# BIOPIRACY IN INTELLECTUAL PROPERTY RIGHTS REGIME: A LEGAL STUDY WITH SPECIAL REFERENCE TO THE RIGHTS OF INDIGENOUS PEOPLE

**THESIS**
**SUBMITTED TO**
**BABASAHEB BHIMRAO AMBEDKAR UNIVERSITY**
**LUCKNOW**

**FOR AWARD OF THE DEGREE OF**
**DOCTOR OF PHILOSOPHY**
**IN**
**LAW**


**SUPERVISOR**
**Prof. Sudarshan Verma**
**Head, Department of Law**
**School for Legal Studies**

**SUBMITTED BY**
**Harkiran Kaur**
**Enrolment No. 328/10**

**Department of Law**
**School for Legal Studies**
**Babasaheb Bhimrao Ambedkar University**
**(A Central University)**
**Vidya Vihar, Raebareli Road**
**Lucknow-226025**


**2017**

# DECLARATION

I, Harkiran Kaur hereby declare that the research work embodied in the thesis entitled **"Biopiracy in Intellectual Property Rights Regime: A Legal Study with Special Reference to the Rights of Indigenous People"** has been carried out by me under the supervision of **Professor Sudarshan Verma**, Head, Department of Law, School for Legal Studies, Babasaheb Bhimrao Ambedkar University (A Central University) Lucknow. The present research work is an original work and it has not been previously submitted in part or full for any other degree or diploma in this University or any other University.

Date: . 07.2017
Place: Lucknow

Harkiran Kaur
Research Scholar
Department of Law, SLS
B.B.A. University , Lucknow

**Babasaheb Bhimrao Ambedkar University**
**(A Central University)**
**Lucknow**

# CERTIFICATE

This is to certify that the thesis titled **"Biopiracy in Intellectual Property Rights Regime: A Legal Study with Special Reference to the Rights of Indigenous People"** submitted by **Harkiran Kaur** is an original research work and has not been previously submitted in part or full for the award of any other degree or diploma to this or any other university.

The thesis submitted to Babasaheb Bhimrao Ambedkar University Lucknow satisfies all the requirements as stipulated in the *Doctor of Philosophy (PhD) regulations-1999 as amended in 2008/2010/2013* and it is fit for submission and evaluation for the award of the degree of Doctor of Philosophy of the University.

Date:

(Prof. Sudarshan Verma)
Supervisor

Head
Department of Law
School for Legal Studies
BBAU, Lucknow

# *Acknowledgement*

*At the outset I offer my floral tribute to the Almighty and my alma mater. By the grace of the Almighty I have been able to complete this research work successfully. I extend my thanks and gratitude whole-heartedly to the Almighty.*

*I owe an inestimable debt of gratitude to Professor S.K. Bhatnagar, Dean, School for Legal Studies, Babasaheb Bhimrao Ambedkar University, Lucknow for providing me an opportunity to work on a subject which is extremely interesting, utile and relevant.*

*I owe an immeasurable debt of gratitude to Professor Sudarshan Verma, Head, Department of Law, School for Legal Studies, Babasaheb Bhimrao Ambedkar University, Lucknow for giving me an opportunity to work on this topic. She guided, mentored and supervised me on my research topic with her enormous knowledge and experience at every level. Her exemplary patience and kindness steered on through the long course of my work. Any amount of words would fall short of expressing my sense of gratitude that I nurture for her. I have gained immensely from the oceanic depth of her knowledge and the clarity of thought she provided to my work. I am whole-heartedly indebted to her for her esteemed efforts in giving a shape to my work. I shall always seek a guide and advisor in her in all my academic endeavours. She has been a true mentor to me.*

*I desire to express my sincere regards and indebtedness to Dr. Sufiya Ahmad, Assistant Professor, Department of Law, SLS, BBAU University, Lucknow, Dr. Anis Ahmed, Assistant Professor, Department of Law, SLS, BBAU University, Lucknow, Dr. Pradeep Kumar, Assistant Professor, Department of Law, BBAU University, Lucknow and all the other faculty members of the Department of Law, SLS, BBAU, Lucknow for their blessings and encouragement which motivated me to put my best.*

*I also owe an inestimable debt of gratitude to all the learned faculty members of Human Rights Department, School for Legal Studies, Babasaheb Bhimrao Ambedkar University, Lucknow for their constant guidance, encouragement and suggestions for the present work.*

*I am grateful to the Departmental Library Staff of Babasaheb Bhimrao Ambedkar University, Lucknow , Ram Manohar Lohia National Law University, Lucknow, Lucknow University, Lucknow and Indian Law Institute, Delhi to provide full library support.*

*I extend my sincere thanks to my family members and friends without whose help carrying out this work would not have been possible. I owe my sincere gratitude to Ms. Shakuntala Devi, Assistant Professor, Ram Manohar Lohia National Law University, Lucknow for her help and guidance in the present research work. My mother* ***Mrs. Jagdish Kaur*** *and father* ***Mr. Pirthi Pal Singh*** *has been extremely patient who has stood by me in my thick and thin and extended me unconditional support and perennial love and they deserve immeasurable appreciation. I am very much grateful to my soul mate Dhirendra Vikram Singh for his unconditional support and encouragement given in the completion of this work. The constant support and encouragement provided by my parents and all the family members has pushed me to work with enthusiasm and perseverance.*

*Date: 10. 07.2017* *(Harkiran Kaur)*

*Place: Lucknow* *Research Scholar*

# PREFACE

Intellectual Property Rights are the rights given to people over the creation of their minds. They usually give the creator an exclusive right over the use of his/her creations for a certain period of time. The different types of Intellectual Property Rights are Patents, Copyrights, Trademarks, Industrial designs, Protection of Integrated Circuits layout design, Geographical indications etc. In the Intellectual Property Rights (IPR) regime, on one hand, IPR is designed to protect the rights of individuals and corporations and the economic interests of the countries. But at the same time, it is violating the rights of the indigenous people by unauthorised use of their traditional knowledge.

Traditional knowledge (TK) is the information that people in a given community, based on experience and adaptation to a local culture and environment, have developed over time, and continues to develop. This knowledge is used to sustain the community and its culture and to maintain the genetic resources necessary for the continued survival of the community. The knowledge of and uses of specific plants for medicinal purposes is an important component of TK. In the Intellectual Property Rights Regime, the interest of developed countries in traditional medicine is rekindled because of which indigenous knowledge of the cultivation and application of genetic resources is becoming exploited at an alarming rate.

Developed nations, in general, have not recognized any significant value of traditional knowledge. Multi-national corporations of rich developed countries looked at traditional knowledge of the indigenous people as information in the public domain, freely available for use by anybody. There does not exist any

concept of compensation to the holders of traditional knowledge. It is only recently that western science has become more interested in traditional knowledge. They are beginning to see that traditional knowledge, in combination with modern scientific knowledge, can lead to the solution of current problems in diverse areas-ranging from agriculture to health. Given the considerable commercial value of traditional knowledge related to plants and its scientific importance as a rich prior art which remains unprotected, traditional knowledge is extremely vulnerable to misappropriation. Developed nations are making commercial use of biological resources and associated traditional knowledge without any authorization and patenting spurious inventions based on such knowledge without any compensation, known as biopiracy.

The concern of indigenous people is that the existing patent regime favours multinational corporations of the rich developed nations. The existing patent regime is aiding corporate interests and entrepreneurs who lay claim to indigenous knowledge without appropriate acknowledgement or compensation for communities who have developed that knowledge. The patent system gives the whole economic benefit to those who have only slightly altered the traditional knowledge and gives nothing at all to those who developed it over generations to its present form. Patent protection to the corporations transforms indigenous people into suppliers of free raw material, displaces them as competitors, and makes them totally dependent on industrial supplies for vital inputs. Thus, due to misappropriation of traditional knowledge of the indigenous people their livelihood and basic human rights are at stake.

The present research work provides a detailed and thorough explanation of the origin of biopiracy in the IPR Regime and its effect on plants and traditional knowledge of the indigenous people. Biopiracy disputes, as a major threat to the very survival of the indigenous communities, are discussed in detail. Various international conventions, treaties, agreements and the national legislations and policies relating to the protection of the rights of the indigenous people are

explored and ways to combat biopiracy, protect indigenous people and their traditional knowledge associated with plants are suggested.

Date: 10.07.2017 Harkiran Kaur

Place: Lucknow Research Scholar

# ACRONYMS

| | |
|---|---|
| ABS | Access and Benefit Sharing |
| AICRPE | All India Coordinated Research Project on Ethnobiology |
| AIDS | Acquired Immuno Deficiency Syndrome |
| APEDA | Agricultural and Processed Food Products Export Development Authority |
| ARIPO | African Region Intellectual Property Organization |
| AYUSH | Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homeopathy |
| BDA | Biological Diversity Act, 2002 |
| BMCs | Biodiversity Management Committees |
| CAM | Complementary and Alternative Medicine |
| CBD | Convention on Biological Diversity |
| CGIAR | Consultative Group on International Agricultural Research |
| CHM | Common Heritage of Mankind |
| CIAT | International Centre for Tropical Agriculture |
| CIEL | Center for International Environmental Law |
| CIP | International Potato Center |
| COICA | Coordinating Body of Indigenous Organizations of the Amazon Basin |
| COP | Conference of Parties |
| CRS | Congressional Research Service |
| CSIR | Council of Scientific and Industrial Research |

| | |
|---|---|
| CWW | Chief Wildlife Warden |
| EPO | European Patent Office |
| ETC Group | Group on Erosion, Technology and Concentration |
| EU | European Union |
| FAO | Food and Agriculture Organisation |
| FSO | Forest Settlement Officer |
| GI Act | Geographical Indications of Goods (Registration and Protection) Act, 1999 |
| GIs | Geographical Indications |
| HARC | Hawaii Agriculture Research Center |
| ICAR | Indian Council of Agricultural Research |
| ICCPR | International Covenant on Civil and Political Rights |
| ICESCR | International Covenant on Economic, Social and Cultural Rights |
| IGC | Inter-Governmental Committee |
| IK | Indigenous Knowledge |
| ILA | International Law Association |
| ILO | International Labour Organisation |
| IM | Integrative Medicine |
| IP | Intellectual Property |
| IPAB | Intellectual Property Appellate Board |
| IPC | International Patent Classification |
| IPR | Intellectual Property Rights |
| IUPGR | International Undertaking on Plant Genetic Resources |

| | |
|---|---|
| JFM | Joint Forest Management |
| KIRTADS | Kerala Institute for Research, Training and Development of Scheduled Castes and Scheduled Tribes |
| MNCs | Multinational Companies |
| MoEF | Ministry of Environment and Forests |
| MoU | Memorandum of Understanding |
| NBA | National Biodiversity Authority |
| NEP | National Environment Policy |
| NGOs | Non-Governmental Organisations |
| NISCAIR | National Institute of Science Communication and Informative Resources |
| NRIs | Non-Residential Indians |
| PA | Protected Area |
| PBR | Plant Breeders' Rights |
| PPVFR Act | The Protection of Plant Variety and Farmers' Rights Act |
| RAFI | Rural Advancement Fund International |
| RI | Responsible Innovation |
| SBB | State Biodiversity Board |
| SI | Starch Index |
| TBGRI | Tropical Botanical Garden and Research Institute |
| The UPOV Convention | The International Convention for the Protection of New Varieties of Plants |
| TK | Traditional Knowledge |
| TKDL | Traditional Knowledge Digital Library |

| | |
|---|---|
| TRIPS | Trade Related Aspects of Intellectual Property Rights |
| UDHR | Universal Declaration of Human Rights |
| UH | University of Hawaii |
| UH-CTAHR | University of Hawaii at Manoa College of Tropical Agriculture and Human Resources |
| UK | United Kingdom |
| UN General Assembly | United Nations General Assembly |
| UN | United Nations |
| UNCED | United Nations Conference on Environment and Development |
| UNDRIP | United Nations Declaration on the Rights of Indigenous Peoples |
| UNESCO | *United Nations Educational, Scientific and Cultural Organization* |
| US | United States |
| USPTO | United States Patents and Trademarks Office |
| VFCs | Village Forest Committees |
| WCED | World Commission on Environment and Development |
| WIPO | World Intellectual Property Organisation |
| WTO | World Trade Organisation |

# LIST OF CASES

# CONTENTS

# CHAPTER I

# INTRODUCTION

## 1.1 INTRODUCTION

Intellectual property[1] (IP) refers to creations of the mind, such as inventions; literary and artistic works; designs; and symbols, names and images used in commerce. IP is protected in law by, for example, patents, copyright and trademarks, which enable people to earn recognition or financial benefit from what they invent or create. By striking the right balance between the interests of innovators and the wider public interest, the IP system aims to foster an environment in which creativity and innovation can flourish.[2] Intellectual property, very broadly, means the legal rights which result from intellectual activity in the industrial, scientific, literary and artistic fields. Countries have laws to protect intellectual property for two main reasons. One is to give statutory expression to the moral and economic rights of creators in their creations and the rights of the public in access to those creations. The second is to promote, as a deliberate act of Government policy, creativity and the dissemination and application of its results and to encourage fair trading which would contribute to economic and social development. Generally speaking, intellectual property law aims at safeguarding creators and other producers of intellectual goods and services by granting them certain time-limited rights to control the use made of those productions. Those rights do not apply to the physical object in which the creation may be embodied but instead to the intellectual creation as such.

Intellectual property is traditionally divided into two branches, "industrial property" and "copyright."[3] The Convention Establishing the World Intellectual Property Organization[4](WIPO), concluded in Stockholm on July 14, 1967 (Article 2(viii)) provides that "intellectual property shall

[1] Hereinafter referred to as IP
[2]Available at http://www.wipo.int/edocs/pubdocs/en/intproperty/450/wipo_pub_450.pdf (visited on 12.03.2016)
[3] Available at http://www.wipo.int/export/sites/www/about-ip/en/iprm/pdf/ch1.pdf 9 (visited on 13.02.2016)
[4] Hereinafter referred to as WIPO

include rights relating to: literary, artistic and scientific works, performances of performing artists, phonograms and broadcasts, inventions in all fields of human endeavour, scientific discoveries, industrial designs, trademarks, service marks and commercial names and designations, protection against unfair competition, and all other rights resulting from intellectual activity in the industrial, scientific, literary or artistic fields."[5] The areas mentioned as literary, artistic and scientific works belong to the copyright branch of intellectual property. The areas mentioned as performances of performing artists, phonograms and broadcasts are usually called "related rights," that is, rights related to copyright. The areas mentioned as inventions, industrial designs, trademarks, service marks and commercial names and designations constitute the industrial property branch of intellectual property.[6]

Intellectual property rights are like any other property rights – they allow the creator, or owner, of a patent, trademark, or copyright to benefit from his or her own work or investment. There are several compelling reasons. First, the progress and well-being of humanity rests on its capacity for new creations in the areas of technology and culture. Second, the legal protection of these new creations encourages the expenditure of additional resources, which leads to further innovation. Third, the promotion and protection of intellectual property spurs economic growth, creates new jobs and industries, and enhances the quality and enjoyment of life. An efficient and equitable intellectual property system can help all countries realize intellectual property's potential as a powerful tool for economic development and social and cultural well-being. The intellectual property system helps strike a balance between the interests of the innovator and the public interest, providing an environment in which creativity and invention can flourish, to the benefit of all.[7]

[5]Available at http://www.wipo.int/edocs/pubdocs/en/intproperty/489/wipo_pub_489.pdf (visited on 12.03.2016)
[6] Available at http://www.wipo.int/export/sites/www/about-ip/en/iprm/pdf/ch1.pdf 9(visited on 13.02.2016)
[7] "What is Intellectual Property" WIPO Publication No. 450(E) , available at http://www.zis.gov.rs/upload/documents/pdf_en/pdf/What%20is%20IP_WIPO.pdf (visited on 10.11.2016)

## 1.2 INDIGENOUS KNOWLEDGE AS INTELLETUAL PROPERTY

*"Indigenous cultural knowledge has always been an open treasure box for the unfettered appropriation of items of value to Western civilization. While we assiduously protect rights to valuable knowledge among ourselves, indigenous people have never been accorded similar rights over their cultural knowledge. Existing Western intellectual property laws support, promote, and excuse the wholesale, uninvited appropriation of whatever indigenous item strikes our fancy or promises profit, with no obligation or expectation to allow the originators of the knowledge a say or a share in the proceeds."*[8]

Indigenous knowledge refers to what indigenous people know and do and what they have known and done for generations – practices that evolved through trial and error and proved flexible enough to cope with change. Intellectual property, very broadly, means the legal rights, which result from intellectual activity in the industrial, scientific, literary and artistic fields. Intellectual property law aims at safeguarding creators and other producers of intellectual goods and services by granting them certain time-limited rights to control the use made of those productions. Intellectual property has increasingly assumed a vital role with the rapid pace of technological, scientific and medical innovation that we are witnessing today. Moreover, changes in the global economic environment have influenced the development of business models where intellectual property is a central element establishing value and potential growth.[9]

Protecting Indigenous knowledge and culture has long been a concern both within and outside of the legal community. In the last decade an increased awareness and attempt to protect the rights and dignity of Indigenous innovation, knowledge, and culture has spread to the realm of intellectual property law. Efforts have been made to protect folklore and art

[8] Greaves, "Tribal Rights" in Brush and Stabinsky (Eds.) Valuing Local Knowledge: Indigenous Peoples and Intellectual Property Rights (Island Press, Covelo, 1996).
[9] Availableat https://link.springer.com/chapter/10.1007%2F978-981-10-3573-9_6 (visited on 11.03.2016)

through copyright law, insignia through trademark law, and biological resources, biotechnology and genetic resources through patent law.[10]

A patent is an exclusive right granted for an invention, which is a product or a process that provides a new way of doing something, or offers a new technical solution to a problem. It provides protection for the invention to the owner of the patent. The protection is granted for a limited period, i.e. 20 years. Patent protection means that the invention cannot be commercially made, used, distributed or sold without the patent owner's consent. A patent owner has the right to decide who may - or may not - use the patented invention for the period in which the invention is protected. The patent owner may give permission to, or license, other parties to use the invention on mutually agreed terms. The owner may also sell the right to the invention to someone else, who will then become the new owner of the patent. Once a patent expires, the protection ends, and an invention enters the public domain, that is, the owner no longer holds exclusive rights to the invention, which becomes available to commercial exploitation by others. All patent owners are obliged, in return for patent protection, to publicly disclose information on their invention in order to enrich the total body of technical knowledge in the world. Such an ever-increasing body of public knowledge promotes further creativity and innovation in others. In this way, patents provide not only protection for the owner but valuable information and inspiration for future generations of researchers and inventors.[11] But this patent is used as a tool by the developed countries to misappropriate biological resources of the indigenous people by claiming patent over them. Often, in the search for new bio-resources, researchers draw on local people's traditional knowledge about the properties of a particular plant, animal or chemical compound. When researchers use traditional knowledge without permission, or exploit the cultures they're drawing from – it's called biopiracy. Biopiracy arises when

[10] Lindsey Schuler, "Modern Age Protection: Protecting Indigenous Knowledge through Intellectual Property Law" Michigan State International Law Review [Vol.21:3] p.752 , available at http://digitalcommons.law. msu.edu /cgi/ view content .cgi?article=1210&context=ilr (visited on 01.07.2014)
[11] Available at http://www.dcmsme.gov.in/emerge/website_material_on_ipr.pdf (visited on 17.02.2016)

researchers or research organisations take biological resources without official sanction, largely from less affluent countries or marginalised people. Biopiracy is not limited to drug development. It also occurs in agricultural and industrial contexts. Indian products such as the Neem tree, Turmeric, and Basmati have all been patented by foreign firms for different lucrative purposes.[12]

## 1.3 BIOPIRACY OF TRADITIONAL KNOWEDGE OF THE USES OF PLANTS (TKUP)[13]

Biopiracy refers to the unauthorized commercial use of biological resources or associated traditional knowledge or the patenting of spurious inventions based on such knowledge, without compensation.[14] The developing nations, rich in biodiversity and valuable resources have become a subject of interest to many corporations as well as individuals, as developed countries rich in technology look to make profit from the diverse biological resources of the developing nations. While searching for ways to gain profit, the corporations and individuals of developed nations often encounter indigenous communities who already have made use of the valuable resources of that region. Thus, when the developed nations decide to claim any plant variety as their own and indigenous communities are overlooked and their interests are ignored by the developed nations, biopiracy dispute arises. Biopiracy has never been more relevant than it has been in 20th and 21st centuries, as never before have individuals been allowed sole ownership of biological matter. The emergence of patent regime beginning in the 1930s allowed plant material to be patented and thus it led to the current rise in biopiracy cases and debates surrounding biopiracy.[15]

[12]Available at http://theconversation.com/biopiracy-when-indigenous-knowledge-is-patented-for-profit-55589 (visited on 23.06.2015)
[13] Hereinafter referred to as TKUP
[14] Ikechi Mgbeoji, *Global Biopiracy: Patents, Plants, and Indigenous Knowledge* 13(Cornell University Press, Ithaca, New York, 2006)
[15] Available at http://sites.duke.edu/amazonbiopiracy/ (visited on 12.07.2015)

Biopiracy has become an exploding issue today. The lack of legal protection of the biological and cultural heritage has made the indigenous communities of the third world vulnerable to biopiracy. This is a matter of great concern for the countries rich in biological resources since patents, which were supposed to prevent piracy, have now become legitimized process for theft of their indigenous knowledge making it an exclusive property of multi-nationals.[16] Through biopiracy the rights of indigenous peoples' to their biological resources and knowledge are erased and replaced by monopoly rights.[17] The patent policy, thus, generated enormous conflict and divided the developed and developing nations on the issue of biopiracy. Corporations in developed nations complain that inadequate patent laws are leading to losses; developing nations claim that biopiracy is robbing them of valuable resources. The biopirate countries argue that it is not stealing resources of the indigenous people but rather creating innovative products. To developing nations, where most traditional knowledge is located, patents utilizing such knowledge represent *"biopiracy"*, a theft of their resources and culture. On the other hand, for industrialized countries, which have the technology to produce such commodities, these patents are a means of rewarding and encouraging important inventions.

## 1.4 STATEMENT OF PROBLEM

Since the last two decades multinational corporations are profiting by patenting the biological resources and associated knowledge of the indigenous people. Biopiracy is hampering developing nations' biodiversity, the livelihoods of indigenous communities and farmers who have invested their time, care, hard work and knowledge in restoring their heritage. Various plants and vegetables like turmeric, neem, basmati rice, ashwagandha, pudina, kalamegha, aloe-vera, karela, and jamun were victimized by biopiracy and

[16] Available at http://www.patnmarks.com/blog/traditionalknowledgeayurveda/(visited on 23.01.2016 )
[17] Available at http://shodhganga.inflibnet.ac.in/bitstream/10603/12824/11/11_chapter%205 .pdf , (visited on 14.12.2015)

where India have successfully put forward its perspective in the international courts and came forth as a winner. There is a dire need of modification or amendments in international and national laws in order to safeguard national interests and to negate the privatization of plant related traditional knowledge and protect the rights of the indigenous people. Problems related to the biopiracy and the protection of the rights of the indigenous people are:

- Biopiracy is mainly a problem of developing countries like India. Developing nations are rich in biodiversity and genetic resources, but having a lack of technology.
- There is no particular law in India to combat biopiracy and protect the rights of the indigenous people.
- There have been numerous cases of biopiracy in the past decade, with a large number of patents being granted on biological resources and knowledge obtained from developing nations, particularly India, without the consent of their original holders, the rural and indigenous communities.
- Not only the economical disadvantages but cultural and social aspects of the indigenous people have been threatened by biopiracy.
- How can the value of biological resources and associated traditional knowledge be determined and shared?

## 1.5 OBJECTIVES OF THE RESEARCH

Prime objective of research was to examine and analyze International IP Regime and existing legislations in India for the protection of indigenous people and their plant associated traditional knowledge with a view to explore the present status of the indigenous people and impact of biopiracy on their rights and other objectives are summarized below:

- To study and analyze the biopiracy disputes and its effect on the rights of the indigenous people.
- To study the reasons behind the growth of biopiracy cases and issues involved.

- To examine some national legislations and international initiatives for the protection of the indigenous people and their knowledge associated with biological resources.
- To make some practical and legal proposals in order to reduce the cases of biopiracy and protect the indigenous people.

## 1.6 LITERATURE REVIEW

- **Protecting Traditional Knowledge Digitally: A Case Study of TKDL[18]**: This article emphasizes that Traditional knowledge on biodiversity from India has been particularly vulnerable to patent claims and the Indian government and Non-Governmental Organisations have made several biopiracy claims in recent years. India has taken various initiatives regarding the protection of traditional knowledge under intellectual property rights, including the Traditional Knowledge Digital Library[19](TKDL), which is a major step to curb biopiracy. The paper discusses various aspects of TKDL including its role in the preservation, protection and dissemination of traditional knowledge, searching facilities, benefits, and current status. The paper also tries to explore the Traditional Knowledge Resources Classification.
- **Global Biopiracy: Patents, Plants, And Indigenous Knowledge[20]:** Ikechi Mgbeojis contribution to the existing literature on biopiracy and the appropriation of traditional knowledge of the uses of plants represents a valuable and provocative perspective. His book, Global Biopiracy: Patents, Plants, and Indigenous Knowledge, protests against the seizure of Indigenous biocultural assets by the developed nations. Mgbeoji emphasizes that the preservation of environmental knowledge, as well as medicinal, folkloric, and other biologically-based insights, is communal and cultural in many instances. Its unauthorized taking may be a form of cultural appropriation facilitated by

[18] Dr. Mangala Anil Hirwade, "Protecting Traditional Knowledge Digitally: A Case Study of TKDL", available at http://eprints.rclis.org/14020/1/TKDL_paper.pdf (visited on 12/03/2016)
[19] Hereinafter referred to as TKDL
[20]Ikechi Mgbeoji, *Global Biopiracy: Patents, Plants, and Indigenous Knowledge,* 13(Cornell University Press, Ithaca, New York, 2006)

the complicity of dominant international regimes for intellectual property protection. It provides an interdisciplinary critique, which interrogates the political, economic, and legal forces that have together shaped the progressive proliferation of global biopiracy. The book examines a very specific area of property law where tension between different legal regimes exists. It discusses how patent and plant breeder's rights are used by the more developed countries (referred to as states of the North) to misappropriate the plants and TKUP from less developed countries (referred to as states of the South). It provides a very detailed and thorough explanation of the development of the modern patent system and its effect on plants and TKUP. To accomplish this, Ikechi Mgbeoji considers evidence from a variety of different disciplinary perspectives. For example, he considers legal perspectives when he discusses the international law concept of the Common Heritage of Mankind , political perspectives when he discusses the backdrop against which the Trade-Related Aspects of Intellectual Property Rights agreement was concluded in the 1994 amendment to the general World Trade Organization agreement, anthropological perspectives when he discusses religious and philosophical conceptions of plants and economic perspectives when he discusses the effect that modern consumerism has on the diversity of plant species.

- **Biopiracy Watch**[21]: This compilation of recent papers on biopiracy published by Third World Network describes cases that span the developing world, from African and Middle Eastern medicinal plants to South American fruit, to Asian microbes, among others. In this book the biopiracy of genetic resources including seeds, medicinal plants and microbes, as well as of the traditional knowledge of uses of those resources from developing countries are discussed.
- **Poor People's Knowledge: Promoting Intellectual Property in Developing Countries**[22]**:** It demonstrates how poor people in poor countries can increase their earnings from their own innovation, knowledge, and creative skills, how

[21]Edward Hammond , *Biopiracy Watch* (Third World Network, Malaysia, Volume 1,2013)
[22] J. Michael Finger, Philp Schuler, *Poor People's Knowledge: Promoting Intellectual Property in Developing Countries (*World Bank Publications and Oxford University Press, Washington D.C., 2004)

people in developing countries can incorporate their own intellectual property into their own development efforts and how they can find international markets for commercial applications of their cultural, intellectual, and traditional knowledge.

- **Genetic Resources, Traditional Knowledge and the Law[23]:** This book deals with access and benefit sharing and related traditional knowledge. A range of issues including the economic, environmental, cultural and inherent value of genetic resources; the nature of TK innovation systems; the effectiveness of existing national Access and Benefit Sharing and TK related legislations; the challenges for development of functional prior informed consent procedures; mechanisms for promoting fair and equitable benefit sharing, including modalities for promoting equitable contractual arrangement mechanisms for protection of sovereign rights over genetic resources and of the rights of indigenous peoples and local communities over their Traditional Knowledge.
- **Indigenous Heritage and Intellectual Property: Genetic Resources, Traditional Knowledge and Folklore[24]:** The author discusses that for indigenous cultures, property is an alien concept, yet the market-driven industries of the developed world do not hesitate to exploit indigenous raw materials, from melodies to plants, using intellectual property law to justify their behaviour. Existing intellectual property law, for the most part, allows industries to use indigenous knowledge and resources without asking for consent and without sharing the benefits of such exploitation with the indigenous people themselves. It should surprise nobody that indigenous people object. Recognizing that the commercial exploitation of indigenous knowledge and resources takes place in the midst of a genuine and significant clash of cultures, the author of this important book explore ways in which intellectual property law can expand to accommodate the interests of

[23] Eavanson C. Kamau, Gerd Winter, *Genetic Resources, Traditional Knowledge and the Law* ( Earthscan Publishers, London, 2009)
[24] Dr. Silke von Lewinski, *Indigenous Heritage and Intellextual Property: Genetic Resources, Traditional Knowledge and Folklore* (Wolters Kluwer Publications, The Netherlands,2nd edition, 2008)

indigenous people to their traditional knowledge, genetic resources, indigenous names and designations, and folklore. In so doing they touch upon such fundamental issues and concepts as the following: collective rights to the living heritage; relevant human rights norms; benefit-sharing in biological resources; farmers rights; the practical needs of documentation, assistance, and advice; the role of customary law; bioprospecting and biopiracy; and public domain. As a starting point toward mutual understanding and a common basis for communication between Western-style industries and indigenous communities, Indigenous Heritage and Intellectual Property is of immeasurable value. It offers not only an in-depth evaluation of the current legal situation under national, regional and international law including analyses of the Convention on Biological Diversity and other international instruments, as well as initiatives of the World Intellectual Property Organization (WIPO)[25], the United Nations Food and Agriculture Organization (FAO)[26], and other international bodies but also probes numerous further possibilities. While no one concerned with indigenous culture or environmental issues can afford to ignore it, this book is also of special significance to practitioners and policymakers in intellectual property law in relation to indigenous heritage.

- **International Public Goods and Transfer of Technology under a Globalized Intellectual Property Regime[27]:** This work is a collection in which distinguished economists, political scientists and experts of legal field discuss the implications of the ever more globalized protection of intellectual property rights for the ability of countries to provide their citizens with such important public goods as basic research, education, public health and sound environmental policies. Such items increasingly depend on the use of private rights over technical inputs and information goods, which could usher in a brave new world of accelerating technological innovation. However, higher

[25] Hereinafter referred to as WIPO
[26] Hereinafter referred to as FAO
[27] Jerome H. Reichman and Keith E. Maskus, *International Public Goods and Transfer of Technology under a Globalized Intellectual Property Regime* (Cambridge University Press, New York, 2005)

and more harmonized levels of international intellectual property rights could also throw up high roadblocks in the path of follow-on innovation, competition, and the attainment of other social objectives. It is at best unclear who represents the public interest in negotiating forums dominated by powerful knowledge cartels. This is the first book to assess the public processes and inputs that an emerging transnational system of innovation will need to promote technical progress, economic growth, and welfare for all participants.

- **Intellectual Property Law- Economic and Social Perspectives[28]:** In this volume of nine chapters, the various authors explore the theoretical foundations of intellectual property rights beyond traditional utilitarian and law and economics approaches, and expand the scope of intellectual property law to accommodate the full range of human values implicit in intellectual production and the regulatory dimension in terms of social goals that can be achieved through their construction.
- **Intellectual Property Rights in India[29]:** This book deals with the changes brought by the Trade Related Aspects of Intellectual Property Rights Agreement (The TRIPS Agreement)[30]. It was the start of a new era in the field of intellectual property rights. The TRIPs Agreement evolved minimum standards for copyright, patents, trademarks, industrial designs, geographical indications, layout design of integrated circuits, and undisclosed information, which includes trade secrets. The subject of intellectual property rights has become extremely important since then. The member states of TRIPs Agreement were under an obligation to amend their laws relating to intellectual property rights to bring them in conformity with the provisions of TRIPs Agreement. India has also enacted new laws on designs, trademarks, plant varieties and farmer's rights, geographical indications, semiconductor integrated circuits layout designs and amended the Copyright Act and Patents

[28] Anne Flagnan and Maria Lilla Montagnani, *Intellectual Property Law- Economic and Social Perspectives* (Edward Elgar Publising Limited, UK, 2012)
[29] Dr. V.K. Ahuja, *Intellectual Property Rights in India* (Lexis Nexis Butterworths, Nagpur, 2nd edition. 2013)
[30] Hereinafter referred to as The TRIPS Agreement

Act drastically. This book discusses and analyses the law on IPRs in India in a lucid language. It explains the know-how and licenses to give an overall picture of the law on IPRs. A summary of all the international agreements, treaties and conventions on IPRs has also been provided. A number of Indian, American and English cases have been referred in the book to further elucidate the concepts.

- **Agriculture and Intellectual Property Rights- Economic, Institutional and Implementation Issues in Technology[31]:** This book presents the perspectives of policy-makers and economists on the following issues- Plant breeding patents, the ownership of biological innovation and associated intellectual property rights which are the subject of increased attention worldwide. They are particularly relevant in the field of agricultural biotechnology. The author has discussed how they are affecting public and private sector organisations and companies, and is significant for developing as well as developed countries.
- **International Intellectual Property in an Integrated World Economy[32]:** International Intellectual Property in an Integrated World Economy features a comprehensive introduction to the global system regulating the field of intellectual property rights, including how the treatment of IP may affect a broad range of social and political interests. The updated third edition includes discussion of important jurisprudential developments, including recent European Union (EU)[33] Court of Justice decisions clarifying permissible acts in relation to copyrighted computer software, Indian Supreme Court case law involving patentability standards, and United States (US)[34] Supreme Court decisions adopting international exhaustion for copyright. Inclusion of important jurisprudential developments, including recent EU Court of Justice decisions clarifying permissible acts in relation to copyrighted computer

[31] V. Santaniello etal., *Agriculture and Intellectual Property Rights- Economic, Institutional and Implementation Issues in Technology* (CABI Publishing, U.K., 2004)
[32] Frederick M. Abbott etal., *International Intellectual Property in an Integrated World Economy* (Aspen Publishers, New York, 2007)
[33] Hereinafter referred to as EU
[34] Hereinafter referred to as US

software and restricting enforcement of intellectual property rights in relation to goods in transit; Indian Supreme Court case law involving patentability standards, and; US Supreme Court decisions adopting international exhaustion for copyright, and limiting patentability of genetic materials and information found in nature. Explains the new European Union Patent System, as well as the new EU IP border measures regulation. Describes developments relating to investment and trade disputes involving patents and trademark. Reviews ongoing regional and multilateral trade and investment negotiation.

- **New Frontiers in the Philosophy of Intellectual Property[35]:** It is an important and wide ranging collection which primarily focuses on the philosophy of patents and copyrights from a range of philosophical aspects, including moral and political philosophy, philosophy of economics and law. Most of the chapters in this collection were specially written for a conference on the philosophy of intellectual property which took place at the Institute of Philosophy, London, in May 2009. One of the main objectives of the conference was to understand the basis which unites patents, copyrights, trademarks and trade secrets and what makes them distinct from other kinds of property. There are many chapters in this volume which lay emphasis on Responsible Innovation (RI)[36], including chapters on the implications of IPRs for a just distribution of technologies, morality exclusions to patentability, alternatives to the patent system, and intellectual property and traditional knowledge.
- **Patenting Lives- Life Patents, Culture and Development[37]:** This collection includes contributions from various interests and perspectives, in the context of current international developments in life patents, and the global agenda of harmonisation of international intellectual property. The book is divided into five sections reflecting the critical issues arising from patents and

[35] Anabelle Lever, *New Frontiers in the Philosophy of Intellectual Property* (Cambridge University Press, UK, 2012)
[36] Hereinafter referred to as RI
[37] Johanna Gibson, *Patenting Lives- Life Patents, Culture and Development* (Ashgate Publishing Limited, England, 2008)

biotechnology - Context; Human Rights and Ethical Frameworks; Medicine and Public Health; Traditional Knowledge; and, Agriculture. The international contributors from government, civil society, academia and the private sector provide diverse perspectives on life patents and the facilitation of social, cultural and economic development in the context of international principles of trade.

## 1.7 HYPOTHESIS

The hypothesis of the study is as follows:

- There is no specific law in India which deals with biopiracy and international law has been slow to recognize the problem of biopiracy.
- Existing international and national laws for the protection of indigenous people and their knowledge associated with biological resources are not very effective.
- Developed countries are exploiting biological resources and indigenous communities traditional knowledge in the name of patents on the inventions derived from those biological resources.
- The patent system gives the entire economic benefit to those who have only slightly altered the traditional knowledge and gives nothing at all to those who developed it over generations to its present form, that is, there is no system of benefit sharing.

## 1.8 RESEARCH METHODOLOGY

Research methodology is an outline of any research that provides the basic guidelines for the details of the project. In this research multivariate factors have been considered for covering different aspect of the study. The methodology adopted by the researcher is a doctrinal method of research based on the study of original empirical research. The researcher used both primary and secondary data to derive necessary conclusions pertaining to research objectives. Primary sources include the study and analysis of the relevant international conventions, treaties, agreements, commissions' reports,

laws, rules, case laws etc. All these were studied from the critical and analytical point of view. The present study focused on biopiracy disputes. Secondary sources explain the law. The present research work includes the detailed analysis of the various secondary sources related to the concept of biopiracy and plant related traditional knowledge of the indigenous people. This included legal dictionaries, legal encyclopedias, legal periodicals, treatises, articles, research papers and journals. The researcher conducted a doctrinal research by use of document analysis and biopiracy cases for the present research. An attempt is made to explain and critically analyze the laws to protect traditional knowledge associated with plants and the rights of the indigenous people with special reference to the knowledge possessed by them both at national and international levels, thereby trying to point out the lacunae in these laws. Literatures of international instruments, reports, journals, working papers, national and international legislations, books, e-books, articles and case laws mainly available from libraries and internet are surveyed. Both the exploratory and descriptive research designs are used for the study. The exploratory design is used because there are many aspects which have not been covered by the earlier studies; as a result of this there is no data available to guide the researcher. Therefore, the researcher explored the universe open ended and investigated into the problem of biopiracy and its implications on the rights of the indigenous people in the Intellectual Property Rights regime which provided an insight to the researcher. The descriptive design is used for the purpose of verifying the hypothesis formulated for the purpose of the research. To maintain the authenticity of the present study the researcher has adopted ILI method for citation.

## 1.9 HYPOTHESIS TESTED

First hypothesis is that there is no specific law in India which deals with biopiracy and international law has been slow to recognize the problem of biopiracy.

For testing the first hypothesis, the researcher examined the available material related to the history and concept of IPR and biopiracy and various laws and legislations related to it but no particular international instrument is found that would be able to put a check on growing biopiracy. In India, not a single law is found which specifically deals with biopiracy. Though on the international level the existing international agreements and conventions talks about the protection of biological resources and their conservation but no clear cut legislation focuses on the issue of biopiracy. Thus it can be said that at present there is no specific law to curb biopiracy both at the national and international level and the international instruments which talks about the protection of biological resources are not very effective, hence hypothesis is proved.

Second hypothesis is that existing international and national laws for the protection of indigenous people and their knowledge associated with biological resources are not very effective.

For testing the second hypothesis, the researcher has studied and analysed various international instruments such as International Labour Organisation Convention no.169, Universal Declaration of Human Rights, Vienna Declaration, Mattatua Declaration, Draft Declaration on Indigenous Rights 1993, The International Covenant on Economic, Social and Cultural Rights, The United Nations Declaration on the Rights of Indigenous Peoples, 2007, The World Commission on Environment and Development, The United Nations Conference on Environment and Development, The 1992 Rio Declaration, Forest Principles, Agenda 21, The Convention on Biological Diversity, The Nagoya Protocol, the International Convention for the protection of New Varieties of Plants (the UPOV Convention), the TRIPS Agreement, efforts of WIPO and national legislations such as Geographical Indications Act, the Patents Act, Protection of Plant Varieties and Farmers Act, Biological Diversity Act and various forest legislations and policies and traditional knowledge database. Inspite of all these legislations and policies, the original holders of the indigenous knowledge concerning biological

resources are the victims of biopiracy, their rights are violated. Hence the existing international instruments and national legislations are not very effective due to poor implementation, hence hypothesis is proved.

Third hypothesis is that developed countries are exploiting biological resources and indigenous communities' traditional knowledge in the name of patents on the inventions derived from those biological resources.

For testing the third hypothesis, the researcher has studied and analysed various biopiracy disputes which shows that the big corporations of the developed countries are stealing of genetic materials especially plants and other biological materials of the indigenous people by the patent process in the name of invention. Hence, the hypothesis is proved.

Fourth hypothesis is that the patent system gives the entire economic benefit to those who have only slightly altered the traditional knowledge and gives nothing at all to those who developed it over generations to its present form, that is, there is no system of benefit sharing.

For testing the fourth hypothesis, the researcher has relied on the study of various biopiracy disputes. Biopiracy issues are increasing because big corporations rich in technology are making money by obtaining patent on the biological resources of the indigenous people. Against many patents indigenous people protested because neither their consent was taken nor was any compensation given to them. Thus, there is no benefit sharing with the holders of the traditional knowledge. This shows that the multinational companies are making money by fully utilizing their knowledge without sharing the profit with them. Hence, hypothesis is proved.

## 1.10 FRAMEWORK OF THE THESIS

The thesis is divided into six chapters.

Chapter One is Introduction which introduces the thesis with statement of the problem, objectives, hypothesis, literature review, research methodology and the methods of hypothesis testing.

Chapter Two is Concept and History of Biopiracy and its Implications on the Rights of the Indigenous People. It provides an overview of concept and history of biopiracy and its impact on the rights of the indigenous people in the Intellectual Property Rights regime.

Chapter Three is Protection of the Rights of Indigenous People under International Law. In this chapter the researcher examined and analysed the international conventions, treaties, agreements and the legislations and policies relating to the protection of the rights of the indigenous people in the intellectual property rights regime.

Chapter Four is Protection of the Rights of Indigenous People and their Knowledge in India. It is an analysis of the Indian legal regime in which the researcher has explored how far it is adequate to protect the traditional knowledge and the rights of the indigenous people.

Chapter Five Biopiracy Disputes discusses various biopiracy disputes and its impact on the rights of the indigenous people.

Chapter Six Conclusion and Suggestions is a concluding note that provides summary of the research and ways and means are suggested to prevent biopiracy and protect the rights of the indigenous people and biological resources based on their traditional knowledge.

# CHAPTER II

# CONCEPT AND HISTORY OF BIOPIRACY AND ITS IMPLICATIONS ON THE RIGHTS OF THE INDIGENOUS PEOPLE

## 2.1 INTRODUCTION

The present chapter deals with the meaning and nature of indigenous people, their knowledge, concept and origin of biopiracy and its impact on the rights of the indigenous people in the Intellectual Property Rights regime. In western legal systems intellectual property rights denotes a specific set of laws designed to foster commercial creativity and industrial innovation by protecting the rights of individual creators and innovators. Indigenous peoples assert that intellectual property systems not only fail to provide adequate protection for their cultural forms, products and expressions; they serve the interests of the dominant, non-indigenous cultures as against the distinct rights and interests of indigenous systems of creativity and cultural products and expressions.[1] To understand the meaning and concept of biopiracy, it is necessary to know the meaning of indigenous people and the concept of their traditional knowledge which is discussed by the researcher in the present chapter.

## 2.2 INDIGENOUS PEOPLE AND THEIR TRADITIONAL KNOWLEDGE

### 2.2.1 MEANING OF INDIGENOUS PEOPLE

Indigenous people have inhabited all continents since time immemorial. They have lived on their sacred lands, nurtured their spiritual and cultural values, maintained and cultivated their environment, and kept their traditions

[1]Available at http://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary _Library/ pubs/ rp/RP9697/97rp20 ( visited on 13.10.2015)

alive over centuries.[2] There are an estimated 370 million indigenous peoples living in more than 70 countries worldwide. They represent a rich diversity of cultures, religions, traditions, languages and histories; yet continue to be among the world's most marginalized population groups. The health status of indigenous peoples varies significantly from that of non-indigenous population groups in countries all over the world.[3]

There is no universal definition because it's quite impossible to come up with an all-inclusive description that would fit all indigenous peoples. However, attempts at a definition can be found in international law, such as the 1989 International Labour Organization´s Convention and the 2007 Declaration on the Rights of Indigenous Peoples.

- Tribal peoples 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;
- Peoples 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 colonisation who, retain some or all of their own social, economic, cultural and political institutions.
- Self-identification as indigenous or tribal is regarded as a fundamental criterion.

The International Labour Organization (ILO)[4] Convention Concerning Indigenous and Tribal Peoples in Independent Countries defines indigenous peoples as *"Peoples in independent countries who are regarded as indigenous on account of their descent from 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*

[2]Silke von Lewinsky , *Indigenous Heritage and Intellectual Property : Genetic Resources, Traditional Knowledge and Folklore*, 7(Netherland: Kulwer Law International, second edition, 2007)
[3] Available at http://www.un.org/esa/socdev/unpfii/documents/5session_factsheet1.pdf (visited on 12.02.2015)
[4] Hereinafter referred to as ILO

*irrespective of their legal status, retain some or all of their own social, economic, cultural and political institutions".*[5]

Considering the diversity of indigenous peoples, an official definition of "indigenous" has not been adopted by any United Nations-system body. Instead the system has developed a modern understanding of this term based on the following:

- Identify themselves and are recognized and accepted by their community as indigenous.
- Demonstrate historical continuity with pre-colonial and/or pre-settler societies.
- Have strong links to territories and surrounding natural resources.
- Have distinct social, economic or political systems.
- Maintain distinct languages, cultures and beliefs.
- Form non-dominant groups of society.
- Resolve to maintain and reproduce their ancestral environments and systems as distinctive peoples and communities.[6]

Following is the one of the most cited descriptions of the concept of the indigenous people:

*"Indigenous communities, peoples and nations are those which, having a historical continuity with pre-invasion and pre-colonial societies that developed on their territories, consider themselves distinct from other sectors of the societies now prevailing on those territories, or parts of them. They form at present non-dominant sectors of society and are determined to preserve, develop and transmit to future generations their ancestral territories, and their ethnic identity, as the basis of their continued existence*

[5]Article 1, International Labor Organization Convention Concerning Indigenous and Tribal Peoples in Independent Countries, June 1989 (referred to as Convention 169).
[6]Available at http://www.unric.org/en/indigenous-people/27309-individual-vs-collective-rights(visited on 19.02.2105)

*as peoples, in accordance with their own cultural patterns, social institutions and legal system"* .[7]

This historical continuity may consist of the continuation, for an extended period reaching into the present of one or more of the following factors:

- Occupation of ancestral lands, or at least of part of them;
- Common ancestry with the original occupants of these lands;
- Culture in general, or in specific manifestations (such as religion, living under a tribal system, membership of an indigenous community, dress, means of livelihood, lifestyle, etc.);
- Language (whether used as the only language, as mother-tongue, as the habitual means of communication at home or in the family, or as the main, preferred, habitual, general or normal language);
- Residence on certain parts of the country, or in certain regions of the world;
- Other relevant factors.

On an individual basis, an indigenous person is one who belongs to these indigenous populations through self-identification as indigenous (group consciousness) and is recognized and accepted by these populations as one of its members (acceptance by the group). This preserves for these communities the sovereign right and power to decide who belongs to them, without external interference.[8]

### 2.2.2 MEANING AND NATURE OF TRADITIONAL KNOWLEDGE

The inter-governmental committee of World Intellectual Property Organisation (WIPO)[9] on Intellectual Property and Genetic Resources,

[7]Jose R. Martinez Cobo,The Special Rapporteur of the Sub-Commission on Prevention of Discrimination and Protection of Minorities, in his famous Study on the Problem of Discrimination against Indigenous Populations
[8]Available at http://www.unric.org/en/indigenous-people/27309-individual-vs-collective-rights(visited on 19.02.2015)
[9] Hereinafter referred to as WIPO

Traditional Knowledge (TK)[10] and Folklore defines traditional knowledge as knowledge that is:

a. Generated, preserved and transmitted in a traditional context.
b. Distinctively associated with the traditional or indigenous culture or community that preserves and transmits it between generations.
c. Linked to a local or indigenous community or other group of persons identifying with a traditional culture through a relationship based on a sense of custodianship, guardianship or cultural responsibility such as a sense of obligation to preserve the knowledge, or a sense that to permit misappropriation or demeaning usage would be harmful or offensive, a relationship that may be expressed formally or informally by customary law.
d. Originating from intellectual activity in a wide range of social, cultural, environmental and technological contexts, and
e. identified by the community or other group as being traditional knowledge.[11]

Needless to say, TK is largely oral and is the collective knowledge, beliefs and practices of indigenous people on sustainable use and management of resources. It embodies the wisdom developed over generations and encompasses agricultural knowledge, medicinal knowledge, biodiversity related knowledge and the like. Oft quoted classic examples of medicinal TK are:

- *Methi* to bring down blood glucose.
- Composition of *jamun*, bitter gourd, jaggery and egg plant to treat diabetes.
- *Kala jeera* to treat hepatitis and asthma.[12]

Traditional knowledge includes mental inventories of local biological resources, animal breeds, and local plant, crop and tree species. It may include such information as trees and plants that grow well together, and indicator

[10] Hereinafter referred to as TK
[11] Overview of the Activities and Outcomes of the Committee, Intergovernmental Committee, WIPO/GRTKF /IC/5/12-2003, pp. 20-21)
[12] R.V. Anuradha, "Biopiracy and Traditional Knowledge" available at http://www./ hinduonnet.com/ folio /fo 105/01050380.htm (visited on 25.05.2016)

plants, such as plants that show the soil salinity or that are known to flower at the beginning of the rains. It includes practices and technologies, such as seed treatment and storage methods and tools used for planting and harvesting. TK also encompasses belief systems that play a fundamental role in a people's livelihood, maintaining their health, and protecting and replenishing the environment. TK is dynamic in nature and may include experimentation in the integration of new plant or tree species into existing farming systems or a traditional healer's tests of new plant medicines. The term "traditional" used in describing this knowledge does not imply that this knowledge is old or untechnical in nature, but "tradition-based." It is "traditional" because it is created in a manner that reflects the traditions of the communities, therefore not relating to the nature of the knowledge itself, but to the way in which that knowledge is created, preserved and disseminated.[13] Traditional knowledge is collective in nature and is often considered the property of the entire community, and not belonging to any single individual within the community. It is transmitted through specific cultural and traditional information exchange mechanisms, for example, maintained and transmitted orally through elders or specialists (breeders, healers, etc.), and often to only a select few people within a community.

Although there is no universally accepted definition of indigenous knowledge and it is a term that takes on many meanings for different people, there are, however, some generally accepted concepts associated with discussions on knowledge possessed by the indigenous people. The following provides some general criteria based on the collective understandings of the term made in international for a, based on comments by the leading experts and academics and direct research experience. This is by no means a finite definition. Indigenous knowledge is widely understood as:

- knowledge developed over time;
- transmitted generation to generation;

[13] Elements Of A Sui Generis System For The Protection Of Traditional Knowledge, World Intellectual Property Organization, Intergovernmental Committee On Intellectual Property And Genetic Resources, Traditional Knowledge And Folklore, 3rd Session., 2002, WIPO/GRTKF/IC/3/8.

- typically, transmitted orally;
- typically, collectively held and owned;
- typically of a practical nature, and relating to natural resources
- is dynamic and evolving with environmental and external influences;
- often involves elements of innovation and experimentation;
- typically is imbedded in specific environmental settings;
- is imbedded in customs, language, local practices and cultural heritage;
- when removed from its local cultural or environmental setting may still exist in memory, but becomes less 'traditional'
- often taking the form of stories, songs, folklore, proverbs, cultural values, beliefs, rituals, community laws, local language and agricultural practices; and
- having an holistic aspect.

Furthermore, indigenous knowledge has been broadly recognised for playing the important roles:

1. for sustaining or improving livelihoods of a vast array of local communities,
2. as part of the sustainable use and conservation of the environment,
3. for experimentation and provision of innovations that can be used to benefit society more broadly,
4. for its benefits to national economies.[14]

### 2.2.3 INTELLECTUAL PROPERTY RIGHTS IN KNOWLEDGE OF THE INDIGENOUS PEOPLE

Over the past decade, indigenous people's knowledge has received increasing attention on the international agenda. Factors contributing to this include the recognition of the importance of the knowledge of indigenous people in the lives of the majority of the world's population and in the conservation of biodiversity; concerns about the rapid loss of indigenous

[14] Gibson Johanna, *Patenting Lives* 121, (Ashgate Publishing Limited, England, 2008)

peoples' knowledge and global cultural diversity; concerns about unauthorized and inappropriate patenting and use of indigenous or traditional knowledge, with little or no sharing of resulting benefits with the original holders of indigenous knowledge, interest in harnessing the potential of indigenous people for local sustainable developments; and increasing attention to indigenous rights.

Intellectual property law has recently received attention as a tool for technological innovation and industrial change. It has also been seen as a tool for promoting the conservation of biological diversity, sustainable use of its components, and for ensuring that benefits arising from the utilization of genetic resources are shared in a fair and equitable manner among the relevant stakeholders. Critics argue that intellectual property protection increases the cost of products, promotes monoculture by concentrating industrial and agricultural activities on a few cultivated varieties of species, and, when extended to plant and animals, is in conflict with the morals of many societies.

Intellectual property laws vary in nature and scope from one country to another. Intellectual property protected in one country may not be recognized in another country. Despite the existence of various international agreements that attempt to harmonize intellectual property protection, there are still differences among national laws, especially those regarding patents. The differences in national application of intellectual property law are at the centre of much of the debate on the intellectual property rights of indigenous and local people. The case of traditional knowledge of indigenous and local peoples has opened debate on the adequacy and ethics of intellectual property protection. The debate (particularly the absence of consensus on whether and how to extend intellectual property protection to traditional knowledge) has so far shown these issues are complex and controversial. This is partly because of differences in conceptual treatment and often lack of clarity on the two concepts of traditional knowledge and intellectual property.[15] It is also

[15]Available at http://www.un.org/en/ga/president/68/pdf/wcip/IASG%20Thematic%20Paper_%20Traditional%20Knowledge%20-%20rev1.pdf(visited on 14.09.2016)

because a scant body of information is available to those responsible for policy and law making, at both national and international levels. In addition, these issues are often debated in insolated United Nations, business sector and non-governmental organizations' conferences-each with its distinct sector and interest and focus in the subject. For example, dialogue (within the ILO and the United Nations Working Group of Indigenous Populations, amongst others) on the human rights of indigenous peoples has seldom addressed, at least consistency, issues of intellectual property rights in traditional knowledge. The World Trade Organizations (WTO)[16] regime has not confronted the implications of its Agreement on Trade-Related aspects of Intellectual Property Rights (the TRIPS Agreement)[17] for the protection and use of traditional knowledge. On the whole, international debate on issues of intellectual property protection in general and rights in traditional knowledge in particular, is characterized by tension and inconsistency.

However, environmental and non-governmental organizations (NGO's)[18], anthropologists and the convention on Biological Diversity (the CBD)[19] have begun to create a strong political foundation for addressing these issues in a holistic manner. The CBD's holistic nature and its large and diverse constituency open to NGO's has provided, at least in the recent past, and intergovernmental forum where these issues are being debated with a certain measure of coherency.

The debate in the CBD and other forums now oscillates between two extremes; one position that advocates the extension of intellectual property protection to cover traditional knowledge, even including patenting of that knowledge, and another position that promotes the status quo where such knowledge is treated as a public good. Those who subscribe to or promote the first position often advance the following arguments. First, they argue that extending intellectual property protection to traditional knowledge will in fact

[16] Hereinafter referred to as WTO
[17] Hereinafter referred to as the TRIPS Agreement
[18] Hereinafter referred to as NGOs
[19] Hereinafter referred to as CBD

promote technological innovation as it would facilitate the dissemination and development of that knowledge in the modern economic space. Second, recognition of intellectual property rights in traditional knowledge could generate incentives for local and indigenous peoples to conserve the environmental and manage biodiversity. Third, the industrialized countries have a moral obligation to ensure that indigenous and local peoples receive a fair and equitable share of benefits arising from the use of their traditional knowledge and commercialization of genetic resources. Proponents of this view further suggest that traditional knowledge should be validated.

Those who oppose the extension of intellectual property protection to traditional knowledge have argued that such a move would in fact destroy the social basis for generating and managing the knowledge. Traditional knowledge, as we have observed, is communal property, passed from one generation to the next. If it is protected under intellectual property law it would be privatized, and this may deny future generation and industry access to such knowledge.[20]

### 2.2.4 THREATS TO INDIGENOUS PEOPLES' KNOWLEDGE

The holders of indigenous or traditional knowledge face various difficulties. In some cases, the very survival of the knowledge is at stake, as the cultural survival of communities is under threat. Following are the challenges which are faced by the indigenous people:

- External social and environmental pressures, migration, the encroachment of modern lifestyle and the disruption of traditional ways of life can all weaken the traditional means of maintaining or passing knowledge on to future generations. There may be a risk of losing the very language that gives the primary voice to a knowledge tradition and the spiritual world-view that sustains this tradition. Either through acculturation or diffusion,

[20]D.J. Mugabe, "*Intellectual Property rights and Traditional knowledge"-An Exploration in International policy discourse"* available at www.wipoint/tk/en/in/paneldiscussion/papers/pdf/ mugabe.pdf (visited on 15.02.2015)

many traditional practices and associated beliefs and knowledge has been irretrievably lost. This, a primary need i.e. to preserve the knowledge that is held by elders and communities throughout the world.

- Another difficulty which the indigenous people are facing is the lack of respect and appreciation for such knowledge. For example, when a traditional healer provides a mixture of herbs to cure a sickness, the healer may not isolate and describe certain chemical compounds and describe their effect on the body in the terms of modern bio-chemistry, but the healer has, effect, based this medical treatment upon generations of clinical trials undertaken by healers in the post, and on a solid empirical understanding of the interaction between the mixture and human physiology. Thus, sometimes the true understanding of the value of their indigenous knowledge may be overlooked if its scientific and technical qualities are considered from a narrow cultural perspective. In fact, many consumers in western countries are turning to treatments based on empirical observation over many generations.
- Yet another problem confronting indigenous people is the commercial exploitation of their knowledge by others, which raises questions of legal protection of indigenous knowledge against misuse, the role of prior informed consent, and the need for equitable benefit-sharing. Cases involving natural products all bear evidence to the value of indigenous knowledge in the modern economy. A lack of experience with existing formal systems, limited economic resources, cultural factors, lack of a unified voice, and, in many cases a lack of clear national policy concerning the utilization and protection of indigenous peoples' knowledge, results in these populations often being placed at a decided disadvantage in using existing Intellectual Property mechanisms. At the same time, the lack of understanding and clear rules concerning the appropriate use of indigenous knowledge creates areas of uncertainly for those seeking to use such knowledge in research and development of new products, there is a

common need for well established, culturally appropriate and predictable rules both for the holders and legitimate users of indigenous knowledge.

- A further challenge is to address the international dimension of the protection of traditional knowledge possessed by the indigenous people and benefit-sharing for associated genetic resources, while learning from existing national experience. Only through the participation of communities and countries from all regions can this work go forward to produce effective and equitable outcomes that are acceptable to all stakeholders.[21]
- Biopiracy is a major threat to the rights of the indigenous people. There is an urgent need to protect indigenous people and their knowledge by avoiding biopiracy. According to Christopher Beat Graber, the term *"biopiracy"* encompasses a variety of circumstances, including:
  - The acquisition of genetic resource or traditional knowledge without permission of their holders.
  - Cases where benefits arising from the commercial use of genetic resources or traditional knowledge are not shared with the provider of these resources or knowledge.
  - Cases where traditional knowledge is protected by IPR, primarily patents. The holders of these rights have not been innovative themselves, but have simply copied this knowledge.

## 2.3 MEANING AND CONCEPT OF BIOPIRACY

One of the most significant issues raised by the indigenous people is the collection, screening, and use for commercial and industrial purposes of their knowledge and of genetic and biological products which come from their lands or which are important to their societies. This 'bioprospecting', as its critics refer to it, raises some important questions about the nature of

[21] *"Intellectual Property and Traditional Knowledge",* WIPO Booklet No.2, WIPO Publication No. 920 (E), available at http://www.kas.de/upload/aus/ands/homepages/namibia/Namibia-Law-Journal/11-1/NLJ-Section-7.pdf (visited on 19.02.2015)

innovation, and of the relationships between natural resources, knowledge, and intellectual property rights. The ecosystems within which indigenous people have lived, and which they have managed sustainably for millennia, are not only vital for their survival; they also figure significantly in their cultural, religious and social systems. These ecosystems also comprise some of the most biologically diverse areas in the world, and the products they yield are sought after by a large and growing biotechnology industry for use in a vast array of medicinal, cosmetic, industrial, and food and agricultural products. Biological products and Indigenous peoples' knowledge about these products and their properties form a vital contribution to the commercial products and processes that sustain the rapidly growing biotechnology industry. The industry isolates and modifies biological and genetic products, and registers patents for them; and in doing so it is dependent on Indigenous peoples' knowledge of these products and their properties.[22]

The indigenous communities from which these products and knowledge are obtained receive little or no recognition for their contribution, and generally do not share equitably in benefits resulting from uses of biological products and knowledge. The intellectual property laws which foster commercial and industrial uses of biological products and processes, and which protect the interests of the biotechnology industry, cannot effectively are used to protect indigenous peoples' claims. This is because of the strict requirements-novelty, inventive step, non-obviousness and industrial application for inventions registered as patents.[23] Products and knowledge from indigenous communities are, in this way, increasingly being transformed into intellectual property in the western industrialised world.

From time immemorial humans have been hunting and collecting plants, seeds and other natural elements. Recorded explorations of foreign natural elements trace back to Ancient Egypt, when Queen Hatshepsut sent her army

[22] V. Santaniello etal., *Agriculture and Intellectual Property Rights- Economic, Institutional and Implementation Issues in Technology* 55(CABI Publishing, U.K., 2004)
[23] Ibid

out on a search for a specific tree.[24] One of the first influential ethno botanical works was written in AD 77 by the Greek physician Dioscorides. His *De Materia Medica* describes nearly 600 plants and their medicinal uses.[25] During colonial times many explorers and colonists brought back plants, minerals and observations of the practices of local communities to the metropolitan state. In 1474 the first known general patent statute was enacted by the Republic of Venice which served an incentive to create or import new technologies. A large segment of population all around the world have been and are making use of biological resources for food, science, economic benefit, medicinal use and many other purposes. In today's world, genetic resources and traditional knowledge associated with those resources play an important role in different industrial sectors such as in plant and animal breeding, bio-control, food and beverage, horticulture, industrial biotechnology, pharmaceutical industry and cosmetics. Many of these industries use biological resources for research and development. For example, over the last 30 years 26% of all new approved drugs are natural products or have been developed from a natural element. A lot of research is carried out in the agricultural industry to increase the resistance of plants through research on different types of seeds and genetic manipulation. This process of research and development is encouraged through patent protection.

The patenting of inventions derived from biological and genetic resources raises some critical questions for indigenous communities. There are ethical concerns regarding the collection and use of such products and their derivatives without the informed consent or equitable participation of indigenous communities who claim rights in the products and knowledge. There is also the concern that companies and researchers that collect such knowledge and products usually provide for few (if any) financial benefits to be returned to the indigenous communities.

[24]D. F. Robinson, *"Confronting Biopiracy: Challenges, Cases and International Debates",* Abingdon, Earthscan, 2010, 1, available at http://samples.sainsburysebooks.co.uk/9781136544125_sample_824042.pdf (visited on 21.09.2015)

[25]Available at http://www.britannica.com/EBchecked/topic/164412/Pedanius-Dioscorides (visited on 21.09.2015)

Another critical concern is the fundamental inappropriateness of patent laws to indigenous peoples' ability to protect their own biological knowledge and resources. As a legal instrument, a patent confers exclusive rights on an inventor which for a fixed period prevent others from producing, using, or engaging in commercial transactions for the invention. A patent requires that an invention should be useful: that is, it must have an industrial application. It also requires an invention to be novel, or recent and original, and not previously known. An invention can also only be accepted for patenting if it is non-obvious: that is, it must have been produced by a reasonable level of technical know-how, rather than having merely been a discovery of what already exists in nature. These requirements create an essential incompatibility between patents and indigenous knowledge and innovations. Innovation and knowledge in indigenous societies generally does not fit the patent laws' requirement for novelty of invention, which hinges on the isolation and modification of biological and genetic products using highly technological processes. Moreover, patents confer rights in individuals or corporations, and are not applicable to communal rights which often pertain in indigenous societies. Indigenous peoples' notions of property differ generally from those which form the basis of patent laws. Biological knowledge in indigenous communities is generally regarded as being a community resource, and is shared and transmitted freely within communities according to customary rights, rules and obligations. The private ownership rights which patent laws confer for inventions are thus antithetical to indigenous peoples' world views.

Although, as with all intellectual property rights systems, patent laws are available for use by indigenous peoples, the incompatibility outlined above means that indigenous people are unlikely to use these laws to protect their knowledge and innovations. Moreover, use of such laws is usually costly and time consuming, and usually necessitates the services of skilled legal professionals. For these reasons, indigenous peoples' access to patent laws,

like copyright laws, is likely to be limited.[26] Thus, the importance of indigenous knowledge for its creators and for the world community at large and the need to foster, preserve and protect such knowledge needs to be recognized in international fora.[27]

The UN Convention on Biological Diversity declares that according to the principles of international law, states possess the sovereign right over the resources which are under their national jurisdiction and the authority to determine access to those resources. Furthermore the Convention puts an obligation on the contracting parties to share the results and benefits, which accrue from research and development based upon genetic resources, in a fair and equitable way with the party which has provided these resources.[28] However, some countries claim an infringement of their sovereign rights by companies which do not comply with these obligations. This is called biopiracy.

## 2.4 DEFINITION OF BIOPIRACY

The phenomenon of biopiracy is of recent origin which became a subject of attention at the international level in the past few years. There is no official definition of the concept as the term itself is relatively novel, being only came in use for the first time in the early 1990s. It has a close relation with the word bioprospecting which also stemmed in the year 1990.

Bioprospecting or bio-diversity prospecting is defined in the Oxford Dictionary as *"the search for plant and animal species from which medicinal drugs and other commercially valuable compounds can be obtained".*[29] The term is widely used for *"any program that endeavours to collect genetic material and/or the knowledge of its uses, usually from areas with high*

[26] Available at http://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/pubs/rp/RP9697/97rp20 (visited on 13.10.2015)
[27] Carlos M Correa, *"Traditional Knowledge and Intellectual Property"*, available at http://www.tansey.org.uk/docs/tk-colourfinal.pdf (visited on 12.09.2015)
[28] Articles 3, 15 and 19, UN Convention on Biological Diversity, Rio de Janeiro, 5 June 1992.
[29] *"Bioprospecting",* Oxford Dictionaries, Oxford University Press, available at http://oxforddictionaries.com/definition /english/bioprospecting (visited on 13.09.2015)

*concentrations of biodiversity"*.[30] The term *'bioprospecting'* originates from the 1993 book Biodiversity Prospecting: Using Genetic Resources for Sustainable Development by Reid et al. from the World Resources Institute. In the book bioprospecting is defined as *"the exploration of biodiversity for commercially valuable genetic and biochemical resources"*.[31] The authors aimed to promote the preservation of biodiversity and the sharing of its benefits by stressing its economic potential. Although the term might be novel, the practice of collecting biological material is not new. Various illustrations from history exhibits that this is an old practice. Anthropology Professor Cori Hayden states that bioprospecting is a new name for an old practice. Its novelty lies in ethical considerations which have established that the taking of biological resources now comes with a mandate to give back.[32] The first use of the term biopiracy is usually attributed to activist Pat Mooney, Executive Director of the Canada-based NGO Action Group on Erosion, Technology and Concentration (ETC Group).[33] It was used as a way to raise queries about the practice of bioprospecting due to increasing frustrations about the utilization and monopolization of resources and traditional knowledge.

Only recently has the international community sought to recognise and protect knowledge of the indigenous people. In 1982 WIPO and UNESCO adopted a model law on folklore. In 1989 the concept of farmers' rights was introduced by the Food and Agriculture Organisation into its International Undertaking on Plant Genetic Resources and in 1992 the Convention on Biological Diversity highlighted the need to promote and preserve traditional knowledge of the indigenous people. A number of cases relating to TK have attracted international attention and involve what is often referred to as

[30]C. Hamilton, "Biodiversity, biopiracy and benefits: what allegations of biopiracy tell us about intellectual property" *Developing world bioethics*, 2006, Vol. 6(3), 159

[31] W. V. Reid et al., *Biodiversity Prospecting: Using Genetic Resources for Sustainable Development,* 2,3 (Baltimore, World Resources Institute Publications, 1993) , available at http://www.wri.org/publication/ biodiversity-prospecting (visited on 20.10.2015)

[32] C. Hayden, *When Nature goes Public : The Making and Unmaking of Bioprospecting in Mexico* 2(Princeton, Princeton University Press, 2003)

[33] Before 2001 the ETC Group was named the Rural Advancement Foundation International (RAFI)

'biopiracy'. Although there is no accepted definition of biopiracy, the following, relating to patents, have been described as such:

a) The granting of 'wrong' patents. These are patents granted for invention that are either not novel or inventive having regard to TK already in the public domain. Such patents may be granted due either to oversights during the examination or simply because the examiner did not have access to the knowledge. This may be because it is written down but not accessible using the tools available or because it is unwritten knowledge.
b) The granting of 'right patents'. Patents must be correctly granted according to national law on inventions derived from a community's TK or genetic resources but (i) patenting standards are too low e.g. national patent regimes may not recognise some forms of public disclosure of TK as prior art or (ii) no arrangements may have been made to obtain prior informed consent of the community providing the knowledge or resource and for sharing benefits of commercialisation.[34]

As mentioned earlier, biopiracy is not a term which has an accepted legal meaning, nor is there a consensus on what the term exactly consists of. Different definitions have been given by scholars, activists and politicians in their own way. However, before looking in depth at the issue, it is important to understand its meaning and the debate surrounding it.

The Oxford Dictionary defines it as: *"the practice of commercially exploiting naturally occurring biochemical or genetic material, especially by obtaining patents that restrict its future use, while failing to pay fair compensation to the community from which it originates".*[35]

This definition limits the object of biopiracy to *'biochemical and genetic material'*, while giving a broad description of the practice as *'commercially exploiting, especially by obtaining patents'*. It explicitly mentions the lack of fair compensation.

[34] Gibson Johanna, *Patenting Lives- Life Patents, Culture and Development* 21 (Ashgate Publishing Limited, England 2008)
[35] *Biopiracy",* Oxford Dictionaries, Oxford University Press, available at http://oxforddictionaries.com/ definition/ english/Biopiracy (visited on 21.10.2015 )

The ETC Group[36], which originally coined the term, gives the following definition: *"Biopiracy refers to the appropriation of the knowledge and genetic resources of farming and indigenous communities by individuals or institutions that seek exclusive monopoly control (patents or intellectual property) over these resources and knowledge."*[37]

According to this definition the object is more comprehensive inclusive of both genetic resources and associated knowledge. Secondly, it places focus on *'farming and indigenous communities'*. Thirdly, in comparison to the Oxford Dictionary definition the scope is somewhat more limited to cases where patents or intellectual property are used to seek control.[38]

One of the most known activists against biopiracy is the Indian scientist Vandana Shiva. She interprets the term 'biopiracy' in the following way: *"Biopiracy refers to the use of intellectual property systems to legitimize the exclusive ownership and control over biological resources and biological products and processes that have been used over centuries in non-industrialized cultures."*[39] With regard to the object of biopiracy, there is no reference to associated knowledge. However, compared to the previous definition, she broadens the victimized group from *'farming and indigenous communities'* to *'non-industrialized cultures'*. Just like most authors, Vandana Shiva targets intellectual property systems. While most descriptions of biopiracy only include intellectual property systems of control, some scholars say this is not fully complete. The unauthorized collection and use of biological resources and associated knowledge, not implicating intellectual property, is also labelled biopiracy by them. This practice is often referred to as the misappropriation of biological resources and traditional knowledge.[40]

[36] ETC Group is an international organization dedicated to "the conservation and sustainable advancement of cultural and ecological diversity and human rights." The full legal name is Action Group on Erosion, Technology and Concentration.

[37] Action Group on Erosion, Technology and Concentration (ETC Group), available at http://www.etcgroup.org/issues/patents-biopiracy, (visited on 17.10.2015 )

[38] D. F. Robinson, *"*Confronting Biopiracy: Challenges, Cases and International Debates*",* Abingdon, Earthscan, 2010, 18, available at http://samples.sainsburysebooks.co.uk/9781136544125_sample_824042.pdf, (visited on 21.09.2015)

[39] V. Shiva, *"Protect or Plunder? Understanding Intellectual Property Rights",* 49 (London, Zed Books, 2001)

[40] Supra note 19, p.20

This is repected in Professor Graham Duttfield's definition of the term: *"it normally refers either to the unauthorized extraction of biological resources and/or associated traditional knowledge from developing countries, or to the patenting of spurious 'inventions' based on such knowledge or resources without compensation."*[41]

Thus, patent claims over biodiversity and indigenous knowledge that are based on the innovation creativity and genius of the people of the Third World are acts of 'biopiracy'.[42]Bio-piracy refers to the practice of corporations, academic institutions and governments in claiming ownership, or taking unfair advantage, of biological resources such as seeds and genetic material without the permission of the indigenous people or communities who have nurtured those resources. Bio-piracy can also refer to the theft of traditional knowledge or technologies from those cultures.[43]

## 2.5 ORIGIN OF BIOPIRACY

The word "Biopiracy" was originated in the 1980s during the period when developing countries had faced tough condemnation from industrialized countries for intellectual piracy. Developed countries, especially the United States (US), blamed developing countries of violating their intellectual property, causing a huge amount of economic lose to their entrepreneurs especially in the field of drug, product, design, trademark, and computer software. As a result , countries such as, India, Argentina, Brazil, Vietnam and Thailand, had all been threatened under the special 301 provision of US trade law "Special 301" clause of the Omnibus Trade and Competitiveness Act of 1988 requires U.S. trade representative to identify, investigate and take retaliatory action against countries whose policies deny adequate protection of intellectual property rights. During the 1970's and 1980's, protectionist

[41] G. Duttfield, *Intellectual Property, Biogenetic Resources, and Traditional Knowledge,* 52(Earthscan, 2004)
[42] N. Stainoff , *"Biological Resources and Beneft sharing: The Interesction Between Traditional Knowledge and Intellectual Property"* ,Intellectual Property Rights- A Global Vision, edited by S. K. Mittal and R. Verma, Indian Law Institute, New Delhi
[43] Available at http://www.afna.ca/uploads/files/env/ns...biopiracy.pdf (visited on 14.10.2015)

sentiment was on the rise in the US congress and, as a result, many developing countries were condemned by the US as unreliable trade counterparts.[44]

To counter the above accusation on the behalf of developing countries, Pat Mooney, the ex-director of the Rural Advancement Fund International (RAFI)[45] invented the term "Biopiracy". Biopirates refer to persons and countries that use the intellectual property rights to monopolize and own the right to access utilize benefit and control biological resources and related indigenous knowledge without proper appropriation of benefit derived and addressing the original innovator.[22] The real pirates are those developed countries, especially the U.S., who benefited and prospered from the plundering of natural resources from the developing and less developed countries without paying any royalty to the source countries at all. According to Mooney, the seriousness of intellectual piracy by developing countries is comparable to Biopiracy by developed countries. Mooney was not alone in the study about the problem of Biopiracy. Dr Vandana Shiva, a biologist from India, has also been studying and is particularly vocal about the matter of Biopiracy. According to Shiva, a patent claim over the biodiversity and indigenous knowledge is the act of Biopiracy. Like Mooney, Shiva argues that a Biopiracy patent denies the innovation incorporated in indigenous knowledge. She claims that the use of traditional knowledge reportedly increases the efficiency of pinpointing plant's medicinal uses by more than 400 percent. For example, in 120 active compounds isolated from higher plants and widely used in modern medicine, 75 percent have uses that were known in traditional systems, while only less than a dozen are synthesized by simple chemical modification. The rest are extracted from plants and then purified. Because the benefit at stake is so exciting, the industrialized world

[44] Available at http://www.etcgroup.org/issues/patents-biopiracy (visited on 23.04.2015)
[45] Hereinafter referred to as RAFI

would rather choose to ignore the centuries' long cumulative innovation of generations of rural communities in the developing countries.[46]

For a thorough understanding of the controversy surrounding biopiracy, it is essential to take a closer look at the historical evolutions leading up to the emergence of the problem. In order to understand the biopiracy discourse, two historical developments are important. Firstly, the current intellectual property system is a result of the globalization of Euro-American intellectual property regimes, particularly through the WTO's Agreement on Trade Related Aspects of Intellectual Property. Secondly, through the Convention on Biological Diversity biodiversity has been recognized as a category of resources and biological resources have become a commodity.[47]

Until the 1930s patent protection did not extend to biological life forms. Plant varieties were not considered inventions and were consequently excluded from intellectual property protection. In the 1930s the method of crossbreeding plants to produce a 'hybrid' that is stronger became a widespread practice in industrialized countries. Seed companies then used their growing influence to obtain plant breeders' rights legislation. In the US the Plant Patent Act was enacted in 1930, allowing to patent the phenotype (entire plant) for asexually reproduced plants. The 1970 Plant Variety Protection Act provides intellectual property protection for varieties that are new, distinct, uniform and stable.[48] This greatly expanded patentability and had as a consequence that even seeds could be patented under some conditions. Before modern methods of plant breeding existed, patent protection was not considered an effective system for the protection of newly developed plant varieties. Crossbreeding plants was a rather obvious method to any farmer and consequently didn't meet the non-obviousness requirement of patent protection. Neither comprised the breeding an inventive step.

[46] Available at http://www.actionbioscience.org/biodiversity/gollin.html(visied on 23.04.2015)
[47] C. Hamilton, "Biodiversity, Biopiracy and Benefits: What allegations of biopiracy tell us about intellectual property", Developing world bioethics, 2006, Vol. 6(3) 160
[48] K. Aoki, *"Food Forethought: Intergenerational Equity and Global Food Supply? Past, Present and Future",* Wisconsin Law Review, 2011, 425, available at http://wisconsinlawreview.org/wp-content/uploads/2011/07/10 - Aoki-Final.pdf (visited on 13.09.2015)

Modern biotechnology brought plant breeding to laboratories. The extension of patent protection to modern plant breeding methods and the resulting products increases the significance of patents in plant variety protection. A patent has the advantage of offering a broader protection. Plant variety protection only relates to the specific variety concerned and the scope of the protection is limited by reference to the physical material itself.

By the Mid-twentieth century a number of international research gene-banks was established to conserve plant genetic resources in the form of raw germ plasm and to provide samples of these materials for agriculture, plant breeding and research. These gene-banks became part of the International Agricultural Research Centres and the Consultative Group on International Agricultural Research (CGIAR)[49] The research of the Consultative Group is dedicated to food security and poverty eradication in developing countries. These evolutions heralded a new era of plant ownership. Coming from a period of free exchange of plant germ plasm and limited exclusive ownership rights over plants research became increasingly globalized in the form of gene-banks and companies pushed for legal protection of the results of their research.[50]

The first international attribution of intellectual property rights for plant genetic resources was the 1961 Convention- the International Convention for the Protection of New Varieties of Plants (the UPOV Convention)[51]. The Convention provides a framework for intellectual property protection of plant varieties. These plant variety rights are often referred to as 'plant breeders' rights' (PBRs)[52]. PBRs are property rights for intentionally bred new plant varieties. PBRs are a weak form of IPR protection compared to the protection a patent offers, but they are easier to obtain. The UPOV Convention was primarily to the advantage of industrialized countries where plant breeders

[49] Hereinafter referred to as CGIAR

[50] D. F. Robinson, "Confronting Biopiracy: Challenges, Cases and International Debates", Abingdon, Earthscan, 2010, 24, available at http://samples.sainsburysebooks.co.uk/9781136544125_sample_824042.pdf, (visited on 21.09.2015)

[51] Hereinafter referred to as The UPOV Convention

[52] hereinafter referred to as PBR

were concentrated. Although it was possible to claim the possession of modified plant genetic resources as of then, raw plant genetic resources were still seen as common heritage.49 In 1983 the UN Food and Agriculture Organization adopted the International Undertaking on Plant Genetic Resources (the Undertaking), a non-binding agreement dealing with the conservation and exchange of plant genetic resources for food and agriculture. This agreement stirred up discussion on whether plant germplasm should be considered as a 'common heritage of mankind' and thus available to anyone without restriction.[53] This was part of the so called 'seed wars' of the 1980s, an international controversy over the access to, control over and preservation of plant genetic resources. This discussion was fought over at various international meetings during the 1970s and 1980s, the principal arena for the conflict being the FAO. Like so many debates within the United Nations, in the controversy surrounding plant germplasm developed and developing countries were and are still on opposite sides. The International Undertaking established the Commission on Genetic Resources for Food and Agriculture. The Commission is the only permanent forum that deals with issues related to plant genetic resources. It offers a place for government discussions and negotiations concerning biological diversity that are relevant for food and agriculture.[54] With regard to the International Undertaking on Plant Genetic Resources, the primary concern was exactly this 'common heritage' principle. In practice plant genetic resources were freely collected in developing countries, but when sold back by seed companies the seed varieties developed from those resources were IPR protected. The Undertaking labelled all plant genetic resources 'common heritage', including special genetic stocks (elite breeding lines and hybrid parents). This label barred intellectual property protection of natural materials.[55] Freely sharing those broadly defined plant

[53] Ibid,p.25

[54]Food and Agriculture Organization of the United Nations, Commission on Genetic Resources for Food and Agriculture, History, available at http://www.fao.org/nr/cgrfa/cgrfa-about/cgrfa-history/en/(visited on 17.09.2015 )

[55]C. Hamilton, *"*Biodiversity, biopiracy and benefits: what allegations of biopiracy tell us about intellectual property*", Developing world bioethics,* 2006, Vol. 6(3)160

genetic resources would radically undermine the property rights breeding companies possess. Therefore the Undertaking was opposed by the US and different European countries. Industrialized states argued that the application of the International Undertaking on cultivated plant varieties conflicted with the UPOV Convention. After some negotiations and lobbying the Undertaking was revised and the Agreed Interpretation of the International Undertaking was issued in 1989. This interpretation recognised that plant breeders' rights (as protected under the UPOV Convention) were not incompatible with the International Undertaking. The Commission on Plant Genetic Resources for Food and Agriculture simultaneously adopted Resolution 5/89 on farmers' rights. Traditional farmers make important contributions to the conservation and improvement of plant materials, farmers' rights are attributed as an acknowledgement for these contributions. The adoption of the interpretation and the resolution was an attempt of the Commission to achieve a balance between the rights of breeders (formal innovators) and the rights of farmers (informal innovators).[56] After seven years of negotiation in the Commission, the International Undertaking has been reviewed and in 2001 replaced by the International Treaty on Plant Genetic Resources for Food and Agriculture, popularly known as the International Seed Treaty. Unlike the International Undertaking, the treaty is a binding legal instrument. The soft law provisions developed in the Commission were now put into 'hard law' rules. The treaty recognizes farmer's rights and establishes a multilateral system to facilitate access and equitable benefit sharing.[57] The growing antagonism between developed and developing countries has led to the enactment of two treaties that are of crucial importance for this dissertation: the 1992 UN Convention on Biological Diversity and the 1994 TRIPS Agreement. The Convention on Biological Diversity has been referred to as 'the grand bargain' because it tries to find a balance between facilitated access to genetic resources and benefit-sharing. The Convention is especially important because it deals with

[56] Available at http://www.fao.org/nr/cgrfa/cgrfa-about/cgrfa-history/en/, (visited on 19.09.2015)
[57] Ibid

biodiversity as genetic resources over which nations have sovereign rights. In doing so, the convention concluded the 'seed wars' discussion and as a consequence genetic resources could no longer be seen as common heritage. The Uruguay Round constituted the first multilateral negotiations on intellectual property rights and concluded in the TRIPS Agreement and the establishment of the World Trade Organisation (WTO)[58]. The TRIPS Agreement is the most comprehensive international instrument on intellectual property rights. The Agreement created an obligation for all the WTO members to implement a minimum level of protection for different categories of intellectual property. Of these categories one is crucial for the topic of biopiracy- the regulation on patents. It increased the standards of protection for IPRs considerably. Although developing countries were reluctant in the negotiations to reform their intellectual property legislation, they made important concessions without receiving any concession back from developed countries. As technology became more and more important for international competition, industrialized countries wanted to protect their technological advancement through IPRs. Especially the US supremacy in technology had been eroded by counterfeiting by Japan and some other Asian industrializing countries. Apart from protection for new technology, multinational companies lobbied for the elimination or reduction of trade barriers in developing countries to get unrestricted access to those markets. The establishment of the TRIPS Agreement shows the importance and influence of the industry and mainly of the pharmaceutical, agricultural biotechnology and software industry. Industrialized countries have defended the TRIPS Agreement as part of a WTO deal of intellectual property rights for developed countries and free market-access for developing countries. However, this globalization of the Euro-American notions of patentability only aggravated the already existing problems concerning IPRs.[59] One of the most controversial points of the TRIPS Agreement was and still is the high minimum standard of patentability

[58] Hereinafter referred to as WTO

[59] M. Correa, *Intellectual Property Rights, the WTO and Developing Countries: The TRIPS Agreement and Policy Options*,2-5 (Zed Books, London,2000)

included in Article 27. This article is crucial for the issue of biopiracy because it protects the biopirates. The general international approach to recognise the possibility to patent a living organism is a consequence of US case law.[60] In the landmark decision of *Diamond vs. Chakrabarty* the US Supreme Court decided: *"the patentee has produced a new bacterium with markedly different characteristics from any found in nature and one having the potential for significant utility. His discovery is not nature's handiwork, but his own; accordingly it is patentable subject matter under Section 101."*[61] Five years later the US Patent Court upheld a patent granted for an entire corn plant, including the seed, in the Ex parte Hibberd case. Due to this jurisprudence companies can legally oblige farmers to buy new seed every year instead of replanting seed generated by their own plants. Now this view is adopted by many developed countries, it is generally conceived possible to patent manmade living organisms under certain circumstances. At this period in history (early 1990s) the discourse of biopiracy emerged. Activists from all over the world raised their voices against the TRIPS Agreement as it was so heavily influenced by industrialized countries. As Walden Bello puts it, *"TRIPS has paved the way for the private ownership of products developed from the traditional knowledge of communities in the South"*.[62] Especially in developing countries, NGO's started to campaign against biopiracy. For example in India farmers started the 'Neem campaign'.

Thus, Biopiracy through Intellectual Property Rights has emerged as a result of the devaluation and invisibility of indigenous knowledge systems and the lack of existing protection of these systems. The protection of indigenous knowledge systems as systems of innovation and the prevention of piracy of

[60] C. Hamilton, *"Biodiversity, biopiracy and benefits: what allegations of biopiracy tell us about intellectual property"* Developing world bioethics, 2006, Vol. 6(3), 161
[61] *Diamond v. Chakrabarty,*1980,447 U.S. 303
[62] W. Bello, *"Building an Iron Cage: The Bretton Woods Institutions, the WTO and the South"* in S. ANDERSON (ed.), Views from the South: The E!ects of Globalization and the WTO on Third World Countries, Food First Books and the International Forum on Globalization, 2000, 77, available at http://www.thirdworldtraveler.com/Globalization/Building_Iron_Cage_VFTS.html, (visited on 30.09.2015)

biodiversity require a widening of legal regimes beyond the existing Intellectual Property Rights regimes such as patents.[63]

## 2.6 IMPLICATIONS OF BIOPIRACY ON THE RIGHTS OF THE INDIGENOUS PEOPLES' KNOWLEDGE

According to Dr.Vandana Shiva, *"Biopiracy and patenting of indigenous knowledge is a double theft because first it allows theft of creativity and innovation, and secondly, the exclusive rights established by patents on stolen knowledge steal economic options of everyday survival on the basis of our indigenous biodiversity and indigenous knowledge. Over time, the patents can be used to create monopolies and make everyday products highly priced."*[64]

Following are the implications of biopiracy on the rights of the indigenous people.

- **Inequitable Considerations:** The value of indigenous knowledge is of economic value, the holders of this are not considered in the economic benefits sharing derived from that knowledge. The TRIPS Agreement requires developing countries (with traditional and indigenous communities) to provide intellectual property rights for a broad range of subject-matter including biological material, it is inequitable that traditional knowledge which the indigenous people possess is not given any legal recognition. An example can be found in genetic resources linked to traditional knowledge. Traditional farming developed varieties of genetic resources through planning, seed production and selecting the best adapted varieties. In additional to these efforts, these people know the qualities of the products, this could be very useful in different fields such as medicine. However this knowledge is collected by researchers or investigators who obtain intellectual property rights for this knowledge and benefit from its commercial use. The

[63] C.M. Correa, *"Traditional Knowledge and Intellectual Property-Issues and options surrounding the Traditional Knowledge"*, Quaker United Nations office Geneva, November 2001,7, available at quakerservice.ca/wpcontent/uploades/2-011/07/Tkcoll3.pdf( visited on 18.01.2016)

[64] Available at http://www.globalissues.org/article/191/food-patents-stealing-indigenous-knowledge(visited on 10.09.2015)

farmers, on the contrary, who contributed to the developing of the resource, are not compensated. The based point is that traditional/indigenous peoples are not paid for the value they deliver, not is there any later compensation or sharing of benefits with them.[65]

- **Poverty:** Poverty is another threat to indigenous knowledge. Poverty often drive the users of bio-diverse environments to over-exploit the resources in their territories to the point of no return in terms of sustainability. It is often the case that when people are poor, conservation is not a high priority, and they will take out of the environment whatever is needed for their survival. As noted in a regional report on threats to traditional knowledge, "even if people have knowledge about sustainable harvesting regimes, when they are poor, this knowledge is ignored".[66]
- **Conservation:** Indigenous people are not able to conserve their knowledge and maintain biological diversity in farming systems which generates value for the global community. Indigenous farmers are forced to use the new patented variety, implying increasing dependence on the company "owning" the seed, especially in case of monopoly and are prohibited to use the seed for any further breeding; thus weakening the rights of communities and traditional farmers over their resources.[67]
- **Loss of biodiversity**: Indigenous people are losing their natural surroundings. Loss of biodiversity is increasing resulting from increased monoculture and monospecies culture. If traditional farmers for example, abandoned the use and breeding of farmers varieties attracted by the higher income obtainable through planting higher holding modern varieties then a serious loss of biodiversity could occur.

---

[65]R. G. A. Nunez, *"Intellectual Property and the Protection of Traditional knowledge, Genetic resources and Folklore: The Peruvian Experience"*, 487(Max Planck Year Book of UN Law, Volume 12, 2008), available at www.mpil.de/shareddata/pdf/pdf mpunyh/14-thesis-rosa-12.pdf (visitred on 30.01.2016)

[66] Neva Collings, "Environment", State of the World's Indigenous People p.94, available at http://www.un.org /esa/socdev/unpfii/documents/SOWIP/en/SOWIP_chapter3.pdf (visited on 20.17.2016)

[67]C. M. Correa, *Traditional Knowledge and Intellectual Property-Issues and options surrounding the Traditional Knowledge*, 6(Quaker United Nations office Geneva, November 2001), available at quakerservice.ca/wpcontent/uploades/2-011/07/Tkcoll3.pdf (visited on 18.01.2016 )

- **Moral Values:** One of the major implications of biopiracy is loss of moral values. Several studies have shown that many of the regions with the highest biological diversity are also home to high levels of cultural and linguistic diversity, a correlation that indicates that a mutually dependent relationship exists between biological, cultural and linguistic diversity. Indigenous knowledge is crucial for the economic and cultural survival of knowledge-holders as distinct peoples, indigenous and local communities are not permitted to live how and where they presently line-and maintain the cultural and economic systems and relationships with the land that they and their ancestors have developed over countless generations.
- **Livelihood of the indigenous people:** In economic terms, traditional knowledge holders are some of the poorest people. The stealing of biological resources and indigenous knowledge affects food security and livelihood of indigenous people. Biological resources based on indigenous knowledge provide for 85% of their food, medicine, shelter and fuel needs and farm-saved seeds and local agricultural knowledge provides food approximately to 1.4 billion rural people daily. Thus, in IPR regime the traditional knowledge which extends to maintaining the lives and livelihoods of those most in need is at stake at the hands of the biopirates.[68]
- **Loss of Traditional community knowledge:** In some cases where fair agreement on benefit sharing between the source country and the company is achieved, there is a possible financial loss and possible loss of traditional community knowledge, with limited compensation.[69]

Thus it can be rightly concluded that in the IPR regime, biopiracy emerged as an abuse of collective rights of community and their traditional knowledge. The knowledge of and uses of specific plants for medicinal

[68]J. Aniott, *"*Investigating the Convention on Biodiversity's Protection for Traditional knowledge*",* available at http://wp.c-edha.net/wp-content/uploads/2011/5/investigating-the conventi-on-biological diversity protection. pdf (visited on 28.09.2015)

[69] R.G.A. Nunez , *Intellectual Property and the Protection of Traditional knowledge, Genetic resources and Folklore: The Peruvian Experience,* 487(Max Planck Year Book of UN Law, Volume 12, 2008), available at www.mpil.de/shareddata/pdf/pdf mpunyh/14-thesis-rosa-12.pdf (visited on 30.01.2016)

purposes is an important component of TK. Traditional medicines are a major source of materials and information for the development of new drugs. In the world of intellectual property, the interest of the developed nations has revived in traditional medicinal knowledge and practices. As interest in traditional medicine is rekindled, indigenous knowledge of the cultivation and application of genetic resources is becoming exploited at an alarming rate which is posing a major threat to the livelihood of the indigenous people and conservation of traditional knowledge associated with biological resources. Thus indigenous people are should be concerned about IPR because instead of maintaining and developing group identity as well as group survival IPR is promoting and encouraging individual economic gain.

# CHAPTER III

# PROTECTION OF THE RIGHTS OF THE INDIGENOUS PEOPLE UNDER INTERNATIONAL LAW

## 3.1 INTRODUCTION

The present chapter provides a general insight on the international conventions, treaties, agreements and the legislations and policies relating to the protection of the rights of the indigenous people in the human rights forum, global environmental agenda and IP regime.

Indigenous peoples are *"composed of the existing descendants of the peoples who inhabited the present territory of a country wholly or partially at the time when persons from a different culture or ethnic origin arrived there from other parts of the world"* .This definition, although not consented to, gives a preliminary indication of the group of individuals international protection is sought for. The reason why indigenous peoples are considered to need particular protection, that is to say a protection which exceeds the protection under international human rights regimes, is the fact that these peoples have been deprived by the immigration of other peoples of their rights. In particular, they have lost rights concerning the land they traditionally occupied, and the possibility to develop and sustain a community reflecting their particular values. Apart from that, these peoples face the danger of losing their identity or, at least, they face difficulties adjusting their traditional values or customs to new conditions of life. Although the endeavors to establish a regime for the protection of indigenous peoples are part of the ongoing process of a progressive development of international human rights, such a regime will, if accepted and implemented, add a new dimension thereto. Attempts to provide for an adequate protection of indigenous peoples date back to the 16th century when Francisco de Vitoria suggested that legal principles of indigenous peoples had to be respected.

Despite the development of international human rights under the aegis of the United Nations, international law has, so far, not been successful in finalizing a regime designed for the protection of indigenous peoples. It took nine years to elaborate a Draft Declaration on the Rights of Indigenous Peoples. The final adoption of a declaration on indigenous peoples is one of the goals of the International Decade of the World's Indigenous Peoples declared by the United Nations General Assembly[1]. The General Assembly of the United Nations also emphasized the commitment of Member States to promote and protect the rights of indigenous peoples in its declaration on the occasion of the 50th anniversary of the United Nations. The fact that no comprehensive international regime exists for the protection of indigenous peoples does not mean that international law has left the individuals involved without protection. They benefit from international human rights standards and, in particular, from the International Labour Organisation (ILO)[2] Convention Concerning Indigenous and Tribal Peoples in Independent Countries, 1989 (ILO Convention No. 169), an international agreement regarding the preservation of indigenous rights. The nevertheless unsatisfactory state of affairs with respect to indigenous peoples has prompted the UN General Assembly to foster the attempts of the Human Rights Commission to finalize its work on a declaration on indigenous peoples. Such a declaration, although it will have no binding force, may serve as a starting point for a development that ultimately leads to the elaboration of a legally binding regime concerning the rights of indigenous peoples and members thereof.[3]

## 3.2 TRADITIONAL KNOWLEDGE AND INDIGENOUS PEOPLE IN HUMAN RIGHTS AGENDA

The debate on the protection of traditional knowledge by intellectual property law has recently moved to the human rights forums. There are a

[1] Hereinafter referred to as UN General Assembly
[2] Hereinafter referred to as ILO
[3]Rfidiger Wolfrum, *"*The Protection of Indigenous Peoples in International Law*"*, Available at http://www. zaoerv .de/59_1999/59_1999_ 2_a_369_382.pdf (visited on 13.07.2015)

number of reasons for this. First, the appropriation of the knowledge by industrialized country firms and scientists without fair compensation or reward to indigenous and local peoples is now seen as contravening fundamental moral, ethical and legal norms that protect people from any form of economic, ecological, political and social abuse. Second, knowledge of indigenous and local peoples is their property and there is no reason why international law should discriminate against them and create barriers to their enjoyment of the rights in that property. The concern in the human rights forums is therefore whether and how to apply international human rights standards and laws to protect traditional knowledge of indigenous and local peoples as their intellectual property.[4]

Indigenous peoples' rights under international law have evolved from existing international law, including human rights treaties, to address the specific circumstances facing indigenous peoples as well as their priorities, such as rights to their lands, territories and resources, and self-determination. Unfortunately, many indigenous peoples continue to face a range of human rights issues. In fact, the implementation of their rights is far from perfect. Some of the most difficult human rights challenges for indigenous peoples stem from pressures on their lands, territories and resources as a result of activities associated with development and the extraction of resources. Their cultures continue to be threatened, and the protection and promotion of their rights resisted.[5]

### 3.2.1 INTERNATIONAL LABOUR ORGANISATION

As the world's only tripartite multilateral agency, the ILO is dedicated to bringing decent work and livelihoods, job-related security and better living standards to the people of both poor and rich countries. It helps to attain those goals by promoting rights at work, encouraging opportunities for decent employment, enhancing social protection and strengthening dialogue on

[4] Ibid.
[5] Indigenous Peoples and the United Nations Human Rights System Fact Sheet No. 9/Rev.2, available at http: // www.ohchr.org/Documents/Publications/fs9Rev.2.pdf (visited on 23.09.2016)

work-related issues. The ILO is the international meeting place for the world of work. We are the experts on work and employment and particularly on the critical role that these issues play in bringing about economic development and progress. At the heart of our mission is helping countries build the institutions that are the bulwarks of democracy and to help them become accountable to the people. The ILO formulates international labour standards in the form of Conventions and Recommendations setting minimum standards of basic labour rights: freedom of association, the right to organize, collective bargaining, abolition of forced labour, equality of opportunity and treatment and other standards addressing conditions across the entire spectrum of work-related issues.

The main objectives of ILO are the following:

1) Promote and realize standards and fundamental principles and rights at work,
2) Create greater opportunities for women and men to secure decent employment and income,
3) Enhance the coverage and effectiveness of social protection for all;
4) Strengthen tripartism and social dialogue.[6]

The ILO was the first United Nations agency to address issues of indigenous people's rights. In 1926, the ILO established an expert committee to develop international Standards for the protection of native workers. This committee generated the basis for the adoption, the 1957, of the convention concerning the Protection and Integration of Indigenous and other Tribal and Semi-Tribal Populations in Independent countries. This convention commonly referred to as convention 107, essentially dealt with measure to integrate indigenous peoples into modern production systems. This convention was revised in June 1989 as convention 169 concerning Indigenous and Tribal Peoples in Independent Countries. The Revised convention eschews the approach of promoting the assimilation of indigenous and tribal peoples.

[6]Available at http://www.gpplatform.ch/pbguide/organisation/international-labour-organization-ilo(visited on 16.07.2015)

The main theme of the Convention No.169 finds expression in its Preamble, where 'the aspirations of indigenous peoples are recognized to exercise control over their own institutions, ways of life and economic development and to maintain and develop their identities, languages and religions, within the framework of the States in which they live.'[7] The Convention thus enjoins states to respect indigenous peoples' expectations in all decision affecting them and includes provisions on indigenous cultural integrity[8] and on non-discrimination of social welfare.[9] Furthermore, importance is attached to the issue of land and resources rights.[10] It promotes the protection of indigenous peoples as distinct and separate people. Article 2.2 (b) provides that governments shall have the responsibility of developing measures for "promoting the full realization of the social, economic and cultural rights of these peoples with respect for their social and cultural identity, their customs and traditions and their institutions". These provisions should be broadly read to include recognition and protection of traditional knowledge of the indigenous peoples.

Although the ILO Convention No.169 does not explicitly refer to indigenous resources, folklore or traditional knowledge, a number of provisions are worth noting. In general Article 23 sets forth that 'handicrafts, rural and community-based industries, and subsistence economy and traditional activities of the peoples concerned shall be recognized as important factors for the maintenance of their cultures and in their economic self-reliance and development'. However, while this provision identifies the listed activities as important for indigenous culture, no inherent further value is recognized and needs to be protected. As traditional knowledge in biological resources and its preservation cannot be separated from the land which the

[7] ILO Convention No.169, Preamble para.5
[8] Article 5 paras (a) and (b): (a) the social, cultural, religious and spiritual values and practices of these peoples shall be recognized and protected, and due account shall be taken of the nature of the problems which face them both as groups and as individuals; (b) the integrity of gthe values, practices and institutions of these peoples shall be respected'.
[9] Artile 3 of ILO Convention No.169: 'Indigenous and tribal peoples shall enjoy the full measure of human rights and fundamental freedoms without hindrance or discrimination'.
[10] ILO Convention No. 169, part II (Articles 13-19)

community occupies, the provisions on land rights are relevant for the given context.[11] Article 13.1 states that "governments shall respect the special importance of the cultures and spiritual values of the peoples concerned of their relationship with the lands or territories, or both as applicable which they occupy or otherwise use, and in particular the collective aspects of this relationship." This provision provides a basis for arguing for the enlargement of intellectual property reigns to accommodate collective rights of indigenous peoples.

Article 15(1) of the ILO Convention No. 169 specifies this by stating that "The rights of the people concerned to the natural resources pertaining to their lands shall be specially safeguarded". These rights include the right of these peoples to participate in the use, management and conservation of the resources.

The adequacy of convention 169 is a concern of some indigenous groups. These groups have been concerned with a number of the provisions of the convention. First, the convention only requires that indigenous peoples be consulted on matters affecting them. It does not require that the consent of these peoples be sought before measures affecting them are instituted. Second, the groups are of the view that provisions dealing with land and natural resources are inadequate.[12]

### 3.2.2 THE UNIVERSAL DECLARATION OF HUMAN RIGHTS, 1948:

Existing international and national laws and programs do not explicitly recognize rights in traditional knowledge as part of the bundle of human rights. The Universal Declaration of Human Rights, 1948 (UDHR)[13] contain provisions that could be interpreted to cover rights of indigenous and local peoples.

---

[11] V. S. Lewinski, *"Indigenous Heritage and Intellectual Propert: Genetic Resources, Traditional Knowledge and Folklore"* 25, (Kluwer Law International, The Netherlands, Second Edition, 2008)

[12] Available at http://www.gpplatform.ch/pbguide/organisation/international-labour-organization-ilo(visited on 16.07.2015)

[13] Hereinafter referred to as UDHR

The objectives of UDHR are the following:

1) To promote interdependence among countries in all areas of cooperation by identifying country's common strengths and opportunities which will help reduce poverty and improve the quality of life for people whilst developing a knowledge-based society within country and enhancing community and people empowerment;
2) To expand the trade and financial market within country and increase the bargaining power of Asian countries in lieu of competition and, in turn, enhances country's' economic competitiveness in the global market;
3) To ultimately transform the continent into community, capable of interacting with the rest of the world on a more equal footing and contributing more positively towards mutual peace and prosperity.

Article 27 of the UDHR could be invoked, albeit implicitly, to argue for protection of traditional knowledge of indigenous and local peoples as well as demand for the sharing (with the peoples) of benefits arising from the use of that knowledge. Article 27.1 of the UDHR states that "Everyone has the right freely to participate in the cultural life of the community, to enjoy the arts and to share in scientific advancement and its benefits." Article 27.2 states that "Everyone has the right to the protection of which he is the author." [14]

Article 27.1 provides a 'soft legal basis' for indigenous and local peoples to be entitled to benefits arising from the use of their knowledge and resources. Denying them access to the benefits would be construed as an abuse of their human rights. Indigenous and local peoples have moral, cultural and material interests in their traditional knowledge and thus (invoking Article 27.2 of the UDHR) these interests should be protected by protecting that knowledge and its products.

On the whole, the UDHR contains provisions on a wide range of civil, political, economic, social and intellectual rights. As already observed, it is Article 27 of the Declaration that is particularly relevant to the issue of intellectual property protection of traditional knowledge. There are, however a

[14] Available at http://www.un.org/en/universal-declaration-human-rights/ (visited on 12.02.2015)

number of limitations to using it as a legal instrument to protect traditional knowledge of indigenous and local peoples. First, while traditional knowledge is a collective property and generates collective, the UDHR largely provides for individual rights.

Generally, the rights of indigenous peoples are said to include rights to land, natural resources, self-determination and culture. Inherent in each of these rights is the concept of collective rights. The emphasis has been on individual rights vis-a-vis the state. This emphasis may limit the utility of western concepts in helping indigenous peoples maintain their identity and rights in the face of pressure to assimilate and yield to the "modern world"

The second limitation of the UDHR is that responsibility for enforcing its provisions is vested in the states.[15]

### 3.2.3 THE VIENNA DECLARATION

In 1993, Indigenous peoples were successful in expanding international consideration of their status and concerns beyond the working Group when they succeeded in having 1993 proclaimed by the General Assembly as the International Years of Indigenous People and by gaining special attention of the agenda of the 1993 World Conference on Human Rights. The 1993 World Conference adopted the Vienna Declaration and programme of Action that symbolized the historic steps being taken to promote and protect the rights of particular vulnerable groups such as women, children and indigenous peoples.

The World Conference on Human Rights in Vienna in 1993 confirmed the universality of human rights, refuting those who argued that human rights were not universal but historically, socially and politically contextual and contingent.

On 25 June 1993, representatives of 171 States adopted the Vienna Declaration and Programme of Action of the World Conference on Human Rights, thereby successfully closing the two-week conference and presenting

[15]D. J. Mugabe, "Intellectual Property rights and Traditional knowledge"-An Exploration in International policy discourse*"* Available at www.wipoint/tk/en/in/paneldiscussion/papers/pdf/ mugabe.pdf (visited on 15.02.2015)

a plan for the strengthening of human rights work around the world. The Vienna Declaration and Programme of Action marked the culmination of a long process of review over the current status of human rights in the world.

It also marked the beginning of a renewed effort to strengthen and further implement human rights instruments that have been constructed on the foundation of the Universal Declaration of Human Rights (UDHR) since 1948.

The Vienna Declaration and Programme of Action (1993) stated:

- The universal nature of all human rights and fundamental freedoms is beyond question
- All human rights are universal, indivisible and interdependent and inter-related.[16]

It also confirmed a role for international action to promote and protect human rights:

"The promotion and protection of all human rights and fundamental freedoms must be considered as a priority objective of the United Nations in accordance with its purposes and principles, in particular the purpose of international co-operation, in the framework of these purposes and principles, the promotion and protection of all human rights is a legitimate concern of the international community".[17]

It also stated:

"While the significance of regional and national particularities and various historical, cultural and religious backgrounds must be borne in mind, it is the duty of states, regardless of their political, economic and cultural systems, to promote and protect all human rights and fundamental freedoms".[18]

Principle 20 recognizes the inherent dignity and the unique contribution of indigenous people to the development and plurality of society and strongly reaffirms the commitment of the international community to their economic,

[16]Available at http://www.bbc.co.uk/worldservice/people/features/ihavearightto/ four_b/treatie s_vienna .s html(visited on 21.03.2016)
[17]Available at http://www.unhchr.ch/huridocda/huridoca.nsf/%28Symbol%29/A.CONF.157.23.En? Open Document (visited on 19.03.2016)
[18] Ibid.

social, and cultural well-being and their enjoyment of the fruits of sustainable development. States should ensure the full and free participation of indigenous people in all aspects of society, in particular in matters of concern to them. Considering the importance of the promotion and protection of the rights of indigenous peoples, and the contribution of such promotion and protection to the political and social stability of the States in which such people live, State should, in accordance with international law, take concerted positive steps to ensure respect for all human rights and fundamental freedoms of indigenous people, on the basis of equality and non-discrimination and recognize the value and diversity of their distinct identities, cultures and social organization.

This principle deals with the human rights of indigenous peoples which extend to include the rights related to the protection of their traditional knowledge.[19]

### 3.2.4 MATAATUA DECLARATION, 1993

The first International Conference on the Cultural & Intellectual Property Rights of Indigenous Peoples, held under the auspices of the working Group on Indigenous Populations in 1993, resulted in the Mataatua Declaration. Although the Declaration has no formal legal power, it clearly indicates the issues and concerns of indigenous peoples regarding intellectual and cultural property rights.[20]

It recognised 1993 as the United Nations International Year for the World's Indigenous Peoples; reaffirmed the undertaking of United Nations Member States to-adopt or strengthen appropriate policies and legal instruments that will protect indigenous intellectual and cultural property and the right to preserve customary and administrative systems and practices, declared that Indigenous Peoples of the world have the right to self

[19]B. C. Cowley, *"*Protecting Indigenous Knowledge under International Law*"*, November 2002, p.46, available at library.usak.ca/theses/…/Cowley-Head-Blanche-Cathleen-2002.pdf (visited on 19.02.2015)

[20] Available at http://www.wipo.int/tk/en/databases/creative_heritage/indigenous/link0002.html (visited on 18.09.2015)

determination and in exercising that right must be recognised as the exclusive owners of their cultural and intellectual property, acknowledged that Indigenous Peoples have a commonality of experiences relating to the exploitation of their cultural and intellectual property, affirmed that the knowledge of the Indigenous Peoples of the world is of benefit to all humanity, recognised that Indigenous Peoples are capable of managing their traditional knowledge themselves, but are willing to offer it to all humanity provided their fundamental rights to define and control this knowledge are protected by the international community, insisted that the first beneficiaries of indigenous knowledge (cultural and intellectual property rights) must be the direct indigenous descendants of such knowledge, Declared that all forms of discrimination and exploitation of indigenous peoples, indigenous knowledge and indigenous cultural and intellectual property rights must cease.[21]

### 3.2.5 DRAFT DECLARATION ON INDIGENOUS RIGHTS, 1993

In 1982, the UN Economic and Social Council established a Working Group on Indigenous Populations with the task of producing a declaration on the rights of Indigenous peoples. A "Draft Declaration on the Rights of Indigenous Peoples" was agreed on in 1993, and approved by the Working Group's parent body, the Sub-Commission on the Protection and Promotion of Human Rights in 1994. In 1993, the Draft Declaration on the Rights of Indigenous Peoples included provisions related to the protection of indigenous cultures heritage and knowledge.[22]

The main principles contained in the Draft Declaration are concerned with non-discrimination and fundamental rights, self-determination (including autonomy and participation rights), cultural integrity, rights to lands,

[21] Preamble to the Mattatua Declaration
[22] Available at https://www.uts.edu.au/sites/default/files/JIHLBP8_11_07_0.pdf (visited on 04.10.2016)

territories and natural resources, and other rights relating to socio-economic welfare.[23]

Indigenous peoples have the right to their traditional medicines and health practices, including the right to the protection of vital medicinal plants, animals and minerals.[24]

Indigenous peoples are entitled to the recognition of the full ownership, control and protection of their cultural and intellectual property. They have the right to special measures to control, develop and protect their sciences, technologies and cultural manifestations, including human and other genetic resources, seeds, medicines knowledge of the properties of fauna and flora, oral traditions, literatures designs and visual and performing arts.[25]

The recognition of cultural and intellectual property is formulated in the Draft Declaration. Indigenous peoples have the right to maintain, control, protect and develop their cultural heritage, traditional knowledge and traditional cultural expressions, as well as the manifestations of their sciences, technologies and cultures, including human and genetic resources, seeds, medicines, knowledge of the properties of fauna and flora, oral traditions, literatures, designs, sports and traditional games and visual and performing arts. They also have the right to maintain, control, protect and develop their intellectual property over such cultural heritage, traditional knowledge, and traditional cultural expressions.[26]

Indigenous peoples have the right to practice and revitalize their cultural traditions and customs. This includes the right to maintain, protect and develop the past, present and future manifestations of their cultures, such as archaeological and historical sites, artefacts, designs, ceremonies, technologies and visual and performing arts and literature. States shall provide redress through effective mechanisms, which may include restitution, developed in conjunction with indigenous peoples, with respect to their

[23] Available at http://www.un.org/esa/socdev/unpfii/documents/DRIPS_en.pdf (visited on 20.01.2015)
[24] Article 24 of the Draft Declaration of the Indigenous Peoples, 1993
[25] Article 29 of the Draft Declaration of the Indigenous People, 1993
[26] Article 31 of the Draft Declaration of the Indigenous People, 1993

cultural, intellectual, religious and spiritual property taken without their free, prior and informed consent or in violation of their laws, traditions and customs.[27]

The rights contained in Article 31(cultural property and intellectual property) and in some sense completed by the right to redress according to Article 11- could be considered in this context to form part of the broader right of self-determination of Article 3 and as a way of exercising it.

These rights are also connected to the provisions about the right to land and related resources. There is an essential relationship between the cultural and traditional knowledge of the indigenous peoples and their land and resources. Thus, the Declaration also states, that indigenous communities have the right to develop and manage resources according to their own laws, traditions and customs, and to determine and develop priorities and strategies to develop or use their lands, territories, and other resources. This includes the right to require that States obtain their free and informed consent before any projects affecting their lands, territories, or resources may be approved, 'particularly in connection with the development, utilization, or exploitation of mineral, water or other resources'. Although, no direct mention is made of indigenous knowledge and traditional resources in this context, the term 'other resources' could be broadly interpreted to cover traditional knowledge and traditional resources.[28]

While Article 31 of the Declaration contains express provisions on the protection of indigenous resources and traditional knowledge, the degree of protection that has to be guaranteed at state level is not specified. Much would depend on the kind of implementation of Article 11, which envisages a right to redress with regard to the 'cultural, intellectual, religious and spiritual property' of indigenous peoples which has been taken without their 'free,

[27] Article 11 of the Draft Declaration, 1993

[28] Hansen etal, "Traditional Knowledge and Intellectual Property"- A Handbook on Issues and options for Traditional Knowledge Holders in 'Protecting their Intellectual Property and maintaining biodiversity, July 2003, American Association for the enhancement of Science, New York, USA, p 13, Available at shr.aaas.org/tek/handbook/handbook.pdf (visited on 18.01.2015)

prior and informed consent' to be defined by national legislation . The same concern has to be raised with regard to the provisions on land rights. Such provisions go beyond the obligation in the ILO Convention No. 169 as they request a clear prior informed consent; the ILO Convention provides for mere participation. However, the Declaration does not represent binding international law.[29]

### 3.2.6 INTERNATIONAL COVENANT ON ECONOMIC, SOCIAL AND CULTURAL RIGHTS, 1996

The International Covenant on Economic, Social and Cultural Rights (ICESCR)[30] together with its sister Covenant, the International Covenant on Civil and Political Rights (ICCPR)[31], and the Universal Declaration, form the International Bill of Human Rights which is the pillar for human rights protection within the United Nations. The ICESCR was adopted by General Assembly Resolution 2200 A (XXI) of 16 December 1966. The Covenant reflects the commitments adopted after World War II to promote social progress and better standards of life, reaffirming faith in human rights and employing the international machinery to that end. Since the ICESCR is an international human rights treaty, it creates legally binding international obligations to those States that have agreed to be bound by the standards contained in it.[32]

ICESCR establishes the right of self determination, including the right to dispose of natural wealth and resources. This implies the right to protect and conserve resources, including intellectual property.[33]

The state parties to the present covenant recognize the right of everyone:

(a) To take part in cultural life:

(b) To enjoy the benefits of scientific progress and its applications;

---

[29]V.S. Lewinski, *Indigenous Heritage and Intellectual Property: Genetic Resources, Traditional Knowledge and Folklore,* 28 (Kluwer Law International, The Netherlands , Second Edition 2008)

[30] Hereinafter referred to as ICESCR

[31] Hereinafter referred to as ICCPR

[32] Available at https://www.escr-net.org/resources/section-5-background-information-icescr(visited on 29.10. 2016)

[33] Article 1 of ICESCR,1966

(c) To benefit from the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author.[34]

### 3.2.7 THE UN DECLARATION ON THE RIGHTS OF INDIGENOUS PEOPLES, 2007

The High Commissioner for Human Rights welcomes the adoption of the United Nations Declaration on the Rights of Indigenous Peoples[35] (UNDRIP) by the General Assembly on 13 September 2007, as a triumph for justice and human dignity following more than two decades of negotiations between governments and indigenous peoples' representatives.

The Declaration establishes a universal framework of minimum standards for the survival, dignity, well-being and rights of the world's indigenous peoples. The Declaration addresses both individual and collective rights; cultural rights and identity; rights to education, health, employment, language, and others. It outlaws discrimination against indigenous peoples and promotes their full and effective participation in all matters that concern them. It also ensures their right to remain distinct and to pursue their own priorities in economic, social and cultural development. The Declaration explicitly encourages harmonious and cooperative relations between States and indigenous peoples.[36]

A provision of particular significance to the Intellectual property protection of traditional knowledge from the UN Declaration on the Rights of Indigenous Peoples is as follows:

Indigenous peoples have the right to maintain, control, protect and develop their cultural heritage, traditional knowledge and traditional cultural expressions, as well as the manifestations of their sciences, technologies and cultures, including human and genetic resources, seeds, medicines, knowledge

[34]Article 15 of ICESCR, 1966
[35]Hereinafter referred to as UNDRIP
[36] Available at http://www.ohchr.org/EN/Issues/IPeoples/Pages/Declaration.aspx(visited on 21.03.2016)

of the properties of fauna and flora, oral traditions, literatures, designs, sports and traditional games and visual and performing arts. They also have a right to maintain control, protect and develop their intellectual property over such cultural heritage, traditional knowledge and traditional cultural expressions.[37]

The UNDRIP, 2007 also provides that States shall take effective measures to recognize and protect the exercise of these right in conjunction with indigenous peoples.[38]

### 3.2.8 EXPERT MECHANISM ON THE RIGHTS OF INDIGENOUS PEOPLES

The Expert Mechanism on the Rights of Indigenous Peoples was established in 2007 by the Human Rights Council, of which it is a subsidiary body. It comprises five experts on the rights of indigenous peoples, usually one from each of the world's five geopolitical regions, with indigenous origin a relevant factor in their appointment, in accordance with resolution 6/36.

The mandate of the Expert Mechanism is to provide the Human Rights Council with thematic expertise, mainly in the form of studies and research, on the rights of indigenous peoples as directed by the Council. The Expert Mechanism may also make proposals to the Council for its consideration and approval, within the scope of its work as set out by the Council.[39]

The Expert Mechanism's first study examined lessons learned and challenges to achieve the implementation of the right of indigenous peoples to education and was finalized in 2009. Its second study, undertaken over two years, examined indigenous peoples and the right to participation in decision-making The Expert Mechanism studied the role of languages and culture in the promotion and protection of the rights and identity of indigenous peoples in 2011–2012 and indigenous peoples' access to justice in 2012–2013. Each study is presented to the Human Rights Council and, from 2011 onwards, is

[37]Article 31 (1)UNDRIP, 2007
[38]Article 31(2) UNDRIP, 2007
[39]Teran Y. etal, "Trends and Scenarios in the legal protection of Traditional Knowledge", Intellectual Property and Human Development, ch-4p.7, Available at www.piipa.org/files/bookcontent%204%20%20IP%20Human %20Development.pdf (visited on 16.02.2015)

the subject of an interactive dialogue between the Council and the Expert Mechanism during one of the Council's sessions. Each study includes advice which outlines the Expert Mechanism's key findings related to the human right under study in the indigenous context.

The Expert Mechanism is a key body within the United Nations human rights structure in Geneva and provides a space for indigenous peoples to raise thematic human rights issues, related to the specific study undertaken by the Expert Mechanism each year. Like the former Working Group on Indigenous Populations, the rules governing participation in its annual sessions are relatively open, so that indigenous peoples' organizations and individuals can usually attend if they have successfully applied for accreditation. Hundreds of representatives of indigenous peoples' organizations, indigenous individuals and non-governmental organizations attend the annual sessions.[40]

### 3.2.9 SPECIAL RAPPORTEUR ON THE RIGHTS OF INDIGENOUS PEOPLES

The Special Rapporteur on the rights of indigenous peoples is a so-called special procedure of the Human Rights Council. The mandate of the Special Rapporteur was established in 2001 by the Commission on Human Rights and continued by the Human Rights Council in 2007. The Special Rapporteur reports to the Human Rights Council each year.[41]

The Special Rapporteur on the rights of indigenous peoples, inter alia:

- Examines ways and means of overcoming existing obstacles to the full and effective protection of the rights of indigenous peoples, in conformity with his/her mandate, and identifies, exchanges and promotes best practices;
- Gathers, requests, receives and exchanges information and communications from all relevant sources, including Governments, indigenous

[40]Available at www.ohchr.org/EN/Issues/IPeoples/ EMRIP/Pages/EMRIPIndex.aspx (visited on 12. 05.2016)
[41]Available at http://www.ohchr.org/EN/Issues/IPeoples/SRIndigenousPeoples/Pages/SRI Peoples Index .aspx (visited on 17.05.2016)

peoples and their communities and organizations, on alleged violations of the rights of indigenous peoples;

- Formulates recommendations and proposals on appropriate mea-sures and activities to prevent and remedy violations of the rights of indigenous peoples; and
- Works in close cooperation and coordination with other special procedures and subsidiary organs of the Council, in particular with the Expert Mechanism on the Rights of Indigenous Peoples, relevant United Nations bodies, the treaty bodies and regional human rights organizations.

In fulfilling this mandate, the Special Rapporteur assesses the situation of indigenous peoples in specific countries; carries out thematic studies; communicates with Governments, indigenous peoples and others concerning allegations of violations of indigenous peoples' rights; and promotes good practices for the protection of these rights. The Special Rapporteur also reports annually to the Human Rights Council on particular human rights issues involving indigenous peoples and coordinates work with the Permanent Forum on Indigenous Issues and the Expert Mechanism on the Rights of Indigenous Peoples.[42]

## 3.3 TRADITIONAL KNOWLEDGE AND INDIGENOUS PEOPLES CONCERNS IN THE GLOBAL ENVIRONMENTAL AGENDA

Issues of indigenous and local peoples' rights have been extensively discussed in global environmental process. The World Commission on Environment and Development[43] (WCED) addressed the issue of indigenous people and sustainable development. The United Nations Conference on Environment and Development[44] (the Earth Summit), held in Brazil in 1992, represented a turning point in the promotion of indigenous peoples' rights

[42]Available at www.ohchr.org/EN/Issues/IPeoples/SRIndigenous Peoples/Pages/SRIPeoplesIndex.aspx(visited on 12.03.2016)
[43] Hereinafter referred to as WCED
[44] Hereinafter referred to as Earth Summit

relating to the environment. A number of legal instruments adopted at the Earth Summit, such as the Rio Declaration, Agenda 21 and the Convention on Biological Diversity, established international legal standards to protect indigenous peoples' rights to their traditional knowledge and practices in the area of environmental management and conservation. Most importantly, there now exists an international legal framework which recognises the unique relationship indigenous peoples have with their traditional lands.

### 3.3.1 THE WORLD COMMISSION ON ENVIRONMENT AND DEVELOPMENT

The World Commission on Environment and Development[45](WCED) established in 1983 by the United Nations General Assembly devoted attention to issues of indigenous peoples, particularly their knowledge in the sustainable development process.

"A global agenda for change" - this was what the World Commission on Environment and Development was asked to formulate. It was an urgent call by the General Assembly of the United Nations: to propose long-term environmental strategies for achieving sustainable development by the year 2000 and beyond; to recommend ways concern for the environment may be translated into greater co-operation among developing countries and between countries at different stages of economical and social development and lead to the achievement of common and mutually supportive objectives that take account of the interrelationships between people, resources, environment, and development; to consider ways and means by which the international community can deal more effectively with environment concerns; and to help define shared perceptions of long-term environmental issues and the appropriate efforts needed to deal successfully with the problems of protecting and enhancing the environment, a long term agenda for action during the coming decades, and aspirational goals for the world community.[46]

[45] Hereinafter referred to as WCED
[46]Available at http://www.un-documents.net/our-common-future.pdf(visited on 24.07.2016)

The Commission published its report *Our Common Future* also known as Brundtland Report in 1987 in which a reference was made to the situation of indigenous peoples in the following words.

*"Tribal and indigenous peoples will need special attention as the forces of economic development disrupt their traditional lifestyles-lifestyles that can offer modern societies many lessons in the management of resources in complex forest, mountain and dry land ecosystems. Some are threatened with virtual extinction by insensitive development over which they have no control. Their traditional rights should be recognized and they should be given a decisive voice in formulating policies about resources development in their areas."*[47]

According to the report, growing interaction with the larger world is increasing the vulnerability of these groups, since they are often left out of the processes of economic development. Social discrimination, cultural barriers, and the exclusion of these people from national political processes make these groups vulnerable and subject to exploitation. Many groups become dispossessed and marginalized, and their traditional practices disappear. They become the victims of what could be described as cultural extinction. These communities are the repositories of vast accumulations of traditional knowledge and experience that links humanity with its ancient origins. Their disappearance is a loss for the larger society, which could learn a great deal from their traditional skills in sustainably managing very complex ecological systems. It is a terrible irony that as formal development reaches more deeply into rain forests, deserts, and other isolated environment, it tends to destroy the only cultures that have proved able to thrive in these environments.[48]

[47]World Commission on Environment and Development, Our Common Future, 12(Oxford University Press, Oxford, 1987)
[48]Report of the World Commission on Environment and Development: Our Common Future p.97, available at http://www.un-documents.net/our-common-future.pdf(visited on 24.07.2016)

Thus, the Commission calls for *'the recognition and protection of their traditional rights to land and other resources that sustain their way of life-rights they may define in terms that do not fit into Standard legal systems."*[49] These groups own institutions to regulate rights and obligations are crucial for maintaining the harmony with nature and the environmental awareness characteristic of the traditional way of life. The report laid emphasis that the recognition of traditional rights must go hand in hand with measures to protect the local institutions that enforce responsibility in resource use. And this recognition must also give local communities a decisive voice in the decisions about resource use in their area. Protection of traditional rights should be accompanied by positive measures to enhance the well-being of the community in ways appropriate to the group's life-style. For example, earnings from traditional activities can be increased through the introduction of marketing arrangements that ensure a fair price for produce, but also through steps to conserve and enhance the resource base and increase resource productivity. It further recommends that local institution through which indigenous and legal peoples socialize and conduct their economic activities should be strengthened. Though it did not explicitly address the question of intellectual property protection of traditional knowledge, it creates a political framework for addressing these issues within environmental circles.[50]

### 3.3.2 THE UNITED NATIONS CONFERENCE ON ENVIRONMENT AND DEVELOPMENT

The United Nations Conference on Environment and Development (UNCED) held in 1992 at the recommendation of WCED addressed issues of intellectual property rights in traditional knowledge and innovations. The Earth Summit resulted in the following documents: Rio Declaration on Environment and Development, Agenda 21 and Forest Principles. Agenda 21

[49] Ibid
[50] D. J. Mugabe, "Intellectual Property rights and Traditional knowledge"-An Exploration in International policy discourse" available at www.wipoint/tk/en/in/paneldiscussion/papers/pdf/ mugabe.pdf (visited on 15.02.2015)

adopted by more than 160 states at the UNCED contains a whole chapter on indigenous peoples' concerns and makes a wide range of recommendations on how these peoples' rights should be protected.

The Conference was an important development for indigenous peoples and their rights related to the environment. The Conference, or Earth Summit as it is called, recognized that indigenous peoples and their communities have a critical role to play in managing and developing the environment. The importance of indigenous peoples' traditional knowledge and practices was acknowledged, and the international community committed itself to promoting, strengthening and protecting the rights, knowledge and practices of indigenous peoples and their communities. During the Earth Summit, indigenous peoples and NGOs gathered in Kari-Oca, Brazil, to share their concerns about the environment. The Kari-Oca Declaration and the Indigenous Peoples' Earth Charter adopted at this meeting expressed the values of the world's indigenous peoples and recognized their distinct relationship with the Earth. The united voice of indigenous peoples helped influence the outcome of the Earth Summit. Another important result of the Earth Summit was the adoption of the Convention on Biological Diversity. The Convention recognizes the close dependence of many indigenous communities on biological resources and the desirability of sharing the benefits that come from using traditional knowledge, innovations and practices to conserve biological diversity, including species diversity.[51]

#### 3.3.2.1 THE RIO DECLARATION, 1992

The 1992 Rio Declaration on Environment and Development defines the rights of the people to be involved in the development of their economies, and the responsibilities of human beings to safeguard the common environment. The declaration builds upon the basic ideas concerning the attitudes of individuals and nations towards the environment and development. The Rio Declaration states that long term economic progress is

[51]Available at http://www.ohchr.org/Documents/Publications/GuideIPleaflet10en.pdf(visited on 24.07.2015)

only ensured if it is linked with the protection of the environment. If this is to be achieved, then nations must establish a new global partnership involving governments, their people and the key sectors of society. Together human society must assemble international agreements that protect the global environment with responsible development.[52]

Following are some of the main principles to the Rio Declaration.

- People are entitled to a healthy and productive life in harmony with nature.
- Development today must not threaten the needs of present and future generations.
- Nations have the right to exploit their own resources, but without causing environmental damage beyond their borders.
- Environmental protection shall constitute an integral part of the development process.
- Eradicating poverty and reducing disparities in living standards in different parts of the world are essential if we are to achieve sustainable development whilst meeting the needs of the majority of the people.
- Environmental issues are best handled with the participation of all concerned citizens.
- The polluter should, in principle, bear the cost of pollution.
- Sustainable development requires better scientific understanding of the problems. Nations should share knowledge and technologies to achieve the goal of sustainability.[53]

The Rio Declaration specifically deals with the situation of indigenous peoples. Following are the principles which are related to the protection of the rights of the indigenous people.

*"Environmental issues are best handled with the participation of all concerned citizens, at the relevant level. At the national level, each individual*

[52]Available at http://www.sustainable-environment.org.uk/Action/Rio_Declaration.php(visited on 21.03.2016)
[53]B. C. Cowley, *"Protecting Indigenous Knowledge under International Law"*, November 2002, p.96, available at library.usak.ca/theses/…/Cowley-Head-Blanche-Cathleen-2002.pdf (visited on 19.02.2015)

*shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available. Effective access to judicial and administrative proceedings, including redress and remedy, shall be provided".*[54]

*"Indigenous people and their communities and other local communities have a vital role in environmental management and development because of their knowledge and traditional practices. States should recognize and duly support their identity, culture and interests and enable their effective participation in the achievement of sustainable development."*[55]

Rio Declaration seeks to ensure that every person has access to information, can participate in the decision-making process and has access to justice in environmental matters with the aim of safeguarding the right to a healthy and sustainable environment for present and future generations.

#### 3.3.2.2 FOREST PRINCIPLES

The Forest Principles[56] (also Rio Forest Principles) is the informal name given to the Non-Legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable Development of All Types of Forests (1992), a document produced UNCED. It is a non-legally binding document that makes several recommendations for conservation and sustainable development forestry.[57]

The Forest Principles recommends that "national forest policies should recognize and duly support the identity, culture and the rights of indigenous peoples, their communities and other communities and forest dwellers."[58]

[54] Principle 10 Rio Declaration
[55] Principle 22 Rio Declaration
[56] Also known as Rio Forest Principles
[57] Available at https://en.wikipedia.org/wiki/Forest_Principles (visited on 25.09.2016)
[58] Section 5(a) Forest Principles

It goes further to recommend that "benefits arising from the utilization of indigenous knowledge should therefore be equitable shared with such people."[59]

### 3.3.2.3 AGENDA 21

Agenda 21 was an action plan of UN initiatives to protect and promote conservation of global biological diversity. While many chapters of Agenda 21 referred generally to the role of indigenous peoples, Chapter 26 (Recognizing. and strengthening The Role of Indigenous Peoples and their Communities) dealt specifically with indigenous peoples.[60]

Chapter 26 of Agenda 21 begins by noting that indigenous peoples and their communities, which represent a significant percentage of the global population, have developed a holistic relationship with the natural environment. Over many generations, they have developed a "holistic traditional scientific knowledge of their lands, natural resources, and environment." It observes that "indigenous peoples and their communities shall enjoy the full measure of human rights and fundamental freedoms without hindrance or discrimination" and recommends that governments should adopt policies and legal instruments that will protect intellectual and cultural property of indigenous peoples.[61]

### 3.3.2.4 THE CONVENTION ON BIOLOGICAL DIVERSITY, 1992

The Convention on Biological Diversity was finalized in Nairobi in May 1992, discussed at the Earth Summit in June 1992, subsequently signed by 150 UN member States present at the United Nations Conference on Environment and Development (UNCED)[62], and entered into force in

[59] Section 12 Forest Principles
[60] D. J. Mugabe, "Intellectual Property rights and Traditional knowledge"-An Exploration in International policy discourse" available at www.wipoint/tk/en/in/paneldiscussion/papers/pdf/ mugabe.pdf (visited on 15.02.2015)
[61] Available at http://www.un.org/esa/socdev/unpfii/documents/DRIPS_en.pdf (visited on 20.01.2015)
[62] Also known as the Rio de Janeiro Earth Summit , Rio Summit, Rio Conference, and Earth Summit (Portuguese: ECO92), was a major United Nations conference held in Rio de Janeiro from 3 to 14 June 1992.

December 1993.[63] The 1992 convention and its particles are *"conscious of the intrinsic value of biological diversity and of the educational, cultural, recreational and aesthetic values of biological diversity and its components."* Thus, the CBD unites concerns for biological and cultural diversity including traditional knowledge systems, into its efforts to conserve the world's biodiversity.[64]

The Preamble of the CBD states: *"the close and traditional dependence of many indigenous and local communities embodying traditional lifestyles on biological resources, and the desirability of sharing equitably benefits arising from the use of traditional knowledge, innovations and practices relevant to the conservation of biological diversity."*[65]

The most significant provision of the CBD for indigenous peoples is Article 8(j) that provides that states shall, as far as possible and as appropriate: *"Subject to its 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, innovations and practices and encourage the equitable sharing of the benefits arising from the utilization of such knowledge, innovations and practices."*

Other articles, such as Articles 10 (c), 17.2 and 18.4 also spoke directly and indirectly about issues affecting indigenous and local communities.

Article 10(c) laid out sustainable use of components of Biological Diversity where states undertook to *"protect and encourage customary use of biological resources in accordance with traditional cultural practices that are compatible with conservation or sustainable use requirements".* Article 17.2 dealt with Exchange of Information where states undertook to "protect and

[63]Supra note 57, p.97

[64]J. Aniott, "Investigating the Convention on Biodiversity's Protection for Traditional knowledge", Available at http://wp.c-edha.net/wp-content/uploads/2011/5/investigating-the conventi-on-biological diversity protection. pdf (visited on 28.01.2015)

[65] Supra note 57

encourage customary use of biological resources in accordance with traditional cultural practices that are compatible with conservation or sustainable use requirements." Article 18.4 dealt with Technical and Scientific Co-operation where states undertook to *"in accordance with national legislation and policies, encourage and develop methods of cooperation for the development and use of technologies, including indigenous and traditional technologies and also to promote co-operation in the training of personnel and exchange of experts."*

Thus, it is clear that there is a general agreement within the international community that there is a need to recognize the traditional knowledge. The concern is to recognize it, take measures to ensure that communities are involved in the preservation and development of it and proper benefit return to them in case of commercial exploitation by others. But the method of achieving it is left to individual nations. But there are no uniform norms regarding the protection of different types of traditional knowledge owned by local communities. The reason being that the international community never had an occasion to look at the protection of traditional knowledge in its entirety.

Follow up to Article 8 (j) of the CBD, which deals directly with indigenous issues has included holding one workshop and establishing an inter-sessional working group to address the implementation of Article 8 (j) and related provisions of the Convention. At its four meeting (May 1998), the COP reviewed the report from a 1997 workshop and decided to establish an open-ended inter-sessional working group on Article 8 (j). The first meeting of the inter-sessional working group, held in Seville, Spain in March 2000, focused discussion on several areas:

- Application and development of legal and other appropriate forms of protection for the knowledge, innovations and practices of indigenous and local communities;

- Implementation of Article 8 (j) and related provisions, in particular, the development and implementation of a programme of work at national and international levels;
- Development of a programme of work on Article 8 (j) and related provisions of the CBD;
- Priorities, opportunities for collaboration and implementation of the programme of work;
- Measure to strengthen co-operation among indigenous and local communities at the international level.[66]

Concerns on intellectual property protection of traditional knowledge have occupied the agenda of the Conference of Parties[67](COP) . The third COP called for dissemination of case studies on the relationship between intellectual property rights and the knowledge, innovations and practices of indigenous and local communities. COP4 in Decision IV /9 recognized the importance of making intellectual property-related provisions of the CBD and provisions of international agreements relating to intellectual property mutually supportive, and the desirability of undertaking further co-operation and consultation with the World Intellectual Property Organisation (WIPO).[68]
COP 7 dealt with the indigenous people's right and protection of traditional knowledge. At the Conference, delegates generally supported the recognition of indigenous peoples' rights and prior informed consent, as well as sui generis systems for traditional knowledge protection on the basis of customary laws and traditional practices. On the development of elements of sui generis systems for the protection of TK, COPT asked the secretariat to compile information on customary laws and to develop a glossary of terms

[66]B.C. Cowley, *"Protecting Indigenous Knowledge under International Law"*, November 2002, p.46, available at library.usak.ca/theses/…/Cowley-Head-Blanche-Cathleen-2002.pdf (visited on 19.02.2015)
[67] Hereinafter referred to as COP
[68]D. J. Mugabe, *"Intellectual Property rights and Traditional knowledge"-An Exploration in International policy discourse"* available at www.wipoint/tk/en/in/paneldiscussion/papers/pdf/ mugabe.pdf (visited on 15.02.2015)

relevant to Article 8 (j), there will be more co-operation between the Access and Benefit sharing (ABS) and Article 8 (j) working Groups.[69]

### 3.3.3 THE NAGOYA PROTOCOL, 2010

Almost six years of negotiations held under the aegis of the United Nations Convention on Biological Diversity (CBD) culminated in the adoption in Nagoya, Japan in October 2010 of an international treaty that seeks to prevent biopiracy, or the misappropriation of genetic resources and associated traditional knowledge of indigenous people and local communities. The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable sharing of Benefits Arising from their Utilization was adopted at the 10th meeting of the CBD Conference of Parties with the following objective is *"the fair and equitable sharing of the benefits arising from the utilization of genetic resources, including by appropriate access to genetic resources, including by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding, thereby contributing to the conservation of biological diversity and the sustainable use its components."*

The Preamble to the Protocol does recognize *"the unique circumstance where traditional knowledge associated with genetic resources is held in countries, which may be oral, documented or in other forms, reflecting a rich cultural heritage relevant for conservation and sustainable use of biological diversity."*

The scope of the Protocol applies to traditional knowledge associated with genetic resources within the scope of the CBD and to the benefits arising from the utilization of such knowledge and to the benefits arising from the utilization of such knowledge.

---

[69]The Road To An Anti-Biopiracy Agreement ; The Negotiations under the UN Convention on Biological Diversity", 2nd Edition 2011, Third world Network ,Penang, Malaysia, available at www.twinside.org.sg/title2books/The.Road.to.an.Antibiopiracy. Agreement .htm (visited on 27.01.2015)

Although the Protocol goes further than the CBD in spelling out the rights of indigenous peoples and local communities, the provision are heavy with qualifications leaving much to the discretion of national governments.

Article 5 on Fair and Equitable Benefit-Sharing states in paragraph 2, *"Each party shall take legislative, administrative or policy measures, as appropriate with the aim of ensuring that benefits arising from the utilization of genetic resources that are held by indigenous and local communities, in accordance with domestic legislation regarding the established rights of these indigenous and local communities over these genetic resources, are shared in a fair and equitable way with the communities concerned, based on mutually agreed terms."*

Article 6 on Access to Genetic Resources states in Paragraph 2, *"in accordance with domestic law, each Party shall take measures, as appropriate, with the aim of ensuring that the prior informed consent or approval and involvement of indigenous and local communities is obtained for access to genetic resources where there have established the right to grant access to such resources."*

Article 7 deals with Access to Traditional knowledge Associated with Genetic Resources *"In accordance with domestic law, each Party shall take measures, as appropriate, with the aim of ensuring that traditional knowledge associated with genetic resources that is held by indigenous and local communities is accessed with the prior and informed consent or approval and involvement of these indigenous and local communities, and that mutually agreed terms have been established."*

Article 12, which is on Traditional knowledge Associated with Genetic Resources, requires domestic law implementing the Protocol to *"take into consideration indigenous and local communities' protocols and procedures, as applicable, with respect to traditional knowledge associated with genetic resources."*

The effective participation of indigenous and local communities is required when Parties establish mechanisms to inform potential users of traditional

knowledge associated with genetic resources about their obligations with genetic resources about their obligations.

Parties, in their implementation of the Protocol *"shall, as far as possible, not restrict the customary use and exchange of genetic resources and associated traditional knowledge within and amongst indigenous and local communities in accordance with the objective of the convention."*[70]

## 3.4 PLANT BREEDERS' RIGHTS AND PROTECTION OF THEIR TRADITIONAL KNOWLEDGE

Plant breeder's rights are used to cover plant varieties. They nest exclusive exploitation rights in the developers of new varieties of plants as an incentive to pursue innovative activity and to enable breeders to recover their investment in breeding. Like most intellectual property rights, plant breeders' rights are limited in time, at the end of which the varieties pass into the public domain.[71]

### 3.4.1 FOOD AND AGRICULTURE ORGANISATION

In 1983 the UN Food and Agriculture Organisation (FAO)[72] adopted the International Undertaking on Plant Genetic Resources (IUPGR)[73], as a non-binding instrument in order to ensure that plant genetic resources for food and agriculture will be preserved, explored and made available for plant breeding and scientific purpose. In 1989 the FAO Conference recognized Farmers' Rights and in 1991 it agreed that Farmer' Rights would be implemented through and international fund for plant genetic resources. In 1993, the FAO Conference decided to renegotiate the International Instrument in harmony with the CBD and for the realization of Farmer's Rights. After seven years of negotiations, the FAO Conference adopted the International Treaty on Plant Genetic Resources for Food and Agriculture which provides in Part III for the

[70] Ibid.
[71] D. J. Mugabe, "Intellectual Property rights and Traditional knowledge"-An Exploration in International policy discourse" available at www.wipoint/tk/en/in/paneldiscussion/papers/pdf/ mugabe.pdf (visited on 15.02.2015)
[72] Hereinafter referred to as FAO
[73] Hereinafter referred to as IUPGR

recognition of farmer's rights, including the protection of traditional knowledge relevant to plant genetic resources for food and agriculture."[74]

### 3.4.2 THE INTERNATIONALCONVENTION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS (THE UPOV CONVENTION)[75]

The UPOV Convention was signed in Paris in 1961. It came into force in 1968. It was revised in Geneva in 1972, 1978 and 1991.[76] Plant breeders' rights under the UPOV Convention provide intellectual property protection to plant varieties that are distinct, novel, uniform and stable.[77]

Regarding TK and UPOV system, it is important to note that UPOV Convention exclusively deals with the protection of new plants varieties and is silent on the subject of TK and genetic resources. The mentioned system protects the plant variety itself, so it must exist physically to be protected. Knowledge frequently does not exist physically hence it will not be suitable for protection under UPOV system. However, new varieties developed by indigenous communities of farmers, and based on their traditional knowledge that fixed identity when reproduced, may, in cases, meet the UPOV criteria and can be protected.

The UPOV convention does not forbid the granting or creation of rights in respect of traditional knowledge, or categories of plant material, which are not plant varieties protected under the convention. Member states are free to establish a special system the purpose of the protection of TK so long as it does not conflict with UPOV convention.[78]

---

[74]"*Intellectual Property and Traditional Knowledge",* 14 WIPO Booklet No.2, WIPO Publication No. 920 (E), available at http://www.kas.de/upload/aus/ands/homepages/namibia/Namibia-Law-Journal/11-1/NLJ-Section-7.pdf (visited on 19.02.2015,)

[75] Hereinafter referred to as the UPOV Convention

[76] E. Verkey. "Legal Protection of Traditional Knowledge", Available at iimk.ac.in/wto/seminar/Elizabeth verkey.doc (visited on 28.01.2015)

[77]D.J. Mugabe, "Intellectual Property rights and Traditional knowledge"-An Exploration in International policy discourse" Available at www.wipoint/tk/en/in/paneldiscussion/papers/pdf/ mugabe.pdf (visited on 15.02.2015)

[78]A. Yupari, "International negotiation related to biodiversity and traditional knowledge" available at www.biotrade.org/resourcespublications/international%negotiations%20related%20to%20biodiversity%20and %20traditional knowledge.pdf (visited on 17.02.2015)

## 3.5 PROTECTION OF INDIGENOUS PEOPLES' KNOWLEDGE UNDER TRIPS (TRADE RELATED ASPECTS OF INTELLECTUAL PROPERTY RIGHTS)[79]

The negotiation and adoption of the TRIPS Agreement as part of the Uruguay Round in 1994 have added new dimensions to the debate on intellectual property rights in traditional knowledge. The trips agreement sets minimum standards for countries to follow in protecting intellectual property. Article 1 of the TRIPS Agreement (on the nature and scope of the obligations) provides some flexibility in the implementation of the provisions of the Agreement. It states in paragraph one of that Article *that "members may, but shall not be obliged to, implement in their domestic law more extensive protection than is required by the Agreement, provided that such protection does not contravene the provisions of the Agreement"* According to outfield, parties to the TRIPS Agreement can invoke this provision to enact legislation for protecting traditional knowledge. He asserts, *"The absence of any mention of traditional knowledge in the Agreement, does not prevent any Member enacting legislation to protect such a category of knowledge."*[80]

TRIPS provide that patents shall be made available for any inventions-products or process in all fields of technology provided that they are new, involve an invention step and re capable of industrial application.[81] The agreement fails to define terms like 'new', 'inventive step' and 'industrial application', leaving the door open for interpretations that suit the interests of the more dominant member states.

*"Members may exclude from patentability plants and animals other than micro-organisms, and essential biological process for the production of plants or animals other than non-biological and microbiological process. However, member states shall provide for the protection of plant varieties either by patents or by an effective sui generis system by any combination*

[79] Hereinafter referred to as the TRIPS Agreement

[80] D. J. Mugabe, *"*Intellectual Property rights and Traditional knowledge"-An Exploration in International policy discourse*"* available at www.wipoint/tk/en/in/paneldiscussion/papers/pdf/ mugabe.pdf (visited on 15.02.2015)

[81] Article 27(1) The TRIPS Agreement

*thereof"*[82] clearly, according to TRIPS, micro-organisms must be provided patent protection. But the Article fails to provide an exhaustive list of subject matters that cannot be patented. This allows scope for interpreting discoveries as patentable if they fulfill the utility criterion. If the agreement had explicitly discoveries from being patented, developed countries could not have extended patent protection to non-inventions, especially in the area of bio-technology.
The indigenous knowledge developed over centuries, passed on from one generation to another, is recognized by some developed countries like the US as 'prior art' only if it has been recorded in writing. This has enabled research institutes to obtain information from indigenous people and patent their knowledge by merely identifying and isolating particular chemicals or giving scientific names to age-old practices.

Moreover, TRIPS does not protect indigenous knowledge, thus enabling multi-national companies to earn penny to the peoples who are the sources of the original information. Indigenous and local communities lack the means to obtain intellectual property protection over their innovations. Although the significant amount of biological resources used and maintained by indigenous people are useful to industry and to the world community, there is no effort to provide protection to this knowledge.

Lord Hoffman has said, *"it was not necessary for an active substance to be identifiable or reproducible for it to have been made available to the public."* He gave the example of Amazonian Indians who had known for centuries that the cinchona bark can be used to treat material and other fevers. It was only in 1820 that quinine was isolated and extracted from the bark. According to him, the Amazonian Indians who believed that the effect of cinchona was due to the spirit of the bark could 'know' about quinine even though they did not know the chemical by name, not its chemical structure. If one were to take a cue from this, it would follow that plant and animal products, including herbal preparations, lack novelty even if there is no prior

[82] Article 27.3(b) The TRIPS Agreement

public knowledge of the presence of a particular active substance that produces the desired results.

Thus, it can be said that most indigenous peoples know about the utility of the biological resources in their region and use them for various purposes. It would be unfair to award patents over products based on such indigenous knowledge without due credit being given to the original holders of such knowledge. It is totally unjust to allow multinational companies[83] (MNC's) to exploit such knowledge in order to reap rich rewards for them without enabling any benefit to flow back to the indigenous people who possessed the knowledge in the first place. Developing countries are therefore, justified in demanding a review of Article 27.3 (b) and asking for indigenous knowledge to be protected under the TRIPS Agreement. The developing countries, in its joint communication to the WTO, has urged the following modifications to be made to the Agreement: Inclusion of provisions to prevent bio-piracy as well as to protect TK; Recognition of the right of traditional communities or traditional practitioners to decide whether or not to commercialize their knowledge; inclusion of a provision mandating prior informed consent from indigenous people for the use of their knowledge and preventing third parties from using, offering for sale, selling, exporting or importing their knowledge without such consent; Inclusion of a provision guarantying full remuneration to the indigenous communities for their traditional knowledge.[84]

## 3.6 THE WORLD INTELLECTUAL PROPERTY ORGANISATION (WIPO)[85]

The WIPO is a specialized agency of the United Nations with the aim to harmonize intellectual property legislation and to develop and international intellectual property legislation and to develop and international intellectual property system.

[83] Hereinafter referred to as MNCs
[84] H. V. Devaiah, "TRIPS, Indigenous Knowledge and the Bio-rush", available at http://www..sarai.net/research /trips indigenous knowledge and the biorush.pdf (visited on 20.04.2015)
[85] Hereinafter referred to as WIPO

In 2000, the WIPO installed the Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional knowledge and Folklore as a forum for debating intellectual property, traditional knowledge, genetic resources and traditional cultural expressions/folklore. Meeting once or twice per year, the IGC is currently discussing two sets of draft provisions for the enhanced protection of traditional knowledge and traditional cultural expressions or expressions of folklore against misappropriation and misuse.

In 2006, the draft of traditional knowledge was prepared which is contained in document WIPO/GRTKF/IC/9/5 of January 2006 with the title The Protection of traditional knowledge: revised objective and principles: Article 1 of the draft calls for protecting traditional knowledge against misappropriation, which is defined very broadly as its unfair or illicit acquisition or utilization. Such protection may be implemented through various legal instruments, including individual or collective property rights in accordance with national and international laws.[86] Protection should at least be available for traditional knowledge that is transmitted between generations, distinctively associated with a community and integral to its cultural identify[87]; it should directly benefit the collective and individual holders.[88]. Benefits from commercial use (also of traditional knowledge already in the public domain)[89] should be shared fairly and equitably, with possibly only non-monetary benefits in the case of non-commercial use.[90] Users should indicate the source of traditional knowledge[91] and obtain prior informed consent from its holders, subject to national laws.[92] The protection of traditional knowledge should be implemented in such a way as not to hinder the continued customary use and exchange by its holders.[93] Where traditional knowledge is associated with

[86] Article 11 The Draft of Traditional Knowledge 2006
[87] Article 4 The Draft of Traditional Knowledge 2006
[88] Article 5 The Draft of Traditional Knowledge 2006
[89] Article 8.2 The Draft of Traditional Knowledge 2006
[90] Article 6.1, 6.2 The Draft of Traditional Knowledge 2006
[91] Article 6.3 The Draft of Traditional Knowledge 2006
[92] Article 7.1 The Draft of Traditional Knowledge 2006
[93] Article 8.1 The Draft of Traditional Knowledge 2006

genetic resources, it should be accessed and used in accordance with national laws concerning these genetic resources.[94]

Every year discussions are going on in the IGC meeting on the draft provisions for the protection of traditional knowledge. It may be fair to contend that the current WIPO/IGC draft is the most systematic international instrument for TK protection, at least in terms of IP protection. It not only provides lofty objectives and principles, but also a definite and well-structured legal foundation. If widely accepted and implemented, it would to a certain degree promote TK protection on a global basis and advance the rights and interests of TK holders as well. Not surprisingly, the WIPO has been considered to be the appropriate forum for formulating relevant rules on TK protection.[95]

Although the IGC work has not yet been finalized, the influence of the draft over international legislation progress cannot be underestimated. Indeed, several regional and national process have availed themselves of the draft WIPO provisions in developing and designing their TK protection measures.[96] The WIPO's Intergovernmental Committee is held every year in Geneva. The Committee works on concrete outcomes for the protection of traditional knowledge and cultural expressions. Discussions are made on set of draft provisions compiling suggestions on policy objectives and core principles to help protect TK and cultural expressions against misappropriation and misuse, relevant issues, including how specific methods to protect TK might fit within the existing intellectual property system and possible reforms of the intellectual property system.[97]

[94] Article 12 The Draft of Traditional Knowledge 2006

[95] Available at www.wipo.int/meeting/en/doc-details.jsp?dic_id=129915(visited on 21.01.2015)

[96] Ni Kuei Jung: *"Traditional Knowledge and Globle Lawmaking"*,North Western Journal of Human Rights, Vol. 10:02, 2011, p106, available at www.law-northwestern.edu/journal /jihr/v10/n-2/3/Ni.pdf (visited on 19.03.2015)

[97] Available at biodiversity-/.iisd.org/news/wipo-committee-disasses-traditional-knowledge-protection/ (visited on 17.03.2015)

## 3.7 FIRST WORLD CONFERENCE ON INDIGENOUS PEOPLES (22-23 SEPTEMBER, 2014)

The first World Conference on Indigenous Peoples was held on 22-23 September 2014. The meeting was an opportunity to share perspectives and best practices on the realization of the rights of indigenous peoples, including pursuing the objectives of the United Nations Declaration on the Rights of Indigenous Peoples.[98] Following the opening of the first World Conference on Indigenous Peoples in New York, UN Member States adopted a landmark Outcome Document in which they renewed their commitment to the full realization of the rights of Indigenous Peoples. Opening the World Conference, the President of the General Assembly, H.E. Sam Kutesa, welcomed the "active participation of Indigenous Peoples in its preparation, as well as the cooperation between Member States and Indigenous Peoples in the preparation of the Outcome document." In his remarks in the opening session, Secretary-General Ban Ki-moon underscored that "Indigenous Peoples are central to our discourse of human rights and global development." Noting that the Conference's "deliberations and decisions will reverberate across the international community with concrete effects in the lives of indigenous people", he stressed that their engagement would be critical in the global drive for a more sustainable future and pledged the full support of the United Nations to indigenous peoples. Indeed, the United Nations works closely with Indigenous Peoples to advance their rights, in particular through the Special Rapporteur on the Rights of Indigenous Peoples, the Expert Mechanism on the Rights of Indigenous Peoples and the Permanent Forum on Indigenous Issues. Addressing the opening session of the Conference as a special guest, Nobel Peace Prize and indigenous rights activist Rigoberta Menchú expressed her deep concern with the persistent violations of the rights of Indigenous Peoples and urged Member States to "apply national and international law, particularly the rights enshrined in [ILO] Convention 169

[98] Available at http://nhri.ohchr.org/EN/Themes/IndigenousPeoples/Pages/WorldConference.aspx(visited on 05.07.2015)

and the UN Declaration on the Rights of Indigenous Peoples, which establishes minimum standards for their survival, dignity, well-being and rights." While significant progress has been made since the adoption of the Declaration in 2007, Indigenous Peoples continue to face numerous obstacles to the full realization of their rights, with many of them struggling to remain on their lands and retain the right to their natural resources. While they make up about five per cent of the world's population, they constitute 15 per cent of the world's poor and about one third of the world's 900 million extremely poor rural people. In the concise and action oriented Outcome Document, prepared on the basis of inclusive and open consultations with Member States and Indigenous Peoples, Member States reiterated their support for the objectives of the United Nations Declaration on the Rights of Indigenous Peoples. They further reaffirmed their commitment to consult and cooperate with Indigenous Peoples in order to obtain their free, prior and informed consent before adopting and implementing legislative or administrative measures that may affect them. The document also calls to focus on the special needs of older people, persons with disabilities, women and youth in indigenous communities.[99]

In conclusion, it can be said that though there are many international instruments which recognize the rights of the indigenous people, conventional international intellectual property law does not protect the plant based traditional knowledge of indigenous peoples adequately. Thus, there is a need to devise new regimes or enlarge existing ones to accommodate the protection of traditional knowledge of the indigenous people associated with their biological resources. However, so far no coherent and inclusive international efforts are being made to address this concern as a consequence of which biopiracy disputes are increasing and violating the human rights of the indigenous peoples.

[99]Available at http://www.un.org/en/ga/69/meetings/indigenous/pdf/Press-Release_final.pdf(visited on 05.07.2015)

# CHAPTER IV

# PROTECTION OF THE RIGHTS OF INDIGENOUS PEOPLE AND THEIR KNOWLEDGE IN INDIA

## 4.1 INTRODUCTION

This chapter provides an insight to the various constitutional provisions in India, legislations and policies and databases which give protection to the Traditional Knowledge (TK)[1] and rights of the indigenous people.

It is estimated that there are more than 370 million indigenous people spread across 70 countries. They are distinct from the dominant societies in their countries. They have unique traditions, distinct culture and peculiar approaches towards land, life and religion. They are usually described as descendants of those who inhabited a country at the time when the people of dominant cultures or ethnic groups occupied the country. The dominant groups attained supremacy through conquest, occupation or settlement.[2]

The rich biodiversity of India is matched with equally rich cultural diversity and a unique wealth of indigenous knowledge system developer preserved and practiced by millions of ethnic and indigenous people living in the tribal and rural sectors. This indigenous knowledge system encompasses a plethora of unique and time-tested knowledge wisdom, belief, traditions and practices associated with conservation and sustainable use of biogenetic resources. Most of this knowledge are held within the traditional communities and are transmitted orally from one generation to another.

The value and importance of knowledge possessed by the indigenous people is now being increasingly realized the world over. For example, it is estimated that about 75% of the 120 biological active plant derived compounds presently in use worldwide have been derived through follow up researched to verify the authenticity of data from folk and ethno medical uses. So, there is a great scope for new drug discoveries based on traditional plant

[1] Hereinafter referred to as TK

[2] Available at http://www.supremecourtofindia.nic.in/speeches/speeches_2006/ila-toronto.pdf (visited on 21.02.2016)

use. And the pharmaceutical industry continues to investigate and confirm the efficacy of many medicine and toxins used by traditional communities. The traditional knowledge can also contribute immensely to modern agriculture, food and other industries. The traditional knowledge and traditional resources of local and indigenous peoples are thus important facets of the biological diversity, which offer immense benefits to the social and economic development of a country.[3]

The current concern with traditional knowledge policy in India may be traced back to the early 1980's, when activities and intellectuals alleged that India' biodiversity by multinational pharmaceutical business. Patents, granted on products derivates of the neem, turmeric and basmati plants were the visible targets of the misappropriation charge. As these protests gained momentum and various anti-globalization groups joined in, the government was compelled to come up with a strategy to combat 'Biopiracy' and protect Indigenous knowledge.[4]

## 4.2 CONSTITUTIONAL PROVISIONS IN INDIA TO PROTECT INDIGENOUS PEOPLE AND THEIR KNOWLEDGE

India has a history of cultural assimilation even while we agree to some communities maintain their distinct identity within the nation. India always presented a unity in diversity and diverse cultural identity is no insignia of the existence of indigenous group. Indeed, India accepts the existence of different tribes within its larger system again not different from the main culture in terms of the core values. True to its tradition of cultural assimilation and spirit of accommodation the Indian constitution presents the picture of the larger system of permitting the smaller political systems of tribal populations to be part of the system to remain distinct culturally but to be part of the larger

[3]P.Pushpangadaring, "Biodiversity and Emerging Benefit Sharing Arrangments- Challenges and Opportunities for India",. *PINSA* 68 No. 3,2002,pp. 297, available at 202,41.82.144/raw data upload/upload/ insa/ INSA _ 1 / 2006178-297.pdf (visited on 03.03.2016)

[4]S. Krishnaswamy, "Access to Knowledge and Traditional Knowledge and Protection", available at http:// www. bloombury academic.com/view/Accessknowledgeindia-9781849665568/chapter-ba-978184966556 8-chapter-002. xml?print&print (visited on 02.03.2016 )

system politically with sufficient autonomy wherever necessary and possible. Schedules V and VI of the Constitution of India specifically make provision for safeguarding the interests of the tribal people in India located in what is called tribal areas. Tribal people of other areas are taken as part of the main society inasmuch as special constitutional provisions have not been made for them. They are to be assimilated rather than to be made separate entity. Indeed, under the scheme their cultural identity is assured to be maintained.

The Supreme Court observed: *"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."*[5]

Justice Y.K. Sabharwal the then Chief Justice of India spoke of the constitutional scheme at the Plenary Session of the International Law Association (ILA) in Toronto: *"The Fifth and Sixth schedules constitute an integral scheme of the constitution with direction, philosophy and anxiety to protect the tribals from exploitation and to preserve natural endowment of their land for their economic empowerment to cognate social and economic democracy with liberty, equality, fraternity and dignity of their person in our political Bharat."*[6] These observations reflect the philosophy of the Indian Republic and the obligation of the government to respect and protect the rights of these people.

[5]*Samatha vs State Of Andhra Pradesh And Ors,* AIR 1997 SC 3297
[6]Available at http://www.supremecourtofindia.nic.in/speeches/speeches_2006/ila-toronto.pdf (visited on 21.02.2016)

The Constitution of India does not directly address the issue of protection of indigenous people and their knowledge. Article 48A[7] of the Constitution refers to the States obligation to protect and improve the environment and safeguard the forests and wildlife of the country. Further Article 51(A) (g) imposes a duty upon the citizens of India to protect and improve the natural environment, including forests, lakes, rivers and wildlife.

As regards protection of Indigenous people's knowledge, Article 29 of the Constitution recognizes as a fundamental right the protection of the culture of minorities. According to Article 29, any section of the citizens residing in the territory of India or any part thereof having a distinct language, script or culture of its own shall have the right to conserve the same. It is possible to protect the folklore of the distinct groups in India under this provision. However, majority of the TK existing and misused in India belong to small communities who do not belong to small communities who do not come under the scope of aforementioned constitutional provision. But no legislation has been enacted to protect the same. The other general provision in the Constitution that can be identified as a source to protect TK in Article 51A (f) of the Constitution provides that it is the fundamental every citizen of India, to value and preserve the rich heritage of our composite culture. Furthermore, considering the special cultural identity of the tribal population in India, the Constitution provides that it is the fundamental duty of every citizen of India, to value and preserve the rich heritage of our composite culture. Furthermore, considering the special cultural identity of the tribal population in India, the Constitution envisages special protection of the indigenous communities. The areas where they are only tribal communities, as per Article 371 read with the Schedule VI of the Constitution, are permitted to have separate autonomous councils for self-governance in accordance with their customary laws.[8]

[7]Organisation of agriculture and animal husbandry: The State shall endeavour to organise agriculture and animal husbandry on modern and scientific lines and shall, in particular, take steps for preserving and improving the breeds, and prohibiting the slaughter, of cows and calves and other milch and draught cattle.

[8]Schedule V of the Constitution provides that the government has the power to create scheduled areas to protect the interests of the tribes. The head of the State can prohibit the application of the normal laws, if they are in conflict with their customs. The tribes not falling in the above categories are subjected to the normal laws of the

In spite of the constitutional provisions which envisage protection and preservation of distinct cultural groups, there is no special law prohibiting the exploitation of folklore of these communities without permission. There are many customary norms in these communities which prohibit the use of some of their folklore and traditional use of plants by the outsiders and of those that are confined only to indigenous people and their customary practices. As there is no particular law prohibiting the use of such indigenous knowledge by the outsiders, increasingly they are being used for commercial gain.

## 4.3 INTELLECTUAL PROPERTY PROTECTION TO THE INDIGENOUS PEOPLE AND THEIR KNOWLEDGE IN INDIA

At the international level, particularly in forums like the World Intellectual Property Organisation (WIPO)[9] and Trade Related Aspects of Intellectual Property Rights (TRIPS)[10] Council, the importance of the intellectual property rights regime in protecting TK and biological resources has been acknowledged. Countries like Australia have expressed the view that, while there is a need to examine ways of improving protection for TK, the starting point should be to explore possibilities for making more effective use of the existing legal framework, particularly the intellectual property system. It was further stated that dismissing the applicability of the current system ignores not only potential benefits to be gained and identify the legitimate "gaps" in protection, but could lead to the creation of additional regulatory burdens and procedures. In surveys conducted by the WIPO to assess the use of existing standards of intellectual property for the protection of TK, countries like Australia, Canada, Columbia, Kazakhstan, New Zealand, the Russian Federation, Venezuela and Vietnam have provided actual examples of how IPRs can be utilized to promote and protect TK.

---

land, to some extent whilst there may be some recognition of customary rules of use within communities, such as at religious and spiritual occasions like marriages, birth and death rituals etc., there is no law in India presently they directly prohibits outsiders from misappropriating their folk arts and practices.

[9] Hereinafter referred to as WIPO

[10] Hereinafter referred to as TRIPS

These include the use of copyright protection in Canada to protect tradition-based creations including masks, totem poles and sound recordings of Aboriginal artists, the use of industrial designs to protect the external appearance of articles such as head dresses and carpets in Kazakhstan and the use of geographical indications to protect traditional products such as liquors, sauces and teas in Venezuela and Vietnam. India too has realized the importance which the Intellectual Property Rights (IPR) regime could have for protection of its TK and products based on it. India, as a member of the WTO, was under obligation to implement the TRIPS Agreement in totality, thus requiring the Indian Intellectual Property laws to meet the minimum standards laid down in the TRIPS Agreement. This led to the amendment of the Patents Act of 1970 and new enactments- the Biological Diversity Act, 2002, the Protection of Plant Varieties and Farmers' Rights Act (PPVFR Act)[11], 2001 and the Geographical Indication of Goods (Registration and Protection) Act (GI Act)[12], 1999. To fulfill the obligations under the Convention on Biological Diversity (CBD)[13], India like other countries such as Brazil, Costa Rica, Philippines, Sweden and the Andean Community have tried to regulate access to genetic resources and the associated TK, by incorporating certain provisions in these legislations. An attempt has been made to include requirements to disclose the origin of the source of the genetic material used in biotechnological inventions and the related IK used in the invention, as well as requirements of evidence of benefit sharing and prior informed consent from the relevant national authorities, through an interface between the Patents Act 1970 (amended in 2005) and the Biological Diversity Act, 2002. Here, an attempt has been made to critically analyse the provisions of each of these enactments, with a view to examine their relevance for protection of TK and biological resources.

[11] Hereinafter referred to as PPVFR Act
[12] Hereinafter referred to as GI Act
[13] Hereinafter referred to as CBD

### 4.3.1 THE GEOGRAPHICAL INDICATIONS OF GOODS (REGISTRATION AND PROTECTION) ACT, 1999

The need to protect India's famous products, the reputation of each of which was carefully built up and painstakingly maintained by the masters of that region, combining the best of Nature and Man, traditionally handed over from one generation to the next for centuries, through geographical indications was acutely realized following the basmati case. In 1997, the United States Patent Office granted a patent on Basmati rice to an American company called Rice Tech Inc. Basmati is a slender, aromatic, long grain variety of rice from the Punjab provinces of India and Pakistan. It is a major export crop for both countries; annual basmati exports are worth about $300 m and represent the livelihood of thousands of farmers. In the absence of domestic legislation then to protect Geographical Indications (GI)[14], India had no option but to resort to the expensive procedure of challenging the patent. In view of these circumstances, it was considered necessary to have a comprehensive legislation for registration and for providing adequate protection for geographical indications. For, unless a geographical indication is protected in the country of its origin, there is no obligation under the TRIPS Agreement for other countries to extend reciprocal protection. Also, India being a party to the TRIPS Agreement is required to protect geographical indications and hence in order to fulfill that obligation, the Geographical Indications of Goods (Registration and Protection) Act, 1999 was enacted. The main benefits which follow from registration under the Act are that it confers legal protection to geographical indications in India, it prevents unauthorized use of a registered geographical indication by others, it boosts exports of Indian GIs by providing legal protection, it promotes economic prosperity of producers and it enables seeking legal protection in other WTO member countries. Here, the discussion would be confined to those provisions of the Act, which have a bearing on protection of IK of biodiversity.

[14] Hereinafter referred to as GI

According to the definition given in the Act[15] a geographical indication in relation to goods[16] means that it is an indication used to identify agricultural, natural or manufactured goods. The goods which it identifies originate from a definite geographical territory, the manufactured goods should be produced or processed or prepared in that territory and the goods which it identifies should have a special quality or reputation or other characteristics due to its geographical origin. It is not necessary that a GI has to be the name of a country, region or locality; it will be regarded as a GI if it satisfies two conditions: it is related to a specific geographical area and is used in connection with particular goods originating from that area.[17]

Section 2.1(g) gives a list of the indications which can be called GI which are any name, geographical or figurative representation or any combination of them conveying or suggesting the geographical origin of goods. From the perspective of protection of TK, one of the best features of the Indian Act is the comprehensive definition given of GI, whereby agricultural, natural and manufactured goods all come under the ambit of GI. This is especially important in the Indian context considering the wide variety of goods that is deserving of protection ranging from agricultural products like Basmati, Darjeeling tea to manufactured goods such as petha from Agra, Kolhapure chappals, Chanderi silk etc.[18]

The provisions of the GI Act can be regarded as adequately suited for the protection of the TK of the indigenous people. It provides that any association of persons, producers, organization or authority established by or under the law can apply for registration of a GI.[19]This section especially facilitates protection of the collective rights of the rural and indigenous communities in their TK.

[15] Section 2.1(e)
[16] Section 2.1 (f) provides that goods mean any agricultural, natural or manufactured goods or any goods of handicraft or of industry and includes food stuff
[17]Explanation to section 2.1 (e)
[18]"The Protection of Geographical Indications in India: Issues and Challenges", available at http://www.teriin. org/ div/ briefing_ paper_GI.pdf(visited on 27.10.2015)
[19] Section 11, GI Act,1999

Another positive feature of the Act is that by registering an item which is the product of IK as GI, it can be continued to be protected indefinitely by renewing the registration when it expires after a period of ten years. This is unlike the protection offered by a patent; after patent lapses, the subject matter of protection comes into the public domain.

The Indian Act also deserves applause for the fact that it has tried to extend the additional protection reserved for wines and spirits mandated by TRIPS to include goods of national interest on case to case basis. The Act provides the Central Government with the authority to give additional protection to certain goods or classes of goods.[20] As seen earlier, India is also exerting pressure in the TRIPS Council in this regard so that high quality products of importance to India based on the IK perfected over centuries can be protected.

The Act, by prohibiting the registration of a GI as a trademark, tries to prevent appropriation of a public property in the nature of a geographical indication by an individual as a trademark, leading to confusion in the market.[21] This provision is conducive to the protection of IK, which may be regarded as a public property or the heritage of a community. The entire community which has preserved the knowledge and has passed it on with incremental refinement over generations should stand to benefit from the knowledge and this should not be locked be up as the private property of one individual. However, the fact remains that Section 25 is diluted to a great extent by the exception contained in Section 26, by which a trademark containing or comprising a GI is protected on fulfillment of certain conditions. A trademark containing a GI is protected, which has been applied for or registered in good faith under the trademarks law or where such trademarks have been used in good faith either (a) before the commencement of the Geographical Indications Act; or (b) before the date of filing the application

[20] Section22(2)GI Act,1999
[21] Section 25 GI Act,1999

for registration of such geographical indication under the Act.[22]The Act also does not apply to GIs which have become the common name of goods in India on or before 1st January, 1995.[23]

A GI cannot be assigned or transmitted. The Act recognizes that a GI is a public property belonging to the producers of the goods concerned; as such it cannot be the subject matter of assignment, transmission, licensing, pledge, mortgage or any contract for transferring the ownership or possession.[24]This feature is essential for protection of IK and to ensure that it does not pass on to the hands of those who are not holders of the knowledge.

Geographical Indications have emerged as one of the important features of the IPR regime of India. In India, there has been an effort to increase the list of protected GIs. After the Geographical Indications Act came into force on September 15th 2003, applications for registration as GI has been filed in respect of Darjeeling tea, Kancheepuram silk, Chanderi silk sarees, Alphonso mangoes, Basmati rice, Kohlapuri sandals, Bikaneri Namkin, apples from Himachal and Kashmir, Petha from Agra, Pedha from Mathura etc., some of which like Darjeeling tea and Chanderi silk have been notified as GIs.[25] Apart from this, India has also resorted to other measures. After long litigation in the case of the basmati patent, which resulted in ultimately changing the title of the patent, India has set up a Basmati Development Fund, a watch agency to keep a worldwide watch for new trademark applications of Basmati rice or its deceptive variations. In order to protect a valuable GI, its registration under the Act is not sufficient. Many a geographical indication has died a natural death because those who owned the rights were negligent in stopping any kind of abuse of the geographical indications. Communities that own geographical indications must, therefore, be alert to any misuse or abuse of their geographical indications. Instances of abuse and misuse would include use of a GI in respect of similar or dissimilar goods (e.g. 'Champagne' in respect of

[22] Section 26 (2) GI Act,1999
[23] Section 26 (3) GI Act,1999
[24] Section 24 GI Act,1999
[25]"Intellectual Property Rights of Darjeeling Tea in the Age of Globalization and World Trade", American University-Trade and Environment Database Journal, Number 752, July 2004.

mineral water or perfumes), use of a GI in lower case ('basmati' in place of 'Basmati'), use of a GI as a qualifier or laudatory term ('Champagne of mineral water'), use of a GI in a generic sense ('Darjeeling type tea') etc.[26]The digital and internet age abuse of geographical indications would be the use of a GI as a domain name when the owner has nothing to do with a product in the GI or simply squatting on the domain to derive a monetary gain from the true owners or selling identical goods not originating in the correct place as indicated by the GI through the internet using the domain name.[27]Again, apart from getting GIs protected, due care needs to be taken to maintain and ensure the quality of the GI protected goods, both in India and while exporting them abroad. Owners of GIs have a collective responsibility to ensure that the quality or supply chain integrity is maintained at all stages. GIs from developing countries like India are mostly agricultural products like rice, tea, dairy products etc. and products of handicrafts such as textiles etc. Most of such products constitute a major source of livelihood and income for rural populations producing them. As such, GIs may be expected to serve as tools for protecting IK as well as acting as mechanisms for socio- economic development of such communities in developing countries. However, it needs to be pointed out that though GIs are considered free of the many adverse socio-economic results of corporate control and accumulation of IPR rights, it is important to recognize that GIs do not in any way protect the knowledge embodied within the good and/or associated production process. Consequently, neither is protection of GIs a guarantee against the misappropriation of IK nor are other strategies to protect IK precluded by the use of GIs.

[26] L. R. Nair, R. Kumar, *Geographical Indications: A Search for Identity*,199-200 (Lexis Nexis, New Delhi, 2005)
[27] Ibid.

### 4.3.2 THE PROTECTION OF PLANT VARIETIES AND FARMERS' RIGHTS ACT, 2001[28]

India is the original home for many crops such as, rice, little and kodo millets, red gram, moth bean, jute, pepper, cardamom, many vegetables and fruit species. These plants were identified from the wild, selected and cultivated by Indian farmers over hundreds of years. The present wealth of varieties in India includes both crops that have originated in the country and those that were introduced from other countries in the past. The introduced cops include wheat, sorghum, maize, pearl millet, ragi, groundnut, gram, sugarcane, cotton, tea, rubbers etc. Recently, few crops like soya bean, sunflower, oil palm and kiwi fruit were also introduced in India. Indian farmers have evolved a rich diversity out of these introduced crops. During the long process of selection, conservation and cultivation, farmers have gained extensive knowledge of each variety. This knowledge includes suitability of variety for specific growing seasons and conditions, its maturity duration in different seasons, resistance to different diseases, pests, and other natural vagaries, suitability to different soils, and quality of the produce. Its availability with farmers is as highly valuable to modern scientific improvement as the genetic diversity of crop plants. This makes the contribution of farmers to plant genetic diversity as important as the contribution scientists make in developing modern plant varieties. Therefore when scientific are given the right to own new varieties created by them, this right concurrently recognizes the right of the farmers on their varieties. The protection of Plant Varieties and Farmer's Rights Act, 2001 (PPVFR Act) therefore, seeks to protect the rights of farmers and breeders on plant varieties. The PPVFR Act is an Act of the Parliament of India enacted to provide for the establishment of an effective system for protection of plant varieties, the rights of farmers and plant breeders, and to encourage the development and cultivation of new varieties of plants. This act received the assent of the President of India on the October 30, 2001.

[28] Hereinafter referred to as PPVFR Act

The PPVFR Act, 2001 was enacted to grant intellectual property rights to plant breeders, researchers and farmers who have developed any new or extant plant varieties. The Intellectual Property Right granted under PPV&FR Act, 2001 is a dual right – one is for the variety and the other is for the denomination assigned to it by the breeder. The rights granted under this Act are heritable and assignable and only registration of a plant variety confers the right.

The Act recognizes the individual and community roles played by farmers in the improvement and conservation of varieties on a plant variety is established by registration of the variety. By registering a plant variety, the person becomes its PBR holder. The PBR holder can be one person, a group or community or an institution. The PBR holder alone has the exclusive rights to produce, sell market or distribute the seeds or planting material of that variety.[29]

The PPVFR Act has a unique provision of benefit sharing to recognize the rights and contribution of local indigenous communities and farmers to conserving genetic resources.[30]

### 4.3.3 THE BIOLOGICAL DIVERSITY ACT, 2002

Indian subcontinent is one of the richest biodiversity habitats in the world. India contains a great wealth of biological diversity in its forests, its wetlands and in its marine areas. Biodiversity encompasses the variety of all life on earth. With only 2.5% of the land area, India already accounts for 7.8% of the global recorded species.[31] India is also rich in traditional and indigenous knowledge, both coded and informal.

---

[29]Venkatraman K. etal., "Intellectual Property Rights, Traditional knowledge and Biodiversity of India", *JIPR*,Vol.13july2008,pp.326, available at nopr.niscair.res.in/bitstream-/123456789/1781/1/jipr%20326-335.pdf(visited on 21.02.2016)

[30]R. Kriplani, "Defining the Role and Scope of IPR in the realm of Environmental Governance in India: Sui Generis Protection of Plant Genetic Resources", available at www.ecoinsee.org/fllconf/sub%20theme%20e/Rahul%20Kriplani.pdf (visited on 04.03.2016)

[31] Available at http://www.moef.nic.in/sites/default/files/India_Fourth_National_Report-FINAL_2.pdf(visited on 23.02.2016 )

India is a party to the Convention on Biological Diversity in the year 1992. Recognizing the sovereign rights of States to use their own biological resources, the CBD states that a member country should facilitate access to its genetic resources by other parties on mutually agreed terms, but tart access requires a prior-informed consent[32](PIC) of the country providing the resources. This convention provides a framework for the sustainable management and conservation of India's natural resources. In order to 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 associated knowledge, to conserve and sustainable use biological diversity a legislation was required. Legislation was also required in order to respect and protect traditional knowledge of local communities and to secure benefit sharing with local people who have conserved the biological resources and inherited knowledge and information relating to their use of biological resources. Accordingly, the Biological Diversity Act, 2002 (BDA)[33] was enacted.[34]

The Biodiversity Act, 2002 primarily addressed access to genetic resources and associated knowledge by foreign individuals, institutions or companies, to ensure equitable sharing of benefits arising out of the use of these resources and knowledge to the country and the people.

A three-tier structure at the national, state and local level is established as following:

- **National Biodiversity Authority (NBA)[35]:** All matters relating to requests for access by foreign individuals, institutions or companies, and all matters relating to transfer of results of research to any foreigner will be dealt with by the National Biodiversity Authority.

[32] Hereinafter referred to as PIC
[33] Hereinafter referred to as BDA
[34] K. Venkatraman, "India's Biodiversity Act 2002 and its role in Conservation", Tropical Ecology 50(1) 2009,p.23, available at www.tropecol.com/pdf/open/pdf-50-1/04%venkatraman.pdf (visited on 03.04.2016 )
[35] Hereinafter referred to as NBA

- **State Biodiversity Boards (SBB)[36]:** All matters relating to access by Indians for commercial purpose will be under the purview of the State Biodiversity Boards. The Indian industry will be required to provide prior intimation to the concerned SSB about the use of biological resources.
- **Biodiversity Management Committees (BMCs)[37]:** Institutions of local self government will be required to setup of Biodiversity Management Committees in their respective areas for conservation, sustainable use, documentation of biodiversity and chronicling of knowledge relating to biodiversity and traditional knowledge.[38]

The salient features of the Biodiversity 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 conserves of biological resources and holders of knowledge and information relating to the use of biological resources;

(e) conserve and develop areas of importance from the standpoint of biological diversity by declaring them as biological diversity heritage sites;

(f) involve institution of state governments in the broad scheme of the implementation of the Act through constitution of committees.

The Act prescribes some special provisions for the protection of the traditional knowledge. Among them Chapter II of the Act regulates access to biological diversity. The Act prohibits 'certain persons' from obtaining any

[36] Hereinafter referred to as SBB
[37] Hereinafter referred to as BMCs
[38] H. Jajodia, "Biodiversity and Traditional Knowledge-Regulatory Framework at Natinal, Regional and International Level", available at http://www.legalserviceindia.com/article1266-Biodiversity-and-Traditional Knowledge.html ( visited on 10.03.2016)

biological resources occurring in India or knowledge associated there to for research or for commercial utilization or bio-safety and bio-utilization. The Act prevents any person from transferring the results of any research for monitoring consideration or otherwise to such certain persons without previous approval of NBA (Section 3.4). Section 6 of the Act, is the key provision dealing with IPR's on biological resources and associated knowledge. According to this provision, no person shall apply for any IPR, by whatever name called, in or outside India for any investigation based on any research or information on a biological resources obtained from India without obtaining the previous approval of the NBA.

The procedures for the access and other purposes mentioned in the Act are provided to ensure effective, efficient and transparent access procedures through written agreements and applications in prescribed formats.

Criteria for Benefit sharing: While the NBA gives Indian nationals/researches permission to access biological resources, it will also lay down conditions as to how any benefits that arise should be shared with local communities. The Act provides that benefit sharing may include monetary payment, technology transfer or joint ownership. IP rights, but this is not an exhaustible list. The Act, subject to Section 21 and Rule 20 of the Biodiversity Rules, insists upon including appropriate benefit sharing provisions in the access agreement on mutually agreed terms related to access and transfer of biological resources or knowledge occurring in or obtained from India for commercial use, bio-survey, bio-utilization or any other monetary purposes. The authority shall develop guidelines and shall notify the specific details guidelines and shall notify the specific details of benefit sharing formula in an official gazette on a case-to-case basis. The suggested benefit sharing measures may include 'monetary benefits' such as royalty development, and 'non-monetary benefits' such as, education and awareness raising activities, institutional capacity building, venture capital fund, etc. the time frame and quantum of benefits to be shared shall be decided on case-to-case based on mutually agreed terms between the applicant, authority local

bodies and other relevant stakeholders, including local and indigenous communities. Of the suggested mechanisms for benefit sharing includes direct payment to persons or group of individual through district administration, if the biological material or knowledge was accessed from specific individuals or organizations. In cases where such individuals or organizations could not be identified, the monetary benefits may be paid to the National Biodiversity fund. 5% of the benefits may be earmarked for the Authority or State Biodiversity Board towards administrative service charges.[39]

A National Biodiversity Fund is being constituted for the purpose of equitable benefit sharing. The NBA will ensure that equitable benefit sharing is made during the utilization of biological resources and the knowledge relating to them. The amount of benefit sharing will be deposited in the National Biodiversity Fund and the amount shall be paid directly to such individuals or organizations in accordance with the terms of any agreement in such manner as described by the NBA. On behalf of the central government, the NBA will take all measures to oppose Intellectual Property Rights (IPR's) granted outside India on any biological resources or associated knowledge origination from India.[40]

With the assistance of NBA, eighteen State Biodiversity Boards (SBBs) have been formed by their respective State governments. Several biodiversity management committees have also been constituted by SBBs. The main function of the Biodiversity Management Committee (BMC) constituted under each local body as per Section 41(1) of the Act and Rule 22(1-11) of Biodiversity Rules (2004), is to prepare Peoples Biodiversity Registers, which shall contain comprehensive information on the availability and knowledge of local biological resources and medicinal or any other traditional knowledge associated with them. Other important functions of the BMC are to advise the

[39]Venkatraman K. etal., "Intellectual Property Rights, Traditional knowledge and Biodiversity of India", *JIPR*,Vol.13july2008,pp.326,Available at nopr.niscair.res.in/bitstream-/123456789/1781/1/*JIPR* %20326-335.pdf(visited on 21.02.2016)

[40]S. Kannaiyan, *"*An overview of Biodiversity Act 2002*"*, Special lecture delivered in the National Horticulture Research conference, 2007- Theme Looking Beyond, National Agricultural Science Complex, ICAR, New Delhi during 27th and 28th April ,2007, available at www.nbaindia.org/docs/biological-diversityact-ii.pdf (visited on 09.04.2016)

SSB and the NBA on matters for granting approval, maintain data about the local valid and practitioners using the biological resources, besides maintaining a register containing information on access to biological resources and knowledge granted, details of collection fee received and details of benefit sharing derived along with the mode of sharing.[41]

### 4.3.4 THE PATENT ACT, 1970

The term "patent" acquired statutory meaning in India when Patents Act, 1970 was enacted. India being founder member of WTO incurred trade obligations to bring its intellectual property rights regime in tune with obligations as envisaged in TRIPs and introduced first amendment to the Patents Act, 1970 through Patents (Amendment) Act, 1995 which came into force in April 1999. The second major amendment in the Act of 1970 was made in the year 2002. To make the patent law to fully comply with TRIPs substantive changes in the Patent Act were introduced in 2005 effective from 1st January 2005.

The 2005 Patents (Amendment) Act introduced product patents along with some provisions relating to TK.

Firstly, the changes made to the definition of the term 'patent' which means a patent granted for an invention under the Act (Section 2(1) (m) and specifications of 'invention' which are not patentable in Section 3 of the Act which states that 'a mere use for a known substance' [Section 3(d)] an 'an invention which, in effect, is traditional knowledge or which is an aggregation or duplication or known properties of traditionally known component or components' [Section 3(p)] will not be an invention.

Secondly, the inclusion of the new provisions of plant opposition proceeding which can be done on limited grounds under Section 25(1) of the Act as:

[41] Supra note 8

Where an application for a patent has been published but a patent has not been granted, any person may, in writing, represent by way of opposition to the Controller against the grant of patent on the ground of:

(a) patentability including novelty, inventive step and industrial applicability, or

(b) non-disclosure or wrongful disclosure mentioning in complete specification, source and geographical origin of biological material used in the invention and anticipation of invention by the knowledge, oral or otherwise available within any local or indigenous community in India or elsewhere.

Thirdly, inclusion of the provision for the opposition of a complete patent specification of an invention which was publicly known or publicity used in India before priority date of that claim.[42]

The reason for the inclusion of all the above provisions in to defy the challenges of misappropriation of the TK which is already in the public domain in India or its use is known to the Indian Communities or individuals from the time immemorial. One inference can be drawn from these provisions that all of them are defensive in nature, which can help to oppose the patents granted for the inventions whose source and geographical origin of biological material used or the knowledge, oral or otherwise is available within any local or indigenous community in India or elsewhere. Benefit sharing is not the concern of the Act. But the doubt arises that, which type of TK knowledge is protected under the provisions. To clarify this confusion, the definition of the TK has to be specified in the Act. This leads to a necessity of a sui generis system for the protection of TK and its subsets which could be a combination of various systems of protection, i.e. patents, trade secrets, geographical indications and a cultural heritage of the nation.[43]

[42] Section 25(3)(d), The Patents Act, 1970
[43] Ibid

### 4.3.5 THE TRADITIONAL KNOWLEDGE (PROTECTION AND REGULATION TO ACCESS) BILL, 2010

The Traditional knowledge (Protection and Regulation to Access) Bill, 2010 is the first ever attempt made in India for a separate and complete regime for protection of Traditional knowledge in India. The present Draft Bill aims to provide for protection, Conservation and effective management of traditional knowledge. It further provides the need for protection of integrity and sentiments of communities against distortions and disrespectful representations of forms of TK and protection from improper commercial exploitation of such forms. It emphasized the need for sustainability of resources which TK is based, as well as ensures the continuation of the customary practice of the TK. Further the bill provides for a mechanism to access and share such TK along with the rights of the communities who hold such knowledge.

The salient features of the Draft Bill are:

1. Definition of terms such as traditional knowledge, abuse access, accessory, benefit, informed consent, misappropriation, prior informed consent, traditional community etc.
2. Identification of the sources and maintenance of the register of Traditional knowledge.
3. Identification of the sources from where the informed consent to use the traditional knowledge has to be gained.
4. Indicative list of assessors who are required to obtain the prior consent for accessing the traditional knowledge.
5. Restriction on the access of traditional knowledge for a fixed period of time and for any further use additional consent to be obtained.
6. Obligation on the Central government, State government and TK board to ensure the prevention of misuse of traditional knowledge by taking non exclusive consent by the indigenous vulnerable communities.
7. Preparation of National Policy, Strategy and action plan by the Traditional knowledge Authority every five year which ensures the

protection, continuum of use and practice of TK and ensures the sustainability of the resources including human resource on which the TK is dependent.

8. Steps to be taken by the Traditional Knowledge Authority to prevent biopiracy and other misuse of TK and to take preventive/punitive actions to safeguard the same.
9. The Traditional knowledge Board to be assigned with additional responsibility to ensure that the due environmental and social impact assessment to be done before granting the access to any TK.
10. The TK Board to ensure that the use of traditional knowledge is not against public order or morality.
11. The TK board to educate and increase awareness in the communities to ensure just and fair negotiations.
12. The TK board to be assigned with power to notify certain traditional knowledge as endangered or on verge of extinction or likely to become extinct, and also the power to restrict the access to such traditional knowledge.
13. Appellate mechanism where any appeal from Traditional knowledge Authority will be Intellectual Property Appellate Board (IPAB)[44]. The decision of the IPAB can be challenged by appeal to the Supreme Court of India.[45]

    Given the nature of Traditional Knowledge of the indigenous people it is difficult to ascertain whether the Traditional Knowledge Bill in its present form will see the light of the legislative day which is still pending.

[44] Hereinafter referred to as IPAB
[45] Available at www.sinapseblog.com/2010/01/round-table-on-protection-of-25.htm(visited on 24.03.2016)

## 4.4 OTHER LAWS AND POLICIES RELATING TO TRADITIONAL KNOWLEDGE OF BIOLOGICAL RESOURCES

Other than the IPR legislation, there is also a need to look into some of the existing laws and policies which have some relation, direct or indirect, to the conservation of biological resources, recognition of the rights of local and indigenous communities etc., which also have an implication on IK protection. Following is the brief account of the forest and wildlife legislations, Joint Forest Management, the National Environment Policy, 2004 from the perspective of TK protection.

In the quest for a system to protect TK in the interest of the local communities and the national interest, existing legal provisions and policies have been examined by the researcher to see if they recognise the importance of availability of natural resources to the holders of TK. For this purpose, a legal analysis of the Indian Forest Act, 1927, the Forest Conservation Act, 1980, and the Wild Life Protection Act, 1972 has been attempted. Since the primary subjects of these Acts are forest and wildlife and not TK, the objective will be to see whether they provide the holders of TK access to the natural resources, which is extremely necessary for the existence and development of TK. There can be two ways by which these Acts can protect, or contribute towards protection of TK:

(a)By providing protection to the natural resources.

(b)By ensuring access to the natural resources by the holders of TK.

### 4.4.1 FOREST LAWS IN INDIA

By the mid-19th century, with depletion of forests becoming a serious issue, the British Government began to take cognizance of the fact that forests in India were not inexhaustible. Accordingly, various officers were deputed from time to time to report on forest areas and all of them emphasized the need for conservation and improvement. In 1856, Lord Dalhousie emphasized the need for definite forest policy. However, the instantaneous reason for this emphasis can also be attributed to the fact that adequate supplies of timber

was required for the great extension of railway lines that were being undertaken.[46] There was also a great demand for Indian Teak. In 1865 the first Indian Forest Act was passed. It was amended in 1878, when a comprehensive Law, the Indian Forest Act VII, came into force. The provisions of the Act established a virtual state monopoly over the forests in a legal sense on one hand, and attempted to establish, on the other, that the customary use of forests by the villagers was not a 'right' but a 'privilege' that could be withdrawn at will. In the period up to 1980s there were two major policy statements purporting to give direction to the role of the government in relation to the alternate functions performed by forests. They were the policy statements of 1894 and 1952. In practice, it was the Forest Act of 1927 that guided governmental actions for much of the period. Assertion of central control and emphasis on the role of forests as providers of timber and industrial raw materials is the common thread running through these major statements of policy. There is a view that, the 1894 policy, even though it came from a colonial government, was more sensitive towards local interests. The role of forests as essential on climatic and ecological grounds was realised and the significance of local user's was also pointed out. Notably it provided that no restriction should be placed upon local demands, merely in order to increase state revenue. On the other hand, in the National Forest Policy 1952, it was made clear that local priorities and interests and claim of communities around forest areas should be subservient to the larger national interests. Forests were viewed as national asset. In 1976, through the 42nd Constitutional Amendment, ‘forest’ was transferred from a subject in the State list[47] to the Concurrent list. It thus re-emphasized the role of the Central Government in the management of forests. In view of the continuing forest depletion, the Forest Conservation Act was enacted in 1980. It also emphasized the Central Government's involvement in deciding land use. Community interests found emphasis only through the introduction of the

[46] Smythries, E.A ., "India's Forest Wealth", India of Today, Vol. VI, Oxford University Press
[47] 7th Schedule of the Constitution

National Forest Policy 1988. While conservation of forests in the national interest remained a policy objective, the emphasis shifted to the bonafide requirements of the marginalized individuals and communities who are dependent on forests. Giving major emphasis on the ecological role of forests, it stipulates that the rights and concessions relating to forest produce of the tribal community and the other poor living within and near forests must be fully protected. The domestic requirements of fuel wood, fodder and minor forest produce and construction timber should be the first charge on forest produce. It now remains to be seen whether the laudable objectives of the policy have found reflection through the necessary corollary changes in formal law - the Indian Forest Act, its State variants or the Forest Conservation Act.

#### 4.4.1.1 THE INDIAN FOREST ACT, 1927

At the time when the Indian Forest Act of 1927 (which continues to be the primary forest legislation even today) was enacted, the stated assumption for the introduction of forest laws and policy was that the local communities were incapable of scientific management and that only a trained, centrally organised cadre of officers could properly manage forests. However, such laws also ensured commercial exploitation of the vast natural resources that India possessed and eliminated the local community from having any control over the resources. It was prompted by the great demand of forest produce for industrial use in Britain.

The Forest Act of 1927 was enacted to consolidate the existing law relating to forests, the transit of forest produce and duty that can be levied on timber and other forest produce. The Act as it stands today, does not provide any definition of 'forest'. For the purpose of the Forest Conservation Act, 1980, the Supreme Court in *TN Godavarman Thirumulkpad vs. Union of India*[48] has expressed the opinion that 'forest' must be understood according to its dictionary meaning. This description covers all statutorily recognised

[48] AIR1997 SC 1228

forests, whether designated as reserved, protected or otherwise for the purpose of the Forest Conservation Act. The term 'forest land' will not only include 'forest' as understood in the dictionary sense, but also any area recorded as forest in the government record irrespective of ownership. The Act provides for various protection measures for forestland. In general it follows the approach of restricting people's access to the forest. Thus, Section 3 empowers the State Government to constitute any forestland or wasteland which is the property of the Government or over which the Government has proprietary rights, or to the whole or any part of the forest produce of which the Government is entitled, as a Reserved Forest. Section 4 provides the procedure for declaration of a Reserve Forest. It requires the State Government to issue a notification declaring its decision to constitute a Reserve Forest and specifying as nearly as possible the situation and limits of such land. Section 5 lays down that once a notification under Section 4 has been issued, no right can be acquired in or over the land comprised in such notification, except by succession or under a grant or contract in writing made by or on behalf of the Government. The section further prohibits any fresh clearings for cultivation or for any other purpose unless in accordance with such rules as may be made by the State Government in this behalf. The combined effect of sections 6, 7, 8 and 9 is that if one fails to bring to the notice of the Forest Settlement Officer any right and corresponding claim over the specified area, his right shall extinguish. In other words, the burden of proving his right lies on the claimant unless such right is already in Government record. The Indian Forest Act anticipates 3 types of claims in forests proposed to be reserved. Firstly, a forest dweller might lay claim of ownership of land. Secondly, right to pasture and forest produce. And thirdly, right with respect to shifting cultivation. Notably, the Forest Settlement Officer[49] has no power to confer any right on the forest dweller, which has not been satisfactorily established. But he is bound to express fully to the Government, his opinion and advice as to any practice which, though not

[49] Hereinafter referred to as FSO

satisfactorily proved to be an existing right, he may think is advisable to sanction as a right or a concession in the interest of the people. It is up to the Government then to decide whether such non-established rights or concessions may be granted in the interest of the people or not. What is left unaddressed is the fact that while community rights or customary rights are themselves difficult to prove in the prevailing judicial system, even the scope provided to the FSO would remain ineffective if it is left to the whims of the officer. [50]

From the point of view of protection of TK, the most important question that such a provision can pose is: What are the rights over the biological resources that the holders of TK possess? A community might have been using, or rather, relying on the forest for livelihood since time immemorial, but unless they have legally recognised rights over the forest they cannot assert them. It is unlikely that tribal or forest dwellers will find the names of their ancestors on any written documents, which may be used to establish rights to the land, even if they have occupied the forest for centuries.

- Should any person currently using forest land or forest products be given rights over the forest?
- Should the granting of right be limited to communal rights of Scheduled Tribes recognised under the Fifth and Sixth Schedule of the Constitution as distinct communities?
- Should rights be based on reference to historical documents?
- How feasible would that be for a community that is oblivious of the modern education and legal systems?

The Act does not provide answers to such questions. The only practice that has been recognised by the Act is the practice of shifting cultivation, as a privilege or concession. But being a privilege and not a right, it is enjoyed at the pleasure of the State Government, which can prohibit such practice.[51]

[50] Available at http://envfor.nic.in/legis/forest/forest4.html(visited on 12.09.2016)
[51] The practice of shifting cultivation shall, in all cases, be deemed a privilege subject to control, restriction and abolition by the State Govt; *Mohd. Siddiq v. State* AIR 1968 All 396.

During all the stages of inquiry, the Forest Settlement Officer (FSO)[52] is required to give notice to all the affected parties. This is in line with the principles of natural justice. The Supreme Court in *Harish Chandra vs. Land Acquisition Officer*[53] has held that though FSO adjudicating claims under the Act is not a court, yet the principle, which is really more of a fair play and is applicable to all tribunals performing judicial or quasi-judicial functions, must also apply to him. The effect of declaration of Reserve Forest is such that even unauthorised entry to the area becomes an offence punishable with imprisonment.[54]Thus, in the absence of specific rights to access, declaration of Reserve Forest completely blocks access to the natural resources. Section 28 lays down that the State Government may assign to any village community the rights of Government to or over any land which has been constituted a reserve forest. Such forests are called village forests. The State Government may make rules for regulating the management of village forests. It can prescribe the conditions under which the community to which any such assignment is made may be provided with timber or other forest produce or pasture, and their duties for the protection and improvement of such forest. However, the Act does not say anything about the factors that the State Government will take into account before assigning a reserve forest to the village community. But such an assignment can provide an opportunity for IK holders to access natural resources. Apart from Reserve Forest, the State Government can also declare a forest land or waste land over which it has proprietary rights, as Protected Forest.[55]

Section 29 (3) mandates inquiry and recording of the nature and extent of the rights of Government and of private persons in or over the forest land, before declaring an area as protected forest. As mentioned above, here also, the lack of well-defined policy for providing access to the natural resources can create obstacles for the IK holders in practicing their knowledge.

[52] Hereinafter referred to as FSO
[53]AIR 1961 SC 1500
[54] Sec.26(1)(d).
[55]Available at http://www.ijlass.org/data/frontImages/gallery/Vol._2_No._8/5.pdf(visited on 27.10.2016)

Section 32 empowers the State Government to make rules for granting licence to the inhabitants of towns and villages in the vicinity of protected forests to take trees, timber or other forest-produce for their own use. This is an enabling provision in favour of TK holders.

#### 4.4.1.2 THE FOREST (CONSERVATION) ACT, 1980

This Act does not in any way effect those provisions of the Indian Forest Act that relate to the access of natural resources by the holders of TK. However Section 2 of the Act lays down that no State Government can, except with the prior approval of the Central Government, make an order that any reserved forest or any portion thereof, shall cease to be reserve.

One very important aspect of the Forest Protection Act got highlighted in the Supreme Court Order in the case *T N Godavarman Thirumulkpad vs. Union of India.*[56] The Supreme Court expressed the opinion that the Forest Conservation Act, 1980 was enacted with a view to check further deforestation which ultimately results in ecological imbalance; and therefore, the provisions made therein for the conservation of forests and for matters connected therewith, must apply to all forest irrespective of the nature of ownership or classification thereof. The court said that the word 'forest' must be understood according to its dictionary meaning. The term 'forest land', occurring in Section 2 of the Act will not only include 'forest' as understood in the dictionary sense, but also any area recorded as forest in the Government record irrespective of the ownership. Thus, according to this meaning, any kind of non-forest activity in any forest will require prior approval of the Central Government. The observations of the Apex Court can be inferred as conferring sanction to State's interference even in the context of forests, traditionally owned by communities, in the name of conservation.

[56] AIR 1997 SC 1228

### 4.4.2 THE WILD LIFE (PROTECTION) ACT, 1972

The Preamble to the Act says that it provides for the protection of wild animals, birds and plants and for matters connected therewith or incidental thereto. It is interesting to note that the Act is not limited only to 'animals', and includes plants as well. Also the scope of the Act extends to matters that are connected or incidental to the basic objective of protection of wildlife.[57] Section 2 (37) of the Act defines 'wild life' to include any animal, bees, butterflies, crustacean, fish and moths, and aquatic or land vegetation which form part of any habitat. From this definition it can inferred that the Act views wildlife as forming part of a habitat and aims at protection in situ.

Chapter III A of the Act, introduced by the 1991 amendment, with a view to protecting specified plants, clearly indicates that members of Scheduled Tribes can freely pick, collect or possess, in the district he resides, any specified plant or part or derivative thereof for his bona fide personal use. Thus, the introduction of this particular section creates a sanction for the activities of the Scheduled Tribes dependent upon forests. However if seen from the perspective of protection of TK, it gives rise to certain questions like:

(i) Why it is only the Scheduled Tribes whose interaction with the forest land is kept intact? There might be other people who are not Scheduled Tribes but dependent upon the forest.

(ii) The holders of TK, for example a *vaid* in a village practicing herbal medicines, need not be a member of a Scheduled Tribe. It is essential that he is not prohibited from collecting and experimenting upon wild herbs, if his knowledge base is to be protected from extinction due to non-use.

(iii) Further, how to define 'personal use' in the context of a *vaid*, whose livelihood is to cure people from various diseases?

These questions need to be adequately addressed if this provision is to benefit the TK holders. The Wildlife Protection Act is based on a similar

[57] Available at http://www.epw.in/journal/1994/42/discussion/people-wildlife-and-wildlife-protection-act.html (visited on 13.07.2016)

approach as the Indian Forest Act, that is, conservation by keeping people away. It provides for the creation of Sanctuaries and National Parks wherein access by the people are severely restricted. The declaration of a sanctuary or national park is such that no person can destroy, exploit or remove any wildlife, including forest produce without the permission from the Chief Wildlife Warden[58] (CWW). The CWW can grant such a permit only when the State Government is satisfied that such act is necessary for the improvement and better management of wildlife. A Sanctuary can be established under sections 18, 26A, 38 (1) and 66 (3).[59]

For an area of land or water, around India's coast to be notified a sanctuary under section 26A, there are three conditions to be fulfilled:

- Firstly, notification under section 18, declaring the intention and the boundaries of a particular area that is required to be made a sanctuary. The area should be of adequate ecological, faunal, floral, geomorphological, natural or zoological significance, for the purpose of protecting, propagating or developing wild life or its environment.
- Secondly, the period of two months after proclamation made by the collector for preferring claim and with regard to people's rights must elapse, and
- Thirdly, all the claims made in relation to any land must be disposed of by the state govt.

After these three conditions are fulfilled the state government is required to issue a notification specifying the limits of the area that would finally be notified as a sanctuary. In case of reserved forests and territorial waters, this notification can be directly issued.

A National Park can be established under sections 35, 38 (2) and 66 (3). For an area to be declared under section 35, an intention is declared by notification for an area, which is of ecological, faunal, floral and

[58] Hereinafter referred to as CWW
[59] Available at http://envfor.nic.in/legis/wildlife/wildlife1.html(visited on 23.05.2016)

geomorphological importance. This area may be an existing sanctuary too. A National Park is notified under the following three conditions:

- Firstly, when the period of preferring claims has elapsed.
- Secondly, when all claims in relation to any land in the area intended to be a national park is disposed of by the state government.
- Thirdly, when all rights in respect of land, which is proposed to be included in the national park are vested in the government.

After these conditions are fulfilled, the state government shall issue a notification specifying the limits of the area that is being declared as a National Park.

According to section 27 (1) and 35 (8) of the Wildlife Protection Act, in both Sanctuaries and National Parks, public entry is restricted and according to section 29 and 35 (6) of the Act the destruction of any wildlife or habitat is prohibited. In theory, National Parks enjoy a higher degree of protection than Sanctuaries. For example, according to section 35 (7) no grazing of any livestock is permitted in a National Park but according to section 33 (d) permissible in a Sanctuary.

The process of settlement of rights in declaring Sanctuary/National Park can be explained as follows:

Stage I: Intention notification declaring intention and limits of such area;

Stage II: Determination of rights: Under section 19, the Collector or any officer authorized by the state government is required to determine the existence, nature and existence of right of any person who may be a claimant in the process of settlement. Section 20 specifically bars the accrual of any rights after the intention notification. The determination of rights under the section is quite comprehensive as it includes the rights of any person. This could mean that such person may not only be those who live within and around the protected area but also those outside it;

Stage III: Proclamation notification under section 21. The Collector or any officer so authorized by the state government is required to issue a proclamation notification under section 21. Such proclamation is required to

be published in regional language in every town or village or in the neighbourhood of the area specifying the boundaries of such a proposed protected area. Under the said notification any claim under section 19 is required to be submitted within 2 months from the date of such proclamation;

Stage IV: Inquiry – section 22 describes the process of inquiry by the collector or his authorized officer. The inquiry includes the claims under section 21 as well as claims under section 19 which may exist as per the collector but not claimed. The inquiry is to be done "expeditiously" though no time limit is given. The primary basis of the claims under this section is records of the government and evidence of any person acquainted with the same;

Stage V: Acquisition - under section 24, the Collector is empowered to pass an order which may admit or reject a claim in whole or part. If such a claim is admitted wholly or partly, then such land may either be excluded from the limits of the protected area or acquired by the state. Such acquisition may either be under an agreement between the right holder and the government or where such right holder has agreed to surrender his right to the government in lieu of compensation, as per Land Acquisition Act, 1894. In case of sanctuaries, the Collector has been given special powers under section 24 (2) (c) to allow any right over any land in CWW of the state. However, it is pertinent to note that no guideline or grounds have been enumerated for acceptance or rejection of such claim. Further, the role of the CWW is unclear in case of allowance of any right in a sanctuary. The Act is silent on the question as to whether his views are binding or not;

Stage VI: Final notification - A sanctuary or national park may be finally notified under section 26A or 35 (4), only after period of claim has elapsed and all other claims have been disposed of (or vested in the government, in case of National Park)[60].

[60]Available at https://www.gktoday.in/blog/wild-life-protection-act-national-parks-sanctuaries-and-other-protected-areas/(visited on 25.02.2016)

Thus, it can be said that in case of National parks the restrictions are stricter than in the case of Sanctuary. Because, in case of National Park, all the rights are vested with the government, there is no scope for continuation of any traditional right over such land. As far effects arising from declaration of Sanctuary and National parks are concerned, there has been a prolonged debate over the issue of alienation of people from the forests, as also taking away their livelihood. Such debate is not confined only to the Wild Life Act, but covers the whole perception behind the policy that forest and wildlife is to be protected from the people. In recent times, however, there has been a shift, with the Government gradually realizing the need for people's participation, as reflected in present policy statements. Thus, the Preamble of the Wild Life (Protection) Act, 2002 recognises the growing alienation of the local communities from wild life conservation programmes as having an effect on increased wild life crimes and mismanagement. The amended Act seeks to provide for participatory management of the buffers around the National Parks and Sanctuaries. Section 36C of the Act introduces the concept of 'Community Reserves', under which the State Government may, where the community or an individual has volunteered to conserve wild life and its habitat, declare any private or community land not comprised within a National Park, Sanctuary or a Conservation Reserve, as a Community Reserve, for protecting fauna, flora and traditional or cultural conservation values and practices. This is a welcome step towards legal recognition of people's efforts at conservation. However, as per the definition provided for Community Reserve, it is confined only to private or community land. There may be communities traditionally involved in conservation, though the land concerned might belong to the Government. In such cases, those communities will not be able to derive benefits from this new provision, nor extend the benefits to the biodiversity they are conserving. Further, there is no definition of community land. There are some other provisions in the Act of 2002, which can be termed as supportive of the close link between community and natural resources. Section 36A the Act which provides for constitution of

"Conservation Reserves", states that for such constitution, the nature of the land should be such that it is adjacent to national park or sanctuary and link one protected area with another. The objective is to protect landscapes, seascapes, flora and fauna and their habitats. Notably, the Act requires consultation with local communities in declaration of Conservation Reserve. Furthermore, in the Management Committee for the Conservation of Forest, there is provision for including member from the Village Panchayat and NGOs.[61] Though it is a positive step, yet actual representation from the village community cannot be said to be ensured. While on one hand the management committee is only an advisory committee, on the other, representation is sought through elected members from the Panchayat. The success of the Panchayati system is itself under a great deal of debate and there has been opinion that elected members often do not represent all sections of society, particularly the underprivileged. The same concern also applies to the Community Reserve Management Committees, formed under the Act. It also consists of members nominated by the Village Panchayat and where there is no such Panchayat, nominated by the Gramsabha. However, unlike the management committee for Conservation Reserve, this Committee has authoritative powers to manage the reserve. It is competent to prepare and implement management plans for the reserve and can take steps for the protection of wildlife and habitat.

### 4.4.3 JOINT FOREST MANAGEMENT

The Forest Policy, 1988 envisaged people's involvement in the development and protection of forests, and enunciated that it is one of the essentials of forest management that the forest communities should be motivated to identify themselves with the development and protection of forests from which they derive benefits. The Government of India passed a resolution on June 1 1990, introducing the concept of Joint Forest

[61]Available at http://www.rightsandresources.org/wp-content/uploads/RRIReport_Protected-Areas-and-Land-Rights_web.pdf(visited on 21.01.2016)

Management[62] (JFM) to facilitate the implementation of the policy. Joint Forest Management often abbreviated as JFM is the official and popular term in India for partnerships in forest movement involving both the state forest departments and local communities.[63]

It has over the past few years acquired a more formal shape as the different States have brought out Regulations for this purpose.[64] The original circular of 1990 to the different States set out a new policy on forest management vide a process of reforestation of degraded forests through a partnership between foresters and forest communities by establishing ecological and economic benefits for the community.

The June 1990 resolution, for the first time, recognized the rights of the protecting communities over forestlands. It also acknowledged the role of NGOs as intermediaries between the Forest Department and the communities. Some of the salient features of JFM Resolution 1990 are:

- Forests should be protected by voluntary agencies or village communities, jointly with State Forest Departments as Village Forest Communities
- No ownership or lease over forest land to be given to village community or voluntary agency.
- The community is entitled full usufruct rights (over non-timber, grass, firewood and timber products) and partial share in final harvest of timber.
- Community to prepare micro-plan for the forest along with Forest Department.[65]

The subsequent guidelines brought out by the Ministry of Environment and Forests[66] (MoEF) in the year 2000 and amended again in 2002, have tried to plug the gaps and strengthen the programme. The 2000 guidelines have

[62]Hereinafter referred to as JFM
[63]Available at https://en.wikipedia.org/wiki/Joint_Forest_Management(visited on 21.03.2106)
[64] States such as Assam, Himachal Pradesh, Orissa and Madhya Pradesh have formally introduced Participatory Forest Management through formulating regulations under their respective State Forest legislation.
[65]Available at http://ifs.nic.in/Dynamic/pdf/JFM%20handbook.pdf(visited on 12.07.2016)
[66] Hereinafter referred to as MoEF

advised the states governments to provide legal status to JFM committees through registration of forest committees under Societies or Co-operative Societies Act, increased participation of women in the programme, giving 33% reservation to women in the Executive Committee, extension of JFM to less degraded forest areas, flexible forest working plans, to suit micro-plan for JFM areas, recognition for self-initiated forest protection groups and a transparent mechanism to compute the income sharing and benefits between different stakeholders. Further to these guidelines, in 2002 the MoEF issued another set of guidelines with a view to strengthen the JFM system. The provisions under these guidelines are important from the IK point of view, as they provide a scope for reflecting local needs in the work plan for JFM. The 2002 guidelines brought about articulation to the working arrangement between the forest department and the JFM committees. It required that, for the purpose of ensuring smooth working relationship between forest department and the JFM committees and also to bring a sense of empowerment and accountability, a Memorandum of Understanding[67] (MOU) should be signed between the forest department and the JFM committees. Such an MOU should outline the short term and long term roles and responsibilities, implementation of work program, pattern of sharing of usufructs and conflict resolution. Also, in the MOU the JFM committees should form the basic forest management units to provide them a feeling of empowerment and enable them effectively protect and conserve the forest resources. This provision shows recognition on the part of the government of the fact that, a sense of empowerment is necessary for the much-needed identification by the people with the issue of conservation. It was provided that the MOU should reflect the consumption and livelihood needs of the forest dependent communities. It was also provided that the MOU for each committee should have location specific work program based on site vegetation profile and mutual understanding. It should plan for restoration of vegetation and clearly spell out the roles, responsibilities and powers. It was

[67] Hereinafter referred to as MOU

emphasized that all JFM committees should be assigned specific roles for boundary demarcation, fire prevention and control of grazing, encroachments and illicit felling as well as ensure non-destructive harvesting of non-timber forest produce including medicinal plants. For this purpose, it was suggested, that the committees should be given authority to act. They should also be given monetary and other incentives as genuine stakeholders.[68]

#### 4.4.3.1 JFM AND PROTECTION OF TK OF THE INDIGENOUS PEOPLE

The JFM model provides an example of government effort to involve people into the process of conservation, as distinct from the alienation imposed by the existing legal regime for forests in India. In its ideal formulation, this system can be a potent tool for successful forestry management and IK protection. Available statistics also show a similar conclusion. However the JFM system is also not free from criticism. It has received criticism mostly in the following areas:

(i) Effective participation of the Village Forest Committees[69] (VFCs): A number of case studies in JFM areas have highlighted the fact that, though on paper the VFCs are equal partners in management of forest resources, in practice a number of factors block this from happening in reality. Those factors include historical attitude of Forest department towards exclusionary protection of forest resources, reflection of societal, caste-based inequalities in constitution of VFCs and effective participation of villagers in functioning of those committees.

(ii) Effective participation of women: This is a reflection of the lack of due representation of women that is typical of the Indian socio-political system. While JFM notification of 2000 specifically targeted this issue by providing for equal participation of women in the VFCs, requirement of their presence in management meetings and at least one third of

[68] Available at http://ifs.nic.in/Dynamic/pdf/JFM%20handbook.pdf (visited on 10.03.2016)
[69] Hereinafter referred tyo as VFCs

women participation in the management committees. In reality JFM model has not have proved itself an effective tool for ensuring effective gender participation. Women, with their immense contribution to generation, protection, propagation and transmission of TK, need to be adequately involved for JFM to contribute to protection of TK and the biodiversity.

As against the provisions for community participation in preparing work plan and management of forest resources, the JFM model has been criticized for not considering traditional practices of forest management of the community. From a more legal point of view, the legal status of the JFM guidelines have been questioned on the ground that they are based on the 1988 Forest Policy, which is not a legally enforceable document. That also raises questions about the legal protection afforded to those village communities who undertake the MOUs and put their efforts in implementing them. There is no legal accountability on the part of the forest department while implementing the JFM system in general, or MOU in particular. Further the benefit sharing provisions under MOUs also have been criticized for favoring the state as compared to the community who undertakes to implement the MOU. The benefits are accruable only on the satisfactory performance of the duties and functions by the community. It cannot be denied that the JFM system does provide a viable alternative to the protectionist approach to forest management and also contains a number of attributes for effective participation of the community.[70]

From the TK point of view, these aspects, implemented effectively, could prove to be an impetus for protection and development of TK related to forest resources. Being a participatory mechanism, it also promises a balance between rights and duties and national interest of forest protection. It can be mentioned here that providing individual or community ownership rights to people might not always prove to be beneficial for conservation. Every

[7070]Available at http://siteresources.worldbank.org/INTINDPEOPLE/922984-1112817179196/20451603/Forestry ManagementBiodiversityConservation.pdf(visited on 23.01.2016)

community has its own set of philosophy and practice and is continuously responding to the changes in values, ethics and aspirations. Instead of having a blanket regime for rights over forest resources, there is a need to look into the present state of practices in each society and accordingly plan the participation in managing the forest resources. This will provide on one hand, the much-required livelihood requirements and on the other, ensure that community practices are reflected in management of forests. The JFM model provides specific provisions for local needs and practices into the management plans. These provisions, effectively implemented, can be a means for realizing continuous use and development of TK by the community through use of and interaction with the surrounding natural resources. The legislation as it stands today offers little scope for community's knowledge to be reflected in the conservation process. The efficacy of the new provisions inserted in the Wildlife and Biodiversity law is yet to be observed. A review of the laws and policies in this field brings to fore that the policy statements in the sector of forests and environment are quite progressive, but there is a huge departure in the laws from the policies on the same subject. Furthermore, policy statements are mere guidelines and serve as intent statements, non-compliance with policies is not enforceable. Hence the good provisions of the policies need to be incorporated into the law on the given subject or else a new law should be enacted to reinforce the intent. In addition, seeking legal recognition to community rights is not sufficient; TK will have to be integrated into developmental planning processes to regain a status and validation.

### 4.4.4 DRAFT NATIONAL ENVIRONMENT POLICY 2004

The National Environment Policy (NEP)[71], 2004 is intended to be a guide to action: in regulatory reform, programmes and projects for environmental conservation; and review and enactment of legislation, by agencies of the Central, State, and Local Governments. It also seeks to

[71] Hereinafter referred to as NEP

stimulate partnerships of different stakeholders, i.e. public agencies, local communities, the investment community, and international development partners, in harnessing their respective resources and strengths for environmental management. On the whole, it is expected to do better than fiscal neutrality, and likely raise substantial resources from outside the fiscal regime to realize its objectives.[72]

The draft National Environment Policy has a number of provisions relevant to protection of TK. To begin with, clause 5.2.3 of the policy defines the term 'traditional knowledge'. TK is here defined as the ethno-biology knowledge possessed by local communities, relating to uses of various indigenous plant and faunal varieties, including in traditional medicine, food, etc., and is potentially an important means of unlocking the value of genetic diversity through reduction in search costs. The policy recognizes IK as a valuable resource and proposes adoption of a sui generis IPR system for its protection. The draft policy emphasizes enabling of the local communities, through this IPR system to derive economic benefits by permitting the use of their ethno-biology knowledge. The policy objective sets out the need to ensure equitable access to environmental resources for all sections of society particularly to the poor communities which are most dependent on these resources for their livelihoods. It also lays emphasis on providing space for participation of underprivileged men and women in various processes. Livelihoods of these vulnerable communities are very closely linked to the biological resources and the TK evolved there from. Thus, fulfillment of this policy objective would also ensure protection of TK when the vulnerable communities are assured equitable access to environmental resources. The policy makes this important observation that village commons – water sources, grazing grounds, local forests, fisheries, etc., have been traditionally protected by local communities from overexploitation through various norms, which may include penalties for unacceptable behaviour. These norms, may, however, have got diluted as a result of the process of development, including

[72]Available at http://www.cesc-india.org/doc-archiv/cpg-epw-23oct2004-nep-india.pdf (visited on 12.04.2016)

urbanization, and population growth resulting from sharp reductions in mortality, also through state actions which may create conditions for the strengthening of individual over communitarian rights and in doing so allow market forces to press for change that has adverse environmental implications. Such access to the community resources under weakened norms would lead to resource degradation and in result affect the livelihoods of the community.[73]

Protection of TK is also inherent in some of the principles expressed in the NEP 2004 which assure entitlements to human beings in the form of a right to a healthy and productive life in harmony with nature. People are entitled to a right to development and this for underprivileged, bio-resources dependent communities implies access to resources; their rights of self-determination and the right to regulate others' access to their knowledge. Under Principle of Equity, the NEP mentions procedural and end result equity where the former relates to fair rules for allocation of entitlements and obligations and the latter relates to fair outcomes in terms of distribution of entitlements and obligations. The NEP reinforces the doctrine of Public Trust and has in clear terms stated that State is not an absolute owner but merely a trustee of all natural resources which are by nature meant for public use and enjoyment, subject to reasonable conditions necessary to protect the legitimate interests of a large number of people, or for matters of national interest.[74]Weak enforcement of the laws and policies among other things has been attributed to insufficient involvement of the potentially impacted local communities in the monitoring of compliance.[75] The Policy makes some reference to the traditional land use practices of local people to suggest that the use of such practices should be encouraged through research and development. This accords some validation to the traditional practices which are based on indigenous knowledge of the local and indigenous communities. The National Environment Policy acknowledges the fact that the receding traditional

[73]Available at http://www.fbae.org/2009/FBAE/website/images/PDF%20files/Imporatant% 20 Publication /National%20environment%20Policy%202004%20(Draft%20for%20Comments).pdf(visited on 13.03.2016)
[74] Clause 4 of the Draft National Environment Policy enlist these principles.
[75] Clause 5.1.3 (v) of the Draft National Environment Policy relating to Substantive Reforms.

community rights of forests dwelling tribes since the commencement of formal forest laws and institutions in 1865 has led to the deterioration of the forests. Disempowerment of the communities led to the forests becoming open access in nature.

Clause 5.2.2 (i) (a) of the policy places a categorical emphasis on giving legal recognition to the rights of the forest dwelling tribes. This, according to the policy, would secure their livelihoods of these people and also provide long – term incentive to the tribals to conserve the forests. The policy also alludes to the establishment of multi-stakeholder partnerships involving the Forest Department, local communities and investors, with clearly defined obligations and entitlements for each partner, following good governance principles to derive environmental, livelihood, and financial benefits. It also suggests rationalization of restrictions on cultivation of forest species outside notified forests to enable farmers to undertake social and farm forestry where their returns are more favourable than cropping. Similarly regarding protection of wildlife, the policy emphasizes expansion of the Protected Area[76] (PA) network of the country which would include the new categories of Conservation and Community Reserves. In doing so, the policy seeks participation of local communities, and the other stakeholders, to harmonise ecological and physical features with needs of socio-economic development. It also proposes partnerships for enhancement of wildlife habitat in Conservation Reserves and Community Reserves so as for the community to derive both environmental and eco-tourism benefits. The policy, further, proposes promotion of site- specific eco-development programmes in fringe of Protected Areas to restore livelihoods and access to forest produce by local communities. But as the policy itself says 'any policy is only as good as its implementation'.

The draft NEP, 2004, outlines a number of new and continuing initiatives in matters relating to conservation of biological resource, protection of community rights thereby affording protection to TK, but the policy does

[76] Hereinafter referred to as PA

not make any reference to any legislative effort that would be required to make the provisions of this policy enforceable.

## 4.5 DOCUMENTATION OF TK IN INDIA

In the above discussion the researcher has primarily concentrated on the legal efforts at the national level to protect TK. Here, the researcher will be dealing with the non-legal efforts undertaken to protect TK; primarily the efforts at documentation of TK in India. Documentation of TK is regarded as a means to extend protection to TK, innovations and practices in a number of ways.[77] Particularly, it is believed that proper documentation of associated TK could help in checking biopiracy.[78]The nature of TK is such that it is mainly transmitted orally and is seldom written down. This leads to difficulties when parties not authorized by the holder of that knowledge seek to obtain IPRs over it. Since there is no accessible written record, patent examiners from other countries are unable to access documentation that would challenge the novelty or inventiveness of an application which is based on TK. The only option for an aggrieved party, be it the holders of the knowledge, or someone representing them, is to challenge the patent during the granting process or after grant, which is an expensive and cumbersome process (as highlighted in the Basmati and turmeric case). It is assumed that if the material or knowledge is documented it can thus be made available to patent examiners all over the world, so that prior art in the case of inventions based on such materials or knowledge is readily available to them. Such documentation can help establish the property rights of local communities over their TK and in cases where TK is commercialized it can facilitate PIC and an equitable sharing of benefits with the TK holders. Documentation can also serve as a mechanism for obtaining protection of TK through national sui generis systems. In addition, documentation can help provide a reliable estimate of the nature and

[77] "The Role of Registers & Databases in the Protection of Indigenous Knowledge-A Comparative Analysis", United Nations University Institute of Advanced Studies (UNU-IAS), Japan, January 2004.

[78] "Protection of Biodiversity and Traditional Knowledge- The Indian Experience" (WT/CTE/W156 IP/C/W/198), Submission by India at the Committee on Trade and Environment Council for Trade- Related Aspects of Intellectual Property Rights, 14 July 2000

extent of biodiversity and associated TK. It can facilitate researchers and others in examining the threats faced by biodiversity and TK. Through recording and preservation in a documented form, TK is prevented from being lost.

### 4.5.1 TRADITIONAL KNOWLEDGE DIGITAL LIBRARY (TKDL)[79]

India's rich traditional knowledge has not only been passed down by word of mouth from generation to generation, but has also been described in ancient classical and other literature. Such knowledge is often inaccessible to the common man, and even when accessible, is rarely understood, as it exists in local languages such as Sanskrit, Urdu, Arabic, Persia, Tamil etc. Documentation of this existing knowledge of various traditional systems of medicine, available in the public domain, has become imperative to protect it from being misappropriated in the form of patents on non-original innovations. It had been observed that, in the past, patents have been granted to inventions related to already known traditional knowledge because the patent examines could not search for traditional knowledge as prior art, due to the non-availability of such information in the classified non-patent literature. In 1995, the United States Patent Office granted a patent on the wound-healing properties of turmeric (curcuma longa) which was challenged successfully and the patent revoked. The revocation of the patent granted by European Patent Office to W.R. Grace Company and the United States Department of Agriculture on neem, again on the same grounds of its use having already been known in India, is another example. A study conducted in 2000 showed that 4,896 patents on medicinal plants had been granted by the US Patent Office, 80 percent of which were on plants of Indian origin. The finding also revealed that out of 760 such patents, 350 should have not been granted every year, mainly due to the lack of access to documented traditional knowledge in India. Every year, about 1,500 patents were being granted by

[79] Hereinafter referred to as TKDL

the European Patent Office (EPO) and the US Patent Office, based on traditional knowledge in medicine.[80]

Keeping in view the importance of such traditional knowledge, the Department of Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homeopathy (AYUSH)[81] of the Indian government constituted an inter-disciplinary Task force in 1999 for the preparation of an approach paper on establishing a Traditional knowledge Digital Library (TKDL). Accordingly, the Government of India has undertaken the development of the TKDL database to prevent patenting of inventions based on Indian traditional knowledge.

TKDL aims to act as a bridge between the traditional knowledge existing in local languages and the patent examiners at various international patent offices. If TKDL had existed earlier, international disputes such as those referred to above would not have arisen. TKDL has also resolved the perpetual problem of lack of access to documentation on India's traditional medicine due to language barriers or formatting incompatibilities, thereby abating the loss of future revenue and resources. It is seen by India as safeguard against the burgeoning research-based fields of biopharmacology integrative medicine (IM)[82], evidence based complementary and alternative medicine (CAM)[83], ethnobotany and enthnopharmacology.

TKDL is a joint project of five Indian government organizations, including the Council of Scientific and Industrial Research (CSIR)[84] and the National Institute of Science Communication and Informative Resources (NISCAIR)[85]. More than 150 traditional medical practitioners, information technology engineers, patent examiners, intellectual property attorneys, scientists, researches and libraries worked together to construct this database for India's indigenous medical and scientific knowledge resources which

[80]R. Chakravarty, *"*Presenting Traditional knowledge; Initiatives in India*"*, *IFLA Journal* 36:294, 2010 pp. 224, available at ifl.sagepub.com/content/26/4/294. Full.pdf (visited on 28.02.2016)
[81] Hereinafter referred to as AYUSH
[82] Hereinafter referred to as IM
[83] Hereinafter referred to as CAM
[84] Hereinafter referred to as CSIR
[85] Hereinafter referred to as NISCAIR

would fit within the framework of the International Patent Classification (IPC)[86] scheme. The TKDL teams systematized and arranged the ancient and medieval Indian medicaments in this database in accordance with modern conventions of taxonomy. The database is built up from transcribed texts of the triad of Indian medical sciences-Ayurveda, Unani and Siddha transposed sacred slokas (verses), of 14 ancient texts from the 6th to 3rd century BC Vedic corpus, and other authoritative Oriental canons and treatises.[87]

Translation of palm leaf scriptural verses, parchment manuscripts, textbook citations and oral tradition references into decoded English, French, German, Japanese and Spanish required Brahmi-based and other non-Latin script conversions of Vedic Sanskrit, classical Sanskrit, Hindi, Arabic, Farsi/Persian, Dravidian, Tamil and Urdu in accordance with international language encoding standards (ISO)[88] and Unicode meta data.

The TKDL team developed 'smart translation' software to produce the scanned text and images from 54 primary sources on ayurvedic medicinal properties, provenance data, biological activity, chemical constituents, approximately 1,50,000 triad medicines and pharmaceutical preparations, 1,500 yoga asana therapies, traditional botanical names malady descriptions, and other bibliographic details in contemporary terminology. TKDL had completed documenting over 2,20,000 medical formulations (including 81,000 Ayurveda, 1,40,000 Unani and 12,000 Siddha formulations) and saved them from piracy. TKDL is a dynamic database, where formulations are continuously added and updated according to inputs from the users of the database.

The information on traditional medicines appears in a standard format in TKDL. For example, formulations on Indian Systems of Medicine appear in the form of a text, which comprises the name of the drug, origin of the knowledge, constituents of the drug with their parts used and their quantity, method of preparation of the drug and usage of the drug as well as

[86] Hereinafter referred to as IPC
[87] Ibid
[88] Hereinafter referred to as ISO

bibliographic details. TKDL uses modern names of plants (e.g. fever Curcuma longa for turmeric), disease (e.g. fever for jwar), or process and establishes relationship between traditional knowledge and modern knowledge. TKDL includes search interface providing full text search and retrieval of traditional knowledge information using the IPC, Traditional knowledge Resource Classification (TKRC)[89] and keywords in multiple languages. TKRC, an innovative structured classification system for the purpose of systematic arrangement, dissemination and retrieval has been evolved for about 25,000 subgroups related to medicinal plants, minerals, animal resources, effects and disease, methods of preparation, mode of administration etc. Search features of TKDL include complex Boolean expression search, proximity search, field search, phrase search etc. the database does not claim exhaustive coverage and does not affect the rights and obligations relating to any prior art traditional knowledge formulation or know-how not listed in TKDL. The contents of TKDL are being digitally transcribed into a readable from in fuel international languages-English, French, German, Japanese and Spanish-with the objective of preventing their misappropriation at international patent offices.

India is going all out to save yoga, a 2,000-year-old Indian art of righteous living. The team of TKDL is presently scanning through 35 ancient Sanskrit texts, including the Mahabharata, Bhagwad Gita and the Yoga Sutras of Patanjali to identify and document all known yoga concepts, postures and terminology. Among the yoga books being scanned by scientists are Hatha Praditika, Gheranda Samhita, Shiva Samhita and Sandra Satkarma. Currently, 600 ‘asanas’ (physical postures) have already been documented with a target to put on record at least 1,500 such yoga-related patents granted in the USA have been traced TKDL. One the postures are put on record, they would be made available in five international languages. Besides photos and explanation of the postures, video clips of an expert performing them will be

[89] Hereinafter referred to as TKRC

put in the TKDL. A voice-will also point out which text mention the posture.[90]

Access of TKDL to International Patent offices is available under TKDL Access (Non-disclosure) Agreement. Under the agreement, examiners of patent office can utilize TKDL for search and examination purpose only and cannot reveal the contents of TKDL to any third party unless it is necessary for the purposes of citation. TKDL Access Agreement is unique in nature and has in built safeguard on non-disclosure to protect India's interest against any possible misuse.

India has signed TKDL Access Agreements with; European Patent Office[91] (February, 2009); United States Patent and Trademarks Office (November, 2009); Indian Patent Office (July, 2009); Canadian Intellectual Property Office (September, 2010); German Patent Office (October, 2009); united Kingdom Patent Office (February, 2010); Intellectual Property Australia (January, 2011); and Japan Patent Office (April, 2011).[92]

The TKDL allows examiners at EPO to compare patent applications with existing traditional knowledge. New patent applications need to demonstrate significant improvements and inventiveness compared to prior art in their field. The cooperation between India and the EPO comes at a time when many countries are struggling to protect traditional and respected knowledge against exploitation, primarily in the pharmaceutical sector. The 34 member states of the EPO now have restricted access for purpose of patent search and examination. TKDL is integrated with the EPO's database as another measure to thwart illegitimately-gained exclusively. Experts at the EPO say that access to the 30-million-page database will help them to correctly examine patent applications relating to traditional knowledge at an early stage of patent examination.

[90]Available at http://www.ayush.gov.in/sites/default/files/tkdl.pdf(visited on 13.07.2016)
[91] Hereinafter referred to as EPO
[92]V. K.Gupta, "Traditional Knowledge Digital Library-A Model to protect Traditional Knowledge*", a*vailable at pib.nic.in/new-site/efeatures.aspx?relid=79647 (visited on 29.04.2016)

Since the grant of access in February, 2009, the EPO has identified 36 patents making use of India TK. In some cases, the EPO set aside its intention to grant the patent, application and similar results withdrew their application and similar results are expected by the CSIR for the rest of these cases. This could prevent engagement in legally complex and extremely expensive opposition process, according to the CSIR.[93] TKDL efforts have also been appreciated at the international level as well. It has become a model for other countries on defensive protection of their traditional knowledge from misappropriation. Countries and organizations such as South Africa, the African Region Intellectual Property Organization (ARIPO)[94], Mongolia, Nigeria, Malaysia and Thailand have expressed their keen desire to replicate TKDL.[95]

### 4.5.2 THE INTERNATIONAL CONFERENCE ON THE UTILIZATION OF THE TRADITIONAL KNOWLEDGE DIGITAL LIBRARY (TKDL)

The International Conference on the Utilization of the TKDL as a model for protection of TK was organized by the WIPO, in cooperation with the CSIR, in New Delhi, India from March 22 to 24, 2011.

Following were the the main objectives of the Conference:

- share experiences and information on the role of a TKDL in the documentation of traditional knowledge (TK);
- identify the intellectual property (IP) issues in and technical implications of the establishment of a TKDL; and
- explore the role and functioning of the TKDL within the international IP protection system.[96]

In this Conference, WIPO Director General Francis Gurry welcomed international cooperation in the fight against the misappropriation of TK. This

[93]Available at http://indigenouspeopleissues.com/index.php?option=com_content&view=article&=9532:india-wipo_and-india-partner-to-protecttraditional-knowledge-frommisappropriation-judigeno(visited on 12.03.2016)
[94] Hereinafter referred to as ARIPO
[95]R. Chakravarty.*,* "Presenting Traditional knowledge; Initiatives in India*", IFLA Journal* 36:294, 2010 pp. 224 Available at ifl.sagepub.com/content/26/4/294. Full.pdf (visited on 28.02.2016)
[96]Available at http://www.wipo.int/meetings/en/2011/wipo_tkdl_del_11/general.html(visited on 12.03.2016)

was echoed by India's Minister of Science and Technology, Earth Sciences, and Parliamentary Affairs Pawan Kumar Bansal. Mr. Bansal said TKDL has been *"an immensely effective tool for the protection of Traditional Knowledge…..a powerful weapon to fight biopiracy."*[97]

Mr. Gurry described the TKDL approach as complementary to the work currently underway in WIPO's Inter Governmental Committee (IGC)[98] on Intellectual Property and Genetic Resources, Traditional knowledge and Folklore, where WIPO's 184 member states are negotiating an international legal instrument to ensure the effective protection of TK and traditional cultural expressions, and to regulate the interface between IP and genetic resources.

The Indian TKDL project, developed over a ten year period, documented knowledge about traditional medical treatments and the curative properties of plants, which was contained in ancient texts and languages, and classified the information in a searchable, via Access and Non-Disclosure Agreements, to six major international patent offices, the TKDL, coupled with India's global bio-piracy watch, system has, according to the CSIR, achieved dramatic success in preventing the grant of erroneous patents, at minimal direct cost and in a matter of a few weeks. Mr. Gurry said that India's TKDL could be a good model for others and that WIPO was ready to facilitate international collaboration for countries, inspired by the Indian example, were interested in establishing their own TKDL's.

The Director-General said WIPO is in consultations with the Government to "internationalize" the TKDL-to help make available the Indian Government's TKDL experience and know-how to other countries which plant to create their own TKDL's. He said, "WIPO is prepared to assist beneficiary countries, should they so wish, to conclude access and non-

[97]Available at http://www.tkdl.res.in/TKDL/Conference/pdf_files/Report_of_Conference.pdf (visited on 12.03.2016)
[98] Hereinafter referred to as IGC

disclosure agreements with international patent offices. Beneficiary countries would own and control access to their own TKDL's"[99]

CSIR Director General Samir K. Brahmachari and Director of the TKDL V.K. Gupta reiterated India's willingness to work with countries interested in similar models to protect their TK Mr. Brahmachari said that the challenge for the New Delhi Conference and beyond is to ensure that the great treasures represented in a nations' TK is to ensure this knowledge serves future generations.[100]

However, as the cradle of one of the most mega bio-diverse regions of the world that supports ancient as well as relatively recent forms of indigenous knowledge, India has a duty towards her traditional communities to ensure their right to live in their natural environment and to earn their livelihood by way of practicing their traditional knowledge. It is imperative for India to establish a viable mechanism to regulate access to the traditional knowledge possessed by the indigenous people as well as ensure that there is reasonable and equitable sharing of benefits based on the three pillars of prior informed consent, regulated access to traditional knowledge resources and establishment of an equitable benefit sharing mechanism.[101]

It can be concluded that though certain provisions are made in the GI Act, PPVFR Act, Biological Diversity Act, 2002, the Patents (Amendment) Act, 2005 and forest and wildlife legislations for the protection of TK, still there is a strong need for protecting and promoting the traditional knowledge related to biodiversity and TKDL is an effective tool to combat biopiracy and protect traditional knowledge but a sui generis system separate from the existing IPR system should be designed to protect traditional knowledge of the local and indigenous communities of India.

---

[99]Available at http://www.wipo.int/meetings/en/2011/wipo_tkdl_del_11/(visited on 12.03.2016)

[100]Available at http://indigenouspeopleissues.com/index.php?option=com_content&view=article&= 95 3 2 :india- wipo_and-india-partner-to-protecttraditional-knowledge-frommisappropriation-judigeno(visited on 12.03.2016)

[101]S. K.Sreedharan, "Bridging theTime and Tide –Traditional Knowledge in the 21st Century" 15 *JIPR* 146-150, March 2010, available at http://nopr.niscair.res.in/bitstream/123456789/7624/1/JIPR%2015(2)% 20146150.pdf (visited on 21.11.2015)

# CHAPTER V
# BIOPIRACY DISPUTES

## 5.1 INTRODUCTION

The present chapter deals with various biopiracy disputes and its impact. The issue of biopiracy has come into sharp focus because of industrialized nations' interests in securing trade benefits for high technology industries and developing nations' attempts to maintain a hold over resources that are used by these high technology industries. It has become a serious problem in biologically rich developing nations because patents on non-patentable knowledge are granted which are either based on the existing indigenous knowledge of the developing world, or a mirror variation. It shows the biopiracy of indigenous peoples' knowledge and in many of these cases the country has to fight to revoke the granted patents which require huge cost and time.[1] Following biopiracy disputes will show how the developed countries, through patents, are commercially exploiting biological resources associated with indigenous peoples' knowledge which is a major threat to the very survival of the indigenous communities.

## 5.2 THE TURMERIC PATENT DISPUTE

The haldi patent is a significant case in the *"biopiracy"* conflict. In 1995, the US patents office granted turmeric patent to two Non-Residential Indians (NRIs), working with the University of Mississipi Medical Centre. This patent raised huge outcry in India as it was a case of biopiracy in which the rights of the indigenous communities were involved. The Indian Council for Agricultural Research (ICAR) and Council for Scientific and Industrial Research (CSIR) challenged the patent on the ground that haldi was used in India for centuries to heal wounds and rashes and therefore its medicinal use was not a new invention. Thus it is a case of biopiracy due to the lack of

[1] S.S. Santra, "Biopiracy", Newsletter,19, *ENVIS Centre of Enviromental Biotechnology* (2011) , available at envis.Kubiotech.org/newslet19.pdf (visited on 06.10. 2015)

novelty.[2] Their claim was supported by documentary evidence of traditional knowledge, including ancient Sanskrit texts and a paper published in 1953 in the Journal of the Indian Medical Association. The petitioners asserted that rhizomes of turmeric have been used for generations in Indian households which have properties that make it an effective ingredient in medicines, cosmetics and colour dyes. It has been an indispensible part of Indian cuisine & also has religious significance.[3] On the basis of evidence produced it was held to be a case of biopiracy and thus the United States Patent Office revoked the patent. This was the first time a patent based on the traditional knowledge of a developing country was successfully challenged.[4] Thus, the revocation of turmeric patent was just the first step in stopping biopiracy.[5]

The botanical name of turmeric is curcumalon-galzingiberace. Turmeric, popularly known as haldi in India is an herbaceous perennial plant of the ginger family that is native to the tropical belts of South Asia. It needs temperature from 20 to 30 degrees celsius and a substantial amount of rainfall to grow. Hence, it is commonly grown and commercially harvested in India, Asia, and other tropical countries. Components of turmeric are named curcuminoids, which include mainly curcumin (deferulolyl methane), demethoxycurcumin and bisdemethoxycurcumin. Curcumin is a non-toxic, highly promising natural anti-oxidant and antiseptic compound having a wide spectrum of biological functions.[6] The thick, cured rhizomes contain proteins, vitamins, minerals, carbohydrates, and yellowish orange volatile oils called curcuminoids that are responsible for the biological activity of turmeric.[7] It is also a very important spice in India which is obtained from rhizomes of the plant. It forms a part of most Indian curry powder. The spice is sometimes also called the *'Indian saffron'* due to its brilliant colour. Due to its extra-ordinary molecular structure it shows strong anti-oxidative, as well as anti-

[2] Novelty implies that the innovation must be new. It cannot be part of 'prior art' or existing knowledge.
[3] Available at http://karshaka.blogspot.in/2012/03/haldi-victim-of-bio-piracy.html (visited on 21.09.2016)
[4] Available at http://www.tribuneindia.com/2007/20070617/spectrum/main1.htm (visited on 21.09.2016)
[5] Available at http://www.twn.my/title/tur-cn.htm /(visited on 20.09.2016)
[6] Available at http://www.researchverified.com/turmeric/TurmericStudy3.pdf (visited on 13.10.2016 )
[7] Available at http://scholarsresearchlibrary.com/AASR-second-issue/10.AASR1_2_86-108.pdf (visited on 13.10.2016)

inflammatory properties.[8] The rhizomes of the plant are boiled for many hours, dried in hot ovens, and ground into a deep orange-yellow powder. This makes for the popular turmeric powder, which is the most common form of usage of turmeric in India. Thus haldi is extensively used by the indigenous people as food, to treat a wide variety of diseases and it also has a place in many religious ceremonies. In Hinduism it is important particularly at weddings; it is used as a dye for holy robes and as a paste to decorate the skin for religious events.[9]

### 5.2.1 USE OF TURMERIC IN AYURVEDA

Turmeric held a place of honour in Indian traditional ayurvedic medicine.[10] It has been used in India for more than two millennia and is a core component of various medications in India's traditional medicine system. Ancient India had discovered turmeric's medicinal properties and prescribed haldi for the treatment of many medical problems ranging from constipation to skin diseases.

The main uses of turmeric in Ayurveda system of medicine are the following:

- Turmeric is used for epilepsy and bleeding disorders, skin diseases, breathing problems, digestion issues, and liver and spleen troubles, as well as for purifying the mind and body.
- It also has therapeutic uses which are as follows. It is used to treat anaemia, cancer, diabetes, food poisoning, gallstones, Irritable Bowel Syndrome, parasites, poor circulation, staph infections, and wounds.
- Turmeric reduces fevers, diarrhoea, urinary disorders, poisoning, cough, and lactation problems in general.

[8] Jaggi Lal, "Turmeric, Curcumin and Our Life: A Review", *Bull. Environ. Pharmacol. Life Sci.;* Volume 1 [7] June 2012: 11 – 17, available at www.bepls.com (visited on 15.10.2016)
[9] Available at https://www.pbrc.edu/training-and-education/pdf/pns/PNS_Turmeric.pdf (visited on 11.10.2016)
[10] Ibid

- Turmeric is used to treat external ulcers that respond to nothing else. It decreases watery discharges like leucorrhoea, and any fluid in the eyes, ears, or in wounds, etc.[11]
- It is used as analgesic, anti-bacterial, anti-inflammatory, anti-tumour, anti-allergic, anti-oxidant, antiseptic, anti-spasmodic, appetizer, and as an astringent. Ayurveda advises the application of turmeric to wounds, due to its anti-bacterial and anti-inflammatory nature. Turmeric's use as an anti-inflammatory was the most predominant and documented use. Due to the potent anti-inflammatory nature of its active ingredient (curcumin), turmeric was used to treat conditions like jaundice, menstrual difficulties, haemorrhage, bruises, chest pain, and colic.[12]

### 5.2.2 USE OF TURMERIC FOR SKIN CARE

According to Ayurveda, turmeric is *Vranahara* (ulcer healing),*Varnya* (improves complexion), *Tvakdoshahara* (cure skin diseases), and *Kandoohara* (cure itching). Before the emergence of synthetic and herbal skin care products in the market, womenfolk were dependent more on turmeric, and they used to smear their bodies with a mixture of turmeric–sandal paste for gaining a golden glow to their skin. Turmeric helps to remove hairs and impart colour and improve complexion of skin. Several Sanskrit synonyms of turmeric indicate its colour-improving property (such as: *varna-datri*-one who gives colour, indicates its use as enhancer of body complexion; *hemaragi* and *hemaragini*-both indicate golden colour, meaning that it is used by womenfolk to get a golden complexion; *yoshti priya*, meaning favourite of young women, indicating its use for enhancing beauty; *hridayavilasini*, meaning giving delight to heart, charming; etc.). The fresh juice of haldi is believed to have anti-parasitic property in many skin afflictions. Turmeric powder with cow's urine is given internally also in prurigo and eczema. Its mixture with gingili oil is applied over the body to prevent skin eruptions. A

[11] Available at http://www.turmeric.co.in/turmeric_ayurvedic_use.htm(visited on 29/12/2015)
[12]Available at http://whfoods.org/genpage.php?tname=foodspice&dbid=78, (visited on 28/12/2015)

coating of turmeric powder or a thin paste is applied on small pox and chicken pox patients to facilitate the process of scabbing.[13]

### 5.2.3 USE OF TURMERIC IN UNANI

The Unani system of medicine-the ancient Persian system of medicine that forms the bridge between Ayurveda and Greek medicine, also relied on turmeric. In Unani turmeric is considered to be the safest herb of choice for all blood disorders since it purifies, stimulates and builds blood. Moreover, it has been used in India for its cosmetic benefits. Turmeric paste is commonly used by Indian women to improve skin, as an anti-microbial, and as an anti-ageing element.

### 5.2.4 USE OF TURMERIC AS FOOD

To most people in India, from housewives to Himalayan hermits, turmeric is affectionately called the *'Kitchen Queen'*, the main spice of kitchen.[14] According to ayurveda, in cooking, turmeric is a multifaceted wonder spice which helps to detoxify the liver, balance cholesterol levels, fight allergies, stimulates digestion, boost immunity and enhance the complexion.[15] Turmeric is non-toxic and can be consumed daily. As a powder, it has been used as a spice in vegetable and meat preparations in many Asian countries for centuries. Turmeric is used differently in some regions in the Indian subcontinent, with some cooking styles choosing to wrap and cook food in turmeric to impart a different flavour. It adds a distinctive yellow colour and taste to food. It is combined with several other spices to make vegetarian and non-vegetarian curries, pickles, sauces and spice blends. As a fresh root, it is added to beverages such as tea for its medicinal effects.[16]

[13] Available at http://www.ajpcr.com/Vol6Issue3/171.pdf (visited on 11.09.2016)
[14] Supra note 16
[15] Available at http://scholarsresearchlibrary.com/AASR-second-issue/10.AASR1_2_86-108.pdf (visited on 08.09.2016)
[16] Available at https://www.pbrc.edu/training-and-education/pdf/pns/PNS_Turmeric.pdf (visited on 19.08.2016)

It is also used along with milk as a cure for colds and a comfort to throat irritations.

### 5.2.5 OTHER USES OF TURMERIC IN TRADITIONAL SYSTEM

- It is an essential ingredient of the traditional bathing ritual of Indian marriages where it is applied along with sandal wood paste before the bath.[17]
- It is an essential substance to purify the gum resin of *Commiphora mukul* (Guggul) before it is used in ayurvedic formulations.
- Turmeric powder is mixed with the latex of *Snuhi* (*Euphorbia nerifolia*) plant and is then coated over the surgical thread repeatedly. This thread is known as *Ksharasoothra* , which is tied on piles and fistula to cure them effectively.
- In veterinary medicine, turmeric is used to heal wounds or ulcers of animals.
- In *"leech therapy",* turmeric powder is sprinkled over the leech to detach it from the biting site. Again turmeric powder is added to the water, in which the leech is kept, to make it vomit the sucked blood.
- Turmeric powder is used as an insect and ant repellant and sprinkled around the vessels to be protected.
- Turmeric is included in the group of yellow substances (*Peethavarga*) in *Rasa sastra* (Alchemy), used in the processing of mercury. [18]
- It also works as a dye, used indigenously for Indian clothing. Marco polo (1280 AD) refers to turmeric as Indian saffron used for dying clothes. Buddhist monks have used turmeric as a dye for their robes for at least 2000 years.[19]
- In many parts of India, it is used to paint doors due to its insecticidal properties.

[17]Available at http://scholarsresearchlibrary.com/AASR-second-issue/10.AASR1_2_86-108.pdf (visited on 17.08.2016)

[18] Available at http://www.ajpcr.com/Vol6Issue3/171.pdf (visited on 17.08.2016)

[19]Jaggi Lal, "Turmeric, Curcumin and Our Life: A Review", *Bull. Environ. Pharmacol. Life Sci.;* Volume 1 [7] June 2012: 11 – 17, available at www.bepls.com (visited on 15.10.2016)

### 5.2.6 PATENTING OF TURMERIC

In May 1995, the United States Patents and Trademarks Office (USPTO) granted a turmeric patent to the University of Mississippi Medical Centre, Jackson, U.S. The patent was titled *'Use of turmeric in wound healing'*.[20] The patentees were non-resident Indians-Suman K. Das and HariHar P. Cohly-at the University of Mississippi Medical Centre. The patentees, under the blanket of the patent, enjoyed exclusive rights to certain formulations of turmeric that were successful in wound healing. The patent gave them exclusive rights to sell and distribute turmeric. It was an attempt to secure a monopoly on turmeric powder's use in wound healing. The fact that the patent was filed implied that the researchers had invented a *'new'* use for turmeric powder. The USPTO's defence on the patent was that turmeric was indigenously and publicly used for healing wounds only as an ointment. The patent was an application in the powder form. At the same time, the patentees asserted that they would not seek a patent in India for the same. From 1995 to 1997, turmeric was the subject of a patent dispute. The patentees' assertion of not seeking a patent in India did not mitigate the piracy of the invention: as turmeric was indigenous knowledge, the patent was an act of biopiracy.

### 5.2.7 IMPACT OF THE GRANT OF TURMERIC PATENT

The patent had an immediate impact, both economic and social. The patent revolved around turmeric and its uses; the patent had the potential to disrupt the trade of turmeric. A patent covering turmeric would imply that the use of turmeric would require a royalty payment to the patentees in any country where the patent would stand. Any turmeric product manufactured, any export of turmeric, and local use of turmeric would all require licensing fee payment. Ironically, if an expatriate Indian in America were to use turmeric in his/her daily life, he/she would be infringing United States (U.S. patent law) and would be open to prosecution. Consumers would have to pay

[20] R.V.Anuradha, "Bio-piracy and Traditional Knowledge" *The Hindu*( 20 May 2001), available at http://www.hinduonnet .com/folio/fo0105/01050380.html (visited on 28.09.2015)

to apply turmeric to their wounds. The patent, if not overturned, had the potential to cause a huge outflow of money from India to the U.S. in the form of licensing fees. The patent holder had exclusive rights over any turmeric drug and could make substantial profits from it, as no Indian pharmaceutical company could export its products to the U.S. without paying royalties to the Mississippi Medical Centre. This meant that India would lose one of the largest export markets it had.

Thus, the turmeric patent triggered two forms of potential losses for the Indian community, that is, royalties out of India in the guise of licensing fees and royalties and deadweight losses that came from pricing a good far higher than its production costs. This was simply the economic losses and excluded the social cost to India and Indians who had to pay for using the herb for its medicinal properties. It is difficult to estimate the total social cost that India incurred due to the turmeric patent.[21]Moreover, the turmeric patent threatened a very dominant unit of India's export of spices as India accounted for 46 percent of the world's spice trade volume in 2004[22] which was a huge setback for the Indian economy.

### 5.2.8 OBJECTIONS AND FILING OF COMPLAINT AGAINST THE TURMERIC PATENT

Activists in India immediately took notice of the patent. While drug companies regularly filed pharmaceutical patents to protect their developed products and recover research and development costs, activists felt that patenting an herbal medicinal practice that was centuries old was unjustifiable. As Vandana Shiva, Director of the Research Foundation for Science, Technology, and Natural Resources, said, '*This is yet another blatant example of biopiracy. How can anybody patent something that has been the collective wisdom of a people for centuries?'*[23] Driven by the initial protests

[21] Available at http://www.american.edu/ted/turmeric.html (visited on 18.12.2015)
[22] Ibid.
[23] Available at http://www.outlookindia.com/article.aspx?201841(visited on 22.12.2015)

led by Non-Governmental Organisations (NGOs), the government took notice of it. In 1997, a complaint was filed by the Council for Scientific and Industrial research (CSIR) in India. The challenge was led by the head of CSIR, Dr. R.A. Mashelkar, an Indian scientist actively working to protect India's intellectual property. The complaint was directed at the novelty of the discovery made, claiming that the qualities of turmeric that were patented were India's indigenous knowledge. India had been using turmeric for thousands of years, including for its medical benefits. The legal criteria surrounding any patent are the novelty of the patent, the non-obviousness of the patent, and the utility. Activists claimed that the patent did not meet the requirements of novelty and non-obviousness. U.S. law allowed a patent on a medicinal substance if a new medicinal property was found; however, the substance could never be patented and in this case the use of haldi was not a novel one.

### 5.2.9 DECISION

The complaint by the CSIR triggered a USPTO examination of the patent. Examination continued for four months. Ultimately, on August 13, 1997, the patent was revoked. The six claims made by the patent were rejected. Ancient Sanskrit writing that documented the uses of turmeric in Indian history-especially its use to heal wounds *'drove the nail in the coffin'* for the patent. CSIR provided a compelling evidence of turmeric being used as a powder for years in India which led to the revocation of patent and the denial for re-examination of the patent by University of Mississippi Medical Centre.

The cancellation of the patent was perceived as a great achievement in India. The CSIR claimed, *"This is a significant development of far-reaching consequences for the protection of the traditional knowledge base which has been an emotional issue not only for the people of India, but also for those of*

*other Third World countries"*.[24] Pointing out the *"far-reaching consequences"*, the CSIR elaborated that, *"This appears to be the first case where the use of traditional knowledge base from a third world country, patented through a US patent, has been successfully challenged with the USPTO, leading to complete cancellation. Earlier efforts made by several interested groups to challenge the neem patent were not even entertained for admission by the US Patent Office. This success story strongly sends signals that if patent cases are fought on well-argued and well supported techno-legal grounds, then there is nothing to fear about protecting our traditional knowledge base. This case also demonstrates that CSIR and other Indian institutions are now acquiring capabilities to fight the complex techno-legal issues of IPR, both defensively and aggressively, to meet the challenges under the WTO regime."* According to Mashelkar, director-general of CSIR, *"This success will enhance the confidence of the people and help remove fears about India's helplessness in preventing biopiracy and appropriation of inventions based on traditional knowledge."*[25]

Thus, the patent claim had no strength as it was a clear instance of biopiracy. In this case no coalition was formed between any local community and any Non-Governmental Organisation (NGO) or government body. Instead, the protest against the grant of haldi patent was almost entirely driven by the CSIR. Due to the efforts of CSIR, litigation was triggered and the weak patent fell apart.

## 5.3 THE NEEM DISPUTE

A classic case of biopiracy by transnational corporations is that of the neem tree in India. It is the most significant case on the issue of biopiracy not only in India but worldwide. India never felt the need to patent this process as it was always a part of indigenous knowledge of Indian people. So, when U.S.

[24]"Why CSIR Won the Battle of Haldi: The text of the Indian Council of Scientific Research Statement describing the facts behind the Case", *Rediff on the Net*, available at http://www. Rediff .com/news/aug/27haldi.html(visited on 14.11.2015)
[25] Ibid.

obtained patent on neem, it raised large-scale protest. The main issue in the present case was biopiracy and rights of the true indigenous communities on one side and the rights of the multinational corporations on the other, to conduct research and development by using patents against the interest of the people who are dependent on neem as a source of livelihood. It was asserted that the patent should be invalidated on the ground that the fungicide qualities of the Neem and its use has been known in India for over 2000 years, and for use to make insect repellents, soaps, cosmetics and contraceptives. [26] The patenting of the fungicidal properties of Neem was held a case of biopiracy due to lack of novelty and inventive step[27] and the neem patent was finally revoked.

Neem is an omnipotent tree and a sacred gift of nature. The botanical name of the tree is *Azadirachta indica*, which is taken from the Persian name for the tree, *AzadDarakth*, meaning *"the free tree"*. It is an incredible plant that has been declared the *"Tree of the 21st century"* by the United Nations.[28]It is a member of the mahogany family and is indigenous to the Indian subcontinent. Over the past century it has been introduced and now flourishes in many countries of Africa, Central and South America, the Caribbean and Asia. Neem trees are attractive tropical evergreens that can grow up to 30 meters tall and 2.5 meters in girth. Their spreading branches form rounded crowns as much as 10 meters across, and they may live for more than two centuries. In India the neem tree has been used for more than 4,500 years. The earliest documentation of neem mentions the fruit, seeds, oil, leaves, roots and bark for their advantageous medicinal properties. The neem tree was called the *"Sarva Roga Nivarini"* (one that could cure all ailments and ills) and the books of the Indian physicians Charaka (2nd century AD)

[26]Available at http://www.thecitizen.in/index.php/NewsDetail/index/1/7840/Biopiracy-From-Neem-to-Rice-to-Atta-Gates-and-Monsanto-Influence-IPR-Policy (visited on 12.12.2015)
[27] R. Anita *Rao* and V. Bhanoji *Rao*, *"Intellectual property Rights-A Primer"* 115 (Eastern Book Company, Lucknow, 1st Edition, 2008)
[28] Available at http://www.unep.org/wed/treeadayneem.asp (visited on 29.07.2015)

and Susruta (4th century AD provides the foundation of the Indian system of natural treatment.[29]

Professor Heinrich Schumutterer, a zoologist from Germany, observed about neem, *"It is such a versatile plant that many people doubt whether anywhere in the world there grows a tree more useful than the neem tree."* It has been applied for centuries in agriculture as an insect and pest repellent, in human and veterinary medicine, toiletries and cosmetics. It is also venerated in the culture, religions, and literature of the region. India has freely shared its *"free tree"* and knowledge of its myriad uses with the world community, but through the patent system multi-national corporations tried to make it a private property.[30]

### 5.3.1 MEDICINAL USE OF NEEM

Neem has for long been used in the traditional unani and ayurveda system of medicine for its beneficial properties. All parts of neem have therapeutic value. It is mentioned in many ancient texts and traditional Indian medical authorities place it at the pinnacle of their pharmacopeia. The bark, leaves, flowers, seeds and fruit pulp are used to treat a wide range of diseases and complaints ranging from leprosy and diabetes to ulcers, skin disorders and constipation. Traditionally used in ayurvedic remedies as an antiseptic to fight viruses and bacteria, it is also recommended for urinary disorders, diarrhoea, fever, skin diseases, burns and inflammatory diseases. Because of its wide variety of applications, it is commonly called the *"Friend and Protector of the Indian Villager."*[31]

[29] Available at http://ssnaneem.weebly.com/neem-history.html (visited on 29.07.2015)
[30]Freeing the Free Tree. A Briefing Paper on the Neem Biopiracy Case | NW Resistance Against Genetic Engineering, available at http://nwrage.org/content/freeing-free-tree-briefing-paper-neem-biopiracy-case (visited on 20.09.2015)
[31]Available at http://www.mapi.com/ayurvedic-knowledge/plants-spices-and-oils/the-power-of-neem.html#gsc.tab=0 (visited on 18.09.2015.)

Following are the parts of neem which are used as medicine since ancient time in India:

**Leaf:** Both fresh and dried leaves are used to treat skin and intestinal diseases. In India, people who are affected with pox viruses are generally made to lie in bed made of neem leaves and branches. This prevents the spreading of pox virus to others and has been in practice since early centuries.

**Seeds:** Seeds of neem are very effective in treatment of boils, leprosy, eczema and other skin diseases; headaches, ulcer, diarrhoea, intestinal problems.

**Stalk:** Stalks are used as tooth sticks which help to prevent infection of teeth and gums; control bad breath and also prevent oral cavity. It is also used to manufacture medicines that cure cough, astham, intestinal worms and also improving the eye sight.

**Bark:** It is mostly used in blood purifying preparations and anti-pyretic medicines. Bark extracts are also used in preparation of medicines curing paralysis, joint pains, nervous weakness etc.

**Flowers:** Flowers are used in medicines curing eye problems and to treat certain dental problems. As flowers are also anti-inflammatory in nature, therefore they are very helpful in treating diseases.

**Fruits:** Fruits of neem tree are used as laxatives and blood purifier. They are also used as an ingredient in medicines curing leprosy, piles etc.

**Gum:** Used as a blood purifier and is also used in body stimulants and tonics.[32]

[32] Available at http://www.neem-products.com/neem-unani-medicine.html (visited on 12.09.2015)

**Use of neem as toiletries**: Neem twigs are used by millions of Indians as an antiseptic tooth brush. Its oil is used in the preparation of toothpaste and soap. Traditionally, slender neem twigs (called datun) are first chewed as a toothbrush and then split as a tongue cleaner. This practice has been in use in India, Africa, and the Middle East for centuries. Many of India's 80% rural population still start their day with the chewing stick, while in urban areas neem toothpaste is preferred. Neem twigs are still collected and sold in markets for this use, and in rural India one often sees youngsters in the streets chewing on neem twigs. It has been found to be as effective as a toothbrush in reducing plaque and gingival inflammation.

**Use of neem as a contraceptive**: Neem oil is known to be a potent spermicide and is considered to be hundred percent effective when applied intra-vaginally before intercourse. Intriguingly, it is also taken internally by ascetics who wish to abate their sexual desire.

**Agricultural use of neem:** The Upavanavinod, an ancient Sanskrit treatise dealing with forestry and agriculture, cites neem as a cure for ailing soils, plants and livestock. Neem cake, the residue from the seeds after oil extraction, is fed to livestock and poultry, while its leaves increase soil fertility. Most importantly, it is a potent insecticide, effective against about 200 insects, including locusts, brown plant-hoppers, nematodes, mosquito larvae, Colorado beetles and boll weevils. It is a key ingredient in non-pesticidal management,providing a natural alternative to synthetic pesticides. Its seeds are ground into a powder that is soaked overnight in water and sprayed on the crops. To be effective, it must be applied repeatedly, at least every ten days. Though it does not directly kill insects on the crop, it acts as an anti-feedant, repellent, and egg laying deterrent, protecting the crops from damage. The insects starve and die within a few days. It also suppresses the

hatching of pest insects from their eggs. Thus, neem cake is mostly used as a fertilizer.[33]

**Use of neem as timber and fuel:** Besides being hard and fast growing, its chemical resistance to termites makes it a useful construction material. Its oil is used as lamp oil, while the fruit pulp is useful in the manufacture of methane.

**Use of neem as a lubricant:** Neem oil is non-drying and it resists degradation better than most vegetable oils. In rural India, it is commonly used to grease cart wheels.

**Use of neem as food:** Neem gum is used as a bulking agent and for the preparation of special purpose foods. An exudate can be tapped from the trunk by wounding the bark. It has a potential as a food additive, and it is widely used in South Asia as "Neem glue". Neem blossoms are used in Andhra Pradesh, Tamil Nadu and Karnataka to prepare Ugadi pachhadi. A mixture of neem flowers and jaggery (or unrefined brown sugar) is prepared and offered to friends and relatives, symbolic of sweet and bitter events in the upcoming New Year, Ugadi. *"Bevina hoovina gojju"* (a type of curry prepared with neem blossoms) is common in Karnataka throughout the year. Dried blossoms are used when fresh blossoms are not available. In Tamil Nadu, a rasam (*veppam poo rasam*) made with neem blossoms is a culinary specialty.[34]

**Use of neem in cosmetics**: Neem is perceived in India as a beauty aid. Powdered leaves are a major component of at least one widely used facial cream. Purified neem oil is also used in nail polish and other cosmetics.

[33] Available at http://web.pppmb.cal s.cornell.edu/resourceguide/mfs/08neem.php (visited on 21.08.2015)
[34] Available at https://en.wikipedia.org/wiki/Azadirachta_indica (visited on 13.09.2015)

### 5.3.2 GRANT OF NEEM PATENT

In 1971, US timber importer Robert Larson observed the neem tree's usefulness in India and began importing its seeds to his company headquarters in Wisconsin. Over the next decade he conducted safety and performance tests upon a pesticidal neem extract called Margosan-O and in 1985 received clearance for the product from the US Environmental Protection Agency (EPA). Three years later he sold the patent for the product to the multinational chemical corporation, W R Grace and Co. Since 1985, over a dozen US patents have been taken out by US and Japanese firms on formulae for stable neem based solutions and emulsions and even for a neem based toothpaste. At least four of these were owned by W R Grace, three by another US company, the Native Plant Institute, and two by the Japanese Terumo Corporation. Grace and company approached several Indian manufacturers with proposals to buy up their technology or to convince them to stop producing value added products and instead supply the company with raw material. Grace eventually managed to arrange a joint venture with a firm called P J Margo Pvt. Ltd.[35]

On December 12, 1990 the multinational agri-business corporation W.R. Grace of New York and the United States Department of America as represented by its Secretary of Agriculture, filed a European Patent Application with the European Patent Office (EPO) on the basis of a U.S. priority application of December 26, 1989, covering a method for controlling fungi on plants by the aid of a hydrophobic extracted Neem oil. This was the third application for a neem-derived product which had been filed by W.R. Grace. After a very difficult and controversial examination procedure, the grant of a European patent for this application was published on September 14, 1994, with the number 436257. The patent covered a method of extracting the active ingredient in neem, known as azadirachtin, and stabilizing it for longer shelf life.

[35] Available at http://www.twn.my/title/pir-ch.htm (visited on 12.09.2015)

### 5.3.3 IMPACT OF THE GRANT OF NEEM PATENT

The grant of the patent led to resentment and opposition among developing nations on the issue. In India, there was widespread protest against the theft of neem by US corporations. There was wide spread protest that neem patents will result in major financial gains for their so-called owners, but the communities which first understood the neem uses and shared this knowledge with the rest of the world will not be compensated at all. The grant of patent meant increase in the price of neem seeds which would have turned an often free resource into an exorbitantly priced one. As the local farmers cannot afford the price that the industry can, the diversion of the seeds as raw material from the community to industry will ultimately establish a regime in which a handful of companies holding patents will control all access to neem as raw material and all production processes.[36]

The neem patent violates old Indian traditions of sharing the neem of and the knowledge related with it by allowing private ownership of this important resource. This privatization of traditional knowledge would threaten the livelihood of countless Indian farmers and indigenous cultures as many applications and products related with the neem tree as well as the evaluation of new uses would become illegal. The TRIPS Agreement would enable the patent holder to enforce his patent worldwide with the result that the patentee would be able to claim exclusive use of neem even in India. Moreover, the increasing demand for neem seeds by the W.R. Grace Corporation had caused the prices *"to skyrocket beyond the reach of ordinary people"*.[37]

Grace's aggressive interest in Indian neem production has provoked a bulk of objections from Indian scientists, farmers and political activists, who assert that multinational companies have no right to exploit the fruit of centuries of indigenous experimentation and several decades of Indian scientific research. This has stimulated a bitter trans-continental debate about

[36]Available at http://www.platformgentechnologie.nl/patents/euro_pat_office/parents/neem_ final_backgrounder _nl.shtml (visited on 24.02.2015)

[37] C.Bastuck, "Biopiracy and Patents-Developing countries, fears are exaggerated"19, available at srvrhldigo001.act.ac29/dlt-published/9/1276.html (visited on 19.02.2015)

the ethics of intellectual property and patent rights. The biopiracy debate was launched with the neem issue. Vandana Shiva asserts, *"While it is repeatedly claimed that the neem itself or its parts cannot be patented, the patent claims in effect cannot exist without the neem or its properties. There is no product or process based on neem which does not depend on the intrinsic properties and principles of neem itself."*[38]She claimed, *"The free tree is no more free".* [39] In addition, there was also speculation on why Indian scientists had not been able to acquire such patents. V.P.Sharma, Director Malaria Research Centre, Delhi, stated, *"Part of the blame for foreign companies patenting neem products have to be taken by our own country. People have been using neem for centuries here but we (the scientists) have not been protecting the rights of our people over neem. It is not that our scientists never worked on it. But generally, our whole approach has been different. So far, the stress of our scientists has been wholly on research; commercial aspects have stood ignored or discouraged. "*[40]

In April 1993, a Congressional Research Service (CRS) report to US Congress set out some of the arguments used to justify patenting*:* A Congressional Research Service Report for Congress entitled, *"Biotechnology, Indigenous Peoples, and Intellectual Property Rights",* explaining the neem patent stated, *"One example of the product of nature issue as it applies to traditional knowledge is the seed of the neem tree, including the species Azadirachta indica and melia azadirachta. Neem seeds have been used as a pesticide in India for hundreds of years. The neem seed itself is not patentable because it is a product of nature. Similarly, the mere knowledge that neem seeds are effective pesticides is not patentable by anyone. Also, the method of scattering ground neem seeds as a pesticide would not be a patentable process, because this process has been known and practiced for centuries and likely would be deemed obvious. However, patents have been granted for (1)*

[38] Vandana Shiva, *Captive minds, captive lives: essays on ethical and ecological implications of patents on life*10( Research Foundation for Science, Technology & Natural Resource Policy, New Delhi, 1st Edition, 1995)
[39] Ibid
[40] A. Agarwal "What's In a Neem?" *Down to Earth* 28 (March 15, 1996), p. 28, available at http://www.downtoearth.org.in/archives (visited on 12.10.2015)

*extracts from pre-treated neem bark shown to be effective against certain cancers (2) neem-seed extracted azadirachtin in a stable storage form and (3) azadirachtin-derivative insecticides which have greater stability than the naturally occurring form of azadirachtin. Azadirachtin itself is a natural product found in the seeds of the neem tree and it is the significant active component. There is no patent on it, perhaps because everyone recognizes it as a product of nature. But, as mentioned above, a synthetic form of a naturally occurring compound may be patentable, because the synthetic form is not technically a product of nature, and the process by which the compound is synthesized may not be patentable. Thus, the laboratory-synthesized derivative of azadirachtin, which was more stable and easier to store and therefore more useful than the naturally occurring azadirachtin was considered patentable by the Patent and Trademark Office."* It further added, *"Although traditional knowledge inspired the research and development that led to these patented compositions and processes, they were considered sufficiently novel and different from the original product of nature and the traditional method of use to be patentable."*

### 5.3.4 OPPOSITION TO THE GRANT OF PATENT

Nine months later a Legal Opposition to this patent was filed jointly by three "plaintiffs". Magda Aelvoet, the then President of the Green Group in the European Parliament, Brussels, Dr. Vandana Shiva, on behalf of the Research Foundation for Science, Technology, and Natural Resource Policy, New Delhi, India, and the International Federation of Organic Agriculture Movements (IFOAM), based in Germany and represented by its future President, Linda Bullard. Other key petitioners included Dr. M.D. Nanjundaswamy of Karnataka Rajya Ryota Sangha, a farmer's organization in India and Martin Khor, Director, Third World Network.[41] The petition was

[41]"US patent on neem",63*TWR*23(November1995), Available at http://www.worldcat.org/title/third-world-resurgence/oclc/25613020(visited on 23.06.2015)

mainly based on the claim of lack of novelty and inventive step as such on insufficient enabling disclosure. [42]

The petitioners claimed that Indian farmers had been using neem as a pesticide for centuries and Indian scientists had documented the use of neem as far back as 1928 so there was nothing novel in Grace's patent. Rifkin, speaking of Grace's patent, stated, *"Any chemist worth his salt could have come up with it."*[43] Secondly, it was claimed that the patent is barred by prior art. According to the petition, *"the patent should be overturned because the company's method of extracting stable compounds has been widely used prior to the patent's issuance and because the extraction methods have been previously described in printed publications. Although W R Grace's processes are more technical, they are mere extensions of the same processes that Indian villagers have been using for hundreds of years."*[44] The opponents asserted "*that the fungicidal effect of hydrophobic extracts of neem seeds was known and used for centuries on a broad scale in India"* both in traditional medicine to cure human skin fungi and for the protection of crops in agriculture. Even the concentration of neem oil in the emulsion that was claimed by the patent had been discovered before. The same was said to be true for the *"claimed method to produce the hydrophobic extracted neem oil"*. Thus, the opponents made a claim that there was lack of "*novelty"* and *"inventive step",* two main essential requisites of patentability in the invention. It was also claimed in the petition that the patent was obvious. It stated that, *"W R Grace merely appropriated the knowledge and wisdom generated by other individuals. Thus, even if there no references that make claims identical to those of W R Grace, the combined teachings of the prior art makes W R Grace's patent obvious."*

US Company W.R. Grace pleaded that they are trying to help the Indian economy and the people by giving more market access in the global scenario.

[42]C. Bastuck, "Biopiracy and Patents-Developing countries, fears are exaggerated", available at srvrhldigo001. act.ac29 dlt-published/9/1276.html (visited on 19.02.2016)

[43] "Grace's Patent On a Pesticide Enrages Indians", *WSJ*(September 13, 1995), available at http://www.wsj.com /india (visited on 29.11.2015)

[44] Supra note 15

The patent on the neem emulsion is considered as a new invention because it with other combinations make the pesticides more powerful and it is a process patent with new innovation. The research foundation for Science, Technology and Ecology headed by Dr. Vandana Shiva was very vocal in her protest stating that it is nothing but a theft, piracy on Indian traditional knowledge. The Indian Government also contested the defence raised by W.R. Grace by producing evidence from ancient texts where neem was used in many ayurvedic medicinal preparations and in manufacturing.[45]

### 5.3.5 PROCEEDINGS BEFORE THE OPPOSITION DIVISION OF EUROPEAN PATENT OFFICE (EPO)

It took five years for the case to come before the Opposition Division of the EPO. During this period the opponents submitted evidence and affidavits gathered to support the claims they had made in the initial opposition. Finally an oral proceeding was scheduled on May 9th and 10th, 2000, before the Opposition Division of the EPO in Munich. At midday on the first day of the hearing demonstrators gathered in front of the EPO building holding banners reading *"No Patents for Theft"* and carrying signs representing all the European patents which had been granted or were pending on the neem. They presented to a representative of the EPO packages of signatures of 100,000 Indian citizens demanding that all patents on the neem be revoked. To support the substance of its case, the opponents had brought two expert witnesses from India: Dr. Udai Pratap Singh of Varanasi (Professor and Head Department of Mycology and Plant Pathology, Institute of Agricultural Sciences, Banaras Hindu University) and Mr. Abhay Dattaray Phadke of Puna (Managing Director of Ajay BioTech (India) Ltd.). Dr. Singh is widely regarded as India's greatest expert on Neem from the scientific community. Mr. Phadke is an agronomist and had commercialized a Neem product in India (without claiming patent protection), following a development phase

[45] R. Anita *Rao* and V. Bhanoji *Rao*, *Intellectual property Rights-A Primer*118 (Eastern Book Company, Lucknow, 1st Edition, 2008)

and extensive field trials with farmers. Interestingly, Mr. Phadke had once worked for RhonePoulenc and had proposed that they commercialize the Neem product; However, that company declined, judging that it would never be possible to obtain a patent on such a product, which would make it commercially uninteresting to produce. He also personally provided samples of his Neem fungicide, called *"Neemark"* to W.R. Grace. However, one after the next, the Opposition Division found in favour of the opponents on all the procedural questions, leaving the room each time to confer, and then returning to announce their decision and resume the proceedings. Then the first witness was called, Mr. Phadke. His testimony was lengthy, extraordinarily detailed, supported by a great deal of documentation, and absolutely crushing. Dr. Singh was never called, as sufficient evidence to overturn the patent was supplied by the first witness.

### 5.3.6 DECISION

At the end of Mr. Phadke's testimony, the Opposition panel ruled that the patentee's claim of novelty had been destroyed on the basis of clearly demonstrated prior public use. According to Dr. Dolder, it is difficult and quite rare to defeat a patent on the basis of novelty, but here it happened. The concentration of neem oil contained in the preparation was now specified as 0.25% ONLY, no more, no less. In practical terms, this altered claim would have been useless to the patentee, because the percentage was so narrowly defined that it actually no longer constituted a monopoly (in other words, it would have been very easy for a competitor to avoid infringing the patent). Nonetheless, this amended claim was immediately examined, and this time the Opposition Division ruled that even in amended form, the "invention" was lacking an inventive step. Thus, the patent was revoked in its entirety.[46]

[46]"Freeing the Free Tree", A Briefing Paper on the Neem Biopiracy Case | NW Resistance Against Genetic Engineering, available at http://nwrage.org/content/freeing-free-tree-briefing-paper-neem-biopiracy-case (visited on 23.11.2015)

### 5.3.7 APPEAL

In 2000, the issue was taken to the EPO's Technical Board of Appeals, when W.R. Grace and the US Department of Agriculture appealed the decision in accordance with Article 106 EPC. On 08.03.2005, the body dismissed the appeal and decided to uphold the decision of the opposition Division to revoke the patent in its entirety. It based its ruling on the ground that the submitted evidence had destroyed novelty and inventive step of the invention because it had shown prior public use respectively prior art with regard to inventive step.[47]

The revocation of neem patent has a great impact not only on India but throughout the world, specially the third world that have been fighting to have control over their bio-resources and knowledge systems from the patent regimes of the development countries. Revocationof the neem patent shows that it is possible to defeat biopiracy. The decision taken by the EPO has been appreciated across the globe by scientists and entrepreneurs alike. It has proved that the civil society can channel its efforts to effectively prevent biopiracy from developing nations. The then Indian Minister for Science and Technology said that *"It is highly appropriate that the EPO has held that the patent amounted to Biopiracy and has endorsed that the process for which the patent had been obtained was actually in use in India since time immemorial."* [48]

## 5.4 THE BASMATI DISPUTE

In 1997 when U.S. patent was granted to Texas Company, Rice Tec on *"basmati rice lines and grains",* it faced international outrage over allegations of biopiracy. It resulted in a brief diplomatic crisis between India and United States with India threatening to take the matter to the World Trade Organisation (WTO) as a violation of Trade Related Intellectual Property

[47] Supra note 23 p.19
[48] Supra note 24 p.120

Rights (TRIPs), because a Geographical Indication (GI)[49] product cannot be patented under the provision of TRIPs. However, ultimately, due to review decisions by the United States Patents and Trademarks Office, Rice Tec has lost most of their claims of the patent, including, most importantly, the right to call their rice "*basmati*".[50]

Basmati rice means the *"queen of fragrance or the perfumed one"*. This type of rice has been grown in the foothills of the Himalayas for thousands of years. It is slender, long-grained, aromatic rice that grows best in the region of the Punjab, which spans both India and Pakistan. Its perfumed, nut like flavour and aroma can be attributed to the fact that the grain is aged to decrease its moisture content. Basmati, long-grained rice with a fine texture is the costliest rice in the world and has been favoured by emperors and praised by poets for hundreds of years.[51] Basmati's unique characteristics are that the grains elongate to twice the original length upon cooking, and the rice remains soft and fluffy in texture. Basmati has a specific amylose (starch) content of approximately 22%, which determines its distinct qualities of stickiness and softness of the cooked grains. The presence of the compound 2-acetyl-1-pyrroline distinguishes its aroma from those of other aromatic rices, rendering basmati unique.[52]

### 5.4.1 GRANT OF PATENT

On September 2, 1997, the U.S. Patent and Trademarks Office granted Patent No. 5,663,484 on *"basmati rice lines and grains"* to the Texas-based company Rice Tec. This broad patent gives the company several rights, including exclusive use of the term *'basmati'*, a monopoly on breeding 22 farmer-bred basmati varieties with any other varieties in the Western Hemisphere, as well proprietary rights on the seeds and grains from any

[49] A geographical indication is a name or sign used on certain products which corresponds to a specific geographical location or origin (e.g. a town, region, or country) and the quality and characteristic link to the product and its place of origin.
[50] Available at https://en.wikipedia.org/wiki/Basmati (visited on 09.01.2016)
[51] Available at http://www1.american.edu/TED/basmati.htm (visited on 11.12. 2015)
[52] Available at http://shodhganga.inflibnet.ac.in/bitstream/10603/14481/14/14_chapter%203.pdf (visited on 11.12.2015)

crosses. The patent also covers the process of breeding Rice Tec's novel rice lines and the method to determine the cooking properties and starch content of the rice grains. The following abstract from the patent application is illustrative.

*"The invention relates to novel rice lines and to plants and grains of these lines and to a method for breeding these lines. The invention also relates to a novel means for determining the cooking starch properties of rice grains and its use in identifying desirable rice lines. Specifically, one aspect of the invention relates to novel rice lines whose plants are semi-dwarf in stature, substantially photoperiod insensitive and high yielding, and produce rice grains having characteristics similar or superior to those of good quality basmati rice. Another aspect of the invention relates to the method for breeding these novel lines and to novel rice grains produced from such lines. A third aspect of the invention relates to the finding that the "starch index" (SI) of a rice grain can predict the grain's cooking and starch properties, to a method based thereon for identifying grains that can be cooked to the firmness of traditional basmati rice preparations, and to the use of this method in selecting desirable segregants in rice breeding programs."*[53]

The company claims that it has produced *"novel rice lines and grains"* by crossing Pakistani basmati varieties with American long-grain rice varieties, to produce a rice line with the desirable traits of basmati (aroma, long slender grain shape, grain elongation, cooked grain texture) and the semi-dwarf long-grain traits of photoperiod insensitivity, high yield, disease tolerance and short stature. One specific rice line, named Basmati 867, produces plants with rice grains that have characteristics that are comparable in quality to traditional Indian and Pakistani basmati. Basmati 867 is claimed to be very similar to traditional basmati, but with a few differences such as less chalky grains, softer grain texture and more aroma. Secondly, Rice Tec also claims that its superior variety of basmati can be grown in the Western

[53] V. K. Gupta, "Basmati Rice Lines and Grains- Gist of the US Patent No.5,663,484" *JIPR* Volume 3,May 1998, 127-137, available at http://nopr.niscair.res.in/bitstream/123456789/19555/1/JIPR%203(3)%20127-137.pdf (visited on 10.12.2015)

Hemisphere, outside of India and Pakistan. Specifically, Rice Tec's claims for its invention encroaches upon the use and definition of the term *'basmati'*, a term traditionally associated with India and Pakistan. Thus, Rice Tec's invention raises the question whether a rice variety grown outside of India and Pakistan can be called *'basmati'*, even if it has similar characteristics to traditional basmati.[54]

### 5.4.2 IMPACT OF THE GRANT OF PATENT

The Basmati patent gave rise to great repercussions for India and Pakistan because Rice Tec's claims for its invention could adversely affect Pakistani and Indian basmati production and exports. The patent would not only result in India losing its United States (US) import market but also its position in important markets like Asia, European Union (EU) and the United Kingdom (UK). Moreover, the Basmati patent was also considered as a violation of the Geographical Indications Act under the TRIPs agreement as the long grain aromatic rice grown only in Punjab, Haryana, and Uttar Pradesh is called Basmati from the ancient Indian history. If patents of Rice Tec were recognised in India, the patent claim would have definitely forced the Indian farmers (who are growing Basmati) to pay royalty as the claim covers the same type of varieties.

### 5.4.3 OPPOSITION

India and Pakistan joined together to defend Rice Tec patent over a variety of basmati rice before the USPTO. APEDA (Agricultural and Processed Food Products Export Development Authority), CSIR (Council for Scientific and Industrial Research), ICAR (Indian Council of Agricultural Research) helped the Indian Government to take initiative against the USPTO granted patent over basmati rice.[55]

[54]Uzama Jamil, *"Biopiracy: The Patenting of Basmati by Ricetec",* available at https://www.sdpi.org/publications/files/W37-Biopiracy.pdf (visited on 18.12.2015)
[55] Available at http://www.itagbs.com/articles/basmati_case.html (visited on 12.01.2016)

The Government of India argued that the specific grain traits listed were already found in over 90 per cent of the Basmati germplasm existing in India and Pakistan much prior to the filing of the patent. Rice Tec Inc had basically crossbred the Pakistani Basmati germplasm with its own local rice varieties, and released the hybrids named, 'Texmati' and 'Kasmati'. However, the Basmati varieties are bred over centuries by farmers of the Indian subcontinent. Crossing different varieties for getting mix traits, transferring characteristics from Basmati and the semi dwarf characteristics are also not novel. In fact, the characteristics for which Rice Tec has claimed a patent are derived from traditional Basmati.

India filed for re-examination on April 28, 2000. The Indian challenge was related to grain quality such as linear kernel elongation and exquisite aroma of a Basmati grain. To oppose the grant of patent, a marathon search was started to find materials on Basmati such as reports, documents, books, cookery / recipe books, dictionaries etc. Among these was a notable book titled *'The Scented Pearl of India'*. The author of this book had researched the historical background of Basmati rice cultivation in the sub-continent, its aroma, cooking qualities etc, which served as the basis for contesting the Basmati patent. Some excerpts are: One can hardly recall in his poem of Heer and Ranjha, the great Punjabi poet Varis Shah has described Basmati in 1766." Much prior to this the earlier reference to red grained Mushkin (Urdu syllable for scented) and Sukhdas is traced back to Abul-Fazl AlIami's Ain-eAkbari. Thus, it is quite evident that Basmati Rice perhaps from its very occurrence has been recipe entertainer of the elite. In this context not much has changed even today, as this scented pearl is still the *'dream of the masses'* and *'charm for the classes'*. One need not overemphasize the historical fact that the naturally perfumed or scented varieties were always treasured and possessively guarded by the nobles and in some instances could be grown under the direct supervision of the King with ordinary people not allowed into the proximity of fields. Yet, the supremacy of Basmati cannot be superseded by any other scented variety because of its unique characteristics viz.

superfine kernels, exquisite aroma, sweet taste, silky texture, delicate curvature and linear kernel elongation with least breadth - wise swelling on cooking.

### 5.4.4 DECISION

In May 2001, Rice Tec withdrew 11 other claims - Nos. 1, 2, 3, *5,* 6, 7, 10, 14, 18, 19 and 20, which mean that, as of now, only five out of the original 20 claims remain uncontested. Claims 8, 9, 11, 12 and 13 pertained to the specific rice lines developed by Rice Tec and not to any varieties lines grown in India. These claims relate to three 'novel rice lines' namely, Bas867, RTI117 and RTl121, which are capable of producing grains similar or superior to Basmati rice. But, these are relatively harmless claims pertaining to Rice Tec's specific plant varietal breeding efforts and not open-ended claims covering grains per se. Though the United States Patents and Trademarks Office (USPTO) has dropped the term *'Basmati Rice Lines and Grains'* from the title of the patent, one of the strains has been allowed to use the word 'Bas 867'. This could mislead consumers into believing that the product is Basmati Rice originating from India or Pakistan. Therefore, by timely intervention by the Indian government the attempt to patent Basmati rice by Rice Tec Inc was thwarted on the basis of the Act of Geographical Indications and on the grounds that Basmati varieties were farmers' varieties bred over centuries by farmers of the Indian subcontinent and that the characteristics for which Rice Tec had claimed a patent were derived from traditional Basmati.[56]

This was a huge victory for Indian and Pakistan farmers who could have lost their indigenous knowledge and faced enormous economic losses due to the grant of patent over Basmati rice.

[56] Available at http://shodhganga.inflibnet.ac.in/bitstream/10603/14481/14/14_chapter%203.pdf (visited on 11.12.2015)

## 5.5 WHEAT GRAIN

After basmati and neem, traditional Indian wheat fell prey to corporate interests. On May 21, 2003, the European Patent office in Munich granted a patent to Monsanto, better known as the world's largest trader in genetically engineered plants. The patent covered wheat exhibiting a special baking quality that Monsanto claimed to be its invention, which Greenpeace proved in its opposition to be a wheat variety bred by Indian farmers for improving its baking quality and not a genetically engineered invention as claimed by Monsanto which led to the revocation of patent. *"This was clearly a bio piracy attempt by Monsanto and would have set a new and dangerous trend. Revocation of the patent in total reinforces a victory for the farmers in India and a lesson to learn that we need to be much more proactive to protect our traditional knowledge."* said Dr. Ashesh Tayal, Scientific Advisor, Greenpeace India.[57]

Wheat (Triticum spp.) is a cereal grain, (botanically, a type of fruit called a caryopsis) originally from the Levant region of the Near East but now cultivated worldwide.[58] Wheat cultivation in India is traditionally dominated by the northern region of India. The northern states of Punjab and Haryana Plains in India have been prolific wheat producers. India is the fourth largest producer of wheat in the world. It is an important cereal crop grown in India. It is a rabi crop which is sown in the beginning of winter (November-December) and is harvested in the beginning of summer.[59] Its high gluten strength and uniform golden colour makes it ideal for bread making and pasta preparation unlike the softer commercially high yielding wheat, which lacks the strength and consistency of durum. Today, India is exporting sufficient quantities of all types of wheat and extensive research efforts are underway for improving its cereals and grain output in the years to come.[60]

[57] Available at http://www.greenpeace.org/india/en/news/chapati-chor-monsanto-s-wheat/ (visited on 21.12.2015)
[58] Available at https://en.wikipedia.org/wiki/Wheat (visited on 11.12.2015)
[59] Available at http://www.krishisewa.com/articles/production-technology/214-wheat-cultivation.html (visited on 13.12.2015)
[60]Available at http://apeda.gov.in/apedawebsite/SubHead_Products/Wheat.htm (visited on 18.12.2015)

Wheat has been cultivated for several thousand years in India. Wheat grains have been found in the Mohenjadaro excavations. These have been identified as belonging to Triticum aestivum sub-species sphaerococcum, characterized by spherical shape and dwarf plant stature.[61] The three species of wheat namely, Triticum aestivum (bread wheat), Triticum durum(macaroni wheat) and Triticum dicoccum (Emmer or Khapli) grown on commercial basis in the Indian subcontinent from prehistoric times are of spring type. Another wheat species T. sphaerococcum that was cultivated in the ancient past during the Indus Valley civilization period has now almost vanished. Systematic wheat improvement in India started during 1905 and since then has undergone many developmental changes.[62]

An amazing diversity of indigenous wheat was evolved by farmers through their indigenous innovation and knowledge. In 1906, the Howards began to select and systematize Indian wheat in Pusa (Bihar) and Lyallpur in Punjab (now Pakistan) and made Indian wheat known worldwide. Howard's work on wheat paid full tribute to the genius of Indian peasants. As he wrote in his plan to study and improve Indian wheat. *"The present condition of Indian agriculture is the heritage of experience handed down from time immemorial by a people little affected by the many changes in the government of the country. The present agricultural practices of India are worthy of respect, however strange and primitive they may appear to Western ideas. The attempt to improve Indian agriculture on Western lines appears to be a fundamental mistake. What is wanted is rather the application of Western scientific methods to the local conditions so as to improve Indian agriculture on its own lines."*[63]

The contributions made by the unknown and unsung Indian farmers in preserving enormous variability in form of land races of wheat through knowingly/unknowingly selection need special mention The pure line selection practiced by earlier wheat workers in local land races which

[61] Available at http://www.iisc.ernet.in/insa/ch21.pdf (visited on 13.12.2015)
[62] Available at http://www.dwr.res.in/node/9 (visited on 18.12.2015)
[63] Available at http://www.countercurrents.org/en-shiva270404.htm (visited on 11.01.2016)

happened to be mixtures resulted in the development of several quality wheat varieties including NP 4, NP 6, NP 12, Pb8, Pb 8A, Pb 9D, Pb 11, K13, K46, AO13, AO 85, AO 90, Bansi, Motia, Gulab etc amongst which NP 4 won international award for its grain quality and also became popular in countries like Australia, South Africa and Hungary. Thereafter, recombination breeding between pure lines led to the development of varieties like Pb C 518, Pb C 591, NP 52, NP 805, NP 120, NP 125, NP 165, Niphad 4, AO 68, AO 113 and AO 115.[64]

### 5.5.1 HEALTH BENEFITS OF WHEAT

Wheat is rich in catalytic elements, mineral salts, calcium, magnesium, potassium, sulphur, chlorine, arsenic, silicon, manganese, zinc, iodide, copper, vitamin B, and vitamin E. This wealth of nutrients is why wheat is often used as a cultural base or foundation of nourishment by the indigenous people. Issues like anaemia, mineral deficiencies, gallstones, breast cancer, chronic inflammation, obesity, asthenia, tuberculosis, pregnancy problems and breastfeeding problems are quickly improved by consuming whole wheat. Wheat is also recommended to treat sterility. Since germinated wheat comprises 2 or 3 times more vitamin B than common wheat; the seeds are used for useful for treating gastrointestinal conditions, skin diseases, respiratory illnesses, and cardiovascular ailments. Wheat is also known to help balance cholesterol levels and protect the heart.[65]

### 5.5.2 GRANT OF WHEAT PATENT

American seeds multinational Monsanto has patented wheat invented by crossing a traditional Indian wheat variety, Nap Hal, with another wheat line. Monsanto Technology was granted the international patent Number EP 445 929 titled 'plants' on May 21, 2003, by the European Patent Office in Munich, Germany. Through the patent, Monsanto has garnered monopoly rights over

[64] Available at http://www.dwr.res.in/node/9 (visited on 21.01.2016)
[65] Available at https://www.organicfacts.net/health-benefits/cereal/wheat.html (visited on 14.01.2016)

the traditional characteristics of wheat variety. It crossed Nap Hal, a traditional Indian land race, with other plants that are conventionally bred, not genetically modified. The patent was granted for 13 European countries, Japan, Australia and Canada. Monsanto's patent covers biscuits, flour and dough produced from this wheat, as well as the plants themselves. This means that the company could, in future, take legal action not only against farmers and scientists trying to breed wheat varieties with similar genetic traits, but also bakeries, confectioners and supermarkets if they produce or sell biscuits and other foods made from patented wheat. Monsanto says dough from its new wheat will be ideal for making bakery products like biscuits, crackers, wafers and crisps. The patent has tremendous scope for generating profits because it gives flour sufficient inelasticity to produce perfect semisweet biscuits and non-fermented crackers without any chemical treatment. The new variety also has a soluble grain protein that prevents lumpiness in batter made from it. *"This is particularly important in wafer manufacture,"* says Monsanto in its patent claims. But gene scientists and farmers are outraged. They say the company's action amounts to theft and is a clear attempt to thwart further breeding of high quality wheat varieties using this heritage seed. While confirming the granting of the patent, Monsanto India's office refused to comment on any aspect of the matter. The NGO Greenpeace India has issued the following statement: *"Monsanto is targeting and stealing from Indian farmers who have cultured this specific variety of wheat for centuries. This patent demonstrates the urgent need for a general legal ban on the patenting of genes, live organisms and seeds."* Greenpeace intends to file an objection to the patent in the coming weeks. In order to obtain the patent, Monsanto crossed a commonly grown soft wheat variety `Galahad' with the Indian wheat. The company accessed samples of NapHal that are freely available in the UK in public germ plasm collections. The resultant Galahad 7 is the variety Monsanto has patented.[66]

[66] Available at http://infochangeindia.org/trade-a-development/news-scan/monsanto-patents-indian-wheat-gene.htm (visited on 20.01.2016)

### 5.5.3 IMPACT OF THE GRANT OF PATENT

Patenting of wheat grain by Monsanto caused apprehensions among Indians. Monsanto has patented wheat invented by crossing traditional Indian variety with another wheat line. Monsanto developed a new wheat variety from the Indian land race names as Nap hal. The wheat obtained from Nap Hal would be ideal for making all bakery products. Monsanto was granted patent by the European Patent office based in Munich. The patent was given for biscuits, flour and other products from the wheat as well as the plant itself. By owning patent on the plant itself, in future the infringement cases could be filed against the Indian farmers and other bakers for non-payment of royalties to Monsanto for using the patented wheat. The new variety that Monsanto developed with the unique character like soft milling wheat is covered by the patent. The flour from this new variety has a tremendous scope for enhancing its profit due to the flour elasticity and also the presence of grain protein which is soluble to prevent bumps in the batter.

### 5.5.4 OPPOSITION TO THE GRANT OF PATENT

This patent was challenged on the following grounds:

The traits of low elasticity, low gluten which were being patented was not an invention, but derived from an Indian variety. The crossing with a soft milling variety is an obvious step to any breeder. The patent is based on piracy, not on non-obvious novelty, and hence needs to be challenged to stop legal precedence being created on false claims to invention.

The broad scope of the patent covering products made with Indian wheat robs Indian food processes and biscuit manufacturers of their legitimate export market and could in future affect our domestic food sovereignty.

The Indian community reacted and challenged Monsanto patent of Indian wheat at EPO on 27, January, 2004 the Green Peace, RFSTE and Bharat Krishak Samaj has jointly challenged this patent right of Monsanto. The European database shows that Nap Hal was collected from Uttar Pradesh,

in India in 1948. This evidence has given substantial support to revoke the patent on 5 October, 2004.[67]

The Governments' 2020 vision refers to making India a *"global food factory"*. However if Monsanto has the patent based on piracy of Indian wheat, India's "food factory" will be controlled by Monsanto, not Indian food processors and producers. If such biopiracy based patents are not challenged, and crop lines and products based on unique properties evolved through indigenous breeding become the monopoly of Multi-National Companies, in future we will be paying royalties for our innovations especially in light of the Patent Cooperation Treat and upward harmonization of patent law. Monsanto's wheat biopiracy patent should be a wakeup call to citizens and governments of the world. It is yet another example of why the Trade Related Intellectual Property Rights Agreement (TRIPS) of World Trade Organisation (W.T.O) needs to be changed, and why traditional knowledge and community rights need to be legally recognized and protected.[68]

## 5.6 THE INDIAN GINSENG –ASHWAGANDHA

Ashwagandha (Withania somnifera), also known as Indian ginseng, and as Indian Winter Cherry is an important ancient plant, the roots of which have been employed in Indian traditional systems of medicine, Ayurveda and Unani. It is native to dry regions of India. It grows in dry parts in sub-tropical regions. Rajasthan, Punjab, Haryana, Uttar Pradesh, Gujarat, Maharashtra and Madhya Pradesh are the major Ashwagandha producing states of the country.[69] It is also the native of Australia, East Asia, and Africa. Ashwagandha in Sanskrit means "horse's smell", probably originating from the odour of its root which resembles that of sweaty horse. The species name somnifera means "sleepbearing" in Latin. The use of Ashwagandha in

[67] R. Anita *Rao* and V. Bhanoji *Rao*, *Intellectual property Rights-A Primer*126 (Eastern Book Company, Lucknow, 1st Edition, 2008)

[68] Vandana Shiva, Wheat Biopiracy, available at http://www.countercurrents.org/enshiva270404.htm 4/4 (visited on 28.12.2015)

[69] M. Umadevi, R. Rajeswari, C. Sharmila Rahale, S. Selvavenkadesh, R.Pushpa, K.P.Sampath Kumar, Debjit Bhowmi, "Traditional And Medicinal Uses of Withania Somnifera"Vol. 1 No. 9 2012 p.102, available at http:// www. the pharma journal.com/archives/2012/vol1issue9/PartA/11.1.pdf (visited on 17.12.2015)

Ayurvedic medicine extends back over 3000 to 4000 years to the teachings of an esteemed rishi (sage) Punarvasu Atriya. It has been described in the sacred texts of Ayurveda, including the Charaka and Sushruta Samhitas.[70]

T his species is a short, tender perennial shrub growing 35–75 cm (14– 30 in) tall. Tomentose branches extend radially from a central stem. Leaves are dull green, elliptic, usually up to 10–12 cm long. The flowers are small, green and bell-shaped. The ripe fruit is orangered.[71] Ashwagandha, the Indian ginseng or winter cherry has been used as a quiet valuable herb in the Ayurvedic and indigenous medical system. The roots, leaves and fruits (berry) possess tremendous medicinal value. A famous Ayurvedic rejuvenative botanical used in many tonics and formulas, Ashwagandha is the best rejuvenative that helps maintain proper nourishment of the tissues, particularly muscle and bones, while supporting the proper function of the adrenals and reproductive system.[72]

### 5.6.1 MEDICINAL VALUES

- This herb is considered an adaptogen which is a nontoxic herb that works on a non-specific basis to normalize physiological function, working on the HPA axis and the neuroendocrine system.
- Ashwagandha is effective for insomnia but does not act as a sedative. Its rejuvenative and nervine properties produce energy which in turn help the body to settle and sleep. Thus it helps the body to address a stress related condition rather than masking it with sedatives. A herb that rejuvenates the nervous system, erases insomnia and eases stress.
- Ashwagandha has also been shown to lower blood pressure and is highly effective in stopping the formation of stress induced ulcers.

[70] Available at http://www.spicesmedicinalherbs.com/ashwagandha-withania-somnifera-history.html (visited on 19.12.2015)

[71] Available at https://en.wikipedia.org/wiki/Withania_somnifera (visited on 12.12.2015)

[72] M. Umadevi, R. Rajeswari, C. Sharmila Rahale, S. Selvavenkadesh, R.Pushpa, K.P.Sampath Kumar, Debjit Bhowmi, "Traditional And Medicinal Uses of Withania Somnifera"Vol. 1 No. 9 2012 p.102, available at http:// www. the pharma journal.com/archives/2012/vol1issue9/PartA/11.1.pdf (visited on 14.12.2015)

- In arthritis, which involves joints that are painful, dry, swollen and inflamed, Ashwagandha would be the herb of choice.
- Ashwagandha increases hemoglobin (red blood count) and hair melanin.It stabilizes blood sugar and lowers cholesterol.[73]

### 5.6.2 GRANT OF PATENT

In May 2001, American and Japanese firms filed applications for the issue of patents in their favour regarding formulations or extracts of *Ashwagandha* The patent application by Japanese firm Pola Chem Tech[74] was regarding topical skin ointment for cosmetic purposes and to promote fertility whereas the US based the New England Deaconess Hospital was successful in getting a patent relating to its use to alleviate the symptoms regarding arthritis.[75] On 27th July, 2006 Natreon Inc, an America based multinational company filed a patent application in the EPO on *Ashwagandha*'s age long use in treatment of anxiety induced stress, depression, insomnia, gastric ulcers and convulsions[76] titled ―*Method of Treatment or Management of Stress*(European patent 1906980).

### 5.6.3 REVOCATION OF PATENT

Out of several patents granted in favour of *Ashwagandha*, India was successful in revoking only one. In order to crush their attempt, Indian authorities replied back on 6th July 2009 by submitting evidences from Traditional Knowledge Digital Library (TKDL) and some documents dating back to 12th century. In our traditional ayurvedic system of medicines, the parts of this wonder plant find a well recognized status as aphrodisiacs, diuretics and for restoring loss of memory. As a result of the breathless

[73] Ibid
[74]M. Somasekhar, " Patent hunters haunt ashwagandha" *The Hindu business line* (February 25, 2001), available at http://www.hindu.com/businessline/2001/02/25/stories/14251803.html (visited on 28.11.2015)
[75] "Ashwagandha next on patent hunters list",*Hinduism Today* (16 May 2001), available at http://www.hindu ismtoday.com/blogs-news/hindu-press-international/ashwagandha-next-on-patent-hunters--list/619.html (visited on 21.11.2015)
[76] K.Sinha, "India beats back US firm's bid to patent Ashwagandha formulations" *The Times of India* (27 March 2010) , available at http://timesofindia.indiatimes.com/articleshow/5728923. cms ?prtpag e=1 (visited on 13.11.2015)

efforts, on 25th March 2010, EPO decided to dismiss the American's firm claims over the Indian Ginseng.[77]

## 5.7 JAMUN PATENT CASE

Syzygium cumini, known as jambul, jambolan, jamblang or jamun, is an evergreen tropical tree in the flowering plant family Myrtaceae. Syzygium cumini is native to the Indian Subcontinent and adjoining regions of Southeast Asia. The species ranges across India, Bangladesh, Pakistan, Nepal, Sri Lanka, Malaysia, the Philippines, and Indonesia. The name of the fruit is sometimes mistranslated as blackberry, which is a different fruit in an unrelated family. Syzygium cumini has been spread overseas from India by Indian emigrants and at present is common in former tropical British colonies.[78]

For long in the period of recorded history, the tree is known to have grown in the Indian sub-continent, and many others adjoin regions of South Asia such as India, Bangladesh, Burma, Nepal, Pakistan, Sri Lanka and Indonesia. It was long ago introduced into and became naturalized in Malaysia. In southern Asia, the tree is venerated by Buddhists, and it is commonly planted near Hindu temples because it is considered sacred to Lord Krishna. The plant has also been introduced to many different places where it has been utilized as a fruit producer, as an ornamental and also for its timber. In India, the plant is available throughout the plains from the Himalayas to southern India.[79]

### 5.7.1 ORIGIN OF JAMUN

History of jamun fruit goes a long way. It is believed this exotic fruit has its origins in Neolithic times, when man consumed wild berries, wild plums, and nuts as a staple. In India, Jamun is referred to as the 'Fruit of Gods'. The

[77] "Is India losing its traditional knowledge to biopiracy?",available at http://www.newkerala. com/ news/fullnews -90434 .html (visited on 13.11.2015)
[78] Available at https://en.wikipedia.org/wiki/Syzygium_cumini (visited on 13.11.2015)
[79] Available at http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3609276/ (visited on 12.11.2015)

fruit is of significant importance in Hindu mythology. During his 14year exile from Ayodhya, Lord Rama is believed to have eaten several berries and plums including jambul. Jamun trees require partial rainfall and thrive in dry weather. Jamun that comes from various parts of the world differ in size, this because of soil and weather conditions.

### 5.7.2 USE OF SEEDS, BARK AND LEAVES OF JAMUN

*'Jamun'* is indigenous to India which is generally grown as an avenue tree or wind break tree and hence found all over India. Jamun is rich in iron and helps preventing heart troubles, liver problems and thyroid. [80] The seeds of Jamun are known for its anti-diabetic properties. It is a common knowledge used in everyday practice. Seeds of jamun are used by Ayurvedic practitioners, herbalists and traditional healers in various formulations. The seeds are usually dried and powdered. Jamun powder is mixed with different herbs and spices in accordance with treatment for an ailment, illness, or disease.

Bark powder of jamun tree is mixed with jamun juice and used as a treatment for cough and cold. In several Asian cultures, leaves of jambul are grounded into a fine paste and given to individuals suffering from dysentery. Leaves of this fruit are also used to treat frequent urine discharge, excess sweating, and healing wounds.

### 5.7.3 HEALTH BENEFITS OF JAMUN

1. Jamun is known to be an effective treatment for diabetes. Extracts of bark, leaves and seeds are used in combination with herbs to reduce levels of glycosuria and blood sugar. Powder of dried seeds is consumed with honey over a course of 2 months for beneficial changes in sugar levels. Research indicates Jamun seeds which are rich in alkaloids have hypoglycemic properties effective in reducing high blood sugar. Jamun juice should be included in a diabetic's nutritional diet.

[80] I.S. Singh, "Jamun" Fruitpedia", available at http://www.fruitipedia.com/jamun.html (visited on 22.10.2015)

2. Bark of Jamun tree has antihelmintic properties, which help in treating urinary disorders. A glass of Jambul juice with 1/2 teaspoon of bark powder daily is recommended for persons with urinary infections and urinary tract disorders.
3. Bark powder mixed with water is effective in curing tapeworm infection.
4. Consumption of Jamun minimizes the risk of cancer. This fruit has several bioactive phytochemicals that include polyphenols, which contain anthocyanin known to fight cancer cells. Individuals that undergo chemotherapy or radiation sessions benefit significantly from jamun juice consumption. Anthocyanins, flavonoids, ellagic acid and gallic acid present in jambul have the capacity to prevent carcinogenesis in organs.
5. Jamun juice is excellent for natural bowel movement.
6. Jamun has medicinal properties. Juice of this fruit is a natural astringent used as a mouthwash as it eliminates bad breath. Pulp of jambul is used as a treatment for gingivitis (bleeding gums). In some Asian cultures leaves of jamun tree are burnt to form an ash. This ash is rubbed on teeth to strengthen them.
7. Leaves and bark of jamun are used in combination with other ingredients by Ayurveda and Unani practitioners for various treatments such as diarrhea and indigestion. Traditional healers in Asia use seed, leaf and bark powder of Jamun tree is several herbal formulations.
8. Jamun seed powder and turmeric is mixed with jamun juice andapplied on skin to get rid of blemishes and light scars.
9. Jamun juice with powder of its leaves is an excellent treatment for ulcerative colitis.
10. Regular consumption of jamun for 2 to 4 months helps individuals with problems of bleeding hemorrhoids significantly.
11. Jamun is known to enrich blood and also protect from liver damage. Many herbalists recommend juice of this fruit with herbs because it has antioxidants and flavonoids that play a huge role in purification of

blood. Natural acids present in this fruit play a pivotal role in digestive enzyme secretion. Regular intake of jamun stimulates healthy liver function.

12. Decoction of jamun seeds that contains aromatic herbs is an excellent home remedy to relieve fatigue and strain.
13. Wine and vinegar made from jamun is used as a cure for sore throat, whooping cough, cuts, bruises, and open wounds.
14. Seed powder is used as a cure for digestive disorders, an excellent home remedy for bloating. Powder of seeds in jamun juice is excellent for individuals with a suppressed immune system.
15. Fruit pulp of jamun is used as a home remedy for asthma and chronic cough.

### 5.7.4 CULINARY USES OF JAMUN

Ripe Jamun fruit can be used in a number of healthy snacks and dessert recipes. Plain ice creams (single flavours) topped with a generous amount of jamun pulp tastes divine. Jambul sauce adds a unique flavor to frozen desserts. You can top cakes, pastries, puddings, and custards with a mushy dollop of jambul pulp. If you haven't used jamun pulp in a pie, get busy now. Single crust or bottom crust pies that are filled with jambul pulp is a memorable explosion in the mouth. Jamun sauce is also used as flavouring in various exotic dishes. Sweet and tangy Jambul pulp can also be used as a dip for various vegetarian and non vegetarian salads. Several chefs in Asian cuisine use jamun sauce for plating (presentation of dishes) because of its dynamic purple color and unique taste.[81]

[81] Available at http://realityspeaks.expertscolumn.com/article/15-health-benefits-jamun (visited on 20.09.2015)

### 5.7.5 GRANT OF PATENT

A US patent No – 5,900,240 was granted on May 4, 1999[82] to Cromak Research Inc., based in New Jersey, USA. The assigners were three non-resident Indians, Onkar S. Tomer, Kripamath Borah , and their colleague, Peter Gloniski.

### 5.7.6 OPPOSITION TO THE GRANT OF PATENT

The claim by the US Company to use Jamun for anti-diabetic treatment as an invention was proved to be false since such use has been known and documented in India widely. The patent was challenged on the ground of prior art. "The indigenous knowledge and use consists of 'prior art'. No patent should be given where prior art exists, since patents are supposed to be granted only for new inventions on the basis of novelty and non-obviousness. These criteria establish inventiveness, and patents are exclusive rights granted for inventions"[83]

The patent was challenged on the ground of prior art and no inventiveness were found. However, "Article 102 of the US Patent Law, that defines prior art does not recognize technologies and methods in use in other countries as prior art". Because of this, the Jamun could be patented in the USA. But it does created hue and cry in India for such a patent as it was considered to be a biopiracy i.e. theft of Indian Traditional Knowledge.[84]

## 5.8 PUDINA AND KALAMEGHA

*Andrographis paniculata* is an annual herbaceous plant in the family *Acanthaceae*, native to India and Sri Lanka. It is widely cultivated in Southern and South-eastern Asia, where it has been traditionally used to treat infections and some diseases. Mostly the leaves and roots were used for medicinal purposes. The whole plant is also used in some cases. *Andrographis*

[82] "Biopiracy and Prior Art" *GRAIN* (August 4, 1999), available at http://www.grain.org/ article/entries/1882-Biopiracy-and-prior-art (visited on 12.09.2015)
[83] Ibid.
[84] Devinder Sharma, "India May Contest U.S. Patent on Diabetic Remedy" *Ens-Newswire* (August 27, 1999), available at http://www. ens-ewswire.com/ ens/aug1999/1999-08-27-01.asp (visited on 12.09.2015)

*paniculata* is an erect annual herb extremely bitter in taste in all parts of the plant body. The plant is known in northeastern India as *Mahatikta*, literally "king of bitters", and known by various vernacular names (see the table below). As an Ayurveda herb it is known as *Kalmegh* or *Kalamegha*, meaning "dark cloud". It is also known as *NilaVembu*, meaning "neem of the ground", since the plant, though being a small annual herb, has a similar strong bitter taste as that of the large Neem tree (*Azadirachta indica*). In Malaysia, it is known as *Hempedu Bumi*, which literally means 'bile of earth' since it is one of the most bitter plants that are used in traditional medicine.[85]

### 5.8.1 TRADITIONAL USES

*Andrographis paniculata* has been reported as having antibacterial, antifungal, antiviral, choleretic,hypoglycemic, hypocholesterolemic, adaptogenic, anti-inflammatory, emollient, astringent, diuretic, carminative, anthelmintic, antipyretic, gastric and liver tonic. Due to its “blood purifying” activity it is recommended for use in cases of leprosy, gonorrhea, scabies, boils, skin eruptions, and chronic and seasonal fevers. Juice or an infusion of fresh leaves is given to infants to relieve griping, irregular bowel habits, and loss of appetite. Leaves and root are also used in general debility, during convalescence after fevers, for dyspepsia associated with gaseous distension, and in advanced stages of dysentery. In China, the herb derived from the leaves or aerial parts of Andrographis *paniculata* is known as Chuanxinlian, Yijianxi or Lanhelian. It is described as bitter and cold, is considered to be antipyretic, detoxicant, anti-inflammatory, and detumescent, and is thought to remove “pathogenic heat” from the blood. *Andrographis paniculata* is used for the treatment of pharyngolaryngitis, diarrhea, dysentery, and cough with thick sputum, carbuncle, sores, and snake bites. Various preparations and compound formulas of the herb have been used to treat infectious and non-infectious diseases, with significant effective rates reported for conditions

[85] Available at https://en.wikipedia.org/wiki/Andrographis_paniculata (visited on 14.09.2015)

such as epidemic encephalitis B, suppurative otitis media, neonatal subcutaneous annular ulcer, vaginitis, cervical erosion, pelvic inflammation, herpes zoster, chicken pox, mumps, neurodermatitis, eczema, and burns. A primary modern use of *Andrographis paniculata* is for the prevention and treatment of the common cold. It appears to have antithrombotic actions, suggesting a possible benefit in cardiovascular disease. Pharmacological and clinical studies suggest the potential for beneficial effects in diseases like cancer and HIV infections.[86]

### 5.8.2 GRANT OF PATENT

On January 19, 2007 M/s Livzon Pharmaceutical Group Inc, Guangdong filed a patent plea at EPO staking novelty in utility of *pudina* (mint) and *kalamegha* (andrographis) for the therapy of H5N1 avian influenza. On February 25, EPO after scrutinizing the plea communicated a positive response to allot the patent.

### 5.8.3 REVOCATION OF PATENT

In a joint venture of CSIR and India's TKDL, formulations from ancient Ayurveda and Unani scripts were excavated dating back to 9th century, to unveil the age long use of '*pudina*' and '*kalamegha*' in India since ages for influenza and epidemic fevers.[87] On April 27, India's TKDL sent a letter to the EPO apprising the evaluators of the references regarding the traditional medicinal properties of *pudina* and *kalamegha* in India, thereby rejecting any novelty and inventiveness in the stakes claimed in the plea (European patent 1849473). [88] After going through the elaborated proofs from CSIR that corroborated India's stand, on June 10, EPO called off the determination to grant patent to Livzon, a major Chinese pharmaceutical company, on the

[86] Anil Kumar, "A Review On King Of Bitter (Kalmegh)" *IJRPC* 2012, 2(1) p.116, available at www.ijrpc.com (visited on 10.01.2016)
[87] K.Sinha, " India Foils Chinese Bid To Patent Pudina" *The Times Of India* (24 June 2010) , available at http:// Times Ofindia.Indiatimes.Com/India/India-Foils-Chinese-Bid-To-Patent-Pudina/Iplarticleshow/608409 1.Cms (visited on 19.12/.015)
[88] "Patent of Pudina and Kalamegha", available at http://www.Pfionline.Com/Index.Php/ Component/ Content/Article/8/20-Newsflash1 (visited On 13.09.2015)

medicinal properties of *pudina* and *kalamegha* for treating bird flu. Thus India thwarted a major attempt at bio-piracy by successfully blocking Chinese bid to patent the use of medicinal plants *pudina* and *kalamegha.*

## 5.9 ALOE VERA

The Aloe vera plant has been known and used for centuries for its health, beauty, medicinal and skin care properties. The name Aloe vera derives from the Arabic word *"Alloeh"* meaning *"shining bitter substance,"* while *"vera"* in Latin means *"true."* 2000 years ago, the Greek scientists regarded Aloe vera as the universal panacea. The Egyptians called Aloe *"the plant of immortality."* Today, the Aloe vera plant has been used for various purposes in dermatology.

The botanical name of Aloe vera is *Aloe barbadensis miller* . It belongs to Asphodelaceae (Liliaceae) family, and is a shrubby or arborescent, perennial, xerophytic, succulent, pea- green color plant. It grows mainly in the dry regions of Africa, Asia, Europe and America. In India, it is found in Rajasthan, Andhra Pradesh, Gujarat, Maharashtra and Tamil Nadu.[89]

### 5.9.1 USES OF ALOE VERA

Aloe Vera has a vast traditional role in indigenous system of medicine like ayurveda, siddha, Unani and homoeopathy. Aloe barbadensis miller or Aloe vera, a semi tropical plant is one of the 250 species of Aloe. Most commonly used for its medicinal properties, Aloe Vera or the Sanskrit name *"Ghee kunwar"* is a member of Lilly family. The plant has lance-shaped, sharp pointed, and jagged & edged leave . Aloe vera is found as the wild herb along the coast of south India. It is under cultivation in fairly large areas in many parts of India viz; Tamil Nadu, Gujarat, Maharashtra etc. Aloes are often thought to only grow in hot and dry climates but they actually grow in a variety of climates including desert, grassland, and coastal or even alpine

[89]Available at http://www.e-ijd.org/article.asp?issn=0019-5154;year=2008;volume=53;issue=4;spage=163; epage =166;aula (visited on 21.02.2016)

locations. There are more than 200 compounds found in Aloe barbadensis, about 75 of which have biological activity, Aloe vera leaves contain a diverse array of compounds, including anthraquinones (e.g. aloe-emodin), anthrones and their glycosides (e.g. 10-(1, 5' anhydroglucosyl)-aloeemodin- 9-anthrone, also known as aloin A and B), chromones, carbohydrates, proteins, glycoproteins, amino acids, organic acids, lipids, sugars, vitamins and minerals. Aloe vera has number of uses and mainly they are used as a food preservative and medicine. Commercially, aloe can be found in pills, sprays, ointments, lotions, liquids, drinks, jellies, and creams. Numerous aloe species around the world are used for conditions ranging from dermatitis to cancer.[90]

### 5.9.2 MEDICINAL USES

Medicinal properties of Aloe vera range from external burn treatments to helping relieve constipation by consumption. Aloe vera is the most efficacious natural plant used both externally and internally and there are numerous benefits that are derived from this wonderful plant. The health benefits of Aloe vera have been propagated throughout the world. There are two parts of Aloe vera that are commonly used. The bitter exudate is used as a natural drug for its cathartic effect and is widely employed as a bittering agent in alcoholic beverages and as a laxative. The dried latex, with a high barbaloin content, is a strong laxative, but its use should be limited to no more than one week, and it should not be used during menstruation, pregnancy and nursing. The suggested medicinal use of Aloe vera is based on its historic and traditional use, and an analysis of modern pharmacological and toxicological research. The inner gel, or "pure gel", is the more readily known part of the Aloe vera plant. This is the section of the plant that is most commonly known to be used for treatments of sun burns. But if prepared properly, the inner gel can be consumed to help treat certain internal ailments.

[90] Available at http://www.e-ijd.org/article.asp?issn=0019-5154;year=2008;volume=53;issue=4;spage=163; epage =166;aula (visited on 21.02.2016)

### 5.9.3 FIVE UNIQUE BENEFITS OF ALOE VERA TO THE BODY

1. Penetration – aloe has the ability to reach deepest body tissues some 7 layers deep.
2. Antiseptic – aloe has at least 6 antiseptic agents which kill bacteria, viruses and fungi .
3. Stimulates cell growth – aloe stimulates the birth of new healthy tissue .
4. Settles nerves – aloe has a clearing effect on the body's nervous system.
5. Cleanses – aloe detoxifies and normalizes the body's metabolism.

### 5.9.4 EXTERNAL USES OF ALOE VERA

Aloe vera contains a majority of the necessary amino acids and vitamins that our skin needs to heal. The Aloe Vera gel itself forms glue-like substance on skin which acts as a natural "band aide", sealing in the nutrients and allowing them to begin working immediately and keeping out any bacteria or agents that could cause healing to slow or cease completely. The Aloe Vera gel is also high in water content which is essential for the body to heal. Although Aloe Vera is effective when taken orally, it is also beneficial when included in topical formulations like ointment, cream or lotion. It mainly protects the wounds due to its moisturizing properties.

**Skin Care:** Aloe Vera is used widely in Dermatology, as it acts as an astringent, moisturizer, humidifier and cleanser. It softens the skin, diminishes wrinkles and cures acne, herpes, red spots, psoriasis, eczema, mycosis, fever blisters, skin irritation and provides protection to the skin against pollution. Also, it is ideal for sunburns, fragile skin, and for removal and repair of dead skin and cells.

**Aloe vera cures gum disease:** The Aloe Vera actually heals gums and eliminates gum disease, mucositis, lip fissure and mouth herpes lesions.

Relieves Itching Aids Healing - Aloe Vera Juice relieves itching that occurs due to allergies and insect bites and aids healing.

Aloe Vera relieves joint and muscle pain - Pain in the joints and muscle pain occurred due to arthritis is reduced by the application of Aloe Vera sprays or gels.

### 5.9.5 INTERNAL USES OF ALOE VERA

Numerous scientific studies on Aloe Vera are demonstrating its analgesic, anti-inflammatory, wound healing, immune modulating and anti-tumor activities as well as antiviral, anti-bacterial, and antifungal properties. Aloe s medicinal properties can be attributed to the synergistic effect of the combined nutritional elements producing a more powerful effect than the individual components. The nutrients together make a powerful combination that can be used in many different therapies to aid in the treatment of different aliments.

**Provides Relief in Liver Infections** - Aloe Vera Juice improves the liver function and is an excellent antidote in case of excessive ingestion of alcohol. In addition to this, it also prevents scarring of the liver.

**Cures Stomach & Intestinal Problems** - Aloe Vera Juice prevents stomach ulcers, facilitates digestion and intestinal transit.

**Acts as an Anti-inflammatory Agent** - Aloe Vera Juice contains 12 essential nutrients that inhibit inflammation with rare incidence of side effects. Also, the juice of Aloe Vera improves joint and muscle mobility.

**Aloe Vera stabilizes blood sugar and reduces cholesterol in diabetics**: Laboratory studies show that aloe can stimulate insulin release from the pancreas and can lower blood glucose levels in mice.

**High cholesterol and triglyceride levels can be lowered naturally with Aloe Vera -** High cholesterol is a risk factor that may often lead to heart disease and strokes. According to medical studies that were conducted, the benefits of the Aloe vera gel when taken internally were proven. The results confirmed that when the Aloe vera gel was administered to patients with heart disease and high cholesterol, these conditions were reduced to a lowered risk.

**Anti-viral and Anti-tumor Activity** - Aloe vera facilitates the stimulation of immune system that in turn protects the body against viral and tumor related disorders.[91]

### 5.9.6 ALOEVERA PATENT

M/s. Cognis IP Management Gmbh, Germany, filed a patent application on 09-03-2007 for the treatment of obesity using *Gheekawaar* (Aloe vera) TKDL evidences based on *Rasendrachintamanih* (time of origin 16th century) and other Ayurveda and Siddha books were submitted on 20-07-2009. On 27-11-2009 applicant decided to withdraw its claims/patent application[92].

## 5.10 MACA

Maca, scientifically called *Lepidium meyenii*, is a herbaceous plant natively found in the Andes Mountains in Peru and Bolivia and, to some extent, Brazil. Maca is part of the mustard family and is usually grown in altitudes of 8,000 to 14,500 feet. It grows well in cold climates with relatively poor agricultural soils.

[91]"Karkala Manvitha, Bhushan Bidya Aloe vera: a wonder plant its history, cultivation and medicinal uses" *Journal of Pharmacognosy and Phytochemistry* 2014; 2 (5): 85-88,available at http://www.phytojournal.com/ vol2Issue5 /Issue_jan_2014/19.1.pdf (visited on 12.02.2016)

[92] "India Partners with US and UK to Protect Its Traditional Knowledge and Prevent Bio-Piracy-TKDL Prevents Traditional Knowledge Patents", available at http://pib.nic.in/newsite /erelease.aspx?relid=61122 (visited on 12.11.2015)

### 5.10.1 USES OF MACA

The maca root has a fleshy hypocotyl (the stem of the germinating seedling), which develops into a tuberous root, and it is used for two prime purposes—as a root vegetable and as a medicinal herb. For almost 2,000 years, maca has been a traditional source of food (as a root vegetable) and a medicinal herb, and was called 'one of the lost crops of the Incas' by the U.S. National Research Council. The local people regard it as a very nutritious food that is quick to provide energy, and at the same time, as a medicine that enhances strength and endurance and functions as an aphrodisiac. Maca is grown and traded for other staples that cannot be grown locally. The prime use of maca by the indigenous people is, however, not for food. For centuries, local Andean people have been using maca to increase the fertility of humans and animals. Peruvian herbal medicine uses maca as a stimulant for the immune system (as an immune stimulant) and to treat anaemia, tuberculosis, menstrual disorders, menopause symptoms, stomach cancer, and sterility (and other reproductive and sexual disorders), and to enhance memory.[93] In modern day, maca is commonly consumed as a health drink or with fruits and vegetables. While maca is appreciated for the rich nutrition it provides in the form of vitamin and protein content, it is most sought after as a fertility enhancer. Maca is generally consumed as a health drink, blended at market stands or even roadside stands along with other fruits or vegetables.

The world came to know about maca's medicinal properties as early as 1961. Researchers tested maca on rats and found an increase in fertility, confirming its fertility-enhancing qualities. A Peruvian company called Quimica Suiza (the Peruvian distributor for the pharmaceutical giant AstraZeneca) was the largest company marketing maca derivatives for medicinal purposes. Multiple U.S. companies purchased maca in its raw form directly from farmers or grew small chunks of it themselves. An example of such a practice was that of Herbs America, which marketed a product called Maca Magic. Herbs America worked directly with farmers in Peru and

[93] Available at http://rainforest-database.com/plants/maca.html (visited on 23.10.2015)

produced raw tubers, then collaborated with local manufacturers to produce the maca derivative. Maca was valued for its putative properties; it acted as 'natural Viagra.' While certain firms were sensitive to the concerns (both cultural and economic) of the indigenous farmers, there were no regulations regarding maca production and purchase. Many companies had tried and succeeded in patenting the maca extract for different uses and applications and had also patented the maca extraction techniques. The patenting activities of one company, Pure World, received the most attention.

### 5.10.2 GRANT OF PATENT

In July 2001, Pure World Botanicals, Inc., a U.S. pharmaceutical company based in New Jersey that specialized in botanical extracts, patented the extracts of the maca plant and began selling it to treat sexual dysfunction. Pure World received a U.S. patent for exclusive commercial distribution of maca extracts, which the company branded as MacaPure. The company took an extra step, going so far as to patent the extraction technique. Pure World filed for two patents— Patent No. 6267995 titled the *'Extraction of Lepidium meyenii roots for pharmaceutical applications'* and Patent No. 6428824 titled *'Treatment of sexual dysfunction with an extract of Lepidium meyenii roots.'* The first patent secured the method of extraction and the second patent used the extracts of maca to boost fertility. Both the medicinal use of the maca extract and the extraction techniques were known indigenously to the local people of Peru. The extraction technique that Pure World patented was an alcoholic extraction of the maca root. The alcoholic extraction technique had been used in the regions of Junin for centuries. Also, Pure World was using the extraction technique to extract the active ingredients from maca and selling powders and capsules that would boost fertility. The patent translated to exclusive commercial distribution of maca extracts, the libido-enhancing components of maca, which the company went on to brand as MacaPure.[94]Maca became a part of a rapidly expanding market and was

[94] Available at http://web.williams.edu/go/native/maca.html (visited on 21.10.2015)

recognized as a product with huge potential, particularly in Europe, the U.S., and Japan. However, as Pure World had exclusive rights over maca in the U.S., if Pure World enforced the patent, the company could prevent other companies from importing maca of Peruvian origin to the United States (or, for that matter, to any country where the patent was recognized). Pure World operated the largest botanical extraction facility in North America, where it extracted close to 15,000 pounds of botanical materials on a daily basis, and maca was one of the 1,000 plant extracts that were extracted out of the facility. Pure World claimed it was not harming Peruvians, but was helping them, as the money Pure World invested into maca research made it a useful commodity and created a market that did not exist before. This had increased market demand for maca extracts. But, demand for maca increased manifold, resulting in overproduction and, consequentially, depressed prices and losses for some small farmers.

The patent was boosting the demand for maca, mainly from the U.S. The patent actually went on to triple Peru's exports of maca from '$1.3 million in 2000 to more than $3 million annually since 2003, according to the Exporters Association of Peru.'[95]Still, the patents caused quite a stir in Peru and all over Latin America. Local stakeholders contended that patenting indigenous knowledge was unethical and unacceptable, as traditional knowledge was being stolen from farming communities.

### 5.10.3 PATENT OPPOSITION

In 2002, almost a dozen Peruvian farming, cultural, and environmental organizations merged together with other maca farmers and international activists, formed a coalition, and began seeking support from the Limabased International Potato Center (CIP), one of the research centers of the Consultative Group on International Agricultural Research (CGIAR). They gathered and formally protested the patents covering maca. The coalition was not trying to claim maca for itself, but simply wanted to return the plant to

[95] Ibid

their cultural domain. The Andean communities were benefitting from the increased exports, but were not receiving any royalties, as the patentees were mining gold through the sale of maca and using extraction techniques that were indigenous knowledge. Indigenous people in Peru considered suing the companies in question to overturn the patents on maca. Peruvian officials called the patent an 'emblematic case' of bio-piracy. The patent could prevent maca extracts produced in Peru from being imported in the U.S. The farmers wanted the CIP, as the promoter and protector of the maca seed, to take action against the claims. They demanded action not only against the seeds and the genetic material, but also on the traditional knowledge that they felt the indigenous communities held. A Peruvian IP protection group formed a working group to analyze the patents and determine the effect the patents would have on Peru. The working group consisted of representatives from the Ministry of Foreign Relations, the Ministry of Foreign Trade and Tourism (MINCETUR), and the CIP, among many others. This working group prioritized three maca patents that they first wanted to fight. The group worked with scientists and exporters of maca to build a solid case; they compiled documents on the prior use of maca and the preparation techniques, making sure the dates were, in fact, prior to the filing dates of the patent applications. In May 2003, the working group submitted a report highlighting the issues that plagued Peru in the domain of bio-piracy to the Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge, and Folklore.

The coalition, led by the farmers, began by calling on two U.S. companies to take back their patents related to maca—and began seeking the help of the Peruvian government and the World Intellectual Property Organization (WIPO)—to help them investigate their claims that maca was developed from traditional knowledge. [96] The working group pushed the Embassy of Peru in the U.S. to supply them with the copies of the official

[96]"Peruvian Farmers and Indigenous People Denounce Maca Patents", *ETC Group* (3 July 2002), available at http://www.etcgroup.org/sites/www.etcgroup.org/files/publication/194/01/macafinal1.pdf (visited on 24.10.2015)

documents of the patents held by Pure World, as well as some other documents. In November 2002, the group wrote to Natalie Koether, president of Pure World, mentioning their concerns about the effect the patents would have on the Peruvians. No reply was received. Certain claims found in two of Pure World's patents (6,267,995 and 6,428,824) were analyzed by INDECOPI and determined to not meet the inventiveness level.

Qun Yi Zheng, Pure World's former president and chief scientist, says that the company invested more than $1 million and three years of research in the endeavour and that it popularized maca as a worldwide Peruvian export. Peruvians 'should not be so narrow-minded,' Zheng said, but should instead be grateful. 'After we studied it, put money into the research, (maca) has become a useful commodity.''[97] In 2005, a French company called Naturex bought Pure World. The marketing manager of Naturex, Antoine Dauby, acknowledged that the indigenous Peruvians had discovered the beneficial properties of maca long before and mentioned how the patent did not interfere with them or their cultivation in any which way. He contended that Peruvians were still allowed to 'grow, sell and use maca as they have for centuries.' The company's defence was that their patents covered the extraction and the isolation of the active ingredients in maca and did not cover anything else. A positive step that Naturex took was to open up the Pure World maca patents to all Peruvian entities, which allowed Peruvian companies to freely use the techniques and information that were patented by Pure World and also market the resulting products. After all the litigation and the efforts, the working group did manage to trigger inspections of the patents covering maca.

In 2010, the EPO cancelled several patents on maca following action by the Peruvian National Anti-Bio-piracy Commission. However, the U.S. patents granted to Pure World stand ground. While Naturex has extended a hand of 'kindness' to the Peruvians, the case still remains as a stark example of bio-piracy where the indigenous bearers of the knowledge did not benefit.

[97] Available at http://web.williams.edu/go/native/maca.html (visited on 21.10.2015)

It was too difficult for the local stakeholders to provide scientific proof that Pure World's formula and extraction techniques were not novel and useful.

The case of maca is a case where a very strong coalition was formed between the local community and an NGO/government body. More importantly, the patent had considerable strength. As pushback was initiated, litigation was triggered, but the patent survived, as it was considered a novel invention. Ultimately, the maca patent remains, resulting in no ultimate benefit to the local community, but considerable benefit to the patent holders. Hence, the case of maca is an instance of a strong stakeholder coalition and very strong patent claim strength leading to a win-loss outcome.

## 5.11 AYAHUASCA

In Amazon Basin, since ages the Shamans of indigenous tribes prepare a drink used in ceremonies known as “ayahusca” by processing the bark of Banisteriopsis Coapi. Shamanas, the indigenous tribe use ayahuasca (which means ‘vine of the soul”) in pious and healing ceremonies to diagnose and cure sickness, meet with spirits, and divine the future.

### 5.11.1 GRANT OF PATENT

In June 1986, a US Plant Patent was taken by Loren Miller, an American which granted him rights over a claimed variety of B. Coapi he had called “Da Vine”. In the patent description it was stated that the “plant was discovered growing in a domestic garden in the Amazon rain-forest of South America.” The claim was made by the patentee that Da Vine depicted a novel and different variety of B. Coapi, basically due to the flower colour.

### 5.11.2 RE-EXAMINATION AND REVOCATION OF THE PATENT

The coordinating Body of Indigenous Organizations of the Amazon Basin (COICA), an umbrella organization which represents over 400 indigenous groups became aware of the patent in 1944. The Center for International Environmental Law (CIEL) on behalf of COICA filed a request

for re-examination of the patent. CIEL asserted that a review of the prior art led that Da Vine was neither novel nor distinct. They argued that nature of Banisteriopsis coapi throughout the Amazon region is sacred and thus the grant of the patent would be against the public and morality facets of the Patent Act. CIEL produced the comprehensive and novel prior art and so in November 1999, the patent claim was rejected by the UPSTO and agreed that Da Vine cannot be distinguished from the prior art produced by CIEL and therefore the grant of patent was not correct.

### 5.11.3 REVERSAL OF DECISION OF USPTO

However, further arguments by patentee prompted the USPTO to reverse its decision and announce in early 2001 that the patent should stand. Because of the date of filing of the patent, it was not covered by the new rules in the US on inter parts re-examination CIEL was therefore unable to comment on the arguments made by the patentee that led to the patent being upheld.[98]

## 5.12 ENOLA BEANS

The Enola Bean is an alleged case of biopiracy, where Larry Procter, a Colorado executive in the bean industry cultivated yellow beans he bought in Mexico on vacation for which he received a US patent two years later on all yellow beans of this variety. Larry's company, Pod Ners, admits that its Enola bean, (named after Larry Proctor's wife), is a descendant of the traditional Mexican bean from the Andes, the Mayacoba, but that it has a better yellow colour and a more consistent shape. By obtaining a patent and a U.S. Plant Variety Protection Certificate, he secured what amounted to a legal monopoly over yellow beans sold in the United States. Under the terms of the patent, he can therefore sue anyone in the United States who sells or grows a bean that he considered to be his particular shade of yellow. Procter also profits from

[98] Available at www.iprcomission.org/papers/pdf/final-report/ch4final.pdf (visited on 12.09.2015)

yellow beans imported from Mexico by imposing on them a six cent per pound royalty. As a result, both farmers in the United States and particularly in Northern Mexico have suffered great economic hardship. The case has stimulated great debate over whether traditional knowledge and/or genetic resources should be patentable in the first place. As the number of patents filed by large corporations for native crops increases, activists become more concerned about the adverse effects of these patents on developing countries and particularly indigenous people.[99]

### 5.12.1 GRANT OF PATENT

Mexican yellow beans have been grown in Mexico for centuries, developed by generations of Mexican farmers and more recently by Mexican plant breeders.[100]In 1999, Larry proctor was granted a patent by the US Patent Office (No. 5894079) for a variety of yellow beans (Phaseolus vulgaris) named Enola. According to the 'detailed description of the invention' in the patent application, Proctor developed the new variety from a bean sample which he bought in a Mexican market and then allowed to self-pollinate, of the segregating population, individual plants were selected. Proctor describes the distinctly yellow colour of the seed, which remains relatively unchanged by season and its presence throughout the entire seed coat as the main characteristics of the new variety. On the basis of their patent, shipment of Mexican yellow beans were hindered to enter the USA, Mexican farmers lost markets for yellow beans in the USA, and US farmers growing yellow beans were charged with patent infringement suits.

### 5.12.2 REVOCATION OF THE PATENT

In 2000, the International Centre for Tropical Agriculture (CIAT), an International Agricultural Research Centre, filed a request for re-examination of the patent on the grounds of lacking novelty and non-obviousness, which

[99] Available at http://www1.american.edu/TED/enola-bean.htm (visited on 12.09.2015)
[100] Available at www.peacefactory.com/dna.html (visited on 12/09/2015)

resulted in a first rejection of the patent in 2003. In 2004, scientists showed that the Enola beans is genetically almost identical to pre-existing Mexican cultivators and supposedly was derived by direct selection within them, therefore being neither truly novel nor non-obvious. After a series of appeals by Proctor, the Board of Patent Appeals finally affirmed the rejection of the patent in 2008, and in 2009, the US Court of Appeal again confirmed its invalidity.[101]

## 5.13 HIGH-OIL MAIZE

Maize, also known as corn, is a large grain plant first domesticated by indigenous peoples in Mexico about 10,000 years ago. The six major types of corn are dent corn, flint corn, pod corn, popcorn, flour corn, and sweet corn. The leafy stalk of the plant produces separate pollen and ovuliferous inflorescences or ears, which are fruits, yielding kernels (often erroneously called seeds). Maize kernels are often used in cooking as a starch.[102]

### 5.13.1 GRANT OF PATENT

In 2000, the US Company Du Pont was granted a patent by the European Patent Office (No. 744888), designated at Spain, France, Italy) for corn (i.e. maize) grains and products with improved oil composition. The patent claims corn grain with a total oil content of at least 6% of the total seed weight, in which at least 55% of the oil consists in oleic acid; both contents are higher than usually in maize. The claims extend further to the processed grains, use of the grains in food, animal feed, cooking and industrial applications and include a conventional method of breeding such corn.

[101] Available at http://www.etcgroup.org/en/materials/publications.html?pub_id=756 (visited on 17/09/2015)
[102] Available at https://en.wikipedia.org/wiki/Maize (visited on 12.09.2015)

### 5.13.2 PATENT OPPOSITION

In 2001, the environmentalist organization Green peace Germany, the Germen Catholic development organization Aisereor, and the government of Mexico filed opposition against the patent for lack of novelty and of invention since maize varieties with such characteristics were already known and used e.g. in Mexico. In 2003, the patent was revoked in total by the patent office.[103]

## 5.14 HAWAIIAN TARO

Taro commonly refers to the plant *Colocasia esculenta*, the most widely cultivated species of several plants in the Araceae family which are used as vegetables for their corms, leaves, and petioles. *Colocasia esculenta* is thought to be not native to Southern India and Southeast Asia, but is widely naturalised. It is a perennial, tropical plant primarily grown as a root vegetable for its edible starchy corm, and as a leaf vegetable. It is a food staple in African, Oceanic and South Indian cultures and is believed to have been one of the earliest cultivated plants. *Colocasia* is thought to have originated in the Indo-Malaya ecozone, perhaps in East India, Nepal and Bangladesh, and spread by cultivation eastward into Southeast Asia, East Asia and the Pacific Islands; westward to Egypt and the eastern Mediterranean Basin; and then southward and westward from there into East Africa and West Africa, where it spread to the Caribbean and Americas. It is known by many local names and often referred to as "elephant ears" when grown as an ornamental plant.[104]

### 5.14.1 USE OF TARO BY THE INDIGENOUS PEOPLE OF HAWAIIAN ISLANDS

Taro was the most important food throughout the Hawaiian Islands. The mature root is boiled as a starchy vegetable. It was the staple of the Hawaiian diet and the plant used to make poi. The leaves are high in minerals and

[103] Available at http://www.no-patents-on-seeds.org/index.php?option=com (visited on 23.08.2015)
[104] Available at https://en.wikipedia.org/wiki/Taro (visited on 12.09.2015)

vitamins A, B, and C. These large leaves are cooked like mustard or turnip greens and the resulting product is called callaloo in the Caribbean. The young leaves are cooked and used for human consumption as a very nutritious vegetable and the corms are used as staple in place of rice or potato. These young leaves are boiled or covered with coconut cream, wrapped in banana or breadfruit leaves and cooked on hot stones. The corms are generally cooked by baking, boiling or baking in the traditional ovens. The starch contained in the large corms of taro is highly digestible, therefore making it a good source for carbohydrate and to a lesser degree a source of potassium and protein. Taro corms have been used in the production of taro chips, dehydrated stable commodities, starch, flour, and in non-food application of taro starch in the manufacture of biodegradable plastics. Taro is good for people allergic to milk or cereals and can be consumed by children who are sensitive to milk.

### 5.14.2 MEDICINAL USES

The Pinatubo Negritos of the Philippines used taro as medicine. The leaves and corms were boiled and eaten by women experiencing a difficult childbirth. Many tribes believed the early morning dew that collected in the leaf was excellent medicinal eyewash. Women with dysmenorrhoeal were made to sit on taro leaves. Juice of the petioles is styptic and was used to arrest arterial haemorrhage. Taro was used in earache and as an external stimulant and rubefacient. Taro was used as a laxative in cases of haemorrhoids. Some tribes use taro as an antidote to the stings of wasps and other biting or stinging insects. Heated tubers were applied to painful parts in rheumatism. Honey mixed with tuber ash was used as a cure for apthae in the mouth. In Hawaii, the raw juice mixed with sugar was taken orally to reduce fever. Taro was used by Hawaiians to treat illness ranging from constipation to tuberculosis. In Malaysia, warmed leaves were used to compress a child's head to size if too long.[105]

[105] Available at https://plants.usda.gov/plantguide/pdf/cs_coes.pdf (visited on 12.01.2016)

### 5.14.3 HEALTH BENEFITS OF TARO

Taro is healthy, and is also loaded with potassium, that is an important mineral for a lot of bodily processes. Taro also includes several calcium, vitamin C, vitamin E and B vitamins, in addition to magnesium, manganese and copper. Taro leaves include great quantities of vitamins A and C, fibre along with a comparatively large quantities of protein. Listed below are some health benefits of Taro:

1. **Cancer Prevention**: Taro root plays an important part for the antioxidant activity in our body. High levels of vitamin A, vitamin C, and various other phenolic antioxidants found in taro root helps to boost immune system and help eliminate dangerous free radicals from our system. Free radicals are actually the dangerous byproducts of cellular metabolism that may result in healthy cells to mutate and turn into cancerous cells. By eliminating these free radicals, our general health is almost guaranteed! Cryptoxanthin, which is found in taro root, is directly related to a lowered chance of developing both lung and oral cancers.
2. **Reduce Symptoms of Rheumatoid Arthritis**: Taro roots are extremely beneficial for overcoming rheumatoid arthritis because low levels of vitamin B6 are related with increased signs of rheumatoid arthritis (RA), like more severe pain. Several researchers conclude that people with RA require comparatively more vitamin B6 than healthy people because they experience constant muscle aches and joint pain due to chronic inflammation. Vitamin B6 benefits include curbing pain and can be useful in supplement form for controlling aches in the muscles and joints due to arthritis.
3. **Blood Pressure and Heart Health**: Taro root s consists of considerable amount of potassium which is considered other essential minerals that are essential to remain healthy and efficient. Potassium not only enables healthy fluid transfers between membranes and tissues throughout the body, but also helps to relieve stress and pressure on blood vessels and arteries. By relaxing the veins and blood vessels, blood pressure can be reduced and stress on the overall cardiovascular system is reduced. Potassium is related to increased

cognitive function because neural connections can be boosted when blood pressure is reduced and fluid transfer between neural membranes is optimized.

4. **Immune System Health**: Taro roots play an important role in the immune system. Vitamin C is found in taro roots which help to encourage immune system to create more white blood cells which help to defend the body from foreign pathogens and agents. Additionally vitamin C acts as an antioxidant, which moderately prevents the development of conditions such as heart disease and cancer.
5. **Cramps**: Consuming high potassium foods is directly related with decreased muscle cramping and improved muscle strength. Taro roots consist of considerable amount of potassium 615 mg which is 13.09% of the daily recommended value. Muscle cramps are one of the common side effects of low potassium levels. This happens when athlete becomes dehydrated and isn't consuming enough potassium rich foods before and after exercise.
6. **Digestive Health**: Taro plays an important role in digestion because it consists of high level of dietary fibre (a single serving contains 11.32% of the daily requirement of dietary fibre) Fibre is very important for supporting our gastrointestinal health. Fibre helps to add bulk to our bowel movements, thus helping food move through the digestive tract and facilitating improved digestion. Apart from that it can help to prevent certain conditions like excess gas, cramping, bloating, constipation and even diarrhoea. A healthy, regulated gastrointestinal system can significantly boost your overall health and reduce your chances of various types of cancer.
7. **Enhances Learning**: Taro roots consists of Vitamin B1 which is also known as thiamine is a crucial vitamin for increasing focus, energy, fighting chronic stress, and perhaps preventing memory loss. Several researches have linked thiamine deficiency to problems learning and retaining information. One study showed that thiamine caused quick reaction times and feelings of clear-headedness in those taking tests. Taro root consists of 0.099 mg of vitamin b1 which is 8.25% of the daily recommended value.

8. **Boosts Vision:** Taro root is loaded with several antioxidants, like beta-carotene and cryptoxanthin. These antioxidants can also help to improve vision as well, by preventing the free radicals from attacking ocular cells and causing macular degeneration or cataracts.
9. **Helps Maintain Dental Health**: Taro roots consist of phosphorus which is essential for both bone health as well as maintaining teeth and gum health. Calcium, vitamin D and phosphorus all play an important role in the formation and maintenance of dental health by supporting tooth enamel, jaw-bone mineral density and holding the teeth in place, too — therefore, these minerals and vitamins can also help heal tooth decay.
10. **Diabetes**: Apart from proper bowel movement dietary fibre can also help lower the chances of developing diabetes because it helps to regulate the release of insulin and glucose in the body. If you consume sufficient amount of taro root in your regular diet then you can manage your glycaemia levels and lower your chances of developing diabetes. If you have diabetes, then fibre-rich foods like taro root can help prevent the spikes and plunges in blood sugar that can be so hazardous.
11. **Thickens Hair**: A taro root consists of significant amount of vitamin E which is a powerful antioxidant that helps to decrease environmental damage to your hair. It also promotes circulation to the scalp. Vitamin E oil can retain the natural moisture in your skin, which help your scalp from becoming dry and flaky. This oil will also make your hair look healthier and fresher. You can use a few drops of vitamin E oil on your hair, especially if it is looking dry and dull.
12. **Circulation Stimulation**: Taro roots consist of several mineral contents. But the presence of iron and copper in taro root make it an important food to prevent anaemia and boost circulation throughout the body. Both Iron and copper are essential for the production of red blood cells that carry the all-important oxygen to our body's systems and cells. By decreasing the chances of anaemia (iron deficiency) and boost the flow of blood through the body, you can speed overall metabolism, growth of new cells, and general

oxygenation of the body that is always a good idea to keep organs and systems functioning at their optimal levels.

13. **Prevents Bone Loss**: Copper present in taro roots plays an important role in slow down bone loss and osteoporosis in older women when taken in combination with other important minerals like zinc, calcium and manganese. Copper has bone-strengthening properties and its collagen-forming qualities encourage strong bones and connective tissues. Taro roots consist of 0.179 mg of copper which is 19.89% of the daily recommended value.
14. **Skin Health**: Taro roots is extremely beneficial to those who wish to keep their skin hydrated as well as protected since it consists of sufficient amount of vitamin A and vitamin E. Each of these vitamin helps to eliminate skin problems and boost overall cellular health. Regular consumption of taro roots helps to heal wounds and blemishes faster, wrinkles will be diminished and you can get a healthy and glowing skin.

### 5.14.4 OTHER TRADITIONAL USES AND BENEFITS OF TARO

- Leaf juice is styptic, stimulant and rubefacient and is useful in internal haemorrhages, otalgia, adenitis and buboes; the juice of the corm is laxative, demulcent and anodyne.
- Medicinal taro varieties were used to treat or cure human ailments.
- Juice of the petioles is styptic and may be used to stop arterial haemorrhage.
- It is occasionally used in treating earache and otorrhea and also an external stimulant and rubefacient.
- Juice of the corm is used in cases of alopecia.
- It acts as a laxative and is used in cases of piles and congestion of the portal system and also an antidote to the stings of wasps, snakes and other insects.
- Roots are used in catarrh and colic in Punjab and Cashmere.
- Ash of the tuber mixed with honey is applied for aphthae in the mouth.

- Stems are occasionally used medicinally, particularly in the treatment of snakebites.
- Heated tubers are locally applied to painful parts.
- Taro corm juices are extensively used for traditional treatment of body ache and baldness.
- It is used to treat diabetes mellitus by the rural community of Dhemaji district of Assam, Northeast India.
- It is used in traditional medicine to treat arterial hypertension, liver problems, ulcers, snakebites and rheumatism in Asia and Africa.
- Rasping from the corm is applied as a poultice to maturate boils and to treat snakebites and rheumatism in Gabon.
- Boiled young leaves are consumed to treat arterial hypertension and liver affections, and the juice is applied externally to treat eczema in Mauritius.
- Corns are used to treat boils and ulcers in Madagascar.[106]

### 5.14.5 PATENTING OF TARO

In 2002, the University of Hawaii at Manoa College of Tropical Agriculture and Human Resources (UH-CTAHR) patented three varieties of hybridized taro that were descendants of the Hawaiian-Polynesian taro group, lehua. Farmers who wanted to grow these patented varieties were required to sign a licensing agreement prohibiting them from selling or breeding the plant. If they intended to do so, they were required to pay royalties to the university.

The following year, University of Hawaii (UH) researchers and the Hawaii Agriculture Research Center (HARC) began genetically engineering three varieties of taro by splicing rice, wheat and grapevine genes into the taro plants. HARC then-president Stephanie Whalen said that the purpose for genetically altering and patenting the lehua taro was to make it more disease-resistant and productive.

[106]Available at https://www.healthbenefitstimes.com/taro/ (visited on 13.01.2016)

Jerry Konanui, Native Hawaiian taro farmer and expert, says genetic modification of taro is unnecessary. He explains that the keys to taro crop management are diversification of cultivars, soil maintenance and farming of the appropriate plants for the purpose and growing conditions. “Our kapunas [elders] understood the need to grow varieties,” he says. “The Hawaiians knew which varieties to plant. They were so in tune with their environment that their varieties were adapted to various conditions. That’s how we survive.”

Konanui explains that 90 percent of the taro produced is of only one variety, Maui lehua. As commercial growers and researchers have transitioned taro from sacred and widely cultivated to a commodity mono-crop grown in non-traditional methods, he says, the taro has been called weak and vulnerable. When mono-cropping is practiced and crop rotation, intercropping, fallowing and composting is not implemented, he says, sickly plants should be expected.

### 5.14.6 OPPOSITION AGAINST THE GRANT OF PATENT

In 2006, Konanui met with traditional farmers from around the world, including Winona La Duke, Mississippi Band Anishinaabeg, executive director of Honour the Earth and Native Harvest, and the founding director for the White Earth Land Recovery Project. He says that his eyes were opened to the lack of research on the effects of genetically engineered plant varieties, so he resolved to work as a taro advocate. Of the hundreds of taro cultivars developed by Hawaiians prior to European arrival, only 84 were documented in 1939 in *Taro Varieties in Hawaii*—the pamphlet that is the go-to reference on taro. Some believe that only two individuals on earth know each of these varieties—Konanui and Alton Arakaki, a UH-CTAHR county extension agent on the island of Molokai. *“I represent eight generations of [taro farming] knowledge. It was really frightening because I thought, I cannot be the missing link,”* Konanui says.

Through e-mail blasts, blogs and farming networks across the world, the taro farmers and advocates with the support of Kahea generated a list of 7,000 individuals in opposition to taro patenting and genetic modification. Hundreds more, including La Duke and farmers from New Mexico, went to the Hawai ʻi legislature in Honolulu to stand up for *kalo*. According to Konanui and State Senator Maile Shimabukuro *kalo* is known as the most digestible, hypoallergenic food available to humans. Due to the outcry against the manipulation of taro, UH dropped its taro patents. The university also agreed to stop genetic engineering experiments on the Hawaiian varieties of taro.

*"The University of Hawaii has a strong desire to maintain appropriate respect and sensitivity to the indigenous Hawaiian host culture,"* said UH Manoa Vice Chancellor for Research & Graduate Education Gary K. Ostrander. *"Taro is unique to the Hawaiian people in that it represents the embodiment of their sacred ancestor. As such, it is appropriate to make an exception to our standard policy of holding all patents."*[107]

The taro patenting was regarded as violative of cultural and spiritual values as the patented varieties were derived from existing varieties incorporating traditional cultivators were not novel enough, and that the claimed properties had not been validated.[108]

## 5.15 TEMPEH

Tempeh is a traditional soy product originating from Indonesia. It is made by a natural culturing and controlled fermentation process that binds soybeans into a cake form. Tempeh is unique among major traditional soy foods in that it is the only one that did not originate from Greater Chinese cuisine.

It originated in today's Indonesia, and is especially popular on the island of Java, where it is a staple source of protein. Like tofu, tempeh is made from soybeans, but it is a whole soybean product with

[107] Available at http://indiancountrytodaymedianetwork.com/2011/11/21/kalo-more-native-hawaiian-plant-its-ancestor-hawaiian-culture-63402 (visited on 14.01.2016)
[108] Available at http://www.centerfoodsafety.org/press-release1_12_20062.cfm (visited on 23/08/2015)

different nutritional characteristics and textural qualities. Tempeh's fermentation process and its retention of the whole bean give it a higher content of protein, dietary fiber, and vitamins. It has a firm texture and an earthy flavor which becomes more pronounced as it ages. Because of its nutritional value, tempeh is used worldwide in vegetarian cuisine, where it is used as a meat analogue.[109]

Tempeh, soul food of the Japanese people and a unique feature of Indonesia's culinary heritage, is now gaining popularity in the west, especially as a health food. It is rich in Vitamin B12 which proved to be a perfect substitute for animal protein. According. to many health reports, dicts that are high in fermented soy products may reduce the risk of breast, colon, lung and stomach cancers, and it may also protect us from cardiovascular disease, osteoporosis and menopausal symptoms. However, Japan has recently granted several patents on the process of making temper and claimed it as a national product of Japan. This is the best example of plundering of a traditional knowledge of Indonesia.[110]

## 5.16 BITTER GOURD

*Momordica charantia*, known as bitter melon, bitter gourd, bitter squash, or balsampear, has names in other languages which have entered English as loanwords, e.g. goya from Okinawan and karela from Sanskrit. It is a tropical and subtropical vine of the family Cucurbitaceae, widely grown in Asia, Africa, and the Caribbean for its edible fruit. Its many varieties differ substantially in the shape and bitterness of the fruit. Bitter melon originated in India and was introduced into China in the 14th century. This herbaceous, tendril bearing vine grows up to 5 m (16 ft) in length. It bears simple, alternate leaves 4–12 cm (1.6–4.7 in) across, with three to seven deeply separated lobes. Each plant bears separate yellow male and female flowers. In the Northern Hemisphere, flowering occurs during June to July and fruiting

[109] Available at https://en.wikipedia.org/wiki/Tempeh (visited on 08.01.2016)
[110]Zamora etal, "Biodiversity,TRIPS and the Patenting of Asia's Rice Bowl", available at www.grain.org/article/entries/27-biopiracy-trips-and-the-patenting-of-asias-rice-bowl (visited on 19.08.2015)

during September to November. The fruit has a distinct warty exterior and an oblong shape. It is hollow in cross-section, with a relatively thin layer of flesh surrounding a central seed cavity filled with large, flat seeds and pith. The fruit is most often eaten green, or as it is beginning to turn yellow. At this stage, the fruit's flesh is crunchy and watery in texture, similar to cucumber, chayote or green bell pepper, but bitter. The skin is tender and edible. Seeds and pith appear white in unripe fruits; they are not intensely bitter and can be removed before cooking. As the fruit ripens, the flesh (rind) becomes somewhat tougher and more bitter, and many consider it too distasteful to eat. On the other hand, the pith becomes sweet and intensely red; it can be eaten uncooked in this state, and is a popular ingredient in some Southeast Asian salads. When the fruit is fully ripe, it turns orange and mushy, and splits into segments which curl back dramatically to expose seeds covered in bright red pulp.[111]

### 5.16.1 USES OF BITTER GOURD

As a vegetable, bitter gourd is widely used in the form of fried slices, curry, stuffed form etc. Apart from this, Bitter gourd juice is highly recommended one. Soft drinks, flakes, pickles etc are also prepared using bitter gourd.

As much high is bitter gourd’s bitterness, so is it enriched with medicinal properties.

- It cures vomiting and purgation, cures diabetes, prevents skin diseases.
- It purifies blood and aids in menstrual cycle.
- It is beneficial in curing jaundice.
- It cures chicken pox, small pox and other such communicable diseases.
- Its cures the congested cough and cure the pneumonia in children.
- It is beneficial in curing gout disorders.
- It cures haziness in eyes and night blindness too.

[111] Available at https://en.wikipedia.org/wiki/Momordica_charantia (visited on 21.01.2016)

- It cures the swelling of throat.
- It is beneficial in curing Arthritis.
- This vegetable is highly beneficial in many other ailments too. Like those suffering from renal problems should include in diet; it activates the nephrons thus making the system fine again.[112]

### 5.16.2 BIOPIRACY OF BITTER GOURD

Thailand has a big problem with Acquired Immuno Deficiency Syndrome (AIDS). National Scientists have been researching all sorts of avenues from the HIV Virus. One research team was processing on bitter gourd (Momordica spp.), or 'Bird Dropping Gourd' as it is called in Thai, which contains compounds that work against HIV. To their dismay, however, they recently learned agenda and patented the active Map-30 protein from a native strain of Thai bitter gourd in the United States. The Thai scientists feel that not only their work has been pirated but part of the country's indigenous biodiversity has been stolen as well.[113]

## 5.17 NUNA BEANS

Nunas *(Thaseolus vulgaris, Fabaceae)*, commonly called popping beans, are traditionally grown in the Andean highlands of South America, and are consumed as a snack food after a quick toasting process. Proximate analysis of their nutritive value revealed that nunas have a higher content of starch, amylose, and copper than four dry bean varieties and a lower mean content of protein, phosphorous, iron, and boron. The unique texture and taste of nunas may be related to their high starch content. Anti-nutritional factors such as lectins were higher in raw and boiled nuna samples than in toasted nunas, while tannin levels did not change from raw to toasted treatments.

[112] Available at http://www.theayurveda.org/ayurveda/herbal-medicine/bitter-gourd-a-bitter-vegetable-towards-wellness/ (visited on 03.01.2016 at `14:28)
[113] Ibid.

Overall in-vitro digestibility was slightly lower for toasted nunas than boiled dry bean.[114]

### 5.17.1 GRANT OF PATENT

On 21 March, 2000 a patent was granted to US corporation in relation to a 'bean-nut popping bean" apparently derived from crosses involving at least 33 Andean nuna bean varieties from Perrier, Bolivia, Ecuador and Colombia.

### 5.17.2 OPPOSITION TO THE GRANT OF PATENT

RAFI reported that a meeting of a tribunal of Indigenous elders from six Andean communities that grow nuna beans met in February 2001 and condemned the patenting as Biopiracy of their Andean heritage and demanded that CIAT-The International Centre for Tropical Agriculture, the CGIAR (The Consultative Group on International Agricultural Research) Centre based in Cali, Colombia-uphold its obligation under a United Nations 'trust agreement' to keep farmer bred bean varieties in the public domain.

RAFI reported the views of a number of scientists working with nuna who were concerned that the patent would limit improvements in the crop to the prejudice of the traditional Andean peoples. In particular it was observed that toasting nunas used less fuel than boiling beans, a feature important to economic and environmental conditions in areas of the world where fuel is scare. Additionally, RAFI reported that the US patent also prejudiced a stratagem to use propping beans grown in the Andes a substitute for illicit crops.

The patent was described as *"particularly offensive to Andean farmers and indigenous people"* because it extended to crosses involving at least 33 Andean nuna varieties traditionally bred and developed over centuries in Peree, Bolivia, Ecuador, all of which were freely provided by Andean farming communities, "who allowed their bean varieties to be put into the public realm

[114] Available at https://www.researchgate.net/publication/226049586_Nutritive_value_of_the_nuna_popping_bean (visited on 17.12.2015)

in order to ensure the continued maintenance of the world's seed biodiversity" Nine of these varieties were held in CIAT's international bean collection as designated in-trust accessions, all being farmers' varieties collected in Peree. This case has been adopted by a number of NGO's as a test of the international intellectual property community resolve to support the conservation and development of indigenous knowledge.[115]

## 5.18 KANIS

Kanis *(Trichopus zeylanicus)* is a rhizomatous, perennial herb, found in Sri Lanka, Malaysia, and southern India. In each of these locations, the herb is found in different conditions—in lowly sandy forests near water bodies in Sri Lanka, in low-lying forests in the Malay Peninsula, and in altitudes around 1,000 meters in India. Only the Indian version of the herb (Trichopus zeylanicus travancoricus) has strong medicinal properties, and these medicinal properties are strongest in the plants that grow in the wild or are cultivated in forest areas.

The Kani tribes have been the traditional users of Trichopus zeylanicus travancoricus. The Kani people are traditionally nomadic, but have gradually eased into settled life in the forests of the Western Ghats, a mountain range along southwestern India. The Kani tribe population was around 25,000 in late 2012.[116] Most of the forest area in and around the location of the Kanis has been classified as a reserved forest under the Indian Forest Act of 1927. A reserved forest implied that in the area, acts need to be ratified and approved by the forest officer or the state government. The forest department would regularly issue a list of minor forest produce that could be extracted by the tribes. The Tropical Botanical Garden and Research Institute (TBGRI), located in Kerala, India, is an autonomous institution and the largest botanical garden in Asia. It is a centre for plant research spreading over 300 acres,

[115] N. Stainoff, "Biological Resources and Beneft sharing: The Interesction Between Traditional Knowledge and Intellectual Property" in S.K. Mittal and R. Verma, *Intellectual Property Rights- A Global Vision* 9 (Indian Law Institute, New Delhi)

[116] Available at http://www.downtoearth.org.in/content/kani-learning (visited on 28.09.2015)

having 50,000 accessions belonging to 12,000 genetic variants of 7,000 tropical plant species. The TBGRI had an active R&D wing, which aimed at conserving and sustainably utilizing the plant diversity of tropical India. The discovery of the potential of the Trichopus zeylanicus travancoricus began in December 1987 when a team of scientists led by Dr. Pushpangadan from the All India Coordinated Research Project on Ethnobiology (AICRPE) began a botanical expedition into the Agastya forests of the Western Ghats. The group was led by three guides from the Kani tribe. The trek was exhausting, but the scientists noticed that the Kani men were full of energy after eating the black fruit of a plant. The scientists tried the fruit and they, too, felt stronger and more energetic. The scientists were eventually able to collect some specimens of the plant to study. Once back at the laboratory, the team began work to isolate the active ingredients. It turned out to be Trichopus zeylanicus travancoricus. Scientists had heard of the plant before, but were unaware of its uses. The scientists determined that the leaves of the plant were also useful as they had immunodulatory/immunorestorative, anti-hepatotoxic, and anti-stress properties.

### 5.18.1 DEVELOPMENT OF JEEVANI DRUG

In 1995, scientists developed a drug called Jeevani, which contained Trichopus zeylanicus travancoricus as one of its ingredients. The scientists were using the leaves, not the fruit, in Jeevani as a restorative, immune-enhancing, antistress, and antifatigue agent. Back at Tropical Botanic Garden and Research Institute (TBGRI) where Dr. Pushpangadan worked, scientists identified one compound from the plant and a patent application was filed for it. Thus, in 1996, TBGRI filed a process patent application to manufacture an herbal sport medicine, in granule or suspension form, based on the compounds isolated from aarogyappacha. Post his move to TBGRI, Dr. Pushpangadan began exploring options for benefit sharing and value addition. Eventually TBGRI was authorized to transfer the technology for manufacturing Jeevani to interested parties, for an appropriate license fee. In

1996, Arya Vaidya Pharmacy Ltd. was selected to manufacture Jeevani for a period of seven years for a license fee of Rupees 10 lakhs. In addition to the license fees, Arya Vaidya Pharmacy would have to pay the TBGRI 2 percent of the sales as a royalty. The TBGRI was looking at sharing the benefits of the commercialization of Jeevani with the Kani people, as it was these tribes who had initially discovered the properties of the fruit.

### 5.18.2 RESOLUTION FOR BENEFIT SHARING

A resolution was passed that gave the Kani tribes 50 percent of the license fee and 50 percent of the royalties obtained by TBGRI on the sale of the drug. Thus, the TBGRI was looking to share half of what it would be getting from the commercialization of the drug with the Kani people. TBGRI had been interacting with the Kanis from the Kuttichal Gram Panchayat area (the Kanis who had been the guides for the scientists). This section of Kanis has been supportive of TBGRI's role. However, Kanis in other areas—the Vithura and Peringamala Panchayat areas— had not been a part of the discussions and some were offended by TBGRI's actions. They saw it as TBGRI pirating their indigenous knowledge.

### 5.18.3 OPPOSITION

In mid-1995, opposition grew. The legislative assembly at Kerala felt the royalty amounts the Kanis would receive were too low. The government owned Kerala Institute for Research, Training and Development of Scheduled Castes and Scheduled Tribes (KIRTADS) also made the case that the agreement was unfair. These groups organized the Kanis and shared their concerns that not all Kani tribes had been involved in the discussions; the benefit-sharing package was not fair to the Kani people; and once the commercialization of the plant began, the company would deplete the natural abundance of the plant.

The TBGRI responded that while it had been in communication and consultation with the Kanis of one area, it has not involved all tribe members.

However, it would now set up a mechanism to share rents with the Kani tribe. Since the community did not have a formal method of receiving its share, the Kerala Kani Samudaya Kshema Trust was formed in November 1997. The plan was for the trust to have all the adult Kanis in Kerala as its members. By December 1997, the total membership stood at 500, while the membership drive had covered about 40 tribal settlements by then. The most encouraging point was that there had been no opposition from any of the Kanis in the 40 tribal settlements. The first licensing fee payment (Rupees 5 lakh) and royalties (Rupees 19,000) of the benefit-sharing formula were deposited into the trust in 1999. The Kanis were also granted Rupees 50,000 as a special incentive for providing the information to the scientists. Apart from this, the trust received Rupees 1.5 lakh annually as royalty payments until 2008.[117]Over time, the drug has made headlines. Its potential was acknowledged in prestigious journals like Nature and magazines like Time. The latest U.S. research shows that the plant has antioxidant and DNA-protecting properties. Hence, the Kanis case is an instance of strong stakeholder coalition and moderately weak patent claim strength leading to a win-win outcome.

One of the main objectives of the patents system is to develop new knowledge for prosperity of mankind which is getting diluted day by day. It is instead helping monopolisation of new knowledge for exploiting mankind. The need of the hour is to grant patents in a way that serves public interest. Our traditional knowledge is the result of hard work of our ancestors. It should be used for the benefit of humanity. But in this competitive world of patents, it needs to be protected. The grant of patents on non-patentable knowledge which is either a part of the traditional knowledge of the developing world or a minor variation thereof has been causing great concern to the developing world.[118]

[117] Available at http://www.downtoearth.org.in/content/kani-learning (visited on at 28/09/2016)
[118] Divya Bhargava, "Patent Act:Biopiracy Of Traditional Indian Products An Overview",*14 May, 2009*, available at http://www.countercurrents.org/bhargava140709.htm (visited on 13.12.2015)

By the analysis of various biopiracy disputes and its impact it can be concluded that India and other developing countries rich in bio-resources and indigenous knowledge are favourite targets and victims of biopiracy. The relationship between patent law and indigenous peoples' knowledge is inherently predatory and harmful to the interests, worldviews, and self-determination of the Third World. More and more transnational corporations are seeking to gain control over the biological resources and seeds of farmers, practising "biopiracy" by appropriating indigenous peoples' knowledge of plants and seeds, and patenting them for their own economic gain. When a plant is entirely or partially patented, the patent holder is entitled to lay claim to subsequent substances and products that contain the plant's genes as well. The original users who have bred these plants and seeds generation after generation are often neither informed nor do they participate in the profits generated. Though many patents have been successfully revoked but the problem of biopiracy may not be resolved with patent revocation alone. There is a need to provide appropriate legal and institutional means for particularly recognizing the rights of the indigenous communities on their traditional knowledge, based on biological resources at the international level. It is important that patenting of indigenous knowledge be rejected and such resources should remain accessible to all people.

# CHAPTER VI

# CONCLUSION AND SUGGESTIONS

Intellectual Property Rights (IPRs)[1] evolved as economic or commercial property rights over various forms of knowledge. IPRs generate government sponsored monopolies over knowledge, processes, products, innovations, inventions, even over naturally-occurring plants, animals, human genetic material, microorganisms, and parts or components of plants and animals, such as genes, cells, DNA[2] sequences and biological, microbiological processes and non-biological processes. Without the involvement of government these could not be monopolized. Essentially, IPRs are legal means used to appropriate knowledge. The Preamble to the Trade Related Aspects of Intellectual Property Rights Agreement expressly states that intellectual property rights are private rights. In the Intellectual Property Rights[3] (IPR) regime, knowledge is reduced to a commodity which can be privately owned by an individual, legal person (e.g., corporations) who asserts exclusive rights over it. Basically, IPRs can only arise from a society where individual private property rights are held inalienable.

Traditional Knowledge[4] (TK) of the indigenous people is generated not only by individuals rather it is generated collectively by gradual accumulation and inter-generationally. Indigenous novel creation is not just motivated by the profit-making will or for commercialization, it is the outcome of the extensive inter-relationship between indigenous people, their territories and resources. The basis of IPR is the protection of individual property rights and these are provided as absolute rights whereas traditional knowledge is held by collectively by individuals, clans, tribes, nations and different independent indigenous communities. The use and sharing of TK is directed and managed

[1] Hereinafter referred to as IPRs
[2] Deoxyribonucleic acid
[3] Hereinafter referred to as IPR
[4] Hereinafter referred to as TK

by complicated collective systems and customary laws and norms of the indigenous communities. Even if individuals possess the knowledge, their right to exploit it is decided collectively. They cannot use it in an unrestricted and free mode because they are under the obligation to obey the laws and customs of their people.

TK cannot be isolated from the indigenous community by transferring its ownership to another person or corporation because that knowledge is part of the distinctive and collective identity and has meaning in reference to that community and not outside it. Consensus to use, show or represent it is therefore non-permanent, and it is given only on the basis of belief that receivers will pay due regard and uphold the conditions and customary laws that are related to specifics aspects of the heritage.

TK is to be kept in perpetuity to be safeguarded, developed and passed from one generation to the next. The transfer of this knowledge is a collective responsibility and in most cases it is transmitted orally. In some cases these are codified in texts. IPRs, on the other hand, whether in the form of patents, copyrights, trademarks, industrial design, geographical indications, trade secrets, plant breeders' rights, database protection, etc., grant protection for a limited period of time.

Though IPRs emerged from a particular worldview about human nature, knowledge and innovation, and these are designed to protect the rights of individuals and corporations and the economic interests of the countries. But in the IPR regime traditional knowledge is threatened by unauthorised use. IPR regimes have miles to go before they can claim to be saviours of TK systems. The billion dollar question is whether the natural habitat of the poor is again and again targeted by the international resource economy – this time in the name of IPR. With most of the original genetic materials located in the biodiversity hot spots of developing countries, the natural question that crop up is – Is the destructive face of colonialism showing up again? India too had its share of bitter experiences vis-a-vis its sovereign rights over the resources

available in nature. Turmeric, Basmati and Neem are the classic cases where the country had to fight tooth and nail.

The concern for indigenous and local communities is not only that their traditional resources and knowledge are unfairly exploited. The commercial use of these resources can also be culturally offensive, particularly if they are considered sacred, and preventing such inappropriate use may be as or more important than gaining fair compensation. In many traditional societies, TK holders or tribal leaders have permanent custodianship responsibilities with respect to the use of knowledge, and ensuring it is used in a culturally appropriate manner, irrespective of whether the knowledge is secret, known to just a few people, or known to thousands across the world.

In recent years issues related to the importance of TK held by indigenous communities, its role in the economy as well as in biodiversity conservation and sustainable use, and the need for its protection from misappropriation by commercial interests have been the subject of debate in international fora like the Convention on Biological Diversity, the World Trade Organization and the World Intellectual Property Organization. Recognition of the remarkable economic potential of such knowledge has led many multinational corporations of the industrialized nations to *"free ride on the genetic resources and traditional knowledge and technologies of the developing countries"*[5] leading the latter to resent such biopiracy or uncompensated exploitation of their natural resources. With an increasing number of patents being extended to products based on genetic resources, developing countries, which harbour much of this biological diversity, are concerned not just about the misappropriation of resource based inventions but also the intangible knowledge associated with the resource. Much of this knowledge belongs to local and indigenous communities who through generations of observation, practice and usage have not only maintained and conserved biodiversity, but also developed and preserved an associated TK

[5] Available at http://www.ictsd.org/downloads/2008/12/protecting-traditional-knowledge_pathways-to-the-future.pdf (visited on 15.10.2016)

base. However, in most cases, benefits arising from commercial utilization of such resources are not shared with the communities that provide the knowledge. Though there is recognition of the need to protect the rights of such indigenous communities, there is also the realization that this cannot be done through conventional IPR systems which are based on concepts of individual ownership. More and more biodiversity rich nations and indigenous groups are realizing the significance of this fact and taking measures to put in place legal and non-legally binding mechanisms to protect their TK base.

Protests relating to biopiracy revolve around the central point that businesses in developed nations are reaping the wealth garnered from poor people's knowledge and at the expense of the developing countries. Biopiracy is considered illegal because it violates international conventions and corresponding domestic regulations through its failure to recognise, respect and equitably compensate the rightful owners of appropriated biological resources and related TK. What becomes unacceptable is that researchers take a bio-resource for its traditional medicinal or other commercially viable properties, put it through limited laboratory testing or selective breeding, produce a marketable product and receive a patent on what is only a slight variant of the traditional product. Some of the patents are granted to resources in their original form and in many cases, the invention for which patent was granted was nothing but the imitation of indigenous knowledge and had applications similar to the traditional use.

From the 1990s onwards there has been an increase in cases related to biopiracy with patents being used to acquire monopoly rights over indigenous resources without concomitant benefit sharing. Thus, the number of biopiracy cases affecting indigenous people is also steadily increasing. It has been alleged that governments of industrialized nations are too quick in granting IPR protection on plants, products and processes that already are in use in developing countries. This is the result of the fact that oral prior art is denied recognition and also that patent applications are not extensively examined by the patent offices of the developed countries. Many of the controversial

patents have been contested by public interest advocacy groups and been revoked but the deterrent to this initiative is the exorbitant cost of the process.

Developing countries have two main complaints about the efforts of industrialized countries to strengthen international intellectual property protection. Firstly, raw genetic resources and traditional knowledge originating from developing countries can freely be transferred to industrialized countries, while the commercial products and technology derived from these resources are very expensive because of the intellectual property protection. Secondly, developing nations feel that intellectual property protection is constructed in favour of the technological innovation of industrialized nations. Through the WIPO and the WTO the minimum standards of patent law have been globally harmonized. The TRIPS Agreement is constructed in the disadvantage of farmers and indigenous communities of developing countries. Farmers who have preserved and improved plant varieties for generations do not get any recognition under the WTO regime. Traditional agricultural innovation and traditional knowledge of indigenous communities are not covered under the TRIPS Agreement and are consequently deprived of protection although this knowledge is a form of intellectual property. The establishment of such a strong intellectual property protection worldwide has been realized under dominance of industrialized countries. The rapid disappearance of biodiversity has spurred the international community to take action and that has resulted in the Convention on Biological Diversity. The Convention essentially makes the national government of biodiversity-rich states their own gatekeeper. Each state has sovereignty over the genetic resources located within its territory and determines the conditions of access to them. This access shall be on mutually agreed terms and subject to prior informed consent and benefit-sharing. These conditions for access and benefit-sharing as well as restrictions on the use of genetic resource need to be defined in national laws. The Convention has very good intentions, but no teeth. Its effects in reality are thus a lot more insignificant than those of the TRIPS Agreement.

Despite the recognition of the rights of the indigenous people at the international level through various UN Conventions and international agreements and years of intense international debate, the rights of indigenous peoples over their traditional knowledge remain largely unprotected. Recent years have seen a welcome increase in national and international efforts to rectify this situation. This has included the adoption of a range of law, policy and administrative measures. It also includes a wide range of projects, programmes and processes designed to strengthen the role of TK in local, national and international development planning, environmental conservation and mitigation strategies and sustainable use of biological diversity but still the biopiracy disputes are on rise.

Thus, the concern of indigenous communities regarding unfair exploitation of their biological resources and TK with disregard to their customary laws and practices has been gaining ground and there is growing recognition of the need to respect and protect their rights over such resources. Policy initiatives are being taken at national and international levels to design a protection regime that does not contract indigenous values of cultural heritage, customs, free sharing of knowledge, resources and innovations and communal control over such resources that have been passed down the generations. The great diversity in cultures, lifestyles, laws and practices of the indigenous peoples of all over the world makes it impossible to design a one-size fits- all protective regime. Protection of TK raises many policy issues related to the rationale for protection, the measures through which it is to be achieved, the mode of enforcement and the implications for indigenous communities and other right holders. Countries designing a protection system must approach it in a holistic manner, addressing issues related to equity, ethics, environment, sustainable resource use, the socio-economic set up and empowerment of indigenous peoples. Importantly, no new form of protection of TK will be effective or have practical meaning if it is separated from the cultural context in which the knowledge exists and denies indigenous communities their rights or reduces their ability to manage and enforce them.

The kind of system of protection a country designs and implements will depends on its diverse legal, conceptual, infrastructural and operational capacities as also on its obligation to international treaties. Countries would need to analyze the existence of and further need for framing complementary policies like recognition of customary laws and practices, terms of land tenure, recognition of rights of indigenous communities and preserving and promoting use of their knowledge.

The call for the protection of traditional knowledge against misuse or misappropriation raises deep policy question and practical challenges alike . The changing social environment, and the sense of the historical dislocation , currently affect many communities may actually strengthen resolve to safeguard TK for the benefit of future generation. Just as the technological value of TK is increasingly recognized and its potential realized, the challenge is to ensure that the intellectual and cultural contribution of traditional communities is appropriately reignited. This means taking greater account of the needs and expectation of TK holding communities concerning the intellectual property system. Its traditional qualities and frequent close linkage with the natural environment means that TK can from the basic of a sustainable appropriate tool for locality – based development. It also provides a potential avenue for developing countries, particularly least- developing countries, to benefit from the knowledge economy.

The protection of TK raises a number of policy issues, notably the objectives and modalities of such protection, and its impact and implication for its intended beneficiaries. Providers of bicultural knowledge deserve to have the right to determine when, where, and how their bicultural knowledge is used. Such issues are extremely complex, since there are broad differences about the definition of subject matter, the rationale for protection, and the means for achieving its purpose. The issues relating to TK should be addressed in a holistic manner, including ethical, environmental and socio-economic concerns. The development of any regime for the protection of TK should be grounded on a sound definition of the objectives sought, and on the

appropriateness of the instrument selected to achieve them. It is unclear the extent to which the various proposals made for the protection of TK reflect the aim and cultural values of the traditional and indigenous communities they intend to serve. There is lack of transferring to such communities, concepts and paradigms which are not suited to their realities, or which may prove ineffective to solve the problem they are supposed to address. The consideration of TK protection should not overshadow the fact that the preservation and use of TK, above all, require that the survival and improvement and cultural milieu of such communities is ensured.

In the indigenous peoples' struggle to protect their traditional knowledge related to biological resources, cultural and instinctual property the 'think-global, act-local' framework remain relevant, or, in other words it can be said, 'go glocal'. It is very important finally to point out that respect, preservation, and maintenance of traditional knowledge should not be justified solely by its instrumental value. In other words, traditional knowledge should not be respected, preserved, and maintained merely because it is relevant to biodiversity conservation and sustainability – even less because some of it has industrial application. A great deal of traditional knowledge has no commercial potential what so ever, but this does not make it any less worthy of respect or protection. The disappearance of TK may be a tragedy for the world, but above all, it is a tragedy for those people and communities of the world that depend on the integrity of their cultural and even physical survival. Thus, there is an urgent need to introduce new forms of protection for traditional knowledge that not only give communities rights over their knowledge but also enable the wider preservation and promotion of such knowledge systems.

The action that would be taken to ensure the effective protection of TK, conservation of biological resources and avoidance of biopiracy are that in the emerging regime of international and national laws and policy regulations, it is necessary that the communities traditional knowledge holders are appropriately educated so that they are made aware of their rights and

responsibilities with regard to safeguarding their TK. National and international enforcement mechanisms in the Intellectual Property system that ensure legal access to genetic resources and traditional knowledge should be fully developed and used. Indigenous and other local communities should have a broad and effective participation in all discussion and negotiations on genetic resources and TK. Leaders, experts and innovative in TK in various fields should be recognised by providing incentives. Thus, indigenous biological and other resources associated with traditional knowledge i.e., traditional health care, food, veterinary products, crafts etc. should be properly conserved and promoted for sustainable development. By designing the structure of the TK database appropriately, it is possible to make the knowledge available to all and at the same time retain the control necessary for benefit sharing to be operationalized. This would go for in ensuring that cases of biopiracy are prevented in the future.

The researcher suggests the following measures for the protection of traditional knowledge of the indigenous people and prevention of biopiracy.

- There should be an international agreed instrument, particularly for the protection of the traditional knowledge of the indigenous people associated with biological resources, for the recognition of national level protection. This would not only prevent misappropriation and avoid biopiracy but also ensure that national level benefit sharing mechanism and laws are respected worldwide.
- A protection regime at the international level that will not only protect the rights of local and indigenous communities but also respect and comply with a wide variety of diverse systems of customary laws and practices is required. Such common international regime should incorporate a certain degree of harmonization in order to be effective in foreign jurisdictions.
- Local protection to the rights of TK holders should be provided through national level sui generis regimes including customary laws as well as others and its effective enforcement inter alia through systems such as positive comity of protection systems for TK.

- Sui generis systems for TK protection should not be consistent with existing intellectual property models which protect individual rights and whose objectives are exclusively commercial, but should be tailored to the distinct characteristics of traditional innovation processes. They should recognise the holistic characters of TK – i.e., its close linkage with biodiversity, traditional territories, cultural values and customary laws, all of which are vital for maintaining TK.
- Sui generis systems and Access and Benefit Sharing regimes should be developed and administered with the active participation of diverse indigenous and local communities through a bottom-up process. The Convention on Biological Diversity process to negotiate an international regime on Access and Benefit-Sharing on Traditional Knowledge protection needs to be broadened to enable representatives of indigenous and local communities to participate fully in the decision-making process. Such participation needs to be made a priority in World Intellectual Property Organisation's work to develop guidance for Traditional Knowledge protection.
- The recognition of customary laws and authorities should form the basis of sui generis systems at all levels, including in determining access to and rights over TK and bio-resource, procedures for Prior Informed Consent and equitable benefit-sharing. TK and genetic resources are often shared freely between communities, even at cross borders, collective rights; decision-making and benefit-sharing amongst neighbouring communities should be recognised.
- Besides designing and implementing *sui generis* systems, national and international initiatives for protecting TK could include formulating legislation to govern access to genetic resources and TK and make Prior Informed Consent of relevant indigenous communities compulsory.
- A procedure needs to be followed whereby the use of indigenous knowledge from one country is allowed, particularly for intellectual property rights protection or commercialization, only after the competent

national authority of the country of origin gives a certificate that source of origin is disclosed and prior informed consent, including acceptance of benefit sharing conditions, obtained.

- Particular criteria for benefit sharing should be laid down whereby the maximum benefit should go to the indigenous communities.
- At the national level, the Government should take steps to preserve, protect, and promote the traditional knowledge of the indigenous and local community people and for this purpose a specific law for the protection of the rights of the indigenous people and protection of traditional knowledge of the indigenous people concerning biological resources should be enacted in India. Not only specific enactment of specific legislation is required but it should also be effectively implemented in order to avoid biopiracy of the indigenous peoples' knowledge.
- State governments must include in their plans and policies to protect biological resources and the associated indigenous knowledge and also the protection of the rights of the community holding it.
- Non-government organizations should be a part of government policy and interact directly to the indigenous communities at the local level.
- The best way for communities to protect their knowledge and resources is at local level. The indigenous knowledge holders should be appropriately educated at the local level so that they are made aware of their rights and responsibilities with regard to safeguarding their biological resources and the knowledge associated with it.
- There is currently no dedicated service providing practical advice, information, suggestions and contacts for indigenous peoples and communities across the range of intellectual property issues that are emerging. Thus, an international resource/education center on traditional knowledge should be established and it should include regional offices that would provide easier access to its resources.
- There should be co-operation between the indigenous people and scientists and biologists for which the States must ensure the availability of latest

technology, and guidance about the use of such technology which the indigenous people in co-operation with such well-versed persons in science can use to develop the biological resources so that they can innovate something new and benefit the whole nation.

- Plant related traditional knowledge of indigenous should be protected through registers of TK databases in order to avoid misappropriation. TK should be documented in a participatory way. Such registers and databases would prevent patents on indigenous resources and related TK by establishing prior art and also prompt sharing of benefits resulting from commercial use of such materials. India has already made inroads in this area in the form of the Traditional Knowledge Digital Library-a computerised database of documented TK related to medicinal and other plants. All the biodiversity rich nations should maintain registers and databases of biological resources associated with traditional knowledge. The option of documentation is not without its limitations. With the amount of TK being owned by innumerable indigenous communities being very vast, it is not possible to develop a completely comprehensive and extensive register of such knowledge. So TK should be documented with full participation of the indigenous people who holds such knowledge.
- A worldwide extensive database of existing Traditional knowledge should also be established. Such a database will be very useful to patent authorities while conducting prior search before granting a patent. This could help to easy the process, lessen the litigation costs that arise after the granting of patent.
- Disclosure of Information should be made mandatory. It is possible for developed countries to regulate the use of traditional knowledge by making it mandatory for the companies to completely disclose information. Mostly, the companies do not divulge the information. Such a regulation could prevent a possible misuse of traditional knowledge.
- Appropriate incentive schemes should be formulated in consonance with the opinion of indigenous and local communities which could lead to

effective protection of biological resources related TK. Core incentives could include security of tenure over land and natural resources and co-management of natural resources, with monetary and non-monetary benefits being added to suit specific situations. Private research and collecting institutions could also aid in this process through contractual obligations based on fair and equitable benefit-sharing arrangements. With regard to providing incentives, it is important to understand that no one incentive will suffice for all situations within or across communities. Incentives would thus have to be tailored to suit different kinds of knowledge, skills, practices, innovations and holders of TK as well as the needs of particular communities and of particular members of the community.

- At the international, national and state level, ways should be developed to genuinely prioritize indigenous peoples' participation, collaboration and partnership in projects that will utilize, engage, document or use traditional knowledge. Government should find out what local traditional knowledge management practices are, and how they can be incorporated into research projects in appropriate ways by which the indigenous people who are the holders of TK can reap benefit. It will develop trust and respect between government, researchers and the indigenous people.
- There should be sustained work by and with indigenous peoples and communities on local knowledge management systems, thereby creating means for emboldening local authority and governance processes. Developing contextually driven protocols and guidelines for engagement with communities that are appropriate for all parties, including those that are not literate will help produce accessible frameworks for indigenous peoples and communities to make informed decisions about the extent of knowledge use permissible, and the reality of benefits that will be returned.

The importance of biological resources associated with TK to indigenous people and its application to the contemporary world is inevitable. From the above discussion it is proven that even though traditional knowledge

is accessible to the public, it is still protected by the local communities and the people who live around that knowledge. There is a proven link between indigenous communities, biological resources and their TK because indigenous communities rely on such knowledge for their survival, daily life, healing or medicinal purposes and other nutrition needs. The Intellectual Property Rights regime needs to be fine tuned in such a way that it can bolster the cultural identity of indigenous communities and give them greater say in its management. This calls for a comprehensive strategy with community, national, regional and international dimensions. This framework should ensure avoidance of acts of biopiracy and that the control and sovereignty over biological resources rest with the local community and that they receive adequate compensation when these resources are utilised by outsiders. Although national and international recognition is a good beginning to indigenous intellectual property protection, only particular law to combat biopiracy and protect indigenous people and their knowledge and binding international regulations will grant indigenous people equal treatment for full protection of their intellectual property. If concern for indigenous people and their traditional knowledge associated with biological resources can become a real element in formulating international intellectual property law and national legislations, the benefits could go beyond the protection of such traditional knowledge and indigenous cultures.

# SELECT BIBLIOGRAPHY

## Acts and Legislations


1. Biological Diversity Act, 2002
2. Forest Conservation Act, 1980
3. Geographical Indication of Goods (Registration and Protection) Act, 1999
4. Indian Forest Act of 1927
5. Patents Act of 1970
6. Protection of Plant Varieties and Farmers' Rights Act, 2001
7. The Constitution of India
8. Wild Life (Protection) Act, 1972


## Bill and Policies


1. Draft National Environment Policy 2004
2. The Forest Policy, 1988
3. The Traditional Knowledge (Protection And Regulation to Access) Bill, 2010


## International Conventions, Covenants,Treaties, Agreements, Conferences and Commission Reports


1. Brundtland Commission Report , 1987
2. Draft Declaration of the Indigenous People, 1993
3. Draft of Traditional Knowledge, 2006
4. First World Conference On Indigenous Peoples, 22-23 September, 2014
5. International Conference on the Utilization of the TKDL, 2011
6. International Convention for the Protection of New Varieties of Plants
7. International Covenant on Civil and Political Rights
8. International Covenant on Economic, Social and Cultural Rights

9. International Labour Organization Convention Concerning Indigenous and Tribal Peoples in Independent Countries, June 1989
10. Mataatua Declaration, 1993
11. Nagoya Protocol, 2010
12. Rio Declaration, 1992
13. The TRIPS Agreement
14. UN Convention on Biological Diversity, Rio de Janeiro, 5 June 1992.
15. United Nations Declaration on the Rights of Indigenous Peoples, 2007
16. Universal Declaration Of Human Rights, 1948
17. Vienna Declaration,1993

## Books

1. Anabelle Lever, *New Frontiers in the Philosophy of Intellectual Property* (Cambridge University Press, UK, 2012)
2. Anne Flagnan and Maria Lilla Montagnani, *Intellectual Property Law- Economic and Social Perspectives* (Edward Elgar Publising Limited, UK, 2012)
3. C. Hayden, *When Nature goes Public : The Making and Unmaking of Bioprospecting in Mexico* (Princeton University Press, Princeton, 2003)
4. Dr. Silke von Lewinski, *Indigenous Heritage and Intellextual Property: Genetic Resources, Traditional Knowledge and Folklore* (Wolters Kluwer Publications, Netherlands, 2nd edition, 2008)
5. Dr. V.K. Ahuja, *Intellectual Property Rights in India* (Lexis Nexis Butterworths, Nagpur, 2nd edition. 2013)
6. Eavanson C. Kamau, Gerd Winter, *Genetic Resources, Traditional Knowledge and the Law* ( Earthscan Publishers, London, 2009)
7. Edward Hammond , *Biopiracy Watch* (Third World Network, Malaysia, Volume 1,2013)
8. Frederick M. Abbott etal., *International Intellectual Property in an Integrated World Economy* (Aspen Publishers, New York, 2007)
9. G. Duttfield, *Intellectual Property, Biogenetic Resources, and Traditional Knowledge,* (Earthscan, 2004)

10. Gibson Johanna, *Patenting Lives- Life Patents, Culture and Development* 21 (Ashgate Publishing Limited, England 2008)
11. Greaves, *Tribal Rights in Brush and Stabinsky (Eds.) Valuing Local Knowledge: Indigenous Peoples and Intellectual Property Rights* (Island Press, Covelo, 1996).
12. *"Intellectual Property and Traditional Knowledge",* WIPO Booklet No.2, WIPO Publication No. 920 (E), available at http://www.kas.de/upload/aus/ands/ homepages/namibia/Namibia-Law-Journal/11-1/NLJ-Section-7.pdf
13. Ikechi Mgbeoji, *Global Biopiracy: Patents, Plants, and Indigenous Knowledge,* (Cornell University Press, Ithaca, New York, 2006)
14. J. Michael Finger, Philp Schuler, *Poor People's Knowledge: Promoting Intellectual Property in Developing Countries (*World Bank Publications and Oxford University Press, Washington D.C., 2004)
15. Jerome H. Reichman and Keith E. Maskus, *International Public Goods and Transfer of Technology under a Globalized Intellectual Property Regime* (Cambridge University Press, New York, 2005)
16. Johanna Gibson, *Patenting Lives- Life Patents, Culture and Development* (Ashgate Publishing Limited, England, 2008)
17. L. R. Nair, R. Kumar, *Geographical Indications: A Search for Identity*,199-200 (Lexis Nexis, New Delhi 2005)
18. Lewinski V.S., *Indigenous Heritage and Intellectual Property: Genetic Resources, Traditional Knowledge and Folklore,* (Kluwer Law International, The Netherlands , Second Edition 2008)
19. M. Correa, *Intellectual Property Rights, the WTO and Developing Countries: The TRIPS Agreement and Policy Options*, (Zed Books, London,2000)
20. R. Anita *Rao* and V. Bhanoji *Rao*, *Intellectual property Rights-A Primer* (Eastern Book Company, Lucknow, 1st Edition, 2008)
21. R. Anita *Rao* and V. Bhanoji *Rao*, *Intellectual property Rights-A Primer* (Eastern Book Company, Lucknow, 1st Edition, 2008)
22. R. G. A. Nunez, *Intellectual Property and the Protection of Traditional knowledge, Genetic resources and Folklore: The Peruvian Experience,* (Max Planck Year Book of UN Law, Volume 12, 2008),

23. Silke von Lewinsky , *Indigenous Heritage and Intellectual Property : Genetic Resources, Traditional Knowledge and Folklore*, (Kulwer Law International, Netherland, 2nd edition, 2007)
24. V. Santaniello etal., *Agriculture and Intellectual Property Rights- Economic, Institutional and Implementation Issues in Technology* (CABI Publishing, U.K., 2004)
25. V. Shiva, *"Protect or Plunder? Understanding Intellectual Property Rights",* (Zed Books, London, 2001)
26. Vandana Shiva, *Captive minds, captive lives: essays on ethical and ecological implications of patents on life* ( Research Foundation for Science, Technology & Natural Resource Policy, New Delhi, 1st Edition, 1995)
27. W. V. Reid et al., *Biodiversity Prospecting: Using Genetic Resources for Sustainable Development,* (Baltimore, World Resources Institute Publications, 1993) ,

## Articles and Journals

1. "Ashwagandha next on patent hunters list",*Hinduism Today* (16 May 2001), available at http://www.hindu ismtoday.com/blogs-news/hindu-press-international/ashwagandha-next-on-patent-hunters--list/619.html
2. A. Agarwal "What's In a Neem?" *Down to Earth* 28 (March 15, 1996), p. 28, available at http://www.downtoearth.org.in/archives
3. A. Yupari, "International negotiation related to biodiversity and traditional knowledge" available at www.biotrade.org/resourcespublications/international% negotiations%20related%20to%20biodiversity%20and%20traditional knowledge. pdf
4. Anil Kumar, "A Review On King Of Bitter (Kalmegh)" *IJRPC* 2012, 2(1) p.116, available at www.ijrpc.com
5. "Biopiracy and Prior Art" *GRAIN* (August 4, 1999), available at http://www.grain.org/article/entries/1882-Biopiracy-and-prior-art

6. B. C. Cowley, *"*Protecting Indigenous Knowledge under International Law*"*, November 2002, p.46, available at library.usak.ca/theses/…/Cowley-Head-Blanche-Cathleen-2002.pdf
7. C. Bastuck, "Biopiracy and Patents-Developing countries, fears are exaggerated", available at srvrhldigo001.act.ac29/dlt-published/9/1276.html
8. C. Hamilton, *"*Biodiversity, biopiracy and benefits: what allegations of biopiracy tell us about intellectual property*"* *Developing world bioethics*, 2006, Vol. 6(3), 159
9. C.Bastuck, "Biopiracy and Patents-Developing countries, fears are exaggerated"19, available at srvrhldigo001.act.ac29/dlt-published/9/1276.html
10. C.M. Correa, *"Traditional Knowledge and Intellectual Property-Issues and options surrounding the Traditional Knowledge"*, Quaker United Nations office Geneva, November 2001,7, available at quakerservice.ca/wpcontent/uploades/2-011/07/Tkcoll3.pdf
11. Carlos M Correa, *"*Traditional Knowledge and Intellectual Property*"*, available at http://www.tansey.org.uk/docs/tk-colourfinal.pdf
12. D. F. Robinson, *"*Confronting Biopiracy: Challenges, Cases and International Debates*",* Abingdon, Earthscan, 2010, 1, available at http://samples. Sainsbury sebooks.co.uk/9781136544125_sample_824042.pdf
13. D. J. Mugabe, *"*Intellectual Property rights and Traditional knowledge"-An Exploration in International policy discourse*"* available at www.wipoint/tk/en/in/paneldiscussion/papers/pdf/ mugabe.pdf
14. Devinder Sharma, "India May Contest U.S. Patent on Diabetic Remedy" *Ens-Newswire* (August 27, 1999), Available at http://www. ens-ewswire.com/ ens/aug1999/1999-08-27-01.asp
15. Divya Bhargava, "Patent Act:Biopiracy Of Traditional Indian Products An Overview",*14 May, 2009*, available at http://www.countercurrents .org/ bhargava140709.htm
16. Dr. Mangala Anil Hirwade, "Protecting Traditional Knowledge Digitally: A Case Study of TKDL", available at http://eprints.rclis.org/14020/1/TKDL_paper.pdf

17. E. Verkey. “Legal Protection of Traditional Knowledge”, Available at iimk.ac.in/wto/seminar/Elizabeth verkey.doc
18. “Freeing the Free Tree”, A Briefing Paper on the Neem Biopiracy Case | NW Resistance Against Genetic Engineering, available at http://nwrage.org/content/ freeing-free-tree-briefing-paper-neem-biopiracy-case
19. "Grace's Patent On a Pesticide Enrages Indians", *WSJ*(September 13, 1995), available at http://www.wsj.com/india
20. H. Jajodia, “Biodiversity and Traditional Knowledge-Regulatory Framework at Natinal, Regional and International Level*”*, available at http://www. legalserviceindia.com/article1266-Biodiversity-and-Traditional Knowledge .html
21. “India Partners with US and UK to Protect Its Traditional Knowledge and Prevent Bio-Piracy-TKDL Prevents Traditional Knowledge Patents”*,* Available at http://pib.nic.in/newsite /erelease.aspx?relid=61122
22. *“*Is India losing its traditional knowledge to biopiracy?”,available at http://www.newkerala. com/ news/fullnews -90434 .html
23. I.S. Singh, “Jamun” Fruitpedia”, available at http://www.fruitipedia .com/jamun .html
24. J. Aniott, *“*Investigating the Convention on Biodiversity’s Protection for Traditional knowledge*”,* available at http://wp.c-edha.net/wp-content/ uploads/2011/5/investigating-theconventi-on-biologicaldiversity protection. pdf
25. Jaggi Lal, “Turmeric, Curcumin and Our Life: A Review”, *Bull. Environ. Pharmacol. Life Sci.;* Volume 1 [7] June 2012: 11 – 17, available at www.bepls.com
26. “Karkala Manvitha, Bhushan Bidya Aloe vera: a wonder plant its history, cultivation and medicinal uses” *Journal of Pharmacognosy and Phytochemistry* 2014; 2 (5): 85-88, available at http://www.phytojournal.com/vol2Issue5 /Issue_jan_2014/19.1.pdf
27. K. Aoki, *“Food Forethought: Intergenerational Equity and Global Food Supply? Past, Present and Future”,* Wisconsin Law Review, 2011, 425, available at http://wisconsinlawreview.org/wp-content/uploads/2011/07/10 - Aoki-Final.pdf

28. K. Venkatraman, "India's Biodiversity Act 2002 and its role in Conservation", Tropical Ecology 50(1) 2009, PP.23, available at www.tropecol.com /pdf/ open/pdf-50-1/04%venkatraman.pdf

29. K.Sinha, " India Foils Chinese Bid To Patent Pudina" *The Times Of India* (24 June 2010) , available at http:// Times Ofindia.Indiatimes.Com/India/India-Foils-Chinese-Bid-To-Patent-Pudina/Iplarticleshow/608409 1.Cms

30. K.Sinha, "India beats back US firm's bid to patent Ashwagandha formulations" *The Times of India* (27 March 2010) , available at http://timesofindia .indiatimes .com/articleshow/5728923. cms ?prtpag e=1

31. Lindsey Schuler, "Modern Age Protection: Protecting Indigenous Knowledge through Intellectual Property Law" Michigan State International Law Review [Vol.21:3] p.752, available at http://digitalcommons.law. msu.edu /cgi/ view content .cgi?article=1210 &context=ilr

32. M. Somasekhar, " Patent hunters haunt ashwagandha" *The Hindu business line* (February 25, 2001), available at http://www.hindu.com/businessline /2001/02/25/ stories /1425 1803.html

33. M. Umadevi, R. Rajeswari, C. Sharmila Rahale, S. Selvavenkadesh, R.Pushpa, K.P.Sampath Kumar, Debjit Bhowmi, "Traditional And Medicinal Uses of Withania Somnifera"Vol. 1 No. 9 2012 p.102, available at http:// www. the pharma journal.com/archives/2012/vol1issue9/PartA/11.1.pdf

34. "Patent of Pudina and Kalamegha", available at http://www.Pfionline. Com/Index.Php /Component/ Content/Article/8/20-Newsflash1

35. "Peruvian Farmers and Indigenous People Denounce Maca Patents", *ETC Group* (3 July 2002), available at http://www.etcgroup.org/sites/www.etcgroup.org/files /publication /194/01/macafinal1.pdf

36. P. Pushpangadaring , "Biodiversity and Emerging Benefit Sharing Arrangments-Challenges and Opportunities for India", Proc. India natn sci Acad. (PINSA) b68 No. 3,2002,pp. 297, available at 202,41.82.144/rawdataupload/upload/insa /INSA_1/2006178-297.pdf

37. R. Chakravarty, *"*Presenting Traditional knowledge; Initiatives in India*"*, *IFLA Journal* 36:294, 2010 pp. 224, available at ifl.sagepub.com/content/26/4/294. Full.pdf

38. R. Kriplani, "Defining the Role and Scope of IPR in the realm of Environmental Governance in India: Sui Generis Protection of Plant Genetic Resources*"* available at www.ecoinsee.org/fllconf/sub%20theme%20e/ Rahul%20Kriplani. pdf

39. R.V. Anuradha, "Biopiracy and Traditional Knowledge" available at http://www./hinduonnet.com/ folio /fo 105/01050380.htm

40. R.V.Anuradha, "Bio-piracy and Traditional Knowledge" *The Hindu*( 20 May 2001), available at http://www.hinduonnet .com/folio/fo0105/01050380.html

41. Rfidiger Wolfrum, *"*The Protection of Indigenous Peoples in International Law*"*, available at http://www. zaoerv .de/59_1999/59_1999_ 2_a_369_382.pdf

42. S. K.Sreedharan, "Bridging theTime and Tide –Traditional Knowledge in the 21st Century" 15 *JIPR* 146-150, March 2010, available at http://nopr. niscair.res.in/bitstream/123456789/7624/1/JIPR%2015(2)% 20146150.pdf

43. S. Krishnaswamy, *"*Access to Knowledge and Traditional Knowledge and Protection*",* available at http://www.bloomburyacademic. com/view/ Accessknowledgeindia-9781849665568/chapter-ba-978184966556 8-chapter-002. xml?print&print

44. S.S. Santra, "Biopiracy", Newsletter,19, *ENVIS Centre of Enviromental Biotechnology* (2011) , available at envis.Kubiotech.org/newslet19.pdf

45. The Protection of Geographical Indications in India: Issues and Challenges, available at http://www.teriin.org /div/ briefing_ paper_GI.pdf

46. "US patent on neem",63*TWR*23(November1995), available at http://www.world cat.org /title/third-world-resurgence/oclc/25613020

47. Uzama Jamil, *"Biopiracy: The Patenting of Basmati by Ricetec",* available at https://www.sdpi.org/ publications/files/W37-Biopiracy.pdf

48. V. K. Gupta, "Basmati Rice Lines and Grains- Gist of the US Patent No.5,663,484" *JIPR* Volume 3,May 1998, 127-137, available at http://nopr. niscair .res .in/bitstream /123456789/19555/1/JIPR%203(3)%20127-137.pdf

49. V. K.Gupta, *"*Traditional Knowledge Digital Library-A Model to protect Traditional Knowledge*"* , available at pib.nic.in/new-site/efeatures. Aspx ?relid =79647
50. Vandana Shiva, Wheat Biopiracy, available at http://www.countercurrents .org/enshiva270404.htm 4/4
51. Venkatraman K. etal., *"*Intellectual Property Rights, Traditional knowledge and Biodiversity of India*", JIPR*,Vol.13july2008,pp.326, available at nopr.niscair.res .in/bitstream-/123456789/1781/1/jipr%20326-335.pdf
52. "What is Intellectual Property" WIPO Publication No. 450(E) , available at http://www.zis.gov.rs/upload/documents/pdf_en/pdf/What%20is%20IP_WIPO. pdf
53. Zamora etal, "Biodiversity,TRIPS and the Patenting of Asia's Rice Bowl", available at www.grain.org/article/entries/27-biopiracy-trips-and-the-patenting-of-asias-rice-bowl

## Websites

1. http://apeda.gov.in/apedawebsite/SubHead_Products/Wheat.htm
2. http://envfor.nic.in/legis/forest/forest4.html
3. http://envfor.nic.in/legis/wildlife/wildlife1.html
4. http://ifs.nic.in/Dynamic/pdf/JFM%20handbook.pdf
5. http://indiancountrytodaymedianetwork.com/2011/11/21/kalo-more-native-hawaiian- plant- its-ancestor-hawaiian-culture-63402
6. http://indigenouspeopleissues.com/index.php?option=com_content&view=article &=9532:india-wipo_and-india-partner-to-protecttraditional-knowledge-frommis appropriation-judigeno
7. http://infochangeindia.org/trade-a-development/news-scan/monsanto-patents-indian-wheat-gene.htm
8. http://karshaka.blogspot.in/2012/03/haldi-victim-of-bio-piracy.html
9. http://nwrage.org/content/freeing-free-tree-briefing-paper-neem-biopiracy-case
10. http://oxforddictionaries.com/ definition/ english/Biopiracy
11. http://oxforddictionaries.com/ definition/english/bioprospecting

12. http://rainforest-database.com/plants/maca.html
13. http://realityspeaks.expertscolumn.com/article/15-health-benefits-jamun
14. http://scholarsresearchlibrary.com/AASR-second-issue/10.AASR1_2_86-108.pdf
15. http://shodhganga.inflibnet.ac.in/bitstream/10603/12824/11/11_chapter%205 .pdf
16. http://shodhganga.inflibnet.ac.in/bitstream/10603/14481/14/14_chapter%203.pdf
17. http://siteresources.worldbank.org/INTINDPEOPLE/922984-1112817179196/20451603 / ForestryManagementBiodiversityConservation.pdf
18. http://sites.duke.edu/amazonbiopiracy/
19. http://ssnaneem.weebly.com/neem-history.html
20. http://theconversation.com/biopiracy-when-indigenous-knowledge-is-patentedfor-profit-55589
21. http://web.pppmb.cal s.cornell.edu/resourceguide/mfs/08neem.php
22. http://web.williams.edu/go/native/maca.html
23. http://whfoods.org/genpage.php?tname=foodspice&dbid=78
24. http://www. Rediff .com/news/aug/27haldi.html
25. http://www..sarai.net/research /trips indigenous knowledge and the biorush.pdf
26. http://www.actionbioscience.org/biodiversity/gollin.html
27. http://www.afna.ca/uploads/files/env/ns...biopiracy.pdf
28. http://www.ajpcr.com/Vol6Issue3/171.pdf
29. http://www.american.edu/ted/turmeric.html
30. http://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/pubs/rp/RP9697/97rp20
31. http://www.bbc.co.uk/worldservice/people/features/ihavearightto/ four_b/treaties_vienna .s html
32. http://www.britannica.com/EBchecked/topic/164412/Pedanius-Dioscorides
33. http://www.centerfoodsafety.org/press-release1_12_20062.cfm
34. http://www.cesc-india.org/doc-archiv/cpg-epw-23oct2004-nep-india.pdf
35. http://www.countercurrents.org/en-shiva270404.htm
36. http://www.dcmsme.gov.in/emerge/website_material_on_ipr.pdf
37. http://www.downtoearth.org.in/content/kani-learning
38. http://www.dwr.res.in/node/9

39. http://www.e-ijd.org/article.asp?issn=00195154;year=2008;volume=53;issue=4;spage= 163;epage =166;aula
40. http://www.epw.in/journal/1994/42/discussion/people-wildlife-and-wildlife-protection-act.html
41. http://www.etcgroup.org/ issues/patents-biopiracy
42. http://www.etcgroup.org/en/materials/publications.html?pub_id=756
43. http://www.etcgroup.org/issues/patents-biopiracy
44. http://www.fao.org/nr/cgrfa/cgrfa-about/cgrfa-history/en/
45. http://www.fbae.org/2009/FBAE/website/images/PDF%20files/Imporatant%20Publication/National%20environment%20Policy%202004%20(Draft%20for%20Comments).pdf
46. http://www.globalissues.org/article/191/food-patents-stealing-indigenous-knowledge
47. http://www.gpplatform.ch/pbguide/organisation/international-labour-organization-ilo
48. http://www.greenpeace.org/india/en/news/chapati-chor-monsanto-s-wheat/
49. http://www.iisc.ernet.in/insa/ch21.pdf
50. http://www.ijlass.org/data/frontImages/gallery/Vol._2_No._8/5.pdf
51. http://www.itagbs.com/articles/basmati_case.html
52. http://www.kas.de/upload/aus/ands/homepages/namibia/Namibia-Law-Journal/11-1/ NLJ-Section-7.pdf
53. http://www.krishisewa.com/articles/production-technology/214-wheat-cultivation.html
54. http://www.mapi.com/ayurvedic-knowledge/plants-spices-and-oils/the-power-of-neem.html#gsc.tab=0
55. http://www.moef.nic.in/sites/default/files/India_Fourth_National_Report-FINAL_2.pdf
56. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3609276/
57. http://www.neem-products.com/neem-unani-medicine.html
58. http://www.no-patents-on-seeds.org/index.php?option=com
59. http://www.ohchr.org/Documents/Publications/GuideIPleaflet10en.pdf

60. http://www.ohchr.org/EN/Issues/IPeoples/SRIndigenousPeoples/Pages/SRIPeoples Index .aspx
61. http://www.outlookindia.com/article.aspx?201841
62. http://www.patnmarks.com/blog/traditionalknowledgeayurveda/
63. http://www.platformgentechnologie.nl/patents/euro_pat_office/parents/neem_final_backgrounder _nl.shtml
64. http://www.researchverified.com/turmeric/TurmericStudy3.pdf
65. http://www.rightsandresources.org/wp-content/uploads/RRIReport_Protected Areas -and-Land-Rights _web .pdf
66. http://www.spicesmedicinalherbs.com/ashwagandha-withania-somnifera-history.html
67. http://www.supremecourtofindia.nic.in/speeches/speeches_2006/ila-toronto.pdf
68. http://www.supremecourtofindia.nic.in/speeches/speeches_2006/ila-toronto.pdf
69. http://www.sustainable-environment.org.uk/Action/Rio_Declaration.php
70. http://www.theayurveda.org/ayurveda/herbal-medicine/bitter-gourd-a-bitter-vegetable-towards-wellness/
71. http://www.thecitizen.in/index.php/NewsDetail/index/1/7840/Biopiracy-From-Neem-to-Rice-to-Atta-Gates-and-Monsanto-Influence-IPR-Policy
72. http://www.thirdworldtraveler.com/Globalization/Building_Iron_Cage_VFTS.html
73. http://www.tkdl.res.in/TKDL/Conference/pdf_files/Report_of_Conference.pdf
74. http://www.tribuneindia.com/2007/20070617/spectrum/main1.htm
75. http://www.turmeric.co.in/turmeric_ayurvedic_use.htm
76. http://www.twn.my/title/pir-ch.htm
77. http://www.twn.my/title/tur-cn.htm /
78. http://www.un.org/en/ga/president/68/pdf/wcip/IASG%20Thematic%20Paper_%20Traditional%20Knowledge%20-%20rev1.pdf
79. http://www.un.org/en/universal-declaration-human-rights/
80. http://www.un.org/esa/socdev/unpfii/documents/5session_factsheet1.pdf
81. http://www.un.org/esa/socdev/unpfii/documents/DRIPS_en.pdf
82. http://www.un-documents.net/our-common-future.pdf

83. http://www.unep.org/wed/treeadayneem.asp
84. http://www.unhchr.ch/huridocda/huridoca.nsf/%28Symbol%29/A.CONF.157.23.En? Open Document
85. http://www.unric.org/en/indigenous-people/27309-individual-vs-collective-rights
86. http://www.wipo.int/edocs/pubdocs/en/intproperty/450/wipo_pub_450.pdf
87. http://www.wipo.int/edocs/pubdocs/en/intproperty/489/wipo_pub_489.pdf
88. http://www.wipo.int/export/sites/www/about-ip/en/iprm/pdf/ch1.pdf
89. http://www.wipo.int/meetings/en/2011/wipo_tkdl_del_11/
90. http://www.wipo.int/meetings/en/2011/wipo_tkdl_del_11/general.htm
91. http://www.wipo.int/tk/en/databases/creative_heritage/indigenous/link0002.html
92. http://www.wri.org/publication/ biodiversity-prospecting
93. http://www1.american.edu/TED/basmati.htm
94. https://en.wikipedia.org/wiki/Andrographis_paniculata
95. https://en.wikipedia.org/wiki/Azadirachta_indica
96. https://en.wikipedia.org/wiki/Basmati
97. https://en.wikipedia.org/wiki/Forest_Principles
98. https://en.wikipedia.org/wiki/Joint_Forest_Management
99. https://en.wikipedia.org/wiki/Maize
100. https://en.wikipedia.org/wiki/Momordica_charantia
101. https://en.wikipedia.org/wiki/Syzygium_cumini
102. https://en.wikipedia.org/wiki/Taro
103. https://en.wikipedia.org/wiki/Wheat
104. https://link.springer.com/chapter/10.1007%2F978-981-10-3573-9_6
105. https://plants.usda.gov/plantguide/pdf/cs_coes.pdf
106. https://www.escr-net.org/resources/section-5-background-information-icescr
107. https://www.gktoday.in/blog/wild-life-protection-act-national-parks-sanctuaries-and-other-protected-areas/
108. https://www.organicfacts.net/health-benefits/cereal/wheat.html
109. https://www.pbrc.edu/training-and-education/pdf/pns/PNS_Turmeric.pdf
110. https://www.researchgate.net/publication/226049586_Nutritive_value_of_the_nuna_popping _bean

111. https://www.uts.edu.au/sites/default/files/JIHLBP8_11_07_0.pdf
112. library.usak.ca/theses/…/Cowley-Head-Blanche-Cathleen-2002.pdf
113. www.iprcomission.org/papers/pdf/final-report/ch4final.pdf
114. www.ohchr.org/EN/Issues/IPeoples/ EMRIP/Pages/EMRIPIndex.aspx
115. www.ohchr.org/EN/Issues/IPeoples/SRIndigenous Peoples/Pages/SRIPeoplesIndex.aspx
116. www.peacefactory.com/dna.html
117. www.sinapseblog.com/2010/01/round-table-on-protection-of-25.htm
118. www.twinside.org.sg/title2books/The.Road.to.an.Antibiopiracy. Agreement .htm
119. www.wipo.int/meeting/en/doc-details.jsp?dic_id=129915
120. www.wipoint/tk/en/in/paneldiscussion/papers/pdf/ mugabe.pdf