# The Protection of Traditional Knowledge: challenges and possibilities arising from the protection of biodiversity in South Africa

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Indigenous communities are richly endowed with some unique knowledge. This knowledge was for much of history held only by these indigenous communities, and was unwritten because it is transmitted orally from one generation to the next, forming part of their ancestral heritage. This knowledge may be in the field of medicine, agriculture, music, dance, folklore, poetry, ecology, biodiversity, artistic, spiritual, and cultural expressions. This is what is referred to as Traditional Knowledge (TK). TK relating to biological resources today is greatly threatened as it is exploited and registered without the knowledge of their holders for Intellectual Property (IP) protection by researchers from developed countries through bio-piracy.[1] Even though the World Trade Organisation (WTO) Trade Related Aspects of Intellectual Property Rights Agreement (TRIPS Agreement) requires individual member states to choose whether to protect their plant varieties through *sui generis* laws or through IP laws, developing countries in general, and South Africa in particular face, several challenges in seeking to protect their TK.

TK has been defined as;

'tradition-based literary, artistic or scientific works; performances; inventions; scientific discoveries; designs; marks, names and symbols; undisclosed information; and, all other tradition-based innovations and creations resulting from intellectual activity in the industrial, scientific, literary or artistic fields'.[2]
**Key Words:** Traditional Knowledge, bio-piracy, indigenous communities

**La protection des Connaissances Traditionnelles : Défis et possibilités découlant de la protection de la biodiversité en Afrique du Sud**
Les communautés indigènes sont dotées de connaissances qui leur sont uniques. Ces connaissances sont, pour la plupart, non-écrites connues seulement par les membres des ces communautés, transmises oralement de générations en générations et faisant partie du patrimoine hérité de leurs ancêtres. Ces connaissances peuvent être du domaine de la médecine, de l'agriculture, de la musique, du folklore, de la poésie, de l'écologie, de la biodiversité, des expressions artistiques, spirituelles et culturelles. C'est cet ensemble de connaissances que l'on appelle « Connaissances Traditionnelles ». Les Connaissances Traditionnelles portant sur les ressources biologiques sont, de nos jours, en danger dans la mesure où elles sont exploitées et enregistrées, a l'insu de leur détenteurs, pour des raisons de protection de la propriété intellectuelle a travers la bio-piraterie par les chercheurs venant des pays développés. Bien que l'Organisation Mondiale du Commerce (OMC), a travers son Accord sur les Aspects des Droits de Propriété Intellectuelle (Accord ADPIC), demande a chaque Etat Membre de choisir de protéger ses variétés végétales par des lois Sui Generis ou a travers les lois portant sur la Propriété Intellectuelle, les pays en développement en général, et l'Afrique du Sud en particulier, font face a de nombreuses difficultés lorsqu'ils cherchent a protéger leurs Connaissances Traditionnelles.
**Mots Clés:** Bio-piraterie, Communautés Indigènes, Connaissances Traditionnelles

TK has also been defined as knowledge held and used by people who identify themselves as indigenes of a place based on cultural distinctiveness, prior territorial occupancy, distinct, and dominant culture.[3] TK is held by a distinct group of people inherently, constituting part of their culture, while it is mainly acquired by others,[4] say, by enquiring into that culture. The word *traditional* in this appellation merely refers to knowledge systems which have been transmitted from one generation to the next. Hence, TK is *traditional* only to the extent that its creation and use are part of the cultural traditions of a community, and not necessarily that the knowledge is ancient or static;[5] as TK evolves in response to changing environment.[6]

In the context of biodiversity, TK refers to knowledge possessed by indigenous communities of their environment. Such knowledge is derived from living close to nature, its richness and the complexity of its ecosystems for centuries; developing an understanding of properties of plants and animals; of functions of the ecosystem; and of techniques for using and managing them.[7] South Africa is one of the 17 countries of the world that is classified as mega-diverse. The country alone has more than 20,000 species of plants, (about 10% of all the known species of plants on earth), making it particularly rich in plant biodiversity.[8] The country is the third most bio-diverse country in the world, after Brazil and Indonesia, and has greater biodiversity than any other country of equal or smaller size.[9] Most South Africans rely on TK as a source of medication, or at least for primary health care, [10] this because it is affordable, and forms part of their culture. In fact, given its position in the biodiversity world, South Africa seems to be one of the African countries that is most affected by bio-piracy. Common cases of bio-piracy in the country include; the Hoodia Cactus Plant, the Pelargonium plant, Rooibos and Honey Bush plants.[11] Other more recent cases include; Skin Whitener, Tube worm extracts, Sponge extracts and Sea pen extracts.[12]

The main causes of bio-piracy are; the desire by pharmaceutical companies to exploit TK as an alternative source of medicine without having to compensate their holders, and non-regulation of, or poor regulation of biodiversity conservation in these countries.

**Challenges arising from the protection of plant biodiversity in South Africa**

Regulating the protection of TK is a contentious issue. This is because it requires the efforts of both developed countries (in need of TK in their biotechnological industries), and developing countries (holders of this knowledge). The topic has been debated upon at the international level by these two blocs with no unanimous outcome. Developing countries call for the harmonisation of the Convention on Biodiversity (CBD), the Nagoya Protocol and the TRIPS Agreement, so as to compel persons applying for IP protection over plant varieties to disclose information relating to; the source of origin of the plant varieties,[13] proof that the indigenous community from which the TK originates consents to its exploitation,[14] and that an access and benefit sharing agreement (ABS) has been reached with the indigenous community, as required by the CBD and the Nagoya Protocol.[15] This position is rejected by developed countries. The only logical explanation for this opposition by the latter may be that they encourage, and want to continue with bio-piracy. The WTO's silence on this issue (bio-piracy), presupposes that it finds nothing wrong with bio-piracy. The Agreement merely allows individual countries the laxity to decide on how to protect plant varieties, making no allusion the CBD. Hence, developing countries, individually, are confronted with a problem that requires international cooperation to resolve.

It is not as though developing countries are not capable of seeking solutions to their problems, the drawback lies in the fact that TK protection is an issue that concerns every country. Consequently, there is need to establish a bottom line on how these two blocs will make use of TK and *equitably* benefit therefrom, failure which the weak will lose to the strong as is the case today. We shall now proceed to discuss some of the challenges that arise from the protection of TK with particular attention to South Africa.

**Lack of education in the field of TK**

Creating awareness on the value of TK, and its misappropriation by foreign researchers is a great

step towards seeking a solution to the problem. One of the challenges faced by South Africa in seeking to protect its TK is that the country still lags behind in terms of educating its citizens on taxonomy and TK;[16] [17] hence, there is lack of knowledge in this field.[18] Taxonomy refers to the science of naming, describing and classifying organisms, including all plants, animals and microorganisms of the world,[19] and it provides basic understanding about the components of biodiversity, which is necessary for effective decision-making about conservation and sustainable use.[20]

The New Partnership for Africa's Development (NEPAD), of which South Africa is a member has emphasised on securing Africa's indigenous knowledge through amongst others, developing and promoting an African body of methodology and guidelines for integrating indigenous knowledge systems into formal education and training.[21] None of these measures seem to have been adopted by South Africa so far. Due to changing natural environments and fast-paced socio-economic conditions like urbanization, indigenous knowledge system is at risk of becoming extinct. However, at the request of the Department of Science and Technology and the South African Qualifications Authority, measures are being taken to introduce an accredited degree in Indigenous Knowledge Systems.[22] Time alone will tell how far this will be achieved.

**Co-ordination of TK experts in South Africa**

South African experts in various fields related to TK seem to be improperly co-ordinated; this is evident from the fact that no active measures seem to have been taken so far to document TK.[23] While Nigeria has taken practical measures to document her TK, India has come up with a Traditional Knowledge Digital Library (TKDL), though both countries have limited financial resources when compared to South Africa.[24] This is thanks to good co-ordination of their TK experts. Changing natural environments and urbanisation have resulted in indigenous knowledge systems fast becoming extinct, as the intrusion of technology aggravates the disappearance of indigenous knowledge.[25] Hence, proper co-ordination of experts in the field of TK protection is necessary for the protection TK. Such proper co-ordination will create a conducive atmosphere for the documentation of TK. South Africa will be able to easily prove prior art in seeking to protect TK in cases of misappropriation through bio-piracy once TK is documented.

**Non documentation of TK**

The fact that TK is not documented prevents its holders from seeking its protection. In order to apply for a patent right, an inventor should be able to properly describe the invention. The TRIPS Agreement provides that WTO Members States shall oblige patent applicants to disclose their invention in a manner sufficiently clear and complete such that it can be carried out by a person skilled in the art.[26] Furthermore, the applicant may be required to indicate the best mode for carrying out the invention at the filing date or, where priority is claimed, at the priority date of the application.[27]

It could be inferred from this provision that documentation is important, though not necessarily mandatory; this has a negative impact on TK holders. Firstly, because a great deal of TK is not documented, and because when a traditional healer prescribes a mixture of herbs as cure for a sickness, he may not be able to isolate and describe the chemical compounds and their effects on the body in terms of modern biochemistry.[28] Nevertheless, the healer is able to provide an efficient treatment based on generations of clinical trials, and on a solid empirical understanding of the interaction between the mixture and human physiology.[29] These

are fundamental characteristics of TK; this explains why a *sui generis* law seems so far the only appropriate mode of protection for TK. Such a *sui generis* law will have to take into account all these features of TK, and be able to, in spite of them, provide a means of protecting this unique form of intellectual creation.

**Unwillingness of some developed countries to participate in seeking a solution**

Most developed countries are unwilling to participate in the fight against bio-piracy. The US, for example, has not ratified the CBD, the Nagoya Protocol, and the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA)[30] which today stand as the only international agreements which recognise the contributions of TK holders in plant varieties, provide for the protection of TK and compensation for its exploitation based on prior informed consent.[31] These agreements require each State Party to take active measures to secure the protection of TK.

US patent laws do not encourage the preservation of TK relating to the general biological resources of indigenous communities as it provides that objections to patent applications based on prior art shall be accompanied by documentary proof,[32] a provision which frustrates TK holders willing to enforce protection of their TK as the TK is not documented in writing.

The US patent laws define prior art to mean;

> '...everything which has been made available to the public anywhere in the world by means of written disclosure [emphasis added] (including drawings and other illustrations) and which is capable of being of assistance in determining that the claimed invention is or is not new and that it does or does not involve an inventive step...' [33]

It is clear from this provision that documentary proof is a *conditio sine qua non* for challenging the application of, or grant of a patent right based on prior art in the US. This is disadvantageous to holders of TK relating to biological resource because a great part of their knowledge is undocumented, consequently, it may be difficult and even impossible for indigenous communities to seek for revocation of such patents whenever they are granted, or when an application for such a patent is lodged with the USPTO. Hence, the USPTO has been described by Ragnar as being a source of bio-piracy because it insists that prior art can only be proven through documentary proof in applications for revocation of patent. [34]

**The idea of prior art**

Prior art refers to a situation where in an invention sought to be patented is already available to the public.[35] The bulk of TK is available to the public because it is known, disseminated and used by members of a community. It seems that the spirit of ubuntu[36] which is typical of traditional communities who produce and utilise TK, works against them when it comes to obtaining protection: this is because these communities share the knowledge with others for purposes of solidarity. Critics hold that modern IP encourages the erosion of TK since it is promotes individual ownership, hence, inherently at odds with indigenous cultures which emphasise collective creation and ownership of knowledge.[37] This is because indigenous communities believe in communal ownership of their TK, and do not hesitate to share it with others. In fact, some holders of TK relating to medicine have the duty of sharing the knowledge with other members of their community.[38] This is contrary to contemporary IPRs wherein intellectual property is concealed and registered for pure and personal economic gains. Hence, only a *sui*

*generis* law will provide a solution to TK protection, and erode and bio-piracy.

**Cost**

Another challenge faced by South Africa in creating a database for registration of TK is financial constrains. It is estimated that the Indian government spent close to US$ 2 million to document and translate databases for its TKDL.[39] Moreover, the TRIPS Agreement does not require any formal national registration system for IPRs, implying that the cost and processes of registration, and enforcement lies with the holders of the IPR (in this case TK holder) and not the government. [40]Moreover, the cost of obtaining a patent under the US patent law alone is estimated to range between $5,000 and $10,000.[41] Even thereafter, it is the responsibility of the patent holder to enforce it against infringements, which equally entails cost.[42]

However these should not act as hindrances to the documentation and protection of TK as government can allocate a specific budget each year for that, and carry out the process progressively. Again, the value of setting up a TKDL should not be underestimated as not only will benefit from royalties to be paid by researchers for gaining access to TK cover the cost in the long run, but the cultural identity of the TK holders will be protected as well.

**Possible measures which can be taken to protect TK**

Sui generis modes of protection

*Protection under Biodiversity Laws*

TK can be protected through Act No 10 of 2004: Biodiversity Act of South Africa. The Act provides that access to bio prospecting activities shall be granted upon obtaining a permit to this effect. Such a permit shall be granted only after some conditions have been met, namely; that all stakeholders have been identified (i.e. state organs or indigenous communities);[43] their interests have been guaranteed;[44] the applicant has fully disclosed all material information relating to the bio prospecting activity to the stakeholders; has obtained their prior consent;[45] has signed a material transfer agreement with them;[46] and has specified the source of the biological resources.[47] The act further incriminates persons who either make use of, or export biological resources without a permit, or use a permit for purposes other than that for which it is granted.[48]

*Protection under a TK Protection Law*

Rather than amending IP laws to include TK protection, enacting a separate law which addresses the specific characteristics of TK, including the fact that part of it is already available to the public, may prove more effective in eliminating bio-piracy in South Africa. This strategy has been adopted by India where a Traditional Knowledge (Protection and Regulation to Access) Bill 2009 has been drafted.[49] Though still pending, it assigns clear and specific duties to the various organs it creates avoiding duplication of duties,[50] and above all assigns the Traditional Knowledge Authority (one of the organs created) to educate communities on TK protection and just and fair negotiations for bio prospecting activities.[51] This is an example worth emulating.

*Creation of a Database*

Creation of a database wherein the TK of South African indigenous communities will be registered (documentation) will play a great role in the protection of TK. Such a database will serve as

documented proof of prior art in defeating patent applications on this TK in institutions like the USPTO and the European Patent Office. This practical measure has been taken by the Indian government. The 2010 Intellectual Property Amendment Bill of South Africa makes mention of the creation of a database for the registration of TK, but provides no further information as to how such a data base would operate.[52] Such a database should be accessible to all indigenous communities, have a central office capital city (Pretoria), alongside regional and local offices in some indigenous communities, with a good representation of indigenous communities. In Costa Rica, the National Biodiversity Administration Committee (CONAGEBIO), charged with the duty of preparing access and benefit sharing policies, is required to 'coordinate with indigenous people in carrying out its functions.'[53] The aim is to ensure the participation of these people in seeking a solution to a problem which affects them, as this will create a minimum degree of democracy as well. Members of the regional and local offices should be assigned the duty of educating these communities on the value of their TK, how to engage in bio prospecting activities, and how to avoid bio-piracy. This will create awareness and encourage registration of TK for fear of bio-piracy.

*Payment of non-monetary compensation to TK holders*

The South African government can also protect holders of TK relating to biological resources by amending the Commencement on Bio-prospecting, Access and Benefit- Sharing Regulations 2008 to expressly provide non-monetary and monetary compensation or at the very least the former, to TK holders in exchange for TK in bio prospecting agreements. A close examination of this regulation gives the impression that only monetary compensation can be paid to indigenous communities for use of their biological resources,[54] which may not have lasting impacts on the lives of their recipients. The Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising out of their Utilisation 2002 provide for payment of monetary or non-monetary compensation in access and benefit sharing negotiations.[55] By so doing, indigenous communities will stand to benefit a lot more. Such non-monetary benefits include; information technology skills (since the benefit to be reaped from utilisation of TK by these companies are usually very high),[56] or sale of the products manufactured out of the biological resource to South Africans at a reduced price. Recalling the bio prospecting agreement on the Hoodia Cactus plant of South Africa, it is quite ironical that being the source of the TK used in manufacturing weight losing tablets, 61% of South Africans are obsessed.[57]

In Bangkok, where Novozymes has negotiated access and equitable benefit sharing agreements with a home company, BIOTEC,[58] while the latter collects, isolates, identifies and screens samples, Novozymes sponsors the research; provides training to BIOTEC workers; and transfers enzymes technology, bioinformatics and royalties to BIOTEC.[59] In addition, In Costa Rica, the Asociacion Instituto Nacional de Biodiversidab (INBio), a private non-profit scientific organisation, and Merck a US pharmaceutical multinational corporation signed a bio prospecting agreement in 1993[60] in which in exchange for the biological resources received, Merck was to pay monetary compensation; royalties on the sales of the products manufactured out of the biological resources obtained; transfer technology necessary to manufacture, direct the marketing of the commercially valuable end-products of genetic materials (biotechnology);[61] and train Costa Rican citizens.[62]

Again, these companies could be required to compensate by providing social services like, good water supply and electricity which are still lacking in some of the communities from which the biological resources are obtained. If corporations are required to pay indigenous communities monetary and/or non-monetary compensation in bio prospecting agreements, then

the country will reap long term benefits even at the end of the bio prospecting agreement.

*Compensation in terms of percentage*

Requiring companies to pay indigenous communities a specific percentage of their sales, after exploiting, harnessing, and selling products made out of TK and biological resources will guarantee greater benefit from the use of TK to its holders. At the time a bio prospecting agreement is contracted, the issuing authority may not know the value of the biological resources it is making available to a foreign company, on the other hand, the latter might also not be sure of the results it will obtain from conducting tests on the particular biological resource it is contracting to gain access to.[63] In such a situation it becomes difficult for both parties to evaluate the profit that will be made out of the said use at the end of the day, so as to determine what is will be *equitable* to offer as compensation to the TK holders,[64] as the CBD and the Nagoya Protocol provide for *equitable* share of benefits. South Africa could in some cases contract for a specified percentage of the profits that will be made after the products are manufactured and sold. This will avoid situations wherein foreign company will make huge benefits from exploitation of TK, and provide insignificant benefits to TK holders.

*Providing funds to Bio-safety organisations*

Measures should be taken by the government to provide a legal basis and mechanisms for funding activities of bio-safety NGOs having as objective to assist indigenous communities in securing a benefit from exploitation of their TK, as this will spur an increase in their number.[65] With the degree of corporate governance required of NGOs in South Africa, risk of misappropriation of such funds, or not channelling the proceeds to indigenous communities is reduced.[66]

*IP protection of TK*

The Patent Amendment Act provides that patent applicants shall indicate in their specifications, whether or not the invention for which protection is sought is based on or derived from an indigenous biological resource, genetic resource, or TK.[67] Where this is the case, such applicants shall furnish proof of authorisation to use the TK, or indigenous biological resource.[68] Such authorisation may be in the form of; a proof of prior informed consent of the indigenous community;[69] proof of a material transfer agreement;[70] and proof of a benefit sharing agreement between the applicant and the indigenous community.[71] This in fact is what developing countries want the EPO, and the USPTO to implement in their patent laws, as it will help eliminate bio-piracy.

## Conclusion

To conclude, one may therefore say that, TK protection today is still a dream for many developing, and South Africa in particular. Though a number of challenges stand on the way of securing its protection, there is a way out. These countries just need to be committed and determined, follow the examples of India and be driven by the desire to protect their heritage, and ensure that their indigenous communities reap the fruits of their labour.

## Notes

1 This refers to patent claims over biodiversity of indigenous knowledge that are based on the innovation, creativity and genus of indigenous communities. See Shiva V. 'Biopiracy' in (Ed) Protect or Plunder: understanding intellectual property rights'. 49.

2 WIPO IP and TK Report (1998-1999) 25 available at http://www.wipo.int/tk/en/tk/ffm/report/final/index.html (accessed 15/08/2010).

3 UNEP/CBD/COP/3/Inf.33, Annex 2.

4 These are people who do not belong to that indigenous group.

5 WIPO IP and TK Report (1998-1999) 25.

6 Holden 'Genetic Resources, Traditional Knowledge and Folklore' (2008) available at http://www.america.gov/st/businessenglish/2008/April/20080429221258myleen0.8259394.html (accessed 21/10/2010).

7 See Frederico Mayor, Director General of UNESCO available at http://www.unesco.org/education/tlsf/TLSF/theme_c/mod11/uncom11t01.htm (accessed 09/01/2011).

8 Olive Leaf Foundation available at http://www.olf.org.za/region/south%20africa (accessed 10/11/2010).

9 Ibid.

10 Draft Policy on African Traditional Medicine for South Africa 11 (2008) Notice 906 of 2008.

11 Press Articles 'Will The Nagoya Keep The Biopirates At Bay In South Africa?' available at http://www.wylie.co.za/PressArticleDetails.aspx?ArticleID=1220 (accessed 28/05/2011).

12 Dwyer 'Biopiracy, Trade and Sustainable Development' 19 Colorado Journal of International Environmental Law and Policy, footnote 91, (2008) 13.

13 Article 17(1)(i) of the Nagoya Protocol.

14 Rosenthal 'The Convention on Biological Resources: A Viable Instrument for Conservation and Sustainable Use' in Bergesen, Parmann and Thommerssen (Ed) Green Yearbook of International Co-operation on Environment and Development (1995) 75 available at http://www.fni.no/YBICED/95_06_rosendal.pdf (accessed 17/10/2010)

15 Article 15(3) and (4) of the CBD; article 6 of the Nagoya Protocol.

16 for more on formation on the importance of taxonomy and why we should study it see the CBD documents on http://www.cbd.int/gti/taxonomy.shtml (accessed 16/11/20110)

17 Raphesu 'Vulnerability of Indigenous Knowledge Management Systems in South Africa' 4 available at http://www.slideshare.net/Mphelar/vulnerability-of-indigenous-knowledge-management-systems-in-south-africa (accessed 16/11/2010).

18 'Why is Taxonomy important' available at http://www.cbd.int/gti/importance.shtml (last visited 07/01/2011).

19 'What is Taxonomy' available at http://www.cbd.int/gti/taxonomy.shtml (accessed 07/01/2011).

20 'Why is Taxonomy important' available at http://www.cbd.int/gti/importance.shtml (accessed 07/01/2011).21 NEPAD 'Securing and Using Africa's Indigenous Knowledge Base' available at http://www.nepadst.org/platforms/ik.shtml (Accessed 16/11/2010).

22 Raphesu 'Vulnerability of Indigenous Knowledge Management Systems in South Africa' 4 available at http://www.slideshare.net/Mphelar/vulnerability-of-indigenous-knowledge-management-systems-in-south-africa (accessed 16/11/2010).

23 Raphesu 'Vulnerability of Indigenous Knowledge Management Systems in South Africa' 5 available at http://www.slideshare.net/Mphelar/vulnerability-of-indigenous-knowledge-management-systems-in-south-africa (accessed 16/11/2010).

24 Ibid.

25 Ibid.

26 Article 29 of the TRIPS Agreement.

27 Article 29 of the TRIPS Agreement.

28 WIPO 'Intellectual Property and Traditional Knowledge' 8 Booklet No 2 available at http://www.wipo.int/freepublications/en/tk/920/wipo_pub_920.pdf (accessed 17/10/2010).

29 WIPO 'Intellectual Property and Traditional Knowledge' 8 Booklet No 2 available at http://www.wipo.int/freepublications/en/tk/920/wipo_pub_920.pdf (accessed 17/10/2010).

30 Robinson 'Biopiracy Concerns Heat Up over Chilli Pepper' (2009) available at http://ictsd.org/i/news/bioresreview/56902/ (accessed 28/05/2011).

31 Article 15 (3) and (4) of the CBD.

32 The US patent law provides that; 'Any person at any time may cite to the office [the USPTO] in writing prior arts consisting of patents or printed publication which that person believes to have a bearing on the patentability of any claim of a particular patent. If the person explains in writing the pertinency and manner of applying to at least one claim of the patent, the citation of the prior art and the explanation thereof will become part of the official file of the patent....' See the 'Patent Opposition and Revocation' section 301 of the USPTO available at www.patentlens.net/daisy/bios/2624/.../Patent%20Opposition%20US.pdf (accessed 15/10/2010).

33 USPTO Patent Cooperation Treaty PCT Rule 33.1 available at http://www.uspto.gov/web/offices/pac/mpep documents/1800_1843_01.htm (accessed 15/10/2010).

34 Ragnar 'Biopiracy, the CBD and TRIPS-the Prevention of Biopiracy' (2004) 40 available at http://www.lu.se/o.o.i.s?id=19464&postid=1561387 (accessed 15/10/2010).

35 Zoltan 'Prior Art and Patent Infringement' available at http://www.suite101.com/content/prior-art-and-patent-infringement---intellectual-property-law-a230634 (accessed 17/10/2010).

36 This relates to the spirit of togetherness which is typical of Africans. For more information about Ubuntu see 'All you need is Ubuntu' by Coughlan available at http://news.bbc.co.uk/2/hi/uk_news/magazine/5388182.stm (accessed 12/11/2010).

37 Downes 'How Intellectual Property Could Be a Tool to Protect Traditional Knowledge' (2000) 25 Columbia Journal of Environmental Law 257.

38 See 2.5.7 supra.

39 'India's Traditional Knowledge Digital Library (TKDL): A powerful tool for patent examiners' available at http://www.epo.org/topics/issues/traditional.html (accessed 23/09/2010).

40 WIPO 'Traditional Knowledge and Geographical Indications' 89 Chapter 4 available at http://www.iprcommission.org/papers/pdfs/final_report/Ch4final.pdf (accessed 15/10/2010).

41 Hansen & Van Fleet 'Traditional Knowledge and Intellectual Property' A Handbook on Issues and Options for Traditional Knowledge Holders in Protecting their Intellectual Property and maintaining Biological Diversity (2003) 10 available at http://shr.aaas.org/tek/handbook/handbook.pdf (accessed 16/10/2010).

42 Ibid.

43 Section 8 of the Regulation on Bio prospecting Access and Benefit Sharing.

44 Section 82 (1) (a) of the Biodiversity Act 2004.

45 Section 82(2) (a) of the Biodiversity Act 2004.

46 A material transfer agreement is a contract that governs the transfer of tangible research materials between two organisations, wherein the recipient intends to use it for his or her own research purpose see University of California, Berkeley available at http://www.spo.berkeley.edu/guide/mtaquick.html (accessed 5/01/2010).

47 See generally Section 13(2) (a)-(f) of the Regulations on Bio prospecting, Access and Benefit-Sharing 2008; and section 83 of the Biodiversity Act 10 of 2004.

48 Section 20 of the Regulation on Access and Benefit-Sharing Agreement 2008.

49 SiNApSE 'A Round Table on Protection of Traditional Knowledge/ Traditional Cultural Expression- Evolving a Sui Generis Model for India' (2010) available at http://www.sinapseblog.com/2010/01/round-table-on-protection-of_25.html (accessed 11/11/2010).

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51 Shreedharan 'Bridging the Time and Tide-Traditional Knowledge in the 21st Century) 15 Journal of Intellectual Property (2010) 150 available at http://nopr.niscair.res.in/bitstream/123456789/7624/1/JIPR%2015%282%29%20146-150.pdf (accessed 11/11/2010).

52 Section 16 (40C) of the South African 2010 Amendment Bill.

53 Article 17 (2) of the Biodiversity Law of Costa Rica available at http://www.sipo.gov.cn/sipo/ztxx/yczyhctzsbh/zlk/gglf/200503/P020070628545694641443.pdf (accessed 11/11/2010).

54 Section 11 (2) (f) (i).

55 Appendix 1 (B) 5 of the Bonn Guidelines provides for the payment of monetary or non-monetary compensation in benefit sharing agreements.

56 It is estimated that in the Hoodia bio-piracy case, when the South African Council for Scientific and Industrial Research licensed P57 to Phytofarm, the latter later on licensed P57 to an American company for $32 million plus royalties from future sales, see Robert, Ostergard, Tubin, Dikirr 'Between the sacred and the secular: indigenous intellectual property, international markets and modern African state' 49 Journal of modern African Studies (2006) 16 (accessed 28/05.2011).

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58 Lange 'Tropical Biodiversity: An Industrial Perspective' (2004) available at http://ixmati.conabio.gob.mx/institucion/cooperacion_internacional/doctos/version_ingles.pdf#page=296 296-347 (accessed 9/11/2010).

59 Laird & Wynberg 'The Commercial Use of Biodiversity: An Update on Recent Trends in Demand for Access to Genetic Resources and Benefit-Sharing, and Industry Perspectives on ABS Policy and Implementation' Secretariat of the CBD Access and Benefit Sharing in Practice 38 (2005) 119 available at http://www.cbd.int/doc/publications/cbd-ts-38-en.pdf (accessed 9/10/2010).

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