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ISSN: 2181-9130
2017 №10

ROLE OF TRADITIONAL KNOWLEDGE IN CLIMATE CHANGE ADAPTATION

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http://dx.doi.org/10.26739/2181-9130-2017-10-10-3

Recommended citation: Lipika Sharma**,** Role of traditional knowledge in climate change adaptation, (10) Journal of Law Research 39-57 (2017)

Abstract

"Climate Change is the single biggest thing that humans have ever done on this planet. The one thing that needs to be bigger is our movement to stop it."

Bill McKibben

Indigenous peoples' "low-carbon" traditional ways of life have contributed little to climate change but indigenous peoples are the most inharmoniously affected by it. This is because of their significant dependence on local biological

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ISSN: 2181-9130
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diversity, ecosystem services. Further their reliance on cultural landscapes as a source of sustenance and well-being in another big reason for getting adversely affected by climate change. Climate change may be a global phenomenon, but the impacts will not be evenly distributed among the world's population . Indigenous groups are projected to be among the communities most heavily affected by climate change .Hence we need to take note of their vulnerability due to climate change and their methods of survival in changing times. The present paper discusses in detail role of Traditional knowledge in the climate change adaptation. The paper is evaluating the adaptive technique under various heading such as Traditional Ecological Knowledge's relevance with regard to Climate Change, Traditional Ecological Knowledge Policy Consideration For Climate Change Initiatives, Relationship Between Traditional Ecological Knowledge and Climate Change, Traditional Knowledge Needs A Role In Global Climate Discourse, Traditional Knowledge, Climate Change And Agriculture, India Study On Tribal Knowledge And Climate Change. It is being concluded that traditional knowledge can provide people with significant information about how climate affects the environment, agriculture and farming. Traditional ecological knowledge is essential to the economic and cultural survival of indigenous groups and has come to forefront of present day deliberations regarding climate change in a positive manner.

Keywords: Traditional knowledge, Traditional Ecological knowledge, climate change, resilience, adaptation and indigenous communities.

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РОЛЬ ТРАДИЦИОННЫХ ЗНАНИЙ В АДАПТАЦИИ ИЗМЕНЕНИЯ КЛИМАТА

Липика Шарма

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«Изменение климата - это самая большая вещь, которую люди когда-либо делали на этой планете. Единственное, что должно быть больше, это наше движение, чтобы остановить его».

Билл Маккиббен

«Низко углеродный» традиционный образ жизни коренных народов мало повлиял на изменение климата, но коренные народы в наибольшей степени подвержены его воздействию. Это связано с их значительной зависимостью от местного биологического разнообразия, эко системных услуг. В дальнейшем их зависимость от культурных ландшафтов как источника пропитания и благополучия является еще одной серьезной причиной для неблагоприятного воздействия изменения климата. Изменение климата может быть глобальным явлением, но воздействие не будет равномерно распределено среди населения мира. Предполагается, что группы коренных народов будут находиться в сообществах, которые в наибольшей степени подвержены влиянию изменения климата. Нам необходимо принять во внимание их уязвимость из-за изменения климата и методов их выживания в меняющиеся времена. В настоящем документе подробно обсуждается роль традиционных знаний в адаптации к изменению климата. В документе

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анализируется адаптивная техника под различным заголовком, например, в отношении важности традиционных экологических знаний в отношении изменения климата, традиционного изучения политики в области экологического знания для инициатив в области изменения климата, взаимосвязи между традиционными экологическими знаниями и изменением климата, потребности в традиционных знаниях роль в глобальном климатическом дискурсе, «Традиционные знания, изменение климата и сельское хозяйство», исследование в Индии знаний о племенных знаниях и изменении климата. Делается вывод о том, что традиционные знания могут предоставить людям значительную информацию о том, как климат влияет на окружающую среду, сельское хозяйство и сельское хозяйство. Традиционные экологические знания имеют важное значение для экономического и культурного выживания групп коренного населения, и они оказались на переднем крае сегодняшних обсуждений, касающихся изменения климата, в позитивном ключе.

Ключевые слова: традиционные знания, традиционные экологические знания, изменение климата, устойчивость, адаптация и общины коренных народов.

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IQLIM O'ZGARISHGA MOSLASHUVDA AN'NAVIY BILIMNINH ROLI

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"Iqlim o'zgarishi odamlar bu sayyorada hech qachon qilmagan eng katta narsa. Katta bo'lishi kerak bo'lgan yagona narsa bizning harakatimizni to'xtatishdir ".

Bill MakKibben

"Kam uglerod" mahalliy xalqlar hayoti an'anaviy yo'l iqlim o'zgarishi ta'siri kam bo'ldi, biroq mahalliy odamlar uning ta'siri eng sezgir bo'ladi. Bu ularning mahalliy biologik xilma-xillikka, ekotizim xizmatlariga jiddiy bog'liqligiga bog'liq. Keyinchalik rizq va farovonlik manbai sifatida madaniy landshaftlar ularning bog'liqligi iqlim o'zgarishi salbiy ta'sir uchun yana bir muhim sababi hisoblanadi. Iqlim o'zgarishi global xodisa bo'lishi mumkin, ammo uning ta'siri jahon aholisiga teng taqsimlanmaydi. Mahalliy guruhlar iqlim o'zgarishiga bevosita ta'sir ko'rsatadigan jamoalarda bo'lishlari kutilmoqda. Biz iqlim o'zgarishi va o'zgaruvchan vaqtlarda ularning yashash usullari tufayli ularning zaifligini hisobga olishimiz kerak. Ushbu maqolada iqlim o'zgarishiga moslashishda an'anaviy bilimlarning o'rni batafsil bayon etilgan. hujjat iqlim o'zgarishi, iqlim o'zgarishi tashabbuslari uchun ekologik bilim sohasidagi siyosatining an'anaviy

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o'rganish bo'yicha an'anaviy ekologik bilimlar ahamiyatini, masalan, turli nom ostida adaptiv uskunalar tahlil, an'anaviy ekologik bilim va iqlim o'zgarishi o'rtasidagi munosabatlar an'anaviy bilim rol kerak global iqlim aytish, "An'anaviy bilim, iqlim o'zgarishi va qishloq xo'jaligi," Hindistonda bir ishda, qabila o'yin- bilim va iqlim o'zgarishi. An'anaviy ma'lumot odamlarga iqlimning atrof muhitga, qishloq xo'jaligiga va qishloq xo'jaligiga qanday ta'sir ko'rsatishi haqida muhim ma'lumot berishi mumkin degan xulosaga keldi. An'anaviy ekologik bilim mahalliy guruhlar, iqtisodiy va madaniy omon qolish uchun muhim bo'lgan, va ular ijobiy tarzda, iqlim o'zgarishi ustida bahslar mavjud muhim mavqega ega edi.

Kalit so'zlar: an'anaviy bilim, an'anaviy ekologik bilim, iqlim o'zgarishi, barqarorlik, moslashuv va mahalliy jamoalar.

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"Climate Change is the single biggest thing that humans have ever done on this planet. The one thing that needs to be bigger is our movement to stop it."

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The rapid rise in the world's population and our ever-growing dependence on fossil fuel-based modes of production has played a considerable role in the growing concentration of greenhouse gases in the atmosphere[1]. As a result, global temperatures are increasing, the sea level is rising and rainfall patterns are changing, while storm surges, floods, droughts and heat waves are becoming more frequent and severe. Subsequently, agricultural production is decreasing, freshwater is becoming more scarce, contagious diseases are on the rise, local livelihoods are being degraded and human well-being is diminishing. It is worth mentioning here that although indigenous peoples' "low-carbon" traditional ways of life have contributed little to climate change but indigenous peoples are the most discordantly affected by it. This is because of their significant dependence on local biological diversity, ecosystem services. Further their reliance on cultural landscapes as a source of sustenance and well-being[2] in another big reason for getting adversely affected by climate change.

[1] United Nations University, available at http://unu.edu/publications/articles/why-traditional-knowledge-holds-the-key-to-climate-change.html, last seen on 20/12/2016
[2]NeelamKadyan, PratimaRanga, Yogender, Role of Indigenous Peoples in Climate Change, World Academy of Science, Engineering and Technology, International Journal of Energy and Power Engineering Vol:2, No:7, 2015

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Climate change may be a global phenomenon, but the impacts will not be evenly distributed among the world's population[3]. Indigenous groups are projected to be among the communities most heavily affected by climate change .Hence we need to take note of their vulnerability due to climate change and their methods of survival in changing times. The word survival is used herein with specific reference to usage of Traditional Knowledge to mitigate climate change. When there is discourse about traditional knowledge, it is important to note that at the international scenario, it was discussed first time in Convention on Biological Diversity (CBD). This treaty endorsed to respect, preserve and maintain Traditional knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity. Further one of the most important outcome of CBD was that first time in an International treaty Traditional knowledge was specifically discussed and there was a dialogue to promote its wider application with the approval and involvement of the indigenous communities with regard to their innovations and practices and encourage the equitable sharing of the benefits arising out of its utilization.

Traditional Knowledge System

Indigenous knowledge is that body of knowledge, which is accumulated over generations of living in a particular environment and has been vital in responding to environmental challenges including floods, droughts, disease and pest infestations and their attendant effects etc. Phonological knowledge held in the indigenous communities

[3]Available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3074818/, last seen on 20/12/2016

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has a high value.[4] Further, the term "traditional knowledge" is generic and represents multiple dimensions of dynamic knowledge systems and life ways of diverse indigenous peoples.[5] Traditional knowledge broadly refer to indigenous communities' ways of knowing that both guide and result from their community members' close relationships with and responsibilities to the landscapes, waterscapes, plants and animals that are vital to the flourishing of indigenous cultures. Many traditional societies have built up knowledge over long periods about environmental change and have developed elaborate strategies to recognize and cope with these changes. Worldwide, however, applications of traditional knowledge systems in mitigation and adaptation to climate change have long been neglected in developing and implementing climate change policy and have only recently become part of the climate change debate. Traditional and indigenous peoples have valuable lessons to offer about successful and unsuccessful adaptations to climate change. These lessons could be vital in the context of global climate change[6] many communities, notably indigenous peoples, already hold context-relevant knowledge and strategies for addressing climate change risks.[7]Climate change will not only threaten the biodiversity, but also affect the socio-

[4] Green D &Raygorodetsky G, Indigenous knowledge of a changing climate, climatic change, 2010,
100:239-242

[5] Available at http://earthzine.org/2015/07/31/the-ethics-of-traditional-knowledge-exchange-in-climate-change-last initiatives/ seen on 20/12/2016

[6]Macchi M, Indigenous and Traditional Peoples and Climate Change, Issue Paper, IUCN, 2008, 9.

[7] P Day and AK Sarkar, Revisiting indigenous farming knowledge of Jharkhand (India) for conservation of natural resources and combating climate change, Indian Journal of Traditional Knowledge , Vol. 10 (1), January 20011, pp. 71-79

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economic condition of the indigenous people of the state[8].

Traditional Ecological Knowledge's relevance with regard to Climate Change

The most relevant aspect of traditional knowledge when we discuss it in the context of climate change is traditional ecological knowledge. Indigenous peoples' traditional ways of knowing and living have been refined over thousands of years of experiences and relationships with living beings and places. English language phrases denoting traditional knowledge, such as "traditional ecological knowledge ," are coined in academic and policy circles that are usually separate from indigenous peoples, and often do not fully reflect the ways in which indigenous communities refer to, or think of, their knowledge and lifeway's[9].

Climate change is recognized as a phenomenon that will be seen and experienced by people all over the world. It is a global phenomenon, but impacts are local and so do the adaptation capacities, preferences and strategies should be. And for that we need to take help of indigenous people. As it must be understood that indigenous people are surviving since ages on Traditional knowledge and part of this large bank of traditional knowledge is Traditional Environment Knowledge .

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[8]SanjeebBharali* and Mohamed Latif Khan Climate change and its impact on biodiversity; Some management options for mitigation in Arunachal Pradesh. Available from: https://www.researchgate.net/publication/232809182_Climate_change_and_its_impact_on_biodiversity_Some_management_options_for_mitigation_in_Arunachal_Pradesh [accessed Jan 31, 2017].

[9] Ibid 2

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The very identity of indigenous peoples is inextricably linked with their lands, which are located predominantly at the social-ecological margins of human habitation — such as small islands, tropical forests, high-altitude zones, coasts, desert margins and the circumpolar Arctic[10]. Here at these margins, the consequences of climate change include effects on agriculture, pastoralism, fishing, hunting and gathering and other subsistence activities, including access to water.

Climate scientists, policymakers and the growing community of citizens engaged in observing global change are increasingly turning to traditional knowledge of indigenous peoples to improve understanding of strategies for adaptation and mitigation. Indigenous peoples are also recognizing the value of methods and information from western climate science, such as models, risk and vulnerability assessments and monitoring strategies.

Traditional Ecological Knowledge Policy Consideration for Climate Change Initiatives

Unfortunately, policymakers who design and implement climate change initiatives frequently overlook indigenous peoples[11]. While they call for access to traditional knowledge to help inform choices for preparation, adaptation or mitigation in response to climate change, they have little awareness of real risks of harm when indigenous peoples share their traditional knowledge. Currently, there are few protections to ensure that traditional knowledge will remain the property of the indigenous peoples or knowledge holders who choose to share traditional knowledge. There is need to

[10]Available at http://www.indigenousclimatechange.com.au/tek.aspx
[11] Available at https://www.researchgate.net/profile/Kyle_Whyte/publication/280621651_The_Ethics_of_Traditional_Knowledge_Exchange_in_Climate_Change_Initiatives/links/55bf42eb08ae9289a099f2da.pdf last seen on 21/12/2016

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have Guidelines which must be intended to promote the use of traditional knowledge in climate change initiatives in such a way as to protect the rights and interests of indigenous peoples, promote greater collaboration with scientists and government professionals and increase indigenous representation in climate change initiatives such as those of the U.S. federal government.[12]

If we talk about the specific area of traditional knowledge i.e. traditional ecological knowledge, than we notice that it is specifically related to food security. Recent observations, studies and research suggest that many farmers cope with and even prepare for climate change, minimizing crop failure through increased use of drought-tolerant local varieties, water harvesting and carbon sequestration, extensive planting, mixed cropping, agro forestry practices, opportunistic weeding, wild plant gathering and a series of other traditional farming system and food production techniques. These practices point to a need to re-evaluate indigenous technology and approaches as a key source of information on adaptive capacity centered on the selective, experimental and resilient capabilities of farmers in dealing with climate change. Rio Declaration on Environment and Development states that indigenous people and their communities and other local communities have a vital role to play in environmental management and development because of their particular knowledge and traditional practices.[13] The UN Declaration on the Rights of Indigenous Peoples confirms and strengthens this directive.[14]

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[12]Available at http://earthzine.org/2015/07/31/the-ethics-of-traditional-knowledge-exchange-in-climate-change-initiatives/

[13] Rio Declaration on Environment and Development, Report of The United Nations Conference on

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Everything said and done, when we negotiate about utilization of traditional ecological knowledge in Indian context than we must take a step forward ,being a biodiversity rich country ,to protect and preserve ,this knowledge and further take steps to make traditional ecological knowledge as part of policy formation and implementation to mitigate climate change. Various efforts are made at the state level in biodiversity rich areas in India to utilize traditional ecological knowledge at ground level to experiment when it comes to growing of crops in changed climate conditions. To name a few are Tamil Nadu, Arunachal Pradesh, Jharkhand, Nagaland, Madhya Pradesh, Western Ghats of Karnataka, and West Bengal Nagaland Assam.

According to the latest assessment report of Intergovernmental Panel on Climate Change refers climate change to a change in the state of the climate that can be identified (e.g. using statistical tests) by changes in the mean and /or the variability of its properties and that persists for an extended period, typically decades or longer[15]. It refers to any changes in climate over time, whether due to natural variability or because of human activity. Whereas adaptation refers to adjustment in ecological, social or economic systems

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Environment and Development held at Rio de Janeiro on 3-14 June 1992, (United Nations
A/CONF),151/26, 1, 1992.

[14]Available at http://www.ias.unu. edu/resource_centre/Expert%20Group%20Meeting%20Sum mary%20Report.pdf, 2008.

[15]LudivineTamiotti,Trade and Climate Change: A Report by the United Nations Environment Programme and the World Trade Organization, UNEP/Earthprint, 2009, at pg 2

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in response to actual or expected climate stimuli and effects or impacts. [16]

Relationship between Traditional Ecological Knowledge and Climate Change

Indigenous populations are projected to face disproportionate impacts because of climate change in comparison to non-indigenous populations. Traditional ecological knowledge, as the indigenous knowledge system is called, has the potential to play a central role in both indigenous and nonindigenous climate change initiatives. The detection of environmental changes, the development of strategies to adapt to these changes, and the implementation of sustainable land-management principles are all important climate action items that can be informed by Traditional ecological knowledge[17].

Traditional ecological knowledge has the potential to play a vital role in climate change assessment and adaptation efforts that bridge human and environmental systems[18]. Although there is a growing body of literature related to Traditional ecological knowledge and climate change, Traditional ecological knowledge is not yet a mainstream consideration in climate change literature[19].

Traditional ecological knowledge can help build an understanding of climate impacts on ecological processes and

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[16]Available at nopr.niscair.res.in/bitstream/123456789/.../IJTK%2013(4)%20752-761.pdf

[17]Available at https://academic.oup.com/bioscience/article/61/6/477/225035/Linking-Indigenous-and-Scientific-Knowledge-of

[18]Kirsten Vinyeta and Kathy Lynn, exploring the role of traditional ecological knowledge in climate change initiatives United States Department of agriculture, general technical report PNW-GTR, 879, may 2013

[19] ibid

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phenomena across longitudinal and temporal scales for different organisms, habitats, and various ecosystems. For many indigenous communities, climate change is already changing physical, biological, and social systems.

Internationally, organizations are progressively recognizing this need but continue to face challenges when attempting to incorporate Traditional ecological knowledge in their climate change initiatives. The foremost climate change authority, the Intergovernmental Panel on Climate Change (IPCC), is among these organizations.

In its fourth assessment report, the IPCC noted the importance of Traditional ecological knowledge as it pertains to climate change. Specifically, it stated that Traditional ecological knowledge is "an invaluable basis for developing adaptation and natural resource management strategies in response to environmental and other forms of change".

Traditional Knowledge Needs a Role in Global Climate Discourse

With collective knowledge of the land, sky and sea, indigenous peoples are excellent observers and interpreters of change in the environment[20]. The ensuing community-based and collectively-held knowledge offers valuable insights, complementing scientific data with chronological and landscape-specific precision and detail that is critical for verifying climate models and evaluating climate change scenarios developed by scientists at much broader spatial and temporal scale. Moreover, indigenous knowledge provides a crucial foundation for community-based adaptation and mitigation actions that sustain resilience of social-ecological systems at the interconnected local, regional and global scales.

[20]Available at http://unu.edu/publications/articles/why-traditional-knowledge-holds-the-key-to-climate-change.html

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While unmitigated climate change poses a growing threat to the survival of indigenous peoples[21], more often than not they continue to be excluded from the global processes of decision and policymaking, such as official UN climate negotiations, that are defining their future.

Local observations have confirmed the existence of climate change. Vegetation growth patterns have also changed. There is increase in the temperature which affects humans and vegetation equally. Including traditional knowledge in climate change policies can lead to development of effective adaptations strategies that are cost effective and sustainable .The indigenous people use traditional ways to predict the climate change with the help of traditional prediction techniques such as moon characteristics, animal behavior patterns, plants growth and shedding leaves pattern specifically in relation to agriculture or farming.

Traditional Knowledge, Climate Change and Agriculture

In India for mitigating climate change with the help of utilization of traditional knowledge or alternative farming has been experimented with. In the State of Tamil Nadu, alternative method of farming was used to circumvent climate change. Climate change is expected to adversely affect agricultural production in India. According to a study and its analysis of data collected from 200 dry land farmers of Tamil Nadu, it was found that 81 % of farmers experienced climate change in terms of decreasing and unpredictable rainfall,

[21]Available at https://unfccc.int/files/adaptation/nairobi_work_programme/application/pdf/maapastoralists.pdf, last seen on 24/12/2016

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increasing temperature and delayed onset of monsoon[22]. Analysis of climate trend validated their perceptions. It was clear that climate change was the major factor which affected farming and the result was frequent crop failures, declining crop and livestock yield, reduced water level in tanks and wells and new pest and diseases. Amidst various constraints, farmers strive to adapt to climate change by manipulating sowing date, reducing fertilizer application, selecting alternate crops and drought tolerant varieties, etc. Elderly farmers tried alternate farming practices.[23]

Until date policy, response to climate change includes mitigation of greenhouse gases that contribute to the adverse changes in the Earth's climate, and adaptation to potential impacts caused by the changing climate. The recent talks in this regard at international level are living example of the same .As the developed and developing countries are still at loggerheads regarding whom to bear the responsibility for reducing greenhouse gases, there is an urgent need to explore suitable adaptation strategies, which make ecosystem more resilient to absorb larger shocks due to climate change[24]. In doing so, one must take into account local community's understanding of climate change. As indigenous knowledge is borne out of continuous experimentation, innovation and adaptations, hence utilization of it for the purposes of climate change will save money and time spent in research and

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[22] R Jayakumara Varadan & Pramod Kumar, Indigenous knowledge about climate change, validating the
perceptions of dryland farmers in Tamil Nadu, IJTK,390, april 2014

[23]Available at http://nopr.niscair.res.in/bitstream/123456789/27934/1/IJTK%2013%282%29%20390-397.pdf

[24]Boomiraj K, Wani SP, Garg KK, Aggarwal PK &Palanisami K, Climate Change Adaptation Strategies for Agro ecosystem – A Review, J Agrometeorol, 12(2) (2010) 145-160

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experimentation. In addition, the most important plus of traditional knowledge is that it is time tested and for generations utilized to tackle natural changes. Moreover, alternative farming is one of such methods.

India Study on Tribal Knowledge and Climate Change

India has played a pivotal role in the decade old efforts of developing countries on the global platform for bringing the protection of traditional knowledge at the center stage of the International Intellectual Property System[25]. These efforts have resulted inter alia in setting up of an Inter-Governmental Committee (IGC) on Intellectual Property, Traditional Knowledge, Genetic Resources and Folklore by WIPO.[26]

The Indian Ministry of Tribal Affairs has decided to conduct a study on climate change and its possible impact on tribal to equip the community members with necessary skills and mechanism to cope with the adverse effects of greenhouse emissions. The study will seek to identify bio-indicators, which could help tribal recognize and anticipate climate change, as well as traditional mechanisms and methodologies applied by the tribal to cope with climate change. It aims to consolidate the existing knowledge of tribal to adapt to climate change and identify areas for project interventions.

There is increasing recognition of the significance of how traditional knowledge can supplement our understanding of the impacts of climate change and strategies for adaptation and mitigation. Yet there are potential risks to indigenous peoples in sharing Traditional knowledge in

[25] http://lib.znate.ru/docs/index-128173.html?page=39
[26] http://www.ipindia.nic.in/iponew/TK_Guidelines_18December2012.pdf

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federal and other non-indigenous climate change initiatives.[27]It is important to understand that each tribal community has its own laws, which gives clear guidelines, and structure as how their community and non-tribal entities in exceptional circumstances treat different facets of Traditional knowledge. Hence, there is need for guidelines, which can, broadly regulate interactions between parties. Sharing of Traditional knowledge is governed by principles and values of an indigenous community, which defines an equitable and productive relationship.

Agencies and research organizations should recognize the role and interaction of Traditional knowledge and multiple knowledge systems in climate change research and adaptation and vulnerability assessments. These entities should also recognize multiple knowledge systems may exist within one tribe and among different Traditional knowledge holders. These knowledge systems may conflict with one another. The agencies and research organizations need to work closely with all parties to ensure that all Traditional knowledge is protected and credited appropriately. «Even developed country like America has also made headways in addressing the Impacts of Climate Change on America's Water, Land, and Other Natural and Cultural Resources", the U.S. Department of the Interior states "climate change may disproportionately affect tribes and their lands because they are heavily dependent on their natural resources for economic and cultural identity.[28]Traditional ecological knowledge has the potential to play a vital role in climate change assessment

[27] Climate and Traditional Knowledge's Workgroup (CTKW). 2014. Guidelines for Considering Traditional Knowledge's in Climate Change Initiatives
[28]http://tribalclimate.uoregon.edu/files/2010/11/TEK_Climate_Synthesis_Oct-12-1nkf2o3.pdf last visited on 25/12/2016

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and adaptation efforts that bridge human and environmental systems. Not only does it hold relevance for indigenous groups, it is also being recognized as an invaluable contribution to the larger climate change discussions occurring at regional, national, and international levels.

Conclusion

There is positive change with regard to adaptation of Traditional knowledge with regard to climate change initiatives. Although there is a growing body of literature related to Traditional ecological knowledge and climate change but it is still not considered as one of the primary consideration when it comes to mitigate climate change and develop policies in this regard. This body of knowledge encompasses language, naming and classification systems, and sustainable practices for the use of resources. Traditional knowledge is part of living indigenous governance systems that regulate and protect indigenous ways of life, including cultural practices, subsistence gathering and harvesting and strategic planning as their basic existence and survival depends on nature entirely.

Traditional knowledge can provide people with significant information about how climate affects the environment, agriculture and farming. It further details that the indigenous knowledge and observations that depend upon local ecological systems are extremely reliable systems when it comes to adapting and mitigating climate change impacts. Many indigenous peoples follow traditional lifestyles based on seasonal and inter-annual patterns of preparation, harvest and utilization, which are reflected in their practices, stories and language.

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Traditional ecological knowledge is essential to the economic and cultural survival of indigenous groups and has proven invaluable to non-indigenous communities as a way of knowing that provides a renewed perspective in terms of climate change initiatives[29]. Traditional ecological knowledge can help build an understanding of climate impacts on ecological processes and phenomena across the world for different organisms, habitats, and various ecosystems. Hence, it is need of time to make traditional knowledge as an active ingredient in climate change policy framework and developing guidelines for mitigating climate change.

"We have the means to limit climate change….The time of action is crucial"

Dr. Youbasokona, Vice Chairman,IPCC

[29]Available at https://academic.oup.com/bioscience/article/61/6/477/225035/Linking-Indigenous-and-Scientific-Knowledge-of

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