

Youth Perception on Indigenous Knowledge and Ethnomedicinal Plants: A Study of Dzongu, Sikkim

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Sikkim University



In Partial Fulfilment for the Requirement of the
Degree of Master of Philosophy

By

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**DEPARTMENT OF PEACE AND CONFLICT
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DECLARATION

I **Ongmit Lepcha** hereby declare that the dissertation entitled “**Youth Perception on Indigenous Knowledge and Ethnomedicinal Plants: A Study of Dzongu, Sikkim**” submitted to Sikkim University for the award of the degree of **Master of Philosophy**, is my original work. Any content or any part of this dissertation has not been submitted to any other institutions or for any academic purposes.

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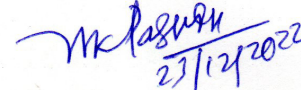
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This is to certified that the dissertation entitled “**Youth Perception on Indigenous Knowledge and Ethnomedicinal Plants: A Study of Dzongu, Sikkim**” submitted to Sikkim University in partial fulfilments of the requirement of the degree of **Master of Philosophy** in Peace and Conflict Studies and Management is the result of the research work that is carried out by **Ms. Ongmit Lepcha** under my guidance and supervision. No part of the dissertation has been submitted for any other degree, diploma, association and fellowship.

All the assistance and help received during the course of investigation have been acknowledged by her.

We recommend this dissertation to be placed before the examiners for evaluation.


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Abbreviation

AD	Anno Domini
AIDS	Acquired immune deficiency
ATs	Appropriate Technologies
BC	Before Christ
CIDA	Canadian International Development Agency
CIISD	Canadian International Institute for Sustainable Development
CSIR	Council of Scientific and Industrial Research
ES	Education System
HR	Human Resources
HIV	Human Immunodeficiency Viruses
IE	Indigenous Education
IK	Indigenous Knowledge
IKS	Indigenous Knowledge System
IMP	Indigenous Medicinal Practice
IS	Information Systems
IT	Information Technology
IWGIA	International Work Group for Indigenous Affair
IWK	Indigenous Ways of Knowing
KS	Knowledge System
LK	Local Knowledge
MC	Modern Culture
ME	Modern Education
MES	Modern Education System

NEICT	North East India Conservation Initiative
PC	Pharmaceutical Companies
PHF	Poly-Herbal Formulation
SDGs	Sustainable Development Goals
TK	Traditional Knowledge
TKDL	Traditional Knowledge Digital Library
UN	United Nations
UNDP	United Nations Development Programmes
UNDRIP	United Nations Declaration on the Rights of Indigenous People
UNESCO	United Nations Educational, Scientific and Cultural Organization
USPTO	United States Patent and Trademark Office
WE	Western Education
WHA	World Health Assembly
WHO	World Health Organization
WIPO	World Intellectual Property Organization
WTO	World Trade Organization

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Chapter I

Introduction

Sikkim, a small state in Northeast India, harbours rich traditions of indigenous knowledge practices of ethnomedicinal plants that are widely available in its rich biodiversity. The unique geographical position and topography, highly fertile soil, sufficient rainfall, and presence of large numbers of perennial streams make the state of Sikkim one of the country's richest treasure houses of biodiversity. Sikkim has also developed the rich cultural practice of folk medicine and the use of plants as raw drugs to cure multiple diseases. However, such traditions and folk practices are declining due to shifts in socioeconomic patterns, and merchant and agents take undue advantage of such knowledge of medicinal plants without disclosing the real market price. Besides, the lack of documentation and oral tradition further places the knowledge of ethnomedicinal plants on the verge of extinction.

Sikkim, a home of ethnic people and tribes, has got a rich tradition of spiritual and supernatural faith healers who revere, preserve and protect their natural resources with deep spiritual and supernatural connection to their land in an animist tradition. The ethnic communities of Sikkim have been using plant extracts for curing various diseases and ailments for ages. They have developed ethnomedicinal knowledge of plants with long time-tested experiential methods in their ecosystem in which they live. But the current scenario of indigenous knowledge and ethnomedicinal plants changing over time due to socio-cultural and economic changes that hinder the passing over of such tradition to younger generation in Sikkim. Lepchas, being the indigenous nature dwellers who are believed to be the most ancient tribe of Sikkim, seem to face troubles in terms of preservation and transfer of their rich indigenous

knowledge practices and traditions associated with ethnomedicinal plants to its younger generation. Though Lepchas are the world-famous plant collectors and possess a vast knowledge of ethno-botany, their herbal system has almost disappeared. Dzongu in North Sikkim is amongst the last strongholds of the Lepcha culture and their herbal medicinal system is still practised. Under Article 371f of the Indian constitution it gets special protection to uphold and preserve its indigenous knowledge practices associated with ethnomedicinal plants.

In India, there are 705 ethnic groups officially recognized as “Scheduled Tribes”. In central India, the Scheduled Tribes are usually referred as to Adivasis, which literally means indigenous people. In India, ethnic groups are notified as scheduled tribes and spread across 28 states and 8 union territories. In order to protect indigenous and tribal communities against exploitation and intrusion from outsiders and to protect their distinct cultural identities and social systems, the Indian state has created ‘Scheduled Areas’ which are predominantly inhabited by indigenous communities. In these ‘Scheduled Areas’ the non-tribal communities are prohibited to settle or acquire property. Under the fifth schedule and sixth schedules of the Constitution of India, special administrative arrangements have been made for ‘Scheduled Areas’ for safeguarding the fundamental rights and development of tribal communities. These two schedules have distinct mechanisms for governing schedule tribe under their respective jurisdiction.

The population of indigenous people in India are estimated of 104 million that constitute 8.6% of the national population. The largest concentrations of indigenous people are found in the eight north-eastern states of India, and the so-called “central tribal belt” that stretches from Rajasthan to west Bengal. Indigenous knowledge is the unique knowledge confined to a particular culture or society. It is known as local

knowledge, Folk Knowledge, People Knowledge, Traditional wisdom or Traditional science. This knowledge is generated and transmitted by communities over time in an effort to cope with their own agro-ecological and socio-economic environment. Ethno-medicine is a study or comparison of the traditional medicine based on bioactive compounds in plants and animals and practiced by various ethnic groups, especially those with little access to western medicines. Ethno-botany and ethnomedicine are as old as man's history.

When we make a comparison Indigenous Knowledge Education with western education we can observe certain remarkable differences in term of written form, documentation, teaching practices, transfer of knowledge etc. Indigenous Knowledge is locally bound and has a specific area which is passed over to next generation through oral medium and practices in context specific culture and in non-formal manner. It is dynamic and adaptive as society changes socially, economically, culturally etc. It is holistic in nature as it is closely connected with survival and subsistence of many people worldwide. It the knowledge is communally owned and obtain through many years of practicing therefore it provides scientific solution to many problems that particular communities are facing.

In present society, indigenous knowledge plays a fundamental role in the societies that are often remote and isolated from one another and their development occur independently. But with the coming of western education, the indigenous knowledge is gradually facing extinction due to lack of written records and problems associated with preservation and conservations of the knowledge. In education system indigenous knowledge is important because it is direct contact with their ecological environment and their cultural practices developed within indigenous systems of knowledge, which are built on their own epistemologies. Indigenous knowledge is

relevant to Sustainable Development Goals (SDGs) because it better understand the complexity of the world.

However, schooling in the modern context is undermining both the processes of transmission of indigenous knowledge and the practices associated with this knowledge. Children and youth have to go to school at times when traditional practices and community activities are also taking place, and so are unable to imbibe these rich cultural traditional practices due to their participation in compulsory education. In this regard, it is also relevant to understand that the adaptive nature of indigenous knowledge systems, transmission of ecological knowledge through the learning processes, symbols, signals, social regulations and cultural internalization of traditional practices. The implementation of education in indigenous contexts require a dynamic training in knowledge specific context that is able to produce and maintain sustainable socio-ecological system.

When we understand the western education and indigenous knowledge there are so many differences that are like purpose, language of instruction, method of instruction, organization, management etc. But there are similarities between indigenous knowledge and western education at equipping the youth on how to perform social functions, respecting other people in the society. Both type of education prepares individuals for employment in their own environment, educate values and norms such as honesty, generosity, diligence and hospitable as part of civil education. When indigenous knowledge and western education system was compared, the indigenous knowledge is more practical than western education. Indigenous type of education has a bearing to the traditions, norms and cultural belongingness to the society. Indigenous knowledge is not well structured as western education but give a sense of belonging to the culture while the western education does not.

Statement of the Problem

The Indigenous knowledge and ethno-medicinal plants are based on a holistic philosophy guided by unwritten customary laws and practices which are preserved by the elder generation and passed over to next generation mostly through oral medium. However, due to the process of modernization and social transformation create a generation gap among elders and younger generation resulting to the extinction of these unique and rich tribal practices among the youth. Hence this study will examine status, factors that induce youth from not inheriting such a rich tradition of indigenous knowledge and medicinal plants which has got socio-economic, cultural scope in the current society.

Rationale and Scope of the Study

Sikkim is one of the small States in Northeast India which is rich in practices of indigenous knowledge and Ethno-medicinal plants among Lepchas. Lepchas' socio-economic and cultural practices grossly connected with nature and its sustainability which is a major challenge to the current developmental paradigm. Lepchas from Sikkim are known their skills in plants collection and also having a vast knowledge of ethno-botany. But ethnomedicinal plants and their indigenous knowledge practices in Sikkim are on the verge of extinction because younger generation are not showing interest or importance to this vast treasure trove. The Lepcha herbal system seems to almost vanished and Dzongu in North Sikkim is last strongholds where the Lepcha culture and this system of medicine is still practiced. Therefore, this work is an attempt to generate interests among the youngsters to preserve and document about the ethno-medicinal plants of Sikkim which have lots of values in contemporary society.

In order to the background information about indigenous knowledge and medicinal plants in general and particularly the Lepchas in Sikkim this research has been reviewed the following literature under the heads of:

- i. Concept of Indigenous Knowledge and Medicinal Plants
- ii. Indigenous Knowledge and Medicinal Plants: Global perspectives
- iii. National Perspectives on Indigenous Knowledge and Medicinal Plants
- iv. Indigenous Knowledge and Medicinal Plants in Sikkim

Concept of Indigenous Knowledge and Medicinal Plants

The term ‘Indigenous’ means Groups of people whose social, cultural and economic conditions distinguish them from other sections of the national communities, and whose status is regulated wholly or partially by their own customs or traditions or by special laws or regulations. People in independent countries who are regarded as indigenous are considered as descent people who inhabited geographical region to which they belonged, at the time of colonization or the establishment of present state boundaries” (Addis Abbaba University, n.d.).

Indigenous knowledge (IK), a popular word throughout the world, has been interpreted in different ways at different places but generally it is understood as local or traditional knowledge that indigenous people have brought down with them from earlier times via the oral tradition. IK is, broadly speaking, the knowledge used by local people to make a living in a particular environment (Warren, 1991; Johnson 1992) IK is “A body of knowledge built up by a group of people through generations of living in close contact with nature” (Johnson, 1992). Generally speaking, such knowledge evolves in the local environment and it is specifically adapted to the requirements of local people and conditions. It is also creative and experimental,

constantly incorporating outside influences and inside innovations to meet new conditions.

The UN Declaration on the Rights of indigenous peoples was adopted by the UN General Assembly during its 62nd session at UN headquarter in the New York city on 13 September 2007. Wane in *African Indigenous Knowledge: Claiming, Writing, Storing and Sharing the Discourse* (2005) define indigenous knowledge “is an everyday rationalization that rewards individuals who live in a given locality” and “reflects the dynamic way in which the residents of an area have come to understand themselves in relation to their natural environment, and how they organize their lives”. The article discusses two questions: (1) how can we utilize an indigenous African knowledge base in the academy? and (2) how can we bridge communications gaps between generations, diverse cultures of peoples of African ancestry and Canadianism?

Batiste in *Indigenous Knowledge: Foundations for First Nation* (2005) focuses on what is indigenous knowledge? and also discussed about indigenous and eurocentric knowledge system and holistic paradigm of indigenous knowledge. This article also reveals wealth and richness of indigenous language, worldviews, teaching and experiences that is excluded from contemporary education and from eurocentric knowledge system. In this article he also describes why indigenous knowledge has been eluded in western knowledge system, and how indigenous knowledge is understood, and what protection are available with in Canadian system.

Horsthemke in *The Idea of Indigenous Knowledge* (2008) argues about indigenous knowledge involves at the best an incomplete, partial or at worst, a questionable understanding or conception of knowledge and as a tool in anti-discrimination and

anti-repression discourse, indigenous knowledge is largely inappropriate. Vhurumuku and Mokeleche in *The Nature of Science and Indigenous Knowledge* (2009) describes and analyse the research in science education on the nature of science and indigenous knowledge system in this discussion show that the research being done in South Africa is attuned with contemporary international research agendas, theoretical paradigms and methodological test. Through this research they point out that the major impetus behind the research has been deliberate effort to inform the implementation of South Africa's new science curricula. This research also analyses that for both nature of science and indigenous knowledge system research, the primary and secondary levels are clearly under research and counsel for future research.

John in *BEYOND LAND: Indigenous Health and Self-Determination an age of Urbanisation* (2020) examines how indigenous peoples in the United States and Australia worked out the potential for self-determination beyond claims to land or territory that is, the pursuit of self-government over two interconnected realms; health services and individual bodily health. In this book she seeks to make a case for the indigenous self-determination in the twentieth and twenty-first centuries.

Carothers Moritz and Zarge in *Introduction: Conceptual, Methodological, Practical, Nd Ethical Challenges in Studying and Applying Indigenous Knowledge* (2014) discusses about development of sophisticated conceptual and methodological approaches of indigenous knowledge, such as cultural consensus analysis and participatory mapping. And in 2012 American Anthropology Association presented a session of paper in annual meeting, where explore key conceptual, methodological, practical, and ethical challenges and applying insight from such knowledge system in scholarly, resources management, and local community venues across the globe. This

paper represents geographic and topical diversity, covering on several important themes facing Anthropology and other fields that study knowledge system.

Burgos et al., in *Indigenous and Local Knowledge in Environmental Management for Human-Nature Connectedness: A Leverage Points Perspective* (2020) describe indigenous people are key actor for environmental management because they hold valuable indigenous and local knowledge for the sustainable stewardship of nature. They define indigenous local knowledge as the ‘cumulative body of knowledge, practice and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings with one another and with environment’. Indigenous people and local communities have established strong relationships with surrounding environments. They have holistic knowledge to maintain an equilibrated social-ecological system. They also overcome a variety of crises and challenges like livelihood change, climate and ecosystem change. Therefore, indigenous communities and their knowledge are additionally relevant to promote sustainable development and environmental management.

Van in *Family-Level Floristic Inventory and Analysis of Medicinal Plants of Used in Traditional African Medicine* (2020) focuses on floristic diversity patterns of medicinal plants in sub-Saharan Africa and compared to global pattern to gain insights into the selection of plants used in Traditional African Medicine. This paper focuses on two questions; (1) is there any selection of medicinal plants used in Traditional African Medicine in Sub-Saharan Africa based on availability or is it based towards certain plants families? (2) does the floristic composition from global pattern and form other healing systems of the world?

De Wet and Ngubane in *Traditional Herbal Remedies Used by Women in a Rural Community in Northern Maputaland (South Africa) For the Treatment of Gynaecology and Obstetrics Complaints* (2014) focuses on plants used for the treatment of gynaecological and obstetric conditions and information was collected through vernacular plant names, plant parts used; preparation and application methods. In this research he found thirty-two plant species from 21 families were recorded for the treatment of 19 different gynaecological and obstetric disorders. Results of the research strongly suggest that the availability of plants is not the only criteria for usage; but cultural influence also play an important role in the choice of plant species.

Madhvi, Sharma, Iqbal, and Younis, in *Phytochemistry, Traditional Uses and Pharmacology of Rhododendron Arboreum: A Review* (2019) discusses about the tree Rhododendron, which belongs to family Ericaceae, consists of 1000 species worldwide. In this article they focus, traditionally the use of Rhododendron for the treatment of blood dysentery, nasal bleeding, asthma, blurry vision, fever, heart problem, diabetes, gout, and liver disorders. Through this view, they attempt to highlight over Botany, Ethnopharmacy, nutrition profile, phytochemistry, biological activities and toxicity of Rhododendron arboreum reported so far. This phytochemistry research on this plant led to isolation of Phenolics, Triterpenoid, Flavanols, Flavanol glycosides and Sterols. The crude and isolated compounds of this plant exhibited various biological activities such as antidiabetic, antinociceptive, antimicrobial etc. So, this plant should be carried for further studies.

Umar, Ratnadewi, Rafi, and Sulistyarningsih, in *Untargeted Metabolomics Analysis Using FTIR And UHPLC-Q-Orbitrap HRMS of Two Curculigo Species And Evaluation of Their Antioxidant and a Glucosidase Inhibitory Activities* (2021) focus

the measured the total phenolics and flavonoid contents as well as analyzed the functional groups and chemical compounds using Fourier-transform infrared (FTIR) spectra and UHPLC-Q-Orbitrap-HRMS for the discrimination of plant parts, geographical origin and compound that have a significant contribution as antioxidant and α -glucosidase inhibitory on both plants. They highlight that in Indonesia, the two curculigo Species are found from Sumatera to Papua which have several therapeutic properties because of their bioactive metabolites content. This curculigo species is traditionally used as estrogenic, neurorestorative, anticancer, antidiabetic and it neutralizes various diseases. The leaves and flowers of Catifolia are used to treat various diseases associated with urination.

Indigenous Knowledge and Medicinal Plants: Global Perspectives

Fre in *The Case for Indigenous Knowledge Systems and Knowledge Sovereignty*. In *Knowledge Sovereignty Among African Cattle Herders* (2018) focuses about the specific aspects of indigenous knowledge system among cattle keepers in the Horn of Africa, and their marginalisation of knowledge system, and its future use if sustainable intensification of livestock production. But it is important to frame the neglect of indigenous knowledge system as a science if a much broader, global, neoliberal, pro-green Revolution context, so, empirical evidence is potential use based on making case.

Cámara and Dennehy, in *Information Gaps in Indigenous and Local Knowledge for Science-Policy Assessments* (2019) talk about the contributions and understanding natures to people across a broad spectrum of cultures and ecosystems is increasingly advocated in science assessments and policy decision making for sustainability. But, for services like food and medicine, gaps in existing studies on indigenous and local knowledge may prevent inclusive assessment. In this article we see that New Guinea

using a large database of indigenous and local knowledge about plant services. They show that there are biological and cultural documentation gaps which exclude many plants service and Indigenous groups from assessments which are based on published research. Further, they show that like the common property of ‘rarity’ in species assemblages and gaps and rarity will affect how plant services are conceptualized, assessed and sustainably managed.

WIPO in *Intellectual Property and Traditional Knowledge* (2016) discusses about traditional knowledge that is indigenous and local community cherish traditional knowledge as a part of their very cultural identities and for many communities. Traditional Knowledge forms part of holistic world view, and is inseparable from their cultural values, spiritual beliefs and customary legal system. This article discusses about Traditional Knowledge holders face lots of challenges and to protect Traditional Knowledge there is requirement of some kind of legal protection for Traditional Knowledge. PIC, respect for customary lens and practices and equitable benefits sharing are some other legal aspects for the protection of Traditional Knowledge.

Cheikhoussef, Shapi, Matengu and Ashekele, in *Ethnobotanical Study of Indigenous Knowledge on Medicinal Plants use by Traditional Healers in Oshikoto Region, Namibia* (2011) discuss about the indigenous communities of Africa who are still rely heavily on traditional medicine where traditional healers in Oshikoto region use 61 medicinal plant species that belong to 25 families for the treatment of various diseases and disorders with the highest number of species being used for mental disease followed by skin infection and external injuries. In Namibia, there are about 2400 traditional medicinal practitioners who are registered with the (NETHA). In this article they found that some communities practice traditional and healing in a gender-

based and most of the traditional healers who acquired this Indigenous Knowledge mostly older than 66 years of age and this traditional healing is widely acknowledged as an occupation in Namibia. People of Oshikoto region are still depending on medicinal plants and traditional knowledge on the indigenous of medicinal plants could boost new innovations in the pharmaceutical industry and have many beneficial applications such as new medicinal trails for some diseases like Malaria, Tuberculosis and AIDS. Medicines for such sickness were developed by the health care sector in Namibia.

Abbott in *Documenting Traditional Medicinal Knowledge* (2014) discusses that Traditional Medicinal Knowledge has got attention worldwide in light of global health care demand and the significant role of traditional medicine in meeting the public health needs of developing countries. Traditional medicine is not only vital source of health care, but also an important source of income. The article discussed that traditional medicine is commercialized and exported in a variety of settings. Some Traditional medicines holder's choose market outside of traditional settings and Biotechnology and pharmaceutical companies also make use of genetic resources for the new drug development. But Genetic Resources and Traditional Medicinal Knowledge may also be misappropriated when third parties use them without the informed consent of Traditional Knowledge holders and without equitable benefit-sharing and developing countries try to make effort to protect Genetic Resources and Traditional Medicinal Knowledge through national legal protection system. However, guarding these resources has challenges due to a lack of national and international regulations and the need for legal enforcement. Regarding this problem, in Beijing November 2008, government officials representing members states of WHO adopted a declaration that provides an endorsement of Traditional Medicine through an

advocacy document. In May 2009, the World Health Assembly (WHA), the governing body of WHO, adopted the Beijing Declaration and urged member states to implement in its policies.

Regassa in *Assessment of Indigenous Knowledge of Medicinal Plants Practice and Mode of Service Delivery in Hawassa City, Southern Ethiopia* (2013) focuses on collect and document information on the use of traditional medicinal plants of local people of Hawassa city, Southern Ethiopia. In Ethiopia, people depend traditional health care on medicinal plants which are collected from wild, but now such medicinal plants and biodiversity resources are depleted due to manmade and natural calamities. Indigenous knowledge associated with the conservation and use of medicinal plants are also disappearing at alarming rate. So, he suggests that the knowledge of using traditional medicinal plants need to be added in the curriculum of school, and organize clubs of traditional medicinal plants in school.

Sivasankari, Anandharaj, and Gunasekaran in *An Ethnobotanical Study of Indigenous Knowledge on Medicinal Plants Used by The Village Peoples of Thoppampatti, Dindigul District, Tamilnadu, India* (2014) provide significant ethnopharmacological information, both qualities and quantities on medicinal plants in the Thoppampatti Village, Dindigul District, Tamilnadu, India. In this paper they discuss that indigenous knowledge of using medicinal plants is in danger and gradually becoming extinct. Because this type of knowledge is passed on orally from generation to generation without a writing system and also many traditional healers did not keep written records. Growing world population, increasing anthropogenic activities, rapidly eroding natural ecosystem are the main threats for medicinal plants. So, the study encourages to document traditional medicinal plants of Thopampatti and record their local names.

Boadu, and Asase, in *Documentation of Herbal Medicines Used for The Treatment and Management of Human Diseases by Some Communities in Southern Ghana* (2017) states that traditional medicine is an important component of the health care system of most developing countries. But indigenous knowledge and their medicine plants are not documented or done any investigated in Ghana. So, the aim of the study was to investigate herbal medicines commonly used for the treatment and management of human diseases and ailments by some communities living in southern Ghana. They further hypothesize that place and time factors are also important during harvesting individual plants for treatments and management of human disease by traditional healers. The study has also confirmed that factors of time and place are given consideration during harvesting of plant materials by healers.

Chinsembu, Suaklima, and Semenya in *Ethnomedicinal Plants Used by Traditional Healers in the Management of HIV/AIDS Opportunistic Diseases in Lusaka, Zambia* (2019) discuss that there is a specific plant species used by traditional healers to manage HIV/AIDS opportunistic infections in Zambia. So, main focus of this study was to determine the following variable: vernacular names of the plants, diseases treated, plants parts used, method of preparation and modes of administration of the plant remedies. And also, documentation of putative plant species for managing HIV/AIDS associated diseases and indigenous knowledge of such resources.

Lawal et al., in *Ethnobotanical Survey of Plants Used for Treating Cough Associated with Respiratory Conditions in Ede South Local Government Area of Osun State, Nigeria* (2020) focus on plants species for the management of cough associated with respiratory diseases in Ede south local government area, Osun state. Nigeria Decoction was the main method of preparing the plants, which were all administered orally. In this study we find that major source of medicinal plants was from wild.

Ndhlovu et al., in *Ethnobotanical Review of Plants Used for The Management and Treatment of Childhood Diseases and Well-Being in South Africa* (2021) discussed about the use of medicinal plants which is used for different diseases and for the general well-being in children of different ethnic cultural groups. In this paper they critically assessed the existing knowledge plants that use for the management of childhood diseases and well-being in South Africa. In this survey, they review those 194 plants from 66 families were cited as remedies against 16 categories of childhood diseases.

Sibeko and Johns in *Global Survey of Medicinal Plants During Lactation and Postpartum Recovery: Evolutionary Perspectives and Contemporary Health Implications* (2021) discuss about the ethnopharmacological research on the postpartum period during the cross-cultural comparison used of plants, and potential roles of phytochemicals in emerging models of interaction among immunity, microbiome and nervous system effects on perinatal development and having long-life health of individuals and contemporary contexts. The main focus of the study was use of medicinal plants injected by mothers during the postpartum activity on immune development and gastrointestinal microbiome of breastfeed infants and also for maternal health.

Sojeetre and Aacharya in *A Review on Ethnomedicinal Claims and Spread of Pothos Scandens* (2020) discusses about the collection of available ethno medicinal information and research about Pothos Scandens, which was popular drug used by local healers for multipurpose. Traditional therapeutic use of this plants was for asthma, smallpox etc. So, this plant has got robust multifaceted properties of ethno-medicinal plants that can be used in pharmacological and clinical studies to establish its ethnic claims.

Sapkota et al., in *Knowledge of Health Workers on Snakes and Snakebite Management and Treatment Seeking Behaviour of Snakebite Victims in Bhutan*. *PLOS Neglected Tropical Diseases* (2020) focus on the snakebite in Bhutan where number of worker report snakebite and associated deaths in Bhutan. snakebite victims are suffered from harmful local practices and traditional beliefs in treatment practices. So, Bhutan government has to manage and create aware in pre hospital care for snakebites.

Majumder and Paridhavi in *A Novel Poly-Herbal Formulation Hastens Diabetic Wound Healing with Potent Antioxidant Potential: A Comprehensive Pharmacological Investigation* (2019) discusses about traditional systems of medicine's numerous classified poly-herbal formulations were described with illustration of therapeutic effectiveness than the recent medication. The study tries to evaluate the wound healing and antioxidant potentials of the novel poly-herbal formulation (PHF) in diabetic rat's models and in-vitro antioxidant essays respectively.

National Perspectives on Indigenous Knowledge and Medicinal Plants

Puri in *Article Integrating Scientific with Indigenous Knowledge: Constructing Knowledge Alliances for Land Management in India* (2007) stresses the importance of constructing knowledge between multiple knowledge systems in order to support more effective (IS) integrating scientific development and Implementation. This paper examines use of geographic information system to alleviate the problem of land degradation in India. This paper also discusses some issues and debates on the subject

of knowledge in the integrating scientific literature, and contributions of both theory and the practice.

Mahanta and Tiwari in *Natural Dye-Yielding Plants and Indigenous Knowledge on Dye Preparation in Arunachal Pradesh, Northeast India* (2005) focus on Arunachal Pradesh, which was recognized as one of the biodiversity homes to a range of economically important plants. There is some plants species which is use for preparation of natural dyes. There are more than 500 dye-yielding plants species. During the time of research there were some aforementioned species possess ethno-medicinal and fibre-yielding properties in addition to natural dyeing and are being used to traditional health care practices, rope making etc. So, this study attempts to explore the availability of natural dye-yielding plants in Arunachal Pradesh and document the indigenous knowledge and procedures related to preparation of natural dyes by tribal societies.

Chatterjee in *Biodiversity conservation issues of Northeast India* (2008) discussed about the geographically and biodiversity-richness of the Northeast India that have several priority-setting processes for initiative to the National and international Conservation agencies. He says that this region is highly diverse mosaic of ecological, social and physiological landscape, so this region needs conservation.

Singh in *India: IPR Vis-à-vis Traditional Knowledge* (2018) focusses about what is Traditional Knowledge, why to Protect this knowledge and various methods to protect this knowledge in India. Under patent Acts 1970, section 25 and 64 deals with traditional knowledge to revoke a patent application. There is international convention along with the national legal systems that facilitated, protected and acknowledge the efficiency of traditional knowledge and its database.

Bhattacharjee in *Protection of Traditional Indigenous Knowledge and Intellectual Property Rights* (2020) discusses on the protect traditional and Indigenous Knowledge in India. We say that India is a country rich with customary practices Indigenous and traditional knowledge of plant variety and their medical uses. His of the opinion Traditional Knowledge base of plant medicines will accelerate drug development so, India has to intellectual Property Right Protection to such knowledge.

Nadasy in *Transcending the Debate Over the Ecologically Noble Indian: Indigenous Peoples and Environmentalism* (2005) discusses about the ambivalent relation asses between indigenous people and environmentalists are deeply ambivalent. He debates over the stereotype of the “Ecologically Noble India” to illuminate ambiguities and complexities assets relationship between indigenous people and environmentalism. So, this essay investigates the cultural assumptions underlying the concepts and highlight political consequences of their use. He argues that the debate over whether indigenous people are noble or not is a spurious one, thought science evaluating their behaviour according to imposed Euro-North American cultural assumptions that create the complicity.

Das, Dutta & Sharma in *Medicinal Plants Used by Different Tribes of Cachar District, Assam* (2008) gather information from different parts of Cachar district of Assam regarding the use of plants by the different tribes or communities settled in that place. In this region, tribal communities are losing their traditional cultural practice of medicinal plants that are used in their daily life because of impact of urbanisation and modernisation. Peoples of this region use different plant species for the treatment. And now researchers and scientists are working to document these ethno-botanical plants and their used. Tribal people and other communities in this region use different plants to cure the ailments in their daily life. Because of urbanisation and modern

civilization influence through education and market, these primitive cultural practices and traditional belief slowly started eroding. So, this work emphasizes the need to record information for the benefit of mankind and to conserve and document this vanishing knowledge of medicinal property used by the different tribes' communities of Cachar district of Assam.

Dutta in his article *Food and Medicinal Values of Certain Species of Dioscorea with Special Reference to Assam* (2015) discusses about *Dioscoreaceae*, which is commonly known as yam, all over the world having 600 species across tropical region. The properties of yam contain steroid, saponins, sapogenins, diosgenin etc, that are used for anti-inflammatory, androgenic, estrogenic and contraceptive drugs. This genus of *Dioscorea* is one of the oldest tube crops cultivated all over the world as a major food item among ethnic groups. This paper present 16 species occurring in Assam used

Upadhya et al., in *Ethno-medicinal Plants Used to Treat Bone Fracture from North-Central Western Ghats of India* (2012) discuss about rich bio-cultural diversity and ethnomedicinal practices assets of north central western ghat of India. This study also highlights the vanishing nature of traditional knowledge that were prevalent for born fracture treatment in the area. This study of the opinion 80% of the world population still depends on traditional medicinal practices even after the emergence of modern medical system. Medicine in contemporary India is a blend of both traditional and modern practices. So, it is important to document, analyses and evaluate the sources of traditional knowledge, its commercial value for pharmaceutical industry for finding new led. In India, traditional system of herbal medicine directly linked to rich floral diversity.

Das et al., in *Diversity of Traditional and Fermented Foods of the Seven Sister States of India and their Nutritional and Nutraceutical Potential: A Review* (2016) discusses about the diverse population with different ethnic backgrounds and their Indigenous fermented foods practices among ethnic tribes, which is the part of diet of these ethnic tribes. Traditional foods, wild fruits, fermented fruits and vegetables contain a diverse group of prebiotic compounds that stimulate the growth of probiotics. For making fermented products each region has their own unique methods for preparations and substrates. Making fermented alcoholic beverages bear deep attachment with socio-cultural lives and livelihood of local people.

Upasani et al., in *Article Infrequent Use of Medicinal Plants from India in Snakebite Treatment* (2018) explain about snakebite as a serious problem across the world and detail more than 100 plants which have potential to utilise as anti-snake venom across India. In India, there are over 520 plants species, belonging to approximately 122 families, which are used for snakebites treatment. As per these plants such as *Acanthaceae*, *Caesalpiniaceae*, *Asteraceae*, *Fabaceae*, *Euphorbiaceae*, *Lamiaceae*, *Rubiaceae*, and *Zingiberaceae* are the most useful for snakebites treatment.

Indigenous Knowledge and Ethnomedicinal Plants in Sikkim

Panda et al., in *Health Traditional of Sikkim Himalaya* (2016) discuss about medicinal plant which was used by different tribal communities in Sikkim. In Sikkim there are 490 medicinal plants out of which 31 are commonly used by folk healers have therapeutic uses. However, Health Traditions and folk practices of Sikkim are under declining due to shifts in socio-economic patterns as well unwillingness of the younger generation to inherent such profession folk practices.

Panda in *Medicinal Plants of Sikkim in Ayurvedic Practice* (2010) discusses about 420 plants used by the tribal people for various diseases out of which thirty Medicinal Plant have medicinal value and such a used drug in Ayurvedic Rasayana and Tridoshagna. However, merchants and agents are taking advantages of tribal and folk knowledge of medicinal plants without disclosing the real value of such drugs in the market.

Idirisi and Singh, in *Indigenous Knowledge and Medicinal Use of Plants by Local Communities in Rangit Valley, South Sikkim, India* (2010) discusses about Lepcha, Bhutia and Nepalese, who hold immense ethno-botanical indigenous knowledge practices using local biodiversity for various diseases and ailments since ages. They also ethno-medicinal knowledge of plants that have great pharmaceutical scope for future. Such Ethno-biological knowledge of Indigenous people is gaining momentum world-wide for multi dimension, usages across pharmaceutical, cultural product etc. Increase communalisation, deforestation, over exploration of medicinal plants and lack of interest by younger generation to appropriate such knowledges, lack of documentation in written or digital etc are factors that place such tresero in the verge of extinction. This ethno Medicinal Plants Resources that grow in a unique eco system having high drug properties are used in Ayurveda, Folk medicine, Homeopathy, Siddha, Amchi (Tibetan) and Unani systems. There are more than 424 species of medicinal plants in Sikkim that are widely used for various remedies treatment, elements etc.

Bharati et al., in *Some Ethno-veterinary Plant Records for Sikkim Himalayas* (2009) stated that ethnic groups of Sikkim used medicinal plants locally for their domestic animals but also for ethno-veterinary purpose.

Research Gap

Indigenous or traditional knowledge has become less relevant at the global, national, and local levels due to issues including the change in the educational systems medium, globalisation, and technological advancements, among others. The study of indigenous knowledge systems has traditionally been connected with the elderly, and it is frequently believed that the younger generation has failed to conserve the indigenous knowledge that has prevailed during the era of their forefathers. The relationship between Indigenous Knowledge and Ethnomedicinal Plants within the Lepcha community has been the subject of numerous researches. The youth's perception of indigenous knowledge practises and ethnomedicinal plants, which have socioeconomic, cultural, and commercial implications for pharmaceutical companies in Sikkim, has not been studied in any depth. In this backdrop, this study focuses on the understanding challenges and scope experienced by indigenous knowledge system and ethnomedicinal plants from the perspective of Lepcha youth's residing in Dzongu.

Objectives of the Study

- To understand the challenges and scope that the indigenous knowledge paradigm faces in the contemporary society.
- To examine the policies and programmes of the government of India initiated to preserve and address the issues associated with indigenous people and their knowledge system.
- To explore the scope and challenges being faced by indigenous knowledge system and ethnomedicinal plants in Sikkim and to understand the youth perception of indigenous knowledge practices and ethno-medicinal plants that have socio-economic, cultural and economic scope in the current milieu.

Research Questions

- What are the challenges and scope the indigenous knowledge paradigm faces in the contemporary society?
- What are the policies and programmes the government of India initiated to address and preserve Indigenous Knowledge and ethno-medicinal plants?
- How the younger generation in Sikkim perceive such a treasure trove which has multidimensional scope?

Research Methodology

The present study has focused on the youth perception on indigenous knowledge and ethno-medicinal plants in the area of Dzongu, Sikkim. The study has employed interdisciplinary research framework. Thus, study has followed mixed methods approach that includes the use of both quantitative as well as qualitative data in order to answer the questions that has been raised in the first chapter. Under Mixed Method Approach Embedded research design has been applied to carry out this study. Therefore, both the quantitative and qualitative data will be collected and analysed together.

The sources of data collection are both primary and secondary. In order to retrieve primary data, interview with the help of semi-structured questionnaire was conducted. The sample size taken up for the study was 130. To understand the perception of youth of Dzongu on indigenous knowledge and ethno medicinal plants 90 youths were interviewed. To explore the scope and challenges faced by indigenous knowledge system and ethno-medicinal plants in Sikkim 40 elders were also interviewed. Both the categories of respondents were interviewed using same set of questionnaires. Questionnaires were prepared with different variables that have been

identified to answer the research questions raised in the study. Qualitative variables that were identified in preparing questionnaire to understand the awareness level on knowledge, among youth as well as elderly of Dzongu. To gain information on people' awareness on indigenous knowledge people were enquired about their knowledge on indigenous knowledge, process of its inheritance, practice of indigenous knowledge in the daily activities, rituals that they practice, their knowledge on medicinal plants and their usage. To understand challenges faced by the indigenous knowledge system questions related to their reliance on indigenous medicinal practice in their lives, their preference over modern and indigenous knowledge were identified. Further to extract information on the awareness level of youths and elder regarding policies and programmes on indigenous knowledge and practices questions were prepared on people's knowledge on provisions and policies related to indigenous knowledge in Sikkim and especially in Dzongu. Scope of ethno-medicinal plants in the contemporary society of Dzongu has tried to understand through questions on socio-economic value of medicinal plants. Questionnaires have been prepared using interval, nominal, ordinal scales.

The secondary sources will consist of newspaper, research articles, book, journals, published and un-published documents.

Study area: Dzongu in particular and Sikkim in general would be the study area.

Chapterisation

Chapter I: Introduction

This chapter provides a general understanding on the historical and conceptual background of indigenous knowledge and ethno-medicinal plants by tracing the trajectory of global, regional, national and local perspectives on Indigenous Knowledge and Medicinal Plants to understand the rationale and scope, objectives of the study, research questions and research methodology.

Chapter II: Indigenous Knowledge Paradigm: Challenges and Scope

This chapter compares the knowledge paradigms to understand scope and challenges faced by indigenous knowledge systems and ethnomedicinal plants in the broader context.

Chapter III: Indigenous Knowledge in India: An Overview

This chapter presents the policies and programme of government of India to protect indigenous knowledge at national level, northeast and particularly in Sikkim.

Chapter IV: Youth Perception on Indigenous Knowledge and Ethno-Medicinal Plants in Dzongu

This chapter tries to understand the status, processes, and practices of indigenous knowledge and ethnomedicinal plants through the lens of younger generation to understand how this knowledge can be streamlined among the youth of Sikkim. Data will be collected from Dzongu to interpret them in background those questions and objectives of the study. Data analysed, interpreted and presented in the report.

Chapter 5: Conclusion

This chapter summarizes the finding of the study and answer the questions and objectives raised in the research and will draw findings to prescribe certain recommendations and further studies.

Chapter II

Indigenous Knowledge Paradigm: Challenges and Scope

Introduction

Indigenous knowledge, defined as the sum of the pieces of knowledge and skills that people in a specific geographic area possess and that enable them to get the most out of their environment, plays an important role in society and is a growing subject of debate both nationally and internationally. The debate and discussion have also aided the idea of indigenous knowledge in evolving and adapting to the needs of local people and their circumstances. The indigenous knowledge debate has revealed a number of scopes and challenges. Since many academics have expressed different points of view on knowledge, there has been much discussion on the subject. Some academics contend that this knowledge is the result of scientific methods, while others contend that knowledge is acquired through experiences rather than just through scientific means. Continuous technological advancement in the modern era. Because of this, people are currently being pulled away from indigenous knowledge and practises. This chapter entails the knowledge paradigm that persists between indigenous knowledge and modern education. Furthermore, the study examines and comprehends the scope and challenges confronting indigenous peoples in today's world with the advent of technology and modern education. This chapter is further divided into several sub-themes, including Knowledge Paradigm, Indigenous Knowledge, Knowledge System, Indigenous Knowledge System, Modern Education, and finally Scope and Challenges in Indigenous Knowledge.

2.1 Knowledge Paradigms

Plato defines knowledge as “true belief accompanied by a rational account”, which can be shortened to justified, true, belief (Berrien, 2004). To “know” is to “hold something in one’s mind as true or as being what it purports to be”, which “implies a sound logical or factual basis”. It also means “to be persuaded of”. Knowledge is also defined as the “fact or condition of knowing something with familiarity gained through experience or association”. As a result, what is known is that which is 'generally recognized'. Knowledge is a type of success through ability, and as such, it inherits the various normative and evaluating properties associated with success through ability in general (Greco, 2007). Knowledge is a highly valued state of being in cognitive contact with reality (Zagzebski, 2017).

The concept of paradigm is intertwined with the Platonic and Aristotelian theories of knowledge. Aristotle believes that knowledge can only be based on what is already known, which is the basis of the scientific method. Plato asserts that knowledge should be measured by what something could become the end result or ultimate goal. A paradigm, according to Thomas Kuhn, “includes the practices that define a scientific discipline at a given point in time”. The term paradigm refers to all of the distinct, established patterns, theories, common methods, and standards that allow us to determine whether an experimental result belongs to a field or not (Cyril & Methodius, 2022).

The world has changed dramatically over the last few decades. Everyone has experienced the rapid growth of communications, networks, and digital technology each day. The rapid advancement of computing power and computational speed has resulted in the pervasive presence of intelligent machines. According to Kurzweil, computers will have the same computational speed as the human brain in around 15

years. From around 12000 BC (Before Christ) to 1800 AD (Anno Domini), communication was as fast as the fastest horse. Over the past 200 years, communication speed has increased from that of a horse to almost that of light (Kurzweil, 2005).

Newton introduced his calculus and laws of gravity in the seventeenth century. This could be considered the dawn of the age of reason, determinism, or analytical thinking, ushering in the industrial era that gave us the world we have known for the past two centuries. Organizations were created to produce specific products or services, and bureaucracies were formed to ensure that the systems were efficient and consistent. This frame of reference interprets learning as knowing facts and their relationships, thinking as applying Aristotelian and Stoic logic with valid assumptions, and acting as controlling the system or correcting the problem (Devlin, 1997).

Communication, which has been greatly enhanced by modern technology, is the foundation of the majority, if not all, processes in modern society. Communication is similar to knowledge management in that it coordinates all processes of collaborative knowledge and information generation, enrichment, dissemination, and utilization. Communication and knowledge management has numerous facets that can be viewed from various angles (Kuhlen, 2004).

“Becoming to know” identifies five stages in the development of knowledge creation theory from 1995 to 2008. Several Knowledge Management (KM) scholars have asked this question since 2000. What is the problem with knowledge management? Many academics believe that “the concept of knowledge management itself is limited”. According to them, KM is overly reliant on quantifiable, measurable data

and is primarily concerned with developing tools, methods, and instruments for manipulating existing knowledge. Organizational high-level knowledge officers have devolved into passive analysts and controllers of knowledge as an “asset”. Instead, practitioners could adopt the role of “knowledge activists”, focusing on creating favourable conditions for knowledge-creation processes (Krogh, et al., 2000).

According to a current comprehensive scient metric data analysis of 2,175 articles published by 4,236 authors in KM and intellectual capital (IC) journals between 1994 and 2008, “KM/IC is still considered to be in its embryonic stages”, and it is critical to establish its identity. They conclude that “the communication gap between researchers and practitioners is a significant barrier confronting the KM/IC field”, and that there is a risk that KM/IC will lose its practical side and become a pure scholarly discipline (Serenko, et al., 2010).

KM has entered a new phase in which concept harmonisation and consolidation are required. By comparing KM frameworks, he identifies the four critical success factors of KM as follows: i. human-oriented factors (culture, people, leadership) ii. organisational factors (processes and structures) iii. technology (infrastructure and applications) and iv. management-process (strategy, goals, measurement) (Heising, 2009, p.11).

Knowledge management revolves around communication. “The Future of Knowledge”, is a new prosperity evolution of business thinking living network learning into complexity power and technological limits (Allee, 2003).

2.2 Indigenous Knowledge

The definition of “indigenous” is “a group of people whose social, cultural, and economic circumstances distinguish them from other sections of national

communities, and whose status is regulated wholly or partially by their own customs or traditions, or by special laws or regulations”. People considered indigenous in independent countries are descendants of people who inhabited the geographical region to which they belong at the time of colonisation or the establishment of current state boundaries” (Addisa Abbaba University, n.d.).

Indigenous knowledge is the knowledge that is unique to a particular culture or society. Unique knowledge, folk knowledge, people’s knowledge, traditional wisdom, or traditional science are all terms for it. Communities generate and transmit this knowledge over time in order to cope with their own agroecological and socioeconomic environment (Fernand, 1994).

Semali and Kincheloe (1993), state that Indigenous knowledge is regarded as an ambiguous topic that immediately puts analysts in perilous territory. Scholars aren’t sure what they are talking about, and many analysts are not sure who should be talking about it. Indigenous knowledge has transformational potential because it provides a visible understanding of cultural processes that legitimize and limit information.

Das (1993) stated that Indigenous knowledge includes all knowledge about specific people and their territory that has been passed down from generation to generation. “All kinds of scientific, agricultural, technical, and ecological knowledge, including cultigens, medicines, and the rational use of flora and fauna”, according to the definition. They use this type of knowledge in their daily activities, which is ipso facto evidence that IK is alive, and IP are active through their knowledge use, rather than passive repositories of knowledge separate from their daily activities. This symbiotic relationship of ideas and practices is holistic, presenting a knowledge circle

that includes religion, law, economics, and the arts. Holistic knowledge is created and transmitted through both human and natural relationships, with its very nature infusing ecology into indigenous education. Indigenous education takes place in the home, rivers, gardens, and forests, where indigenous knowledge is learned in a dialogical relationship with nature.

Many indigenous scholars, such as (Cajete, 2000; Some, 1994), observe that because most indigenous peoples are still recovering from centuries of colonialism, we need a higher perspective to understand where we came from, where we are, and where we want to go. Indeed, life and knowledge are ways of knowing oneself in the context of the complex relationships that comprise our communities, environments, and world. We gain a better understanding of ourselves as we navigate our inner and outer landscapes (Semali & Kinchenloe, 1999).

Passim and Hoppers (2002), concentrate on IK Reclamation of cultural or traditional heritage; decolonization of mind and thought; recognition and acknowledgement of self-determining development; acknowledgments of further colonization, exploitation, appropriation, and or commercialisation; legitimation or validation of indigenous practices and world views; and condemnation of, or at least caution against, the subjugation of nature and general oppressiveness of nonindigenous peoples.

IK is unquestionably a broad concept that encompasses practices, skills, customs, worldviews, perceptions, and theoretical and factual understandings. Indigenous knowledge is seen as a viable alternative to informal forms of knowledge such as ethnomusicology, ethnomathematics, and indigenous science. Indigenous science is commonly understood to include indigenous astronomy, indigenous physics, 'ethnomedicine', 'ethnobotany', 'ethnozoology', and 'ethnopsychiatry', Agricultural,

meteorological, ecological, governance, social welfare, peacebuilding and conflict resolution, medicinal and pharmaceutical, legal and jurisprudential, music, architecture, sculpture, textile manufacturing, metallurgy, and food technology are examples of traditional knowledge. There is a cultural context surrounding the practice of this knowledge, including songs, rituals, dances, and fashion; it also includes technologies ranging from garment weaving and design, medicinal knowledge, food preservation, and conservation, and agricultural practices to fisheries, metallurgy, and astronomy (Hoppers, 2005, p.3).

Hoppers (2005) IKS has been defined as the sum total of the knowledge and skills that people in a specific geographic area possess, allowing them to get the most out of their environment. Traditional knowledge is the sum of all explicit and implicit knowledge and practices used in the management of socioeconomic, spiritual, and ecological aspects of life. Many aspects of it, in this sense, can be contrasted with ‘cosmopolitan knowledge’, which is culturally anchored in Western cosmology, scientific discoveries, economic preferences, and philosophies. Many indigenous people believe that education is really about helping an individual find his or her face, which means discovering who they are, where they came from, and what makes them unique. Thus, education becomes a vehicle for assisting them in discovering their heart, that passionate sense of self that motivates and propels them through life. Indigenous education is also about having a multifaceted sense of self, which is essential for healing inner and outer fragmentation and honouring each person's humanity (p.2).

2.3 Knowledge System

Knowledge is defined as “true belief accompanied by a rational account”, which can be shortened to justified, true belief (Brien, 2004). This common understanding of

knowledge takes into account a collection of understandings known as a knowledge system. Thus, we define a knowledge system as (a) an organized structure and dynamic process for generating and representing content, components, classes, or types of knowledge that are (b) domain-specific or characterized by domain-relevant features as defined by the user or consumer, (c) reinforced by a set of logical relationships that connect the content of knowledge to its value (utility), and (d) enhanced by a set of iterative processes that allow for the evolution, revision, and adaptation of knowledge. GSSD (Global System for Sustainable Development) (Global System for Sustainable Development) (Global System for Sustainable Development, n.d.).

Horsthemke (2008) stated that there are three types of knowledge: the knowledge that or factual knowledge, knowledge-how or practical knowledge, and knowledge of people, places, or things or knowledge by acquaintance. It is relatively uncontroversial to discuss the uniqueness of indigenous people's knowledge in the third sense. Individuals' familiarity with current events, geographical terrain, and so on varies by individual, society, and culture. Many indigenous people believe that education is really about helping an individual find his or her face that is, discovering who they are, where they came from, and what makes them unique. Thus, education becomes a vehicle for assisting them in discovering their heart, that passionate sense of self that motivates and propels them through life. Indigenous education is also about having a multifaceted sense of self, which is essential for healing inner and outer fragmentation and honouring each person's humanity.

Education sector or education system is a group of institution whose primary purpose is to provide education to children and young people in educational settings. Education system facilitates learning or acquisition of knowledge, skill, values

morals, beliefs, habits, and personal development. And education originated as transmission of cultural heritage from one generation to the next generation. UNESCO define three main learning settings. Formal education, that is usually structured by curricular aims and objectives, guided by teacher. Non formal learning is occurring as addition or alternative to formal education. It may be structured according to educational arrangement and this type of education take place in community-based, workplace etc. and lastly, informal learning occurs in daily life, in the family, etc. (United Nations Education, Scientific and Cultural Organization, n.d.).

2.3.1 Indigenous Knowledge System

When used to refer to familiarity, acquaintance, practical knowledge, and skills, the term “indigenous knowledge” is relatively uncontroversial. Individuals’ familiarity with particular mentalities, states of affairs, and the like vary from person to person, society to society, and culture to culture. A traditional healer understands how to heal people, which implies that she is aware of which roots, berries, or bark have the necessary palliative and curative properties (Hoppers, 2005).

Indigenous knowledge is held and made use of by people who regard themselves as indigenous to a particular place (Mugabe, 2013, p.19). Traditional knowledge encompasses all explicit and implicit knowledge and practices used in the management of socioeconomic, spiritual, and ecological aspects of life. Many aspects of it can thus be contrasted with “cosmopolitan knowledge”, which is culturally anchored in Western cosmology, scientific discoveries, economic preferences, and philosophies (Hoppers, 2005). Indigenous knowledge and indigenous knowledge systems refer to a culture's specific knowledge and knowledge systems. Indigenous knowledge can be distinguished from the current scientific and global knowledge systems. Indigenous knowledge systems, also known as Indigenous ways of knowing

(IWK) and ethnoscience, are a new topic discussed in “Indigenous Knowledge Systems in Postcolonial Theory Juxtaposing”. IKS can be viewed as the foundation on which local communities make regional decisions. These decisions have an impact on a variety of endeavours, such as the use of water and other resources, conservation and management, agriculture, health care concerns, and providing information, public outrage, and education within a local community. The primary distinguishing feature of an IKS is its regional and cultural focus. In IKS, which has a strong oral tradition, the majority of knowledge is passed down orally, through imitation, and through practical application. IK is generally defined as the knowledge produced by a society’s or culture's interaction and involvement with daily life in terms of culture and technology. The characteristic of IKS, i.e., the basis of the MSKS, is that it lacks theoretical grounding (Mapara, 2009).

IKS, on the other hand, is created through regular participation and trial and error to determine what best meets the needs of a specific community. These knowledge bases and systems are critical for building capacity within a community because IKS is critical to its survival and growth. To address problems that a community may face in the long run, the capacity building takes the form of the development of appropriate technologies (ATs). Ayurveda, Unani, and even acupuncture, which are really indigenous Chinese medical knowledge, are examples of IKS that have thrived despite the MSKS (Tharakan, 2019). The main problem with IK and IKS is determining what exactly qualifies as “indigenous” in various social, geographic, and cultural contexts. Because it can be difficult to develop a socially and culturally recognized definition of what defines indigenous groupings within a specific nation or region, it can be difficult for a society to agree on what and who is indigenous (Lakhani, 2019).

Indigenous scholars and advocates have sparked interest in the contribution of Indigenous knowledge to a better understanding of sustainable development in the scientific arena. The United Nations Conference on Environment and Development, the Canadian International Institute for Sustainable Development (CIISD), and the Canadian International Development Agency (CIDA) have all joined this discussion (Clarkson et al., 1992). There is an urgent need for knowledge to conserve the environment that has been lost in communities all over the world, as well as the development of mechanisms to protect the earth's biological diversity. The United Nations Convention on Biological Diversity recognizes the importance of Indigenous knowledge to the conservation and sustainable use of biological diversity recognizes Indigenous knowledge's contributions as innovative approaches to environmental studies and recognizes the validity of Indigenous science. It also acknowledges the importance of Indigenous knowledge, innovations, and practices to scientific knowledge, conservation research, and sustainable development (Clarkson et al., 1992). The World Conference on Science, convened in 1999 by the United Nations Educational, Scientific, and Cultural Organization (UNESCO) and the International Council for Science (ICSU), urged governments to foster an understanding of Indigenous knowledge systems. Participants at the conference urged the sciences to respect, sustain, and improve traditional knowledge systems, and they suggested that scientific and traditional knowledge be integrated into interdisciplinary projects addressing the links between culture, environment, and development (UNESCO, 1999).

Thakaran (2019) explains Indigenous knowledge and indigenous knowledge systems are based on the grass roots of communities and deal with the critical socio-cultural capital required for the community's survival and development within their

environment.

Grenier (1998) discusses the dynamic nature of IKS, in which new knowledge is constantly added. While such systems innovate from within, they also internalize, apply, and adapt external knowledge to the local context.

Indigenous knowledge systems are the knowledge forms that are characterised by integrated systems of cognition, belief, and practice (Williams & Muchena, 1991). Indigenous knowledge systems contribute to postcolonial theory by highlighting the knowledge systems and successes of the previously colonized that were condemned or denied by colonialists (Mapara, 2009).

Indigenous education is passed from parents, grandparents, or the community to children outside of formal schooling. Before the arrival of Western civilization, indigenous education was common in Africa. Indigenous education is concerned with the transmission of indigenous knowledge, models, methods, and content through formal or non-formal education systems. Indigenous communities can “reclaim and revalue their languages and traditions, and as a result, it improves the educational status of indigenous students”, ensuring the culture's survival. In the pre-literate era, indigenous education was provided to community-by-community members who possessed specialized skills or abilities in various fields of human endeavour. The indigenous education offered by the community was comprehensive such that it provided training in physical, character, intellectual, social, and vocational development, however, it had limitations. In the absence of writing people depended on the power of their memories to facilitate the retention and transmission of all learned ideas to the future generation. The community's indigenous education was comprehensive in that it provided training in physical, character, intellectual, social,

and vocational development, but it had limitations. In the absence of writing, people relied on their memories to aid in the retention and transmission of all learned ideas to future generations (Regina and Orumbie, n.d.).

Indigenous education refers to all processes involved in the sharing and exchanging of skills and knowledge related to indigenous environmental knowledge. These cultural practices are important for indigenous people's survival, so if elders intend to pass this on to the next generation, they must disseminate these skills and associated knowledge. Because IE is informal, the teaching and learning processes in IEK can be flexible and occur in a variety of settings depending on the nature of the activity administered. IE necessitates a holistic approach to learning that involves the learner's physical, mental, emotional, and spiritual capacities, with a focus on skill acquisition in the technical aspects of activities such as gardening, hunting, and house and artifact making (McGregor, 2004).

2.3.2 Modern Education

Colonial, Western, and Christian education are all synonyms for modern education. It is considered progressive education because it is influenced by a set of educational theories that place emphasis on the individual needs and capacities of each student. Modern education was encouraged and established in many states in written form by Christian church missionaries and was well-documented and taught in a systematic manner. With the arrival of Christian missionaries in Badagry in 1842, modern education arrived in Nigeria. Between 1842 and 1914, various Christian missions arrived in Nigeria and began active missionary and educational activity. There was an overabundance of elementary schools founded by various missions as more schools were established and missions competed for students or members. Despite the fact that literary education in the areas of reading, writing, arithmetic, and religion

predominated, this new missionary education prepared students for new career opportunities as teachers, church evangelists or pastors, clerks, and interpreters. The majority of missions initially established primary schools, with little emphasis on secondary and higher education (Orumbie & Regina, n.d.).

Due to Muslim scepticism about the effectiveness of Christian missionary education, the development of modern education in North and South Nigeria was more rapid in the latter. By 1914, there were estimated to be 25,000 Quranic schools in northern Nigeria. As a result, the introduction of Christian western education was met with fierce opposition. However, in some Northern Nigerian regions, Christian missionaries were successful in establishing schools, sometimes in collaboration with the government. Prior to 1882, a large portion of South Nigerian educational endeavours required government support. However, beginning in 1882, the government began to make a strong intervention by issuing codes and regulations, guidelines, and policies on school management and organisation. To ensure quality, the government began hiring inspectors and providing grants to schools. The government then produced a large number of norms and regulations between 1882 and 1950 in order to control the national standard of education. Between 1952 and 1960, each of the three areas passed and implemented new education laws (Orumbie & Regina, n.d.).

2.4 Issues and Challenges of Indigenous Knowledge

Many people have viewed the use of indigenous knowledge as a novel strategy for promoting development in underdeveloped rural areas around the world. IK is taken to cover all types of beliefs, with only a passing mention of truth or justification. It was used to preserve, promote, and safeguard indigenous peoples traditional knowledge and cultures. One of the goals of indigenous education was to enable

indigenous peoples to participate more fully in their communities. It was a necessary tool for achieving freedom and social justice (Global System for Sustainable Development, n.d.).

2.4.1 Scope of Indigenous Knowledge

IK is essential in modern societies, which are typically divided and isolated from one another and have grown largely independently. Indigenous educational practices have an impact on the norms, principles, and traditions that comprise society. IK education is disorganized and bookish in comparison to western education. Western education, like IE, does not foster a sense of cultural identity (Indigenous African Education, 2018).

Indigenous knowledge is important in the educational system because it gives students a first-hand understanding of their biological surroundings and the cultural practices that have developed within indigenous knowledge systems, which are based on their own epistemologies. Indigenous knowledge is relevant to the SDGs because it has a deeper understanding of the world's complexity (Sustainable Development Goals, n.d.).

Anthropologists are increasingly interested in indigenous knowledge systems. Scholars and practitioners are increasingly interested in a variety of contexts, including international development, resource management, sustainability and resilience, disaster response, climate change, ethnobotany, ethnomedicine, and ethnoveterinary studies, simultaneously, sophisticated conceptual and methodological approaches have emerged, such as cultural consensus analysis and participatory mapping. Many of these more recent developments frequently rely on knowledge conceptions that emphasise mental representations and distinct, condensed, and

abstracted knowledge components that can be verified using formal interview techniques (Maffi & Woodley, 2010).

Anthropologists, on the other hand, have discovered that these methods and approaches limit descriptions and conceal the diverse and hybrid nature of indigenous or local knowledge and ways of knowing. For example, in order to “more fully explore, comprehend, and appreciate indigenous people lives and perspectives in a rapidly changing world”. More research is required to develop approaches and methods for empirically recording aspects of indigenous knowledge and understanding that are frequently overlooked in indigenous knowledge studies" (Carothers et al., 2014).

(Horsthemke, 2008) A central tenet of several current approaches to the study of knowledge is that knowledge is embedded in many systems of practice, beliefs, values, and power at all scales. New concepts and methodologies are required to explore and depict modern indigenous knowledge that crosses many diverse systems of understanding. This special feature examines key conceptual, methodological, practical, and ethical challenges and opportunities in studying indigenous knowledge systems and applying insights from such knowledge systems in scholarly, resource management, and local community revolves around the world, based on an invited session of papers presented at the American Anthropological Association (AAA) annual meeting in 2012.

Several papers use a practice-oriented approach, a framework that enters the analysis assuming that knowledge includes social, dynamic, performative, and improvisational dimensions in addition to cognitive models and classification systems, to better describe and understand indigenous knowledge systems. This essay looks into the

social construction and unequal distribution of knowledge, as well as the cultural activities that go with it. The main questions are: What exactly is wisdom? What exactly is knowing? What is the relationship between abilities and real-world knowledge? What knowledge concepts do the locals have? What are the best methods for incorporating the complexity and richness of local knowledge and practices into knowledge system studies? Who should conduct such research or carry out such interventions? What knowledge gaps exist within and between communities? What roles do researchers play in developing new knowledge and disseminating existing knowledge? What innovative techniques are fostering new forms of collaboration between indigenous or local groups and researchers? Second, several studies examine various knowledge representation strategies (Carothers et al., 2014).

Examining critical factors such as locally relevant research questions and research designs, communicating findings, maintaining control over the research process and its outcomes, and the utility of collaborative research for academics and local populations. This special feature addresses important and related questions for the study and use of indigenous and local ways of knowing throughout each of these themes, such as 1) How are various forms of indigenous knowledge conceptualised by various actors, and what are the implications of these conceptualizations? 2) What are the best methods for investigating and illustrating these various learning and doing traditions? 3) How interdependent are conceptualizations and methodological stances? 4) What moral and practical implications do these conceptualizations, methodological perspectives, and representations have? (Oguamanam, 2016).

Indigenous People can help us respond to climate change in a variety of ways. The Kichwa Sarayaku people in Ecuador, for example, have prepared the proposal Kawsay Sancha (living forest), which is an indigenous-led solution to protect forests and keep

fossil fuels in the ground based on life-plans developed within their own community. It is a proposal for coexistence with the natural environment based on the IP knowledge of the Amazonian rainforest. Recent scientific studies have validated and solidified the efficacy of the TK-based approach to long-term environmental recovery (Salazar & Cordova, 2019).

Indigenous academics are developing new analyses and methodologies to help them, their communities, and their institutions decolonize. The connection between indigenous education and the community is strong. IKS has been defined as the sum total of the knowledge and skills that people in a specific geographic area have that allow them to get the most out of their surroundings. Traditional knowledge is the sum of all explicit and implicit knowledge and practices used in the management of socioeconomic, spiritual, and ecological aspects of life. Many aspects of it, in this sense, can be contrasted with 'cosmopolitan knowledge', which is culturally anchored in Western cosmology, scientific discoveries, economic preferences, and philosophies. Indigenous knowledge also aids in the identification of cost-effective and sustainable mechanisms for poverty alleviation that are locally manageable and meaningful. This is accomplished by identifying motivating pathways to sustainable development that improve local communities and their environments. Indigenous knowledge has also increased livelihood options, revitalised agriculture, increased food security, improved health, and promoted a sense of cultural pride within the community. Indigenous knowledge assists communities in dealing with periodic food shortages by preserving food using traditional methods, thus revitalising agriculture and increasing food security (Musingafi, 2013, p.23).

The incorporation of indigenous knowledge into educational systems could serve several purposes. The main one is knowledge, specifically the indigenous people's

deep culture and knowledge, which has been ignored and denigrated for far too long. It would also encourage more Aboriginal students to attend school and assist them in obtaining a formal education. Furthermore, it would bridge the decades-long divide between Indigenous and non-Indigenous people. In recent years, mono-cultural education has been called into question, and there has emerged a group of people who are interested in understanding and contributing to indigenous culture and knowledge. The greater challenge that still exists is developing a system that recognizes and respects the diversity of both Western and Indigenous cultures (Briggs, 2005).

2.4.2 Challenges of Indigenous Knowledge

The main challenge with indigenous knowledge and indigenous knowledge systems is defining what it means to be indigenous in specific social, geographical, and cultural contexts. It can be difficult for a society to agree on what and who is indigenous, in part because it can be difficult to develop a socially and culturally recognised definition of what defines indigenous groupings within a particular nation or region. Conflicts can arise between those who want to be identified as indigenous and those who find the identification offensive due to its paternalistic nature. There is growing concern that IK may not be as beneficial as expected or assumed. The focus on the binary conflict between WE (Western Education) and IKS creates a quandary (Tharakan, 2017).

Indigenous knowledge is locally bound and has a specific area that is passed down to the next generation orally and through practices in context-specific culture and in a non-formal manner. Whereas Western Education have significant differences in written form, documentation, teaching practices knowledge transfer, and so on. The modern context is undermining both the processes of transmission of indigenous knowledge and the practices associated with this knowledge in the context of

education. Children and youth must attend school during times when traditional practices and community activities are also taking place, and as a result, they are unable to imbibe these rich cultural and traditional practices as a result of their participation in compulsory education. It is also important to understand the adaptive nature of indigenous knowledge systems, the transmission of ecological knowledge through learning processes, symbols, signals, social regulations, and the cultural internalization of traditional practices in this regard. Education in indigenous contexts necessitates dynamic training in knowledge-specific contexts capable of producing and maintaining a sustainable socio-ecological system (Indigenous Knowledge and Knowledge Transmission, n.d.).

Canada has participated in, ratified, and affirmed the majority of international obligations in the field of Academy. However, indigenous knowledge and pedagogy have been largely ignored and continue to be ignored by Canadian educational institutions. In the educational crisis articulated over the last thirty years. And, as a result of previous failures, they have exposed the flaws of the Eurocentric monologue that has shaped modern educational theory and practice. Modern governments and education systems have displaced IK by forcing assimilation and acculturation to Eurocentric knowledge. It is clear, however, that the exclusive use of Eurocentric knowledge in education has failed First Nations children (Schissed & Wotherspoon, 2003).

The west considers Africa to be a “dark continent”, and thus regards its traditions, customs, belief systems, and indigenous knowledge systems as diabolic, barbaric, and backward, which has a negative impact on Africa’s own socioeconomic and political development (Musingafi, 2013, p.19).

Dei et al., (2000) identifies Indigenous knowledge as being at the heart of today's global issues. She contends that the future of Indigenous knowledge will determine not only whether the world's diverse cultures advance in freedom or are colonised, but also whether humanity and diverse species survive. She acknowledges in the foreword that the West's theft of Indigenous knowledge will not provide protection to the world's Indigenous communities or the diverse species with which they have co-evolved (Battiste & Yongblood, 2000).

Indigenous knowledge is mostly kept in people's minds and passed down through generations orally rather than in writing, making it vulnerable to change. There are numerous factors that contribute to the loss of indigenous knowledge, for example, development processes such as rural/urban migration and changes in population structure as a result of deprivation, epidemics, displacement, or war may all contribute to the loss of indigenous knowledge, as may the threat of advanced technology because in remote areas the power that pushes global or just non-local content such as radio and television broadcasting and advertising, among others (Marpana, 2009, p.20).

Western education, brought about by European masters, effectively eliminated all other types of education, resulting in a monocultural society and education system. The formal languages most commonly spoken around the world are European, such as English, French, Spanish, and Portuguese (Athabasca University, 2017a). Indigenous languages have been marginalized and have no place in such formal educational systems. The Europeans used Eurocentric religion and education to dominate any society with which they interacted. The Eurocentric invasion also brought diseases that wiped out people who were resistant to change. As a result, they establish missionaries, orphanages, and schools to teach their languages (Rovitto & Giles,

2016). Furthermore, it was made mandatory for people to use Eurocentric culture, which effectively ended Native American practices of moving from one location to another based on seasons and animal migration patterns (Briggs, 2005). Indigenous peoples' populations in any region are too small to have their knowledge or traditions integrated into formal education systems. They do not have enough teachers, materials, or systems to fully teach the culture to others. The media, schools, and other Eurocentric manifestations have printed a negative connotation or message about Native cultures, leading to confusion among people, including Natives, about their cultures. According to what has been reported, such cultures are 'shameful', 'depressing', and 'unacceptable', and are thus unacceptable (Athabasca University, 2017a).

Conclusion

Many academics have expressed various viewpoints on knowledge, and thus the topic has generated a huge debate. Some scholars believe that this knowledge is derived from scientific processes, whereas others believe that knowledge is gained through experiences rather than scientific methods alone. The modern era continuous technological advancement. As a result, humans in the current context are drawn away from indigenous knowledge and practices. Indigenous Knowledge (IK) is a term that is well-known throughout the world. It has been defined differently in different places, and it is mostly comprehended as local or traditional knowledge that indigenous people have passed down from earlier times through oral tradition. This knowledge includes all knowledge concerning specific people and their territory, as well as the use of their system of knowledge transmission from generation to generation. IK encompasses all types of knowledge activities that they engage in on a daily basis, which are ipso facto evidence that IK is alive.

Reclamation of culture or traditional heritage, recognition and acknowledgment of self-determining development, protection against further colonization, exploitation, appropriation, and or commercialisation, legitimation or validation of Indigenous practices and world views, and condemnation of, or at least caution against, the subjugation of nature and general oppressiveness of non-indigenous rationality, science and IK serves as an umbrella concept that encompasses practice, skills, customs, worldviews, perception, as well as theoretical and factual understandings. This knowledge generally refers to alternative informal forms of knowledge such as ethnomusicology, indigenous science, indigenous physics, ethnomedicine, ethnobotany, ethnozoology, ethno-psychiatry, and so on. Knowledge is the collection of understanding that we refer to as a knowledge system. There are three kinds of knowledge: the knowledge that or factual knowledge, knowledge how or practical knowledge and knowledge of a person, or things, or knowledge by acquaintance. When we discuss the uniqueness of indigenous people's knowledge interoperates it comes under the third kind of knowledge, and it is fairly uncontroversial. Knowledge system defines as an organized structure and dynamic process of generating and representing context, components, classes, or types of knowledge, that are domain-specific or characterized by domain relevant features as defined by the user or consumer, reinforced by a set of logical relationships that connect the context of knowledge to its value, enhanced by a set of iterative processes that enable the evolution, revision, adaptation and advances, and subject to criteria of relevance, reliability, and equality.

IKS is also known as Indigenous knowledge and ethnoscience. IKS was thought to be the foundation upon which local communities make decisions about local issues. IKS is distinguished by its locality, which is rooted in a specific culture and geography.

The oral tradition is strong in IKS, with the majority of knowledge being passed on orally, through mimicry, and through practical application. This knowledge system is created through daily engagement and trial and error to determine what best meets the needs of a specific community. IK and IKS are based at the grassroots level in communities; this knowledge provides critical socio-cultural capital that is required for communities to not only survive but also to go beyond and flourish within the given contexts of that community's geography, environment, culture, and economy.

Many indigenous people stated that education is extremely beneficial in understanding who they are, where they came from, and what makes them unique. Education facilitates learning or acquiring knowledge, skill, moral values, beliefs, habits, and personal development. Education originally served as a means of passing down cultural heritage to the successive generation. Education then serves as a tool for Indigenous people to discover the passionate sense of self that drives them forward in life. Indigenous education is also about having a sense of being multifaceted, which is essential for healing inner and outer fragmentation and honouring each person's humanity.

The Indigenous Education System is defined as the sum total of the knowledge and skills that people in a specific geographical area have that allow them to get the most out of their environment. Before the arrival of western civilization, this form of education was common in Africa and was generally referred to as Indigenous Education. It focuses on imparting Indigenous Knowledge, models, methods, and content through formal or non-formal educational systems. Indigenous education within the community provides training in physical, character, intellectual, social, and vocational development, but it has limitations. Whereas modern education is a progressive education that is related to or influenced by a theory of education that is

characterized by an emphasis on the individual needs and capacities of each child and curriculum informality. This education was introduced by Christian church missionaries, and it was in written form, well documented, and taught through a systemic process.

Many people see indigenous knowledge as an alternative way to promote development in poor rural communities around the world. Indigenous knowledge is a means of preserving, protecting, and developing traditional indigenous skills and cultures. This knowledge system is crucial in societies that are frequently distant and isolated from one another, and their development has occurred relatively independently. This education provides a sense of cultural belonging. Indigenous knowledge is significant because it is based on direct contact with their ecological environment and cultural practices developed within indigenous systems of knowledge based on their own epistemologies. This knowledge is also relevant to long-term development. This Indigenous Knowledge also aids in the identification of cost-effective and long-term mechanisms for poverty alleviation that are locally manageable and meaningful. This is accomplished by identifying motivating pathways to sustainable development that benefit local communities and the environment. Indigenous knowledge has also helped to revitalize agriculture, increase food security, improve health, and instil a sense of cultural pride in the community. This knowledge assists communities in dealing with periodic food shortages by utilizing traditional food preservation techniques. The incorporation of indigenous knowledge into the educational system could meet several purposes. Implementing education in indigenous contexts necessitates dynamic training in knowledge-specific contexts capable of producing and maintaining socio-ecological systems. Knowledge of the indigenous people's deep culture and knowledge, which has been ignored, as

well as inviting more Aboriginal learners into school and assisting them in gaining a formal education. It would also bridge the decades-long divide between Indigenous and non-Indigenous people.

However, in the absence of writing, people relied on the power of their memories to facilitate the retention and transmission of all learned ideas to future generations, which was a significant challenge for indigenous people. The major problem with indigenous knowledge and indigenous knowledge systems is the difficulty encountered in determining what constitutes 'Indigenous' in specific social, geographical, and cultural contexts. There is growing concern that indigenous knowledge is not being used as effectively as hoped for or assumed. The issue stems from a focus on binary tensions between western education and indigenous knowledge systems, where indigenous knowledge is passed down orally from generation to generation and is locally bound. Whereas western education was well-written form, documentation, teaching practices, knowledge transfer, and so on in the context of schooling, children and youth are required to attend school during times when traditional practices and community activity are also taking place, and thus are unable to learn these rich cultural traditional practices due to their participation in compulsory education. As a result, the adaptive nature of indigenous knowledge systems, the transmission of ecological knowledge through learning processes, symbols, signals, social regulations, and the cultural internalization of traditional practices are being gradually eradicated from indigenous communities.

Indigenous Knowledge is mostly kept in people's minds and passed through generations by oral ways rather than in written form. It is vulnerable to change. There are lots of factors that contribute to the loss of indigenous knowledge, for example, development processes, like rural/urban migration and changes of population structure

as a result of deprivation, epidemics, displacement or war may all contribute to loss of indigenous knowledge and also under the threat of advance technology because in remote areas the power that push global or just non-local content such as radio and television broadcasting and advertising among others are much stronger than those pulling local content. Western education rule education system all over the world, the formal languages mostly spoken are European, for instance, English, French, Spanish and Portuguese. So, therefore Indigenous Knowledge are lacking behind in such formal system of education. In the field of indigenous education, they are lack enough teacher, materials and systems that can fully teach the culture to other. The growing recognition and use of indigenous education method can be a response in the erosion and the loss of indigenous knowledge through the processes of colonialism, globalization and modernity. The western education has remained the most functional in education history.

Chapter III

India's Indigenous Knowledge: An Overview

Introduction

Indigenous knowledge is the organized body of knowledge accumulated by local people through practices, informal experiments, and an intimate understanding of the environment in a given culture. Plants have traditionally been used as a source of medicine by indigenous people of various ethnic groups inhabiting various terrains in India for the treatment of various ailments afflicting humans and their domestic animals. This chapter will provide an overview of Indian indigenous knowledge as well as a broad overview of indigenous knowledge. It also analyses and comprehends the policies and programmes instituted by the Indian government to preserve and address issues concerning indigenous people and their knowledge systems. This chapter includes several sub-themes that will address the questions and objectives raised in this chapter. It includes Indigenous Knowledge, Indigenous People in India, Policies, and Programmes to protect Indigenous Knowledge in India, Land Rights of Indigenous People in India, Sui Generis Legislation to Combat Biopiracy; India's Position, The Biological Diversity Act of 2002, Patents Act, Protection of Plant Varieties and Farmers Act, Fifth Schedule of Indian Constitution, Policies and Programme to Protect Indigenous Knowledge in Northeast India, Northeast India Conservation Initiative, Sixth Schedule of Indian Constitution, and Policies and Programmes to protect Indigenous Knowledge in Sikkim.

3.1 Indigenous Knowledge in India

Indigenous knowledge denotes the distinctive cultures of a certain group of people. The preservation of resources, especially indigenous plant species that are important to indigenous societies, depends greatly on indigenous knowledge (Cox, 2000). Particularly in nations where biodiversity is at risk from urban development projects, migration, deforestation, and natural disasters, it is important to preserve this knowledge. India is one such nation where indigenous knowledge is declining day by day due to the aforementioned issues (Mao et al., 2000). North-eastern India is a mega biodiversity hotspot with unique flora that is abundant and has a high commercial value. Nearly 1,350 of these plants are used in various ethnomedical formulations (Dutta and Dutta, 2005). This region is considered one of the ecological hot spots of the world and contains a wealth of medicinal plants known to the native people in addition to being rich in floristic diversity, a diverse and colourful culture, and a traditional knowledge system among 145 tribal communities (Ali and Das, 2003).

In the 1901 census, the tribes were identified as those who ‘practiced animism’ and separated from large Hindu civilizations. In the later census, additional references to the territory were included, producing the label of ‘hill and forest tribes’ in 1921 and ‘Primitive tribes’ a decade later. In the 1941 census, tribes were identified not in terms of their religion but according to their ‘origin’, that is, tribes who have a tribal origin. In 1950 Constitutional Amendment order with the full list of Scheduled Tribes (ST) recognized at the time was largely based on the list of “backward tribes” which is formed by the colonial administration in 1936. With a population of 104 million indigenous people and they comprise 8.06% of the total population of India (The Indigenous World 2022: India, 2022). The Indian government has passed several laws and constitutional provisions, such as the fifth schedule for central India and the Sixth

Schedule for certain areas of northeast India, which recognize indigenous people's rights to land and self-governance. The main aim of these laws is to protect indigenous people and their fundamental rights and the development of tribal communities (Indigenous People in India, n.d.).

In 2007 UN declaration of the right of indigenous people was adopted by the UN general assembly and endorsed by Australia in 2009 (UN, 2018). The government of India also voted in the favour of the UN Declaration on the Rights of Indigenous People (UNDRIP) where they placed a condition that, after independence, all Indians are to be considered indigenous. On 27th September 2018, the government of India form a High-Level Committee and passed an act to look into the social, economic, cultural and linguistic issues of the indigenous population in India. According to the International Work Group for Indigenous Affairs (2019) government of India introduced the Citizenship Amendment Bill in the Lok Shaba stated. "The Bill further seeks to protect the constitutional guarantee given to the indigenous population of North-Eastern State covered under the sixth schedule to the constitution and the statutory protections given to areas covered under the 'Inner Line' system of the Bengal Eastern Frontier Regulation 1873".

In India, people use traditional plant knowledge for therapeutic purposes every day. Through their use of this knowledge system, they serve as ipso facto proof that indigenous knowledge is still active and that indigenous people are not merely passive archivists of knowledge that has been isolated from daily activities (Daes, 1993). Arunachal Pradesh is recognized as one of the biodiversity homes of a range of economically important plants (Mahanta & Tiwari, 2005). Additionally, Arunachal Pradesh has more than 500 plant species that produce dye and are used for fiber production, ethnomedicine, traditional medical procedures, rope making, etc. Singh

(2018) discusses the Patents Acts, 1970, section 25, and section 64, which give some of the grounds for revocation of a patent application based on traditional knowledge. Mahanta & Tiwari (2018) reveal that the Indian government provides various methods to protect traditional knowledge at the international level and to access in India like USPTO (United States Patent and Trademark Office), EPO (European Patent Office), CSIR (Council of Scientific and Industrial Research), etc.

In “Protection of Traditional Indigenous Knowledge and Intellectual Property Rights” it is stated that India is a country rich with customary practices and indigenous and traditional knowledge of plant varieties and their medicinal use. However, in India, there is limited intellectual property right protection for indigenous and traditional knowledge. Nadasy, (2005) reveals cold relations between indigenous people and environmentalists that help to illuminate some ambiguities and complexities. Bhattacharjee (2020) mentions that traditional knowledge of plant medicines will help to accelerate drug development in India. Thus, India has to provide such kind of knowledge which gives intellectual property right protection.

3.2 Ethnomedicinal Indigenous Knowledge in India

Upadhyaya et al., (2012) mention North Central Western Ghats in India are rich in bio-cultural diversity and also home to ethnomedicinal practices. Eight states of Northeast India are characterized by diverse populations with different ethnic backgrounds and fermented food which are part of the diet of these ethnic tribes. Traditional food, wild fruits, and fermented fruits and vegetables contain a diverse group of pro-biotic compounds that attract and stimulate the growth of probiotics. Discuss the treatment of the bone fracture is practiced through traditional knowledge by using medicinal plants. Das et al., (2016), making fermented food or products each

region has its unique methods for preparations and substrates. Making fermented food and alcoholic beverages is a deep attachment to the socio-culture lives of local people.

Snakebite is a serious problem that is experienced worldwide, and in India, there are more than 100 plants that have the potential of curing snake venom across India. There are 520 plant species, belonging to approximately 122 families, which is used for snakebites (Upasani et al., 2018). With the progress of the modern medical system, about 80% of the world's population still depends on the traditional medical system. In India traditional system of herbal medicine is directly linked to its rich flora diversity. In "Integrating Scientific with Indigenous Knowledge, Constructing Knowledge Alliances for Land Management in India" the importance of constructing knowledge between multiple knowledge systems to support more effective (IS) Integrating Scientific development and Implementation (Puri, 2007). Overuse of land geographic information system to alleviate the problem of land degradation in India. Northeast India is rich geographically and in terms of biodiversity. In this region various priority-setting processes for the initiative to the National and International Conservation agencies. Northeast India is highly diverse ecological, social and physiological aspects (Chatterjee, 2008).

In the Cachar district of Assam, the different tribes or communities are settled in that place and they make use of multiple kinds of medicinal plants. According to the tribal people, there are 107 plant species, and out of that plant species some are used against jaundice, diarrhoea, dysentery, cough, malaria fever, skin disease, sexual disease, etc. (Das et al., 2008). In Assam there are 16 species of *Dioscorea* also known as yam is used in curing certain ailments by one of the ethnic communities of this region. It is one of the oldest tube crops cultivated or harvested from wild in the tropical region all over the world and it is also one of the major food items for many ethnic groups

(Dutta, 2015). In the Cachar district of Assam people use different plant species in treating various diseases, they also use different plants to cure the ailments in day-to-day life but in this region, the tribal communities are losing the traditional culture and practice of medicinal plants used in their daily life as an impact of urbanization and partial modernization (Das et al., 2008).

3.3 Policies and Programme to Protect Indigenous Knowledge in India

Indigenous people have a distinct connection to the land they inhabit, and they have also acquired specialized knowledge, ingenuity, and management techniques for utilizing the ecological diversity of their surroundings. Particularly in fields like agriculture and medicine, this kind of knowledge significantly advances research and development (Drissi, 2020). Indigenous people claim that the framework for indigenous knowledge does not appropriately recognize or protect their rights as the traditional custodians and protectors of this unique knowledge. Therefore, they seek not just the recognition and protection of this knowledge, but also the right to a fair share of the benefits that come from its application. In the present, civilizations support policies and regulations that help maintain cultures and knowledge systems. (Hands, 2008). India developed to become a major player on the international stage in the twenty-first century by taking a fair and inclusive approach. Tribal communities, which make up 8.8% of India's overall population, are significant in this regard. Indigenous knowledge is essential for preserving ecosystem functions and safeguarding natural resources in the face of a crisis (Chakrabarty and Kaur, 2021). Indigenous people claim that the system on which their knowledge is built is fading and on the verge of extinction. The loss of this knowledge will be followed by a

deterioration in indigenous identity and a rapid fall in awareness of and understanding of a precious sustainable knowledge system (Honds, 2008).

In particular, the autonomy and land rights of the tribes are protected under the Indian Constitution. It provides a thorough plan with instructions to safeguard the rights of indigenous tribes to their land and to protect them from exploitation. The majority of India's indigenous people are referred to as Scheduled Tribes collectively, and the Indian Constitution guarantees them the right to self-determination (Mohindroo, 2020). The rights granted to tribal people under the Forest Rights Act (2006) aim to ensure that indigenous people in India have individual and community ownership over landholding, exploitation, and habitation in forests. These rights have been transferred to Scheduled Tribes and other traditional forest dwellers who have lived in these areas for generations but have never been granted such rights (GoI, 2006).

A member of a community of tribes that are recognized as Scheduled Tribes in a region under Indian law is referred to as a "Forest Dwelling Scheduled Tribe" under Indian law. The Forest Rights Act also permits Other Traditional Forest Dwellers to assert rights (Banerjee, 2020). Other Traditional Forest Dwellers are individuals or groups that have lived on forest land for three generations and rely on it for their daily needs. Other Traditional Forest Dwellers' claims are supported by public records including census data, surveys, maps, management plans, etc., government-issued identity certificates, court and quasi-court records, physical characteristics like houses and huts, elder testimonies, and more. Any two of these pieces of evidence could be used to support the allegation (GoI, 2006).

Traditional knowledge has limited scope for protection at the national and regional levels, but its effects are felt on a worldwide scale. This type of knowledge exhibits

homogeneous behaviour and has an effect that transcends national borders (Ouma, 2017). Native American groups appreciate the ban on fishing during the mating season, similar to how indigenous societies conserve coral reefs by using similar techniques in many regions of the world. In practically all jurisdictions, international customary law has been disregarded, and the result is apparent today. Nearly 90% of the world's huge fish have disappeared in the previous 60 years. Therefore, international engagement and cooperation are essential to facilitating such laws at the national and international levels. Shared policy goals would guarantee the preservation, dissemination, and appreciation of traditional knowledge (Chakrabarty & Kaur, 2021).

Tribal groups in India are reliant on the forests for their survival. The Indian government formalized the fundamental rights of tribes that live in forests after many years of conflict, prejudice, and suffering Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act in 2006 (Forest Rights Act). In India, Scheduled Tribes have been among the most marginalized and deprived populations. To protect and conserve the land rights of Scheduled Tribes in India, many rights have been devolved (Mohindroo, 2020)

Ministry of Tribal Affairs Government of India, this ministry focused on the integrated socio-economic development of the Scheduled Tribes (ST), in a coordinated and planned manner (GoI, 2006). This ministry looks at overall policy planning and coordination of programs for the development of STs. Under this ministry, there are various activities undertaken that follow under the subjects allocated in the government of India. Under this ministry, there are several programmes and schemes to support and supplement the efforts, primarily with other central ministries, the state government, and parties of voluntary organizations

through financial assistance and to cover the critical gap within institutions programmes, taking into account the situation of STs. The central ministries supplement their efforts by ways of various developmental interventions through specially tailored schemes. These schemes consist of economic, educational, and social development through institution building which is administered by the ministry of tribal affairs and is implemented by the State government and Union Territory Administration (Ministry of Tribal Affairs Government of India, n.d.).

Schemes for the economic development of ST, National Scheduled Tribes Finance and Development Corporation (NSTFDC) under the Ministry of Tribal Affairs Government of India provides financial assistance through soft loans to generate income for economic development for ST aspirants. Like: Team Loan Scheme, Adivasi Mahila Sashaktikaran Yojana (AMSY), Micro Credit Scheme for SHGs. And for education, the Ministry of Tribal Affairs Government of India provide various Scholarship schemes for ST student, under these schemes, there are Pre-Matric, Post-Matric scholarship, National Scholarship, National Overseas Scholarship, and Adivasi Shiksha Rinn Yojana, etc. (National Scheduled Tribes Finance & Development Corporation, n.d.).

3.3.1 Land Rights of Indigenous People in India

Numerous rights are included in indigenous people, basically about occupation and use of their land. The Scheduled Tribes and Other Traditional Dwellers are authorized to hold and live on the forest land, under its specific or mutual ownership for habitation. Any member of a Scheduled Tribe or Other Traditional Forest Dwellers is also entitled to use the land for self-cultivation for their living (Mohindroo, 2020).

3.3.2 Sui Generis Legislation to Combat Biopiracy in India

Sui generis means something unique and exclusive to a specific jurisdiction. Sui generis legislation is approved with specific purposes in the mind. To achieve certain protection for traditional knowledge under the IPR domain, sui generis legislation came into power to address the issue:

- i. To change the existing laws of IPR and make the necessary changes to accommodate TK and its derivation, and
- ii. To make inclusive legislation to promote and protect TK within IPR (Singh, 2018). To accommodate TK with IPR many jurisdictions within WTO (World Trade Organisation) made necessary changes in their legal system. In India, TK accommodates by both amending existing IPR statutes and creating a new one. As a matter of practice, the duty for protection to TK/TCEs globally vests upon the WIPO of WTO who are responsible for TRIPS to make a strategic adjustment to accommodate TK and TCE (Chakrabarty & Kaut, 2021).

3.3.3 The Biological Diversity Act, 2002

The term “Biodiversity” refers to the preservation of biological resources, their by-products, the producers and keepers of knowledge and information about their use, as well as innovations and behaviours connected to such use and application (Ouma, 2017). This Act establishes guidelines for the conservation of biological diversity, the wise use of its constituent parts, and the fair and just distribution of benefits attributable to the utilization of biological resources, knowledge, and related subjects. India is a signatory to the United Nations Convention on Biological Diversity, which was signed in Rio de Janeiro on June 5, 1992, and went into effect on December 12, 1993, while also honouring the country's rich biological diversity and associated

traditional and modern knowledge systems. This convention's principal objectives were to preserve biological variety, utilize it sustainably, and fairly and equitably distribute the advantages brought about by the exploitation of genetic resources. It also provided for the conservation, sustainable use, and equitable sharing of the benefits resulting from the use of genetic resources, as well as to give effect to the Convention on Biological Diversity (The Biological Act, 2002, n.d.).

Under this Act, some of the activities are prohibited without prior approval from the National Biodiversity Authority:

- i. Any person or organization (either based in India or not) from gaining any biological resource occurring in India for its research or commercial utilization.
- ii. The transfer of the outcomes of any research relating to any biological resources occurring in, or found from, India.
- iii. The claim of any intellectual property rights on any invention is based on the research made on the biological resources obtained from India (Mohindroo, 2020).

Biological variety is a key element of agriculture and food production. Natural ecosystems are made up of an almost endless number of different species, from the millions of genes that lay the groundwork to the millions of different types of plants and animals that call the planet home. Biodiversity is extremely important in the context of modern intensive agriculture, which forces many farmers to adopt high-yielding plant and animal varieties. This helps feed millions of people around the world. Animal species and breeds could become extinct, and farming cultures could lose the distinctive qualities that made them useful. Agricultural diversity is essential

for the creation of plant and animal species that can endure catastrophic heat waves, droughts, and disease outbreaks that reduce crop yield and directly impact the farming industry. Agricultural diversity is also a vital part of preventing unanticipated effects of climate change (Kannaiyan, n.d.)

3.3.4 Patent Act 1970

Any individual in India who has a novel invention qualifies for a patent. As information is passed down from one generation to the next, traditional knowledge lacks a creative novelty in this regard. Additionally, no single person can obtain a patent for traditional knowledge because it is the collective knowledge of a particular community of people. Therefore, the Indian Patent Act cannot be used to defend traditional knowledge. From the aforementioned, it is evident that the Indian Patent Act will not permit the registration of traditional knowledge (Tarunika & Tamilselvi, 2018).

There are worries that indigenous knowledge is being used and patented by third parties without the previous informed agreement of Indigenous Knowledge holders across the world. Such worries have elevated indigenous knowledge to the top of the international agenda and have been a debated topic on how to safeguard, protect, advance, and sustainably use Indigenous knowledge. India has put a pioneering effort to preserve indigenous knowledge and stop its unauthorized use by others to document and digitize information in the form of traditional knowledge digital libraries (WIPO, 2011).

3.4 Policies and Programmes to Protect Indigenous Knowledge in Northeast India

Northeast India refers to the easternmost region of India comprising of states of Assam, Arunachal Pradesh, Meghalaya, Nagaland, Manipur, Mizoram, Tripura, and the new addition Sikkim. The region shares an international border with countries like China, Tibet, Bhutan, Burma, and Bangladesh and is connected to the rest of India by a narrow passage. Northeast India is the homeland of a large number of ethnic groups who came from different regions and share different histories. These tribal groups belong to different racial stocks, speak different languages, and have diverse socio-cultural traditions. As a result, this region has become the epicentre of several ethnic nationalities. Especially the society in the hills of the Northeast region reflects a high degree of diversity as each community living within has its distinct characteristics (Phukan, 2013). According to the 'People of India' project sponsored by the Anthropological Survey of India out of 5,633 communities living in India 635 are categorized as tribals, of which 231 are inherent in India. The project recorded those 325 languages of which 175 belong to the Tibeto-Burman group and the Mon-Khmer group are spoken in Northeast India (Bhaumik, 2005).

The indigenous people of the northeast lug their ancestors their history, traditions, and wisdom, around with them. Each indigenous group in the Northeast consists of knowledge systems that are ingrained in their history, culture, and connection to the local economy. They also live their lives by how they perceive the world. Indigenous people of Northeast India are rapidly losing their traditional wisdom. With the rapid socioeconomic change, its relics are often unreported and face the risk of disappearing or changing beyond recognition. These skills include the sophisticated gathering of data, comprehension, and interpretations that direct human societies in their

interactions in a variety of fields, such as agriculture and animal husbandry, fishing, disease management, enlightening natural phenomena, and coping mechanisms for changing environments (Roy, 2020). Some of the measures that have been implemented in the conservation of traditional knowledge in North East India are:

3.4.1 Northeast India Conservation Initiative (NEICI)

North East Conservation Initiative was implemented by United Nations Development Programme in the partnership of Ministry of Environment, Forest and Climate change and the National Biodiversity Authority, and it is funded by the Federal Ministry of the Environment, Nature Conservation and Nuclear Safety, Federal Republic of Germany (UN, 2021).

3.4.2 Sixth Schedule of Indian Constitution

The sixth schedule of the constitution is referred to as a charter of autonomy of a wide magnitude. It has numerous provisions that confer legislative, judicial, executive, and financial power and purposes on autonomous councils. The sixth schedule contains provisions related to the Administration of Tribal Areas in the States of Assam, Meghalaya, Tripura, and Mizoram. The Sixth Schedule gives for the administration of certain tribal areas as autonomous entities. The requirements of the sixth schedule are provided under Articles 244(2) and 275(1) of the Indian Constitution. Passed by the constitution Assembly in 1949, it seeks to safeguard the rights of the tribal population of Autonomous District Councils (Singh, 2007).

3.5 Policies and Programmes to Protect Indigenous Knowledge in Sikkim

A small state in Northeast India called Sikkim is home to rich cultural traditions surrounding the use of widely accessible ethnomedicinal herbs. Sikkim, a place where

there are many different ethnic and tribal groups, has a long history of spiritual and paranormal faith healers who cherish, defend, and uphold their natural resources and have a strong supernatural and spiritual bond with their land according to an animist tradition. There were found to be 48 folk healers in Sikkim (Panda et al., 2010). The Sikkim Himalaya is made up of the hills in Sikkim and Darjeeling. Numerous ethnic tribes, including the Lepcha, Bhutia, Limbus, Nepalese, etc. live there. It is located between 27° and 28° N latitude and 88° and 89° E longitudes (Bharati & Sharma, 2009).

In Sikkim, traditional Tibetan pharmacopeia, supported by Ayurvedic medicine, is still widely used in the practice of old medicinal systems. The Lepcha, Bhutia, and Nepali communities, Sikkim's three largest groups, form the foundation for traditional medical practices and the cultural values that go with them (Panda et al., 2010). In Sikkim, healing techniques play a significant role in maintaining health. All three of the original communities continue to practice it, both in rural and urban locations.

Treatment is provided for a variety of illnesses, including epilepsy, jaundice, and the Primary occupation of the majority of the population is agriculture and animal husbandry (Bharati & Sharma, 2009). Lepchas are world-famous plant collectors and possess a vast knowledge of ethnobotany (Medicinal Plants Resource, n.d.).

Sikkim has a strong tradition of using folk medicine and a vast resource of medicinal herbs. Sikkim is rich in both flora and a variety of unprocessed pharmaceuticals. Nearly 420 plants, some of which are utilized on a commercial basis, are used by the tribal people of the Sikkim Himalayas region to treat a variety of ailments. To identify the molecules that make up the active substances in plants, biochemical laboratories, and scientifically-based plant farms must be established. In Sikkim, scientifically-

based medicinal plant production and preservation are essential (Panda, 2010). Lepcha herbal system has almost become extinct, and Dzongu in north Sikkim is amongst the last stronghold of the Lepcha culture and their herbal medicinal system is still practiced (Medicinal Plants Resources). Overused and overexploitation of medicinal plants pose threat to their potential availability in wild areas and that conveys concern for their conservation (Idirisi et al., 2010).

Conclusion

In today's world, indigenous knowledge has been understood through local or traditional knowledge brought by indigenous people through oral tradition. Indigenous knowledge, traditional knowledge, and local knowledge are all terms used to describe the mature, long-standing traditions and practices of specific regional, indigenous, or local communities. This knowledge has been passed down orally from person to person for generations. Indigenous knowledge, also known as traditional knowledge, is simple and practical, providing practical solutions to people's problems.

In the Indian context, the majority of indigenous people are found in Northeast India and Central India. For the protection of these people, the Indian government has enacted several laws and constitutional provisions, such as the fifth schedule for central India and the sixth schedule for a few North-eastern states. The Indian government has provided multiple techniques for indigenous knowledge safeguarding and access in India, such as the USPTO, EPO, and CSIR. India is very rich in indigenous and traditional knowledge of the different plant species and their medicinal uses. However, indigenous and traditional knowledge are not sufficiently protected by intellectual property laws. Several indigenous ethnomedicinal plants are used to treat severe diseases such as jaundice, diarrhoea, dysentery, cough, malaria

fever, skin disease, sexual disease, snake bite, and so on. However, with the advent of urbanization and partial modernization, tribal communities are losing their traditional culture and medicinal plant practices. The indigenous people claimed that their rights as traditional holders of indigenous knowledge are not recognized or protected. As a result, these people are demanding not only the protection and recognition of knowledge but also an equitable share of the benefits derived from the use of their knowledge. People must focus on the preservation of traditional knowledge because its loss will result in a decline in indigenous identity as well as a decrease in the recognition and understanding of the invaluable sustainable knowledge system.

The majority of indigenous groups in India are Schedule Tribes, and the Indian Constitution guarantees these communities the right to self-determination. Indian tribal communities rely on forests for their food. The Schedule Tribes and other Traditional Forest Dwellers Act of 2006 enshrined the primary rights of forest-dwelling tribes after many years of hardship, discrimination, and anguish. Schedule Tribes have historically been the most marginalized group in India. As a result, many rights have been delegated to protect and conserve the Schedule Tribe's land.

A forest-dwelling Scheduled Tribe is defined as members of a community of Tribes that are listed as Scheduled Tribes in an area under Indian law. Other Traditional Forest Dwellers may also claim rights under the Forest Rights Act. Other Traditional Forest Dwellers are individuals or communities who have lived on forest land for three generations and rely on it for their livelihood. Some sui generis legislation came into force to address the issue of achieving certain protection for traditional knowledge under the IPR domain, such as: amending existing IPR laws and making the necessary changes to accommodate TK and its derivation, to develop comprehensive legislation to promote and protect TK within the context of IPR and to

accommodate TK with IPR, many WTO (World Trade Organization) jurisdictions made necessary changes to their legal systems. In India, TK accommodates by amending existing IPR statutes as well as creating new ones. In practice, the duty to protect TK/TCEs globally rests with WIPO, which is responsible for TRIPS, to make a strategic adjustment to accommodate TK and TCEs.

The Biological Diversity Act, provides the preservation of biological variety, the sustainable use of its elements, and the just and equitable distribution of the benefits derived from the use of biological resources, knowledge, and related topics. India is a signatory to the United Nations Convention on Biological Diversity, which was signed in Rio de Janeiro on June 5, 1992, and went into effect on December 12, 1993. Act VI of 1886 in India was the first legislation related to Indian patents, which were revoked by Act IX of 1887. In 1859, the provisions of exclusive privileges were introduced, which were consolidated with the Act of 1872. Act XII of 1872 was renamed it "The Patterns and Designs Protection Act", and this Act was amended in 1883 to include protection for the novelty of the invention. Furthermore, the Indian Patents and Designs Act of 1911 replaced all previous Acts, and this Act was amended in 1920 and 1930. This act was amended again after independence in 1950. And two amendments failed between 1950 and 1970. As a result, the Patent Act was passed in 1970, and the majority of the 1970 provisions became effective with the publication of the Patent Rules in 1972. This Patent Act was overseen by the Controller General of Patents, Designs, and Trade Marks (CGPDTM). The changes in the Patent Acts and Rules made between 1999 and 2006 were necessitated by India's obligation under the TRIPS agreement, which refers to the Trade-Related Aspects of Intellectual Property Rights, by allowing product Patents in the field of chemicals and drugs.

The Indian Government approved the Protection of Plant Varieties and Farmers Rights Act in 2001. Following India's accession to the Trade-Related Aspects of Intellectual Property Rights Agreement (TRIPs) in 1994, legislation was required. Article 27.3 (b) of this agreement requires member countries to protect plant varieties through a patent, an effective sui generis system, or a combination of the two. As a result, the member countries needed the option to draft legislation tailored to their systems, which India did. There are ten scheduled areas in India. Article 244 deals with Scheduled and Tribal Areas.

The term Schedule Areas is defined in the Indian Constitution, and the president has the authority to declare any area as a Schedule Area under the fifth schedule. The following procedure for scheduling, rescheduling, and altering scheduled areas is prescribed in paragraph 6 of the constitution's fifth schedule. Northeast India is the home of many ethnic groups who came from various areas and have different origins. These tribal groups are of various racial stocks, speak different languages, and have various sociocultural traditions. As a result, this region has become a melting pot for a variety of ethnic groups. Northeast India's indigenous people are rapidly losing their traditional wisdom. With the rapid socioeconomic change, its relics frequently go unnoticed and risk disappearing or changing beyond recognition.

The North East Conservation Initiative was founded by the Federal Ministry of Environment, Nature Conservation, and Nuclear Safety of the Federal Republic of Germany and implemented by the United Nations Development Programme in collaboration with the Ministry of Environment, Forest, and Climate Change and the National Biodiversity Authority. The sixth schedule of the constitution is referred to as a charter of autonomy of a wide magnitude. It has numerous provisions that confer legislative, judicial, executive, and financial power and purposes on autonomous

councils. The sixth schedule contains provisions related to the Administration of Tribal Areas in the States of Assam, Meghalaya, Tripura, and Mizoram. The Sixth Schedule gives for the administration of certain tribal areas as autonomous entities. The requirements of the sixth schedule are provided under Articles 244(2) and 275(1) of the Indian Constitution. Passed by the constitution Assembly in 1949, it seeks to safeguard the rights of the tribal population of Autonomous District Councils. Traditional Tibetan pharmacopeia, supported by Ayurvedic medicine, is still widely used in the practice of ancient medicinal systems in Sikkim. Sikkim has three largest communities, the Lepcha, Bhutia, and Nepali serve as the foundation for traditional medical practices and the cultural values that accompany them. Healing techniques are important in maintaining health in Sikkim. It is still practiced in all three original communities, both rural and urban. Lepchas are world-renowned plant collectors with extensive ethnobotany knowledge. Sikkim has a long history of using folk medicine and a rich supply of medicinal herbs. Sikkim is abundant in flora as well as a variety of unprocessed pharmaceuticals.

The tribal people of the Sikkim Himalayas region use nearly 420 plants, some of which are commercially used, to treat a variety of ailments. Biochemical laboratories and scientifically based plant farms must be established to identify the molecules that make up the active substances in plants. The Lepcha herbal system is nearly extinct, and Dzongu in north Sikkim is one of the last strongholds of the Lepcha culture, where their herbal medicinal system is still practiced. Overuse and overexploitation of medicinal plants endanger their potential availability in wild areas, raising concerns about their conservation.

Chapter IV

Youth Perception on Indigenous Knowledge and Ethnomedicinal Plants in Dzongu, Sikkim

Introduction

The majority of the Lepcha tribes people live in Dzongu Valley, an officially designated reserve for their community that borders the Khangchendzonga Biosphere Reserve in the north district. The Lepcha is the oldest and first tribe to be recorded from Sikkim, India. The Dzongu Lepchas are renowned for maintaining a strong cultural legacy. In Sikkim, factors such as the absence of written records of indigenous knowledge, population migrations, the introduction of technology, and contemporary education are impeding the preservation and application of indigenous knowledge. The practice and preservation of Indigenous knowledge is gradually dwindling in the case of the Dzongu young.

Males and females make up the youth. Typically, youth are defined as those between the ages of 18 and 24. If we look at the Indian setting, this young requirement can be extended up to the age of 35 to 40 years. To better understand how young people view indigenous knowledge practices and ethnomedicinal plants that are relevant to today's socioeconomic, cultural, and economic contexts, the study has used the Dzongu as its focal point. This chapter aimed to answer the critical topic of how the younger generation of Sikkim perceives such a multifaceted treasure trove through fieldwork. This chapter covers the use of traditional healing methods, indigenous knowledge, problems with indigenous knowledge systems, programmes and policies, ethnomedicinal plants, and their use in modern culture.

4.1 Study Area

Dzongu is located in North Sikkim at an elevation ranging from 800m and 6000m above sea level. It spans over an area of about 78 sq.kms and is divided into Lower, Middle and Upper Dzongu. It extends between 27°28'-27°38' N latitude and 88°23'-88°38' E long. Dzongu further extends from Sheep-Gyer in the east to Sakyong-Pentong village in the west and Kishong Cho Lake in north to Lum village in the south. The area is characterized by diverse snowy mountainous landscape with steep and narrow valleys and gorges with well drained flanking slopes, receiving high rainfall between June and September. The area represents three climatic zones viz. sub-tropical, temperate and alpine. The Rongyang Chu (a tributary of Teesta) divides Dzongu into the northern Upper Dzongu and the southern Lower Dzongu. It abuts the Kanchendzonga Biosphere Reserve and National Park. The Indo-Myanmar biodiversity hotspot includes all of them. Dzongu, which consists of 30 sparsely populated settlements, is a Lepcha special reserve. It contains a notably diverse indigenous fauna and flora, including numerous endangered species of animals and invertebrates.

Dzongu is inhabited by Lepcha people. The mountains, rivers, lakes, and woods, especially those of Dzongu, are integral parts of the Lepcha history and culture. The Lepchas have lived in this area for millennia and are closely knit with the environment. The Lepchas have a rich cultural history that extends back to the beginning of time. These customs and heritage are backed by short morality tales and histories regarding their presence in these areas. The simplicity of the Lepcha people is the source of their culture's beauty. They are described as "Born Botanists" and "Pure Naturalists" since they have a keen awareness of their surroundings. The Lepchas in Dzongu have done their best to maintain their ancient way of life. They

are proud of their extensive material, immaterial, and natural heritage. When thoroughly investigated, the Lepcha culture's unmatched biodiversity with a rare range of insects, basic architecture, wood and bamboo crafts, blending of shamanism and Buddhism, reverence for rivers and mountains, and blend of religions make up the most outstanding characteristics.

4.2 The traditional healing system: Mun and Bongthing

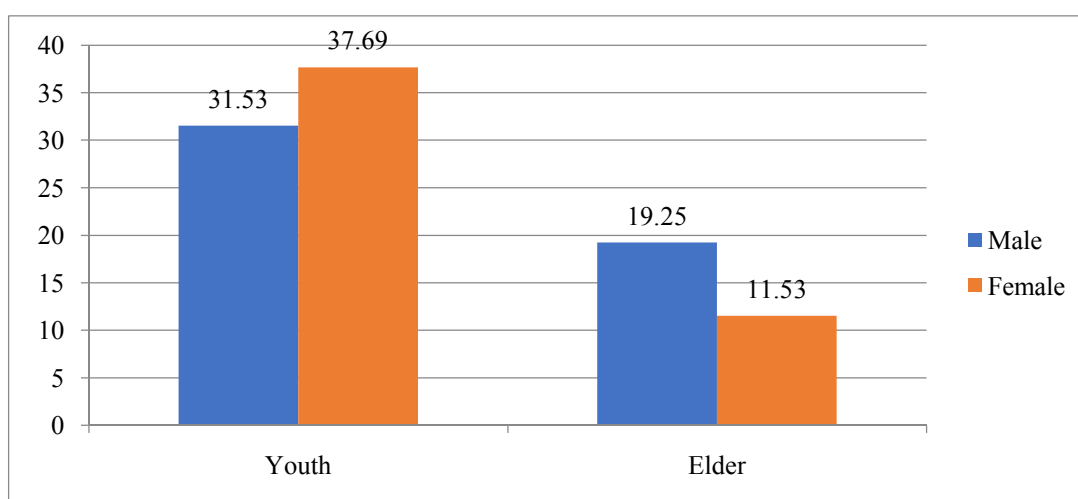
The Lepchas think that both good and terrible spirits rule the world. All natural disasters, including ill health, poor harvests, hailstorms, and other catastrophes, are brought on by evil spirits known as *Mung*, whereas good health and vitality, prosperous harvests, and good harvests are connected to good spirits known as *Rum*. In addition to serving as priests during life cycle ceremonies, *Mun* and *Bongthing* are their traditional healers. Traditional healers implement various methods in the process such as rituals, the use of medicinal plants, prayers, and folk music. Folk medicine is a term used to describe practices and ideologies that use herbal remedies, spiritual and manual therapies, and exercises to identify, treat, and prevent illnesses. Only a small portion of the population in the culture is familiar with this type of medical system, which has been passed down orally from generation to generation. Shamanistic medicine is a type of spiritual medicine in which a patient's sickness is connected to a spiritual procession. A *shaman* is a trace who will consult the spiritual head to determine the root of an ailment and seek treatment. In Dzongu, this kind of *shamanic* medical approach is still used.

Pungo rip, also known as *Oxylum Indicum*, is a plant that is used as an anti-diabetic medication and is thought to be the most sacred plant. It is sometimes compared to the chastity and purity of a virgin girl. The central religious roles are traditionally occupied by *Mun* and *Bongthing*, who both act as *shamans*. They carry out sacrifices

and ceremonies for the group. Since the beginning of civilization, traditional medicine has been widely employed by every country. Even the most ape-like man has access to a basic healthcare system for managing pain and ailing. Their decades-long experiences helped shape empirical treatment techniques and methodology, which over time crystallised into distinct medical practises.

To understand the perceptions of people from different age groups on indigenous knowledge 130 respondents were selected out of which 90 respondents were youth and 40 respondents were elders including government officials, member of NGOs, academicians residing in Dzongu.

Figure: 4.1: Gender of Respondents (in%)



Source: Fieldwork¹

The above figure posits gender background of the respondents selected for the study. Out of 130 samples chosen from Lepcha Community of Dzongu respondents are divided into two categories which are Youth and elders. Respondents are further categorised as male and female. In the category of youth, 37.69% of the total youth selected are female and 31.53% male. Respondents belonging to category of adult

¹The fieldwork of the study is conducted from 30th June to 28th July, 2022.

group comprised of 11.53% females and 19.25% males. In the category of youth male participants were lesser as compared to the female participants and in the section of elderly people more participants were from male category as compared to female members.

Table: 4.1 Age group of Youth Respondents

Age groups	Number of Respondents	Percentage
15-20	23	25.55%
21-30	60	66.66%
31-40	7	7.79%
Total	90	100

Source: Fieldwork

The above table depicts those 90 respondents were selected from the youth category of Dzongu. Accordingly, youth people belonged to the age groups 15 to 40. Majority of the youth respondents are from age group 21-30 accounting for 66.66% of the total youth respondents. The above table further presents that youths belonging to the age groups 15-20 represented 25.55% of the total youth respondents while remaining 7.79% are from 31-40 years. Total 90 youth respondents comprised of both male and female participants.

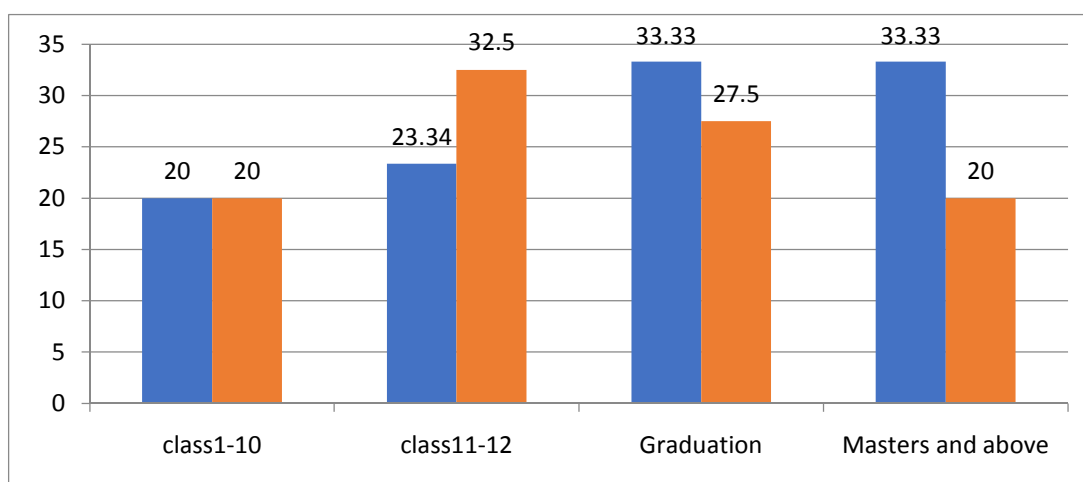
Table: 4.2 Age Profile of Elderly respondents

Age group	Number of respondents	Percentage
41-50	29	72.50%
51-60	7	17.50%
61-70	4	10%
Total	40	100%

Source: Fieldwork

According to the table the total number of participations from elderly group belonging to age group 41-70 were chosen from the population. Most of the respondents are aged 41-50 years, representing 72.50% of the total elder respondents. Few participants from age group 51-70, who are likely to acquire indigenous knowledge, are identified for the study.

Figure: 4.2 Education qualification of Youth and Elder Respondents (in%)



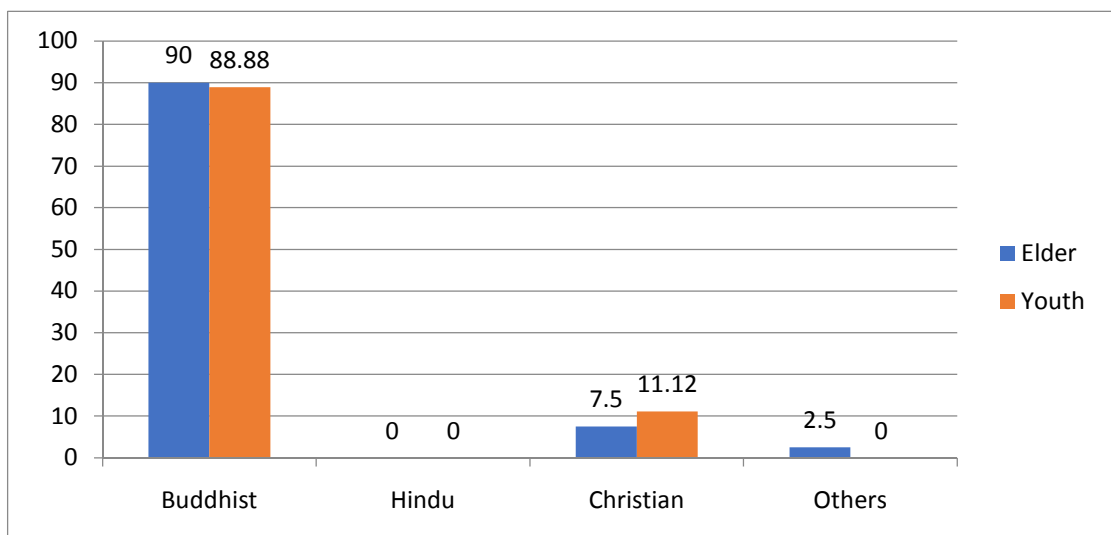
Note: Blue indicate the education qualification of youth and orange indicate the education qualification of elder.

Source: Fieldwork

As shown by the figure graduation and master and above is more extensive among youth of Lepcha community in Dzongu, accounting for 66.66% of total respondents, following by 11-12, which account 23.34% of the total respondent. Only a handful of people have attended schools below plus two level representing 10% of the youth respondents. The data produced shows that younger generation of Lepcha in Dzongu have access to graduation and MA, majority of the youth population have continued their studies after graduation.

According to the figure above 11-12 is more extensive among elder of Lepcha in Dzongu, accounting for 32.50% of total respondent, followed by graduation, which account 27.50% of the total respondents. 1-10 and MA and above are held by 20% and 20% respectively, of the respondent. The data retrieved reveals that majority of elder groups of Lepcha community in Dzongu have accessed education up to plus two levels.

Figure: 4.3 Religious Background of Elder and Youth Respondents (in%)



Source: Fieldwork

According to figure Buddhist is a dominant religious group both among youths as well as elder in Dzongu, accounting for 88.88% and 90% respectively. Out of the total

respondents considered for the study Buddhist group are followed by Christian people accounting for 11.12% from the group of youth and 3 out of 40 respondents from the group of elder. As per the response retrieved from the samples, only one person belonged to the Hindu community in the category of elderly and there are no Hindu respondents from the category of youth. As the place is dominated by Buddhist people it is likely that the practice of indigenous knowledge be influenced by the beliefs of religion to some or large extent.

4.3 Indigenous Knowledge

Since the beginning of time, indigenous wisdom has been used frequently in the Dzongu region. One such area where traditional knowledge has been enormously directly projected is the field of medicine. Approximately 60% of the world's population still relies on conventional medicine for their basic healthcare. WHO (2003) defines traditional medicine as “health practises, approaches, knowledge, and beliefs that use plants, animals, mineral-based medicines, spiritual therapies, manual techniques, and exercise, either alone or in combination, to treat, diagnose, and prevent illness and maintain well-being”.

The Lepcha health management system has two parts:

- (a) Propitiation of spirits, good or bad, responsible for causing diseases and
- (b) Use of ethno-medicines prescribed by *Mun* and *Bongthing*.

The abundance of medicinal plants that the Lepchas' natural resources in the forest provide has allowed them to properly preserve their own health and fitness. According to Lepcha tradition, *Pundim Chu* is the origin of all herbal treatments, and *Tamsangthin*, the fictitious Lord of the Lepchas, instructed *Mun* and *Bongthing* on how to use medical herbs. The ability to observe and analyse natural occurrences,

such as the behaviour of birds, insects, animals, plants, shrubs, and other living things, is also being passed along with this information. The usage of local medicinal plants by Lepchas ensures the continuation of the species' traditional knowledge and, to a certain extent, aids in identifying their habitat, which is limited to small pockets of the most difficult mountainous terrain. Dzongu region is home to numerous medicinal plants and practises that are tied to traditional medicine and have significant pharmacological potential.

In addition to ceremonial care, Dzongu people rely on a herbal-based health care system. Access to medicinal herbs is widespread. The locals are proficient at treating common illnesses with their great knowledge of how to employ plants or parts of plants. Here are some of the names of the natives' favourite medicinal plants. Name of Plants and their usage found in Dzongu.

Table: 4.3 Plants name and its Usage

Plant Name	Usage
Mei-hroom-rik	Juice of the plants is used to cure sores in the mouth and tongue of small babies.
Tuk-rik-Koong	Flowers and leaves of the plant are used as vermifuge tonic.
Ka-chuk-Koong	Bark and root is used to treat ulcer, bleeding, piles and dysentery.
Sa-naomg-kong	Bark is used for relief from diarrhoea
Re-be-rip	Rhizome and leaf paste is applied as remedies to eye ailments and contract.
Kaon-ke-Kong	Pounded bark is used in healing fractures.
Al-etok-Koond	Petals are used for curing dysentery and diarrhoea.

Source: fieldwork

The practice of indigenous knowledge is common among elder people as well as the youth of Dzongu. The figure below reveals that out of 90 youth respondents 84% of youth are aware about the indigenous knowledge system of the community. According to the report collected from the field, 82% of the respondents have inherited this form of knowledge from their family members or elders within the community. Therefore, the elderly people have not failed to impart the education of indigenous knowledge to their next generation. Also, the extinction of traditional knowledge on ethnomedicinal plants in the Dzongu is not a worrisome area.

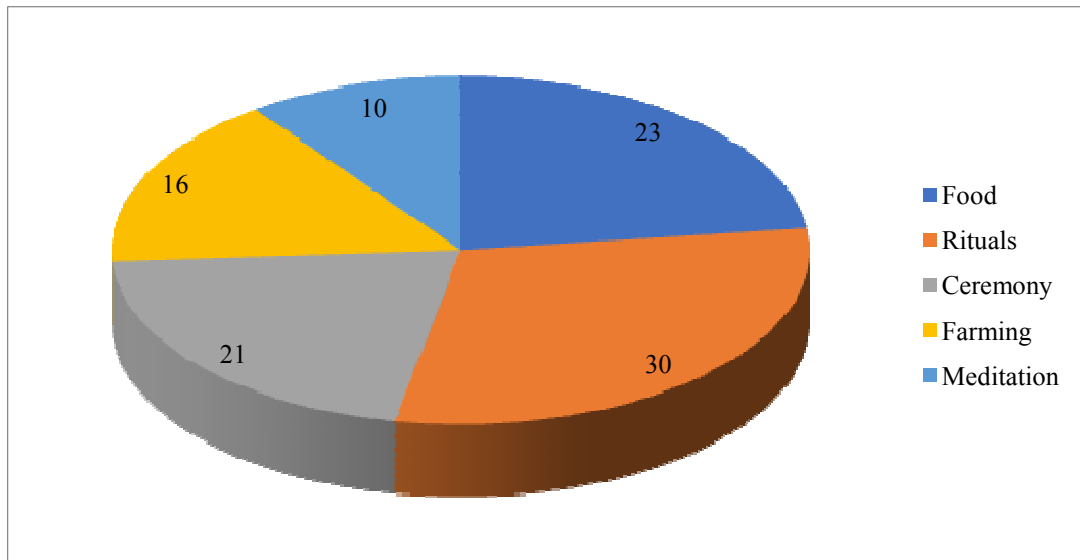
Figure: 4.4 Awareness on Indigenous Knowledge among Youths (in%)



Source: Fieldwork

People have also put an effort to sustain their inherited knowledge by inculcating in their daily lives in forms of food habits, rituals, ceremony, farming, meditation.

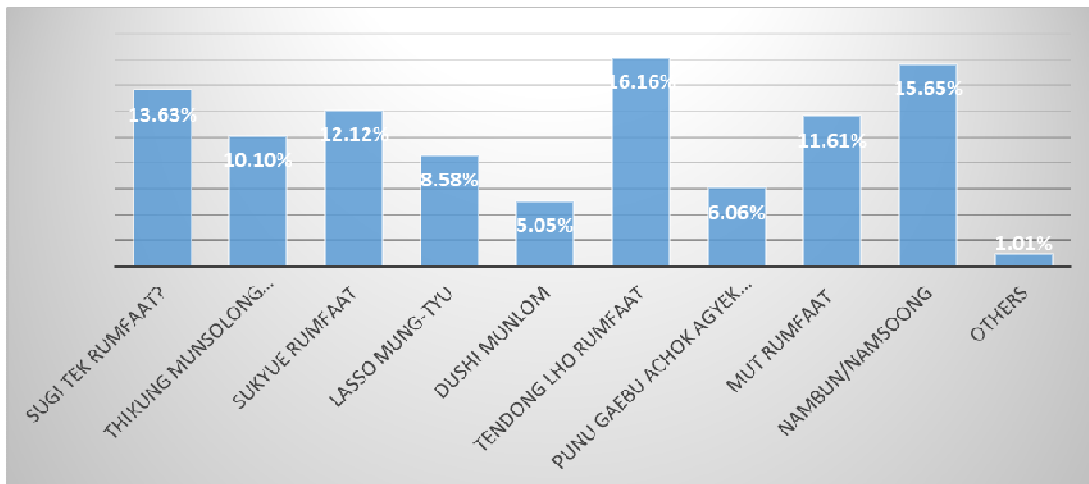
Figure 4.5 Practice of Indigenous knowledge in Daily Lives (in%)



Source: Fieldwork

The above figure indicates that people of Dzongu follow different ways of implementing indigenous knowledge in their everyday lives. As per the response collected from the field indigenous knowledge is practiced mostly in the rituals that are carried out by the locals of Dzongu. 30% of the total respondents practice indigenous knowledge during Sugi Tek Rumfaat, Thikung Mun Solong Suknyim, Sukyue Rumfaat, Lasso Mung-tyu, Dushi Munlom Tendong Lho Rumfaat, Punu Gaebu Achok Agyek Suknyim, Mut Rumfaat and Nambun.

Figure: 4.6 Rituals practiced in Dzongu Village



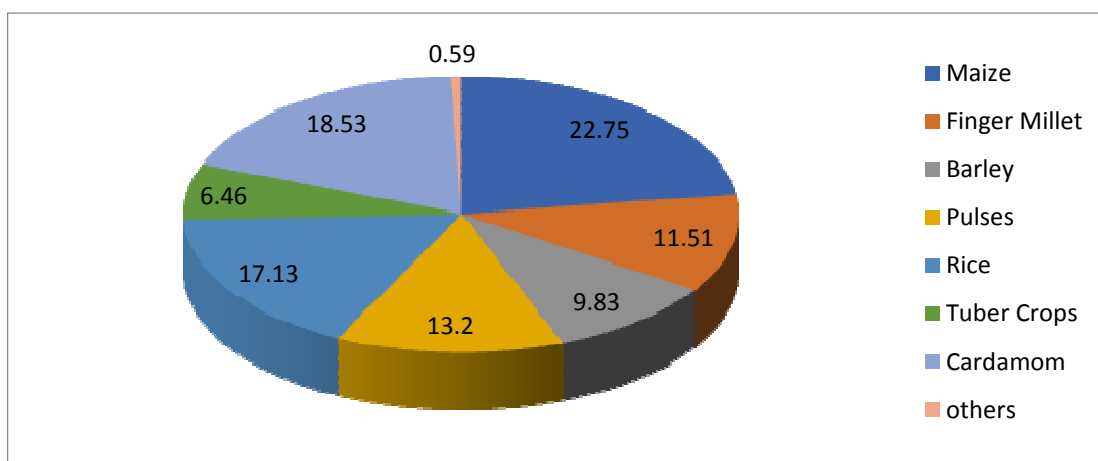
Source: Fieldwork

Tendong Lho Rumfaat and Nmbuun, accounting for 16.16% and 15.65% respectively are the rituals that are practiced in the community by a major chunk of Lepcha people. Lee Rumfaat and Namaal Sa Rumfaat are some of the family rituals practiced by many of the population accounting for 28.68% and 25.58% respectively. All these rituals are led by Mun, Bongthing (Lepcha shaman) and head of the family.

In Dzongu, Lepcha community practice their IK in preparation of foods in their day-to-day life. 23% of the total youth respondents make use of indigenous knowledge on the preparation of food. The types of food that they eat are aayur-nu, nhu-nu (Boiled), ahu-nu (Fried), faat-nu (Burned), tho ka aarhyumnhuthom-nu, serthomaajom (Fermented) and lhaap-nu. Where maximum people prefer Nhu-nu, Ahu-nu, Faat-nu and Serthomaajom. Elder people of Dzongu are of the opinion that in their childhood days they did not use any species while cooking, they just use onion and tomato if available, otherwise they cooked food using oil or animals' fat and tasted better and healthier compared to now. Very a smaller number of people

accounting 10% of the total youth population is into practices like meditation in Dzongu as major chunk of people are indulged into farming practices in the region.

Figure: 4.7 Type of Crops cultivated in Dzongu Village



Source: Fieldwork

People in Dzongu practice Aamuek (Mixed farming), Tungel (Pre farming technique for farming digging hole by the stick t plant grain) and See Aapo (Shifting cultivation farming), and maximum people are into practicing Tungel and Aamuek in producing crops like maize, finger millet, barley, pulses, rice, tuber crops and cardamon. Most of the people of Dzongu cultivate maize (22.75%), cardamon (18.53%) and rice (17.13%). Very meagre amount of people depends on agriculture for their source of income. They cultivate seasonal crops and vegetables and supply it in the market where they get good prices. One of the respondents stated:

“When we farm crops, we do not make use of any kind of fertilizers and pesticides, we rather use cow dung as it is rich in nutrients and is suitable for crops. We also use cow urine which is also a good liquid fertilizer and can be used directly used as spray on the crops. Use of fertilizer and pesticides in agriculture is good for our health and also” (Respondent).

But the elder people of Dzongu revealed that the younger generations are not interested in farming practices. Apparently, many lands are now left barren and this indigenous knowledge of farming is slowly disappearing.

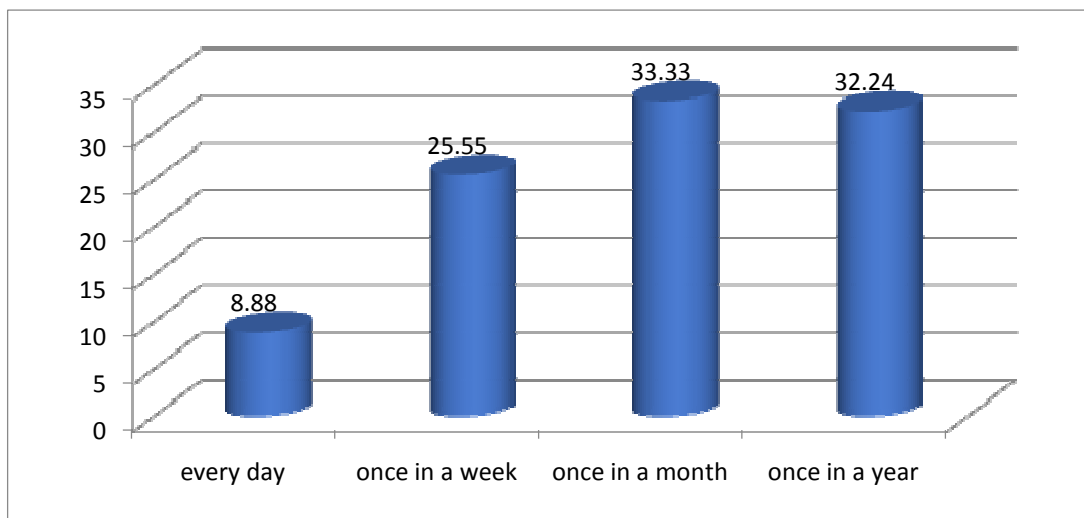
A good and efficient health care system is crucial for improving human health, and the Dzongu people's health is no different. Various community health healers use medical and spiritual healing techniques to improve people's health. Some of the medicinal practices followed by Dzongu people are Pugoreep (Oroxylum flower), Thambongsa-aalopngsa Zurthap, Heeng (Ginger), Tungnel (Fern) and Beela Kongsaaape anu aalop (Guava leaves). Most of the people use Heeng (Ginger) 36.01%, Pugoreep (Oroxylum) 27.01% and Tungnel (Fern) 19.90% these are some of the plants used by maximum number of people in Dzongu. Respondents are of the opinion that the use of these medicinal plants is beneficial to their community and are mostly found in forest and field and elder people have knowledge about more than 100 medicinal plants are found in Dzongu area and these medicinal plants mostly used for meditation, food and selling, according to information. On the other hand, majority of the youths of Dzongu claimed that they are aware of the medicinal plants in their vicinity along with its usage despite being compelled to move out of the region for higher studies and jobs. However, when enquired about their knowledge on the variety of medicinal plants that they are aware of, most of the respondents accounting for 66% have knowledge about only up to 20 medicinal plants found in the area. When enquired about all the medicinal practices that they are aware of, one of the respondents replied:

“We learn all this knowledge from our parents. Earlier, parents and elder of the community taught us all these knowledges in their leisure meet. Elders from our family and community shared their ideas and knowledge to younger generation and

they also took interest in learning about it but because of this modernization that is taking place, it creates relation gap between elders and the younger of the community. We sit together only in some occasions but and the present generation does not show interest in learning and listening to the ideas and knowledge from elder people”.

4.4: Issues Faced by Indigenous Knowledge System

Figure: 4.8 Reliance on Indigenous Medicinal Practice in Life

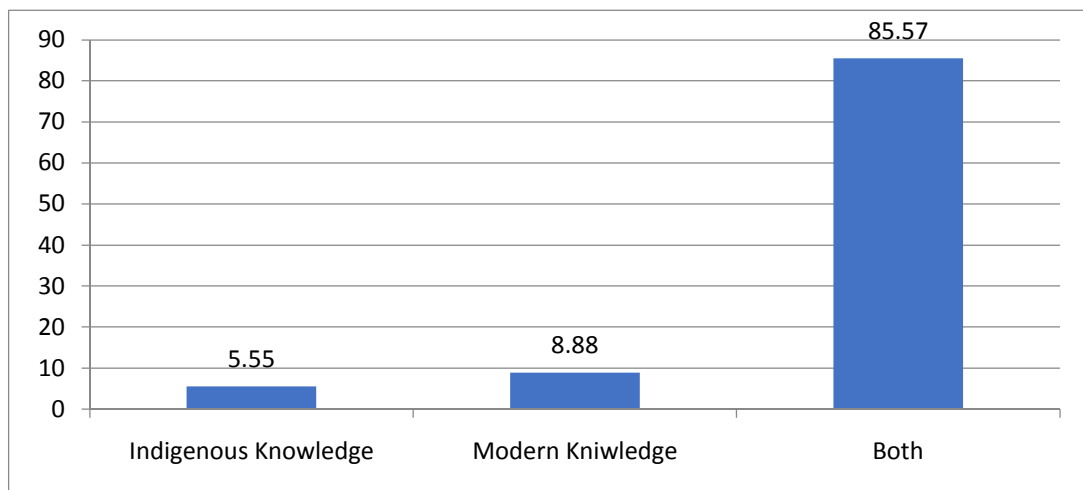


Source: Fieldwork

The residents of Dzongu do not have heavy dependency on indigenous medical plants. Despite the fact that respondents preserve local medicinal plants but 32.24% of the respondents make use of indigenous medicinal practices once in a year. Further only 8.88% of respondents practice indigenous medicine on a regular basis. Most of the people who regularly make use of indigenous medicinal practice are from the elderly category as most of the youth prefer accessing allopathic medical help in times of need due to its efficacy and consumes less time though they do believe in indigenous medicinal practices. From the data retrieved from the field it has been analysed that people accounting 85.57% do believe in both form of knowledge but in

comparison between two forms of knowledge system, people find more reliability on hospital and other health institutions i.e., modern knowledge than their own practice of indigenous knowledge due to its efficacy in shorter span of time. However, people use these plants in cooking food and during the time of performing rituals.

Figure: 4.9 Reliability on Indigenous and Modern Knowledge System



Source: Fieldwork

The perception of youth on preference over kind of knowledge systems can be reflected in one of the responses which states:

“We do not depend only on Indigenous knowledge because sometime this Knowledge system fails to work in medical purpose, so, we seek for modern knowledge for that. So we depend on both Knowledge systems. Indigenous knowledge system provides us with data and modern knowledge system will help us in preserving them. Indigenous knowledge is important and we learn this special knowledge from our grandparents, parents, teachers, and Bongthing. In contrast, modern knowledge teaches us how to advance modern practises. From indigenous knowledge systems, we can know the source and use it in better ways. It is an imperative to preserve this knowledge system

in written documentation for next generation to follow it and pass it down to their younger generation”.

According to the youth respondents, this knowledge system is slowly vanishing and the reasons behind it are as follows:

- influence of modern culture and practices
- indigenous people have been influenced by other cast/religious
- availability of very limited number of written texts about it
- increased influence of modern life style
- people’s ignorance on indigenous knowledge
- perceiving indigenous knowledge as a superstitious practice and ignore it
- people are getting influenced by modern technologies and find those technologies very easy to practice but the indigenous system is consuming time.

In the view of elder respondents, indigenous knowledge system is on the verge of extinction driven by many factors such as lack of interest and knowledge as there are numerous pharmaceutical companies within the state itself. People stop practicing this knowledge system due to convenience in access and efficacy of allopathic medicinal practice. Another factor is as the modern knowledge system has taken over the world children and youth have to go to attend schools and colleges when traditional practices activities are taking place in the community thus, they are unable to imbibe these rich cultural traditional practices due to their participation in compulsory education. Younger generation are not interested to learn and most of the people do not rely on medicinal plants and people are more comfortable with new technologies rather than indigenous knowledge system.

4.5 Policies and Programmes

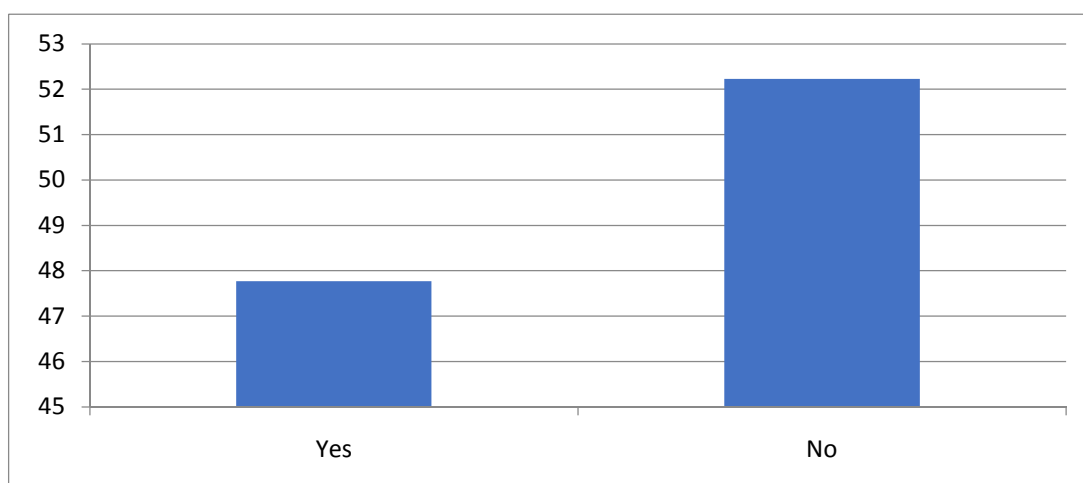
Dzongu is listed as one of Sikkim's protected areas in writing and in practice. The Royal Proclamation of August 30, 1956, which designates the entire Dzongu area as a special reserve, is one such significant law that is still in effect and is protected by Article 371f of the Indian Constitution for the indigenous people of Sikkim. Since 1960 Sikkim was a monarchy ruled by Chogyal Palden Thondup Namgyal. Accordingly, Dzongu is declared as a particular reserve for the Lepcha population (the state's indigenous residents). The few remaining examples of Lepcha identity may only be found in Dzongu, such as traditional homes and bamboo bridges ("made from long sections of split bamboo, a ingenious feat of grass root engineering"), The *Bongthing* (the Lepcha shaman) and the *Mun* (the female counterpart of the same) are revered monasteries, trees, lakes, hot springs, forests, caves, hills, mountains, and rivers that are regularly worshipped and appeased through elaborate ceremonies as they serve as bridges between the natural and supernatural worlds. People who reside in Dzongu feel that this special protection is facilitating in preserving the indigenous knowledge systems of Dzongu. Further according to Article 24(1) of UNDRIP (2007) "indigenous peoples have the right to their traditional medicines and to maintain their health practices, including the conservation of their vital medicinal plants, animals and minerals. Indigenous individuals also have the right to access, without any discrimination, to all social and health services". One of the respondents stated:

"Due to the protective measures in place, it is illegal for strangers to enter Dzongu at will even Sikkimese citizens must obtain a pass from the Sankalang checkpoint, and when they leave, their bags and belongings are checked. This prevents anyone from stealing anything from Dzongu. In the past, it was simple for anyone to enter Dzongu and visit various locations without needing a pass, but then the biopsy problem

occurred. Many outsiders arrived in Dzongu and spent various years living there with the locals, learning many IK that they now put into effect in their daily lives in the areas of MP, food’.

Additionally, The Convention on Biological Diversity is the first treaty to recognise the importance of indigenous and local populations in the preservation and sustainable use of biodiversity. The Convention establishes general requirements for the preservation, sustainable use, information sharing. The Biological Diversity Act of 2002 also looks into the rights of the indigenous community of Sikkim. This act provides fair and equitable sharing of the benefits of Traditional Knowledge and constitution of the state board from experts in the sustainable use of biological resources and biological diversity. Huge mass of people of Dzongu are unaware of the constitutional provisions related to indigenous knowledge. According to the response data only 47.77% of respondents have knowledge about this and 52.23% of respondents do not have information about any constitutional provision related to indigenous knowledge and its protection but most of the people know that Dzongu is one of the protected areas in Sikkim and people from outside Sikkim cannot enter without taking permit. Some of the constitutional provision they know about is Article 371F, special provision with respect to the state of Sikkim.

Figure 4.10 Awareness level on Constitutional Provisions



Source: Fieldwork

Further the Dzongu area of the North District, which is inhabited primarily by the Lepcha, is a proscribed area to safeguard the there. Land Rights of Indigenous People in India: The rights granted to tribals under the Forest Rights Act (2006) aim to ensure that indigenous people in India have individual and collective ownership over landholding, exploitation, and occupation in forests. These rights have been granted to Scheduled Tribes and other traditional forest dwellers who have lived on these lands for many generations but were not previously vested with them. Sui Generis Law, the Biological Diversity Act of 2002, to Combat Biopiracy: The legislation, which was passed in 2002, intends to protect biological resources, manage their sustainable use, and provide a fair and proportionate sharing of benefits resulting from the use and understanding of biological resources with local people. Accordingly, it is also applicable to the community of Dzongu.

There is handful of NGOs like Renjyoung Mutunchi Rong Tazum, Renjyoung Mutunchi Rong Sazum, Sikkim Lepcha Youth Association, Sikkim Indigenous Lepcha Tribal Association, Sikkim Lepcha Literacy Organisation etc., working in Sikkim with an aim to protect or preserve indigenous knowledge in Sikkim. Some of

the NGOs that particularly work in Dzongu are Mutunchi Nam Aaal Shazum, Dzongu welfare Association.

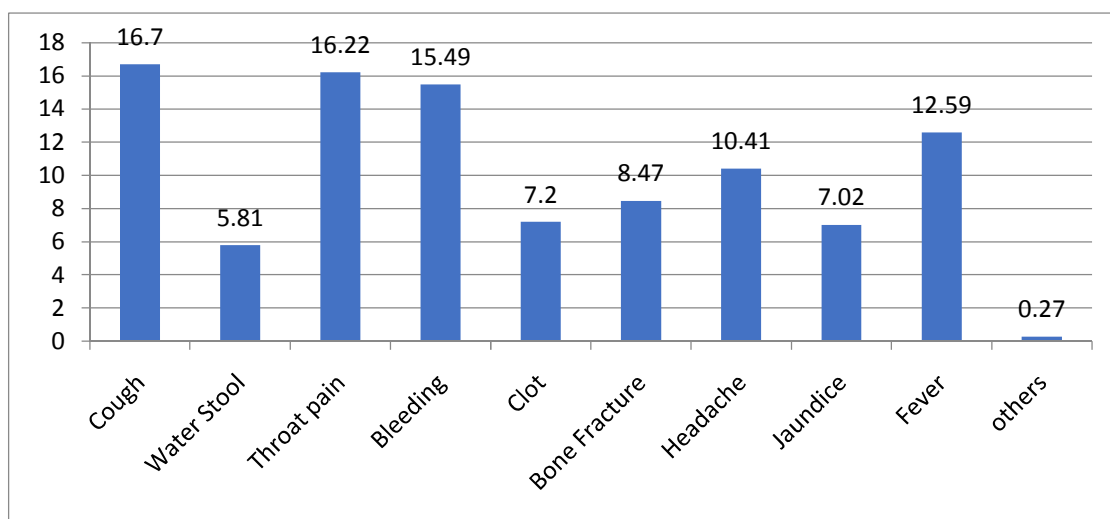
RMRT, they celebrate rituals like Punu-Mun Solong Saknon Saknim celebrating an age-old tradition of offering rituals of Famrong Ney (live before disappearance and sacred place). State level celebrating of Tendong Lho Rum Faat, which is one of the most important festivals of Lepcha people celebrated on 8th of August. They are of the belief that their ancestors went to the top of Tendong Mountain to escape from 40 days and 40 nights of continuous rain. And Nimprikdang Namsoong Festival, cultural fest of Sikkim is celebrated every year at the confluence of river Teesta and Tholung Chu (Tholung Mountain) in upper Dzongu region of North Sikkim. This festival marks the new year of the Lepcha Tribes and presents a magnificent visual treat of folk dance, traditional games and exotic Sikkimese (Lepcha) cuisine. In this festivals and rituals RMRT involve most of the Lepcha youth in these programmes with an aim to hold interest of younger generations in their culture and traditions.

4.6 Ethnomedicinal Plants

Ethnomedicine is a study or comparison of the traditional medicine based on bioactive compounds in plants and animals and practiced by various ethnic groups, especially those with little access to western medicines, example, Indigenous people. Ethnobotany and ethnomedicine are as old as man's history. The Lepchas of the Dzongu valley, who are solitary forest dwellers who have coexisted peacefully with nature for millennia, have amassed a wealth of knowledge regarding the use patterns of many local wild goods. They are considered to be excellent traditional ethnobotanical practitioners. Lepchas have developed a vast expertise of the usage of plants that has been passed down to them via the use of traditional medical treatments for a

variety of problems. Some of the illness that is cured by ethnomedicinal plants available in the Dzongu are depicted in the figure below.

Figure: 4.11 Medicinal Plants and its usage



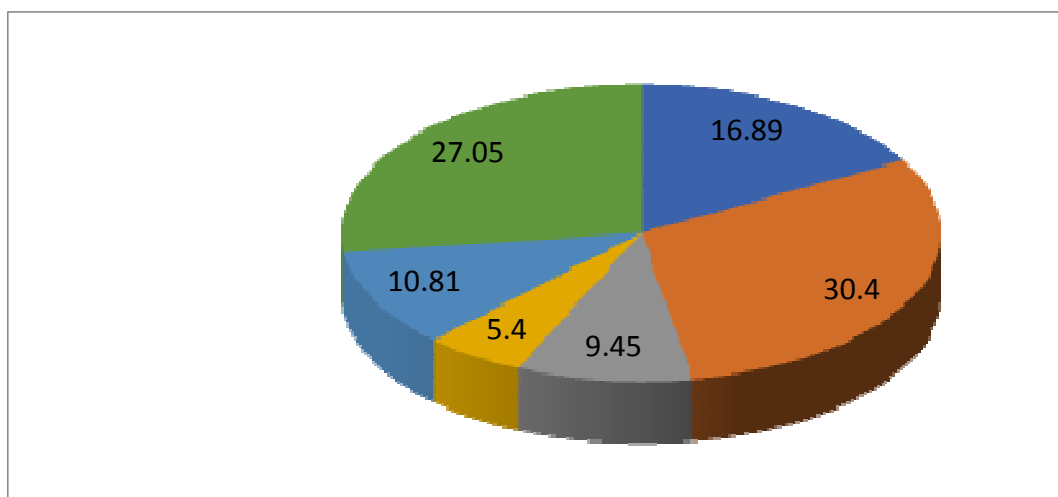
Source: Fieldwork

According to figure, people mostly use of available medicinal plants Pugoreep (*Oxylum indicum*), Aoo Tsong (*Allium Sativum*), Ausoodaong (*Mentha arvensis Linn*), Kacha Koong (*Citrus gaurantifolin Christum*), Kacher (*Hordeum vulgare Linn*), Kaong hi Koong (*Semicarpus anacardium Linn*), Gok rip (*Mincheliachampaca Linn*), Dorbihyur (red fungus), Potur Zi (Bamboo fungus), Tool Koong (*Gynocardiaodarata*), Kuntekrik (*Stephania hernandifolia Walp*), Kuntim Poat (*Piper longum Linn*), Gey boo khanaok (*Dichroafebrifunga Low*), Bisupoat (*Citrus medica Linn*), Heng (*Zinziber officinale rose*), Vyumrik (*Rubia cordifolia Linn*), Soo gook koong (*Ficus cunia Ham*), Barong poat (*Phyllanthus embica Linn*) to cure cough (16.7%), throat pain (16.22), bleeding (15.49), fever (12.59), headaches (10.41), jaundice (7.02), bone fracture(8.47), water stool (5.81).

These plants are widely used by the people as it works as first aid, is found easily when needed with no cost and no side effect. They don't have to visit hospital for treatment, like bleeding, bone fracture, headaches, throat pain etc.

Majority of the aged people from Dzongu have not taken used any medicine other than herbs their entire life. They are rather dependent on their own indigenous medicinal practices and use various parts of medicinal plants in curing ailment. They believe that the medicines produced by Pharmaceutical Companies have side effect on their bodies. In the field of veterinary, they have their own medicinal practice. People make use of their indigenous medical knowledge in treating any kind of disease, injuries in farms and domestic animals. In case of serious and severe injuries and disease veterinary doctor comes handy.

Figure: 4.12 Parts of the Plants Use to Cure Disease



Source: Fieldwork

According to figure, maximum people of Dzongu use all the parts of plants, like: root (16.89%), leaf (30.40%), flower (9.45%), fruit (5.40%) and stem (10.81%) to cure illness and mostly they use these parts of the plants as first aid for example (Aetok Koong) *Rhododendron arboretum*, Flower and Petals-either fresh or dried flower

petals are effectively used in dysentery and diarrhoea. There is a belief among the Lepchas that if the bone of fish get stuck in the throat while eating fish, one has to say the name of this flower and it goes down in the intestine automatically, and it does.

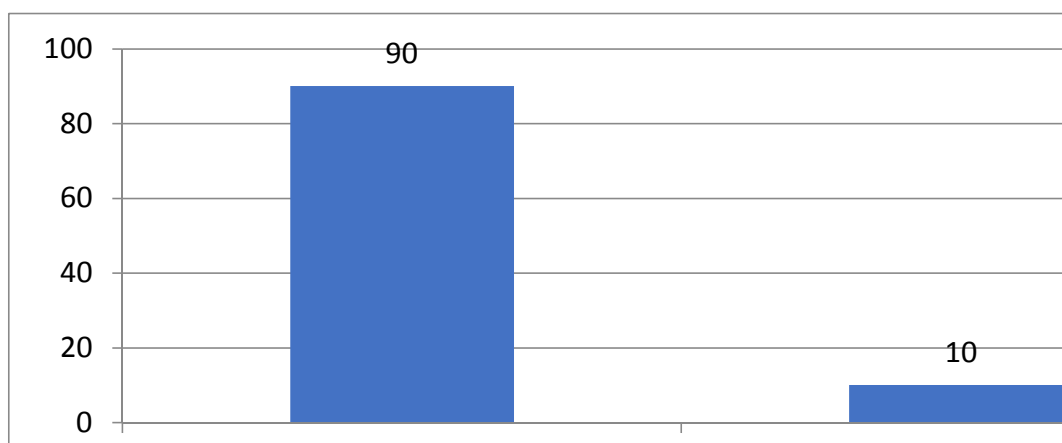
(Ausoodaong) *Mentha arvensis* Linn: leaves and young shoots are used as a remedy for headaches and for cholera. It is carminative, stimulant and digestive. (Aa Aook Mook) *Mimosa pudica* Linn: leaves and roots- used for piles. Leaves are pounded into paste and applied. (Kachik Koong) *Bauhinia variegata* Linn: Barks, Leaves, Flowers buds and Flowers- the bark is useful in ulcers, inflammation of the joint, skin diseases and diarrhoea. Dried flower buds are used for diarrhoea, dysentery and bleeding piles. The fresh flowers are used as mild laxatives. The young shoots are eaten as vegetables which restores healthy condition of the organs. (Kazoo) *Urtica parviflora* Linn: Roots, Leaves and Flowers- Roots are used as medicines for fractures and dislocation. Smashed and drunk, it helps in delivering babies. After pounding the roots, the juice is taken for the cure of gonorrhoea. Young leaves and flowers are cooked and eaten as vegetables. It helps as a tonic and clearing agent after childbirth. (Kaong Chey) *Ananas Comosus* Mar: the juice of the leaves destroys and expels intestinal worms of the children. The ripe fruit causes abortion. The juice of the fruit helps to cure swollen and bleeding gums and aids digestion. (Gey boo Khanaok) *Dichroafebrifuga* Low: Root and Leaves- the root is emetic and febrifuge. The decoction of root is taken in fevers. It gives good result in the treatment of malaria and other fevers without any after effect. (Taryaa bi) *Luffa acutangular* Roxb: Seeds- used as purgative. The juice of leaves is dropped into the eyes in granular conjunctivitis. (Tumbarrik) *Mussaenda frondose* Linn: the flowers are used in cough; asthma and the juice of the roots is used as a remedy for jaundice. Applied externally for the cure of skin eruptions, ulcers etc. (Tuknyil) *Artemisia vulgaris* Linn: whole plants and leaves re rubbed externally in

skin diseases and ulcers. In nose bleeding, it is rubbed and used to block the nostrils, it stops bleeding. It is boiled in water and used as a fermentation in gout and rheumatism. The young shoots are boiled and eaten, it increases appetite and promotes digestion. The whole plants are burnt over the fire and the smoke drives out mosquitoes and other insects. The floors are rubbed and cleaned with it. It drives away insects as fleas etc., it is used in cleaning or purifying ceremonies also. It is very effective in curing malaria and ordinary fever.

4.7 Scope of Ethnomedicinal Plants in Contemporary Society

Indigenous knowledge has proved to a problem-solving approach for the local communities. Ethno-botany plays a huge role in economy of Sikkim and is also considered as one of the zones with abundant resource availability. Plants like *Nakhima*, *Yashagumba*, parts of plants like *gol patta* are sold in the market and fetch good income for the indigenous people selling them. Plants like *Gheu Kumari* is used for cosmetic purpose and are in demand for purchase. Moreover, plants with high potential of curing medical problems are purchased by pharmaceutical companies. 90% of the respondents do believe on the economic value of ethnomedicinal plants available in their area.

Figure: 4.13 Economic Value of Ethnomedicinal Plants



Source: Fieldwork

In “Medicinal Plants of Sikkim in Ayurvedic Practice” Panda (2010) mentions that there are about 420 plants used by the tribal people for various diseases, out of which thirty medicinal plants have medicinal value and such a used drug in Ayurvedic Rasayana and Tridoshagna.

Most of the respondents from Dzongu has acquired this knowledge on scope of ethno-medicinal plants through Oral Stories (32.35%), Rituals (26.96%), Written Stories (23.03%), Traditional Songs (15.68%) and Others (1.98%) The elder of their community share the stories of the legend of their tribes, and how they came to know all about the ways of making food, medicinal plants and how all these rituals are practiced.

Conclusion

The youth of Dzongu are aware about their indigenous knowledge system that has been followed by their ancestors since time immemorial. They claim that they have inherited it from their elderly in their families and communities. Youth as well as the elderly people of Dzongu implement their skills in their day to day lives in form of food such as *Nhu-Nu*, *Ahu-Nu*, *Faat-Nu*. Rituals, ceremonies, farming, medication etc. are also some of the aspects that incorporate indigenous knowledge in Dzongu. Lepchas practice numerous rituals in their homes as well as their societies where they inculcate the indigenous knowledge that they gain. These rituals are led by their religious leaders known as *Mun*, *Pandem* and *Bongthing*.

The Lepcha people of Dzongu are known for living harmoniously with the nature since many decades. Accordingly, they have acquired huge knowledge on medicinal plants through experience and daily life experiments. Therefore, the entire community is considered as great practitioners of ethno-medicines. Ethno-medicinal plants hold huge position lives of the people of Dzongu. However Indigenous knowledge on Ethnomedicinal plants seems to be fading away and one of the major reasons behind is unavailability of written documentation on indigenous knowledge practices. According to information of field work there are more than 100 medicinal plants are found in the village of Dzongu. Some of the names are: Pugoreep (*Oxyium indicum*), Aoo Tsong (*Allium Sativum*), A Usoodaong (*Mentha arvensis Linn*), Kacha Koong (*Citrus gaurantifolin Christum*), Kacher (*Hordeum Vulgare Linn*) etc. where they use this MP in different ways to cure injure and disease and the parts, they used of MP are like leaf, flower, flower buds, fruits, stem, roots etc. However, the younger generation are aware of only up to 20 medicinal plants. Among the many plant species holding medicinal purpose in the area some of it have huge economic value in the market and

the pharmaceutical companies but very few people sell them. Their interest in preservation of the available medicinal plants for their own use is one of the reasons for their denial on selling the ethno-medicinal plants. On the other some handful of people who are interested in selling them have no idea on the process of selling it. While some of the respondent claims to have sold the medicinal plants to market as well as pharmaceutical companies and is a source of income for their families.

There is no doubt that Dzongu is a home to many species of medicinal plants and indigenous knowledge has been prevailing in the valley even in the contemporary era but many people lack awareness on the policies and programmes prescribed for indigenous knowledge at international, national level. However, people are aware about their land rights and its protection through various Acts. Apparently, these Acts on land rights have directly or indirectly facilitated in preserving the indigenous knowledge system among the Lepcha Community of Dzongu. Furthermore, multiple NGOs are playing active role in protecting and preserving Indigenous knowledge in Sikkim in general and handful of NGOs are working specially in the Dzongu valley and local people actively participate in the programmes carried out by NGOs.

It is disheartening that the younger generation feel that the indigenous knowledge is slowly vanishing because of multiple factors such as lack of practice, advancement in technology, introduction of modern education system. In the view of elderly people of Dzongu lack of awareness, communication gap, lack of interest of younger generation in these practices, influence of modern education the younger generation forget their own knowledge system, time consuming practice, scientific development is some of the challenges that they face in imparting indigenous knowledge system to their younger generation.

Since the Lepchas of Dzongu are renowned for their ability to preserve a rich cultural heritage, and particularly in light of the ongoing cultural and economic changes caused by the process of globalisation, it was felt that there was an urgent need to document in detail the understudied ethno-medical practises of the Lepchas of the Dzongu valley.

CHAPTER V

Conclusion

In the present context, knowledge is one of the most essential parts of human life. Knowledge is an abstract concept without any reference to the tangible world. Knowledge plays an important role in human life. With the help of knowledge, we can understand who we are and our history.

Knowledge systems are defined as an organized structure and dynamic process of producing and representing context, components, classes, or types of knowledge that are domain-specific or characterized by domain-relevant features as defined by the user or consumer, reinforced by a set of logical relationships that connect the context of knowledge to its value, enhanced by a set of iterative processes that enable the evolution, revision, adaptation, and advances, and subject to change.

Indigenous knowledge system also known as ethnoscience was believed to serve as the cornerstone for local communities' decision-making about regional issues since the inception of the concept. Indigenous knowledge system stands apart due to its locale, which is based on a particular culture and topography. Indigenous knowledge system has a strong oral tradition, with most knowledge being transmitted orally, through imitation, and through practical application. This knowledge system is developed by constant interaction and trial-and-error to ascertain what best satisfies the demands of a particular community. Indigenous knowledge system is rooted in communities at the local level; this knowledge offers crucial socio-cultural capital that is necessary for communities to not only survive but also to advance and develop within the constraints of that community's geography, environment, culture, and economy.

Numerous indigenous people claimed that education is crucial for helping them to understand their identities, origins, and distinctive characteristics. Learning or obtaining knowledge, skill, moral values, beliefs, habits, and personal development is made easier through education. Initially, education was used to transmit cultural heritage to future generations. The discovery of the passionate sense of self that propels Indigenous people ahead in life can then be facilitated by education. Indigenous education also focuses on developing a feeling of one's own varied nature, which is crucial for mending inner and outward division and respecting one's fellow human beings.

Indigenous knowledge, which can be summed up as the information and abilities that people in a particular geographic area possess and that allow them to make the most of their environment, plays a significant role in society and is a topic of increasing national and worldwide discussion. The debate and discussion have also helped the concept of indigenous knowledge develop and adapt to the demands of the locals and their conditions. The discussion surrounding indigenous knowledge has highlighted a variety of issues and concerns. There has been a lot of discussion on the topic because several academics have stated opposing viewpoints on knowing. The knowledge paradigm on indigenous knowledge faced various challenges during the course of its evolution, some academics argue that this knowledge was obtained using scientific procedures, but others argue that knowledge is acquired through personal experiences and scientific methods and the constant technical development of the modern period. It is generally understood to be local or traditional knowledge that indigenous people have passed down orally from earlier times, though definitions vary depending on where it is used. All information pertaining to a particular group of people, their region, and their method of passing on knowledge from one generation to the next is

included in this knowledge. indigenous knowledge includes all kinds of learning activities that people do on a regular basis, which is a proven fact that indigenous knowledge is active.

The various alternatives or informal knowledge of indigenous knowledge forms include ethnomusicology, indigenous science, indigenous physics, ethnomedicine, ethnobotany, ethnozoology, ethno-psychiatry, and others. Understanding is gathered into a system of knowledge, which we call knowledge. The information and abilities people in a particular geographic location possess that enable them to make the most of their surroundings are collectively referred to as the indigenous education system. This type of education was widespread in Africa before to the coming of western civilisation and was typically referred to as Indigenous Education. The emphasis is on transferring Indigenous Knowledge through official or informal educational systems, including models, methods, and content. Indigenous education within the community offers instruction in the development of the body, character, intellect, social skills, and professions, with its own set of drawbacks.

The problem arises from a focus on binary contradictions between indigenous knowledge systems, which are passed down orally from generation to generation and are locally bound, and western education. Children and youth are required to attend school during times when traditional practises and community activity are also taking place, and as a result, are unable to learn these rich cultural traditional practises due to their participation in compulsory education. In contrast, western education was well-written form, documentation, teaching practises, knowledge transfer, and so on in the context of schooling. As a result, indigenous groups are rapidly losing their adaptive knowledge systems, the transmission of ecological knowledge through

educational procedures, symbols, signals, and social norms, and the cultural internalisation of traditional behaviours.

Indigenous knowledge is primarily retained in people's minds and transmitted orally from generation to generation rather than being recorded in writing. It is susceptible to alteration. There are many factors that contribute to the loss of indigenous knowledge, for instance, development processes, rural/urban migration, and changes in population structure as a result of poverty, epidemics, displacement, or war. Additionally, the threat of advanced technology exists because in remote areas, the power that pushes global or just non-local content such as radio and television broadcasting and advertising, among other things, is present.

English, French, Spanish, and Portuguese are the most commonly used formal languages in the world's education systems, which are dominated by Western education. Indigenous Knowledge is therefore being left behind in such a formal educational system. There aren't enough teachers, resources, and systems available in the field of indigenous education to fully impart the culture to others. Indigenous educational methods are becoming more widely accepted and used as a response to the loss and erosion of indigenous knowledge brought on by colonialism, globalisation, and modernity. The most practical educational system in history is still the western one.

Restoration of culture or traditional knowledge, acknowledgement of self-determined development, protection from further colonization, exploitation, appropriation, and/or commercialization, legitimation or validation of Indigenous practices and worldviews, and condemnation of, or at least warning against, the oppression of nature and general oppression of non-indigenous people are all included under the umbrella concept of

indigenous knowledge. As a result, people today are being pulled away from indigenous knowledge and behaviors despite it is a concept with widespread recognition in the contemporary world. With the development that has been taking place every other day, modern education, has become a progressive education that is connected to or affected by an educational theory that places a focus on the unique needs and abilities of each child as well as curriculum informality. Missionaries from the Christian church introduced this education, which was written down, thoroughly documented, and imparted through a systematic method. For indigenous people, this posed a serious difficulty because, in the lack of writing, individuals relied on their memory to help them retain and pass on all taught concepts to subsequent generations. The main issue with indigenous knowledge and indigenous knowledge systems is how challenging it is to define what it means to be Indigenous in different social, geographic, and cultural situations. Indigenous knowledge is not being utilised as efficiently as intended or assumed, which is causing considerable worry.

On preserving the indigenous knowledge, it has own set of scopes. Indigenous knowledge is frequently viewed as an alternate strategy for fostering development in underdeveloped rural areas worldwide. Indigenous Knowledge skills and traditions can be preserved, protected, and developed through the Practical use of indigenous knowledge. In cultures that are frequently divided and isolated from one another and whose evolution has taken place largely separately, this knowledge system is essential. One feels a sense of cultural belonging because to this schooling. Indigenous knowledge is important because it was produced inside indigenous systems of knowledge based on their own epistemologies and is based on direct contact with their biological environment.

Long-term development can also benefit from this information. Additionally, this indigenous knowledge assists in the discovery of sustainable, locally relevant, and cost-effective long-term mechanisms for poverty reduction. This is achieved through locating inspiring routes to sustainable growth that benefit the environment and nearby populations. Indigenous knowledge has also aided in reviving the agricultural sector, boosting food security, enhancing community health, and fostering a sense of cultural pride. By using conventional food preservation methods, this knowledge helps communities cope with recurring food shortages.

Along the era of paradigm shift in the field of knowledge system, indigenous knowledge could be included into the educational system for a number of reasons. A dynamic training in knowledge-specific contexts capable of creating and maintaining socio-ecological systems is required for the implementation of education in indigenous contexts. The deep culture and knowledge of the indigenous peoples, which have been overlooked, as well as welcoming more Aboriginal students to school and helping them to complete a formal education.

Indigenous knowledge is now understood through local or traditional knowledge that indigenous people have passed down orally. The mature, long-standing traditions and practises of certain regional, indigenous, or local populations are referred to as indigenous knowledge, traditional knowledge, or local knowledge. For many years, this information has been transmitted verbally from one person to another. Indigenous knowledge is perceived as straightforward and useful, offering solutions to people's issues.

The majority of indigenous people in India are concentrated in North-east India and Central India. The Indian government has passed a number of legislation and

constitutional clauses, such as the fifth schedule for central India and the sixth schedule for a few North-eastern states, to safeguard these people. However, United States Patent and Trademark Office (USPTO), European Patent Office (EPO), and Council of Scientific and Industrial Research (CSIR) are some of the international bodies through which the Indian government has offered for the protection of and access to indigenous knowledge in India. The indigenous and traditional knowledge of the various plant species and their medical applications is quite abundant in India. Plants that cure serious illnesses like jaundice, diarrhoea, dysentery, cough, malaria fever, skin ailments, sexual problems, snake bites, and more, a number of indigenous ethnomedicinal herbs are found at a rampant scale. However, rules governing intellectual property do not provide stringent measures and enough protection for traditional and indigenous knowledge.

Indigenous people today are shedding their traditional culture and use of medicinal plants as urbanisation and partial modernization take hold. The indigenous people asserted that neither their rights nor those of other traditional keepers of indigenous knowledge are acknowledged or safeguarded. These people are therefore calling for both the protection and acknowledgement of knowledge as well as a fair distribution of the gains attributable to the use of that information. People must put their efforts into preserving traditional knowledge since losing it will weaken indigenous identity and reduce awareness of and comprehension for the priceless sustainable knowledge system.

The Indian Constitution gives the right to self-determination to Schedule Tribes, the bulk of the indigenous tribes in India. As it is perceived that food for Indian tribal groups comes from the jungles, after many years of hardship, persecution, and suffering, the Schedule Tribes and other Traditional Forest Dwellers Act of 2006

codified the fundamental rights of forest-dwelling tribes. The Schedule Tribes have historically been India's most oppressed tribe. As a result, numerous rights have been granted to safeguard and preserve the property owned by the Schedule Tribe. Members of a group of Tribes that are designated as Scheduled Tribes in a region under Indian law are referred to as members of a Scheduled Tribe that lives in the forest. Under the Forest Rights Act, more traditional forest dwellers may also assert their rights. Individuals or communities who have lived on forest land for three generations and depend on it for their livelihood are also considered as indigenous forest dwellers.

To address the issue of achieving specific protection for traditional knowledge under the IPR domain, some sui generis legislation entered into force. These laws included amending current IPR laws and making the necessary changes to accommodate Indigenous knowledge system and its derivation, developing comprehensive legislation to promote and protect Indigenous knowledge within the context of IPR, and accommodating Indigenous knowledge system with IPR. In India, indigenous knowledge makes accommodations by revising current IPR laws and enacting new ones. In reality, WIPO, which is in charge of TRIPS, has the responsibility to make a strategic adjustment to accept Indigenous knowledge system and TCEs in order to preserve Indigenous knowledge system /TCEs globally.

The Biological Diversity Act promotes the conservation of biological diversity, the responsible exploitation of its constituent parts, and the appropriate and equitable distribution of the advantages attributable to the utilisation of biological resources, knowledge, and related fields. India is a party to the United Nations Convention on Biological Diversity, which was ratified on December 12, 1993, after being signed on June 5, 1992, in Rio de Janeiro.

The first law governing Indian patents was Act VI of 1886, which was later repealed by Act IX of 1887. The Act of 1872 solidified the exclusive privileges provisions, which had been adopted in 1859. The Patterns and Designs Protection Act, originally known as Act XII of 1872, was changed to include protection for the uniqueness of an invention in 1883. In addition, the 1911 Indian Patents and Designs Act, which was revised in 1920 and 1930, supplanted all earlier Acts. Following independence in 1950, this law was modified once more. Between 1950 and 1970, two amendments were unsuccessful. Because of this, the Patent Act was passed in 1970, and most of its provisions went into effect in 1972 after the release of the Patent Rules. The Controller General of Patents, Designs, and Trade Marks was in charge of this Patent Act (CGPDTM). The TRIPS agreement, which stands for the Trade-Related Aspects of Intellectual Property Rights, required India to authorise product patents in the fields of chemicals and pharmaceuticals, which led to modifications in the Patent Acts and Rules between 1999 and 2006. However, this very Act fails to authorise product patents in the field of indigenous ethno-medicinal plants.

The Protection of Plant Varieties and Farmers' Rights Act was enacted by the Indian government in 2001. Legislation was required after India joined the Trade-Related Aspects of Intellectual Property Rights Agreement (TRIPS) in 1994. A patent, a strong sui generis system, or a mix of the two must be used by member countries to preserve plant varieties, according to Article 27.3 (b) of this agreement. India did this because the member nations wanted the option to create law that was specific to their respective systems.

In order to preserve the indigenous group and the belongings of Northeast India various initiatives have been taken up by many bodies such as the North East Conservation Initiative taken up by the Federal Ministry of Environment, Nature

Conservation, and Nuclear Safety of the Federal Republic of Germany which is now being carried out by the UNDP in cooperation with the Ministries of Environment, Forestry, and Climate Change as well as the National Biodiversity Authority.

In India, there are ten scheduled areas. With Scheduled and Tribal Areas, Article 244 of the Indian Constitution defines “Schedule Areas”, and the president has the power to designate any territory as one under the fifth schedule. The fifth schedule of the constitution's schedules specifies the following process for scheduling, rescheduling, and changing scheduled regions. Numerous ethnic groups with diverse origins and ancestries reside in north-eastern India. These tribal tribes have a variety of sociocultural traditions and speak varied languages belonging to different racial stocks. As a result, numerous ethnic groups have merged together in this area. As a result, indigenous people in Northeast India are rapidly losing their traditional knowledge. Its remnants usually go undiscovered and run the risk of disappearing or altering beyond recognition due to the rapid socioeconomic development.

Thus, a charter of extensive autonomy is what is referred to as the sixth schedule of the constitution. Numerous clauses in it grant autonomous councils, authority and objectives in the legislative, judicial, executive, and financial spheres. The administration of tribal areas in the states of Assam, Meghalaya, Tripura, and Mizoram is covered by provisions in the sixth schedule. Certain tribal regions are allowed to be administered as independent legal entities under the Sixth Schedule. The Indian Constitutions Articles 244(2) and 275(1) outline the criteria of the sixth schedule. This 1949 constitutional amendment, which aims to protect the rights of the tribal population of autonomous district councils, was approved by the constitutional assembly.

Sikkim one of the north-eastern states of India is known for its rich biodiversity. Dzongu, home of indigenous community, Lepchas is located in the Mangan district represents over 100 species of ethno-medicinal plants. In Dzongu, the usage of traditional pharmacopoeia, backed by Ayurvedic medicine, is still very common in the administration of antiquated medical systems of the area. In Dzongu, indigenous healing methods are crucial for sustaining health even today majorly among elderly people. Lepchas are well-known plant collectors with a thorough understanding of ethnobotany. Other forms of indigenous knowledge practiced by Lepcha community in Dzongu are Folk medicine, rituals, preparation of food and others.

The Dzongu youngsters are aware of the traditional knowledge system that their predecessors have practised since the dawn of time. They assert that the senior members of their families and communities passed it down to them. Young people and senior citizens in Dzongu use their expertise to make meals like Nhu-Nu, Ahu-Nu, and Faat-Nu in their daily life. Incorporating indigenous knowledge into rituals, ceremonies, farming, medicine, and other areas is also done in Dzongu. Lepchas participate in a variety of ceremonies both in their homes and in their groups, where they pass on the native knowledge they learn. Their religious leaders, known as Mun, Pandem, and Bongthing, are in charge of these rites.

Since many years ago, the Lepcha people of Dzongu have been renowned for coexisting peacefully with nature. They have so gained a wealth of knowledge about therapeutic plants from experience and real-world experiments. As a result, the entire community is regarded as having excellent knowledge of ethnomedicine. The Dzongu people place great importance on ethnomedicinal herbs. However, it appears that indigenous knowledge of ethnomedicinal plants is disappearing, and one of the main causes for this is the lack of written records of indigenous knowledge practices.

More than 100 medicinal plants have been found in the village of Dzongu, according to fieldwork data. These plants are used in various ways to treat injuries and diseases, and the parts of the plants they use for this purpose include However, only up to 20 therapeutic plants are known to the younger generation.

There are many plant species in the area that have therapeutic uses, but only a small number of people sell some of them despite their enormous economic importance to the market and pharmaceutical corporations. One of the reasons they refuse to sell ethnomedicinal plants is their desire to preserve the available medicinal herbs for their own usage. On the other hand, a small number of those who are interested in selling them don't know how to go about doing it. As a means of supporting their families, several respondents claim to have sold the therapeutic plants to both the market and pharmaceutical corporations.

Without a doubt, the Dzongu valley is home to a variety of medicinal plant species, and indigenous knowledge has persisted there even in the modern day. However, many people are unaware of the policies and programs that are outlined for indigenous knowledge at the national and international levels. People are however aware of their land rights and how numerous Acts protect them. It appears that these Land Rights Acts have helped the Lepcha Community of Dzongu preserve its indigenous knowledge system, either directly or indirectly.

Additionally, a number of NGOs are actively trying to maintain and preserve Indigenous knowledge in Sikkim in general, and a select number of NGOs are doing so specifically in the Dzongu valley. Local people actively take part in the programmes run by NGOs. Additionally, a number of NGOs are actively trying to maintain and preserve Indigenous knowledge in Sikkim in general, and a select

number of NGOs are doing so specifically in the Dzongu valley. Local people actively take part in the programmes run by NGOs.

Findings of the study

- Indigenous Knowledge is becoming a subject of discussion both nationally and internationally.
- Indigenous knowledge is essential to all facets of existence. Understanding different foods, customs, rituals, traditions, and other aspects of culture has been made easier. Ethnomedical plants that have commercial worth to pharmaceutical corporations have also been better understood.
- Indigenous knowledge is increasingly dwindling within the indigenous community as a result of the introduction of western education.
- The primary issue with the rapidly vanishing indigenous knowledge system is a lack of written documentation.
- There aren't enough national or state-level policies or programmes in place to safeguard and preserve indigenous knowledge.
- Despite the fact that India has patent laws, they do not apply to indigenous knowledge.
- The young people asserted that they utilise both indigenous and modern knowledge. Furthermore, they argued that Indigenous knowledge helps them provide data about their knowledge system, and modern knowledge helps them preserve knowledge for future generations.
- The young respondents from the study region agreed that the Indigenous knowledge system is gradually eroding as a result of factors including the

influence of modern culture and customs, the dearth of written books and texts, and a lack of interest in using or learning about their knowledge.

- Elder respondents from the study area agreed that the decline of Indigenous knowledge is happening over time due to a lack of interest, accessibility issues, and the effectiveness of allopathic medicine. In addition, most people do not rely on medicinal plants, and they feel more at ease using new technologies than they do using Indigenous Knowledge System.
- Young people's lack of interest in traditional or indigenous knowledge is a result of modern schooling, a modern lifestyle, and the development of information technologies.

This study reveals that lack of written documentation was one of the reasons for vanishing the practices of indigenous knowledge in the society of tribal people. In order to protect or preserve this knowledge which is practical engagement in everyday life and is constantly reinforced by experience and trial and error of the people of Dzungu. Indigenous knowledge documentation should be prioritised in indigenous communities. Also, the government must establish guidelines and policies to preserve indigenous knowledge for a sustainable knowledge system and to prevent it from withering away. Furthermore, the initiatives that has been taken up by the international bodies and organizations in preserving and protecting indigenous knowledge of the North-east states of India, should be legally binding for more efficacy.

Limitations of the Study

- During the field trip, COVID-19 was substantial, making it difficult to arrange a taxi and accommodation.
- The majority of the youth were left stranded in hostels as a result of COVID-19, making it difficult to get information.
- The majority of the elderly people in Dzongu work in agriculture, making it challenging to communicate with them because they are so preoccupied with their work.
- Dzongu's settlements are sparsely populated, making it challenging to locate the path.
- The majority of older people are hesitant to share their knowledge about ethnomedicinal plants because they fear that if they do, everyone will know about them, and their relevance will be lost.
- The COVID-19 Pandemic made it difficult to accomplish the field study on time.

Additional work must be done with a focus on appropriate framework development policies related to indigenous knowledge, and research can also be done on appropriate documentation of IK and practices of medicinal plants. Research can also be done with a focus on the steps necessary to preserve indigenous knowledge.

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Dear Madam/ Sir,

I am Ongmit Lepcha, M.Phil. Research Scholar, Dept of Peace and Conflict Studies and Management, Sikkim University, I am doing research on “Youth Perception on Indigenous Knowledge and Ethnomedicinal Plants: A Study of Dzungu, Sikkim”. In this regard, I am conducting fieldwork to collect data from Youth and Elders of Dzungu region in Sikkim to understand the perceptions on Indigenous Knowledge and Ethnomedicinal Plants. The information collected by you will be only used for research purpose.

Thanking You,
Your Sincerely,

Ongmit Lepcha

APPENDIX

Questionnaire for youth

1. Name..... 2. Age.....
3. Gender: a). Male b). Female c). Others, specify_____
4. Religion: a). Buddhist b). Christen c). Hindu d.) others specify_____
5. Education Qualification: a). up to 10 b). 11 to 12 c). BA d). MA and above.
6. Marital Status: a). Single b). Married c). Separated d). Divorce
7. Occupation: a). Student b). Govt employed c). Private employed d). Business
e). Others, specify_____
8. Where are you staying: a). Own house b). Rented house c). Quarters
d). Others, specify_____

1. INDIGENOUS KNOWLEDGE

1. Do you know the special knowledge system of your community/family?
 - Yes
 - No
2. Do you inherit this knowledge from community / family?
 - Yes
 - No

3. How do you practice indigenous knowledge in your life?

- Food
- Ritual
- Ceremony
- Farming
- Meditation
- Others, specify_____

4. What are the rituals practiced at your village?

- Sugi Tek Rumfaat
- Thikung Mun Solong Suknyim
- Sukyue Rumfaat
- Lasso Mung-tyu
- Dushi Munlom
- Tendong Lho Rumfaat
- Punu Gaebu Achok Agyek Suknyim
- Mut Rumfaat
- Mambuun/Namsoong
- Others, specify_____

5. What are the rituals you practice in your family?

- Lee Rumfaat
- Sukyue Rumfaat
- Pholo Rumfaat
- Namaalsa Rumfaat
- Others, specify_____

6. Which rituals, you participate?

- Lee Rumfaat
- Sukyue Rumfaat
- Mukjukdind Rumfaat
- Tendong Lho Rumfaat
- Nambuun/ Namsoong
- Lasso Mung-tyu

- Others, specify _____

7. Who lead these rituals?

- Mun
- Bongthing
- Head of the family
- Others, specify _____

8. What type of food you eat?

- Aayur-Nu
- Nhu-Nu/Bhuckchoo (Boiled)
- Ahu-nu (Fried)
- Faat-Nu (Burned)
- Tho ka aarhyumnhuthom-Nu
- Serthomaajom (Fermented)
- Lhaap-Nu
- Others, specify _____

9. What are the ways, you prepared those food? Explain.

10. Do you know, how to prepare those food?

- Yes.
- No.
- If yes, where you learnt?

11. What kind of farming practices, you followed in your village?

- Tungal (Pre farming technique for farming digging hole by the stick to plant grain such as Maize, Wheat, Barley etc.)
- See Aapo (Shifting cultivation farming)
- Aamuek (Mix farming)
- Others, specify _____

12. What kind of crops, do you farm in your village?

- Maize
- Finger millet
- Barley

- Pulses
- Rice
- Tuber crops
- Cardamon
- Other, specify_____

13. What are the Indigenous Medicinal Practices you follow in your village?

- Thambongsa-AalopongsaZurthap
- Pugoreep (Oroxylon flower)
- Heeng (Ginger)
- Tungnel (Fern)
- Beelakongsaaape anu aalop
- Others, specify_____

14. In what occasions, you apply Indigenous Knowledge?

15. Do you know any Medicinal Plants?

- Up to 20
- 20 to 50
- 50 to 80
- 80 to 100
- More than 100
- Nil

16. How many Medicinal Plants are found in your area?

- Up to 20
- 20 to 50
- 50 to 80
- 80 to 100
- More than 100.

17. Where do you find them?

- Field
- Forest
- Other, specify_____

18. In what area you use those plants?

- Meditation
- Food
- Selling
- Others, specify _____

19. Use of medicinal plants give any benefits to your community?

- Yes
- No

2. ISSUES FACED BY INDIGENOUS KNOWLEDGE SYSTEM

1. How often do you rely on Indigenous Medicinal Practice in your life?

- Every day.
- Once in a week.
- Once in a month.
- Once in a year.

2. Do you preserve these Medicinal Plants?

- Yes
- No

3. In your opinion which Knowledge System is good?

- Your knowledge system (Indigenous Knowledge System)
- Modern knowledge system
- Both

4. which knowledge system is good and why? Give reason.

5. Do you think this knowledge is important?

- Yes.
- No
- Why? _____

6. How do you come to know about Indigenous Knowledge System?

7. Do you think written documentation of indigenous practices are important?

- Yes.
- No
- Why? _____

8. Do you think this knowledge system is slowly vanishing?

- Yes.
- No.

9. If yes. What is the reason? Specify.

3. POLICIES AND PROGRAMME

1. Do you know that Dzongu is one of the protected areas in Sikkim?

- Yes
- No
- If yes, how?

2. Do you think this special protection really preserve the Indigenous Knowledge Systems?

- Yes
- No
- If no, why? Specify

3. Do you know the constitutional provision related to Indigenous Knowledge and its protection?

- Yes.
- No
- If yes, which are they?

4. Did Sikkim government pass any laws to protect this Indigenous Knowledge?

- Yes
- No
- If yes, which are those?

5. Is there any NGO's that work to protect or preserve Indigenous Knowledge in Sikkim?

- Yes
- No
- If yes, name them _____

6. In your village, is there any Organization that work to protect and preserve this Indigenous knowledge?

- Yes
- No

7. If yes, are you a part of those Organization?

- Yes
- No

8. Why do you think Indigenous Knowledge Practices is not attractive?

4. ETHNOMEDICINAL PLANTS

1. What are the plants available in your area?

Name them:

2. For what purpose you use them?

- Cough
- Water stool
- Throat pain
- Bleeding
- Clot
- Bone fracture
- Headaches
- Jaundice
- Fever
- Others, specify _____

3. What are the benefits of these medicinal plants in your society?

Ans:

4. What are the parts you use from those plants?

- Root
- Leaf
- Flower
- Fruit
- Stem
- All the above

5. **SCOPE OF ETHNOMEDICINAL PLANTS IN CONTEMPORARY SOCIETY**

1. Do you think, there is any economic value associated with ethno medicinal plants?

- Yes
- No

2. Do you know that this knowledge holds socio-economic value in pharmaceutical industry and other business?

- Yes.
- No.
- If yes, what are they? Specify_____

3. How do you know about this knowledge from others?

- Oral stories
- Rituals
- Traditional songs
- Written stories
- Others

4. Did your family sell any medicinal plants to pharmaceutical companies?

- Yes.
- No.

5. Medicinal plants give any source of income to your family?

- Yes.
- No.

6 If yes. How much?

- Less than 3000
- 3000-5000
- 5000-8000
- More than 8000

7. Do you think elder of your community encourage you to encourage you to practice Indigenous Knowledge?

- Yea
- No
- If yes, how?

- If no, why?

Questionnaire for elder

RESPONDENT PROFILE.....

1. Name..... 2. Age.....
3. Gender: a). Male b). Female c). Others, specify_____
4. Religion: a). Buddhist b). Christen c). Hindu d.) others specify_____
5. Education Qualification: a). up to 10 b). 11 to 12 c). BA d). MA and above.
6. Marital Status: a). Single b). Married c). Separated d). Divorce
7. Occupation: a). Govt employed b). Private employed c). Business d). Others, specify_____
8. Where are you staying: a). Own house b). Rented house c). Quarters
d). Others, specify_____

INDIGENOUS KNOWLEDGE

1. Do you know the special knowledge system of your community/family?
 - Yes
 - No
2. Indigenous Knowledge that your practices are:
 - Community knowledge
 - Family knowledge
 - Individual secret knowledge
 - Other, specify_____
3. How do you practice indigenous knowledge in your life?
 - Food
 - Ritual
 - Ceremony
 - Farming
 - Meditation
 - Others, specify_____

4. What are the rituals practiced at your community?

- Sugi Tek Rumfaat
- Thikung Mun Solong Suknyim
- Sukyue Rumfaat
- Lasso Mung-tyu
- Dushi Munlom
- Tendong Lho Rumfaat
- Punu Gaebu Achok Agyek Suknyim
- Mut Rumfaat
- Mambuun/Namsoong
- Others, specify_____

5. What are the rituals you practice in your family?

- Lee Rumfaat
- Sukyue Rumfaat
- Pholo Rumfaat
- Namaal sa Rumfaat
- Others, specify_____

6. Who lead these rituals?

- Mun
- Bongthing
- Head of the family
- Others, specify_____

7. What type of food you eat?

- Aayur-Nu
- Nhu-Nu/Bhuckchoo (Boiled)
- Ahu-nu (Fried)
- Faat-Nu (Burned)
- Tho ka aarhyum nhuthom-Nu
- Serthom aajom (Fermented)
- Lhaap-Nu
- Others, specify_____

8. What kind of farming practices, you followed in your community?
- Tungel (Pre farming technique for farming digging hole by the stick to plant grain such as Maize, Wheat, Barley etc.)
 - See Aapo (Shifting cultivation farming)
 - Aamuek (Mix farming)
 - Others, specify_____
9. What kind of crops, do you farm in your community?
- Maize
 - Finger millet
 - Barley
 - Pulses
 - Rice
 - Tuber crops
 - Cardamon
 - Other, specify_____
10. What are the Indigenous Medicinal Practices you follow in your village?
- Thambongsa-Aalopongsa Zurthap
 - Pugoreep (Oroxylon flower)
 - Heeng (Ginger)
 - Tungnel (Fern)
 - Beela kongsa aape anu aalop
 - Others, specify_____
11. In what occasions, you apply Indigenous Knowledge?
12. Do you know any Medicinal Plants?
- Up to 20
 - 20 to 50
 - 50 to 80
 - 80 to 100
 - More than 100
 - Nil

13. How many Medicinal Plants are found in your area?

- Up to 20
- 20 to 50
- 50 to 80
- 80 to 100
- More than 100
- Nil

14. Where do you find them?

- Field
- Forest
- Other, specify _____

15. In what field you use those plants?

- Meditation
- Food
- Selling
- Others, specify _____

16. Use of medicinal plants give any benefits to your community?

- Yes
- No

17. Is there any changed happened in Indigenous Knowledge System?

- Yes
- No
- If yes, what are they, specify _____

18. whether anybody come in search of Indigenous Knowledge Practices in Dzongu?

- Pharmaceutical companies
- Researcher
- Others, specify _____

ISSUES FACED BY INDIGENOUS KNOWLEDGE SYSTEM

1. How often do you rely on Indigenous Medicinal Practice in your life?

- Every day.
- Once in a week.
- Once in a month.
- Once in a year.

2. Do you preserve these Medicinal Plants?

- Yes
- No

3. Do you think this knowledge system are slowly vanishing?

- Yes.
- No.

4. If yes. What is the reason? Specify.

3.POLICIES AND PROGRAMME

1. Do you know that Dzongu is one of the protected areas in Sikkim?

- Yes
 - No
 - If yes, how?
-

2. Do you think this special protection really preserve the Indigenous Knowledge Systems of Dzongu?

- Yes
- No
- If no, why? Specify

3. In your community, is there any Organization that work to protect or preserve Indigenous Knowledge in Dzongu?

- Yes
- No
- If yes, are you also part of that Organization_____

ETHNOMEDICINAL PLANTS

1. What are the plants available in your area?

Name them:

2. For what purpose you use them?

- Cough
- Water stool
- Throat pain
- Bleeding
- Clot
- Bone fracture
- Headaches
- Jaundice
- Fever
- Others, specify _____

3. What are the benefits of these medicinal plants in your society?

Ans:

4. What are the parts you use from those plants?

- Root
- Leaf
- Flower
- Fruit
- Stem
- All the above

SCOPE OF ETHNOMEDICINAL PLANTS IN CONTEMPORARY SOCIETY

1. Whether younger generation is interested in this kind of knowledge system?

- Yes
 - No
 - If yes, why?
-

2. Whether younger generation are ready to practice this knowledge?

- Yes.
- No.

4. Do you think, there is any economic value associated with ethno medicinal plants?

- Yes
- No

5. Do you know that this knowledge holds socio-economic value in pharmaceutical industry and other business?

- Yes.
- No.
- If yes, what are they? Specify _____

6. How do you share this knowledge with others?

- Oral stories
- Rituals
- Traditional songs
- Written stories
- Others

7. Do you sell any medicinal plants to pharmaceutical companies?

- Yes.
- No.

8. Medicinal plants give any source of income to your family?

- Yes.
- No.

9. If yes. How much?

- Less than 3000
- 3000-5000
- 5000-8000
- More than 8000

10. What are the challenges you think in term of passing over Indigenous Knowledge System from older generation to younger generation?

- 1.
- 2.
- 3.
- 4.