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The medicinal plants it's indigenous use and culture significance in Bastar district Chhattisgarh

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Abstract

Fieldwork was conducted in both Netanar and Tiriya villages through extensive ethnobotanical surveys, participatory observations, and semi-structured interviews with local villagers, elderly persons, and traditional healers (locally known as Baiga and Ojha). Random quadrat sampling was used for vegetation analysis to determine phyto-diversity, species richness, and diversity indices. Sacred groves were mapped, and their floristic composition was recorded to assess their contribution to in-situ conservation of medicinal plants. The study documented a total of 33 medicinal plant species, including trees, shrubs, and herbs, used in the treatment of 30 different ailments and diseases. The ailments included fever, cold, cough, skin infections, wounds, stomach disorders, joint pain, gynecological problems, and even bone fractures. For each species, detailed ethnomedicinal information was recorded, including local name, part used (leaf, bark, root, fruit, seed, or flower), and method of preparation. The most common preparations were decoctions, paste applications, powders, and infusions. For instance, the leaves of *Azadirachta indica* (neem) were used as an antiseptic and for skin infections, while *Tamarindus indica* (imli) was used for digestive problems. This detailed documentation was aimed at preserving and transmitting valuable traditional knowledge to future generations and strengthening community-based healthcare systems.

Keywords: Ethnobotanical, sacred grooves, phyto-diversity, quadrat, gynaecological

1. Introduction

Medicinal plants are a surprisingly diversified group of plants that show their rich potential against varied purposes applied by the tribal peoples. The tribal people used wild herbs to heal a variety of ills, discomforts, and diseases due to their medicinal potency and therapeutic characteristics (Tiwari and Rajendra, 2013) ^[12]. Traditional medicine and ethnobotanical knowledge play a very influential role in alternative Medicinal Plants area associated with various properties related to health and wellness (Biswas, 2020) ^[1]. In India, plants have been used for food and medicinal since the time of the Vedas. The earliest accounts of plant medicine can be found in the Rig Veda and the Atharvaveda and the Ramayana, Mahabharat, and other Vedic literature have many examples of the use of ethno-medicine. Nearly 70 per cent of the world population is dependent on traditional medicines for primary healthcare (Chandel and Budharam, 2023) ^[2].

Ethnobotany in relation to livelihood security of Bastar district of Chhattisgarh state. Existing traditional knowledge of local tribal communities, forest villagers inhabiting in the areas of district Bastar of Chhattisgarh state as well as the status of livelihood promotion through collection and conservation of MAPs (Medicinal and aromatic plants) are playing a key role in the livelihood security of the tribal community, unfortunately due to lack of appropriate planning which is not utilized optimal, although availability of various produces is more than sufficient to cover the food and livelihood security.(Chandel and Budharam, 2023) ^[2].

India is rich in medicinal plant diversity which is distributed in different geographical, environmental conditions and associated tribal & folk knowledge systems. The tribal people mostly depend on forests for their livelihood and up to 70% of the rural population still depends on traditional medicine as a primary healthcare source. "Ethno medicine denotes the totality of health knowledge, values, beliefs, skills and practices of indigenous people, including all the clinical and non-clinical activities that relate to their health needs". The forest of the state is

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recognized as rich biological reservoirs of many medicinal and aromatic plant resources. Since immemorial times the tribes in the state utilize a large number of plants species occurring in these forests as herbal medicine for curing various diseases and health disorders. (Kumar *et al.*, 2022)^[6].

The state of Chhattisgarh has an area of 13.51 mh divided into 18 districts and three agro-climatic zones. Out of which 5.96 mh (44% approx) is covered under dense forests especially in areas like Bastar plateau and Northern hills (62 and 47 per cent, respectively) of total area under forest. These forests include Bastar, Dantewada of Bastar plateau, Koriya, Surguja, Jashpur of Northern hills. Korba, Achanakmar of Chhattisgarh plains possess dense and virgin forests growing medicinal and medicinal tuber plant species under natural habitats. (Nanda and shaw 2008)^[7].

In Chhattisgarh state, Bastar district is found to surround by Kanker district in north, Maharashtra state in the west, Dantewada district in the south and Orissa state in the east. The total forest area of Bastar is 7112 sq km, which is more than the 75% of total area the district. Out of total population 70% are tribals like Gonds, Abujmadia Dandmaria, Muriya, Doriya, Bhatra and Halba etc. (Sinha *et al.*, 2012)^[10]. Bastar is a tribal district where about 70% of the total population is tribals and which constitutes 26.76% of the total tribal population of the Chhattisgarh state. Each tribal group has their own culture, and each of them is following their own traditional living ways. These tribal groups are having different spoken languages, and they differ from each other in their costume, eating habits, customs, art, living ways, etc. (Sinha *et al.*, 2016)^[10].

Many medicinal plants in Bastar are listed as endangered on the IUCN red list, including species like *Rauvolfia serpentine* (Sarpagandha), *Saracaasoca* (Sita ashok), and *Pterocarpus Marsupium* (Bijasal). The loss of these species could have far reaching consequences for human health, particularly in rural areas where traditional medicine is a primary source of healthcare. Ethnobotany deals with the studies among the tribals and rural people for recording their unique knowledge about plant wealth and for search of new resources of herbal drugs, edible plants and other aspect of plants (Srivastava *et al.*, 2018)^[11].

Traditional healing practices are still pursued in various communities around the world, including the Dhurwa community of Netanar and Tiriya in Bastar, Chhattisgarh, India. The Dhurwa community often maintains a strong connection to their traditional healing practices due to cultural, spiritual, and practical reasons. Spirituality and religious beliefs are often inseparable from traditional healing practices among the Dhurwa tribe. Healing rituals, herbal remedies, and other traditional methods are often accompanied by prayers, ceremonies, and other spiritual practices, enhancing their importance within the community (Sahu 2019)^[8].

2. Materials and Methods

2.1 Study Area

The survey was carried out in Netanar and Tiriya Forest Range under Kanger Valley National Park of Jagdalpur Forest Division of Chhattisgarh. For selection of respondent multi sampling procedure was adopted. At the first stage all the certified and non-certified traditional healer was identified. Based on their response and location villagers was selected for personal and group interview. The Sacred groves, to document medicinal and aromatic plants was selected based on the location preference of traditional healers.



Fig 1: Source: Vijay Kumar (2024)^[6]

2.2 Geographical location

Bastar is a district located (N 19°12.5576' latitude and E 81°05.9587' longitude). in the southern part of the state of Chhattisgarh, India, with its administrative headquarters in Jagdalpur. Positioned on the Bastar Plateau, it lies at an average elevation of 2,000 feet. The district is renowned for its diverse landscape, featuring dense tropical forests, rolling hills, and a network of rivers, including the Indravati. It is rich in natural beauty, with notable geographical features such as the Chitrakote Falls and Tirathgarh Falls. Bastar is a culturally significant region, home to several tribal communities, and it is bordered by the Kondagaon, Dantewada, Sukma, and Bijapur districts, as well as the states of Odisha and Telangana, highlighting its strategic position.

2.3 Study design and Sampling

In Netanar and Tiriya, village was selected on the basis of maximum utilization of medicinal flora by local tribes and traditional medicines men. In this both village, 3 compartments of Netanar viz. Tota para, Bati para and Bade para and 5 compartment of Tiriya viz. Dhogri para, Kash para, Kotwar para, Patel para, Naka para was selected for documentation of medicinal plants and out of these 2 villages 8 compartment were selected for study of documentation and identification of traditional medicinal for health problems, traditional healers, sacred groves and conservation. These are the villages considered for the study.

2.4 Selection of respondents

Out of total tribal families in each selected village, Netanar and Tiriya representative sample of was selected randomly for the study. The tribal respondents and the tribal medicine men which were incorporated in this study for collection of data. (Tripathi 2020)^[13].

2.5 Methods of enquiry and collection of data

Information about the use of plants is secret treasure of the aboriginal tribes and they do not easily part with it unless a very close contact and friendship is established with them. The

enquiry was conducted by survey method and collection of information was based on primary data. The investigation was based on participant observation with medicine men and interview with the tribe's families in the study area (Tripathi 2020)^[13].

2.6 Documentation of Sacred groves

A survey has been conducted to know the different Sacred Groves present in the Chhattisgarh and also to know about the different Socio-cultural, Rituals, Traditions, Festivals and Beliefs of the Dhurwa tribal communities situated in this study area. A Proforma has been devised & filled by the Research Scholar to get details of this Sacred Groves and personal interview have been also conducted with local people and preist of the village.

2.7 Data collection

A survey has been conducted to know the different Sacred Groves present in the Netanar and Tiriya village of Bastar in Chhattisgarh. Field surveys were made every in interval of 10 days. Raw data was collected and photographs were taken. Species was noted and picture of rituals were collected. and also, to know about the different Socio-cultural, Rituals, Traditions, Festivals and Beliefs of the tribal communities situated in this Group. (Hemrom& Yadav 2015)^[5]

2.8 Primary information

A Proforma has been devised & to get details of this Sacred Groves and personal interview have been also conducted with local people and preist of the village. An ethno-botanical study has been conducted to record information on sacred groves existing in tribal pockets of Chhattisgarh State. (Chandrakar, *et al* 2014)^[3]

2.9 Secondary information

We searched using internet-based search, databases on scientific literature and leading ecology and conservation journals with keywords, including sacred grove biodiversity, ecology of sacred grove, sacred grove in Chhattisgarh. quantitative studies and documented observations on grove biodiversity and ecology. The study provided valuable information about a large number of useful plants and animals are conserved and worshipped as symbol to local deity by the tribal in sacred groves. (Ekka, 2018)^[4].

3. Results and Discussion

3.1 Demographic Overview

The demographical survey of 40 households each in the villages of Netanar and Tiriya revealed agriculture as the predominant occupation in both villages. The demographic distribution of the respondents of the study area was analysed to understand the background characteristics such as age, gender, education and occupation.

In Netanar, 37 households (92.5%) were engaged in farming, while 2 households (5%) were shopkeeper and only 1 household (2.5%) was employed in government service. In contrast, Tiriya showed a slightly more diverse occupation pattern, with 33 households (82.5%) depending on agriculture, 3 households (7.5%) engaged in shopkeeping, 1 household (2.5%) working in govt. service and 3 households (7.5%) depending on daily wage labour. These major livelihood in both villages, Tiriya demonstrates a relatively broader distribution of occupation compared to Netanar.

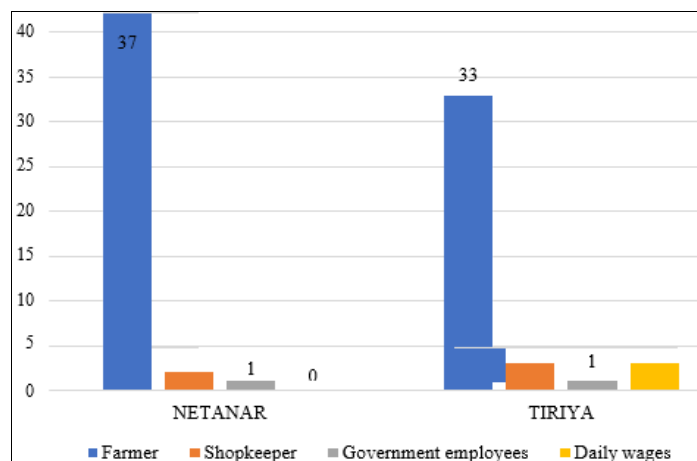


Fig 2: Demographical distribution

Table 1: Demographical distribution across the study area

S. no.	Variable	Category	Netanar	Tiriya
1	Gender	Male	31	29
		Female	9	11
2	Age group	20-40	18	21
		40-50	14	37
		Above 50	8	4
3	Literacy	Upto 5th standard	18	8
		Upto 10th standard	22	32

In the survey, respondents of both the villages, showing almost equal participation of both genders. Most of the respondents belonged to the 20-40 years age group, followed by those between 40-50 years, and a few were above 50 years old. When it comes to education, more people in Tiriya were literate compared to Netanar, while illiterate was slightly higher in Netanar. Overall, the participants were mainly of working age, with a fair mix of men and women, and people from Tiriya showed a higher literacy rate than Netanar.

3.2 Traditional healers

The information was gathered through interview using a pretested schedule. Information regarding common disease and their cure with available wild medicinal plants was recorded along with the recipe of crude herbal drugs preparation and method of treatment. The tribal herbalists were taken individually to the forest where they pointed out the herbs that they used to cure different ailment. Prior to the interview, the respondents were taken into confidence by revealing the actual purpose of the study and also full care was taken to develop good report with them. During the field visit, information was collected by making repeating queries from time to time.

Table 2: List of local traditional healers working in the study area, Netanar and Tiriya village Bastar district of Chhattisgarh.

S. No.	Village	Area	Name	Age/sex	Caste
1	Tiriya	Dongri Para	Dasmu Nag	60/M	Dhurwa
			Rukhdar Nag	40/M	Dhurwa
		Kotwar Para	Mahadev	40/M	Dhurwa
2	Netanar	Batipara	Setu Nag	37/M	Dhurwa
		Badepara	Dasrat Nag	40/M	Dhurwa
		Totapara	Somaru Nag	39/M	Dhurwa

3.3 Identification and documentation of plants used locally for health problems by tradition healers

A total of 33 plants species belonging to 26 families have been collected, identified and documented from Netanar and Tiriya

village of Bastar district Chhattisgarh. These plants are highly utilized by different ethnic groups residing in the study area to cure 30 various diseases and ailments. The distribution of these medicinal plants in the study area is very common the observation on medicinal plants has been recorded as per the information received from traditional healers and respondents of village (Dhurwa tribals) residing in the study area. During the investigation it has been found that the tribal medicine men called Baiga.

There are many works has been conducted previously dealing with the cures of various diseases through natural healing techniques.

3.4 Preparation methods of medicinal plants

A total of 33 medicinal plants preparation were documented

through personal interview. The distribution of preparation methods is as follows:

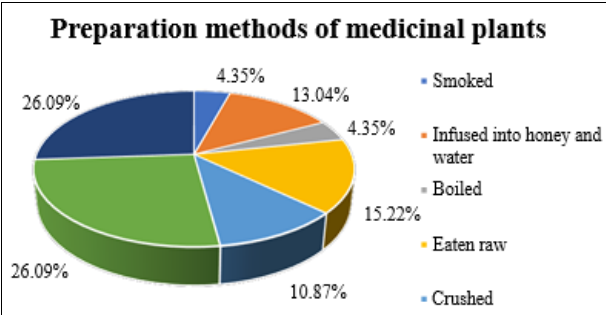


Fig 3: Preparation methods

Table 3: Use of medicinal plants across the study area

S. No	Different use	Species no.	%	Example
1	Purely Medicinal use	6	18.2%	<i>Rauvolfia serpentina, Withaniaso mnifera, Andrographis paniculata</i>
2	Food	9	27%	<i>Syzygiumcumini, Phyllanthus emblica, Madhuca longifolia</i>
3	Timber	6	18.2%	<i>Schleichera oleosa, Azadirachta indica</i>
4	Firewood/charcoal	5	28%	<i>Pongamia pinnata, Diospyros melanoxylon,</i>
5	Construction	4	12.1%	<i>Pterocarpus marsupium, Shorea robusta</i>
6	Fencing	5	15.2%	<i>Semecarpus anacardium, Abutilon indicum</i>

Identification of Habit of all the Medicinal and Aromatic Flora

In the present investigation, trees were the most dominant groups with 72 species and the least recorded groups were

rhizomes and fungus, represented by only 2 and 1 respectively. This clearly highlights the pre-maintenance of trees in the study area, with very few species belonging to rhizomes and fungal categories.

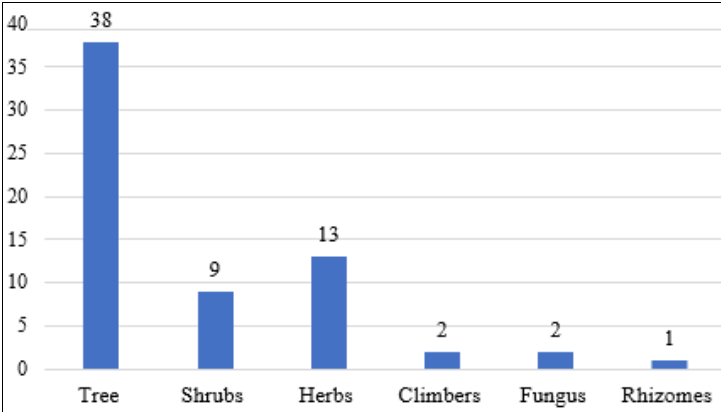


Fig 4: Plants Habit of Study Area

3.5 Documentation of Species Part Used for Medicinal Purpose

Out of the 33 documented medicinal plants species, various plants parts were traditionally utilized for treating different

diseases and ailment. This distribution highlights the dominance of leaves, bark and seeds in traditional medicinal practices, reflecting their accessibility and therapeutic value in addressing a wide range of human health issues.

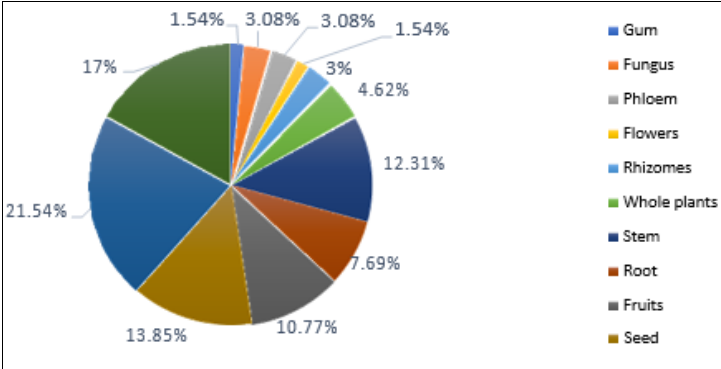


Fig 5: Medicinal Plant Part Used for Curing Ailments

3.6 Families Used in Documentation of Medicinal and Aromatic Flora

In the present investigation, a total of 44 plant families were recorded, reflecting the rich floristic diversity of the study area. Among these, the Fabaceae family emerged as the most dominant, contributing the highest number of species to the

overall composition. Interesting, 20 species were found to be represented by only a single individual, highlighting their restricted occurrence and potential ecological vulnerability. This pattern of distribution emphasizes both the dominance of certain families, such as Fabaceae, and the unique yet limited presence of several rare species within the 44 record families.

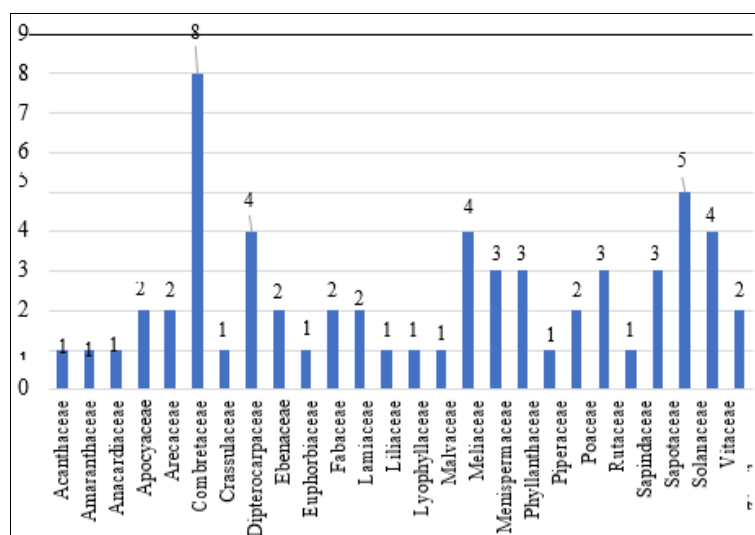


Fig 6: Families of Medicinal Flora

3.7 Role of Sacred Groves in Conservation of This Diversity

Sifting through the information given by the priests (Baigas) and some of the elders about the groves in this both villages, one comes across a lot of similarities in the roles that these Sacred spaces play across many communities. The maintenance of village peace, meaning the well-being of the people and the cattle, is apparently the most important role that groves seem to have. This is how the groves, and the deity residing there respond to the offering and the prayers of the community. In most cases, this extends to the belief that non-compliance with the appropriate behaviour results in the kind of retribution that the community wants to avoid. In addition, in many villages, meeting to decide upon important matters that affect the community are held in the groves. The community feels that with the deity as a witness to the discussion, people will speak the truth and good decision will be made. Other ways in which the groves contribute to overall community well-being are expressed as follows:

- The maintain peace in the village and community
- To prevent the spread of illnesses
- To assure full granaries
- To keep wild animals away from the village and to protect people who guard their crops at night, etc.

There is also specific request brought to the deity in the groves

and these include cures from skin infection, diarrhoea, and small box, for sufficient rain, to keep cattle healthy, and to bless childless couple with Offsprings.

3.8 Primary information

The tribal communities were interviewed to collect information on existence of groves, plants and animals conserved their ethno- botanical information etc. The information was recorded from tribals who were of age group from 16 to 70 years and resided in villages of Chhattisgarh.

In the present documentation, a total of 14 sacred groves were recorded from the two selected villages of Bastar district. Among them, Tiriya village has a greater number of sacred groves with 9 sacred groves compared to Netanar, which has 5 groves. These sacred groves are primarily associated with the Dhurwa community, who preserve them as culturally significant spaces linked to their spiritual belief's traditional rituals and festivals in these groves.

3.9 Secondary information

The study revealed that a large number of useful plants and animals are conserved by the tribals in sacred groves. Plants and animals conserved in sacred groves are documented with scientific name, local name, worshipped as symbol to local deity.

Table 4: Sacred Groves of Bastar

S. No.	Tree species	Local Name	Family	Goddess residing	Area of deogudi (ha.)	Deogudi village	District
1	<i>Dendrocalamus strictus</i>	Bans	Poaceae	Durga Mata	1.4	Keshkal Nawapara	Bastar
2	<i>Mangifera indica</i>	Aam	Anacardiaceae	(Kondagaon) Keshlur	0.2	Bastar	
3	<i>Cassia fistula</i>	Amaltas	Caesalpiniaceae	Raopan Banjari Mata	0.6	(Narayanpur) Jhariniguda (Jagdalpur)	Bastar
4	<i>Mangifera indica</i>	Aam	Anacardiaceae	Banjari Mata	3.5	Jhariniguda (Jagdalpur)	Bastar
5	<i>Shorea robusta</i>	Sal	Dipterocarpaceae	Tikaprai	1.5	Sukma	Bastar
6	<i>Terminalia chebula</i>	Harra	Combretaceae	Mudia	5.0	Bhasmavandarch	Bastar
7	<i>Terminalia arjuna</i>	Arjun	Combretaceae	Lord Brahma Lakshminata	2.7	Keshkal	Bastar
8	<i>Ficus religiosa</i>	Peepal	Moraceae	Jalinimata	0.7	Adawal	Bastar
9	<i>Shorea robusta</i>	Sal	Dipterocarpaceae	Jalinimata	1.5	Kalaguda	Bastar
10	<i>Bixa orellana</i>	Sindoor	Bixaceae	Jalinimata	0.5	Tiriva	Bastar

3.10 Importance Value Index (IVI) of Tree, Sapling, Shrubs and Herbs Species of Netanar and Tiriya Village

Tree species inventory and diversity studies help to understand the species composition and determine the information for forest conservation. This research evaluates the importance value index (IVI) of tree, Sapling, Shrubs and Herbs species and diversity of Netanar and Tiriya Village of Bastar district, Chhattisgarh. In Netaanar, 3 compartments were selected, while in Tiriya 5 compartment were selected in each compartment 10m x10m quadrats were laid for random sampling of tree, shrubs, sapling and herbs.

In Netanar village, tree layer analysis revealed that *Tamarindus indica* recorded the highest Importance Value Index (IVI = 55.6) in Site 2 (Batapara), indicating its dominance in this area, making it the most ecologically significant tree species of this site. Meanwhile, in Site 3 (Badepara), *Madhuca longifolia* showed the highest IVI (197.32), highlighting its prevalence and ecological importance in this compartment. These results suggest that different tree species dominate different sites, reflecting variation in habitat preference and community structure across the study area.

Sapling layer analysis of Netanar revealed that in Site-2 (Batapara), *Azadirachta indica* showed the highest Importance Value Index (IVI = 91.4), indicating its dominance in the regeneration layer of this site. In Site-3 (Badepara), *Tamarindus indica* recorded the maximum IVI (74.03), showing its strong natural regeneration potential and ecological importance. In Site-1 (Totapara), *Bombax ceiba* and *Azadirachta indica* exhibited the same highest IVI (51.6), suggesting that this species is regenerating well in this compartment. These findings indicate that the composition of regenerating saplings varies across the three sites, reflecting site-specific species preference and regeneration dynamics.

The shrub layer analysis showed that in Site-3 and Site-2, *Carissa carandas* exhibited the highest Importance Value Index (IVI = 82.6), indicating its dominance among shrubs. followed by In Site-1, *Achyranthes aspera* recorded the highest IVI (80.76). Similarly, in the herb layer, *Curcuma aromatica* recorded the highest IVI (112.28) in Site 1, followed by *Bryophyllum pinnatum* with IVI (104.36) in Site 2. In Site 3, *Curcuma aromatica* again showed dominance with the highest IVI (81.41). This indicates that *Curcuma aromatica* is a major herb species contributing to the ground flora of Netanar, particularly in Sites 1 and 3.

The phytosociological study of the site revealed a diverse vegetation structure, comprising tree, sapling, shrub, and herb layers. Among trees, *Tamarindus indica* with highest IVI (53.95), (71.13) in site 2 and site 1 respectively emerged as dominant species, followed closely by *Mangifera indica* (34.58) and *Shorea robusta* and *Dictrocarpus alatus* with (31.33) and (31.89), indicating their strong ecological presence. In the sapling layer, *Azadirachta indica* emerged as the most dominant sapling species with a very high importance value index value (74.89) in site-1, site-3, site-4 and site-5 indicating strong regeneration potential, *Mangifera indica* followed with IVI value of (47.38), indicating their capability to influence future forest composition. In the shrub layer *Achyranthus aspera* and *kalanchoe pinnata* emerged as the most dominant shrub species in site-2 and *jatropha curcas* and *kalanchoe pinnata* with same IVI value (93.3) in site-4.

In the herbaceous layer, *Eclipta alba* exhibited the highest Importance Value Index IVI at (133), followed by *Curcuma caesia* with an IVI of (115.2), emphasizing their significance in providing ground cover and contributing to ecosystem stability.

The findings overall indicate that the vegetation is layered, with certain species consistently holding ecological dominance throughout the different strata.

A high Importance Value Index (IVI) shows that a species is better adapted to its surroundings, more competitive, and has stronger chances of survival and reproduction compared to others in the area. On the other hand, species with low IVI values may be vulnerable, as their smaller populations and weaker ability to reproduce or spread could put them at risk of disappearing from the ecosystem if additional pressures arise (Zulkarnain *et al.*, 2015)^[14].

In Netanar, trees showed relatively high diversity all sites with Shannon- Wiener indices ranging from 4.26, indicating a rich and well-distributed tree community. Simpson dominance values were low 0.06. Sapling diversity varied, with Tota Para and Bati Para showing moderate values ($H = 2.59-2.68$), while Bade Para had low sapling diversity ($H = 0.74$), indicating weaker regeneration. Shrubs and herbs generally had low diversity and evenness, with Shannon indices between 0.13 and 1.86, showing sparse or uneven distribution. Beta diversity was higher for saplings, shrubs, and herbs than trees, reflecting greater species turnover between sites.

In Tiriya, tree diversity remained high across all five sites ($H = 3.6-4.12$) with low Simpson dominance (0.07-0.18), similar to Netanar, indicating balanced tree composition. Saplings in Tiriya exhibited very high diversity, especially at Kotwar Para ($H = 6.11$), Kash Para ($H = 5.54$), and Naka Para ($H = 5.94$), showing robust regeneration and a rich mix of species in the younger layer. Shrubs had low diversity overall ($H = 0.32-3.13$), though Naka Para showed comparatively higher shrub diversity. Herbs remained low in diversity across sites ($H = 0.13-0.2$), reflecting sparse herbaceous layers. Beta diversity was highest in shrubs and herbs, indicating that species composition varied significantly between sites.

Overall, trees in both villages were evenly distributed and diverse, whereas saplings in Tiriya regenerated better than in Netanar. Herbaceous and shrub species had low diversity in villages, but site-specific differences, particularly in Tiriya, indicate forest undergrowth composition variability. These trends indicate the need to pay attention to sapling and undergrowth layers when managing and conserving forests since they influence future forest structure and sustainability of species.

Conclusion

The present study concluded that, the local tribes of the study area possess rich knowledge on the medicinal plants and their utilization. Thus, the present study focuses on the documentation of the traditional knowledge of these valuable plants, which could enhance the potential of these medicinal plants to other communities as well and by understanding the importance, other communities can also be helpful for conservation of these resources for further use.

The results highlighted the imperative need to merge traditional knowledge with science-based strategies for conservation of biodiversity and enhancement of healthcare. The sacred groves stood out especially, serving as living herbaria of medicinal plants and demonstrating the community's spiritual and environmental values. Their protection through community-led and legal means is critical. Furthermore, knowledge transmission should be facilitated through awareness programs, capacity-building workshop, and active involvement of younger generations.

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