R. & Seiler, A. (2003). Protection of traditional knowledge: deliberations from a transnational stakeholder dialogue between pharmaceutical companies and civil society organizations, (FS IV 03-102). Berlin: WZB.
- World Intellectual Property Organization = WIPO (n.d.). Traditional Knowledge. URL: <http://www.wipo.int/tk/en/tk/>.
- WIPO (2011). Statistics on Patents: Patent Application Filings, Patents Granted. URL: <http://www.wipo.int/ipstats/en/statistics/patents/>.
- WIPO - Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore = WIPO-IGC (2005). Update on technical standards and issues concerning recorded or registered traditional knowledge, (WIPO/GRTKF/IC/8/7). Geneva: WIPO.
- World Trade Organization = WTO (2000). Protection of biodiversity and traditional knowledge: the Indian experience, (WT/CTE/W/156 IP/C/W/198), Submission by India. Geneva: WTO.
- WTO (2005). Minutes of meeting, (IP/C/M/47), Council for Trade-Related Aspects of Intellectual Property Rights. Geneva: WTO.

WTO (2006). The protection of traditional knowledge and folklore: summary of issues raised and points made, (IP/C/W/370/Rev.1), Council for Trade-Related Aspects of Intellectual Property Rights. Geneva: WTO.

Zhang, X. & Li, Z. (2007). 民族的知保 [The protection of intellectual property for national medicine]. *Lishizhen Medicine and Materia Medica Research* 18(5), 1214-1215.