

# Biodiversity, tribal knowledge and life in India

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**Abstract:** Tribes are known for their close proximity with the nature all over the world. They use natural resources as part of their survival while protecting these as part of their duties and obligations. Thus the concept of nature-man–spirit is very ancient as both biological diversity and cultural diversity are directly related to the origin of many tribes in India who personify their origin from some plants and trees protecting them as sacred grooves. The present paper seeks a critical note on the relationship of biodiversity, traditional knowledge and rights of tribes in India.

**Keywords:** indigenous people; forest; tribes; rights; act; development; protection

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## Introduction

Man is social by nature. Both social and natural environments are responsible for the continuum of human population. Thus plant and trees have special place in the life and living of human beings and in case of tribals these have emotional bonding as most of tribals are having their inhabitations in and around natural surroundings. Various labels have been assigned to name inhabitants in forest when comparison is made between tribal and non-tribal. They are also known as *Adivasi* (*adi* means first, original and *vasi* means dweller, inhabitant). They have been also given self-identity with the modern concept of indigenous people. Debate over a definition of indigenous peoples has often focused on African and Asian indigenous peoples. In the Asian context, the term “indigenous peoples” is generally understood to refer to distinct cultural groups, such as “Adivasis”, “tribal peoples”, “hill tribes” or “scheduled tribes”, while some indigenous peoples in Africa are referred to as “pastoralists”, “vulnerable groups” or “hunter-gatherers” (Office of the United Nations High Commissioner for Human Rights [OHCHR], 2013, p.7). According to

the World Bank, operational directive 4.20, 1991:

Indigenous peoples can be identified in particular geographical areas by the presence in varying degrees of the following characteristics: (a) close attachment to ancestral territories and to the natural resources in these areas; (b) self-identification and identification by others as members of a distinct cultural group; (c) an Indigenous language, often different from the national language; (d) presence of customary social and political institutions; and (e) primarily subsistence-oriented production (The World Bank Operational Manual, 1991, p.1).

The International Labour Organization’s (ILO) Convention concerning Indigenous and Tribal Peoples in Independent Countries (No.169) distinguishes between tribal and indigenous peoples as follows, highlighting also the importance of self-identification (OHCHR, 2013, p.2):

1. (a) Tribal peoples in independent countries whose social, cultural and economic conditions distinguish them from other sections of the national community, and whose status is regulated wholly or partially by their own customs or traditions or by special laws or regulations;

(b) Peoples in independent countries who are regarded as indigenous on account of their descent from the populations which inhabited the country, or a geographical region to which the country belongs, at the time of conquest or colonization or the establishment of present State boundaries and who, irrespective of their legal status, retain some or all of their own social, economic, cultural and political institutions.

2. Self-identification as indigenous or tribal shall be regarded as a fundamental criterion for determining the groups to which the provisions of this Convention apply.

Plants and trees have greater importance in the life of tribals not only for economic purposes but also from the point of their social and cultural importance in preserving the age old tradition of tribal people in the area. Hoffmann (1950) mentions 71 different wild plants used by the Mundas as potherbs 26 of whose tubers, corns and roots are used as vegetables, 15 trees and shrubs where young leaves are used as potherbs, 10 others whose young leaves are eaten raw and of 25 wild trees and plants whose leaves are used as vegetables (p.179). The knowledge, innovations and practices of indigenous peoples and local communities are manifestations of their cultures. Protecting a peoples' culture means maintaining those conditions that allow a culture to thrive and develop further (Dutfield, 1999, p.514).

The importance of trees in the life of man is critically analyzed by ASTRA IDL Ltd., the makers of MUCOSOL, which rightly says: "A tree that lives for 50 years generates Rs 5.3 lakh worth of oxygen, recycles Rs 6.4 lakh worth of soil fertility, facilitates Rs 6.4 lakh worth of soil erosion control, creates Rs 10.5 lakh worth of air pollution control and provides Rs 5.3 lakh worth of shelter for insects, birds, and animals. Besides, it provides flowers and fruits. Our net loss is worth more than Rs 33 lakh when one tree falls or is felled" (Goyal, p.8).

According to the North American indigenous peoples' organization, the Four Directions Council (1996), "[i]ndigenous peoples possess their own locally-specific systems of jurisprudence with respect to the classification of different types of knowledge, proper procedures for acquiring and sharing knowledge, and the rights and responsibilities which attach to possessing knowledge, all of which are embedded uniquely in each culture and its language" (Dutfield, 1999, p.508).

## Biological diversity and Cultural diversity

There exists a close proximity between the biological diversity and cultural diversity. Biodiversity encompasses the variety of all life form on the earth. India is one of the 17 mega-biodiverse countries in the world and has 45,000 identified plant species, including 15,000 flowering plants and 81,000 faunal species. Though it has only 2.5% of the land and less than 2% of the world's forest area but it supports more than 7% of the global recorded species (Chaudhry, Dollo, Bagra & Yakang, 2011, p.339). Mohan (2007) has aptly remarked on the notion of biodiversity in the following words (p.22):

Biodiversity, for a lack of a better description, represents a congruent human-environment interface. Given the complexity of the planet and its inhabitants, one must eschew a one dimensional approach to aspects and issues that warrant perpetual dialogue and discourse. Since natural environs and layers of ecosystem transcend artificial national boundaries, conflict over land, water, minerals and other precious resources have bedeviled civilization ever since civil society came in existence.

Article 26 of the United Nations Draft Declaration on the Rights of Indigenous People, 1994, has clearly mentioned that „indigenous peoples have the right to own, develop, control and use the lands and territories, including the total environment of the lands, air, waters, coastal seas, sea-ice, flora and fauna and other resources which they have traditionally owned or otherwise occupied or used. This includes the right to the full recognition of their laws, traditions and customs, land tenure systems and institutions for the development and management of resources, and the right to effective measures by States to prevent any interference with, alienation of or encroachment upon these rights (United Nations High Commissioner for Human Rights [UNHCHR]).“ Article 27 further notes in this regard that „indigenous peoples have the right to the restitution of the lands, territories and resources which they have traditionally owned or otherwise occupied or used or damage without their free and informed consent. Where this is not possible, they have the right to just and fair compensation. Unless otherwise freely agreed upon by the peoples concerned, compensation shall take the form of lands, territories and resources equal in quality, size and legal status (ibid).“

Even the construction of man as physical being is

related to natural objects where ancient texts basically the *Vedas* narrate that human body is made up of five components (*panchabhutas*) i.e., sun, soil, air, water and space. Since time immemorial tribal people are trying to preserve nature as it provides food, cloth, and shelter for their existence in this world. The cultural complexes like tradition, belief, practices and celebration of various festivals and rites are directly involved with the environmental conservation. Anthropologist Herskovits (1948) says that culture is the man-made part of environment where human beings inculcate their ethos and eidos and pass these to their future generation (p.17).

In fact, tracing of right to environment was done by recourse to Articles 48-A and 51-A of the Constitution of India, which are essentially post-modernist policies for eco-friendly development and citizens' participation for conservation of natural resources. When the genesis of right to environment has such complex background; solid application of convergence amidst environmental, developmental and consensual or concerted act becomes an imperative (Bhat, 2009, p. 812). To protect, preserve and to evolve the sustainable use of natural resources, the Parliament of India passed the Biological Diversity Act in the year 2002. Section 2 (b) of the Biological Diversity Act, 2002 of India defines biological diversity as:

The variability among living organisms from all sources and the ecological complexes of which they are part of, and includes diversity within species or between species and of eco-systems.

Section 2 (c) further notes that the biological resources means plants, animals and micro-organisms or parts thereof, their genetic material and by-products (excluding value added products) with actual or potential use or value, but does not include human genetic material.

Culture is considered the totality of social behavior of a group or society. Culture or Civilization, taken in its wide ethnographic sense, is that complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society (Tylor, 1871, p.1). More recently, the United Nations Educational, Scientific and Cultural Organization (UNESCO) General Conference on 2 November 2001 adopted the Universal Declaration on Cultural Diversity....Accompanied by an Action Plan, the new Universal Declaration insists, amongst other things, that

cultural diversity, „as a source of exchange, innovation and creativity, ...is as necessary for humankind as biodiversity is for nature. In this it is the common heritage of humanity and should be recognized and affirmed for the benefit of present and future generations“ (Article 1) as cited by Lucas-Schloetter (2008, p.438). He further cited that among the objectives set forth in the Action Plan, the Member States commit themselves to:

Respecting and protecting traditional knowledge, in particular that of indigenous peoples, [and] recognizing the contribution of traditional knowledge, particularly with regard to environmental protection and the management of natural resources, and fostering synergies between modern science and local knowledge (No.14).

According to the All India Ethno-biology Survey conducted by the Ministry of Environment and Forests, Government of India, there are more than 7,500 species of plants that are being used by 4,635 ethnic communities for human and veterinary health care across the country. Men have been using different parts of various plants as drugs since ancient times which not only promote good health but also help in maintaining a balanced environment (Goyal, p.1). Various researches have shown the dependence of tribals and other forest dwellers on herbs and animals. Fernandes, Menon & Viegas (1988) remarked that traditionally tribals had kept a balance between human needs and ecological imperatives and preserved forests as a resource for posterity (p.224). They had what can be claimed a constructive dependence on forests and other natural resources. As a result of the vicious circle initiated by industrial clear felling or displacement projects, there has been a transition to destructive dependence on the same resources.

## **Traditional knowledge and Tribes in India**

Tribal people not only in India but also in other parts of the world have been known for their unique cultural identities since time immemorial. They are very close to nature and natural objects like trees and plants which have not only economic importance for them but also have cultural importance. Various trees and plants have religious as well as health importance among the whole tribal India. So far the preservation of these is concerned, tribal people are keener to save biological resources than anything else as their

survival and life activities directly depend on them. However, it has been said that tribal people are exploiting the nature by following the age old tradition of shifting cultivation basically in north-eastern regions of the country. The traditional knowledge (TK) of most of tribal people is on the verge of decline or we can say that the most of the benefits of traditional knowledge are being taken by the outsiders and tribals are getting very less so far the economic importance is concerned.

The social structure that create, use, preserve, and pass down TK between generations and the customary laws and protocols that govern these processes, are deeply rooted in their traditional location and community setting, and indeed may be conceived as integral to the land and environment itself (Taubman & Leistner, 2008, p.60). TK can be characterized as:

The content or substance of knowledge resulting from intellectual activity in a traditional context, and includes the know-how, skills, innovations, practice and learning that form part of traditional knowledge systems, and knowledge embodying traditional lifestyles of indigenous and local communities, or contained in codified knowledge systems passed between generations. It is not limited to any specific technical field, and may include agricultural, environmental and medicinal knowledge, and knowledge associated with genetic resources (ibid).

Studies conducted by Roy (1915, 1917, 1925), Vidyarthi (1963), Rai (1966) and Rath and Behera (1985) significantly contribute the understanding of symbiotic relationship between the tribal people and the biological resources of the country. The ancient literature of India and world on medicine suggests that the primitive people of antiquity have been using several kinds of medicinal plants for combating diseases. The ancient Indians used the „snake root plant“ (*Rauwolfia serpentina*) about 3000 years ago to treat several diseases from mental disorders to insomnia and snake bite. They also used the poppy juice (*Papaver somniferum*) to relieve pain and anxiety (Gene Campaign, 2000).

A single plant has many utilities. The same plant may be used for different disorders: for example *Calotropis gigantea* is used as a vermicide and for chest pain, *Centella asiatica* used for gynaecological problems and for jaundice, *Dodonaea viscosa* used for headache, stomach pain and piles, *Wrightia tinctoria* for treating mumps and as lactagogue. In certain cases

a combination of different plants are used in the treatment for e.g. *Albizia lebeck* together with *Cassia fistula* and *Euphorbia hirta* is used for urinary disorder. *Capparis zeylanica* with *Pongamia pinnata*, *Cissus quadrangularis* and *Toddalia asiatica* are used for venereal disease (Ravishankar, 2003).

Prakash (2005) has noted that among the tribal communities of Andhra Pradesh, trees and plants designated as part of sacred grove are forbidden for normal human interference as it is an abode of the spirits/deities (p.61). Ratha (2006) describes that in worshipping the *bel* (*Aegle marmelos*) and *aswath* (*Ficus religiosa*), the Paudi Bhuyan of Orissa share the great tradition of the country (p.4). The *simili* (*Combax ceiba*) tree personifies Goddess Durga and it is worshipped during Dasahara festival. *Kusum* (*Haldina cordifolia* syn. *Adina cordifolia*) is regarded as the abode of Goddess Basari. The *sal* (*Shorea robusta*) personifies the presiding deity of the village. Huge *sal* trees occupy central positions of most villages symbolizing man-plant coexistence. The tardy situation of development is that more than half of the construction workers in the country are tribals and reason is very clear that the process of displacement and deforestation in the name of development is behind this.

The studies by Rothermund (1978), Mahapatra (1992), Vyasulu (1984) and Mohanty (1997) in different parts of the country state that benefits of Minor Forest Produce (MFP) are largely going in the hands of non-tribals and tribals are getting less. Vyasulu (1984) has vividly mentioned the poor state of affairs as far as the rights of tribals are concerned in their own produce (p.65). He notes that in the case of *sal* seed (*Shorea robusta*) the tribals receive only five percent of the value of their product (per kilogram of seed, the collector received Rs.1, the contractor Rs.12, and the multinational Rs. 20). It is further noted that per every rupees spent in tribal areas for development and welfare, at least four (and possibly more) rupees worth of resources are taken out. Mohanty (2005, p.41, as cited in Mahapatra, 1992) details:

Even when National Parks, Tiger Reserves, Bird Sanctuaries, Lion and Elephant Safaris and other such game sanctuaries are carved out invariably in the heartland of forested tribal areas, the „humane“ consideration and arguments in favour of the rights of these wild animals...are never challenged. But, paradoxically, the same“ humane“ considerations and arguments in favour of...scheduled tribes, are usually

not given any weight...

Indigenous people have various modes of livelihood. Besides agriculture, they also engage themselves in hunting of wild animals and gathering of roots of edible plants as their source of livelihood. Although hunting of animals may endanger the environment and thus may result in disharmony of maintaining biodiversity, the traditional communities are aware of this and they themselves trace alternative methods of survival as well as hunting. This is very much true in the case of some tribal communities in our country. The Onges, who love to hunt wild pigs (*Sus scrofa andamanensis*) had developed a technique to ensure that pigs were not over-hunted in any particular location. Every time an Onge killed a pig, he half broke a branch of the largest tree in the area. This branch then hung half broken from the tree and was a signal to all other Onges that a pig had been killed there recently. No one else would then hunt a pig in that locality, but move to some other locality. After a sufficient period of time had passed, the branch would totally dry up and fall off, once again opening the area for hunting (Sahai, 2013, p.167). The tribals have emotional attachment with their land. The observation of Honorable Supreme Court is worth mentioning here as under:

Agriculture is the only source of livelihood for scheduled tribes, apart from collection and sale of minor forest produce to supplement their income. Land is their most important natural and valuable asset and imperishable endowment from which the tribals derive their sustenance social status, economic and social equality and permanent place of abode and work and living. It is a security and source of economic empowerment. Therefore, the tribes too have great emotional attachment of their lands. The land, on which they live and till, assures them equality of status and dignity of person and means to economic and social justice and is a potent weapon of economic empowerment in a social democracy (Samantha v. State of A.P.[1997]8 SCC 191).

Keeping in view all the above aspects, the international community unanimously took the initiative to protect the TK not only as knowledge *per se* but also a source of livelihood and life of tribals living across the globe. Some of the important developments are as under.

## **International law developments on traditional knowledge**

Many countries are signatories to different international conventions and treaties for the protection of the

rights of indigenous peoples. Such conventions and treaties give legal rights and remedies only when provisions in the conventions are enacted into national legislation. Some of the international conventions, treaties and programs for indigenous peoples are briefly given below. The legislative journey related to protection of traditional knowledge and rights of indigenous people is not much old. Various countries follow their own pattern in this regard.

The importance of traditional knowledge and use of biological diversity at the international level has been recognized by the Convention on Biological Diversity ([CBD], 1992). This is important from the perspective of indigenous people and local communities, which is main feature of CBD. The objectives of Article 1 of the CBD are the conservation of biological diversity, sustainable use of its components and fair and equitable sharing of the benefits arising out of the utilization of the genetic resources by appropriate transfer of technologies, taking into account all rights over those resources and to technologies, and by appropriate funding (CBD, 1992). The CBD is based on reciprocity and the convention recognizes biological resources to be used by other countries that do not harbor the genetic resources with consent from the countries. It also widens horizons for additional support from developed countries to resource existing in developing countries. The convention recognizes rights of the countries. Article 8(j) states that:

Subject to national legislation respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovation and practices and encourage the equitable sharing to the benefits arising from the utilization of such knowledge, innovations and practices (Shrestha, Shrestha, Rai, Sada & Shrestha, 2008).

The other relevant provisions of CBD, 1992 are: Article 10 (c): Protect and encourage customary use of biological resources in accordance with traditional cultural practices that are compatible with conservation and sustainable use requirements, Article 10 (d): Support local population to develop and implement remedial action plan in degraded areas where biological diversity has been reduced, Article 15 (1): Authority to determine access rests with national government, and Article 15 (2): Each contracting party shall facili-

tate access to genetic resources for environmentally sound uses by other Contracting parties and not to impose restrictions that run counter to the objectives of this Convention (CBD, 1992).

## **International Labour Organization Convention 169 (1989)**

International Labour Organization (ILO) Convention 169 on Indigenous and Tribal Peoples is one of the key instruments in the body of international law relating to indigenous peoples. Adopted in 1989, the Convention has been ratified by only 18 countries (as of January, 2007) of which 13 are in Latin America, (Argentina, Bolivia, Brazil, Colombia, Costa Rica, Dominica, Ecuador, Honduras, Guatemala, Mexico, Paraguay, Peru, and Venezuela). The other countries that have ratified the Convention to date are Denmark, Fiji, Norway, the Netherlands, and Spain (IFC, 2007, p.2). Education, employment, customary law, child labor, and forced labor, etc. are the major concerns of the Convention.

## **Traditional knowledge under Indian laws**

The Biological Diversity Act, 2002 has major dimensions on the protection of tribal knowledge. The Act mainly deals with access to genetic resources by foreign companies, individuals or organizations. The National Biodiversity Authority (NBA) was set up under Section 8 of the Act to deal with requests for access to genetic resources by foreigners, and to manage requests to transfer the results of any related research out of India and to determine benefit sharing arising from the commercialization (Venkataraman & Latha, 2008, p. 332). The salient features of the Act are to:

- (a) regulate access to biological resources of the country with the purpose of securing equitable share in benefits arising out of the use of biological resources; and knowledge relating to biological resources;
- (b) conserve and sustainable use of the biological diversity;
- (c) respect and protect knowledge of local communities related to biodiversity;
- (d) secure sharing of benefits with local people as conservers of biological resources and holders of knowledge and information relating to the use of biological resources(ibid).

The Biological Diversity Act (BDA), 2002 as a Central Law lays emphasis on the establishment of State Biodiversity Board under Section 22 (1) at State levels as well as Biodiversity Management Committees (BMCs) under Section 41 (1) at local levels by respective State Governments. The Section 41 (1) reads as under:

Every local body shall constitute a Biodiversity Management Committee within its area for the purpose of promoting conservation, sustainable use and documentation of biological diversity including preservation of habitats, conservation of land races, folk varieties and cultivars, domesticated stocks and breeds of animals and microorganisms and chronicling of knowledge relating to biological diversity (BDA, 2002).

Thus the BMC has to play vital role in the conservation and preservation of biodiversity. The Section 41 (2) of the Act has clearly mentioned this in the following words:

The National Biodiversity Authority and the State Biodiversity Boards shall consult the Biodiversity Management Committees while taking any decision relating to the use of biological resources and knowledge associated with such resources occurring within the territorial jurisdiction of the Biodiversity Management Committee (ibid).

The Section 41 (3) of the Act further reads that “the Biodiversity Management Committee through Gram Sabha may levy charges by way of collection fees from any person for accessing or collecting any biological resources for commercial purpose from area falling in its jurisdiction. The fee so collected shall be deposited with the concerned Gram Sabha”. Various legislative measures have been adopted both as International and National levels to protect the plants and rights of indigenous people. The Protection of Plant Varieties and Farmers’ Rights Act, 2001 known as PPVFR Act is a major tool in this regard. The purpose of this Act is to protect the plant varieties with an effective *sue generis* system and at the same time to also ensure the availability of quality seeds having high yields. There have been series of legal enactments which provide protection to traditional knowledge without having any specific and concrete legal enactments. The Copyright Act 1957, the Patent Act 1970, the Trademarks Act 1999, the Geographical Indications of Goods (Registration and Protection) Act 1999, and the Designs Act 2000, etc. are some of the legislations.

The importance of traditional knowledge has been vividly highlighted by the Draft National Tribal Policy. The framework of this policy came into existence in the year 2006. The wisdom of indigenous or tribal people related to their expertise in the field of TK is known all over the world. Their wisdom is reflected in their water harvesting techniques, indigenously developed agricultural practices and irrigation systems, construction of cane bridges in hills, adaptation to desert life, utilization of forest species like herbs and plants for medicinal purposes, meteorological assessment *etc.* This invaluable knowledge needs to be properly documented and preserved to prevent it getting lost as a result of “modernization” and the passage of time (Ministry of Tribal Affairs, 2006, p.18).

India has also compiled the data on traditional medicines in the Traditional Knowledge Digital Library (TKDL)...there are also varied experiments on documentation undertaken by the village communities, particularly in Kerala, which is one of the richest biodiversity states in India. In the *Pattuvam* (village in Kerala) experiment, the village undertook to register all its natural resources and knowledge pertaining to these resources. The Register was accompanied by the People’s Biodiversity Declaration asserting that no monopoly claims on life forms will be accepted by the people living in that area (Verma, 2009, p.317). The maintenance of biological diversity and cultural diversity is considered the life line of traditional communities.

Thus plants and trees have ethical-religious importance in tribal social structures. The purpose of this paper is not only to give the description of uses of bio-resources and their importance for humanity but it is more about to put arguments for the protection and preservation of age old diminishing cultural traits of tribals in the era of globalization. The expertise and experience of traditional healers and their knowledge about the utility/benefit of particular plant/tree becomes pertinent here. The new and younger generation of tribal community are keeping away themselves to learn the traditional practices of healings and to gain the experience of herbal medicines in and around their surroundings of natural resources. The interference of industrial giants for the commercial utilization of such bio-products which are traditionally known as the soul arena of tribal people, are the alarming and dangerous for the benefits sharing of tribals. At the same time, the displacement of tribals from their native place specially from the forests in

the name of development planning related to construction of railway tracks, bridges, national parks, and the migration of tribal themselves for better livelihood in other areas, are further leading to the extinction of traditional knowledge among the older generation.

India has already witnessed the fight in patenting of the *neem*, *turmeric* and the *basmati* rice. The age old bioresources are no longer safe because of the threat from external world especially from the developed countries. The case of Kani tribe in the forests of Western Ghats in India is worth mentioning in the light of benefit sharing. Kani tribals of Kerala were using the leaf of plant *arogyapaccha* which contained various glycolipids and some other non-steroidal compounds. The Tropical and Botanical Research Institute (TBGRI) in 1987 successfully developed a drug named „*Jeevani*“. A contract has been established between the local community and TBGRI to equally share the benefits. Such efforts will definitely provide moral standing in the legal regime and at the same time will attract younger generation of tribals for the preservation and protection of such knowledge which will give them economic security and cultural rights.

Further, the Meetei communities in the States of Manipur and Assam in India are also known for their nature conservation. Sacred groves, or Umang Lais, as they are called in the Meetei language, form an integral part of the Manipuri tradition of nature worship. Several species of plants are protected in these groves, which also offer protection to birds and animals. These include teak, several fruit trees like lemon, plants of medicinal value such as ginger, eucalyptus and bamboo. Fishes, waterfowl and other aquatic animals like snails and insects are very common items in the diet of the Meetei. However, many of these animals are not eaten during certain periods, probably with the motive of sustainable harvesting and conservation. Thus, in this case certain religious beliefs and practices help in the conservation of nature and its biodiversity (Chhibber, 2008).

The efforts of judiciary in protecting the rights of tribals on forest and use of indigenous medicines related to their health have been advocated in many judgments. The most of the forest laws have been against the freedom of mobility of tribal masses inside the forest areas in the name of protecting forests and wild animals. But it has been seen that the tribals are the best friends of forests with whom they have symbiotic relationships (Singh, 2007, 2013a, 2013b).

Mitra (2010, p. 29) has mentioned that the conservation of wildlife should not be against the rights of tribes and the human rights of forest dwellers and indigenous cannot be ignored in the name of protection of nature. Indian judiciary very amicably pacified this conflict to fulfill the object of both laws. Though the earlier Article 21 did not include rights of livelihood as a right but in case of *Board of Trustee of the Port of Bombay vs. Dilipkumar R. Nandkarni* (AIR 1983 SC 109), the Supreme Court held that right to livelihood is included within the meaning of „life“ which again strongly established in *Olga Tellis vs. Bombay Municipal Corporation* (AIR 1986 SC 180) case later. In *Ramsharan Autyannuprasi vs. Union of India* (AIR 1989 SC 549) case, the Supreme Court observed that life includes all meaning to a man's life including his traditions, culture, heritage and protection of that heritage in its full measure.

## Concluding remarks

The preceding paragraphs highlight the interface of biodiversity, traditional knowledge and the tribes in India. The pace of development is supposed to always go with the tune of people for whom it is needed. In the rapid growing change of environment, the rights of every person must be protected. The progress of any society depends on the shoulders of each and every person without interfering in the social and cultural boundaries to one another. Here it becomes pertinent that all sorts of efforts are needed to protect the rights of tribals as we have seen that the rapid impact of the process of globalization and changing environmental conditions is leading the extinctions of certain tribal groups in the country who are failing to adjust with new changes related to their survival. Here the case of tribals living in Andaman and Nicobar Islands of India become more crucial whose population is declining day by day.

In the era of globalization and free market, the emerging concept of Corporate Social Responsibility may become a powerful tool to protect, preserve and promote TK. The Corporate houses may come forward as part of their responsibility in this regard both in terms of cash and kind. Cash rewards may be made as an acknowledgement to the elderly tribal people who are the repository of TK and in kind by providing monetary support to organize training workshops for the tribal youth along with certain job-oriented incentives. Efforts are needed from all corners of the society especially the policy makers, NGOs,

Civil Society Organizations, community members and all nature lovers to adopt appropriate measures for the betterment of tribal people and their culture, preservation of traditional knowledge and to serve the purpose of humanity. Mohan (2007) emphasizes that:

A genuine respect for diversity, biodiversity and discourse will serve as a guiding principle for national policies that will preserve and conserve life-sustaining resources in the mutual interest of nature and human society. Policies and programs thusly formulated will usher in an era of “bioglobalism” that I believe is conducive to social democracies that promote freedom and justice (p.25).

Thus the documentation of traditional knowledge and role of biodiversity in protecting the rights of tribal people in the country become essential. The Government of India is taking due care in this regard. The letter dated on 17<sup>th</sup> February 2015 written by Dr. Hrusikesh Panda, Secretary, Government of India, Ministry of Tribal Affairs to concerned departments of all States/Union Territories, is worth mentioning here as concluding remarks:

There are many medicinal practices for tribals, which may have been documented in Ayurveda, but may not be in practice much. It is more likely also that there could be many medicines and practices which have not been documented at all, particularly, for tribals living in remote areas who have been able to resist many diseases and have remained healthy. Some work has been done by some Tribal Research Institutes (TRI), Indian Council of Medical Research (ICMR), Botanical Survey of India, Anthropological Survey of India and Ayurvedic Institutions. However, we need to document these practices not only as very useful medical practices, but also for the sake of biodiversity and also preservation of our rich heritage.

## Conflict of interest

The authors declare no potential conflict of interest with respect to the research, authorship and/or publication of this article.

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