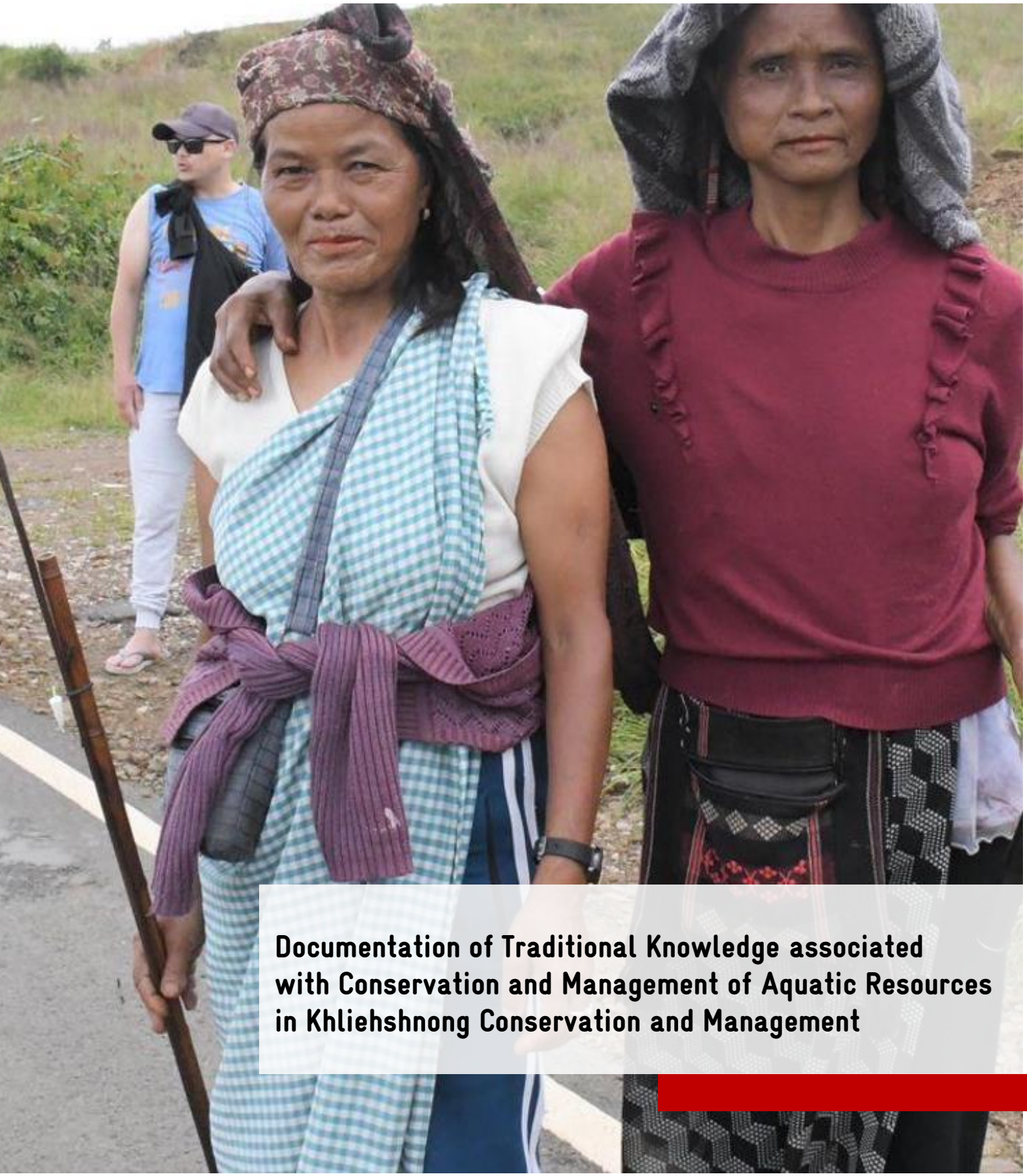

Documentation of Traditional Knowledge associated with Conservation and Management of Aquatic Resources in Khliehshnong Conservation and Management

Ministry of Environment, Forest and Climate Change

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

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Documentation of Traditional Knowledge associated with Conservation and Management of Aquatic Resources in Khliehshnong

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Introduction

Introduction

Aquatic resources are an important source of food security and nutritional diet. The present study focuses on the "Protection and Sustainable Management of Aquatic Resources in the North-Eastern Himalayan Region of India," with Khliehshnong village in Cherrapunji (Sohra as called by the locals) identified as the designated study area. In this village, aquatic resources are one of the food sources of a significant local population. The people in the village expressed that these resources are under threat due to climate change, pollution and unsustainable developmental activities such as mining. Traditionally, natural resources are being managed and administered at the village level.

The study was conducted with the following objectives in mind:

a. Describe current-day and past use of aquatic resources by residents of Khliehshnong, Cherrapunji.
b. Document the knowledge underpinning current and past practices, and management of aquatic resources.
c. In collaboration with the community, develop materials for a public display of their knowledge and practices of aquatic resources, for a new Interpretation Centre.

Methodology

2. Methodology

2.1. Area of the Study:

Khliehshnong village, situated in the Cherrapunji (or Sohra) which is the sub-divisional town of the East Khasi Hills District of Meghalaya, encompasses a substantial area replete with diverse natural resources and biodiversity. The locale is characterized by the presence of significant sedimentary rock formations such as Arwah Cave, Mawmluh Cave, and Mawsmai Cave, found in the neighbouring areas. Renowned for its captivating scenery, Khliehshnong has gained the admiration of several travellers. With an estimated population of 4114 and 951 households (data as maintained by the village), the majority of which rely on tourism as their primary source of livelihood, the village plays a pivotal role in the economic landscape of the region.

Khliehshnong is also home to a diversity of aquatic life forms. The village has numerous man-made ponds utilized for pisciculture. These pisciculture ponds are owned by different individuals as well as by the community. Residents have acquired general knowledge in raising fish, which includes knowledge on breeding and maintaining the health and population of fish.

2.2. Research Design:

For the present study, research design has been followed as per the Methods Manual: documenting Traditional Knowledge of Aquatic Resources in North-East India written by Dr Rajindra K Puri on behalf of the German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV) under the International Climate Initiative (IKI).

2.3. Sampling Design:

The sampling design used for the study is purposive sampling design. The sample unit included elders, women, men, youth and fishing folks (called rawan in Khasi). Persons from the community participated in the Participatory Rural Appraisal (PRA) activities as shown in the table. A total of 26 individuals were identified and interviewed.

2.4. Methods of Data Collection:

Data was collected using tools such as participatory rural appraisal (PRA), in-depth interviews, focused group discussion, free listing, pile sorting, transect walk, Field and naturalistic observation and photographic evidence. Free listing was conducted on various groups of individuals (Elders, women, men, youths) through which a list of all aquatic species present in the community was recorded.

Image 2.1: Resource mapping of Aquatic Resources 1

Resource mapping was performed by asking 3 separate groups of participants (men, women, and youth) to draw an overview of the village and to locate the types of resources found.

Seasonality calendar mapping was also carried out on three separate groups (men, women, and youth) where information on a seasonal variation in fish migration, fish spawning, community fishing, setting of fish traps, festivals, fish availability, temperature, and rain was recorded.

Image 2.2: Resource mapping of Aquatic Resources 2

The transect walk was carried out for ground truthing of the information listed in the resource maps. Interviews were carried out with different groups of people in the community (Rawan or fishermen, elders, women, and youths) to get different perspectives on aquatic resource availability and management.

Image 2.3: Transect walk in the village

Image 2.4: Pile sorting 2

Image 2.5: Free listing 2

Image 2.6: Pile sorting 2

Image 2.7: Pile sorting 2

Image 2.8 Discussion and verification with community members

Image 2.9: Interview being carried out

Image 2.10: Interview with rawan (‘fisher’)

Image 2.11: women fishers on their way to fishing for the day

2.5. Data verification:

Collected data was verified by presenting the data to the community members which had representation from rawans, men, elders, women and youth. This process was carried out twice.

2.6. Ethical concern:

Verbal consent was taken from the community and the respondents of the study. The background and objectives of the study were explained. Consent was taken for photography, video recordings and mentioning their names in the report.

2.7. Respondents' demographics:

The dataset of the respondents reflects a diverse workforce with a mix of occupations, educational backgrounds, and ages. As can be seen in Table 2.1, the majority of the respondents were male (77%). The age ranged between 25 to 78 years with the majority of individuals in their 30s to 70s. Educational backgrounds range from nil (indicating no formal education) to a Bachelor of Arts (B.A) degree. Some individuals, especially in manual labour occupations, have nil or minimal formal education. The occupations vary and include a diverse range such as fish farming, shopkeeping, business, housekeeping, day labour, instruction, retired, carpentry, masonry, and gas management.

Table 2.1: Demographic data of the respondents

Gender	Frequency	Percentage (%)
Male	20	77
Female	6	23
Age	**Frequency**	**Percentage (%)**
25 - 34	3	12
35 - 44	7	27
45 - 54	3	12
55 - 64	5	19
65 - 74	6	23
75 years and over	2	8
Occupation	**Frequency**	**Percentage (%)**
Fish farming	2	8
Business	3	12
Housewife	3	12

Daily wage labourer	8	31
Farmer	2	8
Retired	2	8
Others	6	23
Educational Qualification	**Frequency**	**Percentage (%)**
Graduate	2	8
Class 12	3	12
Class 10	4	15
Below Class 10	13	50
Not literate	4	15

Resource Mapping & Seasonal Calendar

3. Resource Mapping & Seasonal Calendar

3.1 Resource Mapping:

The main objective of Resource mapping is to collect and plot information on the occurrence, distribution, access and use of resources within the economic and cultural domain of a specific community. Resource mapping is ideally proceeded by a resource historical transect. For the present study resource mapping activity was carried out with a focus on aquatic resources and traditional knowledge related to it. The data were collected from different groups of local people. The participants were divided into three groups- elderly men, elderly women and youth.

3.1.1 Resource Mapping by Elderly Men:

As per the data collected from the elderly men of the community, various types of resources were recorded.

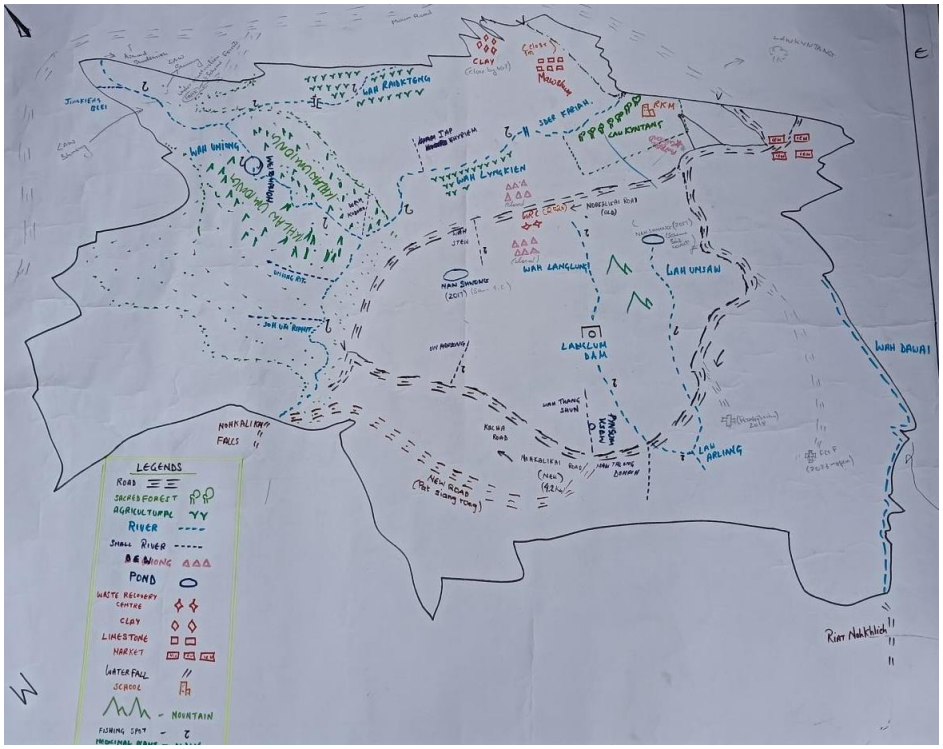


Image 3.1: Resource Mapping drawn by the elderly men

Road: Khliehshnong is a big community, it has a well-constructed road, right from its entry point to the Nohkalikai viewpoint, which has brought ease in commuting both for the locals as well as for the visitors. It consists of two main roads, one road passes through the Sohra market which leads straight to Nohkalikai Fall, this road is known as Nohkalikai Old Road. Another road also passes through the market road which then after a few kilometres diverges towards the southern section of the village. This road is known as the Nohkalikai road as it circles around the southeastern part of Khliehshnong which passes through residential areas and rivers like Wah Umsaw, Wah Thangshun and Um Pardong, and then gets connected to the Nohkalikai old road. A newly constructed road which intersects with

Nohkalikai Road is approximately from the Wah Thangshun River and goes straight to Nohkalikai Fall, it covers about 4.2km and is a Kaccha road as it is still under construction.

Sacred forests: Certain forests in Khliehshnong are protected culturally by certain rules, and these forests are known locally as “Law Kyntang” or sacred groves. As per the definition given by Meghalaya Biodiversity Board, sacred groves are tracts of virgin forests that have cultural or spiritual significance for the people who live around them. They have been protected by communities around the world for a variety of reasons, including religious practices, burial grounds, and watershed value. As a result of this, the rich biodiversity of these forests is protected. According to the data collected from men, two sacred groves are located within the area. One is situated near Ramakrishna Mission School, near the river Sder Kariah (towards the north) and a community football ground (towards the east). The other is located on the roadside of the main road leading to Sohra Market. Commercial activities are strictly prohibited in these forests.

Agriculture: Cultivated lands were recorded in Khliehshnong, these lands are found situated on the riverside. Due to the disruption of topsoil, most agricultural crops are incapable of flourishing. About three cultivated areas were reported within Khliehshnong. One agricultural land is found on a riverfront of the Wah Lyngkien River and two agricultural fields are located on either side of the Wah Raidkteng River.

River: Khliehshnong is a village with various types of water bodies, and numerous rivers were recorded within the village itself. Around eight main rivers are found; Sder Kariah, Wah Lyngkien, Wah Raidkteng, and Wah Umiong- these rivers are situated in the northern part of the village, they are connected at a particular junction and flow towards the Nohkalikai Fall. Wah Langlung, Law Arliang, Wah Umsaw, and Wah Dawai are located in the southern part of the village. A dam was constructed at the Wah Langlung River and is locally called as Langlum Dam. Various Aquatic life forms are found inhabiting in these rivers. Wah Dawai is located just on the outskirts of the village and flows towards the Nohkhlieh Fall. According to the elderly men of the village, it was believed that this river was used to cleanse away skin diseases during the olden days; now it has lost this capability due to contamination.

Small river: Apart from the eight main rivers, around ten small rivers are recorded, namely Iap Khriem, Jingkieng Blei, Wei Sohphoh, Umiong rit, Wah Umriphid, Wah Stew, Wah Thangshun, Pynsum Ksew and Wah Thlong Dohpih. Aquatic life forms are found to live in these bodies which include fishes, frogs, crabs, insects, etc.

Coal (Dewiong in Khasi): Aside from tourism, locals in the past could make a living through mining coal. Khliehshnong has a rich distribution of sedimentary rocks in its soil. One of the profitable sedimentary rocks is coal. Coal is found in high distribution in Khliehshnong soil. As per the data collected, only two mining spots were recorded to date, it is situated only a few distances from the Nohkalikai main road. One mining spot is located on the Wah Lyngkien side and the other is on the Wah Langlung side. Due to the negative impact, it might have on the future generation, the rat-hole mining of coal was banned in Meghalaya by the NGT (National Green Tribunal) in April 2014.

Ponds (Pung in Khasi): Ponds in Khliehshnong are utilised for pisciculture. They are either community ponds or are owned by a local. Only two community ponds (locally known as Nan

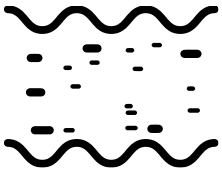
Shnong) were reported. These community ponds were constructed in 2017 under the Soil Conservation Scheme. Numerous individual ponds are found; these ponds are small in comparison to the community pond. Fishing activities such as fishing competitions and recreational fishing are carried out in all these ponds.

Waste Recovery Centre: Khliehshnong has its proper waste recovery system. The Waste Recovery Centre was recently constructed in the year 2020. Waste generated from the households in the village is collected, segregated and disposed of for the time being in the Waste Recovery Centre. Waste Recovery Centre is situated near the coal mining spot (from Nohkalikai Old Road).

Limestone: Limestone is another sedimentary rock present in Khliehshnong. Mining of limestone was quite common in Khliehshnong when MCCL (Mawmluh-Cherra Cement Limited) started functioning in 1955, and locals benefitted from it. As per the data gathered in the map, only one spot of limestone mining was recorded to date, as it was closed down by the NGT, due to the fear of its harmful impact. This mining site is situated near the outskirts of the village (northern part). As per the elderly men in the village, they have expressed that limestone mining is known to have a detrimental impact towards water bodies and their life forms.

Waterfall: Khliehshnong is famously known for the presence of the majestic waterfall known locally as the Kshaid Nohkalikai (kshaid in Khasi means waterfall). This waterfall has attracted the eyes of many and it has put the village and the state of Meghalaya on a map. It was told that this waterfall got its name from a famous folklore story about a woman named “Likai”. This fall receives visitors from time to time mostly during the monsoon season. Aside from Nohkalikai Fall, two more waterfalls are located in Khliehshnong - Kshaid Shadshrieh situated in the northernmost part of the village and Kshaid Riat Nohkhlieh situated in the southernmost part of the village. These falls are not as well-known as the Nohlalikai Falls.

Fishing activity: Fishing is a common activity in Khliehshnong both men and women are involved. Numerous fishing spots are found in Khliehshnong. Fishing activities are carried out in both rivers and ponds. Some fish species found are native while others are non-native species. Fishes are abundant in rivers compared to ponds. Fishing is more of a recreational activity than a commercial activity.



Khliehshnong is a village with various types of water bodies, numerous rivers were recorded within the village itself

3.1.2. Resource mapping by youth:

As per the data collected from the youth of the community, various types of resources were recorded.

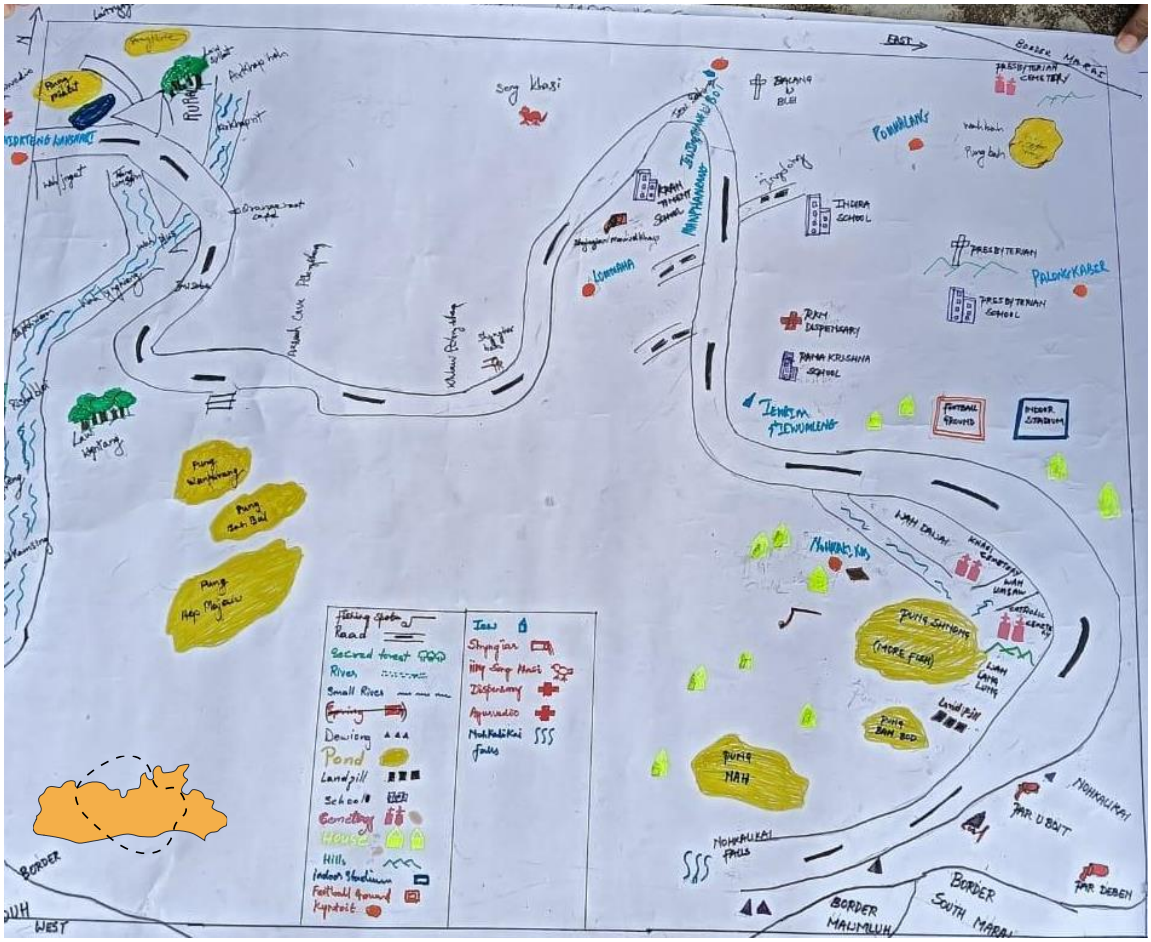


Image 3.2: Resource Mapping drawn by the youth

Road: According to the youth of the village, Khliehshnong has a well-made concrete road which has made the residents' lives easier for daily commute. The existence of these roads has changed the livelihood of the community, as the local people are dependent on tourism to make a living. The road extended from the entry point that is from Iew Sohra (Sohra market) to Nohkalikai Fall and Raidkteng Wahshari.

Sacred forests: As per the data from the youth, it was recorded that in Khliehshnong three sacred forests are located. All these forests are situated in the western part of the village. One of them is found near the river Wah Arkhap and is known by the locals as Law Syllait. The other two are located on the riverine of Rishad Blei and Kshaid Synteng. Any commercial activities are strictly prohibited to perform on these forests.

River: Several rivers are discovered at Khliehshnong, some of the rivers found are Wah Lynkien, Wah Plus, Wah Arkhap, Wah Jngut, Wah Dawai, Wah Umsaw, Wah Umiong, and Wah Phrang. Different types of aquatic biodiversity are found. Fishing activities are performed in all these rivers. Most of these watercourses are interconnected with one another.

Fishing activity: Fishing activities are executed in all types of water bodies (rivers and ponds) found in Khliehshnong. Fish populations are higher on the riverside than in ponds. Fishing is carried out mostly during the monsoon season due to the increase in fish population.

Coal (Dewiong in Khasi): Khliehshnong is rich in sedimentary rock like coal. Coal mining has profited a lot from the community. According to the map about four mining spots are located near the Nohkalikai area. Overindulgence in coal mining can lead to the destruction of the environment. Due to the negative impact, it can have on their surroundings, coal mining is now closed.

Ponds: The pond in Khliehshnong is locally known as “Nan”. These ponds are employed for the rearing of fish. They can be a community pond and pond owned by individuals. Only one community pond is recorded. Numerous private ponds are found, namely Pung Bah Bot, Pung Wanphrang, Pung Hep Majaw, Pung Maphri, Pung Malit, and Pung Bah Ris. These ponds are small in size in comparison to the community pond. Fish populations are higher in community ponds than in privately owned ponds.

Landfill: Khliehshnong has a proper waste management system. A Waste Recovery Centre was recently built to manage and control the dumping of household waste. The Waste Recovery Centre is situated towards Nohkalikai Road.

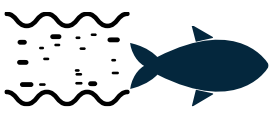
School: Few educational institutions are found in Khliehshnong. Presbyterian School, Indira School, Krantiment School and Ramakrishna Mission Higher Secondary School are the institutions found in Khliehshnong. Indira School and Krantiment School are located in the Mawphanrang area, Presbyterian School is in the Palongkaber area and Ramakrishna Mission Higher Secondary School is near Iewrim Sohra.

Cemetery: Residents in Khliehshnong are either following Christianity or the Khasi indigenous religion. These two religions have their ways to honour and sanctifying the dead. Three cemeteries are found in Khliehshnong - one belonging to the Presbyterian cemetery located on the outskirts of the village near the Marai border, another belongs to the Khasi cemetery and the Catholic cemetery these two are located near Wah Umsaw river.

Houses: Khliehshnong has approximately 1500 households. These houses are scattered all around the Khliehshnong area.

Indoor stadium: There is only one indoor stadium in the community and is located near the Iewumleng area (Iewrim Sohra or old Sohra market).

Football Ground: As per the map drawn, only one football field was recorded. It is located near the Iewumleng area (Iewrim Sohra old Sohra market) close to the Indoor Stadium.



Fish populations are higher on the river side than in ponds

Market (Iew in Khasi): Market, also known locally as Iew Sohra is held at the Iingthang U Bot area. There are two events of Iew- Iew Bah (big market) and Iew Rit (small market). Iew Bah is held once a week and Iew Rit are held three days after the Iew Bah. Iew Sohra back then was held at the Iewrim area near Ramakrishna Mission Higher Secondary School hence the name “Iewrim”.

Spring (Shyngiar in Khasi): Shyngiar are water sources that are well maintained for community purposes. Three Shyngiar were reported on the map- Par U Bot and Par Deben which are located in the Nohkalikai area and Shyngiar Mawdkhap which is located near Lummaha Area.

Dispensary: Only one dispensary was collected in the data at Khliehshnong. It is situated near Ramakrishna Mission Higher Secondary School and it is the Ramakrishna Mission Dispensary.

Ayurvedic: One Ayurvedic hospital is located in Khliehshnong at Raidkteng Wahshari area. This hospital has not been functioning yet.

Nohkalikai Falls: Nohkalikai Falls is one of the tallest plunge waterfalls with a height of about 340 metres. It is the main tourist attraction of the village. It is situated on the outskirts of the village. It was believed that the waterfall got its name from a folklore story about a lady named “Likai” who ended her life by jumping into the waterfall.

3.1.3. Resource mapping by elderly women:

As per the data collected from the elderly women of the community, various types of resources were recorded as follows:

Image 3.3: Resource mapping by elderly women

Road: A well-constructed road can be found in Khliehshnong. The road begins from Misty Hills Hotel (the entry point of the village) and extends till the end of the village which leads to the Nohkalikai fall.

Ponds: Numerous ponds are located in Khliehshnong. These ponds are made specifically for pisciculture purposes. Some are community ponds while others are owned by the local people (private ponds). Community ponds are locally known as “Nan Shnong”, the Nan Shnong is bigger compared to private ponds. Various fishing activities like fishing competitions are held in these ponds. Private ponds are more in number than community ponds.

Sacred Grooves: Several forests in Khliehshnong fall under the protection of a particular culture. Three sacred forests are found in the village, one near Ramakrishna Mission School, the other is found towards the Nongkalikai roadside and the other is on the roadside of the main road next to the Iew Sohra (market). Sacred forests are strictly prohibited from performing any daily human needs. Aside from the sacred forests other protected forests like the community forests are found in Khliehshnong like the Law Umiong Forest which is located near Wah Lyngkien River, the road to Nohkalikai Fall.

River: Many rivers flow through Khliehshnong village. About nine rivers are recorded on the map, namely Raid Kteng, Wah Ar Khaprip, Wah Jngut, Wah Share, Tdong Umsum, Sder Ka Riah, Um Dawai, Um Saw, and Wah Lyngkien.

Hospital/Dispensary: Khliehshnong has two healthcare centres, one hospital and one Dispensary. The dispensary was founded by the Ramakrishna Mission located near the Iewrim Sohra. The Ayush Hospital is the other healthcare Centre that is still under construction.

School: Two Educational institutions are recorded in the data. An Indira School located in the Palong Ka Ber area and the Ramakrishna Mission Higher Secondary School located near Iewrim Sohra.

Quarter: Two Quarters are found in Khliehshnong, both these quarters belong to the Ramakrishna Mission, and these quarters are for the RKM students and teachers. They are situated in the Sohra Iewrim area.

Hotel: Many households in Khliehshnong own a guest house/homestay; few hotels are available in this village namely Misty Hills Hotel, Sohra Plaza and Labana Hotel.
Ground: One football ground is located on the way to Nohkalikai Road which is next to the community indoor stadium, a ground called Madan Seng Khasi is found on the outskirts of the village near the sacred grove down the road next to the Sohra market, this ground is used for celebrating Shad Suk Mynsiem Festival. Close to the Indira School, a Madan Mawphan Rong ground is used for celebrating New Year's Eve.

Water tank: Only one water reservation was located in the community constructed by the Soil Department, located at the junction of Ayush Hospital.

Spring: About three springs are collected from the women’s data, namely Shyngiar Mawdkhap, Shyngiar Bah and Pung Mawrih, all these springs are located close to Iew Sohra.

Some of these springs are well made with proper piping and a water container, residents can use these springs for daily purposes like washing and bathing.
Water Source: Khliehshnong has only one source of water supply is called locally the Law San Lait Tyllong Um; it is situated in the western part of Khliehshnong.
Houses: Khliehshnong covers a wide area of land, however, it has approximately 1500 households.

3.1.4 Comparison of the resource maps by elderly men, elderly women and Youth

On comparing the resources listed by the three groups from the village, namely the elderly men, elderly women and youth, the following variations were noted:

1. Agriculture as a livelihood activity was only mentioned by the elderly men.
2. The elderly men mentioned the presence of two sacred groves in the village whereas the youth and elderly women mentioned three of them.
3. Youth had mentioned the names of the private ponds whereas the elderly men and elderly women did not mention them by name.
4. Elderly men had classified rivers into major and minor rivers whereas elderly women and youth collectively listed the names of the rivers.
5. The presence of a waterfall was mentioned only by the elderly men and youth. The youth mentioned only the Nohkalikai fall.
6. Springs were mentioned only by the women and youth.
7. Locations of schools, hospitals, cemeteries, indoor stadiums, and football grounds were mentioned by the women and youth only.
8. Market location and events were only mentioned by the youth.

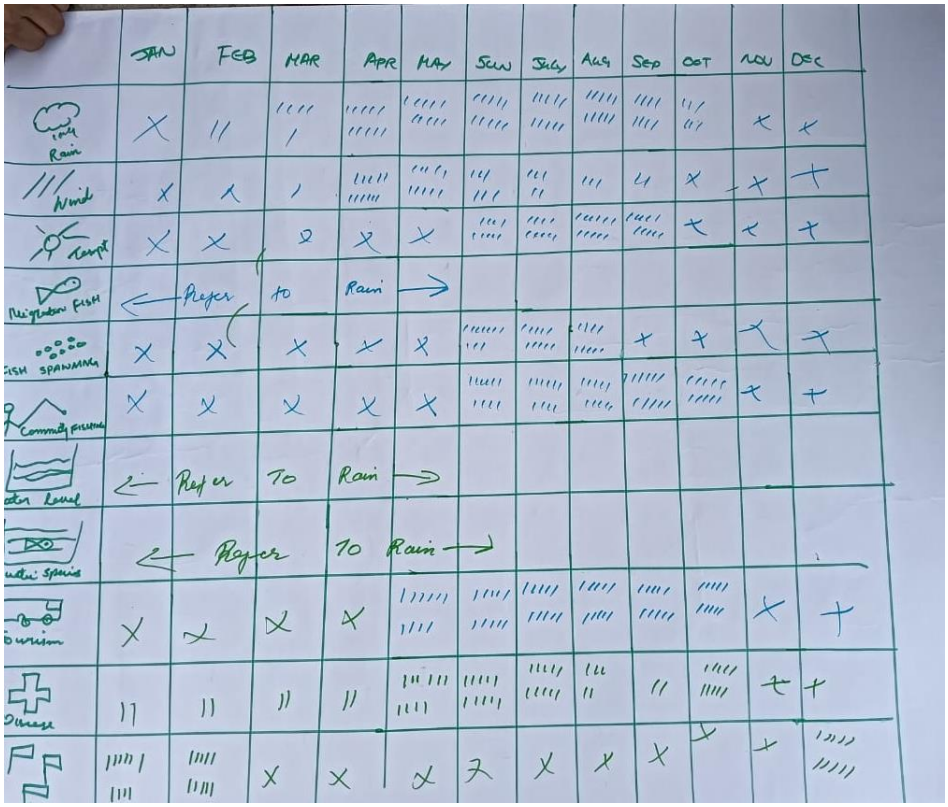
3.2. Seasonal Calendar

The seasonal calendar gives a broad view of the ecological changes, social, and economic aspects and well-being throughout the year. The main objective for performing a seasonal calendar is to study the various alterations in the weather conditions and the changes in water resources (flora and fauna) that occur seasonally. It provides baseline information useful for planning. To collect data for a seasonal calendar the participants were divided into three groups- elderly men, elderly women and youth.

3.2.1. Seasonal Calendar by elderly men

As per the data gathered from the elderly men it was discovered that the seasonal variation in the water resources.

Community ponds are locally known as “Nan Shnong”, the Nan Shnong is bigger compared to private ponds.



Note: “X” represents absence or less availability. The “I” Signifies the presence

Image 3.4: Seasonality calendar by elderly men

Rain: A moderate amount of rain is received by the village in February and March. The month of April to August was marked as the months with the heaviest rainfall. Rain starts to decline during September and October. No rain was recorded during the winter season that is, from November to January.

Wind: Windy seasons occur from April and May. A light breeze of wind blew through the village from June to September but from November to February lesser wind was reported.
Temperature: The months of June to September were said to be hotter as compared to the other months.

Fish Migration: It was expressed that fish migration depends on the condition of the environment and the availability of rain. A species of fish known by its local name “Khasaw” was reported to migrate normally during rainy seasons.

Fish Spawning: The spawning period of fishes is very specific, it occurs under a favourable environment, depending on the water conditions and temperature. Generally, the spawning periods happen from the month of June to August.

Fishing activities: Community fishing is mainly held during and after the spawning period to preserve and sustain the population of fish.

Water level: The quantity of water available in the water bodies relies upon the availability of rainfall in the area. Seasons with maximum rainfall (April- August) will overflow all the water bodies that are available in the region.

Fish abundance: The presence of aquatic life in the area depends on the condition of rainfall. The numbers of aquatic life are lesser during the season with the heaviest rainfall (April to August) and in the season with cold temperatures (November to January).

Tourism: Khliehshnong is being visited by tourists throughout the year as it is known for its famous waterfalls. However, most of the tourists prefer to visit during the monsoon season (May to October) when the village witnesses the maximum amount of rainfall.

Disease: Due to the changes in weather conditions, some villagers are prone to certain diseases depending on the weather conditions. Diseases are more prevalent during April to July and are less during the autumn season.

Festivals: Festivals are mostly held during the dry season that is in December, January and February.

Food availability: The cultivation of food crops does not bring any commercial value to the villagers due to poor soil conditions. However, crops for personal use are grown, and these crops are available only at a certain season. Crops such as onions, mustard, and tomato are found during November and December. Other food crops like pumpkin are grown during August and September.

Wild Edibles: Wild edibles are available only during March and April.

The spawning period of fishes is very specific, it occurs under favourable environment, depending on the water conditions and temperature

3.2.2. Seasonal Calendar by Youth

Following are the variations of the seasonal calendar as per the youth of the community:

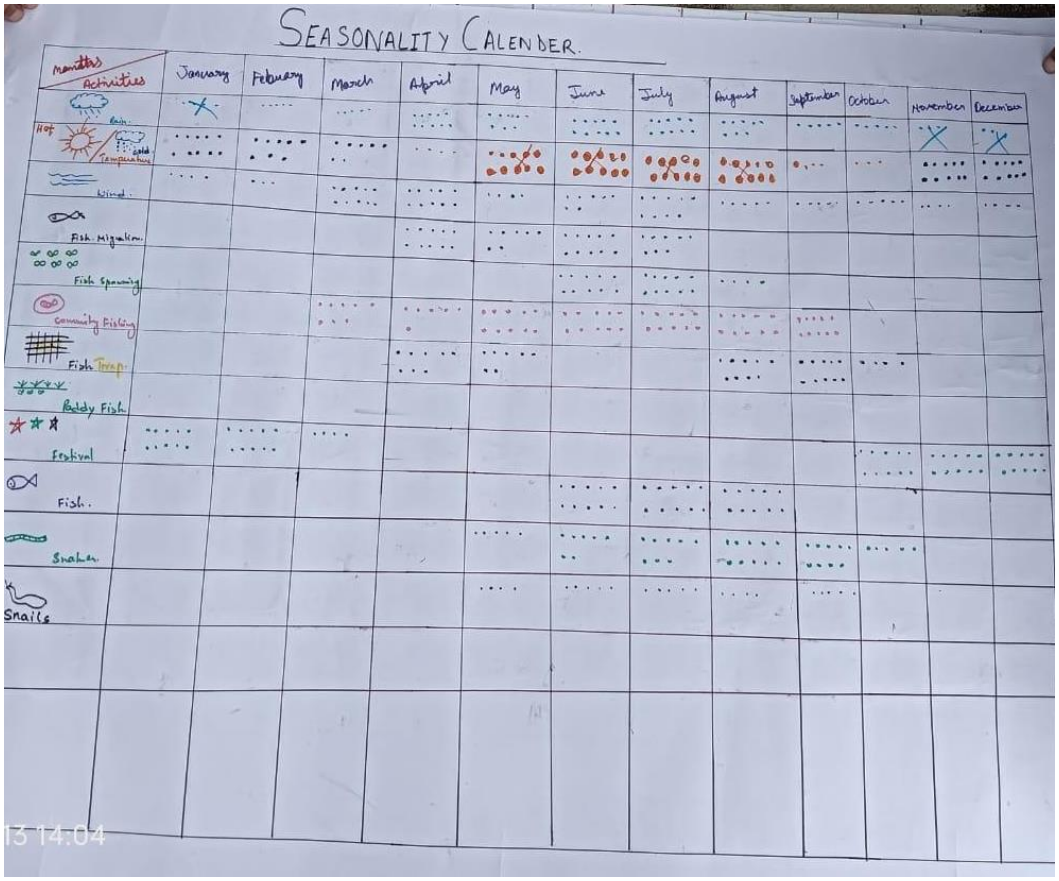


Image 3.5: Seasonality calendar by youth

Rain: The months of February and March indicate the onset of monsoon at Khliehshnong village, in which the villagers experience a minimal amount of rainfall. But during the months from April to August, the village receives the excess amount of heavy rainfall and in the months of September and October, rainfalls start to decline. No rainfall was observed during the months of November to January.

Weather: Cold weather is found from November to March. In April, the temperature starts to become warm. Extreme weather occurs in the village from May to August. The temperature starts to decrease in September and October.

Wind: Seasonally, the wind blows through Khliehshnong. A windy climate is found in April to July. In these months the wind is at its peak but in the autumn and winter seasons, the wind is minimal or at times there is no wind.

Fish Migration: Migration of Fishes is found only in April to July. Fishes are not able to migrate from August to March due to unfavourable environmental conditions.
Fish spawning: It was observed that in a year, fish spawning occurs within a small duration that is from June to August.

Fishing activities: The community has been practising a sustainable way of fishing to maintain and protect the fish population. Community fishing is being held only in those months where the fish population are high, that is during March to September.
Fish Trap: The setting of fish traps is allowed only in April – May and August- October. During the other months, fish traps are prohibited.

Festival: Festivals such as Christmas, and Shad tynrai were mainly held from January to March.

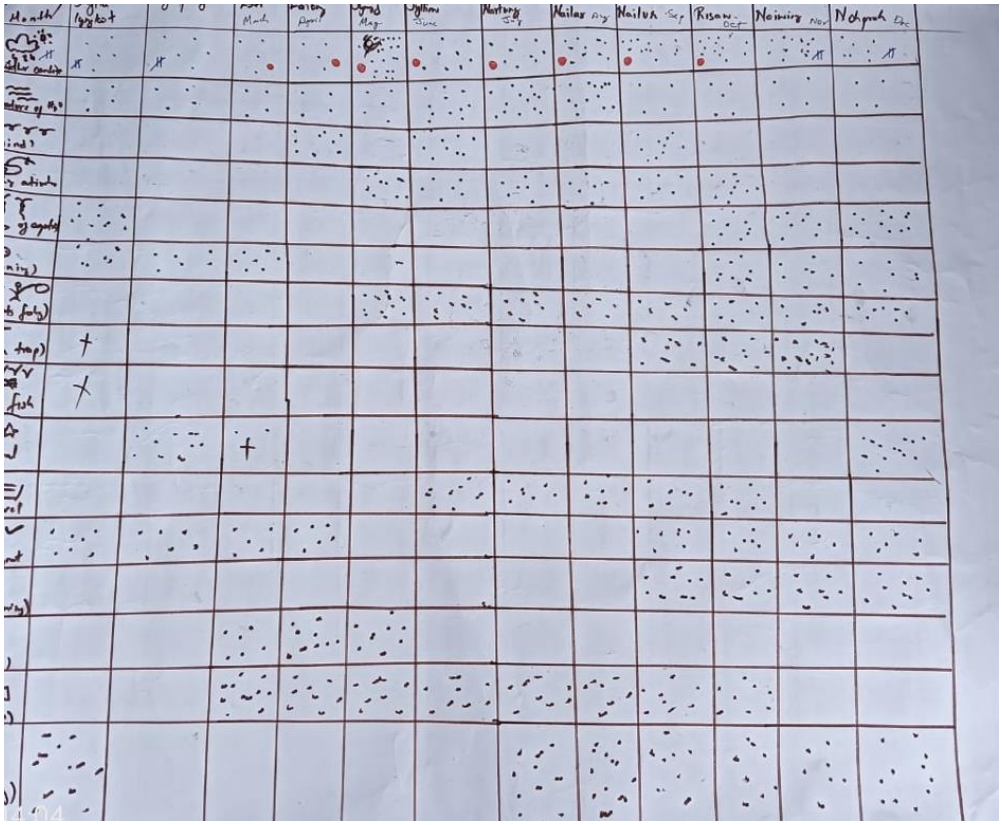
Fish abundance: Fishes are found to be in abundance in the water bodies between the months of June to August.

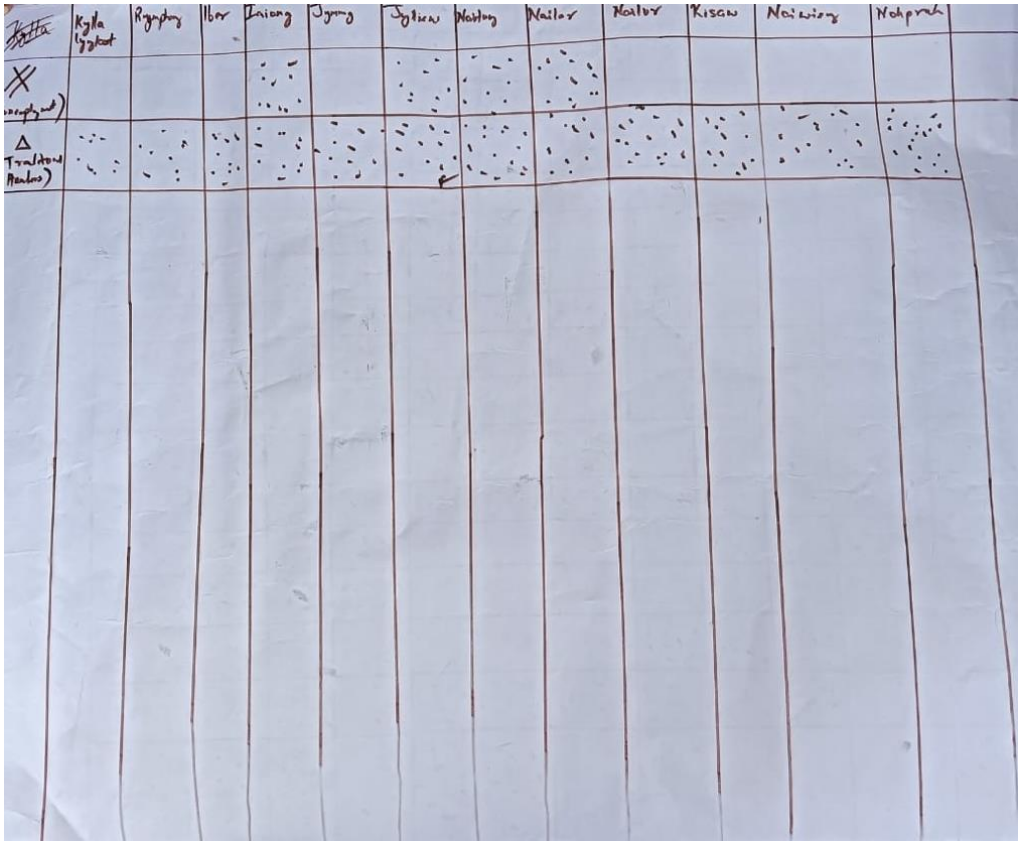
Snake: Reptiles mainly snakes are found to be more during May to October.

Snails: Snails were found to be in abundance from May to September.

3.2.3. Seasonal Calendar by elderly women

Following are the data recorded on the seasonal calendar by the elderly women:





Note: “X” and blank spaces represent absence or less availability. The “.” Signifies the presence
Image 3.6: Seasonality calendar by women

Weather condition: Rainfall strikes this region from May to November. Khliehshnong experienced an extreme temperature from March to October. The temperature was reported low from November to February.

Water level: The rise and fall in water levels in the region rely upon the availability of rainfall. The high water level was recorded from June to August. The water level reduces from September to May.

Wind: According to the data obtained, it was recorded that wind is high in April, June and September.

Fishing activities: Numerous ponds locally known as “Nan” are located in the area, and employed for fishing purposes. Fishing activities occur mostly from May to October
Fish abundance: Diverse fish species are reported to be found in Khliehshnong, but the availability of the species differs from time to time depending on the climatic conditions. Aquatic animals are more in abundance from October to January.

Spawning: Fish spawning is higher in October to December and is less during January, February and March due to the change in the weather conditions.

Fish trap: Fish traps are mainly laid from September to November. Fish traps are rarely allowed due to the effect it has on the fish population.

Festival: Khliehshnong is known to be one of many villages in Sohra with rapid rainfall during monsoon, it would be quite challenging for them to organize any events. The community mostly conducts their festivals during the dry season which is from December to February. A festival like “Ka Shad Suk Mynsiem” is held in February and “Riti Shynshar” on the 22nd of December.

Employment: When it comes to employment opportunities in Khliehshnong, tourism plays a major role in providing job opportunities for the youth and community as a whole. During the spring and monsoon seasons, Khliehshnong receives a lot of visitors. Employment opportunities are quite high during these times.

Farming: Farming is rarely found in Khliehshnong, due to the disruption in the topsoil. No commercial value is obtained through agricultural farming, some of the farmers cultivate specifically for their usage. Cultivation of crops is seen in the months of September to December.

Tourism: The presence of the magnificent landscape in Khliehshnong has put the village on a map. Khliehshnong receives a lot of visitors very often. During the monsoon season (March-September) when the landscape is surrounded by lavish greenery and a plunging waterfall, many tourists are seen.

Disease: Some diseases in Khliehshnong occur seasonally depending on the climatic condition. During the summer season (March-May) Khliehshnong witnessed an increase in the atmospheric temperature, and common diseases like diarrhoea and flu were caught by the locals.

Food availability: Khliehshnong has poor soil content; most of the topsoil is deteriorated. Only certain type of vegetation was found to flourish. The production of food is quite low. Food availability in the area occurs seasonally, that is from the month of July to January.

3.2.4 Comparison of seasonal calendar of the elderly men, elderly women and youth

On comparing the seasonal calendar by the three groups from the village, namely the elderly men, elderly women and youth, the following variations were noted:

1. It was uniformly agreed by the three groups that the area receives rain between the months of April to October.
2. There was a slight differ of opinion on the months with regards to temperature. But collectively it is understood that the months from May to September are warmer months than the other months.
3. According to the elderly men and youth, the windy season is between April to July. Whereas, the women’s group, the windy months are April, June and September.
4. According to elderly men, the migration of fish depends on the condition of the environment and the availability of rain. They reported that Khasaw migrate during the rainy season. The Youth group said that migration occurs from April to July and there was no migration from August to March. The women’s group did not mention the migration of fish.
5. As per the elderly men and youth, it was recorded that the spawning periods happen from the month of June to August.

6. The male group expressed that fishing activities are mainly held during and after the spawning period in order to preserve and sustain the population of fish. Whereas the youth reported that it is held between March to September and women reported that it is carried from May to December.
7. As per men's and youth's groups, seasons with maximum rainfall (April- August) increase the water level in the water bodies. Whereas women recorded that high water level is found during the month of June to August.
8. Both men and youth reported that the abundance of fish is maximum from October to January.
9. Elderly men did not mention the fish traps being used. The youth had the opinion that setting fish traps is allowed only in April – May and August- October. During the other months, fish traps are prohibited. Women expressed that fish traps were laid from September to November.
10. The youth group mentioned that reptiles mainly snakes are found to be more from May to October and snails were found to be in abundance from May to September.
11. Elderly men mentioned that most of the tourists prefer to visit during the monsoon season (May to October) whereas the women group said that maximum tourists visit during March to September.
12. As per the men group, diseases are more prevalent from April to July and that reported by women is between March to May.
13. According to the men crops for personal use are grown. Crops such as onions, mustard, and tomato are found during November and December. Other food crops like pumpkin are grown during August and September. Women mention that most of the grown crops are available between the months of July to January.
14. The men's group mentioned that wild edibles are available during March and April.

3.3. Water Bodies in the Village

Apart from the natural water bodies, several man-made waterbodies (Ponds) are seen scattered around the village. The waterbodies with collected coordinates are represented in the map in Image 3.7. After data verification, the following water bodies were recorded to be present in the village:

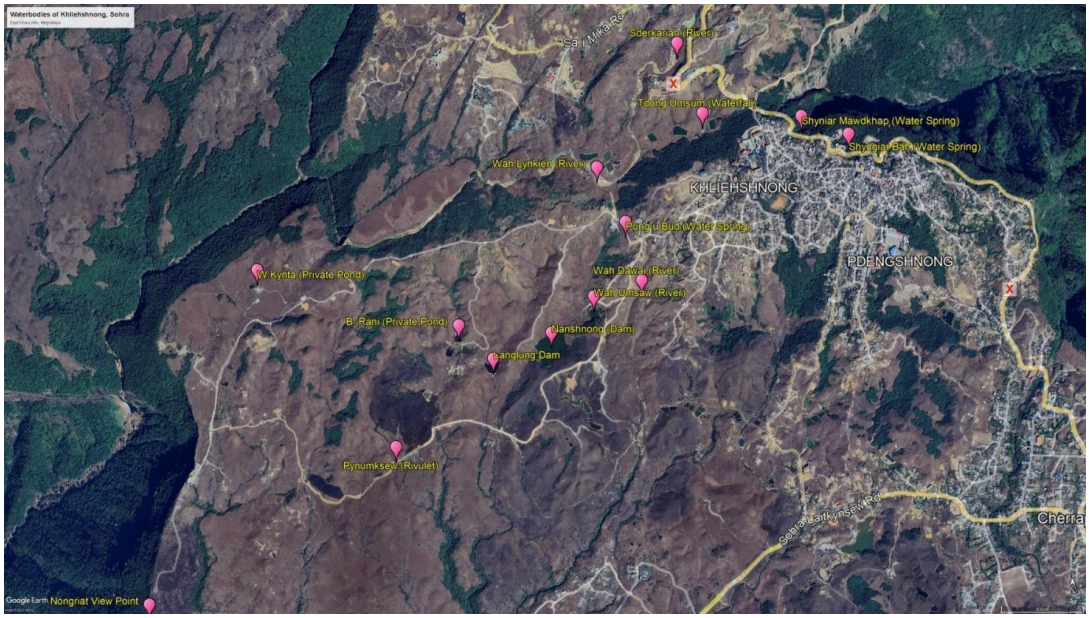


Image 3.7: Map of important water bodies at Khliehshnong

Rivers: Eight rivers are found, most of these rivers are connected at a particular junction and flow towards the Nohkalikai Fall. A dam was constructed at the Wah Langlung River and is locally called Langlum Dam. Various Aquatic life forms are found inhabiting these rivers. Wah Dawai is located just on the outskirts of the village and flows towards the Riat Nohkhlieh Fall. It was believed that this river was used to cleanse away skin diseases during the olden days; now it has lost this capability due to contamination. Apart from the eight major rivers, around 12 rivulets were recorded.

Ponds: The ponds in Khliehshnong are locally known as "*Nan*". These ponds are utilized for pisciculture activity. They are either a community pond or are privately owned by an individual from the community. Privately owned ponds are those developed by individuals on their property. Two community ponds (locally known as "*Nan Shnong*") were reported. These ponds were built by the village authority as a community resource. These community ponds were constructed in 2017 under the Soil Conservation Scheme.

Image 3.8: Private Pond

Image 3.9: Nan shnong (‘community pond’)

Numerous private ponds are found, and they are smaller in comparison with the community ponds. Fishing activities are executed in all these ponds. For the construction of any private pond, the locals need to get approval from the Department of Fisheries, Government of Meghalaya. However, they are to abide by strict rules that no ponds should be constructed on or near a drinking water source, as it can contaminate the drinking water source.

Waterfalls: Khliehshnong is famously known for the presence of the majestic waterfall known locally as the “Kshaid Nohkalikai”. This waterfall has attracted the eyes of many and it has put the village and the state of Meghalaya on a map. It was told that this waterfall got its name from a famous folklore story about a woman named “Likai”. The fall receives visitors from time to time mostly during the monsoon season. Aside from Nohkalikai Fall, two more waterfalls are located in Khliehshnong- Kshaid Shadshrieh situated in the northernmost of the village and Kshaid Riat Nohkhlieh situated in the southernmost part of the village. These falls are not famously known.

Three springs are found within Khliehshnong namely, Shyngiar mawkdap (shyngiar means spring), Shyngiar bah (literally translates to big spring) and Pung mawria (pung means pond; which literally translates to pebbles pond). They are properly constructed for daily use by the locals; water from these springs is used for various household purposes like washing, bathing, and drinking.

The different water bodies in Khliehshnong are listed in Table 3.1.

Table 3.1: Water bodies in Khliehshnong

Rivers	Rivulets	Ponds	Waterfalls	Springs
Sder Kariah	Iap Khyriem	Private pond of B. Rani	Riat Nohkhlieh Falls	Shyngiar mawkdap
Wah Lyngkien	Jingkieng Blei	Private pond of W. Kynta	Nohkalikai Falls	Shyngiar bah
Wah Raidkteng	Wah Sohumriphid	Nan shnong (Community pond)	Kshaid Shadshrieh	Pung mawria
Wah Umiong	Umiong rit	Langlung (Community pond)	Kshaid Ramsing	
Law Arliang	Wah Stew			
WahUmsaw	Wah Thangshun			
Wah Dawai	Wah Langlung			
	Pynsum Ksew			
	Wah Thlong Dohpih			
	Wah Pjah			

Rivers	Rivulets	Ponds	Waterfalls	Springs
	Wah ArKhap Heh			
	Wah Jngut			
	Tdong Umsum			
	Thlong Dohpieh			
	Wei Sohphoh			

Attempts were made to record the coordinates of all the water bodies as listed but due to limited time, this could not be carried out. Table 3.2. is the list of water bodies with recorded coordinates.

Table 3.2: Some of the water bodies with coordinates at Khliehshnong, Sohra

Sl. No.	Site	Location (longitude and latitude)
Rivers		
1.	Wahlynkien (river)	N 25°17.068 E 091°42.567
2.	Wahumsaw (river)	N 25°16.757 E 091°42.531
3.	Wah Sderkariah river	N 25°17.374 E 091°42.787
4.	Wah Dawai (river)	N25°16.716 E 091°42.649
Rivulets		
1.	Pynsumksew (rivulet)	N25°16.362 E091°42.002
Ponds		
1.	Private pond of B. Rani	N25°16.673 E 091°42.184
2.	Private pond of W. Kynta	N25°16.818 E091°41.620
3.	Langlung (Community pond)	N25°16.585 E 091°42.277
4.	Nan shnong (Community pond)	N 25°16.711 E 091°42.45

Sl. No.	Site	Location (longitude and latitude)
Waterfalls		
1.	Tdongumsum waterfall	N 25°17.204 E 091°42.861
Springs		
1.	Shyngiar Bah (water spring)	N25°17.153 E 091°43.265
2.	Shyngiar Mawdakhap (water spring)	N 25°17.193 E 091°43.132
3.	Pungubud (water spring)	N 25°16.936 E 091°42.646

Aquatic Resources

4. Aquatic Resources

Various aquatic species are found in the water bodies of Khliehshnong. The members from the village participated in the free listing followed by pile sorting activities to list down all the aquatic animals that they are aware of.

4.1. Filtered free listing:

A list of aquatic animals was recorded through the free listing activities. The filtered list is provided in Table 4.1. Different aquatic resources listed by the members of the village through free listing activity included a variety of fishes, crabs, frogs, snakes, snails and insects.

Table 4.1: Filtered free listing data of aquatic resources

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7
Khasaw	Dohthli	Kha Silver	Dohthli	Soh pailen (Green and pink)	Kha Amerika	Khaski
Kha bamphlang	Tham	Kha Bamphlang	Tham dud	Soh pailen (Green)	Kha Saw	Kha silver
Kha dkhar	Dohlun	Kha Sorkar	Tham saw	Dohkha Bamphlang	Kha silver	Kha America
Kha silver	Dohpih	Kha saw	Dohpih	Kha ski	Liiong	Kha Sorkar
Dohthli iong	Bsein-um	Dohthli	Khamain	Kha saw	Liriaw	Kha ksiar/Kha snad
Dohthli sawrang	Shalynnai	Sher	Sher Syngkai	Kha shalynnai	Shalynnai	Dohthli
Dohthli por	Japieh	Tham	Kha saw	Doh Thli Ba iong (heh)	Jakoid	Sher
Dohthli siaw	Kabang	Shalynnai	Kha bamphlang	Dohthli Rong saw	Kha sorkar	Khabsein
Kha sher	Kha bamphlang	Dohlun	Jakoid	Tham (Tham iong)	Japieh	Shalynnai
Shalynnai	Kha mukur	Dohpih	Kha Ski	Japdieh		Jakoit
Tham dud	Khanamkba	Jakoit	Doh lun	Dohlun baiong		Japih
Tham jynrein	Shalynnai	Bsein	Kha Sorkar	Mattah Rong lieh		Niangbasiah
Tham heh	Kha silver	DohThli	Shalynnai rit	Mattah Rong stem		Niangapiing
Shympron g	Kha America	Sein Jyrngam	Shalynnai phyrnai	Sein Jyrngam		
Shkaid	Kha Ski	Sein Saw Ryndang	Shalynnai baiong	Niang balien		
Dohpih	Khasaw		Sher	Niangap ing		
	Kha Sorkar		Shymprong			
			Bsein um			
			Bsein jyrngam			
			Bsein star			

			Sein Kyllut			
			Sein thli			
			Sawryngdang			
			Bsein iong			
			Niangjuli			
			Niangpynsngu r um			

4.2. Folk Classification:

Aquatic animals in Khliehshnong were named and classified accordingly by the locals, by grouping them by shared morphological traits and behavioural characteristics. They are classified into 5 life-form categories- Doh Kha (Fish), Dohthli (Snakehead), Bsein (Snake), Tham (Crab) and Jakoid (Frog). Doh in Khasi means 'meat' or 'flesh'. Local taxa usually have binomial names, that often include the lifeform category label, like "Kha" for species that fall under the DohKha category, "Li" for Dohthli, "Sein" for Bsein and "Tham" for Tham. In the 5th category, a list of insects is provided. Niang Khasi means 'insect'.

DohKha	Dohthli	Tham	Jakoid	Bsein	Others
Kha Baw/Khariew Kha Ksiar Kha Sorkar Shalynnai Kha Silver Kha Bamphlang Kha Ski Kha Puthia Kha Saw Kha Amerika Kha Babia Kha Kulai Kha Iong Sherktieh Sher Syngkai Kha Bamkba DohKha	Li-iong Li-por Li-sawrang Li-siaw	Tham saw Tham sib Tham Iong Tham dud	Jarem Ka-beng/Hynroh Jakoid Japieh	Sein iong Sein thli Sein khnai Sein um Sein lyngkru Sein khyndew Sein jyrngam Sein sawryndang	Niangblen Niangap-ing Niangjuli Dohlun Niangpynsngur-um

Figure 4.1: Folk Classification of the Aquatic Resources (language- Khasi)

4.3. Details of aquatic species:

Through interviews carried out with the rawan (fishers) and members of the villages, details on each aquatic species used as a food resource were recorded. It may be noted that there are no cultural practices that are followed before any fishing activity. Following is the list of species found in Khliehshnong as described by the respondents:

1. ***Kha ksiar***

Image 4.1: Kha Ksiar

Scientific Name	*Cyprinus carpio*
Indian Common Name	Common carp
Local Name	*Kha Ksiar (Khasi)*

Kha Ksiar, according to Khliehshnong fishers is golden orange in colour; they are smaller in size. Their sizes are about 90 cm long when fully grown. They show no seasonal variation. They feed on insects, algae, and other aquatic species. They are very rare in Khliehshnong. They do not migrate. Spawning takes place from May until early June. Apart from consumption, it is also being used as ornamental fish. For baiting, fishers use earthworms, flour dough, and biscuits. Both men and women use the same methods for fishing.

2. ***Kha Silver***

Image 4.2: Kha Silver

Scientific Name	*Hypophthalmichthys molitrix*
Indian Common Name	Silver carp
Local Name	*Kha Silver (Khasi)*

When pulled out of the water, their colour changes to a yellowish grey. They have a large head, an extended body, and a narrow tail. Long, comb-like rakes are seen on the gills. They lack teeth and have a large mouths. When they are young, they have a silvery appearance, but as they age, the back and belly take on a greenish hue. Their head become larger as they age. They weigh about 3–4 kgs. They can survive in vast rivers, ponds, or shaded regions. From July through August, spawning begins. They consume food above the water's surface during September, but deep underwater during October. During September most of the insects float on the surface of the water and fishes feed on these insects. When fishing takes place during this time, it is known as Khwai per (‘float fishing’). However, in the month of October, usually, the earthworms sink into the water bodies and the fish feed on them underwater. This period is called as por hap with (‘time of submerging of worms into the water’). Kha silver does not migrate. They consume grasshoppers and insects. Fishers use earthworms, bread and flour dough as bait. Fishing rods are used; men and women use the same approach for fishing. There is no specific rule, custom, or legend about this fish.

3. ***Kha Baw***

Image 4.3: Kha Baw

Scientific Name	*Catla catla*
Indian Common Name	Catla
Local Name	*Kha Baw (Khasi)*

They are similar to Kha Bah. As they get older, they turn black. The mouth is narrow. The snout is covered by large pores. Their colour becomes darker when they are fully grown. They live in shady areas near the banks of rivers and ponds. In the rainy season, they migrate from Bangladesh to Sohra, but in ponds, they cannot migrate. Spawning takes place in August, and they are still abundant in the river or pond. They feed on insects such as earthworms, larvae, and algae. For baiting, fishers used bread, chickpeas, flour dough and fishing poles to catch these fish, but a net can also easily capture them. Both men and women are proficient in using this method.

4. ***Kha Puthia***

Image 4.4: Kha Puthia

Scientific Name	*Systomus sarana*
Indian Common Name	Olive barb
Local Name	*Kha Puthia (Khasi)*

They have short bodies. They have a silvery appearance. The body is elongated, with a small head and a moderate mouth and eye. They have no seasonal variation. They occur in rivers, streams, and lakes and they can also survive in saline water. It spawns in shallow water from July to August. They don't migrate. They feed on algae and other aquatic insects. Chickpea and flour dough are used for baiting. They are only harvested for consumption purposes. They can be caught by casting a net or fishing rod.

5. ***Kha Ski***

Image 4.5: Kha Ski

Scientific Name	*Labeo gonius*
Indian Common Name	Kuria labeo
Local Name	*Kha Ski (Khasi)*

They are similar to Kha Bah. As they get older, they turn black. The mouth is narrow. The snout is covered by large pores. Their colour becomes darker when they are fully grown. They live in shady areas near the banks of rivers and ponds. In the rainy season, they migrate from Bangladesh to Sohra, but in ponds, they cannot migrate. Spawning takes place in August, and they are still abundant in the river or pond. They feed on insects such as earthworms, larvae, and algae. For baiting, fishers used bread, chickpeas, flour dough and fishing poles to catch these fish, but a net can also easily capture them. Both men and women are proficient in using this method.

6. ***Kha Saw***

Image 4.6: Kha Saw

Scientific Name	*Tor putitora*
Indian Common Name	Mahseer
Local Name	*Kha Saw (Khasi)*

The dorsal side of the adult is golden, while the fins have a reddish-yellow colour. Their colour distribution is not prominent when they are still in a developing stage. They have two pairs of barbels, lateral lines, and thick scales. They are found or reside in moving rivers or streams and like sand or gravel for their streambeds. During the breeding season, they move upstream in search of the finest spawning grounds, where spawning takes place from April to October. Since they can't survive in the pond, they are uncommon in *Khliehsnong.* They consume fruits, leaves, water animals, and algae as food. Since meat is regarded as delectable, market demand is considerable. This fish produces a white fluid that can be applied topically to treat skin infections. They are the most difficult to harvest and incredibly powerful. *Rawan* or fishers employ rods, nets, and traps to catch their prey, although only men are proficient at it. A male *Kha Saw* emits a milky substance from its body which is used for the treatment of skin infection called *khaid* in Khasi ('ringworm').

7. ***Kha Sorkar***

Image 4.7: Kha Sorkar

Scientific Name	*Cyprinus carpio*
Indian Common Name	Common carp
Local Name	*Kha Sorkar (Khasi)*

Kha Sorkar and Kha Ksiar have been scientifically classified as the same species; however, in folk classification, distinctions are made based on their colouration, indicating that nomenclature is influenced by observable differences in pigmentation. They are bigger than kha ksiar, they are silver and golden in colour, and they weigh about 10 kg. They do not undergo any seasonal change, and they live in ponds or rivers. They migrate during the rainy season from Bangladesh to Sohra. Spawning occurs from May to July. They feed on wheat, grass and algae. For baiting fishers use bread, flour dough and earthworms. They are only harvested for consumption. They are caught by using a net or fishing rod. There are no required ceremonies or practices as reported by *rawan* or fishers.

8. ***Kha Amerika***

Image 4.8: Kha Amerika

Scientific Name	*Cirrhinus mrigala*
Indian Common Name	Mrigal
Local Name	*Kha Amerika (Khasi)*

It resembles "Kha Silver" in appearance. The head is flattened and depressed. The pelvic fin and the anal fin have a pale red appearance, but the pectoral and caudal fins have a yellow-brown hue on the upper half and a pale red tint on the lower half. Its caudal fin is forked-shaped. The dorsal (fin) profile has a more curved shape. The scales have a black border and are coloured yellow. There are no seasonal variations. The fully grown fish weigh between 3 and 4 kg, and the smaller one is 1/4 kg. The spawning season for this fish occurs between June and July. These fish do not undergo migration. They have a sizable population. Earthworms, chickpeas, and flour dough are used as bait. A fishing rod is used to catch these fish.

9. ***Kha Kulai***

Image 4.9: Kha Kulai

Scientific Name	*Bangana dero*
Indian Common Name	Kalabans
Local Name	*Kha Kulai (Khasi)*

These fish change colour as they grow; they are darker when growing and a little lighter when they are fully grown. They inhabit freshwater environments. They don't migrate. They spawn in April, June, and September. They have a reputation for swimming quickly. A substantial population of these fish is still present in the area. Biscuit and flour dough are used as bait.

10. ***Kha Bamplang***

Image 4.10: Kha Bamphlang

Scientific Name	*Ctenopharyngodon idella*
Indian Common Name	Grass carp
Local Name	*Kha Bamphlang (Khasi)*

They appear big and elongated. Their colour is a little lighter when they are still growing but becomes darker when grow. They can be seen residing in bodies of freshwater. They don't migrate and remain in the same environment. The spawning season for these fishes is in April and May. They have smaller populations. They eat banana leaves, mosses, and other aquatic organisms. For baiting, they use bread, flour dough, and chickpeas. They are caught using a fishing rod.

11. ***Kha Bah***

Image 4.11: Kha bah

Scientific Name	*Labeo rohita*
Indian Common Name	Rohu
Local Name	*Kha Bah (Khasi)*

They have a close resemblance to "*Kha Amerika*". The colour distribution of this fish appears to be darker on the dorsal side and white on the ventral side; their eyes are red. Their pectoral fin and pelvic fin are pale red, while their anal fin and caudal fin are black. They spawn in the month of April, June and August. They have a big population. Mainly earthworms are used as bait. They do not migrate. Fishing poles are used to catch them, and this is a common method used by both men and women. There is no ceremony or ritual required.

12. ***Kha Iong***

Image 4.12: Kha long

Scientific Name	*Labeo pangusia*
Indian Common Name	Pangusia
Local Name	*Kha Iong (Khasi)*

They are blackish grey on their dorsal side and slightly white on the ventral part. Their scales are prominent and almost symmetrical. They show no seasonal variation. The fins are deep black, and the caudal fin is forked-shaped. They have a depressed and flat heads. They spawn three times a year during April, June and September. They are still abundant in the area. They don't migrate. They feed on grass. For baiting, rawan uses flour dough and biscuits. Other than food, they are also consumed by other living organisms, like snakes. They commonly use Tyrsong (scooping net) for fishing and fishing rods.

13. ***Shalynnai***

Scientific Name	*Pethia ticto*
Indian Common Name	Shalynnai
Local Name	*Shalynnai (Khasi)*

These are small fish; their maximum size is around 3 inches long, yellow-like in colour. Their appearance remains the same; they do not undergo any seasonal changes. Spawning occurs in the month of April-July (Spring Season). Their most preferred habitats are ponds and rivers. They migrate during breeding seasons that is they migrate to moving water like rivers, or streams. They are quite rare to find. They consume small insects. Earthworms are used as bait. They are caught by using a fishing rod, a basket (Khoh) or a scooping net (Tyrsong).

14. ***Sherktieh***

Scientific Name	*Canthophrys gongota*
Indian Common Name	Gongota loach
Local Name	*Sherktieh (Khasi)*

Sherktieh are of different colours (yellowish, blackish, and reddish) but share the same anatomical and physiological characteristics. They are smaller in size. They don't undergo any morphological changes. They can live in muddy areas (jaka ba long ktieh), ponds, and rivers. Spawning takes place during May and June. They are still abundant in Khliehshonong. They feed on soil (Khyndew), mud (Ktieh), and algae (Sohpailen). For baiting, they use earthworms. They are captured using a fishing rod.

15. ***Sher Syngkai***

Local Name	*Sher Syngkai (Khasi)*

These are small fish. Their mouth are small, and they have a lot of little dark patches on their back. They do not change their appearance as young and adults. They inhabit rivers; primarily those with flowing water. They do not migrate. Spawning occurs in May to September. With time, Sher Syngkai has become less common. They feed on grass, and for baiting, rawan use earthworms. Frogs and snakes are two more aquatic species that eat Sher Syngkai. They employ fishing rods or Tyrsong, and when the water level is low; they can be caught by hand or with a Jain Kyrshah (Khasi apron).

16. ***Kha Bamkba***

Local Name	*Kha Bamkba (Khasi)*

They are pale in colour, have a somewhat smaller head, and have no seasonal or physical changes. They reside in rivers and ponds. They migrate during the rainy season. Spawning occurs in the month of April-May. They are becoming rare in Khliehshnong with time. They feed on grass and algae (Sohpailen). For baiting they use flour dough, chickpeas, earthworms, bee larvae (khun ngap) clay mixed with flour (dew pyrtha khleh lang bad u moida). They use fishing rods for harvesting. This technique is used by both genders.

17. ***Dohthli (Li-sawrang/Li-por/Li-siaw/Li-iong)***

Scientific Name	Channa stewartii, Channa gachau
Common Name	Snakehead
Local Name	Li-iong, Li-sawrang

“Dohthli” which is commonly known as snakehead fish, have a pointed head resemblance to that of a snake and an elongated cylindrical body. It is composed of a long dorsal and anal fin with a rounded caudal fin. A fully grown Dohthli can reach up to around one foot in length. They consume frogspawn, crickets, and small insects that are washed away by the water during monsoon season and eat earthworms and mosses during winter. They live in both rivers and ponds. Li-sawrang, Li-por, Li-siaw and Li-iong are native species in Khliehshnong. Li-sawrang, Li-por, and Li-siaw share identical anatomical and physiological characteristics, differing solely in their colouration. Li-sawrang are red, Li-por are black, Li-siaw are black-blue and Li-iong is black in colour with patches. Li-siaw are supposedly known to possess an extraordinary ability to climb trees and are capable of whistling (hence the name “siaw” local word for ‘whistle’) when on surfaces in search of food. They can climb up the waterfall by swimming against the current of the waterfall. However, Li-siaw has become rare to catch. They do not change in appearance. They are found inhabiting areas like wetlands/marshes, ponds and low-lying water bodies. During autumn seasons Li-sawrang and, Li-por undergo migration and move upstream. They spawn during April and May. Li-sawrang and Li-por are found in a large population in Khliehshnong, however, Li-siaw is quite rare to find. They are captured by using a Tyrsong or fishing rod.

Li-iong migrates to bigger water bodies during seasons of low water and it remains in smaller water bodies during seasons with high water levels. They spawn in the months of July and August. Their eggs are bigger than other fishes. Earthworms are used as bait to fish *Li-iong*.

Image 4.13: Li-Sawrang

Image 4.14: Li-por

Khliehshnong is home to various crabs. Crabs found in Khliehshnong exhibit different appearances by which they are classified into different types (*Tham saw, Tham sib, Tham Iong, Tham dud*). These crabs are abundant during monsoon season. They spawn during the months of May, June and July. They are captured with a fishing rod using earthworms as bait and they can also be captured by bare hand. Three types of crabs are found in Khliehshnong, namely-

1. Tham Dud- these crabs display a white colouration ventrally and red colouration on the dorsal part. *Tham Dud* is the smallest of the three. Their exoskeletons are fragile and due to this, their preferred habitats are on surfaces, sandy areas (*jaka shyiap*) and ponds to prevent themselves from being preyed upon. Baits used for them are rice, eggs of fish and earthworms.

Image 4.15: Tham saw

2. Tham Saw- these crabs have a reddish appearance on their exoskeleton; hence they are coined locally as "*Tham Saw*" meaning "red". *Tham Saw* is bigger than *Tham Dud*. They feed on rice, eggs of fish, earthworms, small fishes and snakehead fish. They live in muddy water and cavities (*krem maw*).

3. Tham Iong- the exoskeletons of these crabs are black. They are the biggest among the three. A fully grown *Tham Iong* can weigh up to about 1kg to 2kg. They feed on rice, eggs of fishes, earthworms, small fishes and snakehead fish. They live in muddy water and cavities (*krem maw*).

Species Summary

Table 4.2: Fish species with scientific, common and local names

Sl. No	Scientific Name	Common Name	Local Name (Khasi)
1	*Cyprinus carpio*	Common carp	*Kha Ksiar*
2	*Hypophthalmichthys molitrix*	Silver carp	*Kha Silver*
3	*Catla catla*	Catla	*Kha Baw*
4	*Systomus sarana*	Olive barb	*Kha Puthia*
5	*Labeo gonius*	Kuria labeo	*Kha Ksi*
6	*Tor putitora*	Mahseer	*Kha Saw*
7	*Cyprinus carpio*	Common carp	*Kha Sorkar*
8	*Cirrhinus mrigala*	Mrigal	*Kha Amerika*
9	*Bangana dero*	Kalabans	*Kha Kulai*
10	*Labeo rohita*	Rohu	*Kha Bah*
11	*Labeo pangusia*	Pangusia	*Kha Iong*
12	*Channa stewartii, Channa gachau*	Snakehead	*Li-iong, Li-sawrang*

Fish species characteristics summary table

Local name	Migration	Spawning	Seasonal Variation	Bait
Kha Ksiar	No	May until early June	No	Earthworms, flour dough, and biscuits
Kha Silver	No	July through August	They have a silvery appearance during the development stage, but as they age, the back and belly take on a greenish hue	Bread and flour dough
Kha Baw	Bangladesh to *Sohra,* rainy season	August	As they get older, they turn black	Bread, chickpea, and flour dough
Kha Puthia	No	Shallow water, July to August	No	Chickpea, flour dough

Local name	Migration	Spawning	Seasonal Variation	Bait
Kha Ski	Rainy season, from *Sohra* to Bangladesh	Monsoon, June and July	The ones that dwell in the pond are bright silver, whereas the ones that live in the river are light green at first, becoming increasingly dark green as they age	Flour dough, chickpea and biscuits
Kha Saw	Breeding season, move upstream	April to October	The scales hue (red) is more prominent when they are fully grown	Flour dough
Kha Sorkar	Rainy season, from Bangladesh to *Sohra*	May to July	No	Bread, flour dough and earthworms
Kha Amerika	No	June and July	No	Earthworms, chickpeas, and flour dough
Kha Kulai	No	April, June, and September	Change colour as they grow; they are darker when developing and a little lighter when they are fully grown	Biscuit, and flour dough
Kha Bamplang	No	April and May	No	Bread, flour dough, and chickpea
Kha Bah	No	April, June and August	No	Earthworms
Kha Iong	No	Three times a year	No	Flour dough and biscuits
Shalynnai	Moving water like rivers, or streams during breeding seasons	April-July (Spring Season)	No	Earthworms
Sherktieh	No	May and June	No	Earthworms
Sher Syngkai	No	May to September	No	Earthworms
Kha Bamkba	Rainy season	April-May	No	Flour dough, chickpea, earthworm, bee larvae (Khun

Local name	Migration	Spawning	Seasonal Variation	Bait
				Ngap) clay mix with flour (dew byrtha khlehlang bad u moida)
Dohthli (Li-sawrang/Li-por/Li-siaw/Li-iong)	Autumn Season	April and May	No	Earthworms
Tham (Tham Saw, Tham Dud, Tham Iong)	No	May, June and July	No	Rice, eggs of fish and earthworms

Uses of Aquatic Resources

5. Uses of Aquatic Resources

5.1 Consumption frequency:

The data below shows how often the family eats fish at Khliehshnong. The list below shows the many varieties of fish—both imported and domestic—that the families consume. The following graph illustrates the various fish varieties that are the most flavourful, delicate, hard to find, and most prevalent in Khliehshnong, Sohra.

Consumption of fish

Consumption of fish	Number of respondents, n = 26	Percentages
weekly	15	58%
Daily	5	19%
Not very often	5	19%
Monthly	1	4%

Figure 5.1: Frequency of consumption of fish by families

The above figures show the total number of responders is 26 and 58% of the respondents said they consume fish weekly, 19% daily, another 19% consume it not very often, and only 4% consume it monthly.

Table 5.1: Lists of fish consumed by the family

Fishes consumed by families (names in Khasi)
1. Kha Sorkar
2. Kha Ski
3. Kha Amerika
4. Kha Main
5. Shalynnai
6. Kha Silver
7. Kha Blang

Fishes consumed by families (names in Khasi)
8. Kha Baw
9. Doh Thli
10. Kha Bamplang
11. Kha Mukur
12. Kha Bah
13. Kha Thli
14. Kha Saw
15. Kha Rew
16. Sher Syngkai
17. Shymprong
18. Kha Basa
19. Kha Blang

5.2. Fish most favoured by the family

Table 5.2: Fish most favoured by the families

Type of Fish	Number of respondents, n=26	Percentages
Kha Sorkar	8	31%
Other fishes	6	23%
Kha Amerika	4	15%
Kha Bamplang	4	15%
Dohthli	2	8%
Kha Saw	2	8%

From the above Table 5.1, it is shown that the total number of responders is 26 and the majority of the respondents favoured *Kha Sorkar* which constitutes 31*%, Kha Amerika and Kha Bamplang* also favoured by the family constitute 15%, followed by *Doh Thli* and *Kha Saw* all two constitute 8%. While, the other 23% of the respondents' fishes like *Kha Main, Kha Ski, Kha Puthia, Kha Thli, Kha Bah, and Shalynnai* were also favoured by the family.

5.3. Fishes which are considered a delicacy

Table 5.3: Fishes which are considered a delicacy

Type of fish	Number of respondents, n=26	Percentages
Other fishes	13	50%
Kha Silver	4	15%
Kha Ski	3	12%
Kha Bamplang	2	8%
Kha Main	2	8%
Kha Sorkar	2	8%

The above Table 5.2. shows that Kha silver is considered a delicacy fish according to 15% of the respondents, followed by Kha ski, which constitutes 12%; Kha Main, Kha Sorkar, and Kha Bamplang all constitute 8%. Kha silver is considered a delicacy because of its high fat content and fewer bones. On the other hand, 50% of the respondents mentioned that all types of fish are delicacies, including Kha Saw, Kha Triang, Kha Buwa, Kha Bsein, Kha Babia, Kha Thli, Kha Bah, Kha Rew, Kha Baw, Shalynnai, Kha Blang and Shymprong.

Table 5.4: Fish that are rare or hard to find

Type of Fish	Number of respondents, n=26	Percentages
Other Fishes	10	38%
Kha Silver	6	23%
Kha Amerika	3	12%
Kha Saw	3	12%
Kha Rew	2	8%
Sher Syngkai	2	8%

Table 5.3 above shows that the majority said that *Kha Silver* is the most difficult to find and rare in Khliehshnong. In contrast, Kha *Amerika* and *Kha Saw* are also the rare types of fish in

Khliehshnong, mentioned by 12% of the respondents. *Kha Rew* and *Sher Syngkai* both were mentioned by 8% of the respondents as being rare. Moreover, 38% of the respondents claimed that some other types of fish, like *Kha Ski, Kha Triang, Kha Sher, Kha Bah, Lisiaw, Kha Btia, Kha Iong, Kha Mukur, Kha Blang, Kha Baw, and Kha Main, Shymprong, Kha Khla and Kha Basa* are also rare to find.

5.5. Common fishes found in Khliehshnong, Sohra

Image 5.1: Kha Puthia

Image 5.2: Kha Sorkar

According to our respondents, the most common fishes found in Khliehshnong according to our respondents are *Kha Sorkar Kha Puthia, Shalynnnai, Kha Bamkba, Doh Thli-iong, Kha Bamplang, Shalynnai, Kha koi, Kha Mukur.*

5.6. Preservation of fish by salting and drying in the sun (called *Kha thad* in Khasi)

Fish are preserved for later consumption by drying them in the sun. This is carried out by cutting strips of the fish after washing it. Sometimes fishes are coated with salt and allowed to dry in the sun to prevent flies' infestation. But usually, the fish strips are dried directly in the sun without salting. Preservation through this method allows longer shelf life for the fish.

Commercial Activities of Aquatic Resources

6. Commercial Activities of Aquatic Resources

The following section outlines the commercial activities related to aquatic resources and fishing competition in Khliehshnong, Sohra.

6.1. Commercial activities that include aquatic resources

Table 6. 1: Commercial Activity related to aquatic resources

Commercial Activity related to aquatic resources	Number of respondents, n=26	Percentages
No	16	62%
Yes	10	38%

The findings indicate that out of 26 respondents, 62% mentioned they don't partake in commercial activities like fishing, tourism, or trade linked to aquatic resources in Khliehshnong. On the other hand, 38% acknowledged involvement in such activities, particularly in fishing competitions, where fish are traded or sold among neighbours.
When asked about the impacts of other commercial activities on aquatic resources in the region, the following responses were recorded:

Table 6.2: Impacts of Other Commercial Activities on Aquatic Resources

Impacts of other commercial activities on Aquatic Resources	Number of respondents, n=26	Percentage
No Impacts	16	62
The availability of fish has decreased	10	38

Out of the 26 respondents, 62% expressed that other commercial activities don't have a notable impact on the availability of fish, while 38% stated that there was a decrease in the availability of fish as compared to the past. According to respondents, this drop was due to the acidification of the water bodies caused by the coal mining that took place in the past.

6.2. Fishing Competition

In Khliehshong, fishing contests are organized typically from May to November.

Community ponds

Fishing contests are not allowed in community ponds. However, a person may catch them for food, and only one fishing rod is allowed per person.

Private ponds

Pond owners are required to introduce an imported fish, such as *Labeo rohita* (*Kha Bah*), into the pond before the fishing competition. An admission fee for fishing is applicable to access private ponds, even if the purpose is solely for consumption. The entry fee is not fixed, but it typically ranges from Rs. 150 for the first half of the day to Rs. 300 for the entire day. However, during fishing competitions, the entry cost depends on the total prize pool; for example, if the overall prize is Rs. 2000, the entry fee per fishing rod is Rs. 300, whereas, for a prize of Rs. 40000, the entry fee is Rs. 500. The competitions are organized by the pond owners and typically commence at 8 am, and ends at 3 pm. As per community regulations, these competitions are allowed thrice annually.

6.3. Importance of commercial activities using aquatic resources to the local economy

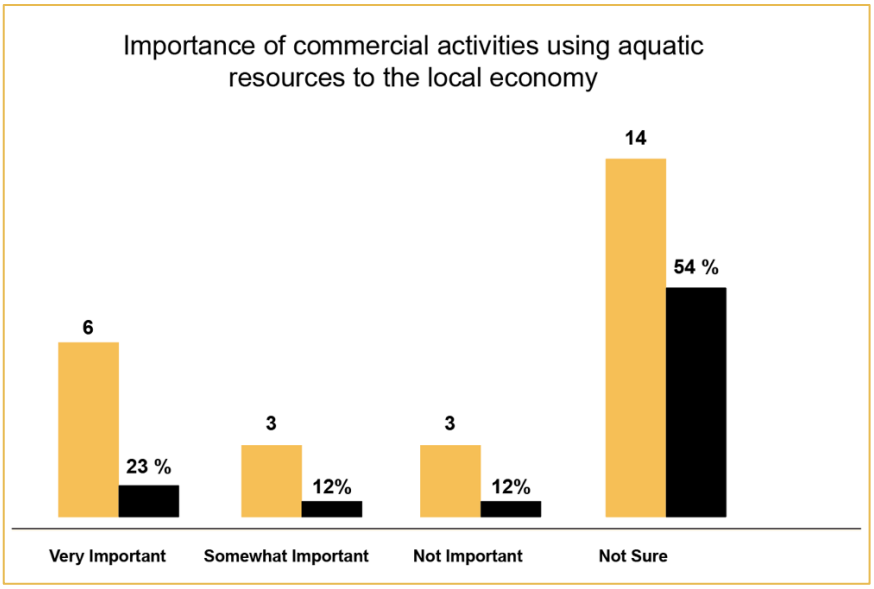


Figure 6.1: Importance of commercial activities using aquatic resources to the local economy

The above graph 6.1 illustrates the opinions of participants on the importance of commercial activities related to aquatic resources on the local economy. Among the 26 respondents, 54% indicated uncertainty regarding the significance of aquatic species to the local economy. In contrast, 23% asserted that they considered them very important, 12% expressed a view of them being somewhat important, while an additional 12% opined that they were not important.

6.4. Local conservation initiatives concerning aquatic resources

In response to an inquiry regarding local conservation initiatives concerning aquatic resources within the community, 69% of respondents affirmed the presence of such initiatives such as implementation of the rules and regulations put in place by the *durbar shnong* (‘community governing body’), while 31% indicated the absence of conservation initiatives.

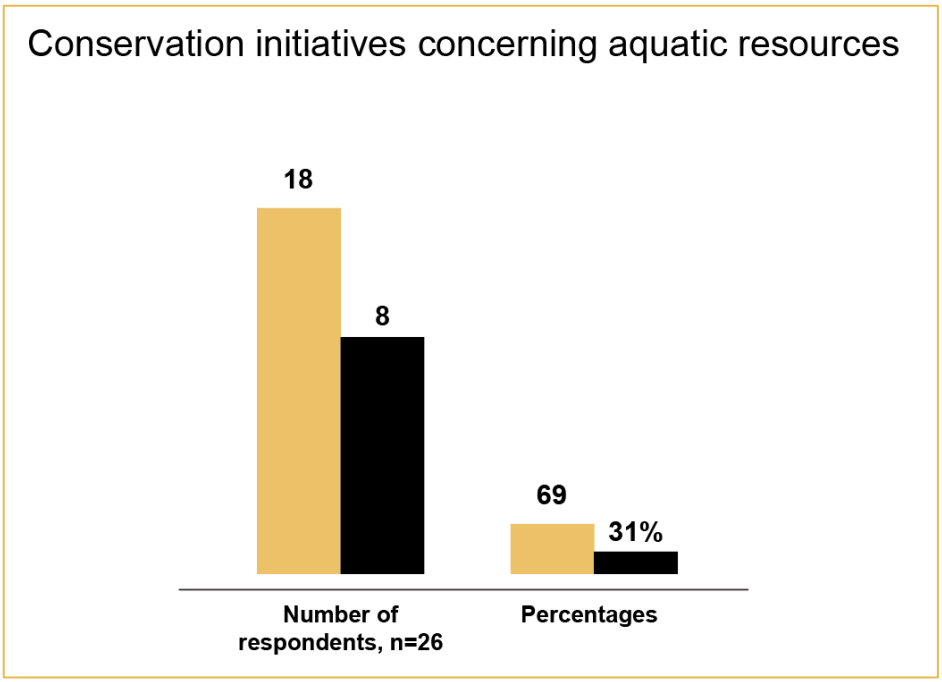


Figure 6.2: Conservation initiatives concerning aquatic resources

Harvesting Tools & Techniques

7. Harvesting Tools and Techniques

Within the realm of harvesting aquatic resources, a wide range of instruments and techniques are used to catch a variety of freshwater species. Traditional practices, common among smaller-scale fisheries, involve the usage of gears like nets, traps, and hooks. Nets and traps are used purposefully to catch different kinds of fish while using baited hooks on fishing rods allows for a more focused catch. The following section summarises the different tools and techniques being used for harvesting aquatic resources in Khliehshnong.

7.1. Preparation before fishing activities

7.1.1. Bait Preparation:

Earthworms, white flour, and chickpeas are the most common bait used. Earthworms are directly pierced into the hook and are ready to fish. Chickpeas are grounded in powdered form. Powdered chickpea and white flour are mixed with water to form a paste so that it does not dissolve in water. It is then rolled into small pieces and then stuck on a fishing hook. Slightly ground chickpeas are tossed into the water before fishing to attract the fish.

Image 7.1: Fish casting

7.1.2. Assembling of a Fishing rod:

A fibre fishing rod is the most preferred presently in Khliehshnong. A fishing line is first attached to the rod; after which, a roll sheet sinker, which is adjustable in both forward and backward directions, is wrapped around the fishing line. Above the sinker, a foam stick float is fastened to the fishing line. A stick float consists of two parts: a heavy bottom half and a buoyant top segment. It serves as a stabiliser, its lower portion is made to keep the float stable, and it serves as a point of reference for the location of the bait. Finally, a hook which may be of varying sizes is fastened to the tip or end of the line. The stick float has to be upright in order to float on the water when a line is cast into it.

The sinker may be moved back and forth to adjust this. Depending on the hook size, the number of bait (earthworms) is accordingly fixed into it. Several earthworms are pierced into the hook until the hook is almost or completely hidden.

Image 7.2: Fishing hooks

Image 7.3: Roll sheet sinkers

7.2. Harvesting Tools for Aquatic Resources

7.2.1. Shrip (in Khasi)

Shrip is a traditional method of capturing fish. It is a curved rectangular trap made by weaving split bamboo strips. It has two holes of rectangular shape situated at the centre. At one corner of the trap, there is a small conical shape that acts as a collecting point for the fish. This trap is used to capture small fishes such as *shersyngkai, shalynnai,* and *shymprong*. It is a slow process but it catches several fish at a time. Earthworms are usually used as bait in this case, they are cut into smaller pieces and packed in a cloth, and usually the local uses a sock. These baits are kept inside the *Shrip* through the two rectangular-shaped holes at the centre. Then it is submerged in the rivers or ponds and is kept undisturbed overnight before it is taken out.

Image 7.4: Ka Shrip (in Khasi)

Measurements of a traditional *Shrip*:

The traditional trap showed dimensions of 103 cm in length and 42 cm in width. The round opening at one end of the shrip was found to be 6 cm in length and the diameter of the hole was 8cm. The rectangular openings at the middle of the trap were measured at 15cm in length and 8 cm in width each.

Image 7.5: Shrip measurement 1

Image 7.6: Shrip measurement 2

Image 7.7: Shrip measurement 3

7.2.2. Tyrsong (in Khasi)

It is made of a mosquito net and the mouth is kept open by a fixed metallic ring. The net is stitched together and closed at the end. These can be used only in slow-running water.

Image 7.8: Ka Tyrsong (Khasi)

7.2.3. Ka Shrip Doh Thli (in Khasi)

This trap is made specifically for *Doh Thli*. This trap resembles a *Ruh (traditional fish trap)* but the posterior end is round. The bamboo strips are woven tightly on the anterior and the posterior part is woven with a small gap to filter water.

Image 7.9: Ka Shrip Doh Thli 1

Image 7.10: K Shrip Doh Thli 2

7.2.4. Ruh Doh Thli (in Khasi)

The mouth of the trap is shaped like a funnel, which makes it easier to cover, and is made of strips of bamboo. This trap has a square-shaped base. This is used for *Doh Thli*.

Image 7.11: Ruh Doh Thli

Measurements of "*Ka ruh Doh Thli*"

Image 7.12: Ruh Doh Thli measurement 1

The measurements of the trap are depicted in the pictures below. The height of the trap was measured to be 23 cm with the mouth having a diameter of 10.5 cm.

Image 7.13: Ruh Doh Thli measurement 2

7.2.5. Box Trap

These boxes are built of an aluminium body with cane netting and are rectangular and flat in design. These are used for *Doh Thli* trapping.

Image 7.14: Box trap

Measurements of a Box Trap:

The box trap below was measured at 20 cm in length, 10 cm in height, and 6 cm in width.

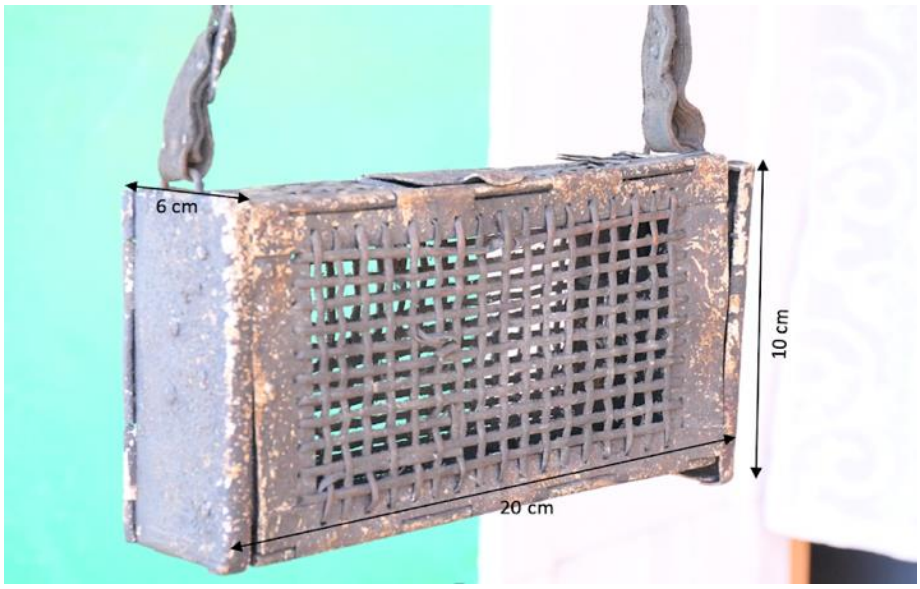


Image 7.15: Box trap measurement (small)

Another box trap (as depicted below) was measured at 25 cm in length, and 12.5 cm in height, and 6 cm in width.

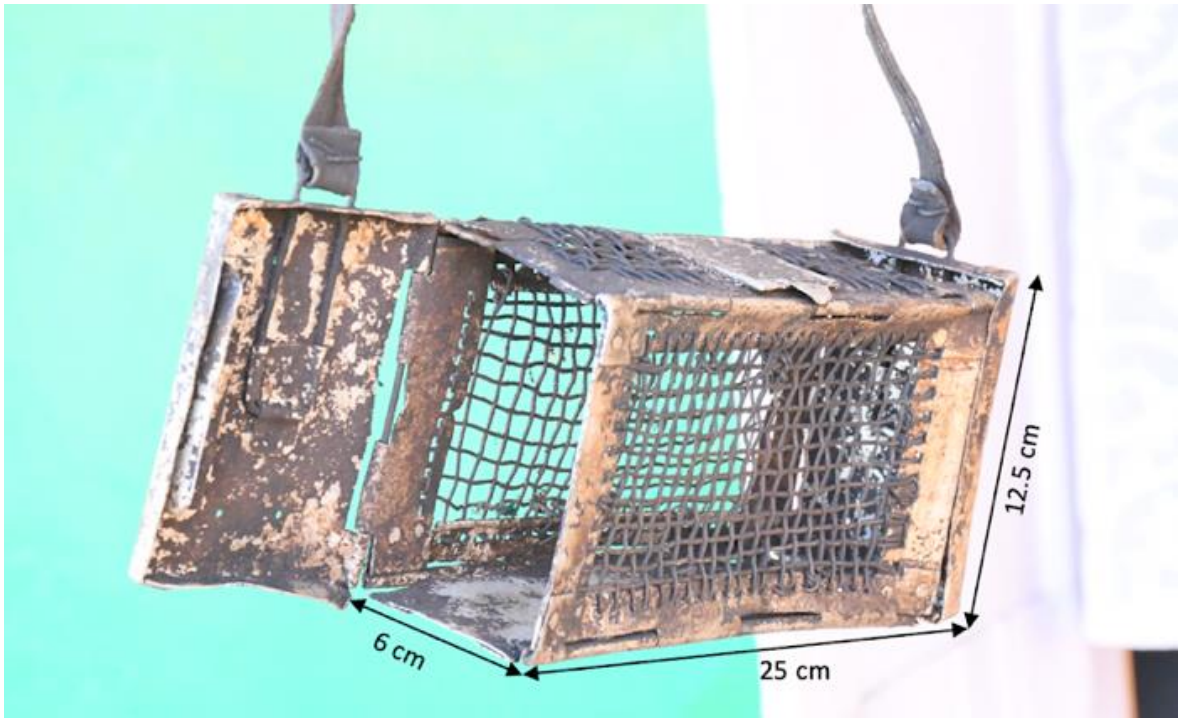


Image 7.16: Box trap measurement (big)

7.2.6. A traditional Fishing Rod (*Rynwiang khwai*)

The traditional fishing rod, which is referred to as "*Ryngwiang*" locally, is very similar to the contemporary fibre fishing rod. The fishing rod (as pictured) is made from a type of bamboo known as "*Tyr-a,*" (*Cephalostachyum capitatum* Munro) known for its durability and it is separated into three sections that are put together before use. As per the *rawan, Tyr-a* bamboo variety is characterised by the short internode making it sturdier and more durable for making fishing rods. However, different types of bamboo can also be used for the preparation of a fishing rod. The rod is thicker near the handle and gets thinner or narrower as it gets closer to the end. Every part of the rod has several guides, which resemble rings. The handle has a reel attached to it, known locally as "*Reel nar*" by the locals. The guides follow the line from the reel to the rod tip.

Image 7.17: Ryngwiang khwai (Khasi)

Measurements of the fishing rod:

The traditional fishing rod, referred to as "*rynwiang*," was measured as having a total height of 227 cm. This rod comprises three distinct segments, each individually measured: Segment 1(S1) recorded a height of 81.5 cm, Segment 2(S2) measured 77 cm, and Segment 3(S3) reached a height of 85 cm.

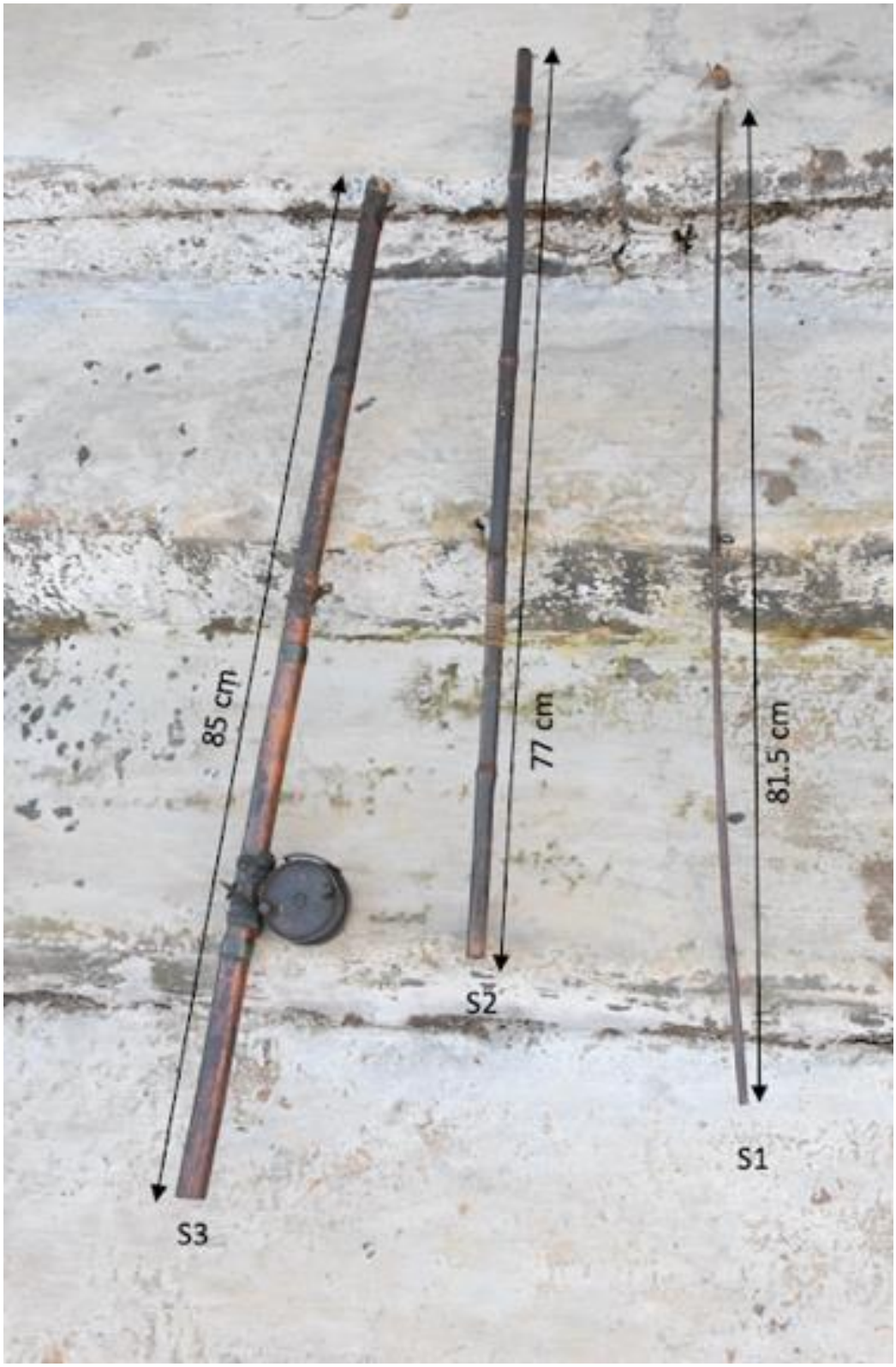


Image 7.18: Ryngwiang khwai measurement

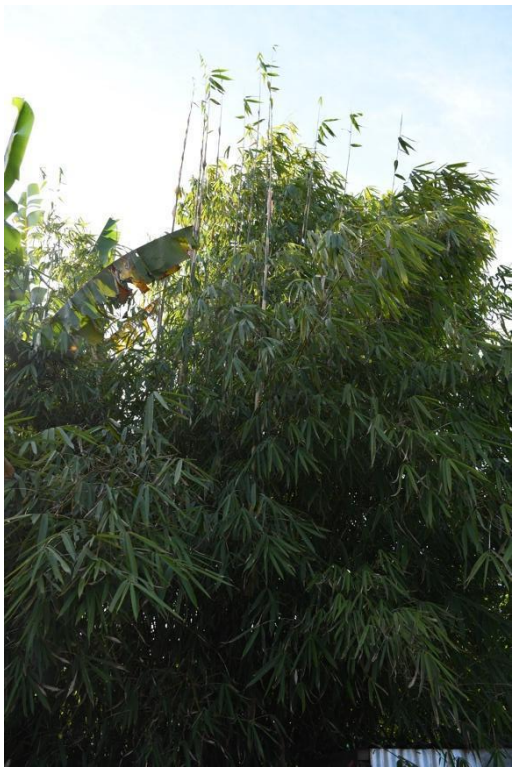


Image 7.19: Shken (Dendrocalamus hamiltonii)

Image 7.20: Tyr-a (Cephalostachyum capitatum Munro)

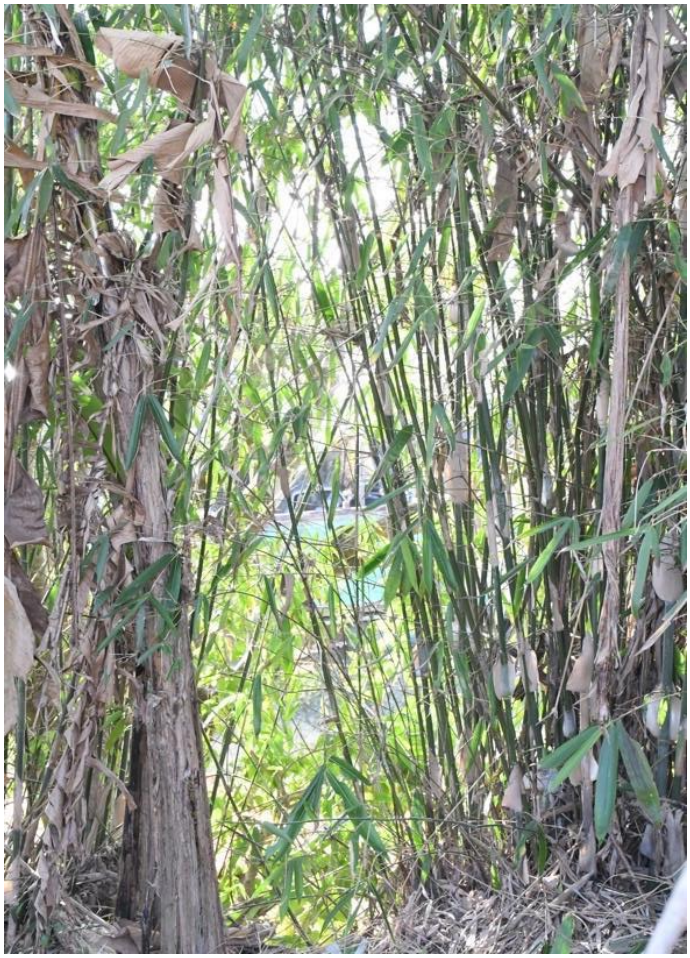


Image 7.21: Siej Naga/Naka (Phyllostachys mannii Gamble)

7.3. Poisoning of fish

Some of the fish sedatives that act as a poison which were practised in the past were *Khariew, Sohramthein* and *Tutia*. *Khariew* and *Sohramthein* are plant derivatives. The roots of *Khariew* are pounded on rocks near the riverside till the milky fluid is extracted. The milky fluid that seeps into the river acts as a poison. The seeds of *Sohramthein* are pounded to pieces and soaked into the water body for poisoning. Copper sulphate locally known as "*Tutia*" is grind into pieces which are then thrown into the water. Chemical poisons have more damage on aquatic species, especially fish larvae. This causes great loss to the fish stock available in the water bodies. Poisoning of fish is prohibited and banned by the local governance body.

7.4. Storage of Traditional Tools

Traps (*Shrip*) made of bamboo and fishing poles made of *Tyr-a* bamboo are stored in a fireplace called *Tyngier ding or Tympan* to keep away pests and maintain the quality and extend durability of the tools. However, as most people now prefer modern techniques, these traditional tools are no longer in use.

Image 7.22: Traditional tools for harvesting aquatic species

Image 7.23: Tyngier ding

Cultural Belief Systems & Folktales

8. Cultural Belief Systems & Folktales

8.1. Taboo related to water bodies and surrounding areas

Taboos associated with water bodies are prevalent across various cultures and societies, reflecting a deep-rooted connection between the communities and their aquatic environments. These taboos often stem from traditional beliefs, folklore, and a desire to maintain and preserve the ecological balance of water ecosystems. Some common taboos recorded in Khliehshnong include the following:

1. Pregnant ladies shouldn't consume *Kha Iong (Labeo pangusia*) during pregnancy due to the possibility of the infant developing infantile diseases such as what is locally known as "*Niang Sohpet*" (cultural illness). *("Kiba armet kim long ban bam Kha Iong namar ba heh niangsohpet ki khyllung")*
2. Pregnant women are advised to refrain from bathing in rivers, particularly around noon, as this is the time when water fairies, known as *puri*, are commonly believed to emerge.
3. A person who has been poisoned by *ka bih* (a cultural belief and practice where the one who poisons a victim gains wealth benefits, whereas the victims will show symptoms such as forming foam in the mouth and convulsion episodes. This must be treated by a traditional healer failing which the victim will continue to have the symptoms.) cannot eat *Kha Iong (Labeo pangusia*) as the symptoms may reoccur. ("*Ki briew ba lah ioh bih teng, kim lah ban bam Kha Iong namar da ki bam ka lah ban khie biang").*
4. It is forbidden to utilize any resources like collecting firewood or any other activities for one's benefit from a sacred grove. Local people to date believe that they would be hunted by their God or Deities "*Ryngkew* "or "*La Basa*" who look after the forest.
5. There is a longstanding belief in the existence of a mystical being that is demon-like in nature called as "*Suid Tynjang*" According to this belief, the entity is thought to inhabit the forest and is reputed to track down individuals who engage in misbehaviour within its territory.
6. It is believed that the best time to go fishing for maximum harvest is during the new moon (*Iap bnai*) while there is less catch if fishing is carried out during the full moon (*Shai bnai*).

8.2. Cultural rules related to water bodies and aquatic resources

The deep connection that exists between communities and their natural environment is reflected in the cultural rules that are most often verbally established in traditions about water bodies and aquatic resources. These rules are frequently linked to customs, and taboos that are prevalent in the area. Below are some of the recorded rules related to water bodies and aquatic resources recorded in Khliehshnong:

1. Avoid using derogatory words as they may upset the *Puri blei (water fairies).*
2. A person suffering from rheumatism (*Pangmat*) cannot consume Pangusia (Kha Iong).
3. *Kha Triang* is not consumed during spawning season as they are poisonous during that period. *(Kha Triang ka shong bih ha ki bnai ba ka lympat pylleng).*
4. Cutting of young trees for firewood from Community Forests is prohibited.

8.3. Folktales associated with water bodies

Water-related folktales are fascinating narratives rooted in the oral tradition. These tales, which frequently include magical creatures and mystical beings, teach moral lessons about obedience to authority, accountability, and the dire consequences of disregarding the sanctity of water. These folktales emphasise the crucial relationship between communities and the life-sustaining waterbodies that define our cultural identity via simple storytelling, acting as moral guides. Participants were asked about their knowledge and familiarity with folktales related to water bodies and aquatic resources. The section below outlines the responses recorded:

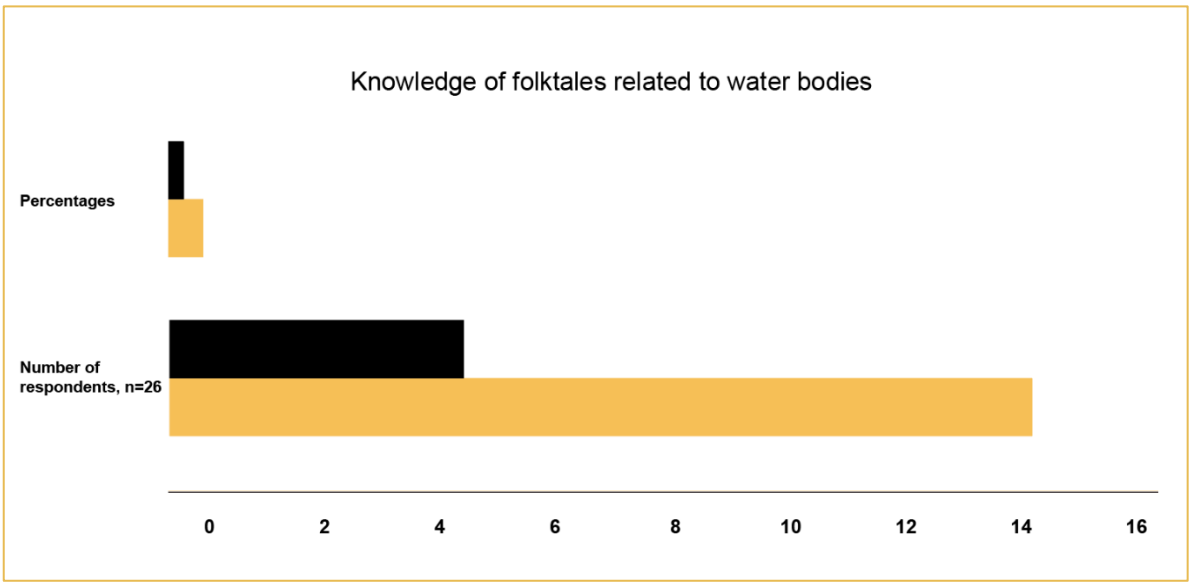


Figure 8.1: Knowledge of folktales related to water bodies

From Figure 8.1, it can be seen that 75% of the respondents stated that they were familiar with folktales about bodies of water, but not with proverbs, myths, or legends about fish or other aquatic species, while 25% were not familiar with any related folktales.

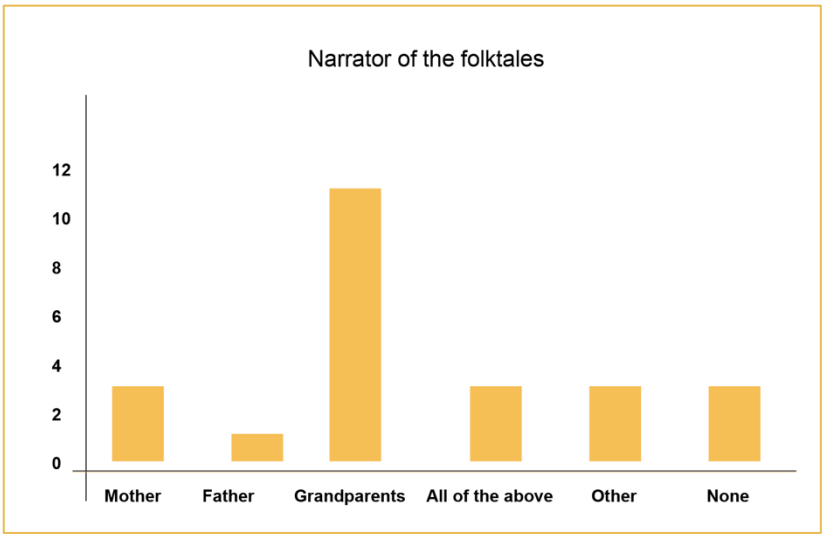


Figure 8.2: Narrator of the Folktales

The depicted data presents insights from 20 respondents, revealing that 50% of participants attribute the narration of stories to their grandparents. In contrast, 10% and 5% credit their mothers and fathers, respectively. Additionally, 15% reported a collective influence from both parents and grandparents, while another 10% acknowledged storytelling contributions from various sources, including family members, friends, village elders, and teachers. Interestingly, 10% note the absence of exposure to such stories or folktales. Some of the folktales associated with water bodies as recorded from Khliehshnong are as follows:

a. Wah dawai

Wah dawai was once regarded as one of the greatest medical innovations given to man by God. If somebody has a skin infection, they would visit this river first thing in the morning without speaking to anyone. This must be done seven days in a row without stopping. The ability of *Wah Dawai* to entirely cure the skin infection was believed to be a miracle. Unfortunately, due to pollution from human activities, the river has seen a decline in health and natural beauty, deterring people from approaching it.

b. Jingkiengblei

The Jingkiengblei is believed to have been created by nature. It has a very small pathway on both sides surrounded by a deep cleft. There are no visitors during the Monsoon as the area is covered with grass, weeds and snakes residing there. They call it "*jingkiengblei"* because they believe it was a gift from God.

c. ***Dohsher***

"Dohsher" is a type of fish, which was named after a particular person *Sher Syngkai Bamon* who was a young, good-looking and healthy man.

d. ***Pungbah***

"Pungbah" was given this name because the pond *(pung)* was larger than normal ponds. *Puri* (water fairies) are said to reside in this *Pungbah,* and people believe that the water that flows from the mountain can treat skin infections.

e. ***Wah Pjah***

Wah Pjah is one of the rivers located in Khliehshnong*;* its name was derived from the local word *Pjah* meaning 'Cold'. This river was known to have low temperatures during the summer and winter seasons; hence it was given the name *Pjah* ('cold').

f. Wah Ur ka Duri

"Wah Ur ka Duri" river was named after a woman called *"Duri".*This river derived its name from the local word *"Ur"* which means "falling down". Whenever *Duri* would walk along the side of the river, she always slipped and fell into it; therefore the river still holds the name*"Wah Ur ka Duri"* to this day.

g. Nohkalikai Fall

The name "*NohKaLikai*" comes from a woman named "*Likai* "who committed suicide from a cliff near the waterfall. She was a widow who had remarried again for her daughter to experience the love of a father. She had no idea how drastically their lives would change as a result of her marriage. Likai's job required her to spend extended periods away from home, leaving her child under the care of her husband. Upon her return, she devoted quality time to her child. However, due to the demands of her job and weariness when she got home, she found it challenging to give sufficient time to her spouse, leading to feelings of resentment and frustration on his part. One day, upon her return home, Likai noted the absence of both her spouse and child. Giving no thought to it, she entered her home and noticed some food that had been prepared in the kitchen. Happily, she presumed her husband had prepared the food for her and started serving herself. After finishing her meal, *Ka Likai* had a habit of snacking on betel leaves and nuts. She reached for the betel basket but discovered a finger lying in it. She then quickly realised the horror of the situation and what must have occurred while she was working. When she discovered that she had eaten the flesh of her daughter, she was overcome with grief. In her madness, she leapt down a cliff next to the waterfall, prompting the naming of "*NohKaLikai* "Falls.

Image 8.1: Nohkalikai fall

8.4: Insights on the importance of folktales

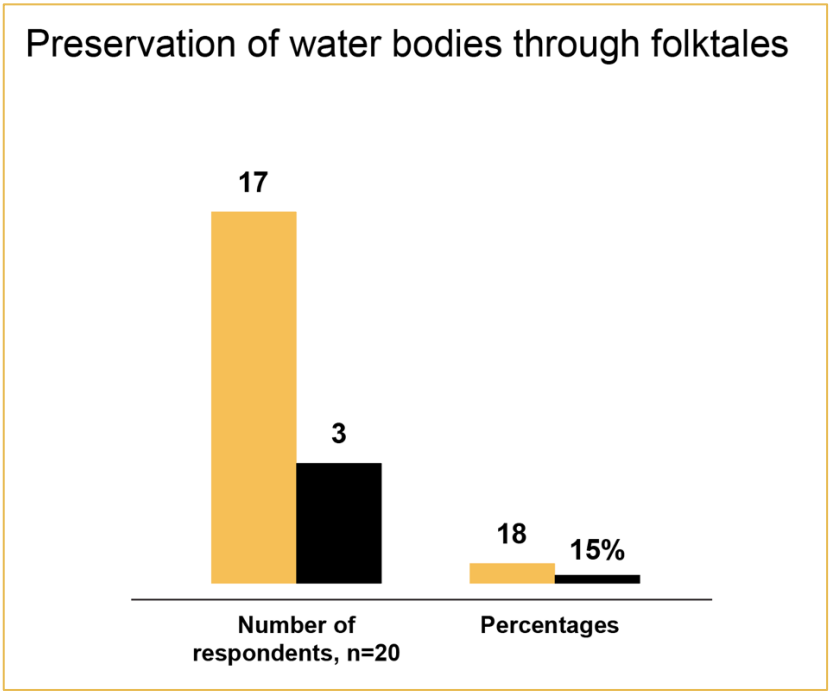


Image 8.2: Preservation of water bodies through folktales

Seventeen out of the 20 respondents (85%) emphasized the significance of folktales in the preservation of water bodies, while three respondents (15%) expressed the view that folktales were not deemed important for this purpose.

Recorded below are some of the responses from the17 participants on their insights about the importance of folktales as well as the effectiveness of these stories on behaviour:

1. The vast majority of the respondents agreed that folktales, which are passed down from ancestors, hold great significance. They bring pride to the community, showcasing the wealth of the community, contributing to cultural preservation with a positive impact, and playing a key role in environmental conservation. Some of them have moral significance, and it is our responsibility to uphold the culture that was passed down from our ancestors.
2. As these tales are passed down verbally from one generation to the next, the knowledge and the accuracy of the tales are progressively decreasing in nature.
3. The younger generation no longer adheres to the local culture or seeks to uphold the traditions.
4. Regrettably, our *Khasi* customs and culture have changed over time as many people have adopted the western culture and lifestyles.

Governance of Water Bodies in the Village

9. Governance of Water Bodies in the Village

Governance plays a crucial role in the functioning and development of communities. In Northeast India, local governance plays a crucial role in the protection and monitoring of water resources including rivers, lakes, ponds and their biodiversity. Some of the important rules and regulations and institutions at Khliehshong, Sohra is:

1. The community or owner of the location where the water source is located are in charge of managing the water body. Additionally, in the past, the governing body engaged in activities related to water bodies, such as cleaning campaigns and policies designed to maintain river cleanliness.
2. Before the existence of the BMC (Biodiversity Management Committee), there was a Social Committee that looked after the well-being of the Khliehshnong Biodiversity. The BMC was established to replace the Social Committee, with the same roles and responsibilities.
3. The Biodiversity Management Committee (BMC) is also responsible for the protection and preservation of the habitats. This includes the conservation of land, forest and water bodies including the aquatic species. The total members of BMC are not more than six members.

9.1. Rules for use of aquatic resources and water bodies

1. Besides permission from the "*local Durbar*" construction of a private pond requires a permit from the Sub-Division Office, Government of Meghalaya.
2. Fix time for fishing is from 8 am to 5 pm for privately-owned ponds.
3. Permission to enter private areas is needed.
4. Poisoning of fish is prohibited.
5. Prohibited to destroy water bodies and small fishes are not allowed to be caught.
6. Prohibited to use of multiple fishing rods (one person can use only one fishing rod).
7. Prohibited to use of barriers and traps.
8. Prohibited from washing clothes and bathing in the community pond.

9.2. Penalties set by the governing body:

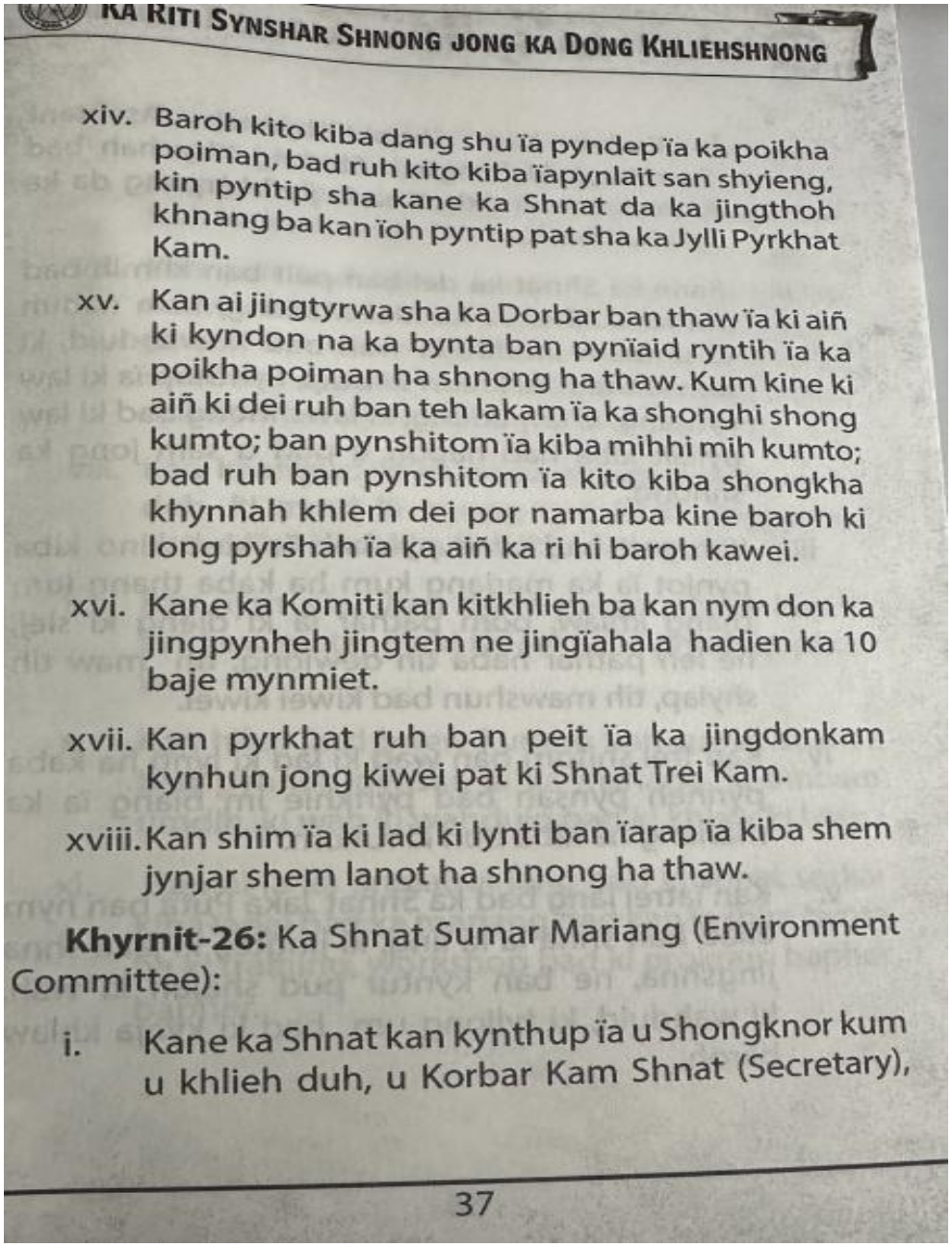
1. Rule breakers and violators are handed over to the *local Durbar* (council of the village) to be dealt with.
2. A Fine of 500 rupees is charged to every violator.
3. In case of frequent violations, there will be a Hearing held at the community hall.
4. Punishment also involves exclusion from involvement in any activities in the community for all violators.

9.3. Constitution of the village:

At the head office of the local *Durbar* (council of the village), there is a constitution available. This has a set of rules and regulations, of govern, committees, their roles and responsibilities as established by the village council for smooth functioning and monitoring of local affairs. Some of the notable rules and regulations are:

1. Establishment of Environment Committee:

As reflected in Image 9.1. shows an important article that states the need for the establishment of an Environment committee with the *Shongknor* (chairman) at the head of the committee, the appointment of a secretary, an assistant secretary and other members who will be responsible for managing all affairs-related to the environment i.e. monitoring and protection of water bodies, hills and forest inclusive of sacred and community forest within the borders of the village. The committee would also be responsible for checking and monitoring environmental degrading activities such as the burning of forests, over utilization of forest products and mining activities.



KA RITI SYNSHAR SHNONG JONG KA DONG KHLIEHSHNONG

xiv. Baroh kito kiba dang shu ïa pyndep ïa ka poikha poiman, bad ruh kito kiba ïapynlait san shyieng, kin pyntip sha kane ka Shnat da ka jingthoh khnang ba kan ïoh pyntip pat sha ka Jylli Pyrkhat Kam.

xv. Kan ai jingtyrwa sha ka Dorbar ban thaw ïa ki aiñ ki kyndon na ka bynta ban pynïaid ryntih ïa ka poikha poiman ha shnong ha thaw. Kum kine ki aiñ ki dei ruh ban teh lakam ïa ka shonghi shong kumto; ban pynshitom ïa kiba mihhi mih kumto; bad ruh ban pynshitom ïa kito kiba shongkha khynnah khlem dei por namarba kine baroh ki long pyrshah ïa ka aiñ ka ri hi baroh kawei.

xvi. Kane ka Komiti kan kitkhlieh ba kan nym don ka jingpynheh jingtem ne jingïahala hadien ka 10 baje mynmiet.

xvii. Kan pyrkhat ruh ban peit ïa ka jingdonkam kynhun jong kiwei pat ki Shnat Trei Kam.

xviii. Kan shim ïa ki lad ki lynti ban ïarap ïa kiba shem jynjar shem lanot ha shnong ha thaw.

Khyrnit-26: Ka Shnat Sumar Mariang (Environment Committee):

i. Kane ka Shnat kan kynthup ïa u Shongknor kum u khlieh duh, u Korbar Kam Shnat (Secretary),

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Image 9.1: Ka riti shnong 1

Image 9.2. reflects that the committee is also responsible for monitoring village projects to guarantee mitigation, protection, and safeguarding of the environment from project operations.

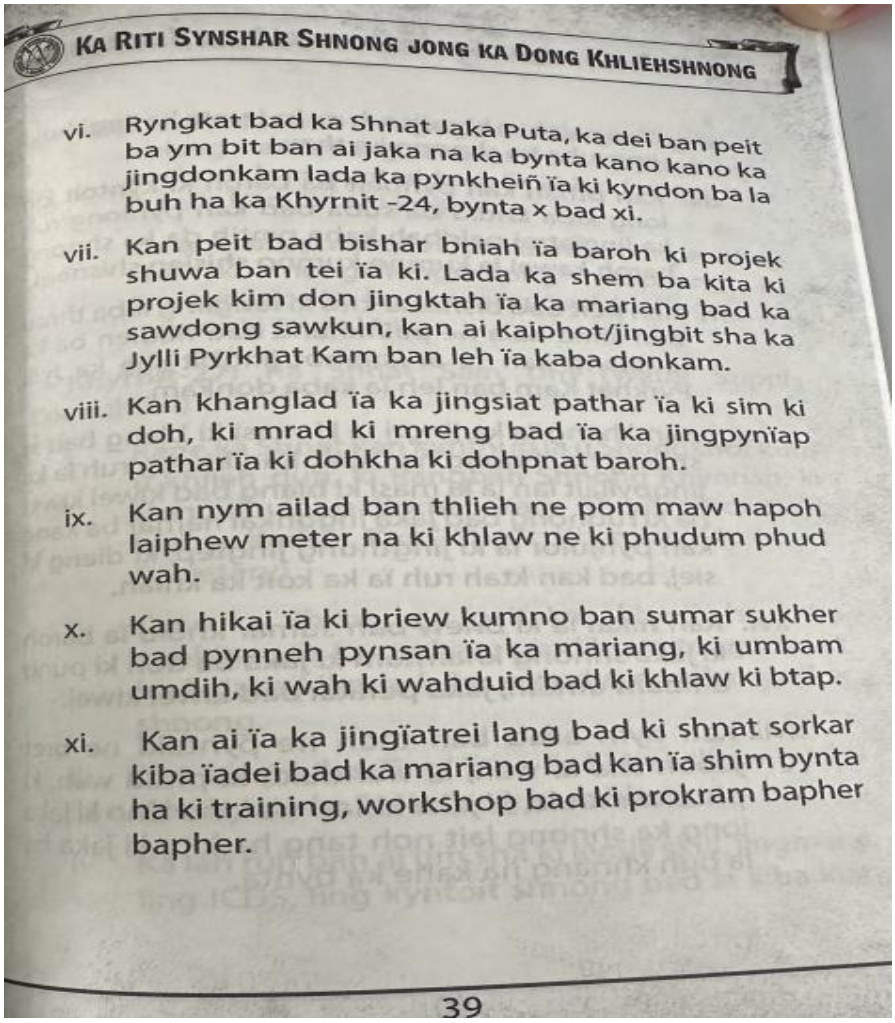


Image 9.2: Ka riti shnong 2

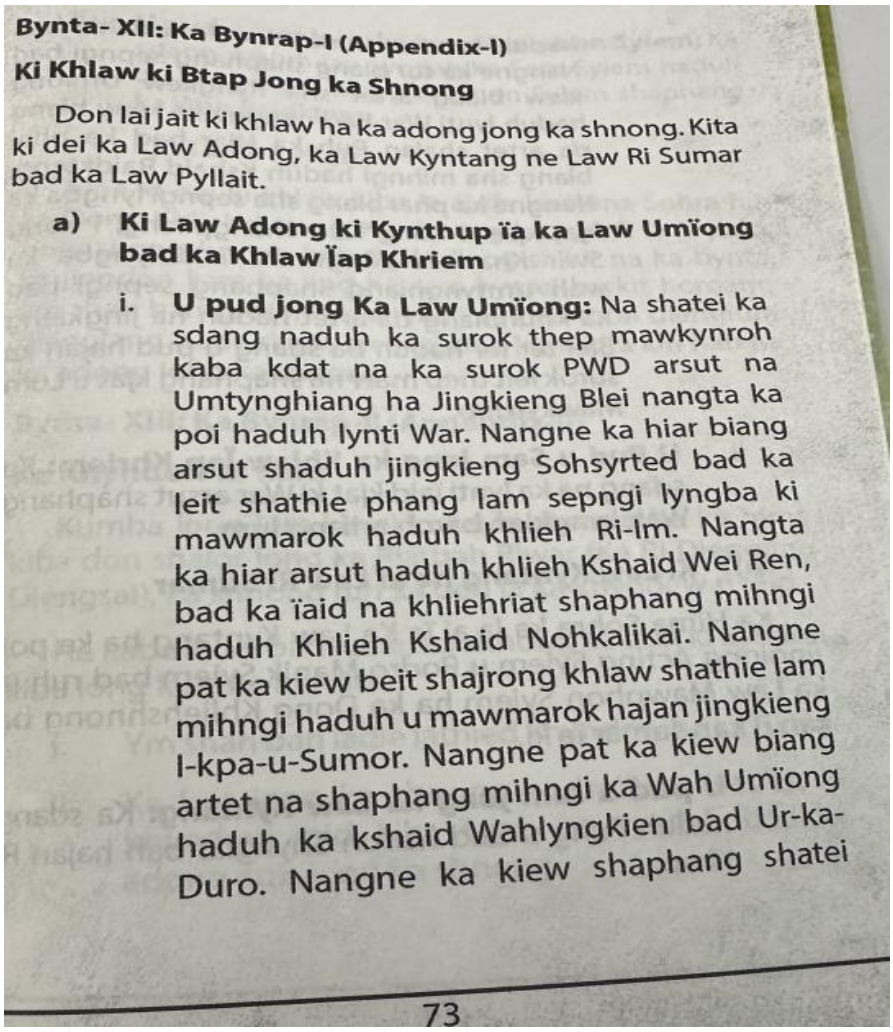
The Committee must also guarantee that no mining activities take place within three meters of any community forest or three meters of any water body. The committee is also entrusted with the role and responsibility of conducting workshops and other activities to educate and make aware of the importance of protecting and safeguarding water bodies, forest resources and the environment as a whole.

2. Water Committee

A section of the constitution also mentions the necessity for a water committee. This committee is again comprised of the *shongknor* (chairman), headman, secretary and other members. This committee is in charge of protecting and safeguarding all water bodies, particularly the sustainability of the village's water supplies.

3. Forest resources

A section on forest resources and their management is also available. Here there is a clear classification of the types of forest in the village i.e. the *law adong* (community reserved forest), sacred forest and *law pyllait* (community forest). It is made public that village residents may only utilize and gather timber and other forest products from the community forest for their home requirements. It is illegal for anybody to gather timers or other resources for commercial reasons.



Bynta- XII: Ka Bynrap-I (Appendix-I)

Ki Khlaw ki Btap Jong ka Shnong

Don lai jait ki khlaw ha ka adong jong ka shnong. Kita ki dei ka Law Adong, ka Law Kyntang ne Law Ri Sumar bad ka Law Pyllait.

a) **Ki Law Adong ki Kynthup ïa ka Law Umïong bad ka Khlaw Ïap Khriem**

i. **U pud jong Ka Law Umïong:** Na shatei ka sdang naduh ka surok thep mawkynroh kaba kdat na ka surok PWD arsut na Umtynghiang ha Jingkieng Blei nangta ka poi haduh lynti War. Nangne ka hiar biang arsut shaduh jingkieng Sohsyrted bad ka leit shathie phang lam sepngi lyngba ki mawmarok haduh khlieh Ri-Im. Nangta ka hiar arsut haduh khlieh Kshaid Wei Ren, bad ka ïaid na khliehriat shaphang mihngi haduh Khlieh Kshaid Nohkalikai. Nangne pat ka kiew beit shajrong khlaw shathie lam mihngi haduh u mawmarok hajan jingkieng I-kpa-u-Sumor. Nangne pat ka kiew biang artet na shaphang mihngi ka Wah Umïong haduh ka kshaid Wahlyngkien bad Ur-ka-Duro. Nangne ka kiew shaphang shatei

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Image 9.3: Ka riti shnong 3

The study has allowed gathering information and knowledge of the use and management of aquatic resources at a community level. This has provided new learning and reflects the collective effort of the people of Khliehshnong to manage aquatic resources sustainably. It was recorded that water bodies and their resources were considered the community's resources and regulations were constituted to govern the same for the benefit of all. It was also recorded that fishing is not limited to the people of Khliehshnong but is allowed for others outside the community to use the aquatic resources. This sets a good example of community sharing, a collective worldview of the indigenous people. Though many of the traditional tools and techniques are no longer in use, it is appreciated that poisoning of waterbodies for fishing is prohibited strictly.

Conclusion & Recommendations

10. Conclusion and Recommendations

The study has allowed gathering information and knowledge of the use and management of aquatic resources at a community level. This has provided new learning and reflects the collective effort of the people of Khliehshnong to manage aquatic resources sustainably. It was recorded that water bodies and their resources were considered the community's resources and regulations were constituted to govern the same for the benefit of all. Similarly, the privately owned ponds were regulated by the community governing body to a good extent. It was also recorded that fishing is not limited to the people of Khliehshnong but is allowed for others outside the community to use the aquatic resources subject to the same rules as the community members. This sets a good example of community sharing, a collective worldview of the indigenous people. Though many of the traditional tools and techniques are no longer in use, continuity with the past still exists. This can be seen especially with the adherence to old traditional belief systems of taboos and cultural beliefs related to aquatic life forms and water bodies. The vast seasonality knowledge of the fish and different aquatic lifeforms is still present among the members of the village. Some of the old methods are still in use such as fishing on the new moon nights, *khwai per during* rainy season and others. Though the knowledge of fish poisoning through traditional methods by using plant-based poison still exists, however, with concern for destroying more aquatic life forms than required and overall sustainability issues, this practice is strictly prohibited and no longer in use.

10. 1. Limitations to the study:

1. It was felt that more time should have been devoted to the field as a process of rapport building. This will allow time for the respondents to open up and be more comfortable in sharing information.
2. Lack of active participation of community members particularly women during PRA activities and data collection. It can be noted from the respondents that the majority of them were males. Further, limited time has also affected gathering data from a larger number of respondents. It was also discovered that many of the residents work in Shillong and other parts of the state and were mostly not available in the village.
3. Due to the paucity of time, the third objective of the study could not be achieved i.e. to develop materials for a public display of their knowledge and practices of aquatic resources, for a new Interpretation Centre in collaboration with the community. Though preliminary discussion has been carried out with a few members of the *durbar*, participation in the community is awaited. With the festive break for Christmas and New Year, it was difficult to bring the community together to take forward the discussion.
4. Due to limited time, GPS coordinates of all the water bodies could not be recorded. This is true, especially for those water bodies that are far away and not easily accessible.

10.2. Recommendations

1. Community participation in identifying the themes to be displayed in the Interpretation Centre should be encouraged. This will build a sense of ownership and pride to showcase their knowledge and culture. Community participation is the most crucial step in building the Interpretation Centre. A follow-up discussion with a good representative sample of the community is recommended to decide on the content and plan for the display of traditional knowledge in the Interpretation Centre,
2. Being part of an oral tradition, there is an urgent need to preserve, protect and promote the folktales available at Khliehshnong.
3. Further, other research areas can be identified to be able to document the traditional knowledge concerning aquatic resources. Such areas are still available in the state and documentation will allow for in-depth learning from the communities.

Annexure 1: General Questionnaire on Aquatic Resources

General Questionnaire on Aquatic Resources

Demographics		
Name of interviewer(s)		
Names of interviewee(s)		Age:
Place		Gender:
Language		
Occupation		Date:
Educational Background		Time:

A. Consumption and Practices

1. Please list (tell us) the types of aquatic resources (fish, fauna and plants) you know of. [don't have to specify water bodies – they may be buying at the market, and we need to know this; also some fish may been missing]

2. Please list (tell us) which ones of the above that you and your family consume.

a. Which among these are favoured by you and your family?
b. Which among these is considered a delicacy?
c. Which among these are rare or difficult to find?
d. Which among these are common ones to find?
e. How often do you eat fish or other aquatic products?

i. Daily
ii. Weekly
iii. Monthly
iv. Not very often

B. Commercial activities

3. Are there any commercial activities (fishing, tourism, trade) in your region that include aquatic resources?

i. Yes
ii. No

a. If yes, what are they?

4. What impacts have these activities had on the availability of aquatic resources in the region?

5. How important are commercial activities using aquatic resources to the local economy in your area?

i. Very important
ii. Important
iii. Somewhat important
iv. Not important
v. Not sure

C. Tools and techniques

6. Please list the harvesting tools used by you and your community for fishing and catching other aquatic resources.

a. If the following are used, kindly elaborate on the method and techniques for each.

i. Nets
ii. Poison fishing
iii. Traps
iv. Barriers
v. Traditional fish storage basket (ruh)
vi. Others

7. How are the traditional tools crafted? (Material used, method, fixing, mending, repairs, etc. to be documented via videography)

8. Are there any conservation or restoration initiatives involving aquatic resources in your community?

i. Yes
ii. No

a. If yes, what kindly elaborate?

D. Governance

9. Who governs the water bodies in your village?

10. Was the governance of the water bodies different in the past years?

i. Yes
ii. No

a. If Yes, how was it different?

11. What are the activities carried out by the governing body in relation to the water bodies? (such as feeding, cleaning, water flow, etc)

12. What are the rules for using the water bodies?

13. What are the rules for using the fish and other resources from the water bodies?

14. What are the penalties set by the governing body for breaking the rules?

Annexure 2: Questionnaire on Traditional Knowledge of Aquatic Resources (Species specific information)

Questionnaire on Traditional Knowledge of Aquatic Resources (Species specific information)

Demographics		
Name of the species as identified in the pilesort		
Name of interviewer(s)		
Names of interviewee(s)		Age:
Place		Gender:
Language		
Occupation		Date:
Educational Background		Time:

1. What kind of appearance does it have? Are there any notable characteristics of its appearance?

2. Does it undergo seasonal, yearly, or life-long changes in appearance?

3. Where does it live? Are there specific habitat requirements it needs (prompts: soil, water flow, shade, nutrients)?

4. Does it migrate, or change location during the year? If yes, when?

5. Do you know about its life cycle? (prompts: birth, growth, migration, mating, spawning, death).

6. Is it abundant or rare? What is the trend over your lifetime?

7. Do you know what it eats? When and where?

8. Does it have a use for people? Other uses not for people? (food for other ARs?).

Food: ……

Medicine:……

Material:……...

Ornament:……

Commerce: ……..

Recreation:……...

Ritual: ……..

Other: ……..

9. Does it have a use for other living organisms? (Other uses not for people) (food for other ARs?).

10. How do you collect/harvest/catch it?? What steps/tasks are needed? Describe or demonstrate the technique. What tools or other materials (bait) are needed? Who tends to use this (everyone, men, women, specialists)? (Description of the technique and tools, demonstration of the same will be recorded through videos and pictures).

11. What rules/ practices must be followed to collect and use this species? Are there any religious rituals required before and/or after collection? If no, were there any prior to Christianity? What happens if someone does not follow the rules? Actual examples?

12. Are there any sayings (proverbs, aphorisms), songs, prayers or stories that mention/include this species?

Annexure 3: Interview Schedule

Interview Schedule

Culture and Belief Systems Related to Aquatic Resources

Demographics		
Name of interviewer(s)		
Names of interviewee(s)		Age:
Place		Gender:
Language		
Occupation		Date:
Educational Background		Time:

1. Where did you grow up?

2. Do you know of any folktales/proverbs /myths/taboos/legends associated with water bodies and aquatic life in the village? (folktales, myths, or legends in your community that feature fish, water, or any aquatic life)?

i. Yes
ii. No

a. If Yes, can you please narrate the Folktale/ Proverbs /myths/taboos/legends (With audio and video recording)

Keywords:

3. Who narrated the folktale/proverbs/myth?

a. Father
b. Mother
c. Grandfather
d. Grandmother
e. Elder in the village

Others:_____

4. According to you, do you think they are important? Yes, No.

a. If Yes, in what way are they important? Do these tales have an impact on your daily life?

5. Are these folktales/myths/proverbs/taboos/legends being told to the children? Yes / No

a. If Yes, how? Only in the house or any programmes held in the village?

b. If No, why not?

6. Is there any kind of effort or protection towards the preservation of this cultural heritage?

7. What are the challenges and opportunities with regard to these cultural traditions?

Additional Notes:

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