Preserving Traditional Medicinal Knowledge and its Transmission in Dorokha, Samtse, Bhutan

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Abstract: Traditional ecological knowledge is often specific to a particular place or ecosystem and is deeply rooted in cultural and spiritual beliefs. It can be a valuable resource for the conservation and management of natural resources. It provides insight into the dynamics of ecosystems and impacts of human activities on the environment. Despite its potential benefits, it is often undervalued and marginalized in mainstream conservation and management efforts. To evaluate the status of traditional ecological knowledge, with special attention to traditional medicinal knowledge, this study was carried out in Dorokha *Dungkhag*, and data was collected through face-to-face interview. The result indicates that there is slow loss of local traditional knowledge because of several factors.

Keywords: Knowledge sharing, tradition, resource, ethnobotany, Dorokha, Bhutan.

Introduction

Bhutan's wildlife management is based on the principles of Buddhism, where humans exist in harmony with nature. Another principle is strong government regulation focused on development for the people and the well-being of flora and fauna. The Middle Path, the national environment strategy of Bhutan, which was formed in 1997, explicitly links environmental resource management to the preservation of culture, values, lifestyle, and traditions (Nepal, 2022a). The Middle Path seeks to formulate policies and laws by keeping an eye on the use of natural resources and the citizen's demand for material development without diminishing the quality of the resource base. Gross National Happiness (GNH) pillars and domains are the guiding light for Bhutan while formulating environmental policies, which ultimately are linked to sustainable development goals (Dema, 2021).

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Unlike many other Himalayan places where forests are typically fragmented and surrounded by farming, Bhutan's forests are vast, complete, and rarely disrupted by anthropogenic activities (Zurick, 2006). Bhutan has avoided major forest destruction, with roughly three-fourths of its land covered in forest. The degree of forest cover exceeds the government's intended 60% minimum coverage target under the constitution. Nonetheless, animal grazing, fuelwood cutting, and commercial resource exploitation threaten forest areas in some densely inhabited areas, such as the southern foothills (Kobayashi, 2022).

Traditional Ecological Knowledge (TEK) refers to a knowledge system passed from one generation to another through direct contact with nature (Inglis, 1993). It is based on communities' experience of interaction with the environment and usually transmitted in the form of stories. However, the concept gained popularity in the 1980s. TEK is also referred to as Indigenous Knowledge and Native Science. When the interaction between humans and the environment is examined, TEK is comprehensive. TEK perspective emphasizes the philosophical concept of holism, which maintains that natural systems (social, mental, economic, linguistic, chemical, biological, physical, and so on) and their qualities are intertwined and should be viewed as a whole, not in parts (Oshry, 2008). It draws on Smuts' (1936) early works, which argued that parts of a whole are closely integrated to the point where they cannot exist independently. TEK is thus the comprehensive knowledge of accumulated encounters, insights, and one-of-a-kind contributions to societies, cultures, and networks of humans living in a close relationship of balance and serenity (Haverkort & Reijntjes, 2010).

TEK is described as having a deeper understanding of identity and culture (Semali & Kincheloe, 1999); at once intuitive, spiritual, and philosophical (Berkes, 2008); and spontaneous, non-dualistic, dynamic, and occasionally sacred or intimate (Semali & Kincheloe, 1999). Native peoples worldwide have their TEK and practice it. TEK is concerned with what is known and how that knowledge it is acquired. Culture, tradition, and lifestyle shape how human societies perceive their surrounding environment. Most communities use and manage their resources based on the knowledge they have passed from one generation to another over millennia. Some of the age-old traditions can degrade the ecosystem, while others can play a critical role in supporting biodiversity conservation and mitigating climate change (Negi, 2010).

The cultural behaviour in traditional societies drives the sustainable management of natural resources, and local culture and traditions get stronger with interaction and living in harmony with nature (Maurya et al., 2022). If the traditional knowledge system can reduce or prevent resource depletion, habitat degradation, and species extinction, then it is considered conservation-worthy (Chunhabunyatip et al., 2018).

Bhutan is the Himalayas' sole remaining Vajrayana Buddhist nation. Rituals and festival celebrations are an important aspect of its Buddhist practice and intangible cultural legacy. Buddhists believe that making ritual gifts to gods and local deities can alleviate patients' and their families' physical and emotional suffering due to sickness (Pelzang, 2010). Such offerings necessitate the use of plants and their products. Cotton fibers from *Gossypium hirsutum* are used to manufacture wicks for burning butter lamps, which are a common sight in Himalayan monasteries and temples. Although butter has been used to light lamps traditionally, most people use vegetable oil these days. *Dimug*'s (*Onosma hookeri*) roots are used to make natural dye for painting *Gtor-ma* (traditional sacrificial cakes) during rites and religious ceremonies. According to Buddhist scholars, sacrificial cakes symbolise the clearing away of negativities and impurities one has in life and symbolise selfless giving to sentient beings (Dema, 2021; Nepal, 2022b). Each guardian deity and rite have its own sacrificial cake. The sacrificial cake takes the place of the pre-Buddhist era's human and animal offerings. *Saali Bishali* (Equisetum *arvense*) is used in one of the intricate rites called *Dog-pa*. Buddhists place the *Tsampaka*/*Totela* (*Oroxylum indicum*) flower and incense sticks in every family's praying room/shrine. The flower signifies the beauty and blossoming of enlightenment, while incense denotes a relaxing aroma offered to the Buddha and represents morals, ethics, and discipline, to cultivate pure enlightened traits (Yeshi et al., 2021).

In many myths and religions around the world, trees always seem to have a special position and sacred stories are connected with them. Hindus consider nature sacred. They cultivate *Tulasi* (*Ocimum sanctum*) and worship it as Tulsi *Mata* (Goddess). *Bar* (*Ficus bengalensis*), *Pipal* (*F. religiosa*), *Jamun* (*Eugenia jambolana*), and *Sāla* (*Shorea robusta*) are all mentioned in Hindu and Buddhist scriptures as having a strong mythical tie to the gods, goddesses, and deities (Pokharel & Pokharel, 2021). *Tsen-den* (*Cupressus corneyana*) is revered in Bhutan for its historical and spiritual value, and each species has its own story to tell. Bhutan was once known as *Lho-Mon Tsen-Den*

Jong (the country of cypress), and the cypress tree is honoured as the country's national tree. People grow this tree outside monasteries, fortresses, and other religious sites (Phuntsho, 2013).

In Bhutan, incense items are the most frequently utilized products made from plants during religious ceremonies and at home. The need for medicinal herbs has increased as incense producers have grown. Most commonly sought are *Jatamansi* (*Nardostachys grandiflora*), *Tsen-Den* (*Juniperus* species), *Kālo Dammar* (*Canarium strictum*), *Agaru* (*Aquilaria malaccensis*), *Kusum* (*Saussurea lappa*), *Puskarmool* (*Inula racemose*), and *Carthamus tinctorus*. These plants are either utilized as incense ingredients or burned fresh (or dried) as part of an offering of prayers. Around 40 medicinal plants, aromatic plants, and natural herbs are utilized to make incense sticks and powder. Since its founding in 1991, the Nado Incense Factory has been one of Bhutan's oldest incense stick manufacturers (Wangchuk & Tobgay, 2015).

Several authors have agreed that the older generation has more experience and knowledge about traditional ecological knowledge compared to the younger generations (Schniter et al., 2021; Childers & Elz, 2022; Flores-Silva et al., 2023). Different social groups tend to develop their own approaches to the environment and specialise in different environmental knowledge (Müller et al., 2015). The literature has shown that there is a gradual loss of traditional ecological knowledge the world over, and there is a need to alter policies and regulations, strengthen stakeholder cooperation, and strengthen interdisciplinary research to preserve the age-old tradition (Ray, 2023). The research's primary goal is to list the risks now facing traditional knowledge related to the use of medicinal herbs. The study that was carried out in the Dorokha *Dungkhag* villages of *Ngagang* and *Boribotey* was driven by this aim.

The Setting

Samtse lies to the southwest of Bhutan, with an area of 1,305 km^2, of which 59.8 % is forested. It is bordered by Haa and Chhukha districts to the east and north, the Indian state of West Bengal to the south, and Sikkim to the west. It has a population of 32,022 individuals, of which 51.2% are male (National Statistics Bureau [NSB], 2020). The altitude ranges from 1,000 to 2,500 meters, and daily temperatures range from 12–

15°C in winter to 26–32°C in summer. The data from 1990 to 2020 shows that the average yearly temperature has been around 17–28 °C. Summers are hot and humid, while winters are chilly and dry, with the mean annual rainfall ranging from 1,200 to 3,000 mm. Dorokha *Dungkhag* is 200–2200 masl and is located in a sub-tropical monsoon climatic zone with dense forest cover. The monthly temperature ranges from 15°C in the winters to 32°C in the summers, with yearly rainfall ranging from 1200 to 3000 mm. Summers are hot and humid, while winters are dry and chilly (Nepal, 2023).

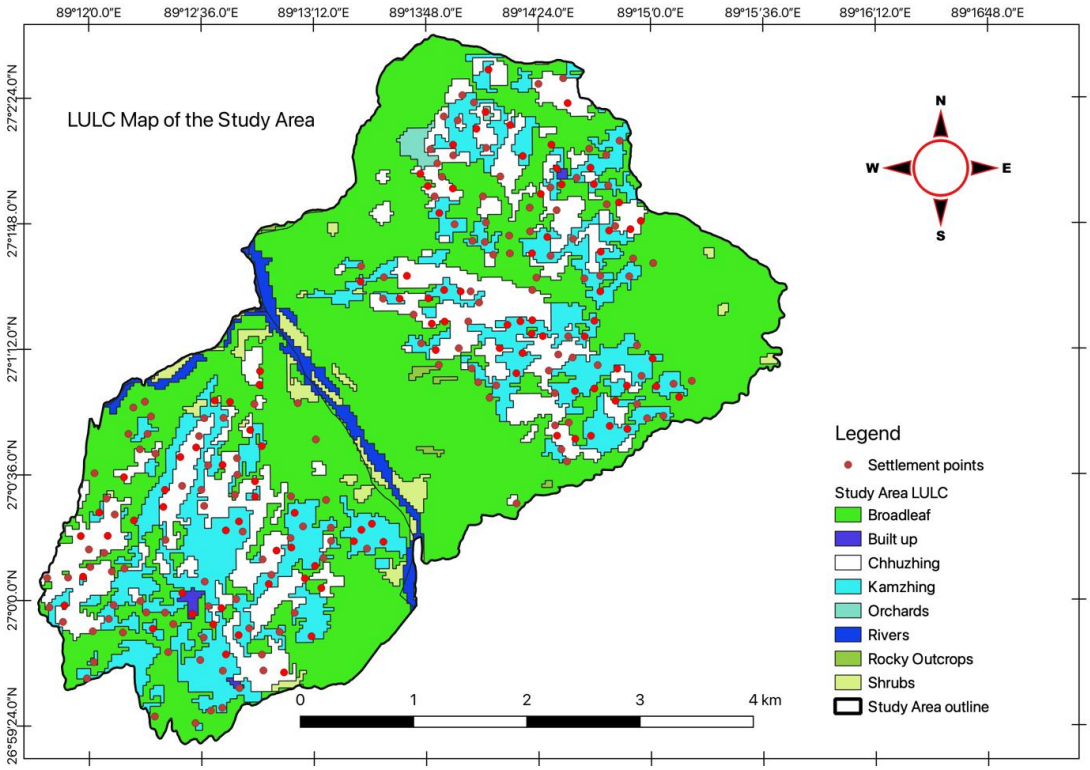

Figure 1. Map of the study area (Ngagang and Boribotey) (the LULC shapefile was downloaded from the Bhutan Land Commission's website, and it was analyzed using QGIS 3.28 Firenze software)

The study was conducted in 2022 within the villages of *Ngagang* and *Boribotey*, situated under Dorokha *Dungkhag* in Bhutan, was strategically made due to their geographical significance. These villages, positioned in close proximity to the Indian border with West Bengal, offer a unique perspective on cross-border dynamics that could influence various aspects such as culture, trade, and environmental factors.

Moreover, their adjacency to the Amochhu River, the fifth largest river basin in Bhutan, adds another layer of importance. The presence of the river basin introduces a critical environmental component to the study, impacting factors like water resources, agriculture, and overall ecosystem dynamics. By selecting these specific villages, the research aims to capture the diverse conditions and potential variations in socio-economic and cultural aspects within a relatively confined geographical area, contributing valuable insights to regional studies and understanding the complexities of the broader context.

A total of 54 persons were interviewed, of whom 29 were male and 25 were female. 8 people belonged to the age group of less than 20 years, 21 people belonged to the age range of 20 to 40, 20 people belonged to the age range of 40 to 60, and 5 were more than 60 years of age. Out of 54 people, 49 were literate with basic education, while 5 were illiterate. Since the community is Hindu-dominated, 42 people followed Hinduism, while 12 of them followed Buddhism. 34 of them belonged to Ngagang village, while twenty of them were from Boribotey village. The research sought to assess the knowledge related to medicinal plants and their corresponding ailments, examining how this knowledge has been passed down to younger generations. Additionally, it inquired about factors influencing the transmission of this knowledge from respondents.

Results and Discussions

In general, there are two types of knowledge about the medicinal properties of plants: community knowledge and specialist knowledge. In the first type, residents of a given village are familiar with the medicinal virtues of various animal and plant parts and can use them when necessary. Individuals gain this knowledge through their daily interactions with the socio-ecological systems in their communities. Members of the community frequently contribute this type of information. Specialists, who perform traditional medicine, on the other hand, keep this information a trade secret. They don't readily share this information with other practitioners. Only family members receive such information vocally and through practise (Biró et al., 2014). As a result, expert information, such as how to make a particularly specific pharmaceutical ingredient or how to identify endangered plant species, is at risk of being lost (Hamilton, 2004).

Using the information, we may examine species knowledge (the name of the plant and its associated properties) according to gender and age (Figure 2). The distribution of species knowledge by age makes it clear that as people get older, they tend to become more knowledgeable about a variety of species. The information is broken down into five age ranges: <30, 31–40, 41–50, 51–60, and >60. With a total of 85 different species reported. The >60 age group stands out as having the highest amount of species knowledge. On the other hand, there are fewer documented species among people under 30; in fact, there are only 21 in this age range. When we look at species knowledge by gender, the data shows that, across all age groups, females report a higher number of species than males (Figure 2). This indicates that females generally have more knowledge of species than males do. It's crucial to highlight that the interpretation makes the assumption that the "species reported" measure refers to the variety of species that people are aware of.

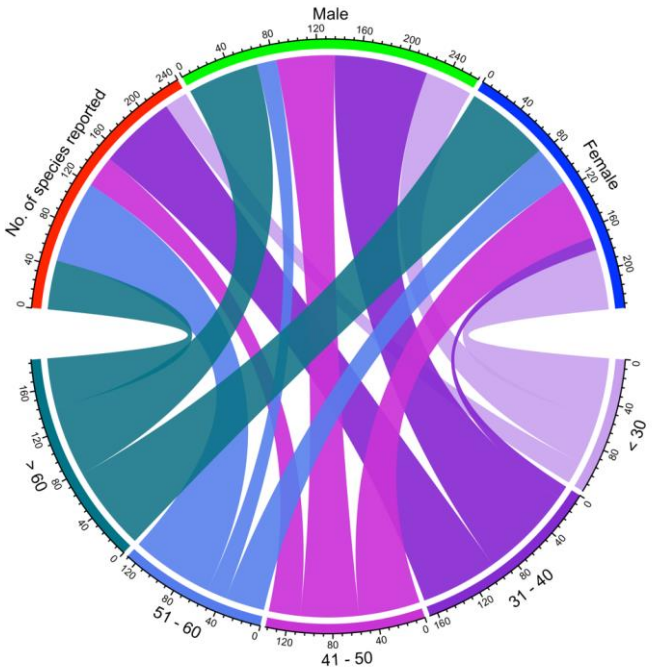

Figure 2. Chord diagram showing plant knowledge based on age group and gender

The younger generations mostly learned about local culture, traditions, and its relationship with the environment from the community or from friends/relatives, followed by their family members. Around 32 people are self-taught regarding the local knowledge, either from what they have heard, read, or seen while visiting other

communities (Figure 3). The most knowledgeable group were those who were over 60 years old, as they were able to name more than 70–90 species of wild edible plants and had wide knowledge regarding the use of medicinal plants. The least knowledgeable group was those less than 20 years of age, as they could hardly name more than 10 species of plants consumed in the wild. But few can name more than 20 species. We can notice from this observation that some younger generations were more concerned about their surroundings and showed interest in learning new things.

A 21-year-old girl shares how she feels about TEK:

> "TEK feels like this incredible bridge between my generation and the wisdom of the past. Growing up in a time of rapid technological advancement, I find solace in the idea that there's this wealth of knowledge grounded in tradition and nature. It's like discovering the roots of our existence in the midst of a digital whirlwind. I see TEK as a way to balance the fast-paced, tech-driven world I'm navigating daily. It's not just about the latest trends or gadgets; it's about connecting with the earth and understanding the timeless wisdom that has sustained communities for generations."

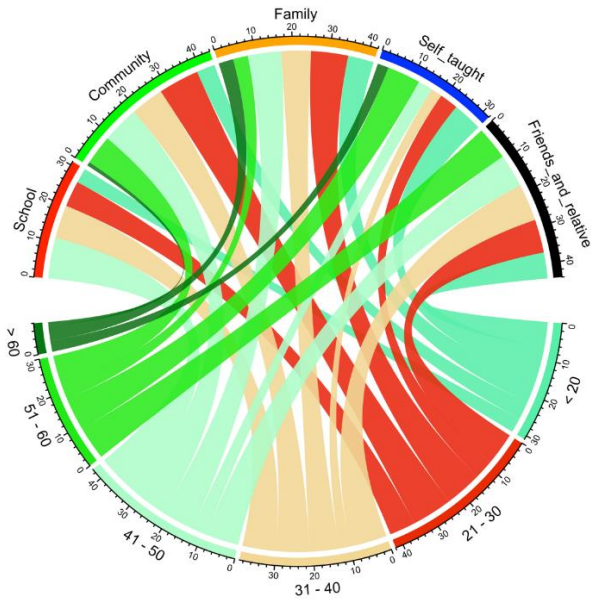

Figure 3. Chord diagram showing the mode of transfer of traditional knowledge

The majority of the village's children and youth leave their villages for education and

better job prospects. They rarely have the chance to interact well with the local environment or learn about it. Traditional knowledge of biological resource management cannot be smoothly passed on in the absence of younger locals, and it may be lost within a generation. Along with particular knowledge of the ecology of medicinally useful species and the making of medicines, a broad understanding of the traditional ways of using them has deteriorated over time. Indigenous knowledge is typically passed down informally (outside of school) and instinctively from a young age, and by puberty, it is practically complete. It occurs in typical activity contexts (work, play, and rest), and it entails observations and experience (e.g., peripheral engagement, trial and error) and a degree of local language skills (Caniago & Siebert, 1998). With youngsters moving abroad for further study, it's unclear whether traditional reproduction will proceed automatically in Dorokha.

Culture, Tradition, and Religion

Many features of nature are seen as divine by most Hindus. Many creatures, including snakes, mountains, rivers, trees, and the cosmos, vibrate with divine energy. Some Hindus consider natural events religious, while others believe they have reigning deities (Table 1). Although the Godhead is investing in some natural occurrences and places, this does not mean that they are not exploited. There is a mismatch between perception and conduct, as there is in many religious systems. At *bhâi tikâ,* during the Hindu festival of *tihâr*, women place walnuts/*Okhor* (*Juglans regia*) in the doorways of houses. When cracked, these are believed to kill local demons. The gum of *Canarium strictum* is used for incense. People believe that burning incense from this gum will drive out the evil spirit. When environmental elements get integrated into religious practises, they get protected (Kumar, 2020).

Table 1: ***Environmental Elements Used for Religious Purposes***

Scientific Name	Local Name	Family	Uses
Elaeocarpus sphericus (Gaert.) Schum. Rudraksha tree	*Rudraksha*	Elaeocarpaceae	Rosary
Juglans regia L.	*Okhar*	Juglandaceae	At *bhâi tikâ* during the Hindu

Walnut			festival of tihâr, women, place walnuts in the doorways of houses. When cracked, these are believed to kill local demons.
Oroxylum indicum (L.) Benth. *ex* Kurz Indian Trumpet Flower	*Totla*	Bignoniaceae	Important while conducting *puja*
Ficus religiosa Forssk Sacred Fig	*Pipal*	Moraceae	Used in *puja*
Ficus benghalensis L. Banyan tree	*Bhar*	Moraceae	Used in *puja*
Ocimum tenuiflorum L. Holy Basil	*Tulsi*	Lamiaceae	Worshiped as the wife of Lord Vishnu
Cynodon dactylon (L.) Pers. Bermuda Grass	*Dubo*	Poaceae	Used during bhâi tikâ
Canarium strictum Roxb Black dammar	*Gokul dhup*	Burseraceae	Gum is used for Incense. People believe that burning incense of this gum would drive out the evil spirit.
Cinnamomum glaucescens (Nees.) Hand.-Mazz. Dwarf Cinnamon	*Malagiri*	Lauraceae	Used seldom its heartwood chips as incense
Mangifera indica L. Mango tree	*Bhan aanp*	Anacardiaceae	Leaves are used while conducting puja
Corvus corax L. Common Raven		Corvidae	National bird of Bhutan
Pavo cristatus L. Indian Peafowl	*Mujur*	Phasianidae	Feather is used in rituals
Snake	*Saap*		Considered related to Lord Shiva, Lord Vishnu, and Lord Krishna

Devi-than

Since 80 percent of the study area's population practices Hinduism, most of the interaction between man and nature is shaped by the idea of Hinduism. One particular practise is the idea of *Devi-than*. *Devi-than* is a place where *Devi* (the goddess) prefers to stay or reside. Anything growing or occurring near this place is considered sacred. To demarcate the boundary of the *Devi-than*, a wall of boulders is made so no one can dirty the place. Most of the people go and worship at the place, offering milk, fruits, flowers, water, and locally made dishes, and in return, they pray for the protection of their king, country, good health, and social harmony. When a place is declared the sacred place where a Devi resides, it is also opened to people of different faiths, and most of the Buddhists residing near the sacred places come to worship during the full moon. Such places not only protect the environment but also promote social harmony.

Sacred areas, such as *Devi-thans*, where the goddess is thought to reside, have the capacity to protect the environment through a number of processes. Respect for these places can deter destructive behavior, resulting in the preservation of biodiversity, the prevention of erosion, and the conservation of natural resources (Molnár & Babai, 2021). These areas are surrounded by walls made of boulders, which can serve as barriers to prevent degradation and save habitats. In addition, the spiritual ties that bind these locations to their water sources can ward off pollution and contamination, ensuring that clean water is always available (Seltenrich, 2018). The cultural practices and communal involvement connected to these locations promote a sense of accountability and cooperation, promoting responsible waste management and long-term sustainability. In the end, the reverence accorded to these places fosters a happy coexistence of people and nature, encouraging the preservation of the environment for both the present and the future.

In my interview with him, a Hindu priest explained:

> "*Devi-than* plays a significant role in the lives of people. We do have a Shiva Mandir, but not all the people can visit it owing to the distance from their homes. These people can always visit the *Devi-than* nearest to them during the

auspicious days. Since my grandparents' time, I have seen people cleaning the *Devi-than* and offering things to the *Devi-than*. Initially, I only noticed a stone and didn't want to believe that a stone had some power over human beings. But as I grew, I heard and saw many people getting sick because they disrespected the sacred place. I know two people who fell seriously ill as they disrespected the place, and both were bedridden. To know what has happened to them all of a sudden, their parents first called a *dhami/jhakri* (shaman) to check on their child's health. Upon performing *pùja* by the shaman, they came to know that the kids were ill because they disrespected the sacred site. The shaman asked for forgiveness on behalf of the kids and promised never to disrespect the sacredness of the *Devi-than*. Their health was back to normal two days after the shaman conducted the *pùja*. Stories and incidents like this instill a sense of respect for Mother Nature. When we respect the site, we are safeguarding the surrounding environment, which is actually good."

The *Devi-than*, a sacred site, holds significant importance in people's lives, as evidenced by the tradition of cleaning and offering at the site, with instances of illness believed to result from disrespect leading to a sense of reverence for nature and environmental preservation.

Threats to local traditional knowledge

Formal education is necessary for human progress, but it may jeopardize indigenous knowledge transmission. Children who receive formal education at a distance (at boarding school) spend much of their time passively learning in classrooms rather than engaging in hands-on learning on the field. Teachers have taken over as custodians of knowledge and responsibility from parents and elders. As a result, formal schooling may lead to indigenous youth's de-culturation, loss of social cohesion, alienation, and confusion. Across the globe, indigenous people are frequently sidelined by mainstream society. This results in the formal school system's marginalization or belittlement of local knowledge, values, and worldviews. The consequent estrangement, loss of identity, and low self-esteem are disastrous for indigenous kids and society (Figure 4). The remainder of this section discusses threats to local traditional knowledge in the context of Dorokha specifically.

A 45-year-old woman says:

"TEK takes me back to a time when life was simpler, and our connection to the environment was more direct. As someone who has witnessed the transformative journey of technology over the years, TEK offers a sense of grounding. It's a reminder of the wisdom that sustained communities long before the digital age. While I've embraced the conveniences that technology brings, there's a certain nostalgia and respect I hold for the deep understanding embedded in TEK. It prompts me to reflect on the sustainable practices of the past and consider how they can inform a more balanced and mindful approach to our rapidly changing world."

One strand of this research looked into the perceived threats of TEK (medicinal plants and their properties), as experienced in Dorokha *Dungkhag* as shown in figure 4.

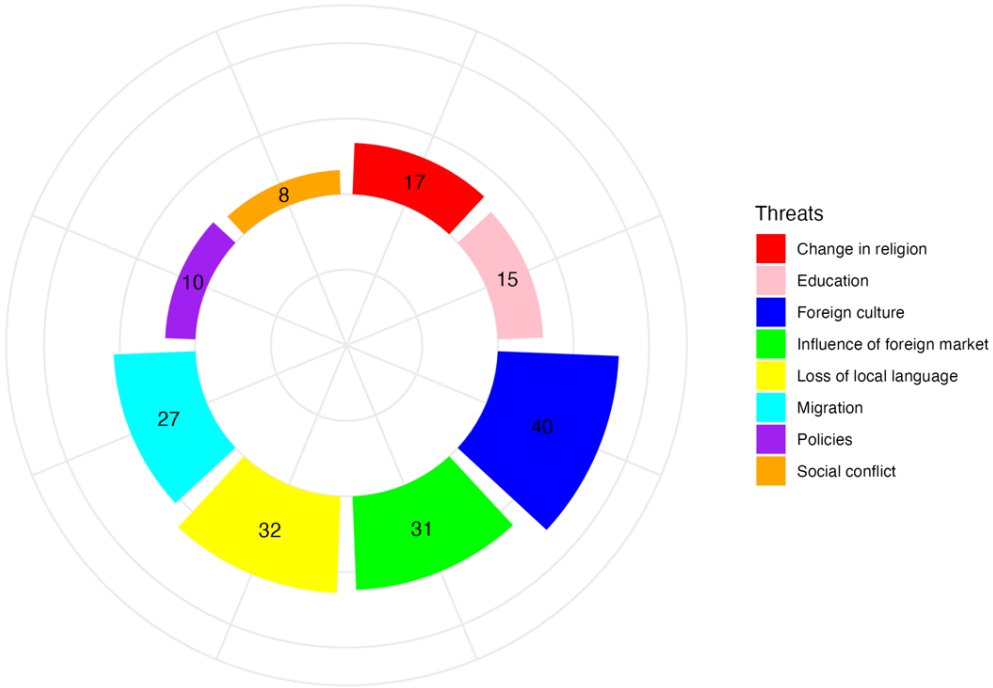

Figure 4. Threats to local traditional knowledge

A respondent shared his opinion:

"I take pride in my children's academic successes, but I can't help but feel a

sense of loss as they become less interested in our traditional ways, cultural beliefs, and language due to the influence of education and external factors, making it crucial to find a way to preserve our local knowledge amidst these challenges."

Figure 5 shows that a significant majority, comprising 72.7% of respondents, perceives imminent threats to local traditional knowledge concerning the importance of medicinal plants. Notably, this sentiment is particularly pronounced among individuals with over 30 to 35 years of experience, having witnessed numerous cycles of both new years and *Diwali* celebrations. In contrast, 27.3% of respondents express a contrary view, asserting that there is no imminent threat to local traditional knowledge. This subgroup contends that traditional knowledge should undergo regular updates, akin to new technological gadgets, as they believe certain aspects of this knowledge have become obsolete in light of the efficacy of modern gadgets, discoveries, and inventions.

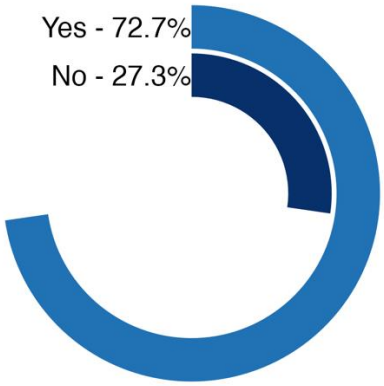

Figure 5. Response to threats to local traditional knowledge

Furthermore, a substantial 75% of respondents contend that traditional knowledge is on a decline, attributing this decline to the transformative effects of modern lifestyles (Figure 6). This observation underscores a prevailing concern about the impact of contemporary living on the preservation and relevance of age-old traditional wisdom.

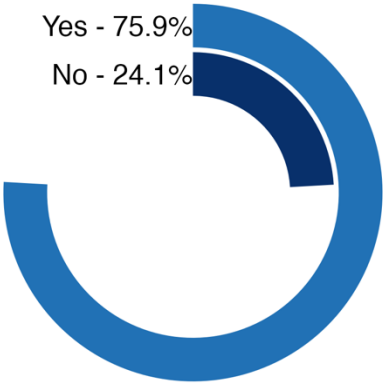

Figure 6. Response to the decline in traditional knowledge

The threats discussed below are not the threats to particular knowledge system, the threats are analyzed in general, partly focusing on the local knowledge on the traditional medicinal plants.

A grandfather shares his concern:

> "The market is changing how we understand nature. New ideas and technologies are coming in, making us rethink our ways. But there's a worry that our traditional knowledge might get mixed up or lost. We need to find a balance between the new things and keeping our old wisdom about nature."

The study findings highlight a prevailing sentiment among respondents, with 57.4% expressing apprehension about the substantial risk posed to local traditional knowledge pertaining to the importance of medicinal plants (Figure 6). This perceived threat is intricately linked to the broader impact of the external market, manifesting in the displacement of traditionally cultivated food crops, locally crafted fermented foods, and handwoven textiles. The influx of cheaper imports from other countries not only undermines local industries but also acts as a catalyst in eroding traditional practices, cultural norms, and historical roots. This multifaceted challenge underscores the complex interplay between economic globalization and the preservation of indigenous knowledge and cultural heritage.

The study area has a longstanding cultural heritage rooted in Buddhism and Hinduism, passed down through generations. Anything outside these religions is often perceived as foreign and as unable to protect and preserve traditional ecological

knowledge. Notably, 31.5% of respondents expressed concern that shifts in religious affiliations pose a threat to local traditional knowledge concerning the significance of medicinal plants. This apprehension reflects the intricate interplay between religious dynamics, cultural preservation, and the perceived vulnerability of traditional knowledge in the face of evolving religious choices in the community.

In the study area, linguistic diversity is evident with *Lhotshamkha*, referring to the Nepali language in Bhutan, being widely spoken, alongside the national language, *Dzongkha*, and other dialects like *Rai*, *Gurung*, *Limbu*, and *Sharchopkha*. However, a noteworthy trend has emerged among school-going children who increasingly perceive English proficiency as a marker of knowledge, potentially sidelining their rich local languages. The loss of local language competencies correlates to a loss of local knowledge. For instance, local languages carry nuanced vocabularies essential for expressing the intricacies of traditional knowledge. The same nuance is not to be found in the English language. The cultural transfer of such knowledge faces a gradual erosion, evident in the fact that 59.3% of respondents express concern about the diminishing use of local languages, seeing it as a significant threat to the preservation of local traditional knowledge.

The above apprehension is rooted in the understanding that the subtleties and depth of traditional knowledge are intricately tied to the exact words used in local languages. The adoption of English, while providing access to a global language, risks diluting the richness of traditional wisdom, hindering the accurate transmission of cultural practices and insights embedded in the local languages and dialects. This underscores the delicate balance needed to ensure the preservation of linguistic diversity for the effective transfer of traditional knowledge across generations.

The overwhelming sentiment among respondents, with 74.5%, identifies the influence of foreign culture as the most significant threat to the survival of local traditional knowledge. Recognizing the inevitability of cultural interaction, there is a collective concern that such intermingling poses a risk to the distinctiveness of local cultures. The fear is not merely of dilution but of potential disruptions to the transmission networks of traditional knowledge, impacting core institutions, livelihood practices, and deeply held beliefs.

Tang & Gavin's (2016) study resonates with this concern, highlighting the amplified impact of modern media, particularly television, on the interest of native youth in traditional ways of life and culture. In the eyes of the residents in the study area, exposure to the outside world brings forth opportunities, but this perceived benefit comes at a cost to local culture, beliefs, and religion. The metaphorical opening of doors to external influences is acknowledged as a double-edged sword, offering prospects for development while simultaneously threatening the essence of local identity and heritage. This underscores the delicate balance communities must navigate between embracing global opportunities and safeguarding the integrity of their cultural and traditional fabric.

The Bhutanese Constitution guarantees citizens access to high-quality health services and international-standard education. However, concerns among adults suggest that the influence of the Western education system on the younger generation is gradually diminishing the local cultural framework. As youths pursue higher education, often relocating from their villages, a disconnection from their cultural roots ensues. Even upon returning, such visits are typically brief, limiting opportunities for substantive interaction and cultural learning. This perceived disconnection is echoed by 27.8% of respondents, who assert that the education system itself poses a threat to the preservation of local traditional knowledge. This highlights the intricate interplay between modern education, cultural preservation, and the necessity for nuanced approaches that reconcile global learning with the conservation of indigenous wisdom.

A woman shares her concern:

> "The modern education system gives us wide opportunities, and we can grab those opportunities, but we tend to lose interest back home. We want to celebrate Christmas and want to know more about celebrities like K-Pop, English singers, and all, but if we ask our youths about our kings, history, and culture, I bet most of them will give a blank look. Recently I had a conversation with a friend of mine, and she was talking about how she has never missed a K-Pop song or concert. In response, I asked her whether she listened to the speech of His Majesty the King during the National Day Celebration. She quickly changed the topic. It is not that we have to abstain from such things, but we must not forget our roots. We, as Bhutanese, are taught to live in harmony and lead a simple life, so if we start to love what we have back home,

then we can appreciate the beauty of other cultures."

The survey indicates a significant concern, with 50% of respondents expressing the belief that substantial migration could lead to the loss of their traditional knowledge. This underscores the intricate relationship between migration patterns and the preservation of indigenous wisdom, highlighting the need for policies and practices that recognize and address the potential impacts of migration on traditional knowledge systems.

Changes in the transmission channels, beliefs, and livelihood practices of TEK can be attributed to voluntary or forced migration, impacting both indigenous and non-indigenous populations. The migration of indigenous youth to urban centers, driven by aspirations for improved career prospects and education, can influence their inclination to learn local traditions, culture, and beliefs. However, prolonged stays outside their communities often result in missed opportunities for practicing their indigenous language and learning from elders upon sporadic return visits.

The Hindu society in the study area adheres to caste systems, with the *Baun* caste, akin to Brahmins in Hindu practices, holding dominance. This hierarchy places *kamis* and *damais* in lower caste positions (Subedi, 2011). Notably, a prevailing belief among respondents is that marriages across caste lines, particularly from higher to lower castes, are viewed negatively, deeming the person from the higher caste as impure.

A man shares his concern:

> "Elderly people talk about the caste system and how they should be inclusive, but when it comes to the individual level and their home, they don't practice what they preach. Suppose I am going to marry a girl from a low caste, then my parents and I will be down-looked, and my parents have to perform *puja* to purify the house. The villagers engaging with our family is out of question; they won't even drink water given to them by us. And finally, they must either leave the village or find acceptance elsewhere for marrying a woman from a lower caste. These are those things that need to end, but we say it is culture, and we need to preserve it. A few people were forced to leave their native places because of such issues."

This caste-based discrimination contradicts the national developmental philosophy

of Gross National Happiness, which advocates for equal treatment irrespective of caste, creed, religion, sex, and nationality. Consequently, such discriminatory practices create social conflicts, compelling couples and families to relocate, hindering the transfer of traditional knowledge. A notable 14.8% of respondents identify social conflict as a contributing factor to the loss of local traditional knowledge. This underscores the tension between traditional societal norms and the national ethos, posing a challenge to the preservation of indigenous wisdom and cultural practices. A substantial 18.5% of respondents highlight the role of policies and regulations in contributing to the loss of local traditional knowledge. This underscores the need for policy reform that recognizes and respects indigenous cultures, promoting an environment where traditional knowledge can thrive and endure.

Conclusion

Traditional ecological knowledge is place-specific, and the knowledge of one community will differ based on the availability of resources, the religion they practise, and the environmental context. The literature on TEK recognises the explicit presence of knowledge among native people groups. The major threat to traditional knowledge is posed by easy access to the outside world. Earlier, people depended on edibles from forests for essential nutrients, but the situation and living standards have changed. Most of the respondents feel that the traditional knowledge of the locality is declining. The most pressing threat is posed by the influence of the outside market, change in faith, loss of local language or dialect, foreign culture, migration, social conflict, and policies. Therefore, there is a need to revive the interest of local youths in appreciating the rich culture and traditions of their society. Overall, the recognition of traditional ecological knowledge as a valuable resource for conservation and management is gaining momentum, but more needs to be done to ensure that the rights, needs, and perspectives of indigenous and local communities are respected and incorporated into decision-making.

Disclaimer

This paper is an extended version of a preprint titled “Keeping the local tradition alive: the status of local traditional knowledge in Dorokha, Samtse, Bhutan” of the

same author. See: https://assets.researchsquare.com/files/rs-2492233/v1/723689ed-d4c1-4b7f-8d53-97c3c1f7ccda.pdf?c=1674160483

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