



## RESEARCH ARTICLE

## Biological and Zoological Diversity and its Sustainable Uses with Human Welfare and Intellectual Property Rights: A Critical Appraisal

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Biological and Zoological diversity and its sustainable uses with human welfare is one of main essence of this world to ensure the existence of living creatures with the protection and preservation of this earth. This world is mutual consequently the sustainable uses with human welfare is required in accordance with time and circumstance. Biodiversity being the lungs of the Earth's planet plays a crucial role in providing sustainable ecosystem services. India, a mega diverse nation with 7-8% of the world's recorded species being 2.4% of global land area, 45000 species of plants and 90000 species of animals, out of which 28% of species is endemic to India. India, Retrieved August 31, 2024 from <https://iucn.org/our-work/region/asia/countries/India>. India and its traditional practices for sustainable use of biodiversity provide numerous benefits to humanity. But due to climate change and other human activities posted a new challenge to biodiversity. In the arena of intellectual property, IPR provides for protection or balanced approach to take tackle the challenges. This paper transverse the relationship between biodiversity, sustainable use, human welfare and IPR in India. This research emphasized the biological and zoological diversity and its sustainable uses with human welfare and intellectual property rights in today's context in the world of globalization.

**\*Corresponding Author**[jmsdrrameshkumar@gmail.com](mailto:jmsdrrameshkumar@gmail.com)**INTRODUCTION**

Biodiversity is the variety of life which includes thousands of different world habitats, millions of different species, billions of different individuals and trillions of different characteristics that they have. According to Article 2 of the Convention on Biological Diversity, it means the variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part, this includes diversity within species, between species and of ecosystem Convention Text Retrieved August 31, 2024 from <https://www.cbd.int/convention/articles/default.shtml?a=cbd-02>. Zoological diversity is a subset of biological diversity that deals with animal species and their ecosystems. Biodiversity can be broadly categorized into three parts i.e. genetic biodiversity, species biodiversity and ecosystem biodiversity. The amount of biodiversity that the world have is so immense that is a very good thing because the more will be the biodiversity, the more secure the life on the earth is including ourselves. The effective and ethical utilization of biodiversity in a long run will contribute more to it. Biodiversity provides us with enormous ecosystem services on which life of all depends such as food, water, medicinal species etc. .India, with its traditional knowledge, protects its indigenous species but due to its vast diversity India suffers cases of bio piracy such as haldi ,neem and basmati rice .Then here comes the role of Intellectual Property Rights which provides protection to indigenous species .Biodiversity and Intellectual Property Rights are two distinct and complex

term. Intellectual Property Rights is the legal framework to provides protection to new innovation including plant varieties and all life forms etc. IPR serves two purposes in relation to biodiversity, firstly, it protects products made with particular raw materials found in the biodiversity system and second, it secures products that are directly derived from conventional wisdom. The role of IPR in Biodiversity Retrieved September 1, 2024 from <https://www.iiprd.com/the-role-of-ipr-in-protection-of-bio-diversity/>.

### **Biodiversity in India**

According to Sec.2(b) of the Biological Diversity Act 2002, "biological diversity" refers to variability among living organisms from all sources and the ecological complexes of which they are part and includes diversity within species or between species and of ecosystems. This act provides for the conservation of biodiversity, sustainable use of its components, and fair and equitable sharing of all biological resources. Biological Diversity Act, 2002 Retrieved September 2, 2024 from <https://www.indiacode.nic.in/bitstream/123456789/2046/4/a2003-18.pdf>. India is a temperate country from the north and a tropical country from the south which is a reason for its vast diversity. India is enormously rich in species and ecosystem diversity. Over 1,03,258 species of fauna and 55,048 species of flora have been documented in the 10 biogeographic zones of the country, out of which 12,095 species are endemic to India. Biodiversity Retrieved September 2, 2024 [https://mospi.gov.in/sites/default/files/reports\\_and\\_publication/statistical\\_publication/EnviStats2/b5\\_ES2\\_2020.pdf](https://mospi.gov.in/sites/default/files/reports_and_publication/statistical_publication/EnviStats2/b5_ES2_2020.pdf). India is a country that is blessed by nature. It experiences all climatic conditions of the world and all heat zones of the world. The country that has all physiographic divisions of the world. In the North, it has The Great Himalayas which have rare, sensitive, and endemic plant varieties that hold medicinal properties. In the south, we have one of the oldest plateaus in the world, The Deccan Plateau, and, large coastal plains from Gujarat to West Bengal that harbor unique marine diversity such as Mangroves which play a crucial role in coastal ecosystems by providing nutrient cycling, seed dispersal and many more. In the west, we have the great Indian desert Thar desert which has a vibrant floral species in the East, we have different small hills that have different varieties of flora and fauna species. India has a great range of northern plains that have flourished by three main rivers The Indus, The Ganga, and The Brahmaputra which have been the backbone of agriculture and of Indian economy.

### **Zoological Diversity in India**

Despite of having only 2 percent of the world's land surface, India is a home to vast diversity of fauna species in the world. India has about 7.5 percent of the animal species that the world holds. Because of India's diversity in its climatic conditions India has immense variety of fauna, 92,037 species of which insects alone include 31,375 species. Fauna Retrieved September 28, 2024 from <https://knowindia.india.gov.in/profile/fauna.php>. The mammals include the majestic elephant, the gaur, the great Indian rhinoceros, nilgai four horned antelope etc. The cats incorporate the lion and the tiger are the biggest and magnificent one, other creatures like the clouded leopard, the snow leopard etc. Crocodiles and Gharials can be found in rivers and lakes. The Andaman and Nicobar Islands as well as eastern shore are home to salt-water crocodiles. Fauna Retrieved September 28, 2024 from <https://knowindia.india.gov.in/profile/fauna.php>. The wildlife of the Great Himalayan Range is having a very distinct diversity that incorporates tapirs, markhor, ibex, shrews and wild sheep and goats. The higher altitudes of the mountains are home to snow leopards and pandas. Fauna Retrieved September 28, 2024 from <https://knowindia.india.gov.in/profile/fauna.php>.

### **Biodiversity Hotspots in India**

Indian Biodiversity is included in the biodiversity hotspot of the world. There are 36 biodiversity hotspots in the world, out of which 4 are to be found in India. Four Biodiversity Hotspots of India are. The Himalayas, Indo-Burma Region, Western Ghats and Sundaland. **The Himalayas** the world's highest mountain peak Mount Everest is found within the Himalayan hotspot which covers North Pakistan, Nepal, Bhutan, Northwest, and Northeast India. The Himalayas lie in a temperate zone, due to which it has alpine meadows and coniferous forests, a kind of ecosystem that has rare,

sensitive plant species and a wide range of economically important plants like jute, citrus, sugarcane, etc. The Snow Leopard, red panda, Himalayan brown bear, Indian bullfrog are also found there and they are considered as threatened species. **Indo-Burma Region** this region is the largest of the world's 36 hotspots, covering a total area of 2,373,000 km<sup>2</sup>. The Indo-Burma region is wrapping parts of northeastern India, Bangladesh, and Malaysia. In the last 12 years, six new species of big mammals have been identified in this area like Leaf Deer, Saola, etc. The forest ecosystem is the most diverse ecosystem of this hotspot comprising Evergreen forests with a great range of canopy tree species, mixed deciduous forests, and semi-evergreen forests. Western Ghats is a globally recognized biodiversity hotspot stretching from Kerala to Gujarat. This area consists of a diverse range spanning from wet to dry regions in the west-to-east direction. The biodiversity of Western Ghats plays a vital role in regulating the monsoon patterns. At least 325 globally threatened (IUCN Red Data List) species occur in the Western Ghats. The globally threatened flora and fauna in the Western Ghats are represented by 229 plant species, 31 mammal species, 15 bird species, 43 amphibian species, 5 reptile species and 1 fish species. Of the total 325 globally threatened species in the Western Ghats, 129 are classified as Vulnerable, 145 as Endangered and 51 as Critically Endangered. Western Ghats. Retrieved September 28, 2024 from <https://whc.unesco.org/en/list/1342/> **Sundaland** this region includes the Nicobar group of islands and islands of Southeast Asia (Malaysia, Singapore, Indonesia, etc). The spectacular flora and fauna of the Sundaland Hotspot are succumbing to the exclusive growth of industrial forestry of these islands and to the international animal trade that claims tigers, monkeys, and turtle species for food and medicines in other countries.

### **Biodiversity Heritage Sites in India**

Biodiversity Heritage Site is a unique conservation approach recognized under the section 37 of the Biological Diversity Act, 2002. Biodiversity Heritage Sites have rich biodiversity with wild as well as domesticated species; high endemism; rare and threatened species, keystone species, species of evolutionary significance, wild ancestors of domesticated/cultivated species, fossil beds, cultural, ethical or aesthetic values for maintaining cultural diversity, with or without long human association with them. According to National Biodiversity Authority there are 45 Biodiversity Heritage sites in India which supports significant impact on economy, tourism, social benefits etc. According to World Heritage Convention 1972, India has 42 World Heritage Sites which are categorized into cultural, natural and mixed. They work on the objectives of Five Cs Creditability, Conservation, Capacity-Building, Communication and Communities. World Heritage Convention Retrieved September 2, 2024 from <https://whc.unesco.org/en/convention/>. Global diversity is the measure of biodiversity on planet Earth and is defined as the total variability of life forms. More than 99 percent of all species that ever lived on Earth are estimated to be extinct. Estimates on the number of Earth's current species range from 2 million to 1 trillion, but most estimates are around 11 million species. Global Biodiversity Retrieved September 3, 2024 from [https://en.wikipedia.org/wiki/Global\\_biodiversity](https://en.wikipedia.org/wiki/Global_biodiversity). Global Biodiversity Hotspots areas are extremely biologically rich regions on the Earth. Around the world 36 areas qualify as hotspots. Their intact habitats represent just 2.5% of Earth's land surface, but they support more than half of the world's plant species as endemics. The major biodiversity hotspots in the world are Madagascar, Brazilian forest, Himalayan region, Horn of Africa, Atlantic Forest etc. Biodiversity hotspots are regions which are exceptionally rich in flora and fauna species that provides protection and conservation of these species. These regions are ecologically and economically important to the world. Biodiversity Heritage Sites as of July 2024, there are total of 1223 world heritages sites across 168 countries. They get categorized into cultural, natural and mixed sites according to the way people get interact with the nature and fundamental need to maintain the balance between these sites. World Heritage Convention, 1972 keep a check on preserving these heritage sites.

### **Laws Relating to Biological Biodiversity and Intellectual Property Rights in India**

India is one of the major biodiversity hotspots in the world, having an immense richness in the form of flora, fauna and other species so there is a need to protect and preserve this biodiversity. To check and maintain diversity, India adopted several laws, out of which some are comprehensive acts that target whole biodiversity and some are adopted for a particular species. Constitutional Provisions biodiversity in the form of Environment is listed in the concurrent list of the 7<sup>th</sup> schedule of the Indian Constitution, on which both the Central Government as well as State Government can frame law accordingly. Being a welfare state, we need to protect preserve and improve the environment as a whole. Our constitution had not provided the direct provisions for its protection at the first instance, but with technological advancement and growing industrialization, we felt the need for the protection of biodiversity. By the 42<sup>nd</sup> Constitutional Amendment Act, 1976 we have amended Ar.48-A in part 4, the directives principles of state policy and Art. 51-A in part 4-A Fundamental Duties. Art. 48-A states that it is the duty of the state to protect and improve the environment and safeguard the forest and wildlife of the country while Ar.51-A(g) states that is the fundamental duty of every citizen to protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures. Art. 21 of part 3 i.e. fundamental rights also talks about the protection of environment ex. right to live in clean environment, right to drink clean water, to be healthy etc. these rights are fundamental in nature and justiciable in the court of law which means their infringements leads you directly to the Supreme Court and High Courts. Indian Forest Act, 1927 and Forest Conservation Act, 1980 these laws deal with the forest management in India, Indian Forest Act, 1927 is a colonial legislation that provides for the legal framework of the forest and forest resources management and its conservation. This act increases the state's control over the use of forest and its resources and limits the people's interference in the management. This act came into force to provide more effective forest laws and improve previous laws. Forest Conservation Act, 1980 this act was passed by the Parliament of India on the wave of ongoing deforestation that expands the need of the protection of forest and its resources. Act address the loss of biodiversity. To give more strength to this act, Central Government has come up with all the responsibilities relating to regulation, management and protection, State Government has to take permission from Central Government if any of the case arises. Wildlife Protection Act, 1972 this is an umbrella legislation passed by the parliament of India which conservation to the various species pf wildlife animals and plants and also deals with their management and regulation. By the 42<sup>nd</sup> Constitutional Amendment Act, 1976 forests and protection of wild animals and birds was transferred from State to Concurrent list. This act comprises of six schedule that deals with significant plants and animals' species according to their IUCN status. Wildlife Protection Act also constituted several authorities under the act. National Board for Wildlife, State Board for Wildlife, The Central Zoo Authority, National Tiger Conservation Authority and Wildlife Crime Control Bureau. This act protects several areas like sanctuary, national parks, conservation reserves, community reserves and tiger reserves. There are series of amendments to this act, the most recent amendment is Wildlife (Protection) Amendment Act 2022 which reduces the number of schedules from six to four. The amendment also permits the use of 'Elephant' in religious purpose or any other purpose. There are several initiatives that has been taken for Wildlife Development by the Wildlife Protection Act, 1972 like Project Tiger in 1973 launched by Central Government to increase and conserve the population of Tigers in India. It is still going project. Project Elephant, it was launched by Central Government to protect and conserve elephants in India. The Geographical Indications of Goods (Registration and Protection) Act, 1999 (GI Act) is a sui generis Act of the Parliament of India for protection of geographical indications in India. India, as a member of the World trade Organization (WTO), enacted the Act to comply with the Agreement on Trade-Related Aspects of Intellectual Property Rights. GI is a mark or symbol used on product that have specific origin geographical area and possess some quality or reputation. This act limits the unauthorized use of GI goods. GI Act provides the detailed provisions related to definitions, regulation, registration, appeal, penalties etc. It recognizes the economic prosperity of the producer. Indian Patent Act, 1970 and Amendment 2005 India's laws pertaining to Intellectual Property Rights has been greatly impacted by its colonial past. Indian Patent Act 1970 was also influenced by earlier British laws but later it

was modified according to our needs and priorities. It governs the patent rights of an individual. Indian Patent Act 1970 provides exclusive patent rights to new invention of product, manufacturing of product etc. The Term of every patent is 20 years from the date of filing the patent. There series of amendment in the act from time to time ,2005 amendment is one of the most significant one. The amendment was made to bring patent system of India concurrence with the TRIPS agreement and also introduce patent for food, pharmaceuticals, chemical, traditional knowledge and genetic resources. Protection of Plant Varieties and Farmers' Rights Act ,2001 It was enacted in 2001 under Ar.27(3) of the TRIPS agreement. Its aim is to recognize and conserve farmer's rights regarding plant genetic resources. It gives exclusive rights to breeder to sell, produce, market, distribute, import or export the protected variety. Researchers can use registered varieties for conducting research or experiments. Farmers are empowered to register and protect their new variety. They can save, use, sow, exchange, share or sell his farm produce. Biological Diversity Act, 2002 is a landmark legislation which is exclusively dedicated to biodiversity aiming to conserve it with its sustainable components. Being a member nation of Convention on Biological Diversity ,1992 it made essential for us to frame legislation in compliance of CBD,1992. This act provides the conservation of biological diversity, sustainable uses of its components and fair and equitable sharing of the benefits arising out of the products. This act has three-tier structure for regulation of biodiversity: National Biodiversity Authority, State Biodiversity Authority, Biodiversity Management Committees. Interest can be shared in a number of ways, including financial assistance, transfer of technology and sharing of intellectual property rights. This act hastens the research tracking and transfer of research results through patent application. It will bring foreign investments with regards to biological resources without sacrificing the interests of the country. The recent amendment of 2023 brought some changes in this act with regards to approval for Intellectual Property Rights, benefits of sharing, offences and penalties and expansion of National Biodiversity Act. The amendment amends the provision of approval from NBA that, prior to amendment approval form NBA is required before filing the application but now approval will be required before the actual grant of IPR. National Green Tribunal Act, 2010 this act was passed by parliament in 2010 for the speedy disposal of cases and matters related to Environment and management of forests and other natural resources including execution of any legal right related to environment and also provides compensation for the same. It was passed in accordance with the United Nation Conference on Environment and Development, 1992. Being a member of the conference India vowed to provide remedies to victims of pollutants and environmental damage.

### **International perspectives relating to biodiversity and its sustainable uses with human welfare and Intellectual property rights**

International Plant Protection Convention, 1951 is a supranational treaty to protect the world's plants, agricultural products, and other natural resources from plant pests. It was established in 1951.185 member nations ratified it and the cornerstone element of the treaty is the adoption of International Phytosanitary Measures which are essential for global food security, help in safe trade, and protect the environment. This treaty has been overseen by Food and Agriculture Organization. The Convention on Wetlands also referred to as Ramsar Convention is a multilateral agreement signed in 1971 promoting the preservation and judicious use of wetlands. They are considered to be highly productive ecosystems in the world. They are the sources of food, water, medicines etc. Wetlands promote tourism also as they are so scenic and diverse. Some are natural wetlands and some are man-made. They cover about 6% of the Earth's land surface and provide a wide range of plant and animal species. They play an integral role in managing the ecology of that area and also contribute to the economic activities of the place.

### **Conservation on International Trade in Endangered Species of Flora and Fauna**

This is one of the largest and oldest sustainable use multilateral agreement that aims to protect endangered plants and animals from threats of international trade. It was drafted in the meeting of members of International Union on Conservation of Nature (IUCN) in 1963 and open for signature

in 1973 and finally came into force on July, 1975. CITES play a crucial role in balancing biodiversity and sustainable use. CITES has categorized plants and animals' species according to their verge of threat. It helps in regulation of international trade by keep a check on over-exploitation of wildlife. It provides habitat protection to wildlife. Encourages research and monitoring in this field to provide better protection for wildlife. It engages community to spread education and awareness in this field. Conservation on Biodiversity Act, 1992 the Conservation on Biodiversity is a global convention on all aspects of biodiversity. It was adopted in Earth Summit in Rio de Janeiro ,1992 and came into force in 1993.This convention has basically three goals- the conservation on biological diversity, sustainable uses of its components and fair and equitable sharing of benefits arising from genetic resources. CBD provides a global framework aimed at conservation and sustainably use of biodiversity. A key factor in determining national and international biodiversity policies is the CBD'S establishment of legally binding agreements among nations to safeguard ecosystems and their resources. Kunming-Montreal Global Biodiversity Framework 2022 this framework was the result of the 15<sup>th</sup> conference of Parties to the UN Convention on Biological Diversity. This framework outlines worldwide targets for biodiversity conservation and sustainable uses that must be met by 2030 and beyond. It seeks to combat with the alarming rate of global loss of biodiversity. It works on reduction of species extinction risk, sustainable uses of biodiversity, enhanced implementation and monitoring.

### **United Nation Sustainable Development Goals**

Sustainable development goals can also be referred to as global goals which was adopted in Agenda 2030 for Sustainable Development by all member nations in 2015. 17 goals cover holistic and comprehensive aspects of an Environment. They aimed to promote equality, prosperity, and sustainability. Though all SDGs are connected some SDGs are exclusively dedicated to biodiversity. Like SDGs 14 and 15 they exclusively talk about Biodiversity. SDG 2 deals with zero hunger, SDG 12 talks about sustainable consumption and productive patterns, and SDG 13 talks about the impact of climate change on biodiversity. Each goal has a specific target to achieve by 2030. Sustainable Development Report 2024 released by the UN Sustainable Development Solutions Network shows the progress of SDGs made by member countries in a year. According to the report, by 2030 only 16% of the SDGs targets are expected to be achieved worldwide. The prominent SDG goals lie in SDGs 2,11,14,15 and 16, which are specifically off track. **UN Sustainable Development Cooperation Framework 2023-2027-** recently Govt. of India and the United Nations in India signed the UN Sustainable Development Cooperation Framework 2023-2027 aiming to facilitate the growth of SDGs in achieving their targets. It is based on pillars of AGENDA 30 focusing on people, prosperity, the planet, and participation. This framework focuses on the localization of SDGs means transforming the SDGs at the local level with national frameworks and community participation.

### **World Intellectual Property Organization (WIPO) and Trade Relate Aspects of Intellectual Property Rights (TRIPS)**

WIPO is one of the specialized agencies of the United Nations. It aims to promote and protect intellectual property rights across the globe with its member nations and other international organizations. It encourages creativity and innovation which leads to the development of international IP laws and treaties. WIPO facilitates and strengthens international cooperation and trade. It promotes arbitration and mediation by settling disputes with the help of these. It facilitates research and information for better protection of IP-related services. **Trade Relate Aspects of Intellectual Property Rights (TRIPS)** is a landmark and multilateral agreement between all the member nations of the World Trade Organization that sets minimum standards for intellectual property protection. It works on standardization, harmonization, and enforcement of IP laws globally. It aims to promote innovation, creativity, and technological advancement by ensuring robust and enforceable IP protection. TRIPS facilitate trade as it simplifies the IP application process. It attracts investment which encourages economic growth. TRIPS prevent piracy and



combats IP infringement. It ensures transparency, fairness, and predictability in IP protection. Sustainable uses of Biodiversity and Human Welfare sustainable uses of biodiversity provide numerous benefits to human welfare in the area of economic, social, environmental, human health etc. **Economic Benefits** provides us with resources like crops, livestock, and fisheries which provide us with food security. Biodiversity has some medicinal-based plants that supply medicines and pharmaceuticals to us. It gives us forest products like fuel wood, timber, and non-timber products. The scenic beauty of biodiversity, biodiversity hotspots, and wetlands encourages ecotourism and wildlife tourism. Biodiversity supplies us with genetic resources that we take for innovation or research. **Social Benefits** biodiversity preserves cultural heritage and traditional knowledge by ensuring a spiritual connection to nature. Promotes recreational activities such as wildlife watching, ecotourism community development, and livelihoods. It also encourages research, education, awareness, and innovation. **Environmental Benefits**-Biodiversity provides habitats to different species or different ecosystems. It helps to regulate climate as oceans, forests, and wetlands absorb carbon dioxide. It helps in soil formation and prevents soil erosion. Helps in controlling air and water pollution. Biodiversity helps in various ecological processes such as Pollination, seed dispersal, nutrient cycle, etc. It provides us with diverse crops ensuring food security. Biodiversity supplies various essential minerals. It helps in disaster risk management, Wetlands and forests mitigate flood impacts; the best example is the Mangrove ecosystem. It also helps in stabilizing soil which prevents landslides. The ecosystem provides water retention that helps in reducing drought problems. Human Health-Biodiversity provides numerous benefits to human health. More than 50% of medicines are derived directly from the nature. Helps in maintaining ecosystems that provides fresh air and water. Nature helps in reducing stress which strengthens our mental health. Some rare species of plants and animals helps in the treatment of specific diseases. It helps in mitigating disasters risks such as floods, droughts, storms etc which ultimately saves life of the people. Biodiversity assures food security to human beings and provide forests, timber and non- timber products which serve as a source of livelihood.

### **Judicial Responses relating to the Biodiversity and Intellectual Property Rights**

There are several hon'ble Supreme Court judgments related to biodiversity and Intellectual Property Rights. Turmeric Patent Case (1995): This case dealt with the biopiracy on Turmeric by the US. The US patent on turmeric was revoked on the grounds of prior arts. Neem Patent Case (2000): This case involves the dispute between India and the European Patent on Neem oil revocation as it isn't particularly novel. Basmati Rice Patent Case (2001): This issue deals with the Biopiracy by the US on Basmati Rice, there was diplomatic dispute between India and the US and efforts to protect the traditional knowledge. Monsanto Wheat Patent Case (2013): This case is concerned with the issue of patenting of wheat varieties and its implications on Biodiversity. The Judicial role and responses relating to the biodiversity and intellectual property rights have found very significant for its protection and preservation in the welfare of people.

### **Findings, Conclusion and Suggestions**

It can be concluded that the biological and zoological diversities, human welfare, sustainable development and intellectual property rights. Having a vast variety of biodiversity contributes to immense opportunities for sustainable uses ranging from medicines to agriculture. The study reveals that there is various legal framework for the protection and conservation of biodiversity at national wide and worldwide but still the biodiversity losses at alarming rate, that clearly shows there are several lacunas that persists. There is fragmentation of laws which sometimes leads to overlapping of laws causing confusion. There is no effective implementation of these laws due to lack of resources. No strict penalties or punishments in any law. Recent trends and practices clearly show how far we are lagging behind to achieve our global target with respect to sustainable development goals. Wildlife Protection Act, 1972 only shows on species protection rather than on whole ecosystems. It provides incompetent provisions for human-wildlife conflict. Forest conservation Act, 1980 lacks involvement of communities in management of forests. It has very

slow clearance process which delays development projects, lack of funding. Geographical Indication (GI) Act, 1999 it is having very limited scope for the protection for traditional knowledge, high registration fees and highly complex process of registration which hinders people to get their GI Tag registered. Indian Patent Act, 1970 it has bio piracy concerns, also provides inadequate enforcement mechanisms, lack of transparency, highly complex procedures in patent laws. Protection of plant varieties and farmers rights act, 2001 lacks in inadequate compensation for farmers varieties, high registration fees with highly complex registration process, conflict with other laws, limited access to benefit sharing, insufficient scrutiny of variety applications, bio piracy concerns etc. Biological Diversity Act 2002 lacks on clarity on Intellectual Property Rights (IPRs), insufficient protection for traditional knowledge, weak enforcement mechanisms, lack of funding, potential for bio piracy, inadequate representation of local communities, lack of transparency in decision making, delays in clearance process etc. India's laws focus on protection of biodiversity, intellectual property rights and sustainable development. Despite strengths these laws faces so many challenges as mentioned above which clearly show there is urgent need of effective implementation, awareness and international cooperation. Reforms should be brought in order to address these challenges. First of all, we have to encourage international cooperation in national laws related to biodiversity and IPR. Interdisciplinary approaches to policy making is to be followed. Proper funding should be provided. There should be comprehensive policy on Biodiversity and IPR at international level. Awareness to be spread via workshops on Biodiversity and IPR. Clarifying IPR laws for biodiversity. There should be short registration process and fees should be reduced. The sustainable agriculture practices should be promoted at local level. More community engagement should be there. There should be traditional knowledge act to provide protection for the same and to deal with the concerns of bio piracy which is one of the major threats in today's world. Encourage artificial intelligence in monitoring of biodiversity. Global biodiversity and IPR forums should be promoted. Intellectual property laws provide practical solution, protection and conservation to the novel plants' varieties and others as require from time to time in the view of biological and zoological diversities and its sustainable uses with human welfare and intellectual property rights with the collective endeavours of National and International communities under coordination of governments, NGOs, Institutions, individual and society. The implantation of the laws, sustainable development goals and others under relevancy relating to the biological and zoological diversities should be made well in time at the grass root level in the interest and welfare of worldwide to protect and preserve the existence of human being, biological and zoological things and the Earth which is mandatory essence in today's globalized fastest developing and changing world under some exceptions as required in this regard.

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Kunming-Montreal Global Biodiversity Framework 2022

United Nation Sustainable Development Goals 2015

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**Trade Relate Aspects of Intellectual Property Rights (TRIPS)**

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