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Green Traditions: Unearthing Uncommon Plant Uses among the Maher Tribe in Porbandar District, Gujarat, India

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ABSTRACT

This paper delves into the intricate relationship between human perception and plant utilization within the Maher community of the Porbandar district in Gujarat. With a focus on the hidden uses of various plants, the study explores the unique connections between the Maher culture, immediate surroundings, and plant interactions, shaping personal, social, and economic dimensions. Conducted in 90 villages of the Porbandar district, ethnobotanical expeditions gathered first-hand information from the Maher tribe. Extensive field surveys involved interactions with 978 individuals, documenting their perspectives on the usage of 30 plants. The demographic profile of informants indicates a predominant age group of 51 to 80, with a substantial representation of those aged 71 to 80. Agricultural occupations dominate, with farmers constituting 85.07% of the informants. The data collection process, conducted in Gujarati, utilized a structured questionnaire to systematically capture crucial details, such as plant names, habits, utilized plant parts, and recommended methods of use. The study categorizes 30 plants based on their applications within the Maher tribe, revealing a diverse range of uses. Plants serve purposes ranging from medicinal applications and weather prediction to crafting artifacts and participation in rituals. The exploration of Maher plant utilization uncovers a rich tapestry of knowledge and practices. Maher's reliance on nature, observed in their occupation and cultural practices, has led to the discovery and utilization of plants for unique purposes. This study, while focused on the Maher tribe, holds broader implications for tribal communities in the region. Understanding the intricate relationships between plants and humans contributes to a deeper awareness of sustainable resource management and its vital role in tribal survival and progress.

Keywords

Ethnobotany,
Maher, Tribe,
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Introduction

In the realm of Angiospermic plants, Govaerts (2001) documented a global count of 420,000 flowering species in 2001, with a multitude of unnamed tropical varieties still awaiting formal identification. Schippmann *et al.*,

(2002), emphasized the application of over 50,000 plants in medicinal contexts. India, with its rich culture, traditions, and abundant natural biodiversity, offers a unique opportunity for researchers engaged in drug discovery. The utilization of plants for medicinal purposes in India has been extensively recorded in

ancient texts (Sankaranarayanan *et al.*, 2010). Both traditional and modern medicinal and plant science research rely heavily on ethnobotanical and ethnomedicinal aspects and discoveries. The term "Ethnobotany," coined by J. W. Harshberger in 1895, serves to describe the study of plants employed by indigenous communities. This term derives its meaning from "ethno," signifying the study of people, and "botany," signifying the study of plants. Ethnobotany is acknowledged as a subset of ethnobiology, centring on the examination and evaluation of the relationships between plants and humans across various dimensions, including the influence of the plant environment on human society.

Over the course of the last century, ethnobotany has experienced substantial growth and transformation, evolving into a distinct field of study that delves into the intricate connection between people and plants from a multidisciplinary perspective. This encompassing approach includes various domains, such as ecology, economic botany, pharmacology, and public health (Balick, 1996). Herbal remedies are widely acknowledged for their pivotal role in primary healthcare, both for individuals and communities in many developing nations. They are prized for their perceived safety when compared to synthetic drugs (Sheldon *et al.*, 1997).

The Maher population of Kathiawar region in Saurashtra also known as the Mer, Mihir, Mair or Mehr are a tribe of people who have evolved from the Kshatriya Varna within Hinduism. They are believed to be of Indo-Aryan descent, and have a rich and diverse history involving many battles, valour & sacrifice to uphold their honour & values. The population of Maher distributed in a number of 155 villages and some 23 nesses was reported to be 50,000 according to the Census of 1951.

Presently population of Maher tribe is 2,50,000. Living in hamlets that comprise shelters scattered sparsely throughout the plain ground in Barda region and in Ghed region shelters is situated on the hilly landscape. The number of shelters constituting a village may range from a small one like twenty-twenty five spread over two or more square kilometers to a thousand (Odedra, 2008).

Traditional occupation of Maher tribe is farming and animal husbandry. Farming is the main livelihood for majority of Maher's in Porbandar district. Every day is based around the farm and it is therefore no surprise that

most of them lives on the farms. Maher is known for their farming, agricultural implements and animal husbandry, farming practice of Maher is nature based and worship the 'Varun' 'Vayu' and fire as their god. Besides farming and animal husbandry they also work as farm custodian called 'Rakholia' (Keshwara, 1943-1945). Figure 1 shows the photograph of Maher couple.

Due to occupation, Maher tribe since its origin to today constantly maintains the livelihood with nature and river plains. Over the year they have developed many cultural practices which might have led to discovery and utilization of plants with unique properties for medicine, religious purposes, artifact making, weather prediction, cattle breeding or cultural purposes that are not commonly known in other regions. Exploring these practices could unveil unique plant applications (Odedra, 2009).

Although this study is purely restricted to the Maher, the exploration and many of its implications are of general significance to the tribals of this area. Special attention is given in this study to the factors that make plants a resource that sustains the Maher and how the management of this resource is vital to their survival and progress (Jadeja, 2006).

Materials and Methods

Study Area

To gather first-hand information on new sources of food, drugs, and traditional knowledge for biodiversity conservation, ethnobotanical expeditions were conducted in 90 villages within the Porbandar district of Gujarat (Fig. 2). The Porbandar district is situated between 21.0° to 22.0° North latitude and 69.0° to 70.0° East longitude. This district comprises three talukas: Porbandar (21.150° N & 70.250° E), Ranavav (25.500° N & 69.550° E), and Kutiyana (21.450° N & 70.100° E). The extensive study area was carefully chosen based on available information, including areas to be visited, the communities to be studied, and aided by the use of maps, botanical resources, local literature, and insights from the Maher tribe, among other sources.

Collection of Data

In the year 2023, an extensive series of field surveys was conducted across diverse villages in the Porbandar district. Before commencing the formal interviews during

subsequent visits, explicit consent was diligently obtained from the residents. The study encompassed interactions with over 978 local individuals from 90 villages, aiming to document their perspectives on the utilization of a particular plant. These interviews were conducted in the local language, 'Gujarati,' and the data collection process in the field was streamlined through the implementation of a structured questionnaire.

The documentation process meticulously captured crucial details, including the common name of the plant, habit, the specific plant part utilized, and the recommended method of utilization. This thorough exploration shed light on the intricate relationship between the local communities and the targeted plant, offering valuable insights for further analysis and understanding.

Demographic profile of Informant

Table 1 shows comprehensive demographic profile of the informants involved in the study. The predominant age group comprises individuals between 51 and 80 years old, with a substantial representation of those aged 71 to 80 (39.97%). Those aged 51–60 and 61–70 also constitute a significant portion, with percentages of 20.04% and 18.20%, respectively. The gender distribution leans towards a higher percentage of male informants (66.25%) compared to women (33.74%) with approximate ratio of 3:1. A notable portion of informants is uneducated (30.87%) or has received primary school education (26.58%).

The percentages decrease for secondary school (17.17%), high school (13.59%), higher secondary (7.56%), and degree (4.19%) education levels. The occupational landscape is predominantly agricultural, with farmers (85.07%) constituting the majority of informants, followed by vendors (9.10%), traditional healers, and other occupations. Notably, some of the primary informants include Parbatbhai from Ratdi village, Kankbhai from Khambhodar village, and Rambhai from Kandorna village.

Specimen collection and Preservation

All the plant specimen was collected and photographed. Later, it was identified using the various literatures (Thaker, 1910; Santapau, 1962; Shah, 1978). The voucher specimens were deposited in the Herbaria of the Department of Botany, M. D. Science College, Porbandar.

Results and Discussion

Gujarat is known to have 4320 plant species, with 2205 being angiosperms (Singh, 2001). In 2009, Odedra noted 334 angiospermic plants used by the Maher tribe in Porbandar district. Out of these, 30 plants with unusual and novel applications were documented in the day-to-day life of the Maher tribe (Table 2). Among the 30 plants, 9 were trees, 6 were shrubs, 9 were herbs, and 6 were climbers (Table 2). Various plant parts were utilized for multiple purposes, with stems and branches being the most commonly used (Figure 3).

All the plants were categorized into 6 divisions based on their uses (Table 3). The Maher tribe uses some plants for medicinal purposes, weather prediction, cattle breeding, crafting artifacts, and various other general applications. Their primary occupation being agriculture, they keenly observe natural phenomena, plants, and animals to predict weather patterns. Four plants are noted for their use in predicting weather, aiding in planning agricultural activities.

Plants also play a significant role in Maher tribe rituals and are used to create toys for children, fostering a strong connection with nature. The use of plants for medicinal purposes reflects their profound understanding, passed down through generations. Additionally, the integration of plants into day-to-day activities demonstrates their commitment to making life more manageable and harmonious with the natural world. They use traditional medicinal plants because these are in expensive and have minimal or no side effects if used correctly.

In Porbandar, Nagar (2005) noted 503 plant species of medicinal value, while Odedra (2009) recorded 224 plant species used by the Maher people for medicinal purposes in the same area. However, our survey identified 8 plant species with unique utilizations compared to the findings of these two and other literature sources (Thaker, 1910; Jain, 1991; Jadeja *et al.*, 2005; Pandey *et al.*, 2005; Chavada *et al.*, 2023) from the same region.

Jadeja (2007) recorded a total of 106 plants used as fodder resources during famines in Gujarat. Two new species (*Carica papaya* L. & *Phoenix sylvestris* (L.) Roxb.) were identified as new fodder sources during famine. People's religious beliefs have played an important part in shaping perceptions of nature and defining man's connection with nature, establishing a link between religious life and natural systems.

Table.1 Demographic profile of the informants included in the survey (N=978).

	No. of Informant	%
Age		
Below 30	12	1.22
31 – 40	51	5.21
41 – 50	124	12.67
51 – 60	196	20.04
61 – 70	178	18.20
71 – 80	391	39.97
Above 80	26	2.65
Gender		
Men	648	66.25
Women	330	33.74
Education		
Uneducated	302	30.87
Primary school	260	26.58
Secondary school	168	17.17
High school	133	13.59
Higher secondary	74	7.56
Degree	41	4.19
Occupation		
Traditional healers	12	1.22
Farmers	832	85.07
Vendors	89	9.10
Priests	4	0.40
Others	41	4.19

Figure.1 Maher couple



Table.2 Uses of different plants by Maher Tribe

Plant Name	Local Name	Habit	Family	Voucher No.	Part Used	Uses
<i>Acacia senegal</i> (L.) Willd.	Gorad	T	Fabaceae	KNO-35	B	<ul style="list-style-type: none"> • Small seeds of crops like Cumin and Ajwain should be sown shallowly. After these seeds are sprinkled, large branches of <i>Acacia senegal</i> are rolled over them, ensuring that the seeds are mixed with the soil and do not enter soil too deeply.
<i>Agave americana</i> L.	Ketki	H	Asparagaceae	KNO-19	L, I	<ul style="list-style-type: none"> • Sometimes, thorns can penetrate the skin, and certain portions of these thorns may not be easily removed. The hard and sharp tip of a leaf is used to remove these embedded thorn fragments. • The pillars or supports of huts used for sheltering cattle are made from the woody inflorescence of <i>Agave americana</i> due to its straight and sturdy nature.
<i>Asparagus racemosus</i> Willd.	Satavari	C	Asparagaceae	KNO-08	B	<ul style="list-style-type: none"> • In <i>Asparagus</i> new branch formation occurs just before the onset of the monsoon season. Rainfall may occur when this brown, leafless, and thornless branch reaches a height of approximately 5-6 feet.
<i>Barleria prionitis</i> Linn.	Pilo Kantaseliyo	S	Acanthaceae	KNO-15	WP	<ul style="list-style-type: none"> • Paste of plant mixed with sesamum oil and heated then applied for three consecutive weeks on the bone fractured parts of cattle.
<i>Cassia auriculata</i> L.	Avad	S	Fabaceae	KNO-21	Br	<ul style="list-style-type: none"> • Children makes whistle from the basal part of the branches of the plant by scraping it in a specific manner.

<i>Carica papaya</i> L.	Papaiya	T	Caricaceae	KNO-27	St	<ul style="list-style-type: none"> • The stem of plant is cut into small pieces and used as fodder during times of famine.
<i>Cardiospermum halicacabum</i> L.	Kaagdoliyo	C	Sapindaceae	KNO-05	Sd	<ul style="list-style-type: none"> • A necklace made of seeds from this plant is worn for three weeks to prevent or alleviate skin disease called 'Karodiya' (Tinea Versicolor). • Also, the crushed pulp of seeds is applied to treat various skin diseases.
<i>Calotropis procera</i> (Aiton) Dryand.	Akado	S	Apocynaceae	KNO-25	St, Lt	<ul style="list-style-type: none"> • Sometimes, thorns penetrate the skin, and certain parts may remain embedded, making them difficult to remove. The sap of Calotropis is applied to the affected area four to five times, and the thorn usually comes out from the skin the next day.
<i>Coccinia grandis</i> (L.) Voigt	Gholi	C	Cucurbitaceae	KNO-37	L	<ul style="list-style-type: none"> • The juice of Coccinia leaves is applied to the area to prevent infection after getting a 'Trajva' or 'Chundna' (Green Tattoos).
<i>Cocculus pendulus</i> (J.R. Forst. & G. Forst.) Diels	Orap	C	Menispermaceae	KNO-03	R	<ul style="list-style-type: none"> • Consuming a decoction made from the root of Cocculus plant for a period of time can be helpful in overcoming poppy addiction.
<i>Derris indica</i> (Lam.) Bennet	Karanj	T	Fabaceae	KNO-22	Sd	<ul style="list-style-type: none"> • Kids use the flat seeds of the plant that are affixed at the middle with threads to make a spinning toy to play.
<i>Dioscorea bulbifera</i> L.	Kanak	C	Dioscoraceae	KNO-12	Bb	<ul style="list-style-type: none"> • The bulbils of Dioscorea are kept in home by Maher people. The bulbil of this plant usually germinates without water nearing monsoon season, and rain usually arrives when it has grown to its first five leaves thus indicating the onset of monsoon.

<i>Echinops echinatus</i> Roxb.	Utkanto	H	Asteraceae	KNO-06	AP	<ul style="list-style-type: none"> • All the aerial parts of the plant are cut into small pieces and mixed with the aerial parts of Ziziphus and other cattle fodder, resulting in an increase in the fat percentage of the milk. • It is valuable source of fodder during famines.
<i>Euphorbia heyneana</i> Spreng.	Dudheli	H	Euphorbeaceae	KNO-04	WP	<ul style="list-style-type: none"> • The entire plant is washed, crushed, and its juice is extracted. Taking 100 to 150 milliliter of this juice during breakfast for 7 to 8 days, without consuming any snacks before, is a preferred remedy for curing bleeding haemorrhoids.
<i>Euphorbia neriifolia</i> L.	Bhungdo thor	T	Euphorbiaceae	KNO-13	L	<ul style="list-style-type: none"> • The leaves of this plant have a sweet and sour taste, making them a rare delicacy and a particular favourite among children.
<i>Ficus benghalensis</i> L.	Vad	T	Moraceae	KNO-18	AR	<ul style="list-style-type: none"> • The farmer predicts rainfall by observing the bending direction of the tip of the aerial root of <i>Ficus benghalensis</i>. If it bends towards Eshan (South-West), it suggests that rain may arrive within 2-3 days.
<i>Ficus amplissima</i> Sm.	Pipad	T	Moraceae	KNO-01	L	<ul style="list-style-type: none"> • Children roll the leaf of <i>Ficus amplissima</i> to create 'Pipudi,' a type of whistle.
<i>Fimbristylis bisumbellata</i> (Forssk.) Bubani	Saaj	H	Cyperaceae	KNO-33	WP	<ul style="list-style-type: none"> • This dried plant is utilized in villages to construct the roofs of huts. After soaking in the first rainfall, they adhere together, forming a waterproof roof for the hut.
<i>Indigofera oblongifolia</i> Forssk.	Jeel	S	Fabaceae	KNO-24	B	<ul style="list-style-type: none"> • To prevent leakage around the water pathway during crop irrigation, a bundle of branches is rolled over it to

						halt the water seepage.
<i>Lepidium sativum</i> L.	Ashediyo	H	Brassicaceae	KNO-32	Sd	<ul style="list-style-type: none"> • Cleaned seeds of <i>Lepidium</i> are applied to the eyes to remove foreign particles. Within 15-20 minutes, these swollen seeds come out with foreign particles.
<i>Luffa cylindrica</i> M. Roem.	Galku	C	Cucurbitaceae	KNO-11	F	<ul style="list-style-type: none"> • The mesocarp of the dried luffa fruit is used as a brush for cleaning kitchen utensils.
<i>Martynia annua</i> L.	Vichudo	S	Martyniaceae	KNO-09	Sd	<ul style="list-style-type: none"> • The seeds of this plant are added to the soles of shoes, creating a unique sound while walking, which is preferred by some people.
<i>Peristrophe paniculata</i> (Forssk.) Brummitt	Kali Anghedi	H	Acanthaceae	KNO-41	WP	<ul style="list-style-type: none"> • During obsequies, the first ritual involves offering water and the entire plant of <i>Peristrophe</i> thrown on the roof of the house. It is believed that these are used by forefathers as toothbrushes, followed by an oblation offered to the crows.
<i>Phoenix sylvestris</i> (L.) Roxb.	Tadi	T	Arecaceae	KNO-36	St	<ul style="list-style-type: none"> • The middle part of the stem is crushed and fed to cattle during the times of famines.
<i>Prosopis juliflora</i> (Sw.) DC.	Gando-Bavad	T	Fabaceae	KNO-17	B	<ul style="list-style-type: none"> • The downward slanting of branches of this plant indicates the impending arrival of the monsoon.
<i>Prosopis cineraria</i> (Linn.) Druce	Khijdo	T	Mimosaceae	KNO-26	R	<ul style="list-style-type: none"> • The soil is excavated near the trunk, and a round hole is prepared beneath the roots for a child to pass through this root loop. It is believed to cure bronchitis in children.
<i>Premna herbacea</i> Roxb.	Ghiti	H	Verbenaceae	KNO-05	St	<ul style="list-style-type: none"> • The stem of this plant contains a high oil content, making it suitable for direct use as fuelwood without the need for a drying process. This

						particular fuelwood is especially preferred during the monsoon season.
<i>Sesamum indicum L.</i>	Tal	H	Pedaliaceae	KNO-32	Sd	<ul style="list-style-type: none"> • During the 'Agnisankar' (Hindu cremation ceremony), sesame seeds are employed to help burn certain flashy and hard-to-burn portions of the corpse.
<i>Sorghum bicolor Kuntze</i>	Juvar	H	Poaceae	KNO-39	Br, St	<ul style="list-style-type: none"> • Children creates various types of toys from the tough bark and interior soft part of the stem of Sorghum.
<i>Ziziphus nummularia (Burm.f.) Wight & Arn.</i>	Bordi	S	Rhamnaceae	KNO-19	B, AP	<ul style="list-style-type: none"> • In a well-recharging pit, branches act as filters that prevent large debris from falling into the well. • All the aerial parts are cut into small pieces and mixed with the aerial parts of Echinops and other cattle fodder, resulting in an increase in the fat percentage of the milk. • It is valuable source of fodder during famines.

Table.3 Division of the plants on the basis of their uses by Maher tribe.

Sr. No.	General purpose	Plant species
1.	Medicinal purposes	<i>Prosopis cineraria</i> (Linn.) Druce <i>Lepidium sativum</i> L. <i>Cocculus pendulus</i> (J.R. Forst. & G. Forst.) Diels <i>Coccinia grandis</i> (L.) Voigt <i>Calotropis procera</i> (Aiton) Dryand. <i>Euphorbia heyneana</i> Spreng. <i>Cardiospermum halicacabum</i> L. <i>Agave americana</i> L.
2.	Religious purposes	<i>Peristrophe paniculata</i> (Forssk.) Brummitt <i>Sesamum indicum</i> L.
3.	Artifacts making	<i>Martynia annua</i> L. <i>Fimbristylis bisumbellata</i> (Forssk.) Bubani <i>Cassia auriculata</i> L. <i>Derris indica</i> (Lam.) Bennet <i>Sorghum bicolor</i> Kuntze <i>Ficus amplissima</i> Sm.
4.	Weather prediction	<i>Ficus benghalensis</i> L. <i>Asparagus racemosus</i> Willd. <i>Prosopis juliflora</i> (Sw.) DC. <i>Dioscorea bulbifera</i> L.
5.	Cattle breeding	<i>Carica papaya</i> L. <i>Phoenix sylvestris</i> (L.) Roxb. <i>Barleria prionitis</i> Linn.
6.	For general purposes	<i>Acacia senegal</i> (L.) Willd. <i>Indigofera oblongifolia</i> Forssk. <i>Luffa cylindrica</i> M. Roem. <i>Euphorbia nerifolia</i> L. <i>Premna herbacea</i> Roxb.
7.	Agricultural purposes	<i>Acacia senegal</i> (L.) Willd. <i>Indigofera oblongifolia</i> Forssk. <i>Ziziphus mummularia</i>

Figure.2 Location Map of Study Area

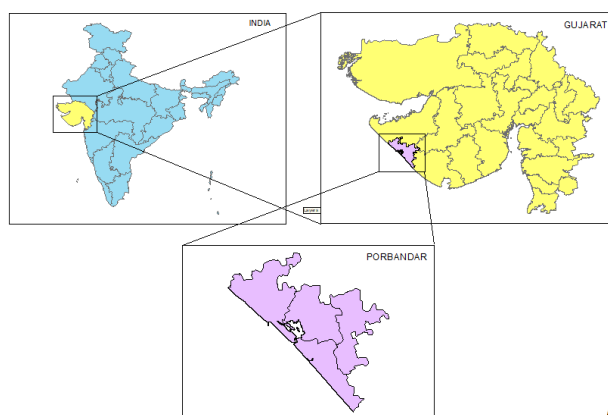
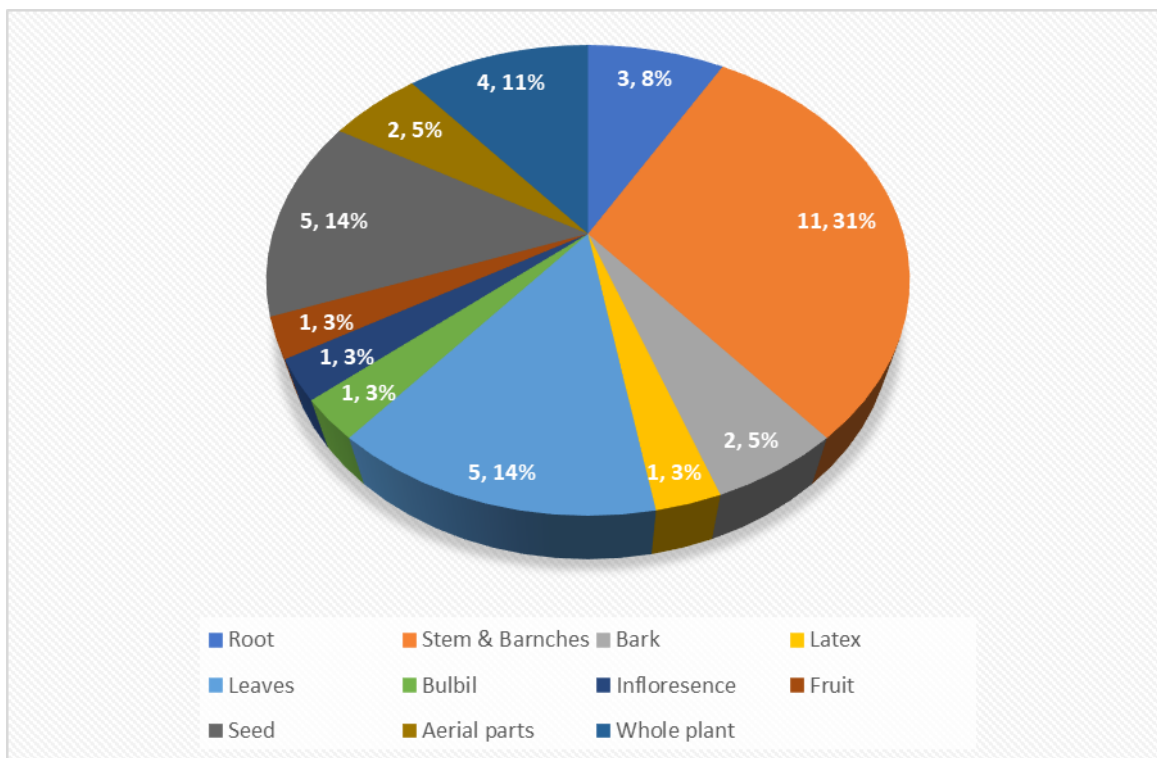


Figure.3 Plant parts used by Maher Tribe



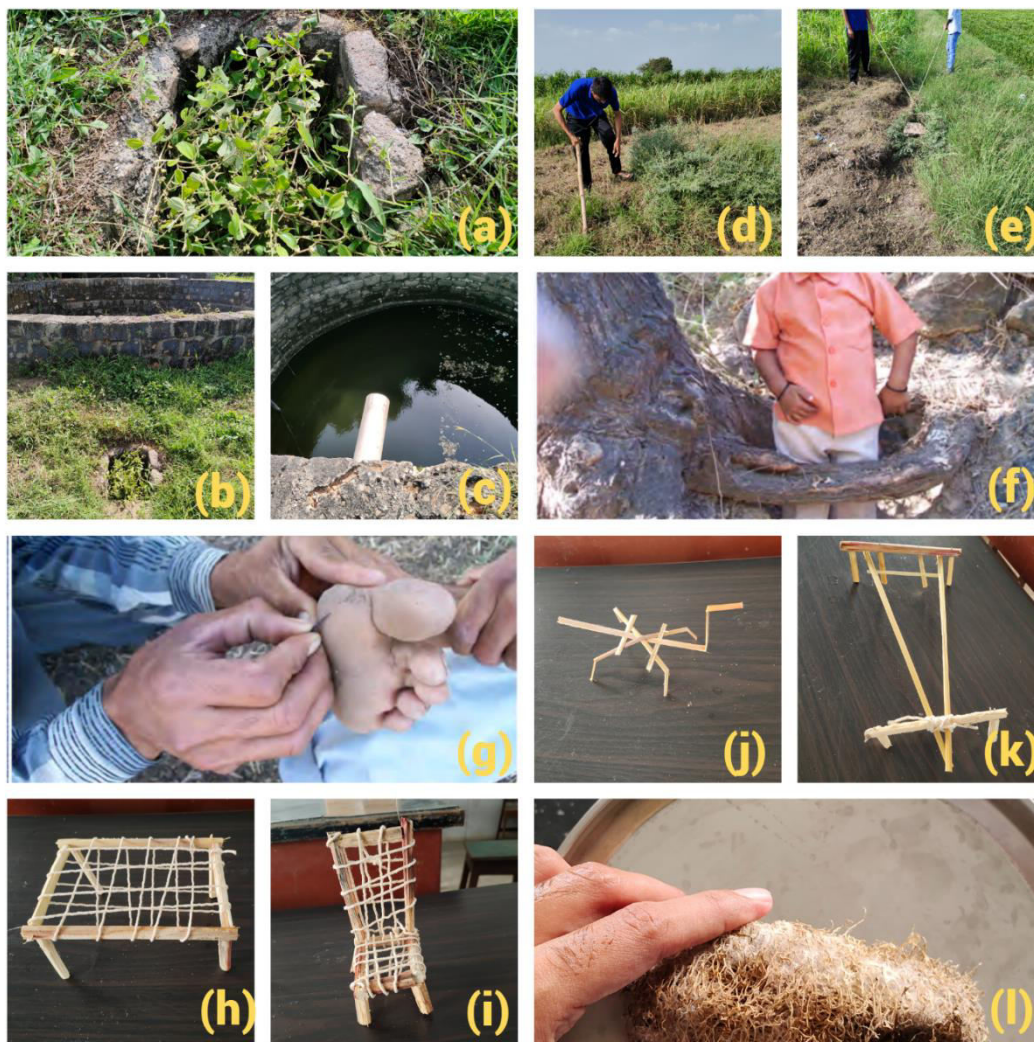
Sood *et al.*, (2005) documented a total of 468 sacred and magico-religious plants, but *Peristrophe paniculata* (Forssk.) Brummitt was not mentioned. However, there were multiple mentions of *Sesamum* in the literature, but its recorded use in this study is novel.

Although the research focuses on the Maher tribe, the knowledge obtained and its implications have wider applicability to tribal communities in the same area. These studies contribute to a deeper understanding of the intricate relationships between plants and humans. Indigenous cultures' age-old traditional practices, wisdom, and religious conceptions of indigenous cultures are dwindling. The depletion of indigenous knowledge among the people of this community was severe owing to the disinterest of the young generation as a result of modern education, urbanization, and modernization. Therefore, this material will be extremely useful to current and future generations in preserving indigenous knowledge and customs, and it will be beneficial in preserving cultural heritage. Figure 4 shows photographs of some plant utilizations by the Maher tribe.

The exploration of the relationship between human perception and plant utilization within the Maher community has unveiled significant insights. This study contributes significantly to our understanding of the hidden uses of both common and uncommon plants, shedding light on their multifaceted roles in the Maher community of the Porbandar district, Gujarat. Notably, this study stands as the first of its kind, providing unprecedented depth into the Maher community's interactions with plant life.

Furthermore, the interdisciplinary approach adopted in this study has paved the way for a deeper comprehension of the intricate relationships between plants and humans. By delving into Maher culture and their immediate surroundings, this research highlights the profound influence of these factors on shaping interactions with plants and governing their utilization. This shared outlook extends beyond the realm of plant interaction, playing a pivotal role in shaping personal, social, and economic relationships within the Maher community.

Figure.4 Utilization of some plant by Maher tribe (a-c: Use of *Ziziphus* for filtering in Well recharging pit, d-e: Use of *Indigofera* to prevent leakage around the water pathway during crop irrigation, f: Child passing through loop of *Prosopis cineraria*, g: Using tip of *Agave* to remove embedded thorn fragments, h-k: Toys made of *Sorghum* stems, i: Use of dry *Luffa* fruit to clean kitchen utensils)



Looking ahead, the future direction of this work involves building upon the foundational knowledge established in this study. Subsequent research could delve into more nuanced aspects of Maher plant utilization, exploring additional hidden uses, their implications and also quantification of data using various ethnobotanical indices. Additionally, fostering collaborations between ethnobotanists, ecologists, and social scientists could provide a more holistic understanding of the Maher community's intricate relationship with their plant environment. This interdisciplinary approach is key to unravelling further layers of knowledge and ensuring the

sustainability of Maher's practices in the ever-changing landscape.

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Abbreviations

AP=Aerial Parts, AR=Aerial Roots, B=Branches, Bb=Bulbils, Br=Bark, C=Climber, F=Fruit, H=Herb, I=Inflorescence, L=Leaves, Lt=Latex, R=Root, S=Shrub, Sd=Seed, St=Stem, T=Tree, WP=Whole Plant.

Author Contribution

Kunal N. Odedra: Investigation, formal analysis, writing—original draft. Kavan Shukla: Validation, methodology, writing—reviewing. B. A. Jadeja:— Formal analysis, writing—review and editing.

Data Availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethical Approval Not applicable.

Consent to Participate Not applicable.

Consent to Publish Not applicable.

Conflict of Interest The authors declare no competing interests.

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