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### Ethno-Medicinal Healing Practices among the Santals of Odisha, India

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#### Abstract

The present study reconnoiters the traditional healthcare practices among the Santal Tribe in Odisha. By interacting with the sample population and traditional health care service providers of the study attempts a holistic understanding on traditional health care practices among them. 25 different plant species are documented that used as a medication. The process of collection of plants, preparation and medication are based purely on traditional method. Significantly, the plants are recognized by using native dialect prior to be translated into the Odia language and scientific botanical names. The data are collected in integrated narrative methods, those include unstructured interviews, focused group discussion and case study among the community members and key informants' interview among the medicinal specialists of sample area. Moreover, the observation has been made to understand the access of Santals people traditional health care practices. Overall, this study comprehends a holistic picture of health care system and also contributes significantly to the documentation and preservation of traditional healthcare knowledge among the Santal Tribe in Odisha. It accentuates the importance of distinguishing and respecting native healing traditions and the appreciated role of medicinal plants in maintaining community health and wellbeing.

**Keywords:** Ailments, Ethno-medicine, Health care, Medicinal plants, Traditional health care, Santals.

#### Introduction

Ages of cohabitation with nature the Santals people of Mayurbhanj district have developed an unique health care system that integrate the human world with nature world and spirit world. Despite, lacking of formal medical degree the traditional healer, popularly known as *Ojha*, is recognized for his ability to extend health care services among the Santals. Using flora and fauna available from the habitation and rooted in socio-cultural and religious practices, the *Ojha* offers a unique perspective on healthcare practice that differs from modern medical practitioners. The health care practitioners within the Santal community may be categorized, such as *Kubraj*, *Ojha*, and *Ghasibudhi*, each with their own specialized knowledge and practices. These specialists' diagnosis patients based on own knowledge, skills, the nature of ailments, and the social and psychological environment. Accordingly, they prescribe traditional medicines and healthcare behaviors to patients. Based on the specialist a payment structure has been followed among the community members for traditional healthcare services provider. A nominal fixed fee is given to the *Ojhas* for the procurement and

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processing of traditional herbal medicine, while the *Kubbraj* and *Ghasibudhi* do not have a fixed fee structure but may receive customary payments for their services. *Ojha* is able to carry out many things which, out of the knowledge and power in the part of a common *Santals* man (Bodding; 2019). Despite, the availability of modern healthcare practitioners in Jagannathpur village of Bisoi block of Mayurbhanj district of Odisha, many residents still opt for traditional healing methods. However, depending on the severity and duration of illnesses, some individuals may seek consultation with local allopathic practitioners. Nonetheless, the study notes a gradual shift towards modern healthcare practices alongside the continuation of traditional healing methods. Documenting the traditional knowledge of Santals on healthcare practices is crucial for preserving and understanding these indigenous healing traditions. It not only contributes to the appreciation of cultural heritage but also provides insights into alternative healthcare systems that may offer valuable perspectives on holistic well-being.

## Theoretical Background

Frazer (1911) in his work "The Golden Bough" delves into the realm of magic, ritual, and belief systems across various cultures. His exploration of magic often contrasts it with religion, with magic typically being characterized as a more primitive or less evolved form of belief compared to organized religion. However, Frazer also recognized the concepts that magic embodies on two basic principles: (i) **the Law of Similarity** (like produce like); an effect resembles its cause or that an action performed on an object will influence a similar action on another object. This forms the basis of imitative magic, where rituals or actions are performed to mimic the desired outcome. (ii) **the Law of Contagion**; objects that have once been in contact with each other maintain a connection even after they are separated. This forms the basis of contagious magic, where items believed to be linked to a person can influence that person's well-being.

Frazer comprehends both the principles with the fundamental of sympathetic magic as it shares underlying belief in the interconnectedness of objects and actions. The concept of sympathetic magic suggests a hidden, mysterious force that allows influence or action to be transmitted between distant objects or individuals on the principle of sympathetic relationship. His notion of "sympathetic relationship or hidden sympathy" and its connection to shamanic principles aligns with the idea of plants as not just individual entities, but representatives of their entire species or even the natural world as a whole. This perspective reflects a deep understanding of the interconnectedness and interdependence of all living beings within nature.

In indigenous culture plants are indeed revered as transformative beings, playing a crucial role in the cycle of life and sustenance. They are seen as intermediaries between the physical and spiritual realms, capable of harnessing and transmuting energy from various sources, primarily sunlight, into vital nutrients and sustenance for all living beings. When we consume plants as food, we directly access the stored sunlight energy that they have converted into carbohydrates, proteins, and fats through photosynthesis. This energy sustains us and powers our biological processes, completing a cycle that began with sunlight being captured by plants. Morwyn (2001) reflects on holistic understanding of plants held among many indigenous cultures worldwide. Across diverse traditions, there's a profound appreciation for the energetic qualities of plants and their ability to facilitate healing and transformation on physical, emotional, and spiritual levels. When a person ingests a plant, whether as food or medicine, they are not only receiving the physical nutrients but also tapping into the energetic essence of the plant. This energy is believed to be released and circulated throughout the body and aura, the subtle energy field surrounding an individual. In doing so, the herbal energy can complement and enhance the body's own natural healing processes, promoting balance, vitality, and well-being (Morwyn; 2001). Kirlian photography often suggests on nonmaterial, "bioplasmic body" or energy field within living organisms, including plants. This energy field is believed to play a vital role in regulating various physiological processes and maintaining the vitality of the organism. The profound significance of plant materials in ritual practices spans cultures and traditions worldwide, reflecting a deep reverence for the natural world and its spiritual potency. Across diverse belief systems, herbs and botanicals are revered for their symbolic qualities, energetic

vibrations, and healing properties, making them indispensable allies in various ceremonial contexts (Morwyn; 2001).

The *Santals* people sample area have developed the herbal remedies through generations of observation, experimentation cohabiting with the nature and passed-down wisdom, resulting in a rich pharmacopeia of plant-based treatments tailored to specific ailments and health needs.

## Prevalence of Ethno-Medicine

The practice of herbal medicine has deep roots in human history, serving as a primary form of healthcare across diverse communities worldwide long before the advent of modern allopathic medicine. Even today, many rural and tribal communities continue to rely on traditional herbal knowledge for their healthcare needs, considering it a valuable part of their cultural heritage (Mukharjee and Wahil; 2006). The scientists recognize the efficacy and value of herbal medicine for treating various diseases, and have turned their attention to studying herbs and plants. This scientific investigation aims to comprehend the therapeutic properties of these natural medications and explore their potential applications in modern medicine (Pati; 2011, Ignacimuthu; 2006 and Blake; 2004).

Moreover, at the other hand the cost-effectiveness and side effects connected with modern allopathic medicine have encouraged people to adopt substitutes like ethno-medicine. Pandey and Pandey (2010) emphasize the affordability based on economic conditions and lesser side effects of traditional health care practices in comparison to conventional treatments, that has led to a revival of notice in traditional healing practices among people seeking safer and more affordable healthcare options. Thus, the herbal medicine focuses its everlasting significance and importance in healthcare systems over the world. Integrating traditional wisdom with contemporary scientific research medicine, there is potential to harness the benefits of herbal medicine while ensuring its safety and efficacy for future generations.

## Indigenous Knowledge on Ethno-Medicine

The traditional healthcare practices on of ethno-medicine among various tribal communities and forest dweller, indicate their dependence on herbal medicine for healthcare needs. These traditional healing practices are valued for their effectiveness, accessibility, affordability, and cultural relevance. Bosco and Aurumugan (2012) highlight the importance of herbal medicine among tribal communities, emphasizing its low risk of side effects and compatibility with cultural practices. Soejarto et al. (2009) underscore the significance of ethno-botanical studies in understanding indigenous knowledge of plant medicines, which are often passed down orally through generations. Pandey and Pandey (2010) analyse the importance and its acceptance of ethno-medicinal medication among the people and suggests, the government and pharmaceutical companies as part of responsibility to explore the knowledge of ethno-medicinal practices of the communities or medicine man who acquire the knowledge living closely and harmoniously with the eco-system through the experience and behavioural experimentation. Furthermore, they suggest to document and to promote such knowledge.

Ignacimuthu et al. (2006) and Mohammad (2012) provide examples of specific studies focusing on ethno-medicinal knowledge among tribal communities in India and Bangladesh, respectively. These studies document the diverse use of medicinal plants for treating various ailments, including malaria, showcasing the importance of traditional knowledge in identifying effective remedies.

Similarly, studies by Saikia and Prakash (2016), Chander and Vijayachari (2018), and Chander et al. (2015) highlight the ethno-medicinal practices of tribes in Assam, Andaman Islands, and Nicobar Islands, respectively. Those studies accentuate the vast arena of species of medicinal plant utilized by indigenous communities and their correlation with scientific databases, affirming their medicinal significance.

Nejat et al. (2021) explore the prevalence of traditional and folk medicine in the context of COVID-19 pandemic in Iran for the prevention and healing of the virus. The findings of study suggest the importance of documentation of ethno-medicinal practices from local healers and to experiment and enhance understanding

of its potential applications in order to combat health crises. Furthermore, the study emphasizes the potential contributions of such practices to modern medicine, biodiversity conservation, and public health initiatives.

### **Threat to Knowledge on Ethno-Medicine**

The large-scale deforestation due to various anthropogenic occurrences; extraction of under earth's natural resources by mining and industrialization, and acquisitions of land to establish mega development projects led a substantial threat to the conservation of ethno-medicinal plants, traditional knowledge and biodiversity. The state like Odisha, rich in mineral resources and forest areas, including those around tribal habitats, are being encroached increasingly for the establishment of developmental projects and mining operations (Mishra et al., 2022; Temper & Martinez-Alier, 2013; Vandana & Bhattacharya, 2022). This encroachment disrupts severely to the natural habitation of medicinal plants that leads to the loss of indigenous knowledge associated with identification, preparation and use product (Bosco and Aurumugan; 2012). Recognizing the value of herbal medicinal plants the pharmaceutical companies, further worsen the depletion of these resources by escalating their focus on extraction.

Bellen (2008) and Suminguit (2005) highlight the close intimacy between traditional indigenous systems and its surroundings eco-systems accentuate the direct impact on traditional healing practices. The destruction and disappearance of ethno-medicinal knowledge among indigenous communities is a direct consequence of the loss of their ecological setting and the availability of medicinal plants within their habitats.

The declining numerical strength of medicine men among communities like the Subanens indicate a generational dwindling in the transmission of medicinal plant knowledge. This represents a loss of biodiversity including cultural heritage and traditional healthcare practices those deeply rooted in the natural environment (Bellen; 2008). Furthermore, the study suggests to address issues of loss of ethno-medicinal knowledge and prioritize the conservation of forest ecosystems and utilization of natural resources sustainably. The collaborative initiatives involving with indigenous communities, forest conservation organizations, policymakers, and researchers are essential to ensure for the preservation of both biodiversity and traditional knowledge systems. Additionally, documenting and promoting indigenous knowledge of ethno-medicine can help ensure its continuity and relevance in the face of environmental and social change.

### **Socio-Cultural Affiliation of Ethno-Medicine**

The case of the Sonowal Kacharia tribal community in Assam and the Subanen indigenous agricultural community in the Philippines illustrates the deep interconnection between ethno-medicinal practices, spirituality, and cultural beliefs. Among the Sonowal Kacharia tribe, the belief in malevolent supernatural forces as the cause of certain diseases underscores the spiritual dimension of healing. Prayer is considered the primary method of curing, complemented by the use of medicinal plants found within their habitat. Elderly members of the community, along with the village medicine man called, 'Bez,' possess valuable knowledge of these medicinal plants and their uses (Das et al., 2008).

Similarly, in local parlance of Subanen community the medicinal plant and herb are stated as *Bulung*. *Bulung* are believed to possess spirits akin to human being. The use of ethno-medicine among them is guided and pass down to the people through the spirit in dream. Therefore, the spiritual essence of medicinal plants reflects their reverence for nature and the interconnectedness of all living beings (Bellen; 2008). The integration of spiritual beliefs into healing practices highlights the holistic approach to health and well-being within the community. Despite differences in cultural heritage, economic patterns, and beliefs, both communities share a common thread in the association of ethno-medicinal healthcare practices with spirituality and religion. This spiritual dimension plays a significant role in healing various diseases, underscoring the importance of cultural context in understanding healthcare practices (Romeo et al., 2015).

However, the rapid urbanization and industrialization observed among the Subanen people present a threat to the preservation of their traditional knowledge systems. As cultural assimilation occurs and oral traditions decline, there is a risk of losing valuable indigenous knowledge rooted in spirituality, cultural heritage, and

ecological wisdom (Suminguit; 2005). Efforts to conserve and promote traditional healing practices must recognize the intrinsic link between spirituality, culture, and healthcare. Collaborative initiatives involving community members, cultural institutions, and policymakers can help safeguard ethno-medicinal knowledge and ensure its transmission to future generations amidst the challenges of modernization and cultural change.

## Composition of Ethno-Medicine

The studies of Ayyanar et al. (2010), Siejak et al. (2021), and Fialova et al. (2021) highlight the therapeutic potential of natural products, particularly plant-based oils, in combating bacterial infections and promoting healing.

Ayyanar et al. (2010) underscore the diverse composition of plant medicines, including oils extracted from seeds such as Mahua, Kusum, and Neem, which possess therapeutic properties beneficial for treating various chronic and infectious diseases. These oils are rich in bioactive compounds that facilitate cellular processes, including energy production, cell regeneration, and waste elimination, through chemical processes. Siejak et al. (2021) emphasis on the enquiry of "five thieves' oil," a traditional health care ailment that composed of rosemary, lemon, clove, eucalyptus, and cinnamon oils and renowned for their antibacterial properties. Based on physio-chemical and biological analyses, the study illuminates the anti-bacterial mechanisms of the oil, particularly its impact on the membrane permeability of bacteria like *Pseudomonas*. The findings of study suggest that the constituents of the oil, notably eugenol and cinnamaldehyde, alter bacterial membrane permeability, thereby inhibiting bacterial activity and survival. However, Fialova et al. (2021) discuss the weakness of modern health care practices of pharmaceutical approaches to treating bacterial infections, particularly skin diseases, and advocate for the exploration of natural products as alternative remedies. Indigenous health care practices based on plants and animals' resources are emphasized for their efficacy in triggering resistant bacterial strains and reducing ferocity. These natural products exhibit antibacterial and anti-inflammatory effects, supporting tissue regeneration and healing processes.

These studies underscore the importance of harnessing the medicinal properties of natural products, particularly plant-based oils, in combating bacterial infections and promoting holistic healing. The rich bioactive composites existing in these natural medications offer promising avenues for the development of therapies and the augmentation of healthcare practices, aligning with the growing interest in natural and traditional medicine.

## Protection of Indigenous Knowledge on Ethno-Medicine

Sujatmiko's (2021) emphasis on the urgent need of formulation of regulations and strategies for the protection and promotion of traditional ethno-medicinal knowledge those help to safeguard the intellectual property rights of indigenous communities and restrict bio-piracy. Traditional knowledge systems on health care practices, including ethno-medicine, are valuable cultural heritage that have been passed down through generations and are integral to indigenous identities and well-being. Therefore, the proposed policy seeks to develop a structural framework that recognize ethno-medicinal practices as part of traditional knowledge system and provide legal rights to the indigenous communities and protect and control its uses.

## Methodology

The study among the Santal community of Jagannathpur village in Odisha was conducted in between May-June 2023 in first phase and October-December, 2025 in second phase that provides valued understandings about traditional knowledge of ethno-medicine and its uses in health care practices. The village Jagannathpur is situated in the Mayurbhanj district, nestled at the foothill of the Ukam forest that named after the god Ukam. Approximately 70 households inhabit, the majority of inhabitants are Santals, with only two households belonging to the *Kamar* (blacksmith) community.

The study adopts qualitative approaches, ensuring a nuanced and comprehensive investigation of healthcare practices of the Santal community and ethno-medicinal knowledge. Embedding the techniques such as personal interviews with head of household, traditional health care practitioners and aged of both the gender, focuses

group discussions, case studies, and observations. The study aims to understand a holistic picture, encompassing both individual experiences and broader community perceptions. This multifaceted approach is expected to vintage rich data that can apprise understanding, policy, and further research in this field.

**Unstructured Interviews with household head and Key Informants Interviews health practitioners** to provide in-depth insights into their experiences and perspectives regarding healthcare practices and to document traditional knowledge related to medicinal flora, fauna, and treatment processes. They provide insights into the traditional healthcare system and practices.

**By** involving people from different age groups **10 focused Group Discussions are undertaken those allow exploring** the healthcare behaviors within the community. The research also conducts 15 case studies among individuals those provide efficacy and application and acceptance of ethno-medicine within the Santal community. This approach offers detailed contextual information that enhances understanding on health behavior. The non-participant observations gain a holistic understanding of the socio-cultural and economic factors influencing healthcare practices. This method adds depth by observing behaviors and practices in their natural context.

## Result and Discussion

The interaction with the head of household, aged of both the gender and the participant of group discussions among the Santals people indicate that the conception of community on health and disease is quite differs from modern therapeutic perspectives, as it is closely embedded with devoutness, religious and moral values. It drives beyond the physical body and incorporates psychological, emotional, and spiritual well-being, along with a harmonious relationship with one's natural setting and community. It highlights the importance of nurturing these dimensions through specific actions and attitudes to foster a fulfilling and healthy life. It also underscores illness as a momentary reprimand from supernatural forces and ancestral soul, with therapeutic seen as a means of reducing sin partially or misconduct. This spiritual dimension is core to their healthcare practices, where spirituality, religiosity, and health are interconnected.

The key informants' interview among four traditional health care practitioners indicates that two different healing practices prevalent among the *Santals*: first is ritualistic practice of healing, that involves divine prayers to supernatural powers and ancestor worship with great devotion, and the second healing comprises of herbs and plants, that relies on the use of flora species available in and around their habitat with great faith. The Santals in of sample village use numerous plant species for both remedial and dietary purposes, employing various parts of the plants in raw, cooked, or ointment form. Table 1 delivers minutiae on the usage of 25 diverse plants for treating common ailments, tracing the multitude of therapeutic properties and usages each plant owns. These plants are used in various processes such as liquid, powder, and paste, with doses typically followed in the morning and evening.

Table 2 indicates about 25 plant species belonging to 19 families and 16 orders, demonstrating the various medications derived from different parts of plant parts. The Santal tribe of sample area has acquired rich knowledge of plant medicine; that's a result of their deep cohabitation with forests and life experimentation.

The Santals people of Jagannathpur village comprehend and manipulate the world around them based on traditional belief systems. Despite, the prevalence of magical practices in in their social and cultural life, they utilize different parts of both flora and fauna through ritualistic practices and moral codes for different medications. This holistic view of the Santals tribal group of Odisha replicate Frazer's idea of **sympathetic relationships**, where the distinct elements of nature such as florae, animals, and humans—are understood as component of a larger web of nature. In their traditional belief systems, any single component is not merely comprehended in isolation; plants are not merely regarded as isolated objects but as representations of their whole species and the ecosystems as an entirety they inhabit. This comprehension of Santals aligns with the perspective that every living being plays a role in the balancing the nature and eco-system accenting interdependency and interconnectness with one another. The idea that the degradation and declining of health of one part affects the whole and larger web of nature. The visions of Santal community hearten a broader

understanding; how humans relate to the natural world, emphasizing the spirit world and the natural (particularly Plants and animals) world are intertwined. These approaches invite to understand the complexity of relationships among the different component within ecosystems and the significance of honoring these connections in various socio-cultural and ritualistic practices. Acknowledging the philosophies of sympathetic magic and its insinuations for the construction of nature, natural resources and eco-system the Santals world view cultivate a greater awareness of habitation within the larger tapestry of life. Furthermore, Morwyn (2001) refers this belief is more different and energetic potentials of plants, demonstrating how they can enable healing and transformation. The act of consumption a plant for nourishment or medication purposes, is understood as a means to harness its energy. The traditional healing practices among Paudi Bhuiyan involves understanding how a definite plant resonate with diverse facets of a person's being—physically, emotionally, and spiritually. This holistic approach aligns with the inkling that everything is interrelated and interconnected. The energies of plants help to enhance natural curative ability of an individual. Recognizing and revering these influences, they develop a profound obligation for the role of plants in their survives and in the broader ecosystem. This understanding encourages to involve with nature mindfully, nurturing a sense of appreciation for the transformative powers that plants hold and their ability to support human health and spiritual growth. Such an understanding enriches indigenous wisdom and disseminate the idea of cohabitation with sustainably and respectfully with the natural world.

**Case-1** delivers a elucidate critically on health medication in relation to dietetic practices and environmental factors among the Santals community through a case of a child suffering with diarrhea. The mother of child states overconsumption led to diarrhea and also reason of gastrointestinal issues that may intensify into more severe condition like cholera. Her child was suffering from diarrhea last two days, consequently she has been giving a half glass of milk mixing with 5-6 full spoons powder, made up of dry bark of old *Bale dare* (**Aegle marmelos**) tree in morning and evening a day. Her child is getting cure.

Moreover, she demonstrates illustrates that persistent diarrhea, stomach pain and indigestion are the symptoms cholera. Similarly, she is well conscious on the communicable diseases and its medium of transmission; secretion of vapour from stool is a symptom of transmission through which disease can spread to other people. This indicates a connection between physical symptoms with environmental factors and refers a broad cultural and environmental understanding of Santals on health and diseases. Furthermore, it integrates the observation of nature on traditional knowledge based and bodily alterations into a therapeutic belief and practices. The traditional worldview of Santals that integrates physical symptoms to environmental and communal health issues and illustrates a holistic and interconnected nature of their beliefs about illness.

**Case-2** gives a illustrate vividly on Santals's traditional knowledge on *Tejos* (parasitic entities) an invisible agent with a visible symptom based on case study of an individual suffering with rabies. For which, he has been applying a paste made up of bark of old *Lim Dare* (Neem tree) (**Azadirachta indica**) on itching spot and skin diseases for last 7 days before going to bed in night and washes it out during bath. Now the itching issue is reducing day by day. He thought that the rabies is caused due to specific *tejos*. He states physical sensations, like itching or discomfort occurs due to the presence of these parasites. They have a method for diagnosing and treating rabies. He was asked to observe his urine for floating oil-like substances, which they interpret as evidence that the *tejos* have been expelled. This indicates the patient is on the path to recovery.

The methods used to address these beliefs often involve ritualistic practices, such as observing bodily fluids or attempting to expel the *tejos* through smoke or other means. These practices reflect a holistic approach where physical symptoms are intertwined with spiritual or ritualistic remedies. The concept of *tejo* illustrates a traditional worldview that attributes a wide range of health issues to the presence and actions of parasitic entities. This perspective integrates physical observations with spiritual beliefs, shaping a unique approach to diagnosing and treating illness.

This traditional healing practices among Santals is a mesmerizing and thoughtful understanding of man-nature relationship. It reproduces a profound connection of the divinity and the natural world, that emphasizes the medications for all ailments are already kept by the Creator and are surrounded in nature itself. The knowledge that remedies and disease must "meet" for therapeutic to occur emphasizes a belief in the inherent harmony and balance in the universe. It explores a holistic approach to health where the precise medication is understood as a key component in reestablishing well-being, signifying that healing is a process of aligning with the natural order established by the Supreme Being. This philosophy of Santals emphasizes a reverential association with nature and an understanding that the resolutions to health problems are available in the natural surroundings, guided by divine wisdom.

However, there is also a serious concern referring to transmission of this traditional knowledge to younger generations. As the elderly people of community possess extensive and intensive knowledge on value based medicinal plants, while the youth are less aware and unenthusiastic to receive the traditional practices. The lack of documentation of traditional knowledge on medicinal plants and its applications that underscores the immediate need to assemble and preserve for future generations. The healthcare practices of Santal community's reflect a holistic approach rooted in spirituality, traditional knowledge, and ritualistic practices

## Conclusion

The Santal people of Mayurbhanj district of Odisha have acquired a profound knowledge of plants and their medicinal value based on their deep association with nature and the natural surroundings. This knowledge, have been passed down to younger ones from older generations. It is closely entrenched in their socio-cultural practices and health behaviors. The ethno-medicinal knowledge continues to perform a substantial role in their health care practices, with the community placing great faith in its efficacy. The sample region avowals high variety of floristic and faunistic richness, encompassing numerous plants having a great degree of medicinal values. However, there is a conspicuous unavailability of information e regarding the gardening, farming, sustainable harvesting, and preservation of these species. These carriages a significant threat to the continued availability of medicinal plants in the area.

The demolition of the habitats of medicinal plants due to various man-made factors such as deforestation, mining, industrialization, population growth, over-exploitation, and uneconomic use worsens the jeopardy condition to these species. Many of valued medicinal plants have become scarce as a result, it necessitates urgent attention to conservation initiatives. Initiatives to protect and preserve these scarce invaluable plants resources must be prioritized, including its implementation safety measures for sustainable harvesting, promotion cultivation initiatives, and raising consciousness about the importance of preserving biodiversity and eco-system. The collaborative efforts of stakeholders such as involving local communities, conservation organizations, policymakers are essential to protect and conservation of these medicinal plants for future generations and ensuring the continued availability of ethno-medicinal knowledge for the Santal people and beyond

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**Table 1:** Traditional Use of Medicinal Plants among the Santal Tribe of Odisha

Sr. No	Species Name	Vernacular Name	Part Used	Ailments	Prescription
01	Achyranthes aspera	Budhidatram	Leaves	Dental problem	Leaves of <b>Achyranthes aspera</b> are boiled and make a cooling in the morning after filtering for over a period of 7 days.
			Root	Snake bite	Roots of <b>Achyranthes aspera</b> are grinded and prepared a juice mixing with water. Half glass of juice is given to the patients bitten with snake. Gradually the snake venom reduces. It is an antidote of venom.
02	Aegle marmelos	Beladare (wood apple tree)	Leaves	Black and white spot on skin	Prepare a paste made up of <b>Aegle marmelos</b> leaves and apply before go to bed at night over the spot.
				Diabetes	Consume 3.5 leaves of <b>Aegle marmelos</b> tree in empty stomach in early morning.
				Heart problem	Boiled water made up of <b>Aegle marmelos</b> leaves is drunk early morning in empty stomach.
				Fever (normal)	Prepare a juice after boiling the leaves of <b>Aegle marmelos</b> tree and drink the warm water in empty stomach.
				Pain due to honey bites	A paste prepares from the leaves of <b>Aegle marmelos</b> tree and applies on the injected part which reduces pain.
			Stomach problem	Consuming of 7 <b>Aegle marmelos</b> tree leaves in early morning in empty stomach every day cures the diseases of stomach and other problems.	
Leaves and Root	Piles	Powder made up of dry leaves of <b>Aegle marmelos</b> is consumed twice a day that is both in the morning and evening mixing with sugar. The 2-3 spoon powder made up of the dry root of <b>Aegle marmelos</b> tree is mixed with warm water and drink three times a day.			
03	Aegle marmelos	Bale (Dare Banyan tree)	Bark	Diarrhea	A glass of milk mixing with the powder of 5-6 spoons made up of dry bark of old <b>Aegle marmelos</b> tree.
				Teeth pain	Bark of old <b>Aegle marmelos</b> tree is boiled with water and made gargling in the morning for over a period 7 days.
			Dry Root	Hair-fall	Powder of dry roots of <b>Aegle marmelos</b> and lotus is apply on hair in morning and have birth at noon.
			Root	Infertility	Powder of dry root of <b>Aegle marmelos</b> tree is consumed mixing with a glass of milk after end of menstrual period for over a period of three days early in the morning.
04	Aloe Vera	Ghitokuanri	Leaves	Hair fall and glowing face	Washing the hair and face with <b>Ghikuanri</b> juice reduce immature hair falling and increasing glowing of face.

				Low blood pressure and stomach problem	Consume the juice made up of <b>Aloe vera</b> in the morning which purify the blood as well as increase blood pressure. The <b>Aloe vera</b> juice is also use for the medication to cure stomach problem, weight loss, heart problem.
05	<i>Alternanthera sessilis</i>	Madranga Alah	Leaves	Dark hair	Application of little warm juice of <b>Alternanthera sessilis</b> leaves mixing with bhringraj ( <i>Eclipta Alba</i> ) juice, one piece of ginger and coconut oil. In morning and take a birth a noon.
				Jaundice	Takes a glass of boil juice of <b>Alternanthera sessilis</b> leaves mixing with milk two times a day morning and evening.
				Piles	Prepare a cup of juice made up of <b>Alternanthera sessilis</b> and 3-4 garlic and 2-3 black pepper and consume it for over a period of 7 days early in the morning in empty stomach.
			Root	Discharge leucorrhoea.	Prepare a glass of <b>Alternanthera sessilis</b> juice with milk and takes before going to bed which cure the undesired semen falling and white discharge leucorrhoea.
				Healthy sleep	Consume juice made up of <b>Alternanthera sessilis</b> with milk develops healthy sleep, eyesight and control the sugar level of body.
				Maintain body weight	Powder of dry root of <b>Alternanthera sessilis</b> is consumed for over a period of one month in morning in empty stomach.
06	<i>Arbor tristis</i>	Separam	Leaves	Cold and Fever	Prepare juice made up of ginger with 3-4 leaf of <b>Arbor tristis</b> and drink 2 times a day after food. It reduces cold the fever.
				Sore throat	Prepare juice made up of 4 <b>Arbor tristis</b> leaves and consume it after making little warm two times a day after food.
				Worm infection diseases	A full spoon of juice prepared from the leaves of <b>Arbor tristis</b> and consume in the morning and evening in empty stomach.
07	<i>Asparagus racemosus</i>	<i>Kadal</i>	Root	Dry cough	Mixture of powder prepared from dried roots of <b>Asparagus racemosus</b> and <i>Pipli</i> is consumed three times a day after food.
				Healthy sleeping	Drink a glass of little warm milk mixing the powder prepared from the dried roots of <b>Asparagus racemosus</b> for 7 days daily before go to bed at night.
				Night blindness	In order to relief from the night blindness the roots of <b>Asparagus racemosus</b> are consumed directly in the morning in empty stomach.
				Weakness due to usual	Prepare a powder from dried roots of the <b>Asparagus racemosus</b> and consumes it by mixing some amount of sugar before going to bed.

				falling of semen	
08	Azadirachta indica	Neem Dare	Bark	Acidity	Prepare a little warm mixing with powder of dry barks of old <b>Azadirachta indica</b> , coriander and sunthi both in the morning and evening in empty stomach is cured acidity.
				Dental problem	Gargling with boiled water made up of the bark of old <b>Azadirachta indica</b> and rinse cures the toothache and bad smell of the mouth.
				Filarial	A glass of juice made up of bark of old <b>Azadirachta indica</b> tree with and honey in the morning and evening for over a period of one month.
			Bark and Leaf	Diabetes	A glass of juice made up of raw barks of old <b>Azadirachta indica</b> tree mixing with honey in morning and evening for a period of month in empty stomach. <b>Azadirachta indica</b> leaf becomes a part of food-plate as leafy vegetable in lunch to control diabetes.
				Dry Leaves and Flower	Piles
			Leaves	Arthritis pain	Drink a glass of juice prepares from the boiling of <b>Azadirachta indica</b> and <i>Trichosanthes dioica</i> leaves mixing with honey in morning and evening.
				Blood purification	Drinking a glass of warm water made up of boiling of <b>Azadirachta indica</b> leaves' for over a period 10-15 days.
				Eye pain Ear infection	2 drops of juice made up of <b>Azadirachta indica</b> leaves in ear before go to be in night for 7days
				Itching and skin disease	Application of paste made up of <b>Azadirachta indica</b> leaves over the itching spot and skin diseases for over a period of 7 days in the morning and wash it out during bath.
				Nasal bleeding	A paste made up of 7-8 <b>Azadirachta indica</b> leaves with ajowan and apply on the nose and forehead in the morning stops the nose bleeding
				Nipple wound	Prepares a paste from the raw tender <b>Azadirachta indica</b> leaves and warm it mixing with mustard oil and apply over the wound.
				Stone in urinary bladder	To consume warm water made up of the powder of dry <b>Azadirachta indica</b> leaves in both morning and evening for over a period of month which dissolve the stone and help to come out with urine.
Stomach pain and	Consumption of tender <b>Azadirachta indica</b> leaves as spinach for over period of 7 days in year.				

			Seed	Stomach worm	
				Asthma	Consume 3-6 drops of <b>Azadirachta indica</b> oil applying with betel leaf in empty stomach in the morning for over a period of one month
				Biting of poisonous insect and reptiles	Consume a paste made up of the powder of dry <b>Azadirachta indica</b> seed, salt and honey just after the snake bite.
				Chicken pox	The juice is prepared from the paste of <b>Azadirachta indica</b> seeds and raw turmeric and consume 2 teaspoon in both morning and evening, which give quick relief.
09	Bacopa monnieri	Bahmi Alah	Bark	High blood pressure	Consumes a juice made up of the bark of <b>Bacopa monnieri</b> in empty stomach early in morning for 7 days.
			Tender Leaves	Stability of mind	The juice made up of tender leave of the <b>Bacopa monnieri</b> and takes in the morning in empty stomach.
10	Bombax Ceiba	Murudbaha	Root	Healthy sleep	Prepares a powder of dry the <b>Bombax Ceiba</b> root, satabari, sugar candy and milk or warm water and drink before going to bed.
				Falling of semen	Prepare a powder from the <b>Bombax Ceiba</b> dry root and eating 1 teaspoon in 1 day in empty stomach in the morning.
				Stomach Problem	Prepares a paste of <b>Bombax Ceiba</b> root and drink 4-5 spoons mixing with warm water in empty stomach.
11	Coccinia grandis Violales	Bir Kendrick	Fruit	Diabetes	Prepares a juice of <b>Cocciniagrands Violales</b> fruits and leaves drink in empty stomach in morning.
12	Diploknemabutryacea	Matkam	Bark	Loose motion	Prepares a juice of bark of <b>Diploknemabutryacea</b> tree and drink 2-3 times a day.
				Tooth Pain	Cooling warm water mixing the powder made up of bark of the <b>Diploknemabutryacea</b> tree in the morning.
			Leaves	Eczema	Prepares an ointment made up of the leaves of <b>Diploknemabutryacea</b> and mustard oil and apply on the on eczema.
			Seed	Pain relief	The oil extracts from <b>Diploknemabutryacea</b> seeds and applies at the pain.
13	Enhydra Angallis	<b>Hidmichani</b>	Leaves	Urinary problem	Prepare a paste of <b>Enhydra Angallis</b> leaves and consume after food in the night.
14	Ficus racemosa	Loa	Bark	Mouth wound	Rinsing with the boil water of the bark of old <b>Ficus racemosa</b> tree mixing with alum.
			Dry Root	Loose motion	Consume a powder made up of the dry roots of <b>Ficus racemosa</b> tree.
			Gum	Bile	The gum of cluster fig tree is consumed with sugar to get relief from the fever due to bile

			Fruit	Body weakness	Consumes the powder of dry <b>Ficus racemosa</b> fruit after food daily for one month.
				Bleeding due to wound	Consumes the juice made up of 2-3 ripe <b>Ficus racemosa</b> fruits mixing with sugar candy.
				Diabetes	Prepares a powder of raw dry fruit of <b>Ficus racemosa</b> with sugar candy and take in empty stomach in morning.
				Stomach pain	The fruit of <b>Ficus racemosa</b> tree is eaten in empty stomach in the morning.
				Urinary diseases	Prepares a juice made up of the fruits of raw <b>Ficus racemosa</b> fruit with 2 leaves in the morning.
			Leaves	Chicken pox	Apply the paste of tender leaves of <b>Ficus racemosa</b> tree mixing with milk over the body.
				Discharge leucorrhoea	Prepares a juice of <b>Ficus racemosa</b> leaves mixed up with sugar candy and drink in the morning in empty stomach.
				Dysentery	Prepares a powder made up of dry leaves of the <b>Ficus racemosa</b> adding 5 black peppers and some black salt and drink with cool water.
				Goitre	Prepares juice after grinding tender leaves of <b>Ficus racemosa</b> and mix it with curd and honey (approximate 5ml) and take it in empty stomach, once a day in the morning.
				Menstrual circle	The juice of <b>Ficus racemosa</b> leaves mixing with some drop of honey is taken.
				Wound	The paste made up of <b>Ficus racemose</b> leaves id applied over the wound and covers with a piece cotton cloth. The piece of cotton cloth is changed every day in the morning
			Milk	Piles	10ml. of <b>Ficus racemosa</b> milk is drunk in empty stomach daily in early morning.
			Root	Irregular Vaginal discharge	A glass of boiled water prepared out of boiling raw root of <b>Ficus racemosa</b> and drink for one month in empty stomach in the morning.
15	Heracleum mantegazzianum	KhapraAlah	Bark	Dry cough	Juice made up of <b>Heracleum mantegazzianum</b> bark is drunk mixing with sugar and consumed in early morning in empty for over a period of month.
				Poly-Urine	The paste made up of <b>Heracleum mantegazzianum</b> bark is consumed mixing with mixing with black pepper.
				Remove face wrinkle and face glazing	Prepares a paste of spreading <b>Heracleum mantegazzianum</b> bark with milk and apply on the face before going to bed.

				Stomach problem	A powder made up of the dry bark of <b>Heracleum mantegazzianum</b> and take in the morning in empty stomach.
			Dry Root	Asthma	Prepare powder out of dry roots of <b>Heracleum mantegazzianum</b> tree and turmeric and consume it in the morning in empty stomach.
			Root	Increase Diet	Prepare a powder from the dry root of <b>Heracleum mantegazzianum</b> and takes it mixing with water in empty stomach twice a day both in the morning and evening.
				Infertility	The raw roots of <b>Heracleum mantegazzianum</b> are boiled and the last cup of boiled water is consumed mixing with milk.
				Insomnia	The raw root of <b>Heracleum mantegazzianum</b> is boiled at night and in the morning takes a glass of that after making little warm in the morning.
			Tender Leaves	Heart problem	Consumes five tender leaves of <b>Heracleum mantegazzianum</b> daily in the morning for one month.
16	Justicia Gendarussa	Birkandah	Flower	Headache	Prepares a paste made up of flowers of <b>Justicia Gendarussa</b> and apply it on the forehead by making it light heat.
				Bleeding due to minor injury	Apply a paste prepares from the leaves of <b>Justicia Gendarussa</b> over the injury
			Leaves	Eye and Stomach Problem	Consumes 2-3 spoons of powder made up of the leaves of <b>Justicia Gendarussa</b> in empty stomach in morning for 7 days.
				Running nose or blockage	The 2-4 drops of the juice of the <b>Justicia Gendarussa</b> leaves is consumed in the morning in empty stomach
				Throat problem	Chewing the leaves of <b>Justicia Gendarussa</b> clears the throat problem and makes it smooth.
17	Kalanchoe piñata	Amar poi	Leaves	Dysentery	Prepares a juice of 4-5 teaspoon of <b>Kalanchoe piñata</b> leaves and mix 2 teaspoon of cumin powder and consume it three times a day.
				High blood pressure	Consumes a juice made up of the <b>Kalanchoe piñata</b> leaves in the morning in empty stomach for over a period of one month.
				Migraine	Applies the paste made up of <b>Kalanchoe piñata</b> leaves over the forehead.
				Stomach pain	Consumes the 2-3 spoon of juice made up of <b>Kalanchoe piñata</b> leaves mixing with sunthi.
				Root	Asthma

18	Momordica dioica	Kankada	Root	Menstrual and childless	The women suffering with menstrual disorder takes a paste made up of <b>Momordica dioica</b> root for seven days in empty stomach.
19	Moringa Oleifera	Munga Alah	Bark	Body pain	Takes a glass of boil water made up of the bark of old <b>Moringa Oleifera</b> adding salt.
			Fruits	Muscles weakness	Drinks a glass juice made up of fruits of <b>Moringa Oleifera</b> in the morning in empty stomach.
			Leaves	Paralysis	A glass of boiled water made up of <b>Moringa Oleifera</b> leaves and takes three times a day.
				Piles	Prepares juice boiling the leaves of <b>Moringa Oleifera</b> and consumes in empty stomach in morning for 7 days.
				Stomach pain	Takes a glass of juice made up of <b>Moringa Oleifera</b> leaves for 2-3 day at morning in empty stomach.
Leave and Fruit	High blood pressure	The consumption of <b>Moringa Oleifera</b> spinach in a regular basis as a part of food plate reduces the high blood pressure.			
20	Musa Sp.	Kaera dare	Tender Leaves	Fever	Consumes the boil water of dry <b>Musa Sp.</b> leaves mixing with 5 drop of honey.
				immature hair fall, dandruff and other hair problems and face glaze	Washes the hair and face with the boil water made up of <b>Musa Sp.</b> tender leaves daily for one month.
				Immunity	Prepares tea with the boil water of <b>Musa Sp.</b> tender leaves and takes in the morning in empty stomach.
				Pimple and skin wrinkles	The young girls and boys apply paste of <b>Musa Sp.</b> leaves mixing with gram flour over the face before go to bed at night and wash the face after getting up in the morning
Throat pain due to cold	Prepares a glass of water made up of tender leaves of <b>Musa Sp.</b> and consumes twice a day for over a period of three days.				
21	Nelumbo Nucifera	Upalbaha	Roots	Dementia	Prepares a powder made up of dry root of <b>Nelumbo Nucifera</b> and consume it mixing with little sugar both in the morning and evening.
				Sore teeth	Chewing the root of <b>Nelumbo Nucifera</b> reduce the sore of the teeth.
				Women semen falling	Consumes the raw root of <b>Nelumbo Nucifera</b> after removing the its bark.
			Seed	Vomiting and eye problem	Consumes the seed of <b>Nelumbo Nucifera</b> flower mixing with honey in order to reduce vomiting and also apply the 2-3 drops of lotus milk at the eyelid

					(like kajal) before go to bed at night which reduces the eye problem.
			Seedpod	Migraine	Applies a paste over the forehead made up of seedpod of <b>Nelumbo Nucifera</b> flower mixing with little honey and pipli.
			Stalk	Dark spot on the body	Prepares a paste from the dry stalk of <b>Nelumbo Nucifera</b> and apply on the spot.
22	Ocimumtenuiflorum	Tursi	Leaves	Asthma	Takes daily 4 <b>Ocimumtenuiflorum</b> leaves in empty stomach early in the morning mixing with little salt in order to get relief.
				Diabetes	Consumes little warm juice of <b>Ocimumtenuiflorum</b> leaves early morning in empty stomach for a month.
				Ear-pain	A mixed up of <b>Ocimumtenuiflorum</b> juice and camphor is put in the ear.
				Facial infections	A paste of <b>Ocimumtenuiflorum</b> leaves apply over the infectious spots of face.
				Headaches	<b>Ocimumtenuiflorum</b> leaves of 7-8 are taken in empty stomach.
				Immunity	The practice of eating <b>Ocimumtenuiflorum</b> leaves in empty stomach in morning daily develops body immunity, skin diseases and pimples.
				Kidney problem	The daily consumption of three and half <b>Ocimumtenuiflorum</b> leaves early in the morning in empty stomach cures kidney problem.
				Viral fever	Prepares a juice of 10 <b>Ocimumtenuiflorum</b> leaves and add little drops of honey and drink it with little warm.
				Vomiting and loose motion	Prepares juice of <b>Ocimumtenuiflorum</b> leaves with few drop of honey and mix the powder of cumin and consume in empty stomach. For vomiting the juice of <b>Ocimumtenuiflorum</b> leave and ginger is taken in empty stomach.
23	Rauvolfia Serpentina	Patalgaru	Leaves	Rheumatic fever	The juice of <b>Rauvolfia Serpentina</b> tender leaves is taken two times a day in empty stomach with the mixed up of honey for the ailments of rheumatic fever, bilious fever, and Phlegm.
				Skin disease	Consumes the juice of <b>Rauvolfia Serpentina</b> , Aswagandha and honey for 7 day in empty stomach in the morning. The juice is prepared by grinding the leaves of <b>Rauvolfia Serpentina</b> . This juice is also consumed for the purification of blood.
				Snake bite	Prepares a juice of made up of leaves of <b>Rauvolfia Serpentina</b> and takes it three times in an hour mixing with the powder of some black pepper. It reduces snake venom.
			Root	Stomach pain	The roots of <b>Rauvolfia Serpentina</b> tree are boiled with water; the boiled water is left for cool and is drunk three times a day in empty stomach.

24	<i>Syzygiumcumini</i>	Kud	Fruit	Liver problem	Prepares a juice of <i>Syzygiumcumini</i> fruit and drinks both in the morning and evening for 15 days.
			Leaves	Dental bleeding	Prepares a juice of <i>Syzygiumcumini</i> leaves and gargling with it daily in the morning.
			Seed	Diabetes	Prepares a powder from the <i>Syzygiumcumini</i> seeds after drying and consumes two times a day in empty stomach.
			Seed	Low blood pressure	Prepare a juice of <i>Syzygiumcumini</i> seeds and drinks taken daily in morning for one month.
			Seed	Oily face	The paste of <i>Syzygiumcumini</i> seeds apply on the face.
			Seed	White spot of body	The paste of <i>Syzygiumcumini</i> seeds is applied over the white spot once a day in the morning.
25	Vetex negundo	Begna tree	Leaves	Leprosy	The application of the paste made up of tender <b>Vetex negundo</b> leave on the affected part cures the leprosy.
				stomach syphilis	Prepare a paste of tender <b>Vetex negundo</b> leaves and apply on the stomach of around the navel which makes the stomach cool.

Source: Field Survey

**Table 2:** Identification of Plants species

Sl. No	Name of Plant Species	Vernacular Name	Order	Families	Genera
1.	Rauvolfia Serpentina	<i>Patalgaru</i>	Gentianales	Apocynaceae	Rauvofia
2.	Asparagus racemosus	<i>Kadal</i>	Asparagales	Asparagaceae	Asparagus
3.	Aloe vera	<i>Ghitokuanri</i>		Asphodeloideae	Aloe
4.	Coccinia grandis Violales	<i>Bir Kendrick</i>	Cucurbitales	Cucurbitaceae	Coccinia
5.	Arbor tristis	<i>Separam</i>	Lamalea	Oleaceae	Nyctanthes
6.	<i>Syzygiumcumini</i>	<i>Kud</i>	Myrtales	Myrtaceae	Syzygium
7.	Enhydra Angallis	<i>Hidmichani</i>	Asterales	Asteraceae	Enhydra
8.	Justicia Gendarussa	<i>Birkandah</i>			Tridax
9.	Diploknemabutyracea	<i>Matkam</i>	Heathers	Sapotaceae	Diploknema
10.	Momordica dioica	<i>Kankada</i>	Cucurbitales	Cucurbitaceae	Momordica
11.	Achyranthes aspera	<i>Budhidatram</i>	Caryophyllales	Amaranthaceae	Achyranthes
12.	Alternanthera sessilis	<i>MadrangaAlah</i>			Alternanthera
13.	Bombax Ceiba	<i>Murudbaha</i>	Malvales	Malvaceae	Bombax ceiba
14.	Moringa Oleifera	<i>MungaAlah</i>	Brassicales	Moringaceae	Moringa
15.	Ocimumtenuiflorum	<i>Tursi</i>	Lamiales	Lamiaceae	Ocimum
16.	Vetex negundo	<i>Begna tree</i>			Vitex
17.	Bacopa monnieri	<i>BahmiAlah</i>		Plantaginaceae	Bacopa
18.	Aegle marmelos	<i>Bale (Dare</i>	Rosales	Moraceae	Ficus
19.	Ficus racemosa	<i>Loa</i>			Ficus
20.	Heracleum	<i>KhapraAlah</i>	Apiales	Apiaceae	Heracleum
21.	Nelumbo Nucifera	<i>Upalbaha</i>	Proteales	Nelumbonaceae	Nelumbo
22.	Kalanchoe piñata	<i>Amar poi</i>	Saxifragales	Crassulaceae	Kalanchoe

23.	Aegle marmelos	Beladare (wood apple)	Sapindales	Rutaceae	Aegle Correa
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Source: Field Survey

## End Notes

<sup>1</sup> Traditional healer who cure diseases by prescribing herbal medicine

<sup>2</sup> Traditional healer who cure diseases of black magic, super-natural power, and evil spirit

<sup>3</sup> Traditional birth attendee/assistant an elderly untouchable women belong to *Ghasi/Ghasia* caste (a scheduled castes), who assist the midwife during child birth.

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