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Intellectual Property Protection of Traditional Medicinal Knowledge and Associated Knowledge Holders in The Light of ABS Norm: A Case Study of Odisha

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To survive on earth we have to manage our natural resources which are the important way to protect all living organisms on earth. To bring this result conservation of biodiversity is the top most priority brought about by a convention on biological diversity i.e, CBD. There are six capable sites enriched in floristic components and endemism that have been found after prolonged research, they have named the biodiversity storehouse of Odisha. There is "Similipal Biosphere Reserve, Gandhamardan Hill, Mahendragiri Hill, Deomali Hill, Bhitarkanika and Chililika lagoons." Out of 2727 "plant species" which is being reported from Odisha, 27 species is found to be endemic and almost all of them are found in the granaries. This paper is dealing and discussing the "bio-granaries" along with the physiographical significance, diverse vegetation types & loss of biodiversity posing for a serious threatening to the sustainability development. In the present scenario, indiscriminate human exploitation of the natural resources and the overpopulating with the continuation of under "productive" cattle populating posing great threats to the species and the ecosystem. Many other valuable species are being reduced to alarming numbers and times are disappearing from the scenario. Natural hazards that are owing to the adverse impact, are also contributing to the loss of biodiversity. Thus there is an urgent need which is felt in order to conserve the "gene pool" which involves mixing of "in situ as well as ex-situ strategies".

Keywords: *biodiversity, conservation, exploitation, gene pool, floristic.*

INTRODUCTION

‘When an elder dies, a library burns, this statement rightfully applies in the case of Traditional Knowledge. Traditional knowledge is the most precious gift that the elders have passed on through generations. They have taught us the healthiest of food habits to the simplest of skincare and the best medicinal knowledge of Mother Nature. Several centuries ago, the varied indigenous communities of India survived by the utilization of their traditional knowledge in all facets of life. This knowledge isn’t just restricted to food habits or living conditions but largely related to medicinal practices. For every small community, the knowledge differs and treatments for various diseases and injuries depend on what type of medicinal plant the community has in abundance. They don’t just use it as a part of their livelihood but also manufacture various products based on this traditional knowledge to sell and earn their bread and butter.

“The definition of Traditional medicine by the World Health Organization is the sum total of the knowledge, skills, and practices based on the theories, beliefs, and experiences of health, as well as in the prevention, diagnosis, improvement or treatment of physical and mental illness¹.” Traditional Knowledge in a simple language is basically the experiences and knowledge acquired over the years and decades altogether by a particular group or community of people, who have adapted it to their local culture and practices. It is an accumulation of wisdom, knowledge, and practices of these communities that they have passed on to future generations.

These Traditional Medicinal Knowledge has been used by several indigenous communities for as long as they have lived. It is not just restricted to these communities but the entire world has started acknowledging the benefits of all-natural traditionally accepted medicinal practices. These are mostly without any kind of side effects, fairly affordable, and easily available. For the poor in various countries, the only source of healthcare is traditionally acquired medicinal knowledge. India has six unique and distinctive recognized system of traditional medicine

¹ ‘Traditional Medicine, Traditional, Complementary and Integrative Medicine (*World Health Organization*) <https://www.who.int/health-topics/traditional-complementary-and-integrative-medicine#tab=tab_1> accessed 10 May 2021

which have been in practice for hundreds of years, namely Ayurveda, Siddha, Yoga, Naturopathy, Homeopathy, and Unani. Almost 1.5 million practitioners in India use this traditional knowledge for healthcare. This is the reason why India is called a rich source of Traditional medicinal knowledge.

The use of Traditional Medicinal Knowledge has spread like wildfire ever since the pandemic has hit. The world is going crazy about home remedies and Indian Ayurveda, Yoga and so much more. Even China along with its modern medicines heavily relied upon Traditional Chinese Medicine for the treatment of Covid. India itself has come up with the iconic Patanjali Coronil kit which is a claimed Ayurvedic preventive for Covid. People in India started taking kadhaa with Tulsi and ginger, etc. and people all around the globe started having a 'Turmeric latte' to boost their immunity. These are nothing but age old practices and cures for all the health problems used by the indigenous communities.

When such kind of Traditional knowledge is present, it needs to be protected otherwise it gets misused and exploited. The classic case of haldi or turmeric being granted a patent by the U.S. Patent and Trademark Office (1995)², signifies how vulnerable the knowledge is to bio-piracy. Bio-piracy is when the traditional knowledge has been used or rather misused without the consent of the knowledge holder or when any Intellectual right is claimed over that knowledge without the consent of the actual knowledge holder and without sharing any benefit of such right with them, so this knowledge needs protection.

To understand what kind of protection is offered in India, one needs to understand the provisions available for protection. India does not have any specific provision of law for the protection of the Traditional knowledge as such, but it deals with the issue of access and transfer of technologies and genetic resources, the reward for the intellectual property of traditional communities, and equitable sharing that arises out of traditional knowledge and biological resources through various laws. These laws, though not directly associated with traditional

² Ryan Abbott and others, 'Misappropriation, Documenting Traditional Medical Knowledge' (*World Intellectual Property Organization*, March 2014) 16

<https://www.wipo.int/export/sites/www/tk/en/resources/pdf/medical_tk.pdf> accessed 11 May 2021

knowledge but can be utilized for protecting the traditional knowledge. Some laws that can be used for protection are The “Geographical Indications of Goods (Registration and Protection) Act of 1999³,” The Biological Diversity Act of 2000⁴, The “Protection of Plant Varieties and Farmers Rights Act 2001⁵, and The Indian Patent Act of 2005⁶” Another aspect to the protection is the Access and Benefit-sharing, it is a mechanism used for protection against bio-piracy. The ABS mechanism ensures that access to traditional medicinal knowledge for research or commercial exploitation would require prior permission from the relevant community who is the right holder. ABS became one of the three pillars of the CBD (Convention on Biological Diversity) which ensures fair and equitable sharing of benefits.

In Odisha there are various examples who have been using Traditional medicinal knowledge for medical problems such as the Kandha Tribe of Kandhamal district use a variety of plants for the cure of typhoid, lice, etc. and Koraput, being a nature dominated district it has various and rich traditional custom where the tribe mob sparks a vast traditional knowledge regarding usage of medicinal plants for treating various diseases The Paraja tribe uses it’s medicinal treatment via plants and herbs to treat cold, vomiting, diarrhea, headache, mouth ulcer, fever, scabies, etc. Special emphasis is given to the Mandasaru Village in Odisha.

Lastly, the question arises, who are the people who will hold the rights under these provisions, or who are the ones getting protection. These people are the Right Holders. Right Holders are those people who have the knowledge, who use it or have been using it and Stakeholders are the people who have a direct interest in that specific knowledge. The traditional knowledge holders can be an individual, few individuals from a community, or the entire community as a whole. These Rights holders play a very crucial role in the modern day healthcare system. The modern healthcare system is based on this and only these right holders can help in sharing their knowledge to build and create modern healthcare medications. As per studies of WHO, at least 25% of the entire modern medicine is derived from medicinal plants. These rights holders have

³ Geographical Indications of Goods (Registration and Protection) Act 1999

⁴ Biological Diversity Act 2002

⁵ Protection of Plant Varieties and Farmers’ Rights Act 2001

⁶ Patents (Amendment) Act 2005

the right to allow and permit researchers to access biological resources and study them. These studies and research help in the creation of new medication derived from traditional knowledge.

LITERATURE REVIEW

It has been estimated that almost 80 percent of the total population of the developed country relies on traditional medicinal knowledge for their healthcare needs (The World Health Organization)⁷. India has more than 8000 species of medicinal plants and has a rich history of traditional healing systems, among which many list the use of these plants (Botanical Survey of India). The National Plant Board has listed 72 medicinal plants conservation and development areas covering approximately 10,935 hectares spread across 13 states to help conserve the medicinal plants in their natural place of origin.

Traditional Medicinal Knowledge holders have been experiencing misappropriation from the domestic as well as foreign developers. “The unauthorized third parties have patented the traditional knowledge based products without having any prior permission from the Traditional Medicinal Knowledge holders and without fair competition (WIPO).⁸ The best example to explain this would be the United States of America patenting turmeric. In 1995 the U.S. Patent and Trademark Office (UPSTO) had granted a patent to the University of Mississippi Medical Centre for the ‘Medical use of turmeric in wound healing). After the patent was granted it was a huge controversy at the International level and India claimed that the Indian traditional medicine was being misappropriated. The “Council of Scientific and Industrial Research of India” is providing that, literature that documented the prior use of turmeric for wound healing which included an ancient text and paper published in the Sanskrit language in the year 1953 (Published in the Journal of the Indian Medical Association)⁹.” The role of Medical plants in

⁷ ‘WHO launches the first global strategy on traditional and alternative medicine’ (*World Health Organization*, 16 May 2002)

<<https://webcache.googleusercontent.com/search?q=cache:aac87JJ36tMJ:https://www.who.int/mediacentre/news/releases/release38/en/+&cd=1&hl=en&ct=clnk&gl=in>> accessed 12 May 2021

⁸Abbott (n 2)

⁹ *Ibid*

modern drug discovery is undeniable. At least 25% of the entire modern medicine is derived from medicinal plants (The World Health Organization)¹⁰ be it directly or indirectly.

METHOD

In order to collect information for this research paper, a qualitative approach was taken up. To provide answers to all the questions in the paper, literature on the related topics suggests that the qualitative methods are the most appropriate ones. We have heavily relied upon the existing data and analyzed the data thoroughly to derive the desired information. Some of the reliable sources and literature that we have relied upon are the World Health Organization and the Journal of Traditional Knowledge. These sources have been read thoroughly and have been analyzed by breaking down each and every sentence and interpreting all the possible meanings of these sentences.

THREATS WITH RESPECT TO TRADITIONAL MEDICINAL KNOWLEDGE

Biodiversity¹¹ loss diminishes the "supplies of raw materials for drug discovery and biotechnology, causes a loss of medical models, affects the spread of human diseases and threatens food production and water quality. Its reduction has direct effects on the discovery of dormant medicines. The story of Taxol¹² and the Pacific yew depicts how we may be losing new medicines before medicinal species have been analyzed for their chemical content. The commercially useless Pacific Yew¹³ was forsaken continuously as a trash tree during logging of old growth in the pacific northwest region of the United States until it was found to contain a compound called Taxol, a substance that kills cancer cells by a mechanism unlike that of further known chemotherapeutic agents"- it forbids cell division by obstructing the dis-assembly of the mitotic spindle.

¹⁰ World Health Organization, 'WHO Traditional medicine strategy 2002-2005' (WHO/EDM/TRM/2002.1)

¹¹ Sophia Twarog & Promila Kapoor, 'Protecting and Promoting Traditional Knowledge: Systems, National Experiences and International Dimensions' (UNCTAD, 2004) <https://unctad.org/en/Docs/ditcted10_en.pdf> accessed 10 June 2021

¹² 'Taxol' (Chemocare) <<http://chemocare.com/chemotherapy/drug-info/Taxol.aspx>> accessed 15 May 2021

¹³ Hanna Gersmann & Jessica Aldred, 'Medicinal tree used in chemotherapy drug faces extinction' (*The Guardian*, 10 November 2011) <<https://www.theguardian.com/environment/2011/nov/10/iucn-red-list-tree-chemotherapy>> accessed 17 May 2021

Human activities are known as evident in order to transmit some diseases. “Forest clearance” is wiping out species that are breeding in the water in a tree hole “(e.g., the forest *Aedes*¹⁴ species that spreads yellow fever)” but is providing favourable condition for those that are preferring on temporary ground pools exposing to full sunlight “(e.g., many of the *Anopheles*¹⁵ species that transmit Malaria).” Drainage of wetlands ignores the marshy pools inhabited by many species.

The term biopiracy is being coined by ETC Group which refers to the appropriation of knowledge and also genetic resources of farming and originating communities by individuals who seek exclusive monopoly control. On the rights and knowledge of farming the intellectual property seeks to exploit others this is being believed by ETC Group. Genetic research has become sophisticated day by day, by using plants and animals to make new drugs and also to modify them. Without any permission when the researcher uses the traditional knowledge or exploits the cultures they are bringing from – is known as biopiracy. It is unauthorized access in biological material or knowledge of originating naturally, but those things belong to the community, a particular region, or other countries. Biopiracy is held when the researcher or any research organization takes biological resources without any legal sanction. It also happens for agricultural and industrial purposes. At first, patents were being used to protect inventions and also stimulates innovation. Many academic and scientific circles and anti biopiracy are asking for changes in the system because it is the hindrance of research in many important areas. As of now, biopiracy remains in a statement. Many of the biopiracy holders use it misappropriately.

NEEM CASE:-From the Indian subcontinent the neem is being originated. The neem grows in 50 tropical countries as it is grown in the dry region. Its multiple uses like it help to make medicines, cosmetics, and toiletries. In 1928, in India, it is being reported that neem has some pesticide properties in it. After thirty years the research work is being initiated in a systematic way. But it “has been patented in Japan, USA and also in European countries. In 1983 Terumo

¹⁴ Biswadeep Das and others, ‘*Aedes: What Do We Know about Them and What Can They Transmit?*’ (*Intechopen*, 16 May 2018) <<https://www.intechopen.com/books/vectors-and-vector-borne-zoonotic-diseases/aedes-what-do-we-know-about-them-and-what-can-they-transmit>> accessed 18 May 2021

¹⁵ ‘*Anopheles Mosquito*’ (*Mosquito Magnet*) <<https://www.mosquitomagnet.com/advice/mosquito-info/biting-insect-library/anopheles-mosquito>> accessed 18 May 2021

Corporation has got the first US patent for therapeutic preparation from neem bank. Robert Larson in 1985 a patent is obtained for the preparation of extract of neem seeds and products is being approved".

Environmental Protection Agency for using it in US market. The patent is being sold by Robert Larson in 1988 in the process of extraction to US company WR Grace. After four years their patents and clearance are being collected from EPA. After setting up a manufacturing plant and collaboration of Grace commercialized its product with Magro Pvt. Ltd. In India. In the USA they continued to file patents by their own research. A large number of companies were developed in India with stabilized neem products filed during this period were limited and also geographically confined. There were many challenges which are being held by WR Grace and the patent was being rejected for its products which came from the resources which are related to the common origin and cannot be patented. About seventy patent were being rejected and about fifty companies are trying to get patent.

ROLE OF IPR AGAINST BIO-PIRACY

Estimating the Role of IPR on biodiversity is a tough task. Genetic diversity benefits are Incessant & less predictable. A person shares mutual bag which contains only 20 cultivated crops that are sustaining 90 percent of our calorie requirements "(FAO 1991)¹⁶". All twenty crops come from a developed country and all the crops are weak to pests and diseased and depending on genetic diversity for their survivals. During this period, most authorities believe that a high proportion of the genetic variability of our major food plants will become extinct as it is available in the field. The development & conservation of the rest diversity of crop is a matter of global issue.

"Various government schemes force farmers to adopt specific seeds or new plant varieties as when a farmer look into increase its sale he often sows unique and more commercially viable seeds. Hence, commercial agriculture likely to increase genetic uniformity, and this, in turn,

¹⁶ 'The State of Food and Agriculture' (Food & Agricultural Organization, 1991) <<http://www.fao.org/3/a-t0496e.pdf>> accessed 19 May 2021

leads to the wearing away of genetic diversity. Intellectual Property systems boost commercial agriculture that further genetic erosion. Since Biotechnology research focuses on commercial agriculture which leads to the demand for Intellectual protection at the same rate but with a negative consequences for genetic diversity.¹⁷

The standards required for patent are higher than the objective of awarding a plant variety protection certificate. There are needs for novelty and distinctness, but there is no match of non-obviousness (inventive step) or industrial application or utility. Therefore, "Plant variety protection laws allow breeders to protect the varieties with similar traits, which means the system likely to be driven by commercial use of the product differentiation and planned Antiquation, rather than the improvements in agricultural Characteristics."

RELATIONSHIP BETWEEN PATENT LAWS AND BIODIVERSITY LAWS

The Way to Obey the national laws the Indian parliament passed the Biodiversity Act on the order of "convention on biological diversity". " Section 6(1) of the Act lays down the provision of obtaining prior permission from the National Biodiversity Authority for applying for any IP in or outside India for any invention based on any research or information on a biological resource obtained from India.¹⁸

Permissions of the National Biodiversity Authority should be obtained after the patent but before sealing the patent in case the patent has already applied. Section 6 directs that the NBA shall submit the application of permission within 90 days from the date of receipt. Patent laws of India work well with section 6 of the Biodiversity Act by making it compulsory for the applicant of a patent to submit a declaration on the application form to convey that the invention

¹⁷ Anthony M Shelton, 'Considerations for conducting research in agricultural biotechnology' (2003) 83(2) Journal of Invertebrate Pathology 110-2

¹⁸ Section 6 of BDA: (1)" No person shall apply for any intellectual property right, by whatever name called, in or outside India for any invention based on any research or information on a biological resource obtained from India without obtaining the previous approval of the National Biodiversity Authority before making such application Provided that if a person applies for a patent, permission of the National Biodiversity Authority may be obtained after the acceptance of the patent but before the seating of tile patent by the patent authority concerned Provided further that the National Biodiversity Authority shall dispose of the application for permission made to it within a period of ninety days from the date of receipt thereof"

mentioned in the specification use material of biologic from India and permission is required from the official authority and should be submitted by the applicant before the grant of the patent” according to section 6 (4)¹⁹. Moreover, the Patents Act “ mandates obligation on the applicant to disclose the source and geographical origin of the biological material used in the invention.”

Since there was widespread criticism of this view", the patent office and Ministry of Commerce" are conducting a meet with the stakeholders to "identify possible ways to speed up the grant of patents. There were a lot of suggestions but a few got implemented for the speed up process of grant of the patent application and clear whatever applications are listed before on biological inventions.

ACCESS AND BENEFIT SHARING NORMS IN INDIA

Introduction to “access and benefit sharing norms in India”

A large section of the population depends on traditional knowledge and biological resources for a living and many for their livelihoods. Transfer of “associated traditional knowledge and access to biological resources is a lot older than the concept of Access and Benefit Sharing regime.” ABS makes sure that the traditional owners benefit by facilitating access and increasing usage of these biological resources and the associated traditional knowledge.

All living organisms carry genetic material which can be beneficial to humans in some or another way. They can be cultivated or sometimes be taken from the wild. What ABS does is gives access which means to obtain, possess, and also use these genetic resources or their derived products. It may be for the purpose of research, medication, industrial application, commercial use, or conservation.

WHAT BENEFITS ARE PROVIDED TO THE TRADITIONAL OWNERS?

1. Monetary benefits such as access fees.

¹⁹ (4) "Where any right is granted under law referred to in sub-section (3), the concerned authority granting such right shall endorse a copy of such

2. Payments of royalty.
3. Up-front payments.
4. Milestone payments.
5. Trust funds supporting sustainable use and conservation are to be paid special fees.
6. Mutually agreed preferentially terms and salaries.
7. Joint ventures or joint ownership of certain Intellectual Property Rights.
8. Research funding.
9. Participation in the development of a product.
10. Research and development results must be shared.
11. Collaboration in research operations or cooperation in scientific research.
12. Fair and favourable terms for the transfer of genetic resources of knowledge and technology.
13. "Training related to genetic resources is to be given with the full participation of the country."
14. Technology capacity is to be strengthened.
15. Access regulations must be strengthened and for this human and material resources must be provided.

PROS -

1. Regulation of genetic resources and benefit sharing through a comprehensive framework.
2. International and regional laws on ABS were harmonized.
3. Clear provisions to ensure that the owners or providers are benefitted.
4. Regulations were developed through thorough participation and consultation.

CONS -

1. There is no clear provision as to how the local community would be distributed the benefits.

2. This is a comparatively new issue to the country and no standard provisions of the contents of PIC (Prior Informed Consent) and MTA (Material Transfer Agreement) may cause confusion to providers or owners.
3. This is a question if it covers Biological resources as well.

WORKING OF ABS “(Access and Benefit Sharing)”

A User is granted Prior Informed Consent (PIC) by a Provider.

- There needs to be mutually agreed on terms between the provider and the user in order to ensure that the benefits are equitably provided to both parties.

PARTIES INVOLVES IN ABS

- PROVIDERS

Rights over genetic resources are determined at the national level by the laws within the provider country and who should be involved in the negotiation of mutually agreed terms and also who has the authority to grant access to these genetic resources with the potential users. States have sovereign rights over their own natural resources.

- USERS

Users may vary from botanical gardens, agricultural industries, research industries, collectors, etc. They seek a grant of access for research purposes, developmental purposes, and a wide range of purposes.

RELATED SECTIONS OF THE BIODIVERSITY ACT, 2002

SECTION 3 states that for any foreign entity or person to access any biological resource or knowledge associated occurring in India for commercial usage, research, or bio survey will have to seek prior approval from the NBA before accessing or obtaining it.

SECTION 4 states that if any person wants to transfer results of research relating to biological resources occurring in India or obtained from India to another person or entity having any foreign element must take prior approval of NBA before any such transfer. This consideration

under this section may be monetary. This section also does not allow for publication or to share knowledge in any seminar or workshop unless Central Government Guidelines made in this regard confirm it.

SECTION 5 states that transfer of biological resources or associated information is not allowed under this act if any research institution in India is engaged in a collaborative research project with such an institution in a foreign country provided it should have the approval of the Central Government Guidelines made in this regard. Relevant details regarding this and also a copy of the approval must also be submitted to the NBA (National Biodiversity Authority).

TRADITIONAL MEDICINAL KNOWLEDGE AND ITS ASSOCIATED KNOWLEDGE HOLDERS IN ODISHA

Odisha as a state is recognized for its rich variety of flora and fauna. The interior districts are profoundly covered by forest. Almost one third part of Odisha is covered with forest making it home to a huge variety of indigenous plant and animal species. Tribes of Odisha shared a very close bond with the plant species as a result of which they not only obtain food but also a huge variety of medicinal benefits. These indigenous communities possess certain traditional medicinal knowledge which is used by them for curing various diseases. For instance, the Kandhas of Kandhamal district uses a variety of plants for the cure of typhoid, lice, and a lot more. Most of the herbal and natural products of traditional medicine are practised for centuries worldwide. Today, a scientist from all over the world claim that ayurvedic medicines are far more effective and advanced over modern allopathic. The present paper will highlight several cases in Odisha where protection of such traditional medicinal knowledge and its associated knowledge holders is needed to prevent their exploitation by third parties and also whether the implementation of the BD Act²⁰ and role of OBB has been proactive or not.

CONCEPT OF TRADITIONAL MEDICINAL KNOWLEDGE AND ITS ESSENCE IN ODISHA

²⁰ Biological Diversity Act 2002

Traditional medicinal knowledge plays an essential part in the indigenous knowledge of the tribal communities. One of its features is that it is not written anywhere and exists only in the minds of the local holders. Such local holders are otherwise called associated knowledge holders. Since it is transmitted orally from one generation to another preservation of such knowledge becomes essential. In the case of medicinal plants, it has been found that nearly 25% of plant varieties exhibit medicinal use around the world. The need for protection is much imperative in present times due to its vulnerability of the knowledge to bio-piracy within the frame of IPR.

Odisha as a state is rich in biodiversity and its population is relying upon the ancient and natural ways of treating themselves. It speaks out the paramount utility provided to the herbal plants and medication modes. A significant amount of vital information and wisdom have been obtained by the wisdom holders only through examining different ways of implementing herbal plants to heal any specific kind of disease. For example, the plant of "Withania Somnifera" locally in Odisha known as "Aswagandha" owing to its high medicinal values, which has been used by the tribes of Odisha to combat Restorative Tonic, stress, nerves disorder, aphrodisiac has also acquired profound popularity across the globe.

A careful inference from the development parts of India would demonstrate its immense growth in economic area and technology areas. It is another crucial fact that the Indian legal system has always been contributing in conserving these expansions and also safeguarding to furnish the right set of circumstances to develop and profound in more sides of the country. Divergent laws in India have always been fruitful for keeping an amicable connection of commerce and trade between the neighbouring foreign countries. However, there are lots of gaps and lacunae in our legal system which if filled according to its requirement will undoubtedly set out an immense footprint on a national and international level.

It is needless to mention that "traditional knowledge" is that zone of the country which is securing a rapid impulse throughout these modern days too owing to its several benefits. This sector is diversified which coupled with Arts, Ethnic music, medicines, etc. The interest in

“traditional knowledge” has spread its wings not only within the country boundaries but also reached beyond the boundaries.

MANDASARU -THE SILENT VALLEY

“Odisha Biodiversity Board” recently declaring “Mandasaru village as a biodiversity heritage site (BHS).” It is one of the 14 BHS in India. “Mandasaru” is a unique ecosystem in the eastern part of the “Kandhamal district, Odisha.” The ecosystem mainly is comprising of semi-evergreen and deciduous forests with “low riparian and moist valleys.” “Mandasaru is rich in biodiversity with two species of otters, 40 orchids, 150 medicinal plant varieties, a number of wild food plants and tubers, nearly 125 mushroom species of which 20 are edible,” “Prasad Kumar Dash, a scientist at Odisha Biodiversity Board.” The local communities believe that anyone who cuts trees from the gorge will die from the curse of their local goddess. “During some festivals, the local communities still pay homage to certain medicinal plants like pathara girdini (*Drynaria quercifolia*),” said Mukti Prasad Mallick. Pathara girdini is used to cure several diseases like jaundice, typhoid. “Initially the plant was reported to be therapeutically inert. Later, the whole plant was reported to be used against tuberculosis, hectic fever, dyspepsia, and cough. Also, the pounded fronds were used as a poultice over inflammatory regions. The macerated paste of rhizome was applied on the forehead, relieves headache. The whole plant is reportedly used as an antihelmintic, expectorant, pectoral in the treatment of chest and skin diseases; loss of appetite i.e. dyspepsia. The roots of this plant are said to be used as a bitter tonic which in turn acts as an astringent to the bowels during typhoid fever as per Ayurvedic concept, some medico folklore reports highlighted it to be used against phthisis and hay fever. The reports also suggest that while these indigenous communities never harmed their biodiversity, outsiders are constantly over exploiting fauna and flora for medicinal and commercial purposes which has denuded the biodiversity-rich forest and gorge ecosystem. When experts who visited Mandasaru to study its biodiversity they had a discussion with the local communities and villagers and learned that the degradation of the forests was the result of over-exploitation.” Since the gorge ecosystem comes under the gram panchayats of Gumamaha and Sugadabadi “-two biodiversity management committees have been formed in the last two years with seven

members in each, in compliance with the Biodiversity Act, 2002." As specified in the Act the BMC members were trained regarding their duties and responsibilities and in organizing awareness programs at the community level so that the indigenous tribes know their rights of benefit sharing as said by " Panchanan Mishra of PAHAD, a local non-profit organization facilitating conservation and overseeing the implementation of BD Act, 2002."

"The implementation of the act is still in its preliminary stage. They are yet to restrict outsider entry into the ecosystem and collect a levy from the resource collectors. In fact, the important provision of fair and equitable benefit sharing cannot be achieved unless the BMCs and other communities have full control over the forest and its biological resources. Unless the community is benefited from the management of resources, it's difficult to achieve the very objective of the Act. So far 900 species have been documented in the PBR. When we see an unregistered species, we send a picture with our observations to the Odisha Biodiversity Board. After scientific examination and authentication, we document it in the biodiversity register," said " Amit Kumar Mallick. "

WHAT NEEDS TO BE DONE?

"Biodiversity conservation in Mandasaru" is aligning with the sustainable developing goals which is set by "United Nations for 2030" that is urging in protecting, restoring, and promoting sustainable using of "terrestrial ecosystems". The need to combat desertification and slowing down degrading and biodiversity loss. "There need to be more awareness programs and public engagement. With water scarcity degrading the region which was once famous for the production of ginger, the need for the implementation of BD Act is essential."

"Present Status of Access and Benefit Sharing Mechanism in Odisha -

*As of now Dabur Research and Development Centre, Ghaziabad, New Delhi application has been accessed by the expert committee and the board is going to share benefit sharing provisions with Dabur very soon and in another application of Lohia Brothers Private Limited, Kolkata has been received by the board seeking to access the seed of *Calophyllum inophyllum*. In his second meeting the Lohia Brothers Private*

Limited, Kolkata application has been accessed by an expert committee and the board is going to share a benefit sharing provisions with Lohia Brothers Private Limited very soon."

CONCLUSION AND SUGGESTIONS

It is seen that now traditional medicinal knowledge has become vulnerable due to threats in the form of biopiracy. Indigenous "knowledge is an important" aspect "of cultural identity". Nearly more than "thousands of communities have been living in Odisha" by practicing the knowledge which has been passed on to them by their forefathers. The sad part is that they are unaware of the "value of their treasured culture, knowledge, practices, medicines "and also the threat i.e Bio-piracy. Protection of such "is necessary along with absolute *sine qua non* for its preservation and further development which will help such indigenous communities to lead a fruitful life in the form of benefit sharing."

"For its effective promotional exposure, the following measures may be suggested -

- A database has to be developed in order to include information about traditional medicinal knowledge available in Odisha. It should be mandatory to search such databases before granting any intellectual property protection.
- Odisha needs to have its own state traditional knowledge digital library so that information about such indigenous communities, their traditional knowledge can be documented.
- The need for generating awareness programs, mainly at Panchayat levels to enable the local communities to recognize traditional knowledge as a path for long term sustainability.

Lastly, we need to react quickly and decisively to protect these knowledge systems through joint efforts of National policies and State policies in order to prevent exploitation of such communities and their knowledge."