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Traditional Botanical Knowledge in Goa: Echoes from the Past, Relevance for the Future

Ms. Shanta alias Arya Yeshwant Shetye[1], Mr. Aditya Kailash Shivale[2]

[1]UG Student, Botany
[2]UG Student, Geology

ABSTRACT

Traditional Botanical Knowledge (TBK) represents the deep, time-tested relationship between communities and the natural world, especially through the use of plants for health, rituals, and daily living. This study explores TBK in Goa by documenting medicinal, ritual, and culinary plant use through field surveys, interviews, and community-based questionnaires. A total of 50 medicinal plant species from 29 families and 47 genera were recorded, along with 15 ritual plants and 15 culinary species. The study highlights how plants like *Tulsi*, *Neem* and *Aloe vera* continue to play vital roles in healing and cultural practices. Insights from traditional healers and elders revealed a holistic view of health, where food, herbs, and spiritual practices are closely linked. However, concerns were raised about the declining transmission of this knowledge due to modernization and changing lifestyles. The findings suggest that TBK remains relevant for modern health, environmental sustainability, and cultural identity, and call for its preservation through education, documentation, and integration into modern science and policy frameworks.

INTRODUCTION

Goa, a state in the western region of India known as the Konkan, is bordered by Maharashtra to the north, Karnataka to the east and south, and the Arabian Sea along its western coastline. Covering an area of 3,702 square kilometres, Goa is situated between latitudes 14°53′54″ N and 15°40′00″ N, and longitudes 73°40′33″ E and 74°20′13″ E. Goa boasts an impressive range of flora due to its unique geographical features, tropical monsoon climate, and varied topography that includes coastal plains, laterite plateaus, riverine ecosystems, and the foothills of the Western Ghats.

Traditional Botanical Knowledge represents a vast and intricate system of understanding the natural world, cultivated over millennia by indigenous peoples and local communities across the globe. This knowledge encompasses the classification, cultivation, and utilization of plants for a range of purposes including medicine, food, shelter, rituals, and ecological stewardship. Far from being static, Traditional Botanical Knowledge is dynamic and adaptive, evolving in response to environmental changes, cultural shifts, and intergenerational learning. It reflects a holistic worldview in which nature and human well-being are deeply interconnected. It is still not clear how man got medicinal knowledge of plants even though all the ancient civilizations used a variety of plants for curative purpose (Kamat and Kamat, 1994).

TBK has been passed down orally or through practice in communities across the globe. Ancient Indian texts like the Charaka Samhita and Sushruta Samhita document plant-based remedies. Similar records exist in Chinese, African, and Native American traditions. These knowledge systems have often laid the groundwork for modern botanical sciences and ethnopharmacology.

In the context of the 21st century, marked by rapid scientific advancement, climate change, biodiversity loss, and growing health challenges, the relevance of Traditional Botanical Knowledge has gained renewed scholarly and practical attention. Increasing evidence suggests that Traditional Botanical Knowledge can complement modern scientific disciplines especially pharmacology, ethno medicine, conservation biology, and agroecology offering insights into sustainable resource management, disease prevention, and ecosystem restoration.

Yet, despite its value, Traditional Botanical Knowledge faces serious threats. Globalization, habitat destruction, cultural assimilation, and the erosion of indigenous languages contribute to the loss of knowledge that is often orally transmitted and undocumented. Additionally, issues of bio piracy and the lack of legal recognition for indigenous intellectual property rights pose ethical and political challenges to the equitable use of Traditional Botanical Knowledge in contemporary research and industry. With industrialization, modern education system, invasion of western culture, especially Portuguese culture and gradually growing urbanization, the original traditional knowledge base system is eroding (Naik et al., 2014). Local communities have long used a variety of native plants for healing, nutrition, rituals, and craftsmanship. Species such as *Terminalia arjuna*, *Centella asiatica*, *Aegle marmelos*, and *Gymnema sylvestre* are commonly used in folk medicine and are increasingly studied for their pharmacological properties.

This research paper explores the multifaceted significance of Traditional Botanical Knowledge in the modern era. It investigates its contributions to science and society, the threats it confronts in a globalized world, and the frameworks needed to protect, preserve, and integrate this knowledge respectfully and effectively into modern scientific and policy arenas. By doing so, the paper seeks to underscore the importance of bridging traditional wisdom with contemporary innovation to address some of the most pressing challenges of our time.

REVIEW OF LITERATURE

Rana et al. (2020) conducted a study on Traditional Botanical Knowledge (TBK) related to medicinal plant use in the Sikles area of Kaski District, Nepal. The research, focusing on three wards of this Gurung-majority village, involved 45 informants divided into two age groups (below and above 40 years). Using semi-structured questionnaires, the study documented 42 plant species used to treat 43 different ailments. Herbs were the most common life form, with roots being the most frequently utilized plant part. Families like Compositae, Ericaceae, Labiatae, Rosaceae, Urticaceae, and Zingiberaceae had more than one species reported. Quantitative analysis through Relative Frequency Citation (RFC) and Use Value (UV) revealed a weak correlation between plant use and informant responses. The authors emphasized the urgent need to preserve TBK by educating future generations on the medicinal value of local plant species.

Gilani et al. (2007) conducted an ethnobotanical study in the moist temperate forests of Northern Pakistan, with a specific focus on Ayubia National Park, which spans 3,312 hectares between 34°38′ N latitude and 73°22.8′ to 73°27.1′ E longitude. The research highlighted the deep interdependence between local communities and plant resources, as inhabitants rely on various plant species for food, medicine, and domestic uses. A total of 11 significant plant species from 10 families were documented for their traditional applications. The study incorporated over 100 informant interviews, market surveys of ethnomedicinal plants, and school surveys to assess plant-related awareness among students. Findings underscored the rapid loss of traditional knowledge and identified species such as *Podophyllum emodi* and *Viola canescens*

as vulnerable due to overharvesting. The authors emphasized the importance of preserving ethnobotanical knowledge as a key strategy in biodiversity conservation.

Beltreschi et al. (2019) investigated the traditional botanical knowledge of medicinal plants in the Ipiranga quilombola community, located on the southern coast of Paraíba, northeastern Brazil. Through semi-structured interviews conducted with 100 household heads, the study documented 69 plant species from 38 families used to treat 66 ailments, classified into 14 body system categories. Most medicinal plants were cultivated in backyard gardens, with only two species (*Stryphnodendron pulcherrimum* and *Handroanthus impetiginosus*) found in the surrounding Atlantic Forest. The highest Use Values were recorded for *Alpinia zerumbet*. Disorders of the respiratory, gastrointestinal, and genitourinary systems showed the highest informant consensus values. Despite the proximity of a modern health center, the community continues to rely on traditional remedies, highlighting the resilience and importance of local ethnobotanical knowledge.

Anton et al. (2019) explored the global traditional use of botanicals and botanical preparations, emphasizing their widespread application in foods and dietary supplements for nutritional and physiological benefits. The authors highlighted that traditional use, derived from centuries of empirical observation and cultural transmission, constitutes the largest body of human-based evidence for the safety and efficacy of botanicals. This accumulated folk knowledge, later systematically documented, forms the foundation for assessing the health benefits and safety of plant-based products. The paper advocates for mutual recognition of traditional use across different regions through expert evaluation, supporting its validity in regulatory and scientific contexts worldwide.

Ali-Shtayeh et al. (2008) conducted a comprehensive ethnobotanical study across fifteen rural communities in five districts of the Palestinian Authority (northern West Bank), including Nablus, Jenin, Salfit, Qalqilia, and Tulkarm. Over a one-year period, semi-structured interviews with 190 local informants documented the use of 100 wild edible plant species spanning 70 genera and 26 families. Among the most culturally important species were *Majorana syriaca*, *Foeniculum vulgare*, and *Salvia fruticosa*, consistently cited across all areas. Cultural importance values (CI) were notably higher in relatively remote and isolated areas, suggesting stronger preservation of traditional botanical knowledge in these communities. Despite ongoing use, the study highlighted a decline in wild plant gathering, emphasizing the urgent need to document, conserve, and transmit this knowledge to future generations

An ethnobotanical study conducted in 2012–13 in South Goa documented traditional knowledge of 50 medicinal plant species from 20 families used to treat 18 human ailments. Data were collected through interviews and questionnaires, focusing on taxonomic identification, ailments treated, plant parts used, preparation methods, administration, and added ingredients. Decoction was the most common preparation method, followed by paste and poultice. The study highlighted the community's strong faith in medicinal herbs but noted that this traditional knowledge is rapidly declining due to low income from this practice, the rise of allopathic medicine, and lack of written records. The objective was to preserve and document traditional home remedies for healthcare in Goa (Sawant & Rodrigues, 2015).

Sawant and Rodrigues (2015) further emphasized the importance of documenting medicinal plant species in Goa to safeguard indigenous knowledge that faces threats from modernization and urbanization. Their work contributes valuable insights into the diversity of medicinal plants and underscores the urgent need for conservation and awareness efforts in the region.

METHODOLOGY

This qualitative ethnobotanical study was conducted using a combination of field surveys, interviews, google forms, discussions, and literature review to comprehensively document TBK in Goa. The participants included were traditional healers, locals, elderly people and herbal practitioners.

Study Design:

This was a qualitative and quantitative ethnobotanical study conducted in April 2025, across rural and semi-urban regions of Goa.

Sampling Strategy:

Sampling Method: Purposive sampling was used to select knowledgeable participants such as traditional healers, elders, herbal vendors, and home remedy users.

Sample Size: A total of **50** individuals participated in the study, including traditional healers, locals, elderly people and herbal product users.

Data Collection:

Field visits were undertaken to collect information on plants used traditionally for medicinal, culinary, and ritual purposes. Plants were identified with help from local experts, and specimens photographed and catalogued.

Interviews with a few participants was conducted to elicit information about plant usage, preparation methods, and cultural significance.

A google form was also created in order to explore the current status, usage, and perceptions of traditional botanical knowledge among various individuals and communities.

Prior informed consent was obtained from all participants. Anonymity and cultural sensitivity were maintained. The study adhered to ethical research guidelines involving indigenous knowledge.

RESULTS

During the study period, 50 medicinal plant species belonging to 29 families and 47 genera were collected and studied for its medicinal uses. The present study reveals that the documented plants are traditionally used to treat a wide range of ailments, including cough, diarrhoea, dysentery, wound healing, diabetes, jaundice, fever, vomiting, skin disorders, toothache, menstrual irregularities, hypertension, and headaches.

Table 1: Medicinal plants studied in Goa

Family	Botanical name	Local name	Parts used	Medicinal value
Acanthaceae	*Adathoda vasica*	Adulsa	Leaves	Expectorant, relieves cough and asthma
Acanthaceae	*Andrographis paniculata*	Kirayte	Whole plant	Immunity booster and antipyretic
Amaryllidaceae	*Allium sativum*	Lasun	Bulb	Lowers blood pressure and cholesterol
Amaryllidaceae	*Colocasia esculenta*	Kanda	Leaves and corms	Rich in iron, used to treat anemia
Anacardiaceae	*Mangifera indica*	Aamo	Bark and leaves	Astringent, used in diarrhea

Anacardiaceae	*Anacardium occidentale*	Kaju	Bark and leaves	Anti-diabetic and anti-inflammatory
Annonaceae	*Annona reticulata*	Sitaphal	Leaves	Anthelmintic and anti-tumor
Annonaceae	*Polyalthia longifolia*	Ashoka	Fruits and leaves	Antipyretic and antimicrobial
Apiaceae	*Trachyspermum ammi*	Ajwain	Seeds	Carminative and digestive aid
Apiaceae	*Cuminum cyminum*	Jeera	Seeds	Digestive stimulant and antispasmodic
Apiaceae	*Foeniculum vulgare*	Badishep	Seeds	Carminative and relieves bloating
Apiaceae	*Anethum graveolens*	Shepu	Leaves	Treats indigestion and colic. Increases appetite
Apocynaceae	*Calotropis gigantea*	Rui	Leaves and latex	Used externally for joint pain and skin conditions
Apocynaceae	*Tabernaemontana orientalis*	Anant	Root	Treats wounds and inflammation
Apocynaceae	*Alstonia scholaris*	Satvin	Bark	Treats respiratory disorders and fever
Apocynaceae	*Holarrhena antidysenterica*	Kudo	Bark and seeds	Antidiarrheal and antimicrobial
Apocynaceae	*Catharanthus roseus*	Sadafuli	Leaves	Source of anticancer alkaloids
Apocynaceae	*Carissa spinarum*	Karvanda	Roots and leaves	Antipyretic and cardiotonic
Asclepiadaceae	*Hemidesmus indicus*	Anantmul	Root	Blood purifier and coolant
Asparagaceae	*Asparagus racemosus*	Shatavari	Leaves	Female reproductive tonic
Asphodelaceae	*Aloe vera*	Katekor	Leaf gel	Heals wounds and soothes skin
Asteraceae	*Eclipta prostrata*	Meko	Leaves	Promotes hair growth and supports liver health
Asteraceae	*Chromolaena odorata L.*	Ghanyari	Leaves	Promotes wound healing

Asteraceae	*Chrysanthemum indicum*	Shevanti	Flowers	Treats eye infections and fever
Bixaceae	*Crocus sativus*	Kesari	Pods, fruits	Antidepressant and memory enhancer
Caricaceae	*Carica papaya*	Popaay	Leaves and latex	Increases platelet count and aids digestion
Clusiaceae	*Garcinia indica*	Kokum	Fruit rind	Cooling agent, used for acidity
Combretaceae	*Terminalia bellerica*	Baheda	Fruit	Used in Triphala, treats digestion issues
Combretaceae	*Terminalia arjuna*	Arjun	Bark	Strengthens the heart
Fabaceae	*Tamarindus indica*	Tamarind	Pulp and leaves	Mild laxative and digestive aid
Lamiaceae	*Ocimum tenuiflorum*	Tulsi	Leaves	Adaptogen and respiratory support
Lamiaceae	*Mentha spicata*	Pudina	Leaves	Relieves indigestion and nausea
Lauraceae	*Cinnamomum verum*	Dalchini	Bark	Regulates blood sugar
Loganiaceae	*Strychnos nux-vomica*	Karo	Seeds (processed)	Nervine stimulant)
Meliaceae	*Azadirachta indica*	Neem	Leaves and bark	Antibacterial and blood purifier
Menispermaceae	*Tinospora cordifolia*	Amrutvel	Stem	Immunity booster
Myristicaceae	*Myristica fragrans*	Jaipjal	Seed	Used for insomnia and digestive disorders
Myrtaceae	*Syzygium cumini*	Jambolan	Seed and fruit	Controls diabetes and improves digestion
Nyctaginaceae	*Boerhaavia diffusa*	Punarnava	Root	Diuretic and anti-inflammatory
Phyllanthaceae	*Phyllanthus emblica*	Amla	Fruit	Rich in vitamin C; rejuvenating tonic (Amla)

Piperaceae	*Piper longum*	Pimpali	Fruit	Respiratory stimulant and digestive aid
Piperaceae	*Piper betle*	Paan	Leaves	Carminative and stimulant
Piperaceae	*Piper nigrum*	Kali miri	Fruit	Enhances bioavailability and aids digestion
Poaceae	*Cymbopogon citratus*	Ganjan	Leaves	Reduces anxiety and aids digestion
Rutaceae	*Aegle marmelos*	Bel	Leaves and fruits	Antidiarrheal and digestive
Rutaceae	*Murraya koenigii*	Curry leaves	leaves	Improves digestion and has antidiabetic properties
Solanaceae	*Datura metel*	Datura	Leaves and seeds	Analgesic and antiasthmatic (used cautiously)
Solanaceae	*Withania somnifera*	Ashwagandha	Roots	Adaptogen; reduces stress
Zingiberaceae	*Curcuma longa*	Haldi	Rhizome	Anti-inflammatory and antioxidant
Zingiberaceae	*Zingiber officinale*	Ginger	Rhizome	Anti-inflammatory and digestive

A total of 15 plants used in rituals were collected and studied. A detailed observation was made. These plants belonged to 13 families and were classified under 15 genera.

Table 2: Plants used in rituals in Goa.

Botanical name	Local name	Uses
Aegle marmelos	Bel	Leaves used in Shiv puja in temples and homes.
Areca catechu	Supari	Used in wedding rituals and also during puja.
Bauhinia racemosa	Aapta	Leaves are exchanged as "gold" during Dussehra**.**
Calotropis gigantea	Rui	Flowers are offered to Lord Shiva and lord Hanuman.
Cocos nucifera	Naal	Integral to Goan Hindu rituals. Broken as offerings to deities at temples and homes. Coconut

		water used in purification rituals.
Curcuma longa	Halad	Used in "Haldi" ceremonies before weddings. Mixed with sandalwood and applied to deities during rituals.
Cynodon dactylon	Durva	Offered to Lord Ganesha
Elaeocarpus ganitrus	Rudraksha	Worn for spiritual, mental, and physical well-being.
Ficus religiosa	Pipal	Worshipped especially by women for family well-being.
Hibiscus rosa-sinensis	Hibiscus	Offered to Lord Ganesha
Mangifera indica	Aamo	Leaves are tied as torans (door garlands) during festivals. Also placed in Kalash during pujas.
Musa paradisiaca	Kelyache zhaad	Banana leaves used to serve festive meals. Also used for decorations during puja.
Ocimum tenuiflorum	Tulsi	Used in Tulsi vivah, a local ritual marriage of the Tulsi plant to Lord Vishnu after Diwali
Saccharum officinarum	Sugarcane	Used in Tulsi vivah.
Tagetes erecta	Marigold	Used for temple decoration, garlands, and festival décor.

A total of 15 plants used in culinary were collected and studied. A detailed observation was made. These plants belonged to 15 families and were classified under 15 genera.

Table 3: Plants used in culinary in Goa.

Botanical name	Local name	Uses
Amaranthus spp.	Tambdi bhaji	Used as a leafy vegetable
Artocarpus heterophyllus	Panas	Raw fruit is used as vegetable, ripe fruit eaten fresh
Capsicum annuum	Mirchi	Adds spice to many dishes.
Cocos nucifera	Naal	Grated, milk, and oil widely used in Goan cooking.
Colocasia esculenta	Aalu	Used in curries and fritters
Garcinia indica	Kokum	Used as a souring agent in curries and drinks.
Mangifera indica	Aamo	Consumed as fruit
Mentha	Pudina	Used in chutneys and salads.

Moringa oleifera	Saango	Used in sambar and curries.
Murraya koenigii	Karbel	Essential for flavoring curries and dals.
Oryza sativa	Tandul	Staple food of Goa
Piper nigrum	Kali miri	Used as spice
Raphanus sativus	Mulo	Used as a vegetable
Tamarindus indica	Tamarind	Used for its tangy flavour in Goan curries and chutneys
Zingiber officinale	Aale	Used in pastes and marinades.

A survey was conducted to explore the current status, usage, and perceptions of traditional botanical knowledge among various individuals and communities. The survey included questions such as: whether respondents are part of communities that use traditional botanical practices; how they acquired their knowledge about traditional botanical remedies; the primary purposes for which these plant-based remedies are used; commonly used medicinal plants in their families; whether they believe this knowledge is being passed down to younger generations; the main challenges faced in preserving this knowledge; their views on the role of traditional botanical knowledge in complementing modern healthcare; support for integrating this knowledge into formal education and healthcare systems; strategies for preserving and promoting this knowledge in the modern era; its importance to cultural identity; its potential for income generation; and opinions on the need for scientific validation of traditional remedies.

The collected data reveals diverse engagement with traditional botanical practices across different communities. Most respondents affirm participation in communities or families where traditional plant knowledge is actively used. It was observed that primary knowledge acquired by respondents was through family elders, community healers, books, and formal education.

Traditional remedies are predominantly applied for medicinal treatment, cultural rituals, and nutritional purposes. Frequently mentioned medicinal plants included Tulsi (Holy Basil), Aloe Vera, Ginger, Neem and Turmeric (Haldi), highlighting their central role in everyday health and cultural practices.

While many respondents believe that traditional botanical knowledge continues to be passed to younger generations, there is concern about its decline due to lack of interest among youth, urbanization, modernization, inadequate documentation, and dominance of allopathic medicine. These factors pose significant challenges to the preservation of this knowledge.

There is broad agreement on the potential for traditional botanical knowledge to complement modern healthcare, with many supporting its integration into formal education and health systems. Effective preservation strategies suggested to include proper documentation, educational programs, workshops, promote Ayurvedic shastra, digital platforms, and public awareness campaigns.

Many view traditional botanical knowledge as an important part of cultural identity and see economic opportunities through herbal product development and ecotourism.

Overall, the responses underscore the value of traditional botanical knowledge both culturally and medicinally, while highlighting urgent challenges that require coordinated efforts for conservation, education, and integration with contemporary science and healthcare.

Traditional knowledge holders, especially elderly people and community healers, emphasized the spiritual and everyday significance of medicinal plants. Tulsi, for instance, was not just seen as a remedy for colds but was regarded as a sacred plant requiring daily rituals of watering and prayer. One senior participant

from remarked that "Tulsi gives medicine to the body and peace to the home." Similarly, Kokum and Ginger were used not only in curries but also as preventive remedies against seasonal ailments. A sense of concern was shared by many elders over the fading of this knowledge among younger generations, who "prefer the convenience of clinics over home remedies." This intergenerational shift underscores the urgent need to document, validate, and revive these practices in contemporary settings.

A respected elder from a Siolim (North Goa) shared how *Adulsa* (*Adhatoda vasica*) leaves were boiled into a decoction with honey and ginger to treat persistent coughs, especially during the monsoon. Similarly, Aloe vera was widely used not just for burns and wounds but as a daily tonic mixed with amla juice to "cleanse the blood." She further added that , "We never went to doctors for every fever or stomach ache. The forest and our backyards had everything we needed." These insights reflect a holistic view of healing, where food, herbs, and prayer were seamlessly integrated into daily life.

DISCUSSION

This study shows how deeply traditional botanical knowledge (TBK) is rooted in the culture and daily life of people in Goa. The documentation of 50 medicinal plants from 29 families and 47 genera highlights the wide variety of natural remedies used by local communities. These plants are not just for treating illnesses, but also play an important role in food, rituals, and spiritual practices. People still rely on plants like Tulsi, Neem, Ginger, Aloe vera, and Turmeric for their healing properties, often passed down through generations.

The knowledge shared by elders and traditional healers revealed a deep connection between nature and well-being. For many, plants are part of daily routines. Aloe vera is taken with amla to cleanse the body, Kokum is used to stay cool during hot months, and Adulsa leaves are boiled to treat coughs and respiratory related problems. These practices are part of a lifestyle that focuses on prevention, balance, and natural healing. Many elders spoke about how health was once maintained with simple, home-grown remedies, without the need for frequent doctor visits.

Beyond medicine, plants are also used in rituals and food. Leaves of *Aegle marmelos* and flowers of Hibiscus are offered in prayers, while banana leaves are used during festivals. Many traditional foods are made with ingredients that also support health, such as mint, black pepper, ginger, and tamarind. These uses show how TBK is not separate from everyday life, but woven into it through habits and customs.

However, there is a growing worry about the loss of this knowledge. Elders expressed concern that younger generations are less interested in traditional ways and often turn to modern medicine first. Urbanization, lack of documentation, and changes in lifestyle are making it harder to keep this knowledge alive. Still, many participants agreed that TBK should be preserved and shared, especially through schools, workshops, and community programs.

People also saw TBK as a valuable part of their identity and a source of future opportunities. There is growing interest in herbal products, eco-tourism, and natural health, all of which can support local economies if traditional knowledge is protected and promoted properly. TBK is not just about treating illness but also about living in harmony with nature, using what is available responsibly, and passing on values that support both health and the environment.

In today's world, where we face new health problems and environmental challenges, TBK offers practical and meaningful solutions. It reminds us that we do not always need complex treatments to stay healthy, and that the answers to many of our problems may lie in the wisdom of the past. By preserving this knowledge, we also preserve a way of life that respects both people and nature.

CONCLUSION

Traditional Botanical Knowledge (TBK) holds immense relevance for the future, particularly in the face of pressing global challenges such as chronic lifestyle diseases, antibiotic resistance, climate change, and biodiversity loss. As modern societies seek safer, natural, and more sustainable approaches to health and agriculture, TBK offers a time-tested, eco-friendly, and culturally rooted alternative. The resurgence of interest in herbal medicines, plant-based diets, and holistic wellness systems like Ayurveda and naturopathy reflects a broader shift toward preventive healthcare an area where TBK excels. Moreover, TBK promotes sustainable resource use, emphasizing respect for nature, seasonal harvesting, and zero-waste living, aligning with 21st-century goals for climate resilience and environmental conservation. In education and research, integrating TBK can help develop interdisciplinary approaches that bridge traditional wisdom with modern science. Importantly, TBK is not a static archive of the past it is a dynamic, evolving system shaped by centuries of human-nature interaction. Protecting and revitalizing TBK ensures that future generations inherit not only remedies for ailments, but also values of balance, respect, and stewardship that are essential for a healthier planet and society.

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