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The Fibers of Indigenous Communities Living in Pilibhit Tiger Reserve

Sandhya Devi*, Alok Kumar Khare

Department of Botany, Bareilly College Bareilly

**corresponding author email: sandhya18botany@gmail.com*

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Abstract

Forests contain everything a living being might possibly need: food, forage, medicine, timber, and fiber. In terms of their value to human society, fiber-producing plants have been ranked second only to food plants. The current study focuses on the natural fibers utilized by the communities residing in the Pilibhit Tiger Reserve area. Field surveys and ethnobotanical data collecting using the open-ended, structured, and participatory rural appraisal (PRA) technique are the primary sources of the data. The study identified 22 plant species of 21 genera belonging to 7 different families. Most of the plants belonged to family Poaceae (36%) and stem (32%), leaves (27%) and stem bark (23%) are main source of fiber. The study area is rich in biodiversity and inhabited by many ethnic and subethnic communities with good traditional knowledge on fibres and the extraction processes. The purpose of the study is to promote awareness and explore the possible commercial application of the natural fibre yielding plants.

Keywords

Ethnobotany, PTR, Terai, Natural Fibers, Traditional Knowledge

Introduction

Ethnobotany is the study of rural and tribal people to document their distinctive knowledge of plant wealth and to find new resources in forests (Mudgal and Jain, 1999); it would be more accurate to say that it recuses traditional knowledge about plants and their products, as well as their involvement in human cultural practices. Food, a home, and clothing are the most probable need. Textile production, like agriculture, is one of mankind's oldest and most traditional practices. Men have utilized natural fibers to make fabric and clothing for millennia, and knowledge of vegetable fibers and textile production processes is still prevalent in many traditional civilizations (Yumi et.al, 2012). Plant fiber, a type of lignocellulosic material

produced during photosynthesis, has great potential for usage as a natural fiber because of its exceptional mechanical qualities and renewability (Low and Rahman, 2017). A wide variety of products, such as ropes, roofing, paper, and other everyday objects are made from plant fibers. Many different types of plants are known to produce fibers. However, only a small number of plant fibers, such as cotton, jute, coir, flax, etc., are used in the commercial sector. The bulk of conventional fiber-producing plants are still unused (Sahu. et.al, 2013). Fiber-producing plants are turned into bundles, and the portions of the plant from which the fiber is to be removed are taken into consideration while choosing an appropriate extraction technique. The qualities and attributes of composites made from it are determined by the extraction technique selected. Traditional fiber extraction techniques include scooping seed fibers, direct sun-drying, retting fiber bundles, and scrapping bark (Mohankumar et.al, 2021).

Materials and Methods

Study area

The Pilibhit Tiger Reserve (Figure.1) are situated in the northern Uttar Pradesh Terai-Bhabar stretch (28°38'17.00"N 79°57'18.12"E. The elevation 150-182 meters above sea level. The Terai is a lowland area that runs parallel to the Himalayan foothills in Northern India and Southern Nepal. It is situated south of the hills of Shiwalik. Kishanpur Sanctuary of Dudhwa Tiger Reserve and Shukla Phanta National Park in Nepal are connected to Pilibhit Tiger Reserve (Chatterjee et.al, 2022). Temperatures may range from 5°C (average) in winter to 40-44°C (peak) in summer. The average annual rainfall figure is 612.59 mm(Singh and Khare, 2020).The terrain and vegetation in these places are typical of the Terai Bhabar belt(Figure.2), comprising wet alluvial grasslands, swamp low forests, alluvial savannah woods, moist deciduous forests and plain Sal forests(State of Forest Report, 2011). The study region is home to a variety of ethnic and non-ethnic people, including Bangladeshi refugees known as Bangalis. Agriculture remains the predominant occupation. Some are herbal healers who use traditional knowledge in forests to treat various ailments of humans and cattle. Women are typically housewives, while some may run small businesses or serve as labourers for businesses (bidi making, preparing saplings for nursery, construction work, etc.), farms, or the forest division. The rate of literacy is really low.

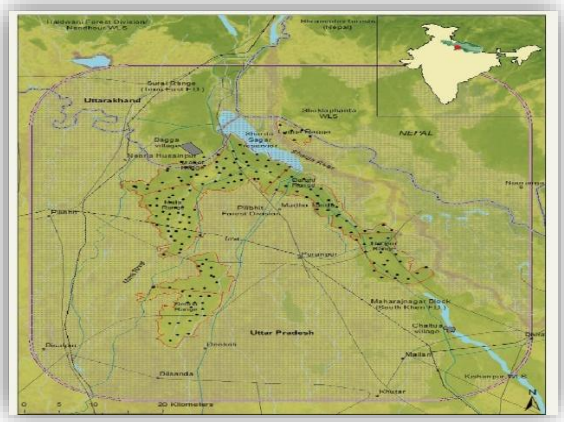

Figure.1-Geographical Location of Pilibhit Tiger Reserve

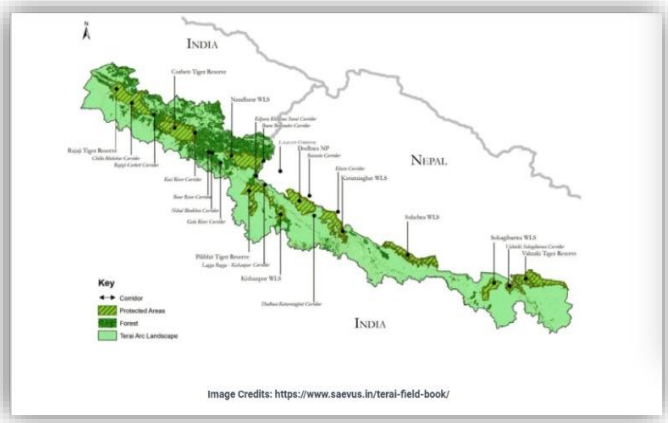

Figure.2- Illustration of Terai Arc Landscape (Terai Belt)

- **Data Collection**

From September 2024 to November 2025, a number of field trips were conducted in the research region to record the natural fiber-producing plants and the traditional fiber extraction processes. The open-ended, structured, and participatory rural appraisal (PRA) technique was used to gather data for the study, which was conducted during different seasons. Various groups of people were interviewed, and group discussions were held in PRA. The plants were collected and identified by consulting the appropriate literature (Singh, 1997), and a herbarium was prepared.

Results And Discussion

The gathered information on the fiber plants in the study area revealed around 22 plants species of 21 genera and 7 families (Table.1). Out of total species reported 36% belongs to familiy Poaceae followed by Malvaceae (32%), Fabaceae (14%) least members belonged to Caesalpiniaceae, Typhaceae, Apocynaceae and Menispermaceae. Generally perennial grass (8 species), shrubs (8 species), climbing shrubs (3 species) and tree (3 species) yield fiber for textile use were reported from study area.

S.No	Botanical name	Local Name	Family	Habit	Parts Used	Mode Of Use
1.	*Abrus precatorius* Linn.	Ratti, Ghumchi	Fabaceae	Climber	Stem	Temporary Binding
2.	*Abutilon indicum* (L.) Sweet.	Kanghi	Malvaceae	Under shrub	Stem	Cordage
3.	*Bauhinia vahlii* wight & Arn.	Mahulain Bel	Caesalpiniaceae	Woody Climber	Shoot, Bark	Rope, Thread
4.	*Bombax ceiba* Linn.	Semar/semal	Malvaceae	Tree	Seed (seed fibre)	Stuffing fibre ,as non absorbant bandage
5.	*Butea monosperma* (Lamk.) Taub.	Dhak	Fabaceae	Tree	Root bark	Rope, Threads
6.	*Calotropis gigantea* (Linn.) R. Br	Akahua	Apocyanaceae	Shrub	Bark	Fine fibre for fishing net
7.	*Dendrocalam us strictus* (Roxb.) Nees	Bans	Poaceae	Huge Shrub	stem	Mat, Baskets, Hats and fishing appliances
8.	*Desmostachya bipinnata* (Linn.) Stapf.	Kush	Poaceae	Grass	Leaves	Mats
9.	*Eulaliopsis binata* (Retz.) Hubbard	Baib	Poaceae	Grass	Leaves	Ropes, Brooms, Mats

10.	*Flemingia chapper* Buch, -Ham.	Titali	Fabaceae	Shrub	Stem	Basket and Broom
11.	*Helicteres isora* Linn.	Marodphali/ Bhendu	Malvaceae	Shrub	Stem/ Bark	Rope
12.	*Imperata cylindrica* (L.) Raeusch.	Bharuee /Ullo ghass	Poaceae	Grass	Leaves	Brooms, Cord
13.	*Phragmites karka* Trin. ex Steud	Narkul	Poaceae	Tall Grass	Stem	Mats, Basket
14.	*Saccharum spontaneum* Linn.	Kans	Poaceae	Tall Grass	Whole Plant	Basket, Mats
15.	*Saccharum munja* Roxb.	Munj	Poaceae	all Grass	Leaf Sheath	Basket, Roofings
16.	*Sida rhombifolia* Linn.	Khareti/lal Bariara	Malvaceae	Under Shrub	Stem	Fibre
17.	*Sterculia villosa* Roxb.	Udar	Malvaceae	Tree	Stem Bark	Rope
18.	*Themeda arundinacea* (Roxb.) Ridley	Ulla	Poaceae	Tall Grass	Leaf	Rope, Cordage
19.	*Thespesia lampas*(Cav.) Dalz.	Banbhindi	Malvaceae	Shrub	Stem Bark	Cordage, Bags
20.	*Tiliacora acuminata* (Lamk.) Miers	kharwanth	Menispermaceae	Woody climber	Twigs	Temporary binding, Basket
21.	*Typha angustata* Bory &chaub.	Patel	Typhaceae	Tall Grass	Leaves	Mats, Handicrafts, rope
22.	*Urena lobata* Linn.	Lapetua	Malvaceae	Shrub	Stem	Fibre, Rope

Table 1. Fiber Yielding Plants Reported from the Study Area

Uses of Natural Fibre

Natural fibers are extracted and utilized in the production of numerous conventional and innovative goods, including fabrics, paper and board materials, brushes, carpets and mats, beds, ropes, and nets. The long fibers are converted into threads or yarns, which are used to create bonds, networks, or weaves as well as to join, connect, or attach (Bhardwaj et. al, 2014). Certain species of climbing plants, known as coarse fibers, are used as ropes for short-term binding, while others are utilized as cordages or filling materials.

Plant Parts Used

The fiber-yielding plants recorded from the study area are generally under shrubs, shrubs, trees, and mostly tall perennial grasses. Leaves (*Desmostachya*, *Imperata*), leaf sheaths (*Phragmites*), and culms (*Dendrocalamus*)of some grasses are sources of fiber. Trees (*Sterculia*) and woody climbers (*Tiliacora*) possess fibrous stems or bark. In plants like *Butea monosperma,* root bark is also a good source of fiber. Stems and twigs of shrubs and undershrubs yield fiber of traditional use. *Bombax ceiba*, the source of silk cotton used as a stuffing fiber as well as a bandage due to its nonabsorbent property, is obtained from the seed surface of the fruit; such fibers are seed fibers.

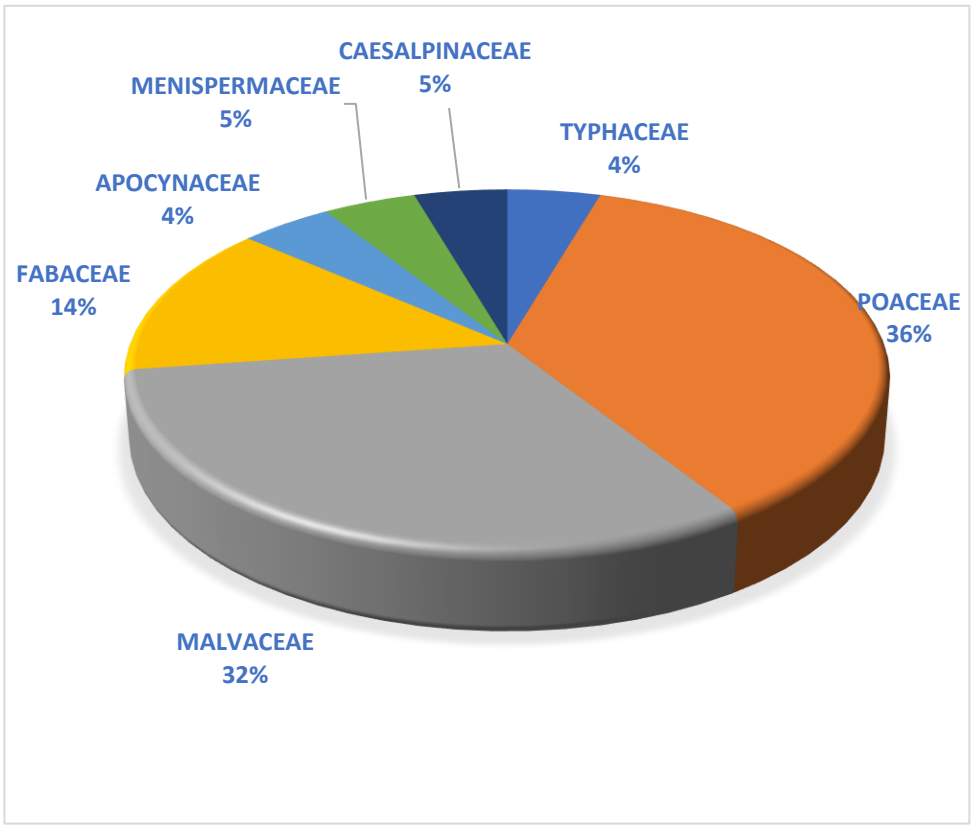

Figure.3-Pie chart comparing the fiber-producing families in the Study area

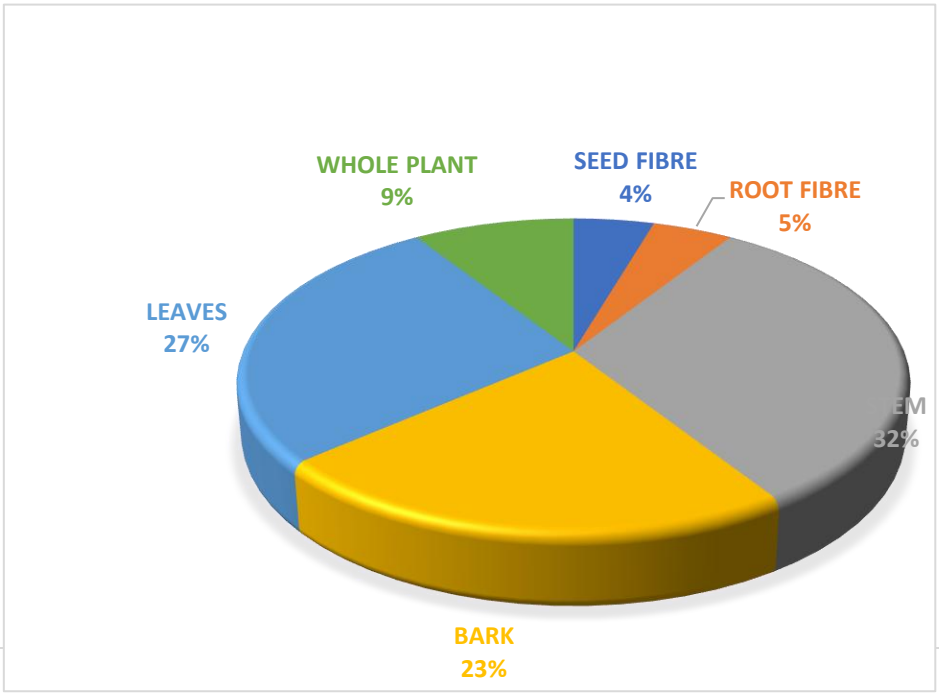

Figure.4- Pie Chart Comparing Parts of the Plant Used to Extract Fiber

Traditional Method of Extracting fibre

Retting (*Helictres & Bauhinia vahlii*) is the process of extracting fiber from stem and bark by soaking the source in slow running water (water retting) for a few days until the non-fibrous portion becomes soft. The fiber bundle is then extracted and battered to extract fiber from pulp. Another kind of retting is dew retting (Grasses), in which the source is allowed to rot in fields or forests. Fruit is scoped to extract seed fibers, which are then dried. Coarse fibers (*Tiliacora & Abrus*) are either directly used or occasionally dried. A portion of stem or bark are removed by scraping off to extract fiber from some plants (*Dendrocalamus*). Twigs are dried to make basket and handicrafts (*Sida*).

Conclusion

Tribes and rural groups live in peace with nature, utilizing and consuming but also conserving it. They depend on the forest for food, livestock fodder, medicine, and timber. For clothes and textiles, aborigines rely on natural fibers derived from animals or plants. The plant fibers identified have been used for apparel and textile purposes. Natural fibers are largely recyclable and biodegradable, making them both advantageous to the environment and adaptable in use. Plant fibers are used to make a variety of items, including ropes, paper, and household materials.

The worth of fiber-producing plants has been evaluated alongside food plants in terms of their utility to humanity. This account not only provides valuable insights into the research area's untapped fiber genetic resources, but it also provides several production and marketing options. The production of fibre makes a significant economic impact. However, plant fibers are rarely used in the commercial sector. The majority of conventional fiber-yielding plants are underutilized.

c. d

Plate 1. Images from the study Area a-d; **a**. Woody Climber *Bauhinia vahli,* **b**. Mat made up of *Phragmites karka* and roofing of *Saccharum munja,* ***c.*** A tribal man making basket of *Dendrocalamus* **d.** *Broom made up of Impereta cylindrica*

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Conflict of interest: *"The authors declare no conflict of interest."*

References

1. Bhardwaj, A., Rani, S., & Rana, J. C. (2014). Traditionally used common fibre plants in outer siraj area, Himachal Pradesh. *Indian Journal of Natural Products and Resources (IJNPR)[Formerly Natural Product Radiance (NPR)]*, *5*(2), 190-194.
2. Chatterjee, M., Chatterjee, N., Chandel, P., Bhattacharya, T., & Kaul, R. (2022). Predicting negative human-tiger (Panthera tigris) interactions in mosaic landscapes around Dudhwa and Pilibhit tiger reserves in India. *Frontiers in Conservation Science*, *3*, 999195.
3. Low, J. H., & Rahman, W. A. W. A. (2017). Plant fibers: Renewable reinforcing filler in polyolefin bio-composites. *Nova Science Publishers, Inc.: Hauppauge, NY, USA*, 303-324.
4. Mohankumar, D., Amarnath, V., Bhuvaneswari, V., Saran, S. P., Saravanaraj, K., Gogul, M. S., ... & Rajeshkumar, L. (2021, April). Extraction of plant based natural fibers–A mini review. In *IOP conference series: materials science and engineering* (Vol. 1145, No. 1, p. 012023). IOP Publishing.
5. Sahu, S. C., Pattnaik, S. K., Dash, S. S., & Dhal, N. K. (2013). Fibre-yielding plant resources of Odisha and traditional fibre preparation knowledge—an overview. *Indian J Nat Prod Resour*, *4*(4), 339-347.
6. Singh, D., & Khare, A. K. (2020). Studies on the occurrence and distribution of the invasive alien angiospermic plant species in Pilibhit Tiger Reserve, Pilibhit, UP,(India).
7. Singh, K. K. (1997). Flora of Dudhwa National Park: Kheri district. *Uttar Pradesh*.
8. State of Forest Report (2011) *Forest survey of India, government of India*. Available at: http://wipl.net.in/fsi_report_20011/final_2011.pdf.
9. Yumi, S. D. A., de Queiroz Rayana, S., Aparecida, S. R., Regina, G. C., & Giuseppe, D. F. (2012). Ethnobotany of natural fibres-bactris setosa (tucum) in a traditional rural community. *Fibres & Textiles in Eastern Europe*.