



Depleting Biodiversity and Indigenous People: Case Study of Jharkhand

Smita Pandey, Assistant Professor
Symbiosis Law School, Pune

Symbiosis International (Deemed University)

Opp. Pune Airport, New VIP Road, Viman Nagar, Pune, Maharashtra 411014
India

Abstract: Rio Earth summit gave birth to Convention on Bio Diversity and UNFCCC and the world met in Paris in the year 2015 to talk about the climate change and took unanimous decision to join hands and fight against the climate change. The nature creates a very intrinsically designed, interdependent system of which even if one component is disturbed it is bound to disturb everything else. Bio-diversity, ecosystem, climate change each of these components are a part of each other and in some way or the other control each other. This paper looks into the importance of Biodiversity generally and specially to indigenous people. The paper brings forth the issues faced by the indigenous people of Jharkhand when the bio-diversity of the area is disturbed. The disturbance has been caused due to several reasons like social, economic and political but the paper concentrated on the economical reason alone through the Bi lateral treaties with foreign MNC for the purpose of investment. The paper also looks into the international convention like United Nations Declaration on the Rights of Indigenous People, 2006 International Labour Organisation (ILO) Convention concerning Indigenous and Tribal Peoples, 1989 and ILO Convention concerning the Protection and Integration of Indigenous and Other Tribal and Semi-Tribal Populations in Independent Countries, 1957. The implementation and ratification of these Conventions is also looked into in India especially Jharkhand and its Tribal People. The paper tries to suggest the solution to the problem of depleting Bio-diversity and its implications on Indigenous people of the Jharkhand.

Keywords: Biodiversity, Sustainable Development, Jharkhand, Indigenous People, UNFCCC

I. Biodiversity and its importance

In recent years the use of the term biodiversity or biological diversity has increased exponentially, an issue which only discussed on international forum is now being discussed in school classrooms. It is of utmost importance that the greater look into the topic is taken instead of superficial knowledge of it.

“Biological diversity” means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.ⁱ

It is also important to know that why is it so important to conserve the biodiversity and why is so many hue and cry all through the world In simpler terms it could understand that it is important as it consists of all forms of animals, plants and several varieties of ecosystem that sustains life on earth. It leaves scope for evolution and helps the human race to survive or else the earth would have been a planet of adverse situations. It also allows for differences among groups within larger species hence even when humans seem similar yet variations could be seen amongst them.ⁱⁱ

Water, wind, and sunlight are responsible for the energy which is generated on earth and the action of the conditions of the earth lead to the formation of fossil fuel over course of millions of years. In absence of biodiversity we would have been a similar looking homogeneous population with similar weaknesses from physical level to genetically, in that situation if an epidemic broke it would have lead to end of the complete civilization as there existed no variation which could adapt accordingly and counter the effect of the epidemic.

The modern medicines are mostly created by combining various substances extracted from plants. This has been a practice since the very beginning of the civilization in the form of Ayurveda and Unani medicines. Even in existence of such plants biodiversity plays an important role where such plans are pollinated and cross pollinated by the various forms of insects.ⁱⁱⁱ Also even in 21st century there exists a large part of population who depend upon forests for their basic necessities, such as food, building material, fodder, medicine etc. In absence of biodiversity this population would have to face greater number of challenges everyday. The building material upon which the society takes shelter is also provided by biodiversity and it also makes availability of various types of diet possible. Further, not all the nutrients we need are in any particular food, so without a diverse base of foods to make combinations from our general health would suffer. Biodiversity sustains the bodies we live in,

and affects the lives we lead, and the societies we form. Traditionally almost all civilizations have understood the importance of biodiversity and has worshipped nature in various forms. Hence there exists a moral, ethical and historical reason of conserving biodiversity which in addition to all those above mentioned functions add to our imagination and creativity and plays an integral part in tourism throughout the world.^{iv}

II. Environment and its importance on world platform

In November 1988 in order to dig deeper the need of an international convention on biodiversity the United Nations Environment Programme (UNEP) convened a Working Group of Experts on Biological Diversity. Later a group of technical and legal experts were preparing a legal document for conserving and sustainable use of biological diversity.

The Convention was opened for signature on 5 June 1992 at the United Nations Conference on Environment and Development (the Rio "Earth Summit"). It remained open for signature until 4 June 1993, by which time it had received 168 signatures. The Convention entered into force on 29 December 1993, which was 90 days after the 30th ratification. The first session of the Conference of the Parties was scheduled for 28 November – 9 December 1994 in the Bahamas.^v

The Convention on Biological Diversity was inspired by the world community's growing commitment to sustainable development. The Convention on Biological Diversity became a reality as the world community's commitment towards sustainable development grew stronger. It represented a great step ahead in the conservation, the sustainable use of its components, and the fair and equitable sharing of benefits arising from the use of genetic resources.

According to the convention the objective of the convention stays to conserve the diversity by shared benefits. Following are the words used in the convention:-

The objectives of this Convention, to be pursued in accordance with its relevant provisions, are the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding.^{vi}

World today strives for sustainability. Rio+20, Paris convention and several other recent moves of the world community shows that environmental issues are no more being neglected and the world community considers it as a real threat, such consideration has got its own reasons, from Australian wildfires in 2013, Pakistan floods in the same year to recent Antarctica Iceberg melt, the nature has been giving enough warning to the human kind. However in spite of such large scale recognition of the issue and ratification of the CBD there have been serious lacunas and lack of implementation of laws by the concerned authorities in India which has lead to loss of biodiversity and hence has put a question mark upon the concept of sustainability and how far are we able to work on sustainable development goals.

III. Importance of Bio-diversity for Indigenous People

Decolonization as a process was largely initiated by the UN Charter which has ultimately reflected upon the rights of indigenous people.^{vii} The acceptance of decolonization has been evident in international hard and soft-law instruments and institutions at the global and regional levels including: Agenda 21,^{viii} the Convention on Biological Diversity ("CBD"),^{ix} the 1995 FAO Code of Conduct for Responsible Fisheries,^x the Arctic Council, the Convention to Combat Desertification and the Forest Principles; lending practices of development banks such as the World Bank; and more generally, in the UN system.^{xi} The indigenous people are very important on local, national as well as international level. They have been assigned certain rights which will help them to sustain their living style as well as culture. From Environment perspective also they are very important. The cultures and living style of them eventually help the bio-diversity of any region from being depleted. Putting the environment under spotlight, the paper has concentrated on Agenda 21, the World Summit on Sustainable Development ("WSSD"), the Barbados Programme of Action for the Sustainable Development of Small Island Developing States ("Barbados Programme of Action" or "BPoA"), the CBD, the World Bank, the Permanent Forum on Indigenous Issues, and the Arctic Council.^{xii}

The Rio Declaration under its Article 22 of Declaration states "[i]ndigenous people and their communities and other local communities have a vital role in environmental management and development because of their knowledge and traditional practices. States should recognize and duly support their identity, culture and interests and enable their effective participation in the achievement of sustainable development."^{xiii} Likewise, Agenda 21 of Rio Earth Summit calls for the empowerment of "indigenous people and their communities" through, among other means, "[r]ecognition of their values, traditional knowledge and resource management practices" as well as "traditional and direct dependence on renewable resources and ecosystems;" capacity building; strengthening

their active participation in the national formulation of policies and laws; and involving them in "resource management and conservation strategies." Agenda 21 also notes that states "could" adopt or strengthen "indigenous intellectual and cultural property" protections and measures to "preserve customary and administrative systems and practices."

Even Chapter 40 of Agenda 21 has emphasised on the need of information whenever there is decision-making involved. The Chapter has emphasises that the states, with the help of international organisations, local communities and resource users, which is inclusive of indigenous populations, with the information and know-how they need to manage their environment and resources sustainably, applying traditional and indigenous knowledge and approaches when appropriate. The importance of indigenous people has been clearly pointed out by Agenda 21 and that has a significant impact on global level. Agenda 21 is a framework for the states to follow in order to achieve sustainable development. The framework has also gave guidelines for the international organisations including UN. It has asked UN organizations and other international development and finance organizations to incorporate the values, views and knowledge of indigenous peoples, including the unique contribution of indigenous women in resource management and other policies and programmes that may affect them. The call to UN has also asked to appoint a special focal point within their organization. For the inclusive growth it is required that they organize annual inter-organizational coordination meetings and develop a procedure within and between operational agencies for assisting Governments in ensuring the coherent and coordinated incorporation of the views of indigenous people in the design and implementation of policies and programmes. At the Earth Summit^{xiv}, which happened ten years later, the international community reiterated the commitments it made to indigenous peoples. Not only that, it went beyond the Earth Summit blueprint for sustainable development in the WSSD Plan of Implementation ("Johannesburg Plan of Implementation" or "JPOI").^{xv} The core solution to eradication of poverty sustainable development lies in the respect for cultural diversity, indigenous peoples' access to economic activities and natural resources, and indigenous peoples' participation in developing resource management systems which had been earmarked by JPOI. Furthermore, the JPOI recommends the enactment, as appropriate, of measures that protect indigenous resource management systems and support the contribution of all appropriate stakeholders. The JPOI also recognizes the paramount role that indigenous peoples' rights play in the conservation and sustainable use of biodiversity. Although the JPOI is not mandatory on legal level, the document nicely paints the picture that indigenous peoples' rights are gaining strength at the international level. The first sign of understanding the importance of indigenous people for environment can be understood from International adoption of the Barbados Programme of Action ("BPoA") in 1994 and can be considered as strongest international soft law. It was a realization towards a post-Agenda 21 vision of indigenous peoples' involvement in sustainable management. ^{o xvi} The BPoA and Declaration of Barbados recognizes indigenous peoples' needs, aspirations, and rights, through their call for the development of legal instruments and indigenous peoples' participation in resource management. If the inhabitants of small island developing states ("SIDS") is taken as an example, it is evident they depend greatly on natural resources, especially marine resources, for their livelihoods and also indigenous peoples and traditional knowledge play a central and significant role in community management in such states. The BPoA also identifies the importance of indigenous involvement, and states that "[t]he nature of traditional, often communal land and marine resource ownership in many island countries requires community support for the conservation effort."

The bio-diversity zone of the world interestingly falls under the fold of indigenous people. The loss of such biodiversity can have particularly profound effects on indigenous cultures. The international law making agencies have, therefore, asserted the importance of these communities. This lead to one of the most important law for indigenous people, i.e., CBD. 188 member states have ratified this law making it one of the most widely-ratified environmental conventions. Therefore, it has been asserted that, in relation to the management of biodiversity, the "most important claims of indigenous peoples are made in international law making." The international community brought the CBD into force on December 29, 1993, and it has become the focal point of a world-wide effort to conserve biodiversity. The obvious objectives of the CBD are the "conservation of biological diversity," the "sustainable use of its components," and the "fair and equitable sharing" of benefits derived from the use of genetic resources.

The indigenous people have been granted certain privileges in monetary sense as well. The global financial institutions such as World Bank have come forward with special policies which specifically apply to indigenous people. The World Bank keeping with the major objective of its existence, of reducing poverty and improving living standards in the developing world in areas such as agriculture, forestry, environment, transportation, and education, has put forth the policies. The World Bank was the first multilateral institution to introduce a special policy for the treatment of indigenous or tribal people in development projects. In 1982, the World Bank implemented its first indigenous policy titled Tribal People in Bank-Financed Projects. The purpose of the World Bank's directive was twofold: to safeguard the interests of tribal people in World Bank-financed projects affecting the environmental or the social situation of tribal communities and to protect land rights and health services. In 1991, the World Bank adopted the Operational Directive 4.20 ("OD 4.20"), a policy that incorporated indigenous peoples' concerns into World Bank-financed projects and maintained the protective

measures of the earlier directive, but specifically supported the rights of indigenous peoples to participate in and benefit from the development process.

IV. Indigenous People

The international community is coming together for "indigenous peoples". They are recognised by different names world over, for e.g., "aborigines" "tribal" peoples and "First Peoples" as well. International organisations and conventions have named them beneficiaries. Many countries have individually named them differently. America calls them "Native Americans/Indians" and Canada has termed them "First nations"

The different names for indigenous people have created a void of the definition of them. Jose Martinez-Cobo was one of the earlier sociologists to define the parameters of this term in his seminal Study of the Problem of Discrimination against Indigenous Populations. According to him, 'Indigenous communities, peoples and nations are those which, having a historical continuity with pre-invasion and pre-colonial societies that developed on their territories, consider themselves distinct from other sectors of the societies now prevailing in those territories, or parts of them. They form at present non-dominant sectors of society and are determined to preserve, develop and transmit to future generations their ancestral territories, and their ethnic identity, as the basis of their continued existence as peoples, in accordance with their own cultural patterns, social institutions and legal systems.' The definition given by Martinez-Cobo in some parts emphasizes the element of distinctiveness (cultural and otherwise), which could be characteristic of "tribal" as well as "indigenous" peoples, and in others the element of invasion or colonialism," which international law and international law scholars use in part to distinguish "tribal" from "indigenous" peoples. Not only these elements define indigenous people but other traits like historical continuity, non-dominance, traditional lands, and self-identification function as important determinants as well. With no clear definition of both kinds of people, in recent times, Individuals or cultures described as "indigenous" can be put side by side against communities as "local" or "traditional." The most important aspect of Local or traditional communities is that they have a connection with particular land which is a remarkably similar trait as indigenous people. Their use of those lands and their lifestyles are integrally tied to their cultural traditions, which distinguish them from the dominant societies within their states. The terms "local" and "traditional," like "indigenous," are not defined in international law even though their use as term has been increasing exponentially. Examples of their use in international environmental law include the Convention to Combat Desertification, the Proposed American Declaration on the Rights of Indigenous Peoples, and the Convention on Biological Diversity.

In the Asian context, Benedict Kingsbury is tilts his liking in favour of "local" communities against "indigenous" or "tribal" concepts. His contention lies in the fact that the latter cannot be defined in true sense and its "implicit emphasis on social structure does not mesh well with the dynamic societies, cultures, and political forms of many of the groups in the internationally active indigenous peoples' movement. Inclusion of "local" communities with "indigenous" within the ambit of international environmental law is not without controversy in some contexts. For example, some whaling preservation advocates have expressed concerns over the resumption of whaling by the Makah Indian tribe in the United States because they feared the implications of a precedent in favour of Makah whaling on Japan's advocacy for small-type coastal whaling.

V. The state of Jharkhand and its biodiversity

The state of Jharkhand became a state in the year 2000. Its geographical coordinates are having from latitude 21° 58' 02" N to 25 ° 08' 32"N and longitude 83° 19' 05" E to 87° 55' 03" E. The total geographical area of the state is 79,714 km² accounted for nearly 2.4 % of total geographical area of the country whereas total forest area 23,478 km² and is surrounded in east by West Bengal, on the west by Chhattisgarh, on the north by Bihar and on the south by Orissa.

The present study which has been taken into consideration^{xvii}, for long term forest deforestation assessment forest has been defined as land with more than 1% of grid area dominated with indigenous tree species with over story canopy greater than 10%. A grid of 5 km × 5 km (each 25 km²) size has been prepared to understand the status of threat. Historical/long term changes of forest cover have been expressed in quantitative terms. The spatial distribution of forest cover during the last 80 years (2015-1935) has been mapped during the present study. The software used for long-term deforestation analysis was ERDAS IMAGINE 11 for digital image processing and ArcGIS for GRID analysis and presenting the results in geospatial domain (in form of map). Survey of India topographical maps of 1924–1935 (say 1935) were downloaded (<http://www.lib.utexas.edu/maps/ams/india/>) and interpreted visually to generate spatial data sets on 1:250,000 scale for the year 1935. Remote Sensing data pertaining to Landsat 8 (2015) was utilized to obtain forest cover of 2015. The nine Landsat images (path /row: 142/43, 141/43, 141/44, 140/43, 140/44, 140/45, 139/43, 139/44 and 139/45) of the time December 2015 were downloaded from USGS website. All the images were mosaicked with providing outline and resampled using Nearest Neighbor resampling methods in order to preserve the radiometry of pixel and spectral information in the imagery. For classification we have used hybrid classification techniques/approach (combination of visual, supervised and Normalized Difference Vegetation Index) to map forest cover with two class viz. forest and non-forest class. The accuracy of classified forest cover

map was analyzed/ evaluated by generating 250 random sampling points, and each point was then assigned to the respective class based on ground truth knowledge and literature. The error matrix was used to compute overall accuracy and kappa statistic. The GRID analysis was performed in the vector grid (5 km × 5 km) the percent forest column were created in vector grid for the year 2015 and 1935. If the grid percent is full of forest means 100 values or if there is no forest in that grid means 0 values. These values for the year 1935 and 2015 were finally utilized to create grid based maps that includes forest cover % (90%). The long term deforestation was evaluated by counting the spatial grid data of forests in the time series 1935– 2015 has been considered for assessment of historical decline.

VI. Observation

The overall classification accuracy of the final classified forest cover map of 2015 was 94.1% and the kappa value was 0.91. The forest was quantitatively evaluated based on grid analysis which is given in Table 1, Fig. 2 and Fig. 3.

Total number of grids of forest in the year 1935 was 2596 out of which 1685 grids shows more than 50% of forest cover. Similarly for the year 2015 total number of grid of forest were 1372 out of which 751 grids shows more than 50% of forest cover. The approximate forest percent calculated based on grid analysis for the year 1935 was 49% where as for the year 2015 it was 23 % when compared with the total geographical area of Jharkhand. So we can say 934 grids of more than 50 % forest cover has been lost during this 80 years of span. The driving factors of deforestation (loss of 1224 grid) between the period 1935 and 2015 were industrialization, urbanization, mining activity and conversion of forest land to other land use purpose viz. dam construction, agriculture purpose etc. Within the state, the losses of forest ecosystems are more pronounced in those areas where population was high which resulted into forest loss by various anthropogenic activity. We have also compared our result with Forest Survey of India report 2015 (FSI, 2015) of Jharkhand. FSI has reported 29 % of forest in Jharkhand for the year 2015 whereas our evaluation for the same base year exhibits 23 % of forest. The difference (6%) in percent is due to because our evaluation procedures, we only consider the forest greater than 25 ha as forest whereas FSI has considered greater than 1 ha as forest. Several small forest patches from less than 25 ha are excluded in the present study whereas FSI has included greater than 1ha forest patches for their evaluation.

The present study has attempted to develop grid (5 km × 5 km) based forest cover percent of Jharkhand for the year 1935 and 2015. Deforestation has been evaluated based on the grid loss between the 80 years period. Roughly 53 percent of the forest area has been lost between these periods. The deforestation within the state of Jharkhand which is at such alarming rate is concern for forest policy/decision maker. There is an urgent need to strictly implement the Indian forest conservation act 1988 and formulate appropriate conservation measures and strategies in deforested and degraded forest areas. There is urgent need to provide environmental education to the people and involve/encourage them for tree planting/ protecting forest which would involve local bodies for conservation measures plans. The driving factor for deforestation in Jharkhand must be closely monitored and restricted. Finally we recommend that the forests for the Jharkhand state should be temporally monitored using remote sensing and GIS for identifying forest health (quantitative and qualitative) and disturbance (driving factor for deforestation) so that appropriate conservation related policy/decision should be taken on time.

Figure 1

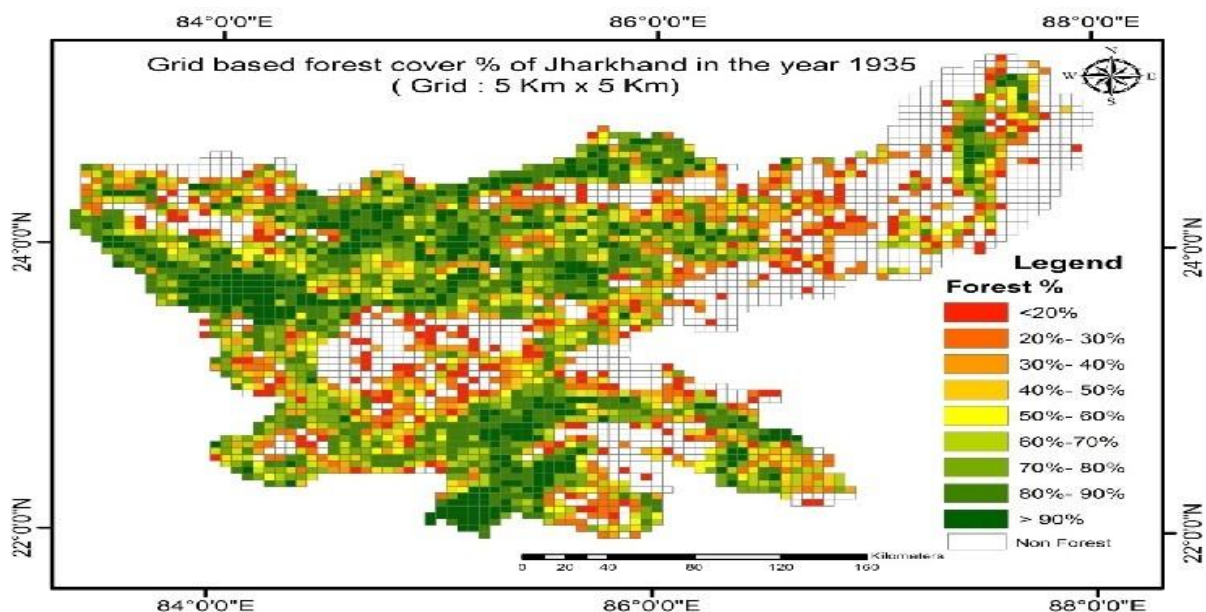
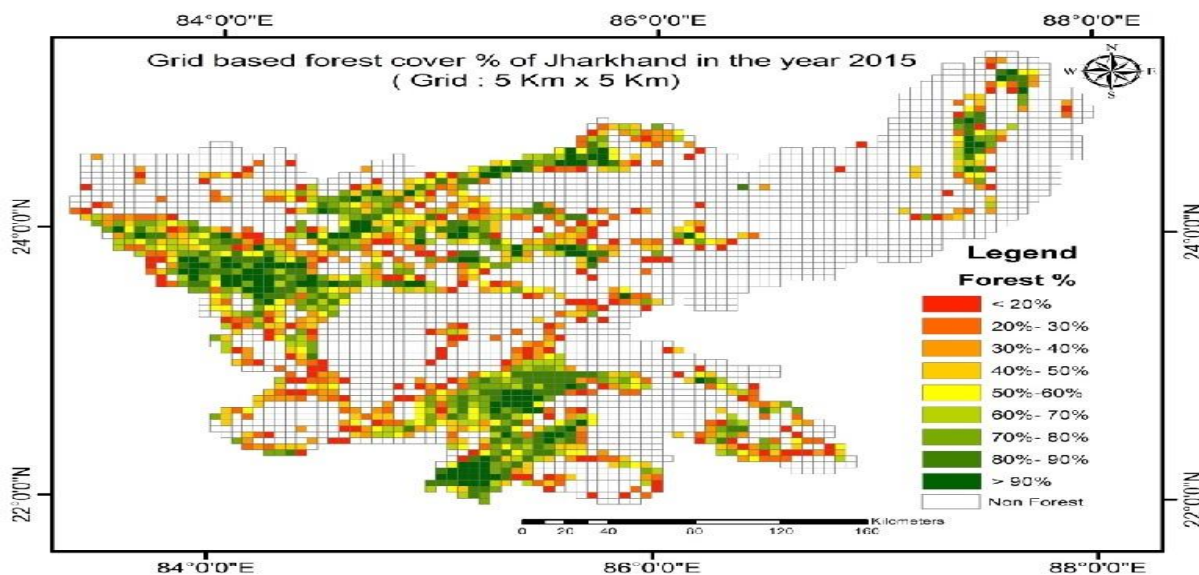


Figure 2



VII. The Analysis

The above report says that nearly 50 percent of the forest cover has been lost by the state. By the same rate of loss of forest cover in coming years Jharkhand would lose all the what its name is based upon (Jharkhand which means land of bushes). If forest cover has decreased at such a rate it cannot be denied that the loss of biodiversity would be in the similar drastic way. There exists a direct relation between loss of biodiversity and deforestation since most of the species find it difficult to survive out of their natural habitat. Another study which is provided below gives evidence about the loss of biodiversity in the state.^{xviii}

Table 1

Year	2000	2003	2005	2008	2010
Mammalian species	45	41	37	39	35
Avian species	205	201	165	170	168
Reptilian species	15	14	14	12	11
Invertebrae species	15	16	15	21	23

From the above data, it can be observed that the species diversity of the state is continuously declining. It is evident that the biodiversity in the concerned state is under tremendous pressure several reasons can be attributed for such decline such as impact of pollution, habitat destruction, unsustainable harvests etc. Comparing the two studies it can be observed that the principle of sustainability has failed to a great extent and there exists an urgency for all the executive and judicial bodies to come together and work for the cause. It is also important to understand that why the strategies taken up by now did not work.

Jharkhand with its overall literacy rate as 66.41%^{xix} stays to be the state with least literacy rate and over the years a very clear relationship has been established between lack of awareness and environmental degradation. Lack of awareness leads to practices which are unsustainable in nature which adds to the depletion of the environment for example vegetation in the forest areas have been under constant trouble, it leaves no room for any check and results in unsustainable exploitation in the form of illicit felling, firewood and fodder collection etc. In recent years due to constant disturbance and human activities the forests in Jharkhand has been facing constant threat of forest fire. Unrestricted grazing has been another constant threat, as mentioned above due to lack of literacy the states largely depends upon conventional ways of agriculture and so needs fodder for the cattle with most of the protected forest being a part of wildlife sanctuary and not national parks, the forest department has been unable to curb the problem of unrestricted grazing. Decrease in forest cover and increase in population has added to the trouble.

It has been estimated that iron and manganese ore miners of Jharkhand could be asked to disgorge 14,403 crore and 138 crore, respectively, for environmental violations.^{xx} From the report it can be very well concluded that huge environmental loss has taken place due to the mining activities and hence must be an important cause of what data studies we received from the studies mentioned above.

India being a signatory of the convention of the convention of biological diversity became one of the very first countries to enact a legislation which had the sole objective of conserving the biological diversity. The legislation led to the establishment of the National Biodiversity Authority (NBA) in the year 2004. The National Biodiversity Authority along with the State Biodiversity was expected to acquire data and resources and utilize it to strategize future actions. The Jharkhand biodiversity board was established in 2007. However it is a matter of fact that laws are merely texts written in books if they are not implemented properly which is what exactly has happened in the state of Jharkhand

VIII. Conclusion

The depletion of environment in Jharkhand is a classic example of all what is wrong with Indian conservation strategies. illiteracy, corruption, lack of political will and ambiguous laws. Vote bank politics, lack of technology, all these factor add to the creation of a vicious cycle which hits the environment so hard that it loses its capability to replenish back. It is not pragmatic to say that construction of roads, railway tracks, dams and all other developmental activities should be stopped but it also needs to be understood that the principle of sustainable development should not be forgotten, a little efforts from everyone can bring a lot of change. A very simple solution in the present scenario could be making the local tribes aware and trying to get them to work for the conservation if the government is too busy with its other agendas. Nature can no longer be taken for granted and the due importance it deserves should be given to it or else soon it would be an end of the civilization.

On the global level, the importance of indigenous people is evident. They have started getting importance, rights, and financial help as well as say in any bio-diversity zone related decisions. The increased participation of indigenous peoples within the UN system reflects these notions. Moreover, various international instruments now include some indigenous peoples' concerns, in particular those related to sustainable development. of the benefits of their voice for biodiversity conservation is growing, as is a sense that indigenous peoples' involvement in the development of policies that may affect them and in the management of their traditional lands and natural resources. Jharkhand as a state has major laws in place. They are following the international as well as national norms in totality on the paper. The implementation and awareness are lacking to the core level. Although states have begun to implement these international instruments and policies, indigenous peoples have not yet fully realized their rights. Indeed, there remains a need for international consensus on how best to proceed in order to ensure indigenous peoples' early involvement in the process of international law and policymaking and on implementation of indigenous rights at the state level (instead of relying so much on national discretion, as in the example of the BPOA).As the case study of Jharkhand demonstrate, there exists a fundamental distinction between indigenous groups whose states have recognized their rights and those groups whose states have not. Furthermore, as we noted that the given the existence of vague definitions and international instruments that are often non-binding and which provide substantial discretion to state actors, the norm that is emerging around indigenous peoples' rights, while bounded, is "blurry". Yet, given that indigenous peoples and their circumstances, cultures, histories, and aspirations are not one-dimensional, perhaps states, indigenous peoples, and other non-state actors should look at this "blurry boundary" as an opportunity, rather than an impediment.

Two basic requirement of indigenous peoples for their sustenance as well as the prosperity of bio-diversity zone are :

- (1) an unquestioned right of self-government and autonomy in matters of local affairs; and
- (2) the discretion to have their unique voices heard in the wider decision-making process and their presence as well.

The two concepts mentioned above for indigenous peoples, can be seen in the judicial sphere in international organizations (most prominently, indigenous peoples representing themselves rather than nation-states representing them), within international conventions (the growing appreciation of the right of self-determination, the protection of intellectual property and ownership), and at the state level (the value of indigenous participation and co-management of natural resources).

References

- [1] Article 2, Convention on Biological Diversity
- [2] Gaston, K.J. and Spicer J.I. (2004) Biodiversity: An Introduction, 2nd Edition, Blackwell.
- [3] Mittelbach, G.G. et. al. (2001) "What is the observed relationship between species richness and productivity?", Ecology, 82: 2381-2396.

-
- [4] Dr. Nitasha Malhotra, The importance of Biodiversity, available at http://ags.geography.du.ac.in/Study%20Materials_files/Nitasha%20Malhotra_KNC.pdf, visited on 23 September 2017
- [5] History of the convention, available at <https://www.cbd.int/history/>, visited on 23 September 2017
- [6] Article 5, CBD
- [7] Benjamin J. Richardson, Indigenous Peoples, International Law and Sustainability, 10(1) RECIEL 1 (2001) (stating that the concept of "environmental justice," in terms of indigenous peoples, includes recognition of ownership of land and resources, effective participation in decision-making, and equitable benefit sharing).
- [8] Agenda 21, adopted by, United Nations Conference on Environment and Development, June 3-14, 1992, U.N. Dept. Econ. & Soc. Affairs, available at www.un.org/esa/sustdev/documents/agenda21/english/agenda21_toc.htm
- [9] United Nations Conference on Environment and Development, Convention on Biological Diversity, concluded June 5, 1992, 1760 U.N.T.S. 79, reprinted in 31 I.L.M. 818 (entered into force Dec. 29, 1993) available at <http://www.biodiv.org/convention/articles.asp>
- [10] Code of Conduct for Responsible Fisheries, Food and Agricultural Association, Oct. 31, 1995, 12.12 (recognizing that "[s]tates should investigate and document traditional fisheries knowledge and technologies, in particular those applied to small-scale fisheries, in order to assess their application to sustainable fisheries conservation, management and development."), available at <http://www.fao.org/DOCREP/005/v9878e/v9878e00.htm>
- [11] ANAYA, S. JAMES ANAYA, INDIGENOUS PEOPLES IN INTERNATIONAL LAW 64, n.63 (1996) (stating "Convention No. 169 can be seen as a manifestation of the movement toward responsiveness to indigenous demands through international law, and, at the same time, the tension inherent in that movement.")
- [12] Plan of Implementation, World Summit on Sustainable Development, Sept. 4, 2002, at http://www.johannesburgsummit.org/html/documents/summit_docs/2309-planfinal.htm
- [13] Rio Declaration on Environment and Development, U.N. Conference on the Human Environment, June 5-16, 1992, Sales No. E.73.II.A.14, Principle 22, available at <http://habitat.igc.org/agenda21/rio-dec.html>
- [14] Report of the U.N. Conference on Environment and Development, Rio de Janeiro, U.N. Dep't of Economics & Social Affairs (UNDESA),
- [15] Report of the World Summit on Sustainable Development, Plan of Implementation, UNDESA, at 2, U.N. Doc. A/CONF.199/20, U.N. Sales No. E.03.II.A.1 (2002), [hereinafter JPoI], available at <http://www.un.org/esa/sustdev/issues/finance/fin-doc.htm>
- [16] Report of the Global Conference on Sustainable Development of Small Island Developing States, Bridgetown, Barbados, 25 April -6 May 1994, U.N. Doc. A/CONF.167/9 (1994) [hereinafter Declaration of Barbados], available at <http://www.un.org/documents/ga/conf167/aconf167-9.htm>
- [17] Firoz Ahmad and Laxmi Goparaju, Long Term Deforestation Assessment in Jharkhand state, India: A grid based Geospatial Approach, ISSN No. (Online): 2249-3239
- [18] Ranjita chatterjee, Deepali Chatterjee, Depletion of faunal diversity from Jharkhand state, available at https://www.academia.edu/3742431/Depletion_of_Faunal_Biodiversity_from_Jharkhand_State, visited on 19 september 2017
- [19] Jharkhand population census data 2011
- [20] MB Shah Commission Report, 2013