Protection of Community Knowledge Adaptation Technologies through Intellectual Property Rights: An Analysis

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Adaptation and mitigation are two important tools to battle against climate change. Combating climate change requires widespread innovation and transfer of both adaptation and mitigation technologies. However, the global law and policy regime on climate change is still more focused on mitigation than that of the adaptation. Consequently, innovation and transfer of new adaptation technologies lag behind in comparison with innovation and transfer of mitigation technologies. Investors or research organizations are reluctant to invest in identifying or developing adaptation technologies since mostly 'knowledge' or 'know how' based 'software' kinds of adaptation technologies are not entitled to receive intellectual property (IP) protection. This article assesses possibilities of protecting community knowledge and traditional knowledge 'soft' adaptation technologies through modern Intellectual Property Rights (IPRs). The assessment is done on the basis of the following three criteria - the nature of ownership, the nature of protected object, and the term of protection. The article concludes finds that if no modification takes place, the existing IPRs system might not suitably protect community knowledge or traditional knowledge adaptation technologies. Accordingly, the study suggests introduction of a sui generis protection system for community knowledge or traditional knowledge adaptation technologies.

Introduction

Battling against climate change is planet's most important agenda of this century.[3] This battle is mostly dependent on innovation, identification and deployment of the most appropriate

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technologies.[4] Innovation and deployment of these technologies is equally important for both climate change mitigation and adaptation.[5] However, until today the global governance regime on climate change has provided more importance on mitigation than adaptation.[6] Arguably, it happened due to an apprehension that emphasis on adaptation might undermine the urgency of mitigation.[7] Besides, due to clear nature of mitigation technologies *(i.e. boosting energy efficiency and reducing greenhouse gas emissions in atmosphere, storing greenhouse gases etc.)* countries found it easy to take necessary steps for innovation and deployment of mitigation technologies. On the contrary uncertain and diverse nature of adaptation technologies led countries choosing a path to let adaptation take place by way of natural adjustments 'through the "invisible hands" of natural selection and market forces'.[8] Besides, since adaptation technologies are mostly based on 'know-how' or knowledge[9], which are not always protectable under modern intellectual property rights (IPRs) regime as such do not offer any reward to the developers or identifiers of the concerned technologies[10], private sector investors are also less likely to invest in developing or identifying adaptation technologies. This is especially true for community knowledge and traditional knowledge-based adaptation technologies. This article will assess to what extent community knowledge or traditional knowledge-based adaptation technologies can be brought under diverse rights of modern IPRs regime. For this purpose, before going into analysis section, the following

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[3]John S. Dryzek, Richard B. Norgaard, and David Schlosberg, "Climate Change and Society: Approaches and Responses," in *The Oxford Handbook of Climate Change and Society* , eds. John S. Dryzek, Richard B. Norgaard, and David Schlosberg, (U.K: Oxford University Press, 2012), 1, accessed May 12, 2020, https://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780199566600.001.0001/oxfordhb-9780199566600-e-1?print=pdf; See also Geoffrey Maslen, *Too Late: How We Lost the Battle with Climate Change* (Richmond: Hardie Grant, 2017).

[4] United Nations Department of Economic and Social Affairs (UN DESA), "Climate Change: Technology Development and Technology Transfer", (UN DESA: 2008) 4. See also Md Mahatab Uddin and Md Saiful Karim, "International Law and South-South Cooperation for Innovation and Transfer of Green technologies", *George Washington International Law Review* 53, no, 3, (Fall 2020): 355.

[5]Ibid.

[6] Paul Steele, "Why Adaptation is the Greatest Market Failure and What This Means for the State", World Resources Report, World Resources Institute, accessed March 15, 2019, https://www.wri.org/our-work/project/world-resources-report/why-adaptation-greatest-market-failure-and-what-means-state

[7]Ibid

[8]Ibid

[9] Alina Schulenburg et al., *Adaptation Technology in Bangladesh* (Gobeshona Subgroup on Adaptation technology, 2017), 1-3.

[10]C.f. Walter Park , "Impact of the International Patent System on Productivity and Technology Diffusion," in *Competitive Strategies for the Protection of Intellectual Property ,* ed. Owen Lippert , (Vancouver: Fraser Institute: 1999) 47; "What is Intellectual Property", *World Intellectual Property Organization (WIPO)*, accessed May 12, 2020, https://www.wipo.int/edocs/ pubdocs/en/intproperty/450/wipo_pub_450.pdf.

two sections of article will provide a brief overview of climate change adaptation and adaptation technologies.

Climate Change Adaptation

While as an adverse impact of climate change, world is experiencing increased temperature, droughts, heavy rainfalls, frequent cyclones, and sea level rises etc.[11] , adaptation to climate change refers to 'adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.'[12] It means that adaptation to climate change requires 'changes in processes, practices, and structures to moderate potential damages or to benefit from opportunities associated with climate change'. [13]

Since nature of adverse impacts of climate change differs from country to country and sector to sector, there is no 'one size fits all' approach for climate change adaptation. Countries and communities need to adopt their respective adaptation mechanisms depending on the nature of the adversities they suffer from. The process of adaptation for any climate change induced adverse impact on any sector requires following some scientific approaches such as – assessing impacts, vulnerabilities, and risks; planning for adaptation; implementing adaptation measures; and monitoring and evaluating adaptation. The success of adaptation process 'not only depends on governments but also on the active and sustained engagement of stakeholders including national, regional, multilateral and international organizations, the public and private sectors, civil society and other relevant stakeholders, as well as effective management of knowledge'. [14]

Adaptation technology

Adaptation technology refers to 'the application of technology in order to reduce the vulnerability, or enhance the resilience, of a natural or human system to the impacts of climate change'.[15]

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[11] "Climate change consequences," European Commission, accessed April 7, 2021, https://ec.europa.eu/clima/change/consequences_en

[12] "Glossary A-D", *Intergovernmental Panel on Climate Change (IPCC)*, accessed April 3, 2021, https://www.ipcc.ch/sr15/chapter/glossary/

[13] "What do adaptation to climate change and climate resilience mean?" *UNFCCC*, accessed April 5, 2021, https://unfccc.int/topics/adaptation-and-resilience/the-big-picture/what-do-adaptation-to-climate-change-and-climate-resilience-mean

[14] "What do adaptation to climate change and climate resilience mean?" UNFCCC

[15] Subsidiary Body For Scientific and Technological Advice, in *the Twenty-third session of the seminar on the development and transfer of technologies for adaptation to climate change, Montreal, 28 Nov. to 6 Dec. 2005*, FCCC/SBSTA/2005/8, para 17.

Identifying and enlisting adaptation technologies are not as easy as mitigation technologies. This is because, the adaptation technologies are not confined to energy and industry sector, instead these technologies cover a wider range of arena such as water, agriculture, health, and infrastructure etc. This means that the nature of these technologies is more cross-sectorial that requires gathering of diverse stakeholders within and across the concerned sectors.[16]

Adaptation technologies can be classified as – 'hardware' and 'soft-ware' technologies.[17] 'Hardware' kinds of adaptation technologies refer to 'hard' and tangible products like-flood or drought resistant crops, while 'software' or 'soft' adaptation technologies refer to capacity and process essentially involved with employing any technology.[18] Instances of software or 'soft' technologies include knowledge, know-how, skills, building awareness, providing education and training etc.[19]Adaptation practices and methods like insurance schemes, or crop rotation patterns etc. are also considered as 'software' kind of adaptation technology.[20] Finally techniques for instance, building houses on stilts and constructing bunds, building levees and dykes for protecting flood etc. which are applied by many communities as traditional method of coping with climate variability and improving resilience to socio-economic changes are also fallen under 'software' adaptation technologies.[21] Since these technologies are actually tools for community based adaptation (CBA),[22] this article considers them as 'community knowledge'. A vivid example of community knowledge

[16]Lars Christiansen et al. (eds.), *Technologies for Adaptation - Perspectives and Practical Experiences Christiansen*, (Copenhagen: UNEP RISO: 2011), ix.

[17] Christiansen, Technologies, ix; See also Alina Schulenburg et al. *Adaptation Technology in Bangladesh,* (Dhaka: Gobeshona Subgroup on Adaptation technology, 2017), 1-3.

[18] Ibid.

[19] Ibid

[20] Ibid.

[21] Richard J.T. Klein, 'Adaptation to climate change: More than technology', in *Technologies for Adaptation - Perspectives and Practical Experiences Christiansen*, ed. Lars Christiansen et al. Lars; Olhoff, et al., (Copenhagen: UNEP RISO, 2011), 20.

[22] The community-based adaptation approach to climate change 'aims to include vulnerable people in the design and implementation of adaptation measures.' While the community based adaptation approach mostly includes simple and accessible technologies like storing fresh water during monsoon, it can also include complex methods or technologies for social and economic resilience, see Tim Forsyth, 'Community-Based Adaptation to Climate Change', *Climate Science*, (UK: Oxford University Press, 2017), accessed May 12, 2021, https://oxfordre.com/climatescience/view/10.1093/acrefore/9780190228620.001.0001/acrefore-9780190228620-e-602; For more about community based adaptation, see also S. Huq and H. Reid, "Community Based Adapta-tion: A Vital Approach to the Threat Climate Change Poses to the Poor," International Institute of Environment and Development (IIED) briefing (London: IIED, 2007); Jonathan Ensor, Rachel Berger, Saleemul Huq (eds.), *Community-based Adaptation to Climate Change: Emerging lessons,* (UK: Practical Action Publishing, 2014); J. Ayers and S. Huq, "Adaptation, development and the community" in *Climate Adaptation Futures,* eds. J. Palutikof, et al. (New York: John Wiley & Sons, Ltd, 2013) 203-214

'soft' adaptation technology is – enhancing water use efficiency through storing fresh water during monsoons.[23]

Like community knowledge, traditional practices, methods and knowledge used by diverse indigenous communities to cope with climate change-driven adversities are also known as 'soft' kind of adaptation technology.[24] While local communities of different regions of the world began to face adverse impacts of climate change recently (which started not more than 25 years back), research and study as to community observations and response to climate change also began in recent times (not more than 15 years ago). It means it might take more time for countries to identify or list all traditional and community knowledge based necessary adaptation technologies[25]. In the next few decades, it might appear clear that a large number of adaptation technologies will actually be based on traditional knowledge, method, or process.[26]

Traditional knowledge is often transmitted from one generation to other generation and owned collectively by the concerned community.[27] Traditional knowledge 'soft' adaptation technology does also include traditional medicines.[28] At present, a notable number of people throughout the world use traditional medicines. In some Asian and African countries around 80% of total population is dependent on traditional medicine. Even in many developed countries, from 70% to 80% people use any form of alternative or traditional medicine like acupuncture.[29] Adversities posed by climate change might increase the ratio of such dependencies. This is because climate change will gear-up health-hazards and vulnerability to diverse kinds of infectious, water-borne, vector-borne and other kinds of communicable and non-communicable diseases.[30] Hence, traditional

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[23] Mahatab Uddin and Saleemul Huq, "Protecting Soft Adaptation Technologies under Intellectual Property Rights system," *University of San Francisco Intellectual Property and Technology Law Journal* 25, no. 1, (Spring, 2021) 484.

[24]UN, "Best practices and available tools for the use of indigenous and traditional knowledge and practices for adaptation, and the application of gender-sensitive approaches and tools for understanding and assessing impacts, vulnerability and adaptation to climate change", *Technical paper*, FCCC/TP/2013/11, (31 October 2013): 3-4.

[25]Ibid

[26]Ibid; It is noteworthy that the term 'traditional' for traditional knowledge does not necessarily refer to 'old', instead of that it refers to the fact that the knowledge creation process reflects community traditions. See Elsa Stamatopoulou, *Cultural Rights in International Law: Article 27 of the Universal Declaration of Human Rights and Beyond,* (Leiden: BRILL, 2007) 216.

[27] WIPO, "Intellectual Property and Traditional Medical Knowledge," *Background Brief N ° 6*, 1 , accessed May 12, 2020, https://www.wipo.int/export/sites/www/tk/en/documents/pdf/background_briefs-e-n6-web.pdf.

[28]The World Health Organization (WHO) defines traditional medicine as "the sum total of the knowledge, skills and practices based on the theories, beliefs and experiences indigenous to different cultures, whether explicable or not, used in the maintenance of health, as well as in the prevention, diagnosis, improvement or treatment of physical and mental illnesses," WHO, "Traditional, complementary and integrative medicine," accessed May 12, 2020, https://www.who.int/traditional-complementary-integrative-medicine/about/en/

[29] WHO Fact Sheet N°134, "Traditional Medicine" (December 2008).

[30] World Bank, "Bangladesh: Climate Change & Sustainable Development," Report Prepared by *South Asia Development Tea* (Dhaka: World Bank; 2000) 37ff; See also Ramesha Chandrappa and Diganta Bhusan Das , "Introduction to

methods of curing or healing these diseases through using traditional plants should also be considered as 'software' adaptation technology. In this case, the method of treatment is a 'soft technology' while the concerned plants are 'hard technology'. For the purpose of this study, all traditional knowledge and traditional method-based adaptation technologies will be considered as part of community knowledge adaptation technologies.

Intellectual property rights and community knowledge adaptation technologies

Intellectual property (IP) refers to 'creations of the mind, such as inventions; literary and artistic works; designs; and symbols, names and images used in commerce'.[31] Accordingly, intellectual property rights (IPRs) refer to conferring rights to the inventors, authors, musicians, or business entrepreneurs.[32] The philosophy behind conferring rights over people's intellectual creations lies in offering moral and economic rewards to the concerned authors, inventors and creators, which consequently inspires them to engage in more innovative activities.[33] Based on diversities in nature of creations, IPRs can be named as copyright, patent, trademark, industrial design, geographical indication (GI), and undisclosed information or trade secret and so on.[34] Minimum standard and requirements of protection of these IPRs are enumerated under the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS)[35] governed by the World Trade Organization (WTO).[36] Alongside the WTO, it is the World Intellectual property Organization (WIPO), which acts as the international forum for IP services, IP policy as well as IP related information and cooperation.[37]

Environmental Sciences" , in *Environmental Health - Theory and Practice*, eds. Ramesha Chandrappa and Diganta Bhusan Das (Berlin: Springer, 2021) 131-174.

[31] "What is Intellectual Property," WIPO.

[32] C.f. Saha, Chandra Nath and Sanjib Bhattacharya, "Intellectual property rights: An overview and implications in pharmaceutical industry," *Journal of Advanced Pharmaceutical Technology &Research* 2,no. 2 (2011): 88-93; See also China National Intellectual Property Administration (CNIPA) and World Intellectual Property Organization (WIPO) , *Intellectual Property Basics: A Q&A for Students* , (Beijing and Geneva: 2019) 13 ff.

[33]C.f. Paul Goldstein, and R. Anthony Reese, *Copyright, Patent, Trademark and Related State Doctrines: Cases and Materials on the Law of Intellectual Property* (6th ed.), (New York: Foundation Press, 2008) 17. See also Graeme B. Dinwoodie, "Diversifying Perspectives of the International Intellectual Property System", in *Diversifying Perspectives of the International Intellectual Property System in a Time of Change: European and International Perspectives*, eds. Christophe Geiger (New York: Lexis Nexis, 2016).

[34]"What is Intellectual Property?" WIPO.

[35]TRIPS: Agreement on Trade-Related Aspects of Intellectual Property Rights, pmbl, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1C, 1869 U.N.T.S. 299, 33 I.L.M. 1197 (1994) [hereinafter "TRIPS" t].

[36] The World Trade Organization (WTO) is the only global international organization dealing with the rules of trade between nations. At its heart are the WTO agreements, negotiated and signed by the bulk of the world's trading nations and ratified in their parliaments. The goal is to help producers of goods and services, exporters, and importers conduct their business, See "What is WTO?", *WTO*, accessed May 12, 2020, https://www.wto.org /English/ thewto_e /thewto_e.htm.

[37]"What is Intellectual Property?" WIPO.

Among diverse kinds of IPRs, copyright and neighboring rights are available for authors, poets, painters, music composers, music directors, singers, actors, and film/drama directors.[38] Computer programs and compilations of data are also protected by copyright.[39] Scientific creations and innovations whether it is a product or method or process are mainly protected by patent protection.[40] Business marks or product or service logos are protected by trademark or service mark.[41] Besides these, products or services specially originated from any specific geographical conditions are protected by a kind of IPR known as GI.[42] Business secret or any scientific innovations are entitled to receive protection as undisclosed information or trade secret.[43]

Above mentioned diverse IPRs provide an exclusive right of exploiting concerned intellectual creation to the concerned creators or right holders for a specific period of time.[44] Within this period of time, the concerned creator(s) or owner(s) can make profit through commercial utilization of his/her/their concerned creation/ creations.[45] Besides, the creators may assign other person or provide licenses to other person for particular commercial use of their creation/ creations.[46] Tenure of some IPRs for instance, trademark or GI is extendable by paying a certain amount of fees, while most other IPRs go into public domain after expiry of the specific official tenure of protection.[47]

While international agreements and conventions governing global IPRs systems have specified a set of conditions and criteria for each of the above kind of IPRs, fulfilling those conditions or criteria is a challenge for community knowledge or traditional knowledge adaptation technologies.[48] These challenges are broadly addressed below in the light of three broad determiners- the nature of ownership of IPRs, the nature of object protectable under IPRs, and the term of protection of IPRs.

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[38]Ibid, 18
[39]Ibid.
[40]Ibid, 5
[41] Ibid, 8
[42] Ibid, 15
[43]"What is trade secret?" *WIPO*, accessed August 17, 2020, https://www.wipo.int/ edocs/pubdocs/ en/intproperty/ 450/wipo_pub_450.pdf .
[44] "What is Intellectual Property?" WIPO.
[45] Ibid.
[46] Ibid.
[47]Ibid.
[48]C.f. Daniel Gervais, "Traditional Knowledge & Intellectual Property: A TRIPS-Compatible Approach," *Mich. St. L. Rev 137*, (2005), 149 ff .

Nature of the ownership

For innovation of any method, know-how or knowledge deriving from any research conducted by an individual researcher or by a group of researchers or by any specific organization, ownership of IPR is conferred to the concerned researcher(s) or to the concerned research organization(s).[49] For this reason, identifying ownership for modern-tech or high-tech 'software' or 'knowledge' adaptation technologies is not a difficult task. But the nature of the ownership for traditional method, knowledge, or know-how for adaptation technology might bring debates, as it happens in the case of traditional knowledge and cultural expressions.[50] This is because this knowledge is not owned by any specific person or group of persons, instead traditional methods of adaptation for instance specific farming procedures or irrigation methods have come out as a result of practices conducted by farmers of any specific geographical region. It means basically this form of knowledge is owned by the concerned community where it has been generated from.

The current forms of IPR regime accept the idea of collective ownership. For instance, collective ownership of trade mark or service mark is already well-accepted.[51] Communal ownership of GI is also accepted.[52] According to Gervais (2005), recognizing a community as owner of a patent is also not a complicated theoretical jump.[53] In this connection, primary difficulty lies in figuring out originator of the work. [54] Once originator of the work is figured out, the next level difficulty concerns the "transfer" of rights from such originators to the community.[55] However, conferring ownership of a patent or copyright to a community does not intimidate the foundations of IPRs as they presently exist.[56] It may necessitate a change of some ascription and assignment rules and formalities, which is actually not prohibited by TRIPS.[57] In fact, in light of the above policy investigation[58] TRIPS is flexible on this front, as it does not necessarily inflict ownership rules. In principle, collective or communal ownership of copyright cannot be enormously challenged. This is

[49]"What is Intellectual Property?" WIPO.
[50]Kannamma Raman , "Debates on Protecting Traditional Knowledge in the Age of Globalisation: A Call for Re-Imagining Political Theory", in *Interdisciplinary Perspectives in Political Theory*, ed. Mangesh Kulkarni (New York: SAGE Publishing, 2011) 189-215 ; See also Jessica Cytryn, "Protecting Traditional Knowledge: International IP Debates Over the Rights to Genetic Resources," *Centre for Intellectual Property Policy* , McGill University , accessed May 12, 2020, https://www.cippmcgill.ca/news/2018/11/01/1872/
[51]Gervais, "Traditional Knowledge & Intellectual Property," 149.
[52]Ibid.
[53] Ibid.
[54] Ibid.
[55] Ibid.
[56] Ibid.
[57]The Agreement only ensures availability of patents and procedural guidelines as to acquisition of patent without determining ownership. See "TRIPS", Art. 27 & 62.
[58]"Cf. TRIPs Material ," WTO.

because, by now, many countries have introduced collective ownership for collective works in their national law.[59]

Hence, regarding ownership of the IPR on community knowledge or traditional knowledge adaptation technology, ownership of the right can logically be conferred to the concerned community, or local government, or national government or to the group of researchers who successfully identify any particular community knowledge or traditional knowledge as a tool for climate change adaptation. WTO and/or WIPO may think of adopting rules concerning the way of identifying originator of the concerned traditional knowledge. In addition, WTO and WIPO may authorize its member states to adopt appropriate rules and constitute any expert body to identify originator of their country-specific traditional knowledge for climate change adaptation. In this regard, precedents exist in the area of land rights.[60]

Nature of the object

Discussion concerning IP protection of community knowledge or traditional knowledge adaptation technology can be more complex if it concerns nature of the object for which protection is claimed. The degree or level of complexity depends on the type of IPRs as described below.

Copyright

Apparently, protection of traditional or community knowledge adaptation technologies are not possible under existing copyright system. This is because Art. 9 (2) of TRIPS states that copyright 'shall extend to expressions and not to ideas, procedures, and methods of operation or mathematical concepts as such.' However, technically countries still can adopt their national law incorporating 'idea' under copyright protection. While apparently it appears as derogation from Art. 9 (2) of the TRIPS, the derogation is justifiable in the light of Art. 1(1) of TRIPS. Art. 1(1) permits member states to confer stricter protection than that of the TRIPS provisions.[61] Besides this, in connection with rules to determine whether any work is protectable under copyright or not, Art 9 (1) of TRIPS

[59]Gervais, "Traditional Knowledge & Intellectual Property," 151.

[60] James on behalf of the Martu People v State of Western Australia [2002] FCA 1208 (Australia)

[61]Art 1(1) of TRIPS states: Members shall give effect to the provisions of this Agreement. Members may, but shall not be obliged to, implement in their law more extensive protection than is required by this Agreement, provided that such protection does not contravene the provisions of this Agreement. Members shall be free to determine the appropriate method of implementing the provisions of this Agreement within their own legal system and practice.

refers to Berne Convention.[62] The Berne Convention does not contain any provision preventing copyright protection for 'idea'. Instead, it confers discretion of decision to member states whether 'works in general or any specified categories of works shall not be protected unless they have been fixed in some material form.'[63]All these mean, if any WTO member state determines to provide copyright protection for community knowledge or traditional knowledge which are essential for climate change adaptation, theoretically it will not go against international rules and laws of IPRs.

Patent

Regarding patent protection, Art. 27 of TRIPS states that patents 'shall be available for any inventions, whether products or processes, in all fields of technology…'. It means that the nature of community knowledge or traditional knowledge which is essential for climate change adaptation cannot be barred from patentability if the concerned knowledge is claimed as an essential 'process' for climate change adaptation. However, the relevant knowledge needs to fulfill other essential conditions – novelty (being new), involving an inventive step and capable of industrial application.[64]

To fulfill 'novelty' requirement any claimed invention 'must never have been made public in any way, anywhere, before the date on which the application for a patent is filed'.[65] It means that the claimed invention should necessarily be 'the first of its kind'.[66] Hence, it will not be easy to determine novelty of the community knowledge or traditional knowledge 'soft' adaptation technologies. This is because, these knowledge are orally transmitted from one generation to another generation of a community as such at the time of filing patent application these knowledge do not remain 'new' anymore. However, technically, this difficulty can be overcome if it is examined based on the available 'prior art', as formal process of identifying 'prior art' differs from country to country. In fact, most jurisdictions largely consider those information and knowledge as 'prior art', which are disclosed in written form or documented in printed manner or public access databases

[62]Berne Convention for the Protection of Literary and Artistic Works of September 9, 1886, completed at PARIS on May 4, 1896, revised at BERLIN on November 13, 1908, completed at BERNE on March 20, 1914, and revised at ROME on June 2, 1928, at BRUSSELS on June 26, 1948, at STOCKHOLM on July 14, 1967, and at PARIS on July 24, 1971.
[63]Art 2(2) of Berne Convention states: 'It shall, however, be a matter for legislation in the countries of the Union to prescribe that works in general or any specified categories of works shall not be protected unless they have been fixed in some material form'
[64]"TRIPS," Art. 27(1).
[65] "Novelty Law and Legal Definition," *US Legal*, accessed December 12, 2020, https://definitions.uslegal.com/n/novelty/.
[66] "A Guide to Patents," *Government of Canada*, accessed December 20, 2020, https://www.ic.gc.ca/eic/site/cipointernet-internetopic.nsf/eng/h_wr03652.html.

etc.[67] Since traditional knowledge or community knowledge are not documented , technically it does not loose 'novelty'.

An invention is considered to involve an 'inventive step' or 'non-obviousness' if, 'having regard to the state of the art, it is not obvious to a person skilled in the art.'[68] Hence, for fulfilling 'inventive step' requirement, any claimed innovation needs to be an improved version of any 'prior art' or existing technology. Improved version means that it would not be obvious or clearly understandable to someone expert in the field of technology. The improvement needs to be 'non-obvious' in the eye of the concerned expert. Accordingly, it would be difficult to fulfill inventive step requirement for any traditional knowledge or community knowledge adaptation technology, as the scientific or commercial application of the community or traditional knowledge adaptation tools contain a risk that it may not be deemed as 'non- obvious' to an expert working in the area.

To meet the third requirement of patentability, 'being capable of industrial application' or 'utility', any claimed invention must have use in any kind of industry or in agriculture.[69] Since traditional knowledge or community knowledge adaptation tools have clear utility or use (*i.e. as a tool for coping with changed climate of any given locality),* it will easily fulfill this requirement.

Hence, any traditional knowledge adaptation technology can theoretically fulfill 'novelty' and industrial application conditions. But fulfilling 'inventive step' or 'non-obviousness' criterion will remain difficult if no substantive change as to 'inventive step' requirement of patent law takes place.

However, without fulfilling 'inventive step' requirement it is possible to obtain utility model or petty patent protection in many countries. For receiving utility model or petty patent protection, the knowledge must meet the novelty and industrial application criteria.[70]Since the community knowledge or traditional knowledge adaptation technologies technically fulfill these two criteria, these technologies may easily obtain utility model or petty patent.

Trademark

In accordance with Article 15 of TRIPS, a trademark can consist of 'any sign, or any combination of signs, capable of distinguishing the goods or services of one undertaking from those of other

[67]WIPO/GRTKF/IC/9/8, para 39.
[68]Convention on the Grant of European Patents, October 5, 1973, 13 Int'l Legal Mats . 268 (1974) [Also Known as the European Patent Convention (hereinafter referred to as "EPC"), Art. 56.
[69]"EPC," Art. 57.
[70] "Utility Model," WIPO.

undertakings'[71]. It means trademark protection is available for goods or services, but not for any idea or scientific knowledge or traditional knowledge. Hence, the nature of community or traditional knowledge adaptation technologies is not meant to be protected by trademark. However, if any business entity provides commercial service for climate change adaptation and the offered service is based on any community or traditional knowledge, the concerned business entity is entitled to receive trademark protection for their business. Furthermore, trademark protection is also available for commercialization of traditional medicine or any newly invented modern medicine produced from any traditional plant.

Geographical Indication (GI)

Art. 22 of TRIPS denotes GI as 'indications which identify a good as originating in the territory of a Member, or a region or locality in that territory, where a given quality, reputation or other characteristic of the good is essentially attributable to its geographical origin'[72]. From the notion it is clear that the GI is applicable for any tangible goods or product. In relation with this study, GI is not applicable for 'soft' adaptation technology meaning community or traditional knowledge tool for climate change adaptation. But, GI may be considered as an option for protecting traditional medicine or plant kind of knowledge which are employable for climate change adaptation.

Design

Design protection is aimed for 'independently created industrial designs that are new or original'[73]. Since 'soft' kinds of adaptation technology does not belong to any visible shape or design, this kind of IP protection is neither suitable for any new scientific process nor suitable for community knowledge or traditional knowledge climate change adaptation tools.

Trade secret

In addition to the above-mentioned diverse kinds of IP protection, TRIPS also allows for protection of undisclosed information or trade secret. This kind of protection allows concerned right holders' possibility of 'preventing information lawfully within their control from being disclosed to, acquired

[71] "TRIPS", Art. 15.
[72] Ibid, Art. 22.
[73] Ibid, Art. 25.

by, or used by others without their consent in a manner contrary to honest commercial practices'.[74] Since this protection is given for soft kind of property (*i.e. information*), it seems fit with the nature of the soft adaptation technologies, whether it is adaptation related scientific process or scientific knowledge or community knowledge traditional knowledge.

Term of protection

Apart from trademark, trade secret, and GI, all other kinds of IPRs are strictly tenure specific. It means, at the time of choosing IP protection for community knowledge or traditional knowledge adaptation technologies, the tenure of protection should also be a matter of concern. Although limited tenure protection is justifiable or appropriate for any recently invented scientific knowledge-based adaptation technology, limited tenure of protection for community or traditional knowledge adaptation technology requires further thoughts. This is because, these technologies are part of tradition or cultural heritage of the concerned community or country. For the sake of greater betterment of any community, protection of these technologies requires to be conferred for indefinite period. Taking this issue into account, one may argue that a *sui generis* system or new kind of IPR can be introduced for community knowledge or traditional knowledge adaptation technologies. To introduce a *sui generis* system conferring ownership of community or traditional knowledge adaptation technologies, it is worth considering Professor Gupta's suggestion which he specially gave for traditional knowledge:[75]

> "Any new system of protection will have to balance the long-term needs of a community to have a vested interest in the conservation of their knowledge systems, and yet provide incentives for those who may add value to share the benefits of using that knowledge for a limited period of time. In my view, any new system should discriminate between rights of communities in the knowledge systems per se, vis-a-vis the rights in a specific knowledge output. The rights in the systems should be perpetual".

[74] Ibid, Art. 39.
[75] Anil K. Gupta, *WIPO-UNEP Study on the Role of Intellectual Property Rights in the Sharing of Benefits Arising from the Use of Biological Resources and Traditional Knowledge* (WIPO-UNEP: 2004), 161, accessed December 20, 2020, https://www.wipo.int/edocs/pubdocs/en/tk/769/wipo_pub_769.pdf.

Conclusion

This paper finds that bringing community knowledge or traditional knowledge adaptation technologies under some modern IP protection method may be possible in the light of first two determiners of the study- 'the nature of ownership', and 'nature of object'. But the third determiner of this study (*i.e. tenure of protection*) may impede this possibility of conferring IPRs on community knowledge or traditional knowledge adaptation technologies. These technologies (in its current 'soft' form) can be protected by copyright if countries extend the scope of their national copyright protection from expressions of the ideas to mere ideas. Besides, the community knowledge or traditional knowledge adaptation technologies can also fulfil the 'novelty' and 'utility' requirements of patent, at least theoretically. But it does not really pass the 'inventive step' criterion of patent protection.

Some community knowledge or traditional knowledge adaptation technologies *(e.g. traditional medicine or traditional plants)* can obtain increased commercial value through gaining trademark protection. However, being a 'soft' technology, community knowledge or traditional knowledge adaptation technologies are not usually entitled to receive any 'design' or 'GI' kind of IP protection.

While taking into account the first two determiners of the assessment *(e.g. nature of ownership and the protectable object)*, the community knowledge or traditional knowledge adaptation technologies are not entitled to receive patent protection, these 'soft' technologies can obtain 'utility model' or 'petty patent' protection in countries where legislation exists for granting such protection.

If any community knowledge or traditional knowledge adaptation technology is protected under copyright or utility model or petty patent, this paper finds that commercial values of those technologies can be enhanced if those 'soft' technologies are offered as a 'product' *(e.g. traditional medicine)* or 'service' *(e.g. traditional method of treatment)* and receive protection under trademark or service mark or GI where appropriate.

In terms of the third determiner of the study *(i.e. the tenure of protection)*, this study finds that all copyright or patent or petty patent are granted for a limited period, which does not suit with inherent nature of community knowledge or traditional knowledge adaptation technologies. Hence, considering tenure of protection, community knowledge or traditional knowledge adaptation technologies can be better protected by 'trade secret'. This is because if the information remains

secret among the agreement or contract signatories, no limitation exists for protection period. But the risk with trade secret protection is that once the secret is revealed to public, the protection is lost forever.

Finally, considering all three determiners *(i.e. the nature of ownership, nature of object, and tenure of protection)*, this paper argues that a *sui generis* protection-system may help countries protect their community knowledge and traditional knowledge adaptation technologies. Since countries have freedom to design their own *sui generis* system based on their need as well as the nature of the community or traditional knowledge technologies in question,[76] designing a *sui generis* system would best serve their respective interests.

[76]S. Hansen, and J. 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*, (Washington, DC: American Association for the Advancement of Science (AAAS) Science and Human Rights Program, 2003: 27.