The Academic
International Journal of Multidisciplinary Research

An Online Peer Reviewed / Refereed Journal
Volume 3 | Issue 11 | November 2025
ISSN: 2583-973X (Online)
Website: www.theacademic.in

Role of indigenous practices in the conservation of community conserved forests in Meghalaya

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DOI : https://doi.org/10.5281/zenodo.17922161

ARTICLE DETAILS

Research Paper

Accepted: 22-11-2025

Published: 10-12-2025

Keywords:

Traditional knowledge, indigenous people, community forest, conservation, NTFPs, ecosystem services

ABSTRACT

The present study involving a concurrent mixed-method of research found that the traditional knowledge system in Swer village was driven by both culture and religion embedded in the way of living of the indigenous community. 12 different forms of TK, namely, rituals and prayers, taboos, dreams, legend, land use, harvesting of wild plants, forest conservation, occurrence of rainfall, traditional medicine, natural regeneration, land use planning and sustainable farming were identified to be instrumental in the sustainable conservation of community forests including sacred forests and other natural resources. TK served as a guideline for demarcation of land use, identification of consumable and medicinal plants and conservation of forests. The classification of community forest based on religious beliefs besides utilization of forest goods and conservation, construction of fire line, rainwater harvesting, tree plantation and springshed management were common traditional natural resource management practices of the people of Swer. Women members of the community were the frequent gatherers of forest products including medicinal plants and the custodian of traditional knowledge transmitting knowledge and experiences to the younger generation. Benefits accrued out of the community forest contributed to

livelihoods. The study revealed that in an indigenous setting, traditional knowledge helped in preserving both nature and culture promoting community sustainability.

Introduction

Traditional knowledge (TK) dates back to the earliest societies and has developed over time as a result of interactions between people and the natural world. Indigenous people use traditional knowledge to better understand, utilize, and manage ecosystems and their natural resources (Lertzman & Vredenburg, 2005; Berkes, 2009).

Traditional knowledge encompasses a wide range of norms, values, beliefs, worldviews, and behaviours among the indigenous people. Being dynamic, it allows knowledge to evolve with new information (Menzies & Butler 2006). The terms used for this knowledge inter alia, Traditional Knowledge (TK), Traditional Ecological Knowledge (TEK), Native Knowledge (NK) and Indigenous Knowledge (IK) are often used interchangeably. Berkes (1999) provides a widely used definition of TK as "a cumulative body of knowledge, practice, and belief, evolving by adapting processes and handed down through generations by cultural transmission about the relationship of living beings (including humans) with one another and with their environment".

Among the Khasi community in Meghalaya, culture and nature are fundamental, and associated with the people's beliefs and their way of living. God, nature and human collectively form a single indivisible entity in the Khasi worldview (Mawrie, 2009) playing a vital role in linking culture with nature and man through customary practices and beliefs.

In Meghalaya, traditional knowledge on forest conservation, utilization and management of natural resources and agriculture have been studied by Jeeva et al. (2006); Tiwari et al. (2010); Tynsong et al. (2012); Tynsong et al. (2022); Mao et al. (2009). Classification of community forests primarily into sacred forests, village protected forests and village forests based on the religious beliefs, conservation and utilization is one of the traditional methods practiced in this region that are commendable (Nongkynrih, 2017; Tiwari et al., 2010).

Traditional knowledge is on the decline the world over despite its recognition and applications , inadequate documentation notwithstanding attempts to document and digitize this valuable knowledge. Loss in traditional knowledge is often linked to the decline in traditional natural resource-based

livelihoods (Loh & Harmon, 2014 and as a result of modernization-related socio-economic shifts and changes in people's beliefs (Boafo et al., 2016). The present study aims to understand and document the repository of traditional knowledge used by the people of Swer.

Materials and Methods

Study Area

The study was conducted in Swer village under the Khatarshnong, Laitkroh Block in the East Khasi Hills district of Meghalaya, North East India (Figure 1.) located at a distance of about 28 km away from the capital city of Shillong(91˚47' E latitude and 25˚25' N longitude) at an altitude of 1915 MSL. The climate of the study area is monsoonic with seasonal variation in temperature and rainfall. The average annual rainfall is about 2500 mm with an annual temperature ranging between 3 to 22˚C and an annual relative humidity of 84%.

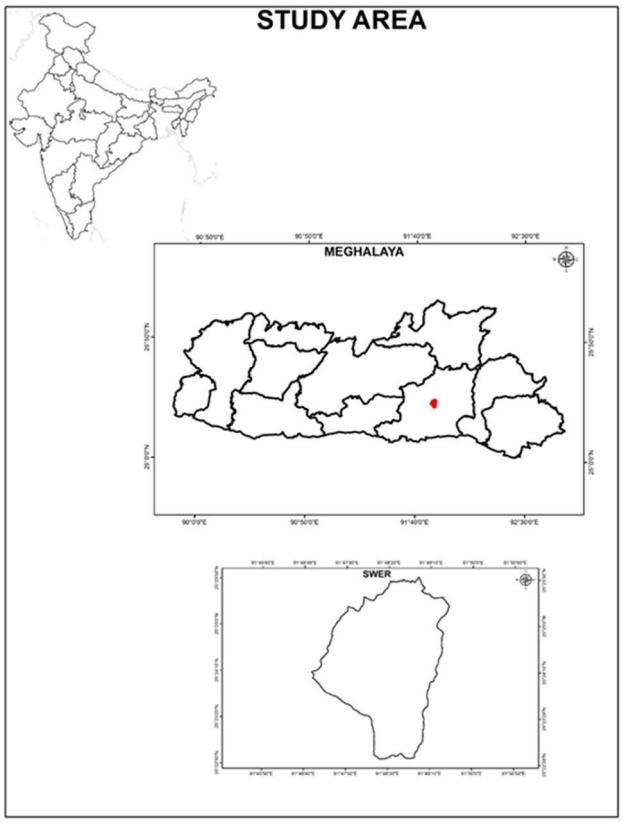

Figure 1 Map of the study area

Swer village is inhabited by the Khasi tribe with a population of ca. 1989 with 386 households who follows the indigenous religion of the Khasi people- *'Niam Tynrai/ Niam Khasi'*.

The community forest comprises the sacred forest (*Law Kyntang* also known as *Lum Ryngkew* among the inhabitants of Swer) spread over the area of 13.2 ha and the village protected forest *(Law Adong*) with an area of 18.9 ha. Both forests are protected by the village community under the supervision of the *Basan* who is the elder of the principal clan. Swer village boasts of village forests or *Law Shnong* and privately owned forests or *Law Ri-Sumar/ Law Ri-Kynti*.

The vegetation of the study area is semi-evergreen subtropical broad-leaved hill forest (Champion & Seth, 1968). *Engelhardia spicata*, *Eurya japonica*, *Gaultheria fragrantissima, Ilex khasiana, Myrica esculenta* and *Rhododendron arboreum* are some of the common dominant species recorded in this area.

Table 1 Demographic profile of the Swer households

Demographic Characteristics	**Category**	**Value (%)**
Household size	Mean	4.9
	SD	1.85
	Min	1
	Max	10
Religion	Indigenous Religion (*Niam Tynrai*)	93.8
	Christianity	6.2
Occupation	Daily Wage (Quarry, Maids,	32.2
	MGNREGA)	4.8
	Farmer	1.8
	Teacher	32.8
	Student	12.3
	Unemployed	16.1
Availability of electricity	Yes	96.3
	No	3.7
Domestic Water Supply	Village Water Supply + Springwater	13.5
	Village Water Supply + Rainwater	47.0
	All three	39.5
Source of Cooking + Heating	Firewood + Charcoal	93.8
	Firewood + Kerosene stove/LPG stove	6.2

Data collection and analysis

A mixed-method approach using both quantitative and qualitative methods was employed to collect and analyze data in this study. Primary data was collected through survey, interviews, participant observation and focus group discussions during the years 2019-2021. The study attempted to understand and record the traditional knowledge used by the local people in their daily lives in relation to their customs and practices. Simple random sampling was employed to conduct the household surveys. 20% of the total number of households were randomly selected. To gather more insight on the application of traditional knowledge in the utilization of NTFPs, land use and conservation, in-depth interviews were conducted following purposive sampling method with selected community elders, farmers, traditional healers, herders and gatherers. Household survey (n=80), Focus Group Discussion (FGD) (n=2) and semi-structured in-depth interviews (n=12) were carried out in the study. Thematic analysis was employed to categorize the various forms of traditional knowledge while MS Excel was used for percentage and graphs representations.

Results

Background of TK according to the community members

Culture and nature were centric in the worldview of the people of Swer. With majority population following the indigenous religion, religious rituals and traditional practices were common in the village. The existence of community forest represented their importance in terms of religion, culture and nature. The inhabitants of Swer believed in '*U Rynkew U Basa'* as their guardian or the deity who resided in the sacred forest.

The people of Swer associated traditional knowledge in their day-to-day activities. Family and community elders and clans including women were the custodians and transmitters of such knowledge to the younger generations.TK guided the inhabitants on knowledge about utilization and management of land, water, plants and animals apart from conservation. Table 2 highlights the background and applications of TK. The use of TK on rituals and conservation was the highest with a percentage of 30.4% and 26.9 % respectively. 72.5% of the respondents believed that TK was not eroding over time with religion serving as a key factor in preserving such knowledge.

Table 2 : Background of TK in % (n=80)

Origin of TK

Custom	48.6
Folktale	14.7
Folksong	5.5
Legend	31.2
Custodian/ Transmitters	
Family elders	26
Village elders	46.2
Clan elders	27.8
TK Applications	
Conservation of forest	26.90
Farming	24.70
Weather	11.90
Rituals	30.40
Traditional medicine	5.30
Fishing	0.90
Erosion of TK	
Yes	1.3
No	72.5
Do Not Know	26.2

Different forms of TK believed and practiced in Swer

a. Ritual and Prayers

The study suggested that religious beliefs and practices were performed during various ceremonies and

for various purposes. Prayers and rituals were offered by the *Rangbah Lyngdoh* [elderly priest] of the principal clans every ten or fifteen years to the deity of the sacred forest for the well-being of the inhabitants, before sowing season and in times of natural calamity.

b. Taboos

Raw meat was prohibited to the protected forests as this was considered impious to the deity. An incident occurred in 2013 where a group of neighbouring villagers organized a picnic around the protected community forest; a major fire broke out and spread to the forest. The elderly priest had to offer prayers to protect the people and the forest from devastation. The locals assumed that raw meat must have been taken to the protected forests. Anything gathered from the protected forests must not be placed in the hearth. For example, if fruit seeds were thrown to the hearth, the fruits bearing trees would stop producing fruits.

c. Dream

Dream is a characteristic element among the worldview of the Khasi tribe which is interpreted as a sign of good luck or misfortune. As narrated by one of the respondents on the onset of the pandemic in 2020, "A lady appears to one of the elders seeking permission to stay in the village' the elder in response warns the lady that the *Sordar* (Village head) will not allow her to reside in the village. Soon after the lady leaves and says she will head to the town (Shillong) instead, keeping the village safe". Through this dream the locals believed that the pandemic did not affect any resident of the village.

d. Legend

Many years ago, an elderly lady known as *Jitrai Shanpru* carried water upside down in a bamboo tumbler (*Tyndong Siej*) from a distant village. When she reached Swer ,she poured the water into the site where the springwater shed was currently located. Ever since, the springwater had never dried up. The local people preserved this site with reverence towards the ancestors and nature.

e. *Occurrence of Rainfall*

According to an elder's account, there was a kind of a water beetle called *'Niangrang'* that marked the forest in a pattern of a stroke indicating the water level as well as the timing and quantity of rainfall. This predicted the best time to go fishing and prepare for farming activities. The phenomenon also suggested the availability of water as fresh river water was one of the main sources of water supply in the village.

f. Farming

Another common practice was the timing of sowing of seeds by following the moon phases. *'Pynnohsymbai da la ngen u bnai'*- sow when the full moon disappears or when the new moon begins.

g. Natural destruction and regeneration

The beekeepers believed that if a certain animal called *'Phyllad'* (a type of weasel) used its tail to reach the hive and consume the honey, all of the bees in contact with the tail would die.

h. Natural regeneration.

It was widely believed that bamboo would die after flowering, but after two years they would germinate new shoots called as *'Siej-sylli'*. *"Ka bet hi ka mariang"* [Nature sows itself] stated an elderly member regarding the origin of the protected forests that have been preserved from the past four generations.

i. *Traditional medicine*

Traditional method of making medicines was professional practiced by three traditional healers. Similar techniques were employed which combined herbal remedies, massage and prayers. The treatments were in the form of oil-based, powder, syrup and balm. The barks of trees, their roots, leaves, and climbers were among the plant elements that the healers frequently. One of the practitioners used hair and ash; chicken lard and eggs in his medicine.

j. Harvesting of wild plants

People of Swer had knowledge and skills on identifying and gathering different types of consumable wild herbs and mushrooms. The skills of selecting and harvesting were handed-down from the elders.

k. Land use pattern

Another customary practice is the demarcation of land based on its functions or activities. Land for settlement was allotted to every married couple. Land for farming was lent without any fee on a three-year basis by the village council.

l. Conservation of forest

Preserving land use, community forest, and surrounding water bodies were examples of traditional methods of conservation passed down from generation to generation. Community forest was categorized according to their utilization and conservation purposes.

TK on land tenure system and land use pattern

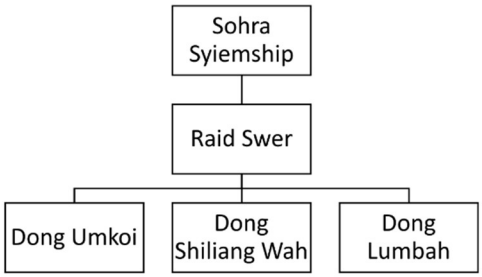

Figure 2 Traditional governance hierarchy

As in Meghalaya, Swer has its own traditional governance. Swer falls under the *Raid* Swer (Raid meaning community). The community owned land in Swer called *Raid* Swer comes under the Sohra *Syiemship*. The *Raid* headed by the *Sordar* (Village head)functions under the direction and agreement of the executive body members of the *Dorbar* (Village council) which comprised the three Headmen of the three localities. The Headmen and the *Sordar* are chosen by the members of the *Dorbar*. The *Raid* is responsible for the administration of the village, land demarcation, conservation of natural resources and the religious rituals and ceremonies.

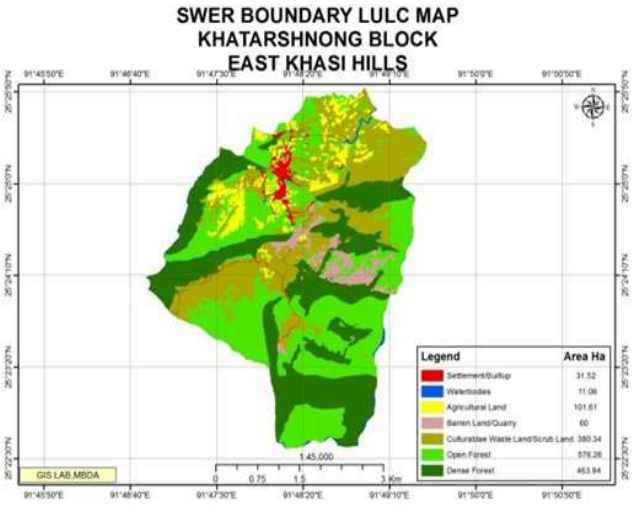

Figure 3: Land use land cover (LULC) pattern of the study area

The following types of LULC were characterized in the study area:

a. Settlement

The *Raid Swer* through the village council offered every married couple an average of 1200 square feet of land per household. Boundaries were separated by boulders or *'Maw Adong'*. The residential blocks were prohibited from encroaching the community forest.

b. Cultivated land

Land for farming was allotted to every household on a three-year basis without any fee. Only selected area called *'Lum Rep'* or cultivating hill could be used for cultivation. If the land was not utilized during the allotted three years, then the land would revert to the community or to other households.

c. Water bodies

There were three sources of water in the village namely '*Wah Khnang Khlur'* which supplied water to the Swer village and two neighbouring villages – *Dympep* and *Mawkdok.* Both '*Wah Ning Nong'*, the village springshed supplied drinking and cooking water and '*Wah At Phong Lon*g' finally joined with the bigger river *'Wah Sohra'*.

d. Quarries

There were 120 numbers of quarries running each 15m in length exclusively located in one particular hill and not scattered. These were rented by private individuals on a yearly fee of ₹500 given as a royalty to the village council. The stones extracted from Swer has a grade II quality reputed in this region. Abandoned quarries were left for natural regeneration. Quarry spoil was discarded in an area that had been fenced to prevent spillage to the nearby river.

e. Community forest

The community forest besides being protected provided a variety of forest products that the community depended on for provisions such as firewood, wild vegetables, wild fruits, grazing and fodder.

TK on natural resource management

Utilization of non-timber forest products

Eleven types of NTFPs namely firewood (18 nos), fodder (10 nos), grazing, forest manure, wild vegetables, wild fruits, mushroom, honey, ornamental flowers and medicinal plants (Table 3) extracted from the community forest were utilized by the people of Swer for sustenance. Community was highly reliant on firewood as it was the only source of cooking and heating. However, firewood was extracted

only from the village forest. Other NTFPs were gathered from and around the sacred forest (SF) and village protected forests (VPF). Firewood for cremation were to be extracted only from the VPF.

The frequency of collection and availability of the NTFPs (Table 2) suggested that the extraction of NTFPs occurred throughout the year depending on their requirement and harvesting seasons, eg., firewood was collected between the months of October and February when the climate was dry. About 93% of the total households still used firewood for cooking and heating. Common trees extracted for firewood were *Betula alnoides, Castanopsis armata, Corylopsis himalayana, Elaeocarpus lancifolius, Engelhardia spicata, Eurya accuminata, Exbucklandia populnea.*

Different plant parts were used such as stems, leaves, fruits and whole part. Some plants had multiple uses (Table 3). Extractions of NTFPs were mainly for subsistence rather than commercial. Occasionally surplus fruits and wild vegetables were sold to a nearby market.

Besides the traditional healers, it was also found that the local inhabitants had common knowledge in treating minor wounds and illness by using wild plants. Plants like *Gaultheria fragrantissima* were used for cold by sniffing on the crushed leaves; *Swertia chirayita* was used for worms; *Hedyotis uncinella* was used for animal wounds and pine buds were used for cough and cold.

Beekeeping was practiced by a few households. The hives were prepared by making hollows in the trunk of trees grown in the community forest and transferred to wooden boxes. Honey was used for both self-consumption and sale. One bottle of honey was sold for ₹600.

Women were the main gatherers of forest products as compared to men who were more engaged in other daily wage activities. Gathering of firewood, fodder, edible wild vegetables, fruits and mushroom were generally carried out by women. Women were often accompanied by their children or other younger members of the community. When they foraged the forest, they taught the young ones on how to choose and pick edible mushrooms, wild herbs and medicinal plants. It was an acquired skill to choose the type of mushroom that were non-poisonous to consume. Women were also aware of basic natural remedy found in plant parts that were used for minor ailments. Interestingly, women had basic knowledge about plant anatomy and their medicinal properties.

Forest products were extracted only at the harvestable age and controllably without over extracting them. The gatherers understood the importance to sustainably utilize forest products in order to preserve them for posterity.

Table 3 Sources and frequency of NTFPs collection in the study area

Type of NTFPs extracted	**Gatherer Male-M/ Female-F/ Both**	**Quantity of collection (approx.)**	**Time of collection**	**Sources**			
				Sacred forest (SF)	Village protected forest (VPF)	Periphery of SF & VPF	Village forest & Private Forest
Firewood for domestic use	Both	20 kg per person	Oct- Feb	-	-	-	✔
Firewood for cremation	M	NA	Occasionally		✔	-	-
Fodder	F	1 sack	Daily	-	-	✔	✔
Grazing	F	NA	Twice a week			✔	
Forest manure	Both	2 sacks	Occasionally	✔	-	-	-
Wild Vegetables	F	2-3 kgs	Seasonally	✔	✔	-	-
Wild Fruits	F	NA	Seasonally	✔	✔	-	-
Mushroom	F	½ kg	Seasonally	✔	✔		
Honey	Both	3-6 bottles	Yearly	-	-	-	-
Ornamental flowers	F	NA	Seasonally	✔	✔	-	✔
Medicinal plants	Both	NA	Seasonally	✔	✔	-	✔

Table 4 Plants species used as NTFPs by the people of Swer

Scientific name (s) of plants	**Family**	**Habit**	**Parts used**	**Purpose**
Betula alnoides Buch.-Ham. ex D.Don	Betulaceae	Tree	Branches	Firewood & Fodder
Camellia caduca C.B.Clarke ex Brandis	Theaceae	Tree	Branches	Firewood
Castanopsis armata (Roxb.) Spach	Fagaceae	Tree	Branches	Firewood
Centella asiatica (L.) Urb.	Apiaceae	Herb	Leaves	Food, Medicinal
Cinnamomum pauciflorum Nees	Lauraceae	Tree	Bark	Medicinal
Corylopsis himalayana Griff.	Hamamelidaceae	Shrub	Leaves	Fodder
Crassocephalum crepidioides (Benth.) S. Moore	Asteraceae	Herb	Leaves	Medicinal
Cryptomeria japonica (Thunb. ex L. f.) D.Don	Cupressaceae	Tree	Trunk	Construction of house and beehive box
Cymbopogon khasianus (Hack.) Stapf ex Bor	Poaceae	Grass	Leaves	Fodder
Cynodon dactylon L. Pers.	Poaeceae	Grass	Leaves	Fodder
Elaeocarpus lancifolius Roxb.	Elaeocarpaceae	Tree	Branches	Firewood
Engelhardia spicata Lesch. ex Blume	Juglandaceae	Tree	Branches	Firewood
Eriocaulon brownianum Mart.	Eriocaulaceae	Herb	Flower	Ornamental
Eupatorium adenophorum Spreng.	Asteraceae	Herb	Leaves	Medicinal
Eurya acuminata DC.	Theaceae	Tree	Leaves	Firewood
Eurya japonica Thunb	Theaceae	Shrub	Leaves	Fodder
Exbucklandia populnea (R.Br. ex	Hamamelidace	Tree	Branches	Firewood

Griff.) R.W.Br.	ae		Leaves	Fodder
Ficus clavata Wall. ex Miq.	Moraceae	Tree	Branches	Firewood
Gaultheria fragrantissima Wall.	Ericaceae	Shrub	Leaves	Medicinal
Hedyotis uncinella Hook. & Arn.	Rubiaceae	Herb	Leaves	Medicinal (Animal wounds)
Helicia excelsa (Roxb.) Blume	Proteaceae	Shrub	Leaves Stem	Fodder
Lantana camara Linn.	Verbenaceae	Shrub	Branches	Firewood Medicinal
Lithocarpus dealbatus (Hk.f.&Th.ex Miq.) Rehder	Fagaceae	Tree	Branches	Firewood
Lithocarpus elagans (Blume) Hatus. ex Soepadmo	Fagaceae	Tree	Branches	Firewood
Lycopodium clavatum Linn.	Lycopodiaceae	Climber	Leaves	Ornamental
Myrica esculenta Buch. -Ham ex D. Don.	Myricaceae	Tree	Fruits, Branches	Food, Firewood
Osbekia crinita Benth. ex Triana	Melastomaceae	Herb	Leaves	Medicinal
Panicum spp.	Poaceae	Grass	Leaves	Fodder
Photinia integrifolia Lindl.	Rosaceae	Tree	Branches	Firewood
Pinus kesiya Royle ex Gordon	Pinaceae	Tree	Leaves, Branches	Forest litter, Firewood
Plantago major Linn.	Plantaginaceae	Herb	Leaves	Medicinal
Potentilla fulgens Wall. ex Hook.	Rosaceae	Herb	Roots	Medicinal
Pyrus pashia Buch.-Ham. ex D.Don	Rosaceae	Tree	Fruits Stem	Food Firewood
Pyrus pashia Buch.-Ham. ex D.Don	Rosaceae	Tree	Fruits Stem	Food Firewood
Rhododendron arboreum Seem	Ericaceae	Tree	Flower	Ornamental

Rubia cordifolia Linn.	Rubiaceae	Climbers	Roots	Medicinal
Rubus ellipticus Smith	Rosaceae	Climbers	Fruits Roots	Food Medicinal
Sarcandra glabra (Thunb.) Nakai	Chloranthaceae	Herb	Flowers	Ornamental
Schefflera hypoleuca (Kurz.) Harms	Araliaceae	Tree	Leaves	Fodder Firewood
Schima wallichii (DC.) Korth.	Theaceae	Tree	Branches	Firewood
Smilax ferox Wall. ex Kunth	Smilacaceae	Climber	Roots	Medicinal
Syzygium tetragonum (Wight) Wall. Ex Walp	Myrtaceae	Tree	Fruit Branches	Food, Firewood
Swertia chirayita (Roxb.) Buch.-Ham. ex C.B.Clarke	Gentianaceae	Herb	Leaves and roots	Medicinal
Symplocos glomerata King ex C.B.Clarke	Symplocaceae	Tree	Leaves	Fodder
Tetrastigma serratum (Roxb.) Planch	Vitaceae	Climber	Leaves	Medicinal
Vaccinium griffithianum Wight	Ericaceae	Shrub	Fruits	Food
Viburnum foetidum Wall.	Caprifoliaceae	Shrub	Bark	Medicinal
Viburnum simonsii Hook.fil. & Thomson	Caprifoliaceae	Shrub	Fruits	Food
Viburnum simonsii Hook.fil. & Thomson	Caprifoliaceae	Shrub	Fruits	Food
Pluteus conizatus (Berk. & Br.) Sacc	Pluteaceae	Mushroom	Cap and stem	Food
Lentinula sp.	Trichotomataceae	Mushroom	Cap and stem	Food
Clavulina sp.	Clavulinaceae	Mushroom	Cap and stem	Food

Methods of conservation

a. Classification of Forests

Sacred forests and village protected forests were kept for conservation and controlled utilization of forest products. Religious rites and rituals were held only in the sacred forests. Village forests were reserved for firewood collection. Private forests were scarce and commonly used for plantation of trees that could be used as timbers. Tree felling was strictly prohibited in the protected forests. The traditional methods of forest management and conservation extended beyond the community forest.

b. Extraction of non-timber forest products

When extracting firewood, only the branches were chopped and the trees were left to regenerate for a period of five years. NTFPs were extracted only at harvestable age and in sufficient amounts. Traditional healers voluntarily refrained from over-extraction of medicinal plants, preferring to wait for nature to replenish them.

c. Tree plantation

Tree plantation with the help from forest department was carried out on a yearly basis. Trees like *Betula alnoides*, *Pinus patula* and *Exbucklandia populnea* had been planted around the community forest in the past.

d. Construction of fire lines

Each year male members of the community engaged in a custom called as *'Sain ding'* in the local dialect which involved construction of fire lines of about 20 feet broad around the protected forests in order to safeguard these forests from unprecedented forest fire.

e. Springshed conservation

The springshed conservation was another important traditional practice, where the whole community was involved in maintaining the spring water and construction of new sites. A hillock was preserved to replenish the current spring source. Overflowing water from the village water supply tank was connected with a pipe to the springshed to feed its source.

f. Rainwater harvesting

Rainwater harvesting was practiced by the community by constructing Harvesting dykes to store

rain water in order to rejuvenate the forests and use for domestic purposes.

Local perception of ecosystem services

Following the Millennium Ecosystem Assessment (2005) guidelines, the following ecosystem services were categorized.

Table 5 Categories and Types of Ecosystem services found in the study area

Ecosystem services category	**Ecosystem services recorded**
Provisioning (12)	Water Firewood for domestic use Firewood for cremation Fodder Grazing Forest manure Wild Vegetables Wild Fruits Mushrooms Honey Ornamental flowers Medicinal plants
Supporting (2)	Diversity of plants Diversity of animals & birds
Regulating (1)	Clean air
Cultural (4)	Recreation & Aesthetic beauty Tourism Cultural value Spiritual and Religious value

Community members considered clean air, water and firewood as the most important ecosystem services (Figure 5). The regulating service (clean air) was considered very vital by 80% of respondents. Most of

the provisioning services and spiritual and religious values were perceived to be important by 60% of the local community.

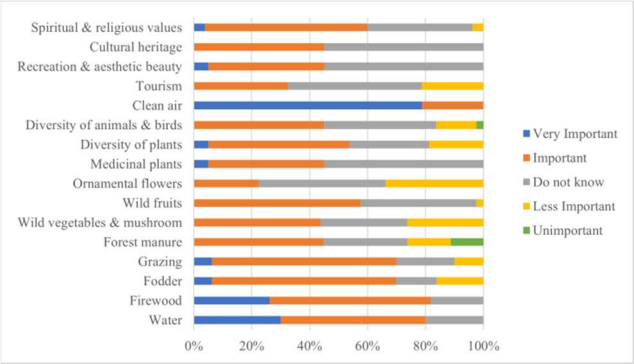

Figure 4 Perception of the community on importance of ecosystem services

Discussion:

Culture and religion were key to the beliefs and practices of the people of Swer. The indigenous religion - '*Niam Tynrai'* played a significant role in strengthening the local people's customs and traditional beliefs.

According to Berkes (1999), traditional knowledge encompasses not just practices and knowledge, but also beliefs ingrained in the interplay between humans and the natural world. Similarly, Swer people's customs and religious rituals reinforce their use of traditional knowledge. It was customary in the community for the elders of the family to teach and pass on their traditional wisdom to the younger members.

This study revealed that traditional knowledge was applied in a variety of contexts- indicators on occurrence of rain; time of sowing; water management; conservation of forests; traditional making of medicines and utilization of plant resources. These practices resembled those reported in the studies of Rawat & Sah, 2009; Hynniewta & Kumar, 2008; Uprety et al., 2012). The emergence of a water beetle, an insect indicator was thought to have indicated the locals about the timing and amount of rainfall besides sounding local fisherman about the best times to fish. Appearance of biotic factors such as animals, birds, amphibians and insects that predicts the onset of rainfall has been documented by Chinlampianga (2011) among farmers in Mizoram.

Locals adhered to taboos like burning fruit seeds and not allowing raw meat into the forest as manifestations of traditional wisdom. As discussed, people viewed bringing raw meat into the forest in

2013 as being responsible for forest fire. A study by Etiendem et al. (2011) demonstrated the gorilla taboo culture in South Africa where hunting is forbidden and if performed the hunter falls ill or dies. Furthermore, the people of Swer also believed in dreams as a sign of safety and well-being corroborated by a study of Mfusi in 1984 in South Africa.

Customary law and practices in Swer served as guidelines in land use planning, demarcation and ownership of land. The study provides evidence that the locals have been managing and safeguarding the community forest using a variety of customary practices. The traditional classification of community forests which is customary in Meghalaya is an excellent example of forest management and conservation (Tiwari et al., 2010). Likewise, Swer community forests were classified into sacred forest, village protected forests and village forest based on their various usages and conservation purposes. This practice is in line with studies on the classification of community forest by the Adi community of Arunachal Pradesh (Singh et al., 2018). Construction of fireline, rainwater harvesting and springshed management are standard forest management practices observed in Swer as corroborated by studies on other indigenous communities (Rai et al., 1994; Madegowda, 2009).

The study revealed that women of Swer representing the matrilineal society played a vital role in preservation of traditional knowledge. Without being the head of the familiy, women played a key role as an ancestral inheritor, a care-giver and a clan or family line carrier.

Women in Swer valued both nature and culture as evidenced from one of the female respondents- “Preserving traditional knowledge preserves one’s identity of being a Khasi”. Although men were knowledgeable, women were found to have more knowledge on the consumable types of plants. They were the main users, transmitters and valuers of such knowledge through their day-to-day activities similar to the Zulo tribe women in South Africa (Zobolo & Mkabela, 2006).

Even though women did not perform any rituals and ceremonies, they understood the importance and sanctity of nature, as echoed by one of the female respondents, “Firewood with an appropriate size must be carefully and precisely extracted from the village protected forest for religious cremation”.

Benefits provided by the community forests such as firewood, wild fruits, mushrooms, grazing, fodder, forest litter in the form of ecosystem services directly influenced better and sustainable rural livelihoods, which is in conformity with the studies of Tynsong et al. (2010) and (Nayak, 2007).

The practice of categorizing forest and utilizing forest products prudently and seasonally is an ideal example of a sustainable use of natural resources. Traditional knowledge informs them about the forests

and the type of plant products that can be utilized for daily sustenance. They recognize the importance of traditional knowledge in order to preserve both culture and environment uplifting women economically in rural areas. Such knowledge can be valuable for future natural resource management especially in rural areas where majority of the population is dependent on forest and their products.

The traditional knowledge being their identity plays a vital role in the way of life of the people of Swer facilitating collective and collaborative actions on the part of the community. Traditions are associated not only with religious practices but livelihoods, cultural identity, conservation and the overall well-being of the community. Community feels obligated to improve the welfare of the community through their beliefs and practices.

Community members regardless of age, understanding the importance of nature and need to safeguard it followed the guidelines to protect the community forest and its surroundings. For instance, firewood was taken from the village forest but never extracted from the protected areas. Even the young gatherers knew where, when and how to extract various NTFPs. The residents o voluntarily complied with these directives without any penalties or fines imposed. In 2013, when a fire started near the protected forest, everyone in the community, young and old, helped putting the fire out. Every year, all of the male members participate in the construction of the fireline around the protected forests. Occasionally, the entire community participated in tree plantation. Construction of new springshed sites was also taken part by the community members. It was observed that conservation extended beyond the community forests and the role played by every member helped in shaping and sustaining the community per se.

Conclusion

It can be concluded from the study that the people of Swer perceived nature as sacred being rooted in their culture and the resultant benefits and services provided by it. Traditional knowledge being a constituent of their identity played a significant role in livelihoods, environmental conservation and culture preservation. The categorization of forest and utilizing forest products prudently spoke volumes about sustainable use of natural resources. Traditional knowledge about plant and plant products products can be valuable tool for prioritizing plant species conservation especially in rural areas where majority of the population rely on forest and their services. It is imperative to highlight the role of women in preserving traditional knowledge; women being the primary and proficient gatherers of NTFPs. Traditional knowledge as exemplified by the people of Swer may be integrated into decision making processes relevant to community development and natural resource management.

It is worth bearing in mind that traditional knowledge and practices handed down from one generation to another have evolved with time. Progressively, traditional knowledge may have been enhanced or altered by new local knowledge and experiences. The usage and application of traditional knowledge is nonetheless declining globally due to decrease in traditional natural resource-based livelihoods (Loh & Harmon, 2014), socio-economic changes and changes in people's perceptions leading to lesser transmission and application of TK (Boafo et al., 2016). Traditional knowledge must therefore be recognized, encouraged and documented to preserve both culture and nature.

The study reveals that traditional knowledge and practices influence both cultural and ecological conservation. It also strongly recommends the inclusion of TK in natural resource management and conservation; introduction of TK in education system to encourage the transfer of knowledge; recognition of the traditional wisdom and skills of women as traditional knowledge transmitters.

Acknowledgements

Acknowledgements: The authors are thankful to the local respondents of Swer Village for their time, participation and contribution to this study. The authors are also grateful to the Martin Luther Christian University, Shillong for allowing this Doctoral study to be undertaken and the Ministry of Tribal Affairs, Government of India for the financial assistance in the form of a Fellowship.

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