

RU SOAM

Connecting with Our Heritage

WALKING
ALONG WITH
TRADITION



Sikkim State Council of Science & Technology,
Department of Science & Technology,
Government of Sikkim, 2026



**AN ETHNOGRAPHIC
STUDY OF THE LEPCHA
HERITAGE CANE BRIDGE**

[illegible]

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CHIEF MINISTER, SIKKIM

सिक्किम सरकार
GOVERNMENT OF SIKKIM

MESSAGE

Sikkim's identity is deeply rooted in its mountains, rivers, forests, and in the communities and traditions that have evolved in harmony with this Himalayan landscape. Our indigenous knowledge systems are an invaluable inheritance, carrying generations of experience, creativity, and wisdom.

It is with great satisfaction to see the publication of "RU SOAM: Connecting with Our Heritage, An Ethnographic Study of the Lepcha Heritage Cane Bridge." This work highlights an extraordinary Lepcha tradition and helps preserve its knowledge for future generations.

The Ru Soam, traditionally built with cane and other local materials, reflects the ingenuity of our ancestors. More than a means to cross rivers and difficult terrain, these bridges symbolize the bond between community, nature, craftsmanship, and knowledge passed down through generations.

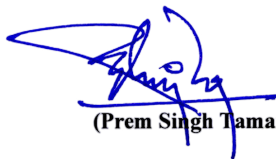
As Sikkim advances in science, technology, and sustainable development, we must ensure that our ancestral wisdom remains integral to our progress. Traditional knowledge offers vital insights into sustainable living and resilience in fragile mountain ecosystems.

I commend the Sikkim State Council of Science & Technology, Department of Science & Technology, Government of Sikkim, for documenting the story of Ru Soam. Such efforts ensure our living traditions are studied, understood, and carried forward with respect.

My sincere appreciation to the Lepcha elders, knowledge holders, community members, and researchers whose contributions have given this publication authenticity and tremendous value.

May this book inspire students, researchers, policymakers, and communities to protect and promote our indigenous heritage. Ru Soam bridges rivers, and its legacy bridges our ancestral wisdom with the aspirations of future generations. May we cherish and pass it forward with pride and responsibility.

Date: - 08.08.2026
Place: - Gangtok



(Prem Singh Tamang)



Pintso Namgyal Lepcha



GOVERNMENT OF SIKKIM

Hon'ble Minister

Forest & Environment, Mines & Geology
and Science & Tech. Department
Government of Sikkim

MESSAGE

The indigenous knowledge traditions of Sikkim constitute a valuable repository of practical wisdom developed through generations of interaction with our distinctive Himalayan environment. Preserving and scientifically documenting these traditions is important not only for protecting our cultural heritage but also for understanding their relevance to sustainability and contemporary society.

I am pleased that the Sikkim State Council of Science & Technology, Department of Science & Technology, Government of Sikkim, has brought out "RU SOAM: Connecting with Our Heritage – An Ethnographic Study of the Lepcha Heritage Cane Bridge." The publication represents an important effort to document the traditional knowledge associated with one of the distinctive cultural practices of the Lepcha community.

The Ru Soam illustrates how indigenous communities developed practical solutions by understanding their landscape and making thoughtful use of locally available natural resources. The knowledge involved in selecting materials, constructing the bridge and maintaining it over time reflects skills accumulated through experience and transmitted across generations.

The value of such heritage extends beyond the physical structure itself. Associated with it are community practices, craftsmanship, knowledge of natural materials, cultural memories and a relationship with the surrounding environment. When a traditional practice disappears, these interconnected forms of knowledge can also be lost. Documentation therefore becomes an important part of conservation.

The Department of Science & Technology recognises the importance of bringing traditional knowledge and scientific inquiry into meaningful dialogue. Ethnographic documentation such as this provides an opportunity to understand indigenous practices in their cultural context while opening avenues for interdisciplinary research, conservation and sustainable applications.

I acknowledge with gratitude the Lepcha community, elders and traditional practitioners who have shared their knowledge and experiences for this study. I also appreciate the researchers, field teams and officials of the Sikkim State Council of Science & Technology for their efforts in documenting this important aspect of Sikkim's heritage.

I trust that this publication will serve as a useful reference for researchers, students, institutions and future generations, and encourage further documentation and scientific study of the rich indigenous knowledge systems of our State.

May this endeavour contribute towards ensuring that the wisdom embodied in the Ru Soam continues to be understood, respected and preserved as part of Sikkim's living heritage.

A handwritten signature in black ink, appearing to read 'Pintso Namgyal Lepcha'.

(Pintso Namgyal Lepcha)



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1. DOCUMENTATION: BACKGROUND AND PROCESS

Under the guidance of the Hon'ble Chief Minister of Sikkim Shri Prem Singh Tamang (Golay) and the Hon'ble Minister-cum-area-MLA of Dzongu Shri Pintso Namgyal Lepcha, the Department of Science and Technology, Government of Sikkim, undertook the initiative to document the Lepcha cane bridge (Ru-Soam). Aim is to preserve and rejuvenate the living heritage as well as to prepare proposals for the inscription of the Ru-Soam in the National Inventory of Intangible Cultural Heritage of India, maintained by the Sangeet Natak Akademi and the Ministry of Culture with a view to its future consideration for nomination to UNESCO's Representative List of Cultural Heritage of Humanity. Further, the Department of Science and Technology is exploring the integration of Ru-Soam knowledge and skills into the State's disaster management and resilience-building strategies.

The Ru-Soam, the traditional Lepcha cane bridge, is one of the finest examples of indigenous engineering in the Himalayas. Constructed entirely from wild cane, bamboo and natural materials, these bridges enabled communities to traverse Sikkim's challenging mountain terrain for centuries without disturbing nature. Its modular construction technique is uniquely adapted to the fragile landscape, allowing for flexible and resilient responses to environmental challenges. Ru-Soam represent a remarkable synthesis of engineering, ecology and culture, demonstrating how traditional societies developed sustainable solutions in harmony with the environment.

The project team constituted by the Department of Science and Technology, Government of Sikkim, comprised of Senior Consultant Dr. Jenny Bentley, Research Associate Dr. Mongfing Lepcha and Research Scholar Miss Pema Yangden Lepcha. The project was conducted from July 2025 to March 2026.

In April 2025 a preliminary meeting was held in Gangtok with representatives from the community, experts in the field of culture and heritage, as well as the concerned government departments. All participants were in favour of proceeding with the documentation project.



Ritual during the inception workshop, 29 August 2025 © Department of Science and Technology, Government of Sikkim, photographer Kunga Tashi Lepcha (KTL)

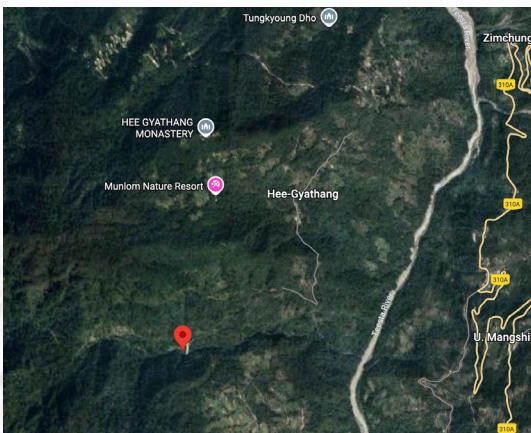
On 29 August 2025 the project was kickstarted in Dzongu through an inception workshop. This was to raise awareness among local community stakeholders, formulate basic consent, and draft a way forward. To begin with, a boongthing, a local Lepcha shaman, performed a ritual to request the local deities of the place and the ancestors in order to receive blessings for the project. They were asked for permission and protection. This ritual was required according to the Lepcha community's religious practice and ethics of consent and care.

During the initial meeting as well as in the inception workshop, it was decided that to go forward with the nomination, a Ru Soam needed to be built. The practice and knowledge of the element is transmitted in the process of building the Ru Soam. To honour the Indigenous Lepcha way of sharing knowledge on the element and to not build a nomination relying on secondary sources, the steering committee and the community decided it was important to build a bridge. The building was organized and coordinated by the community leaders, representatives, religious practitioners, and knowledge keepers of four village areas in Dzongu (Hee Gyathang, Songdong, Lingthem, Passingdang).



Decision-making among bridge builders and knowledge keepers, 29 August 2025 © Department of Science and Technology, photographer Kunga Tashi Lepcha

The location is at Mani khola in Hee-Gyathang constituency, between the Sudur and the Sangdong ward. In Lepcha, the river is called Muni kyong, mispronounced Mani. There are two rivers in the region, Munmu kyong is between Sangdong and Taryang. Munmu Ram Muni Ram is the source of both rivers. It is located at a latitude of 27.459766° and a longitude 88.499040°. It is at an elevation of approximately 1130 meters above sea level.



Images of the approximate location from google maps, Screenshot, 18 November 2025



The location that was chosen for the bridge is just a short walk from the road, where there are two existing bridges. The one that is currently used is a sturdy metal bridge that was built in 2021. Then just next to it is an iron suspension bridge, built in 1973 by all Lepcha engineers under the leadership of Tar Tshering Lepcha, who was then an engineer. It was one of the main bridges connecting lower Dzongu for motor vehicle traffic, until the new one was built just a few years ago. Therefore, the Ru Soam will add to a historical narrative of changing technology to the location. It will tell the story of the struggle to stay connected, of living in an environment prone to rain and shifting hills, it will tell a story of changing technology.



*The view of the two existing bridges as viewed from the site,
4 November 2025, Jenny Bentley (JB)*



During the meeting, two committees were formed. One committee was established to focus on the bridge construction itself and included ru soam knowledge holders from Dzongu, local panchayat members, government officials, and other representatives of the Lower Dzongu community. The other committee included representatives of the wider Lepcha community in Sikkim, members of relevant government departments, as well as other experts in the fields of cultural heritage and environment.

Before the bridge building the documentation team interviewed knowledge keepers from the Lepcha community. The list of knowledge keepers was compiled and amended by the committee members.



The documentation team in conversation, 28 August 2025, TKL



The documentation team in conversation with the master builder and panchayat president, 28 August 2025, JB

The bridge building began on 3 November with a meeting of the local community and the knowledge keepers to discuss the details of the building. It was officially inaugurated by Honourable Minister (Forest Department and Science and Technology Department, Government of Sikkim) cum Dzongu MLA Shri Pintso Namgyal Lepcha on the 15 November 2025. The building itself was completed in just three days.

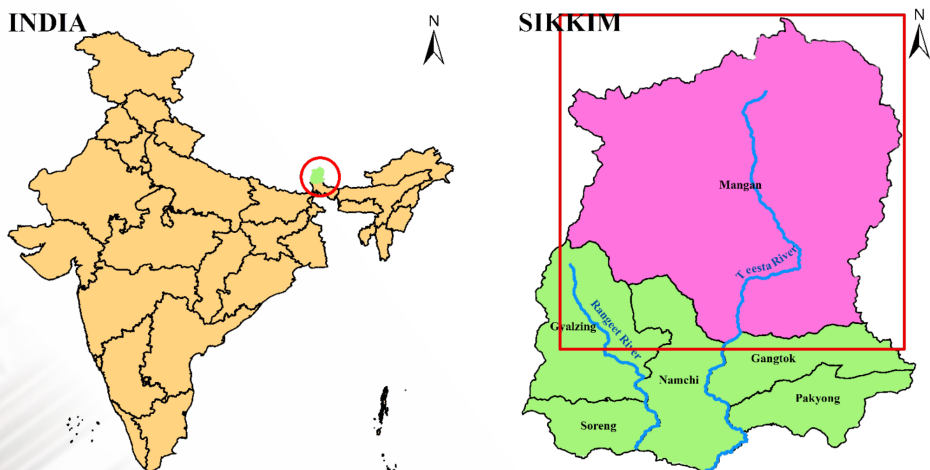


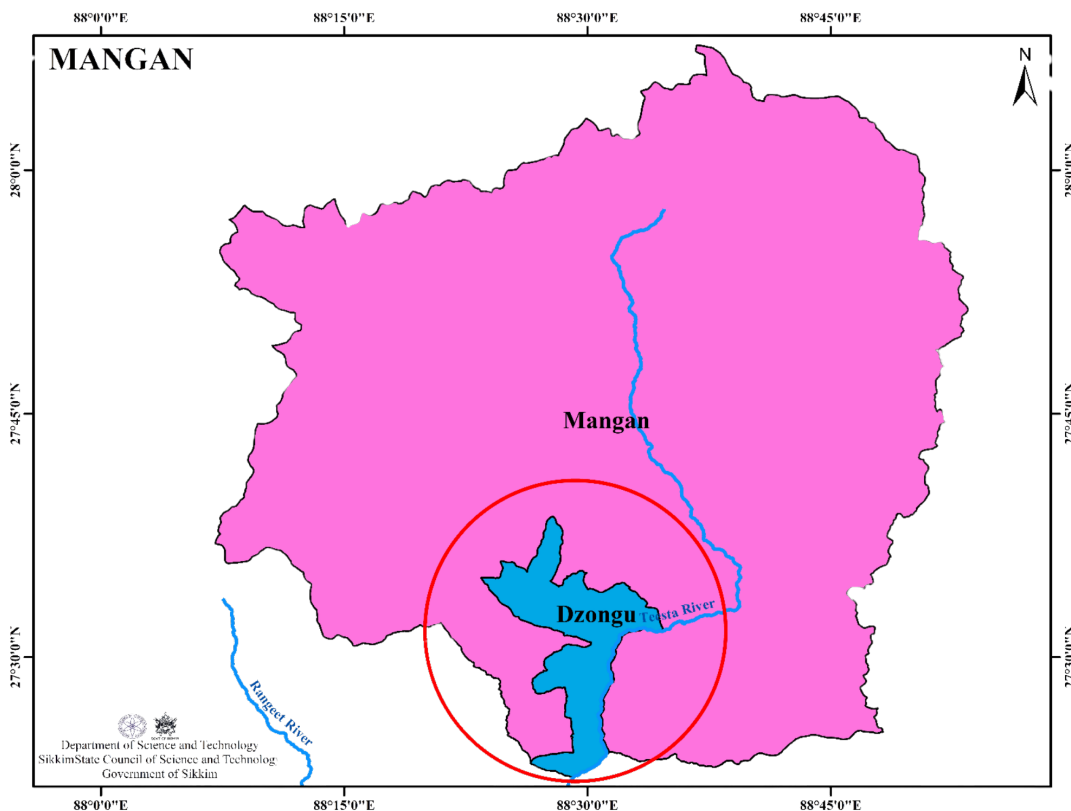
Honourable Minister and Dzongu MLA Shri Pintso Namgyal Lepcha inaugurating the ru soam at Mani khola, 15 November 2025, JB

2. BACKGROUND: SIKKIM HIMALAYA AND LEPCHA (MOOTUNCHEE ROANGKUP RUMKUP)

Sikkim is an Indian state, located in the south-eastern Himalaya. It is a mountainous region characterised by ecological diversity, but also fragility. As part of the Himalayan cryosphere—often referred to as the “Third” or “Fourth Pole”—the region plays a critical role in regulating water systems across Asia, while also being highly vulnerable to climate change. Accelerated glacial retreat, intensified monsoon patterns, landslides, and glacial lake outburst floods increasingly affect both landscapes and livelihoods.

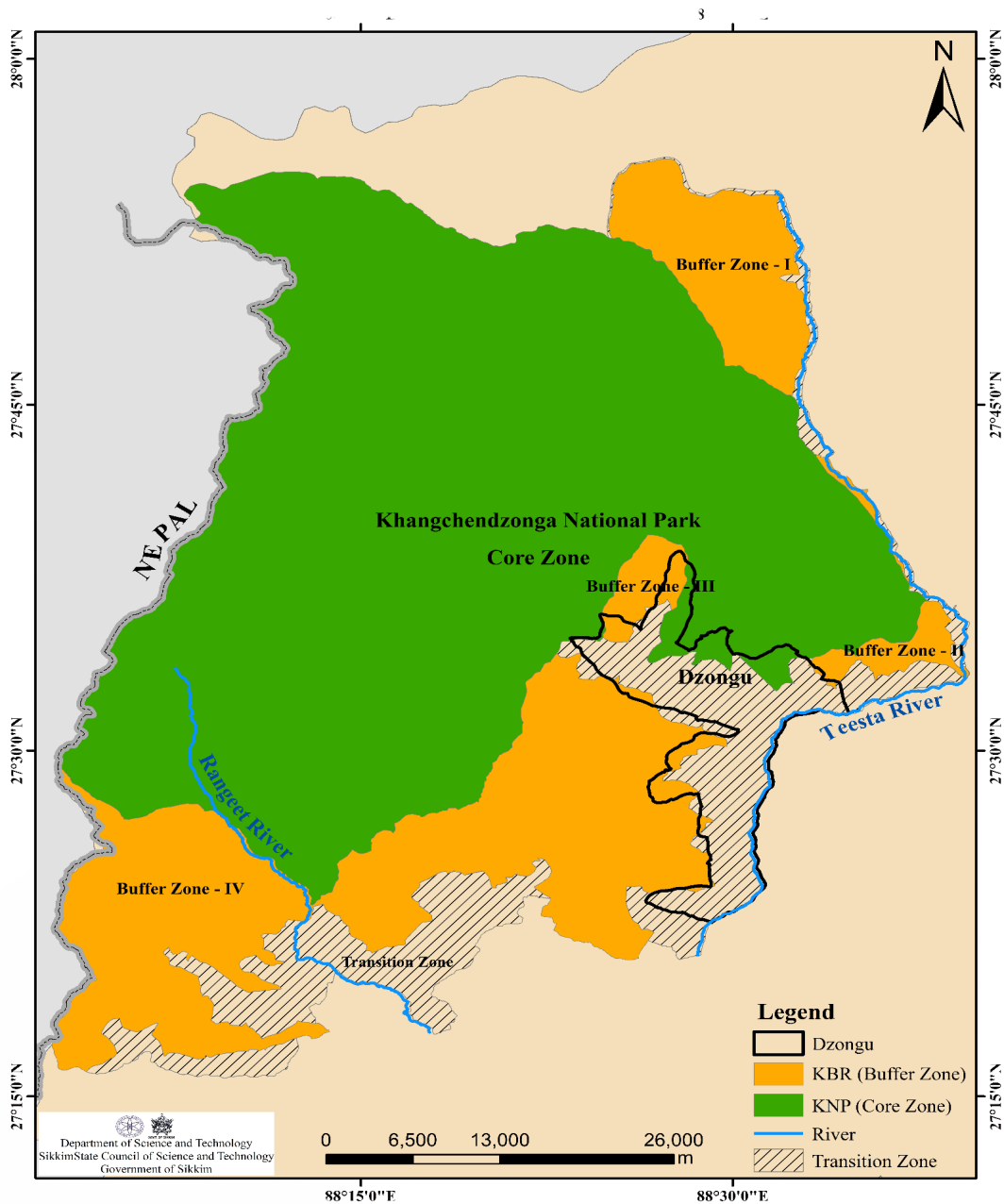
At the same time, Sikkim is home to culturally diverse Indigenous and local communities whose lifeways have developed in close relationship with this challenging environment. Over generations, communities such as the Lepcha have cultivated orally transmitted knowledge systems that integrate ecological awareness, material expertise, and social organisation to actively navigate terrain instability, seasonal change, and environmental risk. The knowledge embedded in such practices offers insights that resonate far beyond the Himalaya, contributing to broader reflections on how communities worldwide—particularly in mountainous and climate-sensitive regions—develop culturally grounded responses to environmental uncertainty. In this sense, the south-eastern Himalaya provides a relevant setting for understanding the role of intangible cultural heritage in fostering resilience, adaptability, and sustainable human–environment relations in a changing world.





Location of Sikkim and Dzongu © Department of Science and Technology, Govt. of Sikkim

The Lepcha, who call themselves Mutoonchee Roangkup Rumkup (ཆུ་ཤོ་འཕྲོ་རྩེ་ལྷོ་རྩེ་) are widely acknowledged as one of the Indigenous inhabitants in the state of Sikkim and the Himalayan foothills in the districts of Darjeeling and Kalimpong in the state of West Bengal, India (Molommu 2018a). In 1978, they were recognised as a Scheduled Tribe by the Government of India. Additionally, the Government of Sikkim notified them as “Primitive Tribe” on state level in 2006, a status now known as Particularly Vulnerable Tribal Groups or PVTGs. Further, in North Sikkim, Dzongu, previously lands allotted to the Sikkimese queens, was declared protected for the Lepcha during the Sikkimese kingdom, a status upheld until today (K.T. Lepcha 2021; Bentley 2025). Dzongu falls within the core zone, buffer zone and the transition zone of the mixed UNESCO World Heritage Site Khangchendzonga National Park (KNP) and within the larger Khangchendzonga Biosphere Reserve.



Location of Dzongu, KNP Bufferzone, Core Zone and Transition Zone © Department of Science and Technology, Govt of Sikkim

Based on Government of India Census data (2011), there are 76,871 people classified as Lepcha living in India. The Census of Nepal (2011) additionally surveyed 3445 Lepcha and, while no official numbers exist, the Lepcha population in Bhutan



is estimated at around the same amount. Within Lepcha knowledge transmission, this larger region is Ne Maayel Lyaang (རྒྱལ་མཚའུ་ལྷམ་ལང་།), their ancestral homeland. Every Lepcha clan is closely linked to the region and its environment through an ancestral connection to a mountain (choo, ཇུ), a lake (da, ཌཱ) and an entry point (usually a gorge or a cave) to the ancestral resting place (lep, ལེ།) (R.P. Lepcha 2025). Their endonym Mutoonchee Roangkup Runkup loosely translates as the children of god and mother nature (Tamsang [1980] 2009).

The Lepcha community's closeness to the local Himalayan environment shows in their shamanic religious practices that focus around interaction with more-than-human beings embedded in the immediate landscape, as well as their ancestrally passed down knowledge (C.K. Lepcha 2025; C.K. Lepcha 2021; Lepcha & Lepcha 2021). Traditionally, the Lepcha communities practiced shifting cultivation around dry rice, millet, and buckwheat, foraged forest produced and hunted for game (Khaling & Lepcha 2022). Therefore, ancestrally transmitted intangible knowledge is closely related to survival within the fertile but fragile Himalayan environment. Thereby, use of cane and bamboo was crucial for their livelihood (Lepcha et al. 2011) and the Lepcha are skilled in crafts (S.R. Lepcha 2025; Lepcha et al. 2011)

The language of the Lepcha, called Roangreeng (རྩལ་རྒྱེང་།), belongs to the Tibeto-Burman language group (Plaisier 2007; Van Driem 2001) and is classified as definitely endangered by the UNESCO, as only about half of the estimated population speaks it (Guardian Datablog 2011; UNESCO 2011). While Roangreeng does have a script, knowledge transmission is predominantly oral – passed down through elders, embodied practices, and the religious practitioners called mun (མུན་) and boongtheeng (བུང་ཐེང་།), called padim (པདུམ་) in North Sikkim, who are traditionally the custodians of knowledge (Bentley 2025: R.P. Lepcha 2025).

In 2025, the Lepcha community reached a milestone in safeguarding their tangible cultural heritage, two musical instruments (tungbuk, ཐུང་བུཅ་), and pumtoang paleet, པུམ་ཐོང་པལེེཏ་) received Geographical Indication (GI) recognition at a Indian national level, filed by Ugen Palzor Lepcha and Namgyal Lepcha respectively and largely supported by Lepcha knowledge keepers, a local NGO from Dzongu, the Mutanchi Lom Al Shezum (MLAS), and NABARD Gangtok, Sikkim. The protection of intangible cultural heritage, however, still lags behind—and considering transmission of knowledge is crucially oral and embedded in practices, it is important to focus on



the preservation and protection of intangible cultural heritage of the Lepcha. The application for the inscription of the Lepcha cane bridge in the National List for Intangible Cultural Heritage (ICH) managed by the Ministry of Culture, Government of India, with the Sangeet Natak Akademi (SNA) and in the UNESCO Representative List of Intangible Cultural Heritage of Humanity is an important step in preserving the Lepcha's intangible traditional and ancestral knowledge.



3. LEPCHA HERITAGE CANE BRIDGE (RU SOAM) BUILDING PROCESS

3.1. Building Season and Site Selection

Detailed environmental knowledge and long-established seasonal practices that are passed down orally within the Lepcha community give instruction on which season is the best for building the cane bridge. The most suitable period for building a Lepcha cane suspension bridge is during the winter months, when weather conditions are dry and river water levels are low. Bridges are generally not constructed during the monsoon and usually built from January to April at the latest (Interview, Namgyal Lepcha, Passingdang, 28 August 2025; Tshering Lepcha, Sangdong, 04 October 2025; Ugen Palzor Lepcha, Sudur, 30 September 2025). In emergency situations, such as after floods or landslides, ru soam bridges can be constructed at any time of year in order to restore essential connectivity (Interview, Dupden Lepcha, Jigme Lepcha, Passingdang, 28 August 2025). However, community members emphasise that bridges built during the rainy season are generally less durable, as cane is not yet fully mature and the ground near the riverbanks is less stable, reducing the overall longevity of the structure compared to bridges built in winter (Interview, Ugen Palzor Lepcha, Sudur, 30 September 2025).

The choice of location is equally informed by practical and ecological criteria. Key factors include the width of the river and the availability of trees and rocks on both banks (Interview, Namgyal Lepcha, Passingdang, 28 August 2025). Trees play an important role not only as anchoring points for suspension ropes (Interview, Namgyal Lepcha, Passingdang, 28 August 2025), but also in stabilising riverbank soil, thereby contributing to the long-term durability of the bridge. The width of the river is a critical consideration: if the span is too wide, suspending the main ropes becomes difficult, making narrower crossing points preferable. Bridge sites are often located in challenging terrain close to the riverbed, characterised by steep and rocky ground. As a result, the area must first be cleared, and access routes prepared to allow safe movement of people and materials during construction. This preparatory work is an integral part of the bridge-building process and facilitates coordinated collective labour in difficult environments (Interview, Ugen Palzor Lepcha, Sudur, 30 September 2025).



Official site visit, 19 September 2025, Rajdeep Gurung

3.2. Structural Stability: Tree-based Anchorage of the Bridge (Daampo and Tingpo)

The structural stability of the Lepcha cane suspension bridge is ensured through a carefully constructed anchorage system based on tree trunks and crossbeams. At the outset of construction, base pillars are established on both sides of the riverbank at the designated site. These pillars function as the anchoring structures of the bridge. Where suitable trees are already present at the site, they may be incorporated directly as anchorage elements; however, this situation is now rare, and in most cases dedicated anchoring pillars must be constructed (Interview, Dupden Lepcha, Jigme Lepcha, Passingdang, 28 August 2025). The constructed anchorage is similar in structure and function to a modern suspension bridge anchorage system (S.R.



Clearing the area, cutting the trees, 4 November 2025, JB

The Lepcha recognise several tree species as particularly suitable for use as anchorage pillars due to their durability, strength, and resistance to rot. Preferred species include

- Numboang koong (ཁྱོང་ཁྱོང་) (Gmelina arborea Linn), known as white teak or Kimbu in Nepali (Tshering Lepcha, Sangdong, 4 October 2025). According to K.P. Tamsang this tree is found in middle and lower hill forests and is characterised by strong, light wood (Tamsang [1980] 2009, 454).
- Suloat koong (སུལ་ལཱ་ཁྱོང་) (Choerospondias axillaris), known as Nepali hog plum or locally referred to as lapsi. It is a tree from the family Anacardiaceae.
- Sunglong koong (སུང་ལྷོང་ཁྱོང་) (Jambosa kurzii), a tree of moist middle hill forests with hard, white wood and edible fruit (Tamsang [1980] 2009, 880).
- Pejoo kyoong (པེའུ་ཁྱོང་) (Fraxinus floribunda), known as Himalayan ash or lakuri in Nepali, a tall tree from the upper hill forests (Tamsang [1980] 2009, 488).

When suitable trees are not already present at the site, these species are felled



elsewhere and erected as base pillars (daampo) at the bridge location (Namgyal Lepcha, Passingdang, 28 August 2025). If existing trees are used, particular attention is paid to the strength of their root systems to ensure long-term stability (Interview, Tshering Lepcha, Sangdong, 4 October 2025). In selecting a specific tree, the straightness and diameter of the trunk are considered essential, while the presence or absence of branches is of lesser importance (Interview, Namgyal Lepcha, Passingdang, 28 August 2025).

Cutting the trees and bringing the trunks to the construction site is strenuous work. In the case of the Mani khola construction around 10 people were involved. This is on the lower side of men required.



Pulling up the tree from the lower side, 4 November 2025, JB



Teamwork, carrying the log for the pillar, 4 November 2025, JB

The anchorage structure consists of two principal vertical pillars known as soamglyaang daampo (ဆာမ္ဂျာၤငါးပံး), which translates as “the pillar on which the cane suspension ropes, called soamglyaang (ဆာမ္ဂျာၤ), rests or is placed”. Each pillar is placed in a hole approximately three feet deep and stabilised with stones packed around its base.



Digging the hole for the pillar, right riverbank, 6 November 2025, JB



The height and spacing of the pillars vary according to the terrain and the required length and elevation of the bridge. Measurements are taken using a bamboo stick known as podong, a term referring to a small bamboo or bamboo shoot (Tamsang [1980] 2009, 476). These measurements are relational rather than fixed: the relative height of the pillars is adjusted so that, together with the surrounding terrain, they reach an equivalent level on both sides of the river. For example, where one riverbank lies lower, the pillar on that side must be taller to achieve the necessary alignment (Interview, Dupden Lepcha, Jigmee Lepcha, Passingdang, 28 August 2025). The overall height of the anchorage structure is also determined in relation to the river itself. Typically, a vertical clearance of approximately 30 metres is maintained above the normal water level to ensure the safety of the bridge during periods of high water in the monsoon season (Mulommu 2018; S.R. Lepcha 2025).



Measuring and cutting the tree for the pillar, 6 November 2025, JB



Lifting the tree trunk into the hole, and adjusting the pillar, 6 November 2025, JB



Stabilising the pillar with stones, 6 November 2025, JB



The two vertical pillars are connected by at least two horizontal crossbeams. The upper crossbeam, known as soamglyaang tingbo (ဆာမ္ဂျာၤ တိၣ်ပၤ), rests in a natural fork or notch at the top of the pillar and supports the cane suspension vines. Where necessary, a carved indentation, called aafok (အာဖုၣ်) is created to secure the suspension ropes in place, increasing tension and preventing lateral movement. A lower crossbeam, known as soamdaa tingbo (ဆာမ္ဍာၤ တိၣ်ပၤ), translated as “crossbeam on which the bridge rests or is placed” supports the structure of the bridge itself. The crossbeams are all tied to the pillars using pillars with cane vines. The knots are not unified, but need to be tied. To add stability, the cane is twisted.



Tying the crossbeam; close-up of a knot in cane, 6 November 2025, JB



The finished pillar structure on the right riverbank, 6 November 2025, JB



While the anchorage system is being constructed, other members of the building team simultaneously prepare the binding materials by cutting cane into strips approximately two centimetres wide. These strips are used for tying structural elements together and for forming the loops that make up the body of the bridge. This parallel organisation of labour highlights the collective and coordinated nature of ru soam construction.

The anchorage system of daampo and tingbo demonstrates the Lepcha community's sophisticated understanding of materials, terrain, and load distribution. This knowledge forms a central component of the intangible cultural heritage of the Lepcha cane bridge, contributing directly to its safety, durability, and continued viability as a living tradition.

3.3. Shooting the Arrow: Positioning the Cane Suspension Ropes



*Returning from high altitude with cane,
6 November 2025, JB*

Positioning the cane suspension ropes constitutes one of the most technically demanding and critical stages in the construction of a Lepcha cane suspension bridge. This stage requires both coordinated manpower and specialised skill, as the correct placement of the suspension vines determines the structural integrity, load-bearing capacity, and long-term safety of the bridge (Interview, Namgyal Lepcha, Passingdang, 28 August 2025). The cane suspension ropes (soamglyaang) form the backbone of the bridge, as they carry the weight of the structure and those who cross it.

Each suspension rope is composed of at least two cane vines loosely bound together with bamboo strips; for longer spans, three vines may be used to increase stability.



Bundling three canes to make the suspension cane vine, 7 November 2025, JB

Because the length of the required suspension rope varies according to the span of the river, it is often necessary to join two or more vines. This is done using a specialised method of joining known as *aatut* (འའུཏ) or as *aashyok* (འཤཡོཅ). In this technique, the ends of the two vines are bent, looped into one another, and pulled as tightly as possible. The resulting loop knot is then reinforced by weaving cane slivers around it to secure the connection firmly in place. Builders generally seek to avoid such joins, as knots can make later adjustment of the cane loops more difficult; however, when vines are not sufficiently long or the river span is wide, this technique becomes essential (Dupden Lepcha, Jigmee Lepcha, Passingdang, 28 August 2025).



Special technique to tie to canes together, 7 November 2025, l, Pema Yangden Lepcha (PYL), r, JB



Looping two canes and weaving over the knot, 7 November 2025, l, JB, r PYL



Once the anchorage pillars and crossbeams have been erected on both riverbanks, the cane suspension ropes must be transferred across the river. Traditionally, this is achieved by shooting an arrow (tsoang, ཏཱང་) across the span. The arrow is weighted at its front by fitting it into a bamboo barrel known as themboak (ཐེམ་བོ་ཁཱ་) and a thread (pasoang, པ་སུ་འང་) is attached to it. It is *Sungban*, which is similar to an arrow but with blunt head. The arrow is then shot with bow (sukli, སུ་ཁྱི་). Some knowledge holders note that, depending on the width of the river, stones may also be used to carry the thread across (Interview, Tshering Lepcha, Sangdong, 4 October 2025). Shooting the arrow accurately over wide rivers requires considerable skill and experience. According to K. P. Tamsang once this task has been successfully completed, the remaining construction of the bridge can proceed rapidly, often within a matter of hours (Tamsang [1983] 1998).



The arrow with detachable top and carved dent for the string, 7 November 2025, JB



*Tying the string to the arrow, getting ready to shoot the arrow across the river,
7 November 2025, JB*



Shooting the arrow, 7 November 2025, Purvim Productions (PP)



*Pulling from the other side, attaching the second suspension cane vine bundle,
7 November 2025, JB*

After the thread reaches the opposite bank, ru pasoang or long strip of cane is attached to it. Through this strip, the main suspension vines are gradually pulled across the river to the other side (Interview, Namgyal Lepcha, Passingdang, 28 August 2025). The one thread is used to pull across both the cane suspension vines. The same thread is used to draw both suspension vines into position. The vines are then placed over the upper crossbeam (soamglyaang tingbo), maintaining an appropriate distance between them—generally about four feet (approximately 120 to 150 meters)—to ensure balance and load distribution (S.R. Lepcha 2025).

Behind each main pillar, the suspension vines are secured at an angle using a horizontal tree trunk laid on the ground at approximately ninety degrees to the bridge. This trunk, known as soamgring tingbo, (ཤུའུ་གྲིང་ཐིང་བོ་), translating as the crossbeam which makes tight”, functions as a tightening crossbeam. The suspension vines are wrapped around it and pulled taut. The trunk itself is stabilised by vertically



placed thick tree branches called soamgring daampo (མཐུག་རྩེ་མཐུག་), translated as the pillar (erected tree branch) that holds tight, which act as pillars to hold the structure firmly in place. Stones are added to weigh the assembly down further, increasing tension and stability.



Making the beam structure to attach the suspension cane vines, 7 November 2025, JB



Pulling the suspension cane vines (soamglyaang) over the river, 7 November 2025, PP



Strengthening the supporting structure, 8 November 2025, JB; stones over the tree trunk and increased cane support, 9 November 2025, JB



Additional cane support for the soamglyaang, 10 November 2025, JB



Once the suspension vines are correctly aligned and tensioned, they are additionally secured to the main pillars using cane strips as a precautionary measure, ensuring that they cannot slip out of position. Through this carefully coordinated sequence of actions, the Lepcha builders transform flexible forest materials into a stable suspension system, demonstrating advanced practical knowledge of tension, balance, and risk management.



The suspension cables are laid across the soamglyaang tingbo, 8 November 2025, JB



Tying the suspension cane vines to the pillar structure, 8 November 2025, JB



Knots. To make the knot more durable, the cane is twisted. 8 November 2025, JB



Again, additional cane is twisted around to make sure the knots do not open, 8 November 2025, JB



Details of the tying technics, 8 November 2025, JB

*Details of the tying technics,
8 November 2025, JB*



3.4. Indigenous Craftsmanship: Ru Soam Speciality Tools

The construction relies on specialised implements that reflect Indigenous craftsmanship, technical ingenuity, and embodied knowledge transmitted through practice. Two tools are considered essential for bridge building, both of which are crafted locally from bamboo and cane and used exclusively within the context of ru soam construction.

The most important implement is the soamvaa (ལའཁྱེ), a term that may be translated as “bridge swing”. K.P. Tamsang translates the verb vaa as “to cause to move to and fro, sway, oscillate, as something suspended from above” (Tamsang [1980] 2009, 824). Practitioners compare it to a small bridge itself (Interview, Namgyal Lepcha, Passingdang, 28 August 2025). The soamvaa is a specialised tool made from two bamboo poles that are bound together at both ends. Holes are carved into each bamboo, through which cane strips are threaded and tightly wrapped to secure the structure. On one side, an additional cane strip is attached, which is later looped around the main cane suspension vines of the bridge. In use, the soamvaa functions as the first movable plank of the bridge, allowing the builder to advance safely over the river. The front of the soamvaa hangs from the cane suspension vines, while its rear initially rests on the upper crossbeam and subsequently on the bamboo elements laid into newly formed cane loops as construction progresses. Through this process, the soamvaa enables the controlled extension of the bridge while supporting the builder’s weight in a highly exposed environment. In this way, the tool helps create a stable and progressively extended platform on which the builder can stand while forming loops and positioning the bamboo walkway.

While the soamnoakboo, the master builder, is on the soamvaa, there is another person whose responsibility is to make sure that the soamvaa is either tied to the walkway or he stabilises it with his own weight. During the bridge construction, the builders need to communicate and coordinate with each other, this is done over verbal communication, but also the embodied knowledge of relying on each other.



Preparing the soamvaa, 8 November 2025, JB



Preparing the soamvaa, 8 November 2025, JB



Going ahead on the soamvaa, 8 November 2025, PP

The second specialised implement is a bamboo stick carved into a U-shaped form at its upper end, known as punthaar (པུན་ཏཱ་ར་). According to K.P. Tamsang, punthaar refers to a bamboo catapult, a device to hurl something (Tamsang [1980] 2009, 482). This tool is compared with a hurling device, because in the context of bridge construction, the punthaar is used to push forward the cane loops that are suspended between the soamvaa and the cane suspension vines.

The coordinated use of the soamvaa and punthaar demonstrates a refined understanding of balance, tension, and movement, allowing construction to proceed safely above moving water. These specialised tools exemplify the Indigenous technological knowledge embedded in ru soam construction. Their fabrication and use require skill, experience, and confidence, and their transmission depends on direct participation in bridge building.



Punthaar, 8 November 2025, JB



Punthaar in use, 9 November 2025, JB

3.5. Hanging in the Air: Tying the Cane Loops (Soam Tsaakoa) and the Walkway (Soamtaalyoang)

The basic structural framework of the ru soam consists of cane loops tied onto the suspension vines, into which bamboo planks are laid to form the walkway. These cane loops are known among knowledge holders in Dzongu, North Sikkim, as soam tsaakoa (འཇམ་ཐ་མཱ་ཀཱ་), while K. P. Tamsang records the term aahool (འཇམ་ཐ་མཱ་ཀཱ་) for the same element in Kalimpong (Tamsang [1983] 1998).



Cane is ready and cut and carried to the construction site, 7 November 2025, I, JB, r. PYL

At the riverbank, close to the anchorage pillars, the vertical distance between the cane suspension vines and the crossbeam that supports the bamboo planks is initially too high for a single person to work alone. For this reason, bridge construction at this stage requires close coordination between two builders. One person positions himself on top of the upper crossbeam (soamglyaang tingbo) and ties the cane strips to the suspension vines. The second person sits on the soamvaa, which has been placed above a long bamboo intended for the walkway. Using his foot, he pulls the cane strip underneath the bamboo and up the other side, passing it to the person above, who then knots it securely onto the cane suspension vines.



Tying the cane loops, 8 November 2025, JB



Passing the cane loops up to tie the knot, 8 November 2025, PP



Between the lower bamboo planks and the suspension vines, a bamboo railing is installed when the distance between these elements is too great for a builder standing on the walkway to reach the suspension vines directly. The cane strip forming the loop is additionally wound around this bamboo, which serves both as a support and as a working platform. This railing is constructed only for the section where the distance remains excessive and is known as *soamglyaang* apart) *soamtukpoal* / *katsaam* (ལྷུ་མཁའ་ཤིང་། རྩོམ་པོ།). K.P. Tamsang defines མཁའ་ཤིང་ as a bamboo barrier or railing (Tamsang [1980] 2009, 378) and རྩོམ་པོ། as a handle or gripping element (Tamsang [1980] 2009, 139). The railing is typically positioned at a height of approximately four feet. As construction advances further out over the river, the builder who initially sat on the upper crossbeam moves onto the railing, while the *soamdoakboo* continues looping the cane strips under the *soamvaa* and the bamboo planks. The bamboo elements forming the walkway are laid without being split or cut and are tied together with cane strips to ensure stability. These bamboo planks are referred to as *soamtaalyoang* (ལྷུ་མཁའ་ལྷོང་།). Traditionally, no more than two bamboo poles are used for the walkway, balancing the need for stability with considerations of weight (Interview, Dupden Lepcha, Jigme Lepcha, Passingdang, 28 August 2025).



Tying the cane loops, with help of the soamvaa, 8 November 2025, JB



Tying the soamvaa to the bamboo for stability, 8 November 2025, JB

The soamvaa plays a critical role in progressively reducing the distance between the bamboo walkway and the cane suspension vines—that is, in shortening the cane loops. After several loops have been tied, the soamdoakboo tightens the loops connecting the soamvaa to the suspension vines. After approximately the length



of one mature bamboo, the distance is reduced sufficiently for a builder standing on the soamvaa and the bamboo planks to reach the suspension vines directly. As construction approaches the pillar structure on the opposite riverbank, bamboo is placed extending from the lower crossbeam (soamdaa tingbo) to the existing cane loops. This increases the distance between the walkway and the suspension vines once more, requiring the reinstallation of a bamboo railing for the second builder to stand on. When bridges are constructed simultaneously from both riverbanks, this step is not required.



The loops attached to the soamvaa have just been tightened the second time, 8 November 2025, JB



Tightening the loops, 8 November 2025, PP



The soamnoakboo (master builder) ahead, the chhaakokorboo (main helper with the loops) and the other helpers, maximum 4 people are on the bridge while building, 8 November, PP



Hanging in mid-air, 8 November 2025, PP



Widening loops, reaching the opposite bank, 8 November 2025, JB



*Tying the bamboo to the pillar structure, securing the bridge on the opposite side,
9 November 2025, JB*



Walkway, 9 November 2025, JB



Tying the three bamboos for walking on to the log crossbeam, 9 November 2025, JB



A specialised knotting technique is used to attach the cane strip loops to the suspension vines. The cane strip is first looped over the suspension vine from the outside, then bent behind the strip coming from below, and drawn upward and finally looped inside the gap alongside the lower strip. These knots provide stability while remaining flexible enough to be loosened or tightened as needed when the bridge is completed. They can also be pushed along the suspension vines using the punthaar. These knots are known as aatyaap (အတ်ယာပ်).



Aatyaap, specialised knots for bridge building, 8 November 2025, JB



Once the main structure is completed, the entrance to the bridge, called *soam veng* (འཇམ་ཕྱེད་), is made accessible by constructing stairs, platforms, and railings from bamboo or wood. While these elements are not considered specialised knowledge exclusive to bridge construction and are also used in house building, the *soam veng* forms an important threshold of the bridge. It is often marked by ritual gestures, such as the placement of flowers, which establish a respectful and mindful approach to crossing (Interview, Tshering Lepcha, Sangdong, 4 October 2025).

The practices of tying cane loops and constructing the bamboo walkway illustrate the high degree of coordination, bodily skill, and experiential knowledge required to build a *ru soam*.



Making a platform, 9 November 2025, JB



View from above with the crossbeams, pillars, and stones holding the suspension cane vines in the foreground, 9 November 2025, JB



Completed platform and fence, 10 November 2025, JB



Making a stairs to reach the bridge, 10 November 2025, JB



Tying the wooden stairs with cane, 10 November 2025, JB



Finishing the railing and platform, 10 November 2025, JB

3.6. Maintaining Width and Stability: Soamlook Tukvyaa and Soamtsaang Paasoang

In addition to the main suspension system and walkway, Lepcha bridge builders employ two further structural elements to stabilise the ru soam and ensure safe passage: the soamlook tukvyaa (འཇམ་ལྗང་ཐུག་བྱེད་) and the soamtsaang paasoang (འཇམ་ལྗང་པ་འཕུ་འཇམ་ལྗང་). Both elements reflect detailed knowledge of tension, balance, and movement, and are essential for maintaining the width and overall stability of the bridge.

The soamlook tukvyaa consists of a bamboo pole positioned beneath the walkway at a right angle (approximately 90 degrees) to the direction of the bridge. Cane strips are attached to both ends of this lateral bamboo. Once prepared, the bamboo is lowered beneath the bridge, and the cane strips are loosely looped over the two suspension vines (soamglyaang) on either side. The bamboo is then aligned precisely at a right angle to the bamboo walkway and secured to the walkway bamboos with additional cane strips. To activate the stabilising function of the soamlook tukvyaa, the cane strips are pulled over the top of the suspension vines on both sides of the bridge. At this stage, the soam noakboo climbs onto the structure and physically forces the two suspension vines apart by extending his arms and legs, using his body weight to increase lateral tension. While the bridge is held in this expanded position, two other builders tie the cane strips tightly from the outside. This coordinated action fixes the suspension vines at a set distance from each other, ensuring that the bridge remains wide enough to walk on and preventing it from collapsing inward.

A bridge requires a minimum of two soamlook tukvyaa, typically positioned at approximately one-third of the bridge length from each riverbank. Longer bridges may incorporate six or more such elements, depending on span and terrain. Historical descriptions corroborate this practice: in 1900, L. A. Waddell described a 400-foot cane suspension bridge at Samdong over the Teesta River as having transverse bamboo rods placed under the walkway every ten feet (approximately three metres), which he referred to as an “ingenious device of outriggers” (Waddell 1900, 128). This corresponds with Hooker’s sketch of the bridge over River Rangit (Hooker 1854, 149).



Special structure, soamlook tukvyaa, to prevent the bridge from caving in, 9 November 2025, JB



Widening the bridge with technological ancestral knowledge, 9 November 2025, JB



Details of the soamlook tukvyaa, 9 November 2025, JB

The second stabilising element, the soamtsaang paasoang, consists of long cane vines attached to the walkway, usually near the middle section of the bridge. These vines are extended from the bridge and tied to trees or other stable structures on each riverbank, with one anchoring line on either side. The primary function of the soamtsaang paasoang is to limit excessive swaying and lateral movement, thereby keeping the bridge aligned and stable during use.



Tying the soamtsaang paasoang to both the riverbanks, 9 November 2025, JB



Tying the soamtsaang paasoang to both the riverbanks, 9 November 2025, JB



The soamlook tukvyaa and soamtsaang paasoang demonstrate the Lepcha community's refined understanding of structural balance and dynamic forces acting on suspended structures. Their installation requires precise coordination, physical strength, and experiential knowledge, and their effectiveness depends on collective action.

The Lepcha cane suspension bridge (ru soam) is designed to combine lightness with structural strength, relying on detailed practical knowledge of materials, load distribution, and ongoing observation. According to contemporary practitioners, a traditionally constructed ru soam can bear loads of approximately 300 to 450 kilograms (S. R. Lepcha 2025). When newly built, the bridge is considered strong and stable enough to carry eight to nine people simultaneously, and in some cases up to ten, depending on the span and condition of the materials used.

Load management forms an integral part of the construction process itself. During and immediately after completion, builders assess and adjust the bridge through collective testing: people walk across it to regulate the spacing, length, and alignment of cane strips, and to ensure that the structure responds safely under weight (Interview, Dupden Lepcha; Jigme Lepcha, Passingdang, 28 August 2025). Community knowledge further specifies that a distance of approximately three metres should be maintained between individuals crossing the bridge in order to minimise stress on the structure (S. R. Lepcha 2025).



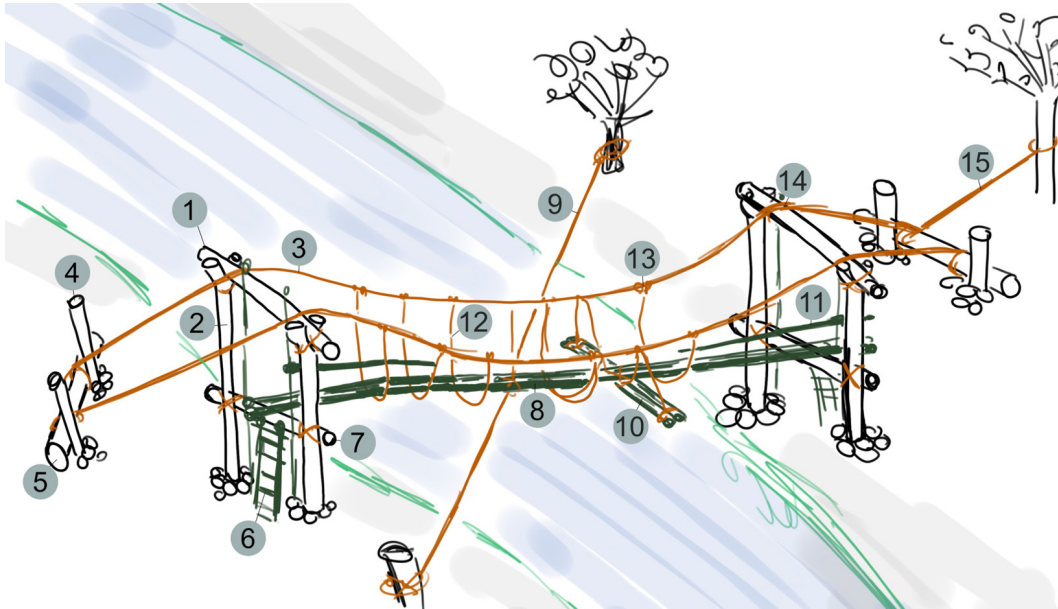
The extra cane has been cut and cleared up, 9 November 2025, PYL



The bridge in its glory, 9 November 2025, JB



3.7. Ru Soam Illustration and Technical Terminology



1. soamglyaang tingbo (ရွှေမာလ် တီဂ်ဝ) crossbeam of the pillar structure made of tree trunks on which the cane suspension vines rest
2. soamglyaang daampo (ရွှေမာလ် ဒါမ္ပ) pillar made of tree trunks on which the crossbeams are tied
3. soamglyaang (ရွှေမာလ်) cane suspension vines
4. soamgring daampo (ရွှေဂြိယံ ဒါမ္ပ) pillar (erected tree branch) holding the structure that holds the soamglyaang
5. soamgring tingpo (ရွှေဂြိယံ တီဂ်ဝ) crossbeam (tree trunk) around which the soamglyaang are bound
6. tunggrong (တုဂ္ဂရဝ်) ladder or staircase leading to the bridge
7. soamdaa tingbo (ရွှေဒါ တီဂ်ဝ) crossbeam of the pillar structure made of a branch
8. soamtaalyoang (ရွှေ တါလ်ယွာ) bridge walk way (bamboos)
9. soamtsaang paasoang (ရွှေတံဆာ ပါဆွာ) 2 canes holding the bridge
10. soamlook tukvyaa (ရွှေလွဲ တုကျီယ) Bamboo attached below the soamtaalyong in a 90 degree angle, with two canes attached to it on either side, used to pull the soamglyaang apart)



11. soamtukpoal / katsaam ལྷོ་ལྷོ་ལྷོ་ / ལྷོ་ལྷོ་ Bamboo attached as a railing
12. soam tsaakoa ལྷོ་ ལྷོ་ Cane loops
13. aatyaap ལྷོ་ལྷོ་ Special knots attaching the cane loops to the soam glyang
14. aafoak ལྷོ་ལྷོ་ dent carved to hold the cane suspension
15. vines in place on the cross beam soamting paasoang ལྷོ་ལྷོ་ ལྷོ་ལྷོ་ Cane attaching the soamgring tingpo to a tree behind

Drawing designed together with Ren Namgyal Lepcha, Passingdang.





3.8. Measurements of the Ru Soam at Mani Khola

Based on the ancestral traditional knowledge, passed from one generation to the next, the soamnoakboo measures and estimates the different elements of the bridge. However, the effective measurements vary depending on the location and the properties of the soil and rock of the riverbank. The measurement tool used is a bamboo stick chosen at the location itself. It's exact length according to the metric system is irrelevant, it is chosen at convenience of the builder. Importantly, the bamboo needs to be straight. In the case of the ru soam on Mani Khola, the bamboo was approximately 3 feet long. The measurements of each element are thus done in proportion to each other. These proportions are passed down in an embedded way. Stability of the bridge is not merely measured, it is felt and sensed during the building process.

Therefore, the following measurements are only an example, specifically referring to the bridge documented.

Holes for the anchorage structure: There are two holes at 8 feet (2.44 m) apart, approximately 3 feet deep (91 cm).

Stone pile fixing the pillar in the hole: Othe right riverbank the stones are piled about 18 inches high (approximately 46 to 50 cm high). The stone pile is about 3 to 3.5 f wide.

Pillars of anchorage structure 1 (right riverbank when looking downstream) (soamglyaang daampo): The longest trunk used for one of the main pillars is approximately 23 feet (7m). The pillars are about 15 feet high (4.6 m, from above the ground), with approximately additional 2 feet under the earth. The perimeter of the pillar is around 31 inches, approximately 80 cm

Crossbeams of the anchorage structure (soamglyaang tingbo): The distance between the crossbeams is approximately 4 feet (1.2 to 1.3 m), with the lower one at 4 feet and the higher ones at 4.3 feet distance respectively. The tree fork, in which the uppermost crossbeam is placed, adds approximately another 1 foot to the total height. The crossbeams are 8.5 feet (2.6) meters long, while the distance between the two beams, measured from the inside, is 7 feet (2.1 m). The crossbeam (lower one) is about 6 inches (15 cm) wide (diameter). The first pillar structure is

approximately 15 feet high and 8 feet wide, a proportion of slightly less than 1 to 2.

Pillars of anchorage structure 2 (left riverbank when looking downstream) (soamglyaang daampo): The tree trunk used for this anchorage is approximately 25 feet long (7.6 m). The pillar structure is approximately 22 feet high and 8 feet wide, again with about 3 feet underneath the ground.

Support structure for the cane vines (soamring daampo, soamring tingpo): The crossbeam is 11 feet long, approx. 3.5 meters. After that they fix the log by putting two thick branches in the two holes. The branches are about 5 feet long (1.5 m), including the 3 feet under the ground. The distance between the branches is 3.75 feet (1.2 m). The left end of the log is wedged behind a thin tree, the distance between the branch and the tree is approximately 7 feet (2 m). At all the joints, the structure is tied with split cane.

Cane slithers used for loops and tying any element: They are 27.5 feet long (8.4 m) and 2 cm (0.8 inches) wide.

Cane suspension vines (soamglyaang): The length of the section of cane suspension vines between the pillars and the soamring tinpo is approximately 26.5 feet (8 m), 5.25 feet (1.6) feet are beyond the slope that goes down to the footpath.

The distance between the two cane suspension vines varies. Where they are attached at the upper crossbeam (soamglyaang tingbo), the distance is about 5 feet (1.5 m), then on the right riverbank as they reach back to the sómgring tingpo the distance gets wider, approximately 6.75 feet (2 m). On other hand, on the left riverbank, the distance at the sómgring tingpo is merely 3.4 feet (1 m). This is adjusted depending on the requirements of the terrain.

Bamboo railing (soamtukpoal / katsaam): It is at a height of about 4 feet (1.2m) from the bamboos that are laid for walking on.

Bamboo walkway (soamtaalyoang): The bamboos they use for the bridge are very long, the one we measured was slightly longer than 28 feet (8.5 m).

Bamboo suspended under the bridge (soamlook tukvyaa): They are approximately 6 feet (2 m).



Ladder (tunggrong): The tree trunk ladder is about 6 feet long (1.8 m), the breath of the cut-out steps is 9 inches.

Bridge (soam): The distance from one side to the other that needs to be covered with the cane suspension ropes is approximately between 30 to 35 meters (around 100 to 110 feet), as the cane needs to be pulled behind the pillar structure. The pillar structure on the right riverbank is slightly closer to the river, on a rock, therefore, the length of the bridge is slightly reduced (80 feet, 24 to 25 m).

The bridge from riverbank to riverbank has a span of 80 feet (approx. 24.5 m). The distance between the loops is 10 to 12 inches, so approximately 1 foot. The distance between the bamboo railing on either side of the bridge is between 3 to 4 feet.





4. Indigenous Practices of Consent and Care

This application does not foreground the bridge itself, but the knowledge systems and collective practices surrounding the building process. Importantly, this intangible cultural heritage is not merely technical practices, but the enactment and reinforcement of an indigenous practice of consent and care that include the human community, the plants and the wider environment, as well as the more-than-human divine inhabitants. This practice is built around communication, and does not merely reproduce a specific religious system, but a way of interacting respectfully with the environment and communicating based on reciprocity and care. Such knowledge can crucially contribute to human creativity and intercultural dialogue within but also beyond the Himalayan region—especially in current times when seeking respectful and sustainable interactions between humans and environment are sought after and crucial.

4.1 Bridge Building: A Practice Grounded in Indigenous Life-cycle Events

The cane bridge is not only an example of sustainable engineering, but also deeply embedded in cultural knowledge and ethical principles that emphasise respectful relationships with the environment and with one another (Lepcha 2002; S.R. Lepcha 2025). Its significance extends beyond its physical function to encompass symbolic, linguistic, and social dimensions central to Lepcha cultural life.

The Lepcha term *soam* used for bridge encompasses a wide range of meanings, including “spirit,” “breath,” “respiration,” and “life” (Tamsang [1980] 2009: 867). In the Lepcha language (Roangreeng), concepts frequently appear in paired forms. The full expression for bridge is *soampu-soambling* (ལའུ་ལའུ་ལོང་), in which *soampu* refers to the bridge in its honorific form, while *soambling* denotes the structural base—typically the tree-trunk pillars that anchor the bridge. Together, *soampu-soambling* conveys an expanded semantic field in which the bridge is understood as a path—a means of movement and transformation—towards the realisation of one’s aspirations. In this sense, both the journey itself and the skills acquired along the way are metaphorically articulated through the notion of *soampu-soambling* (Interview, Namgyal Lepcha, Passingdang, 28 August 2025).



This layered symbolism is particularly evident in Lepcha marriage rituals. During weddings, a ceremonial discourse known as soampu—soambing lenmo is traditionally delivered by a mediator (bekboo, འཕྱོད, or pamiboo, རམ་ཇོ་མོ་མཁན་). In this speech, marriage is conceptualised as a bridge that connects two lineages in mutual understanding and responsibility. The careful and sequential construction of the ru soam is explicitly compared to the deliberate process of weaving together two families, underscoring both as structured acts of connection and social continuity (Namgyal Lepcha, Passingdang, 28 August 2025). Historically, bridges also played a central role in everyday social relations and mobility. They connected Lepcha settlements to hunting grounds, agricultural fields, and neighbouring communities. A Lepcha saying distinguishes between two types of hunters (sheraaboo, ཤེ་རཱ་བ་ལྷོ་མཁན་ one who crosses the bridge to hunt animals in the forest, and another who crosses the river to meet a woman—illustrating how bridges mediate both subsistence activities and social relationships (Interview, Dupden Lepcha, Jigme Lepcha, Passingdang, 28 August 2025).

The semantic association of soam with life and spirit further extends to the material used for the bridge—a combination of cane and bamboo. Bamboo (pomeet-potoang, རམ་ཇོ་མོ་མཁན་) holds deep cultural significance for the Lepcha community and is culturally associated with creation. According to their oral traditions and religious practices, when Eetboo deboo created the Lepcha, she also created bamboo along side them, as she knew they would not be able to live without bamboo. She made bamboo to help them with all their livelihood requirements (Nebesky-Wojkowitz 1956; Moommu 2018b; Tamsang [1983] 1998). This shapes an important kinship relationship: Lepcha and bamboo are siblings, one could even say twins, as their creation was simultaneous. Bamboo is associated with birth and, according to Lepcha ontology, all Lepcha possess a chhung, a higher being that resides above them, known as Yongne–Yongsom —the same honorific name used for bamboo. As a result, the Lepcha are often referred to as the children of the clan of Pomit–Potong (bamboo) (Namgyal Lepcha, Passingdang, 28 August 2025). Additionally, numerous creation narratives link bamboo to the origin of living beings and cultural practices. As such, bamboo is understood as a guardian of the land, bongtenmoo (Interview, Namgyal Lepcha, Passingdang, 28 August 2025). This ties the community to the ecology surrounding them.



On the other end of the spectrum, cane is used in mortuary practices. In Lepcha death rituals, the body of the deceased is traditionally placed in a basket woven from cane, known as tungaar (ཏུང་ཁ་). Afterward, the base of the tungaar is removed to prevent misfortune. Cane is also used to bind the body, yet during cremation it is not burned; instead, it is discarded, again to avoid negative consequences. These practices reflect a careful handling of cane in contexts associated with life, transition, and death (Interview, Namgyal Lepcha, Passingdang, 28 August 2025).

These linguistic meanings, ritual practices, and social uses demonstrate that the ru soam is embedded within a broader Lepcha worldview in which material structures, language, and life-cycle rituals are deeply interconnected. The cane bridge thus functions not only as an infrastructure but the construction process reactivates practices of relationality, continuity, and respect for both human and more-than-human worlds deeply rooted in Lepcha thought-framework. Moreover, it is essentially important to prototype ways of engaging with the environment sustainably at present.

4.2. Traditional Leadership: Decision-Making and Collective Organisation

As a community, the Lepcha have traditionally come together in councils to discuss matters concerning communal life. This is evident in ancestrally transmitted narratives, myths, and forms of traditional governance that continue to be practised today. In this context, the decision to build a cane suspension bridge (ru soam) is not taken individually but requires collective deliberation on whether a bridge is needed, where it should be located, and how it should be constructed (Tamsang [1983] 1998, 167). Traditionally, the yoomi-gyapan carried most of the responsibility for organising bridge construction and coordinating the various tasks involved. In contemporary practice, many of these organisational roles are now formally undertaken by the panchayat, as the local elected government body (Namgyal Lepcha, Passingdang, 28 August 2025). When a need for a bridge arises, the party interested in building it traditionally would first approach the yoomi-gyapan, while today the panchayat, the democratically elected local body within Indian governance, is also included. The yoomi-gyapan then convenes a village meeting to discuss the proposal. This meeting will include elders, recognised knowledge keepers, religious specialists including Lepcha shamans (mun or boongtheeng / padim) and Buddhist monks,



young able men, as well as women. It is also the yoomi-gyapan who distribute individual responsibilities, such as assigning people to source materials or prepare specific components (Dupden Lepcha; Jigme Lepcha; Passingdang, 28 August 2025; Namgyal Lepcha, Passingdang, 28 August 2025; Tshering Lepcha, Sangdong, 04 October 2025). During these meetings, the location of the bridge, the appropriate time for construction, and related ritual considerations are discussed and agreed upon (Interview, Namgyal Lepcha, Passingdang, 28 August 2025).



Discussion about the bridge building, 3 November 2025, Takzen Lepcha (TL)

Bridge building is not organised along clan or lineage lines. Any community member with relevant bridge-building knowledge may participate, making the activity community-driven and open to all based on skill and experience rather than hereditary affiliation (Ugen Palzor Lepcha, Sudur, 30 September 2025, Tshering Lepcha, Sangdong, 4 October 2025, Namgyal Lepcha, Passingdang, 28 August 2025). In the process of building a ru soam, it is considered important that participants are fearless, courageous, and energetic. Roles are distributed according to age and capability: elders and middle-aged knowledge holders typically carry out the technically demanding work of tying and suspending the cane, drawing on their experience, while younger men are primarily responsible for collecting raw materials and performing tasks that require physical strength. Elders who are no longer able to engage in physical labour may still be present to provide advice and guidance. The construction of a ru soam thus relies on a combination of wisdom and energy (Interview, Ugen Palzor Lepcha, Sudur, 30 September 2025). Certain customary restrictions are also observed. Individuals whose close family members



have died due to accidents or unnatural causes are discouraged from approaching the river during bridge construction. As a result, they do not participate directly in building the bridge, although they may take on other tasks such as sourcing cane or preparing materials (Interview, Namgyal Lepcha, Passingdang, 28 August 2025).

“During the bridge building people are assigned different roles. While some lead the soam building, some put down the po walkway. Some go for po hyun and po brool, meaning the pulling and cutting the bamboo, removing the leaves and cleaning the bamboo. Again others engage in cutting the cane into strips, some make sure the strips are long enough, while others carry them to the bridge.” (Interview, Namgyal Lepcha, Passingdang, 28 August 2025)

Bridge construction typically requires between ten and twenty people. When more participants are available, multiple tasks can be carried out simultaneously, such as sourcing and preparing materials and erecting pillars. One individual assumes overall responsibility for directing the construction. In Lepcha language, this person is known as the soam noakboo (ꠠꠞꠞꠞꠞ), meaning “the one who pushes the bridge forward,” (noakboo: “pusher, n. one who or that which pushes” Tamsang [1980] 2009, 447). After the initial council meeting, the soam noakboo carries the main responsibility for the construction process. While he consults with other knowledgeable members, he takes charge of decision-making, directs all work, takes measurements, and double-checks their accuracy. He also occupies the front position on the bridge during construction, which is considered the most hazardous part of the building process (Namgyal Lepcha, Passingdang, 28 August 2025). During construction, a maximum of three people are on the bridge together with the soam noakboo. One additional person assists directly in building the bridge by suspending cane strips and supporting the main builder; this role is known as chhaakokorboo (ꠞꠞꠞꠞꠞꠞ) (Interview, Namgyal Lepcha, Passingdang, 28 August 2025). Another person is responsible for ensuring that the bamboo elements used as walkways are secure and that the specialised bamboo tool called soamvaa is tied to them and stabilised. Some knowledge keepers refer to this person as the soamvaaboo, as they are in charge of this tool during construction (Interview, Dupden Lepcha, Jigme Lepcha, Passingdang, 28 August 2025). At least one person is also required to transport materials to the construction site.

Individuals take on these roles based on their abilities and experience. A defining



characteristic of the soam noakboo is the courage required to work suspended in the air above moving water (Interview, Dupden Lepcha, Jigmee Lepcha, Passingdang, 28 August 2025). When particularly large bridges are built, two teams may work simultaneously from opposite riverbanks. In such cases, two specialist builders are required on each side, resulting in a total of four leading builders coordinating the construction (Interview, Ugen Palzor Lepcha, Sudur, 30 September 2025)

4.3. Gender Roles and Participation

Within Lepcha society, the construction of the cane suspension bridge (ru soam) has traditionally been undertaken by men, reflecting a culturally embedded division of labour associated with physically demanding tasks in challenging terrain. Women, however, play an essential supportive role during the bridge-building process, particularly through the preparation and provision of food and drinks for the builders. This contribution sustains collective labour and reinforces the communal character of the practice (Interview, Namgyal Lepcha, Passingdang, 28 August 2025; Tshering Lepcha, Sangdong, 4 October 2025).



Women bringing food during ru soam building, 9 November 2025, PYL



Women who are present during bridge construction are familiar with the process and, through observation and participation in related activities, may acquire theoretical knowledge of the techniques involved. While they do not typically undertake the physical construction themselves, their involvement forms part of the broader social and cultural context in which ru soam knowledge is embedded and transmitted (Interview, Namgyal Lepcha, Passingdang, 28 August 2025, 1:10:19-1:10:34, Dupden Lepcha, Jigme Lepcha, Passingdang, 28 August 2025). These roles are understood within the community as complementary rather than hierarchical, and they contribute to the continuity of the practice as a shared cultural endeavour.



Bridge builders and knowledge keepers enjoying a traditional meal, 9 November 2025, PYL

4.4. Ritual Conversations: Permission From Land and Water and Protection For Safe Crossing

The construction of a Lepcha cane suspension bridge is embedded in a ritually framed dialog with the environment and the more-than-human beings residing in the landscape. From a Lepcha perspective, this embeddedness is crucial and



required even when bridges are built during disaster and in interaction with people from other communities. It ensures the safety of the bridge and shows an ethics of mutual dependency with other-than-humans, be it the river, the cane, the deities residing in the bridge building locality, or the spirits of deceased roaming the river banks. The ceremonial practice, called rumfaat (རུམམམམ) in Lepcha, is therefore mandatory within the Lepcha cultural framework. Two rituals are performed, one before the construction to seek permission and protect the builders, and one after the completion of the bridge to protect the people walking across. No bridge builder would attempt to begin construction without first securing ritual protection (Interview, Dupden Lepcha, Jigmee Lepcha, Passingdang, 28 August 2025). The rituals takes the form of a dialogical exchange with the more-than-humans, soampu-soambling len (འུམ་པུ་འུམ་པུ་ལེན་), through which the ritual specialists communicate with the guardian deities as well as the malevolent beings (Interview, Namgyal Lepcha, Passingdang, 28 August 2025).



Clearing the space for the altar, the padim and the ritual offering, 4 November 2025, JB



Before the construction can begin, a religious specialist, mun or boongtheeng / padim (མུན་, འཇུག་པོ་, བུའ་མཁན་) will sit facing the river and the site chosen for the bridge, to perform a ritual, referred to as soampu–soambing rumfaat (ལྷ་མཁུ་ ལྷ་ཁྲུང་ རུམ་པ་). It is undertaken to seek permission from the more-than-humans associated with land and water (lyaangdoak oongdoak, ལྷ་མཁུ་འཇུག་པོ་) (Interview, Namgyal Lepcha, Passingdang, 28 August 2025). First, guardian deities are addressed and requested to prevent misfortune, accidents, and harm during the construction of the bridge. Second, offerings are made to malevolent beings that might inhabit the site, including those associated with past accidental or unnatural deaths at the location. This request explicitly includes not only the bridge builders but also their families. The ritual also includes a promise of further offerings after the completion of the bridge. Construction may only begin once this ritual has been completed (Namgyal Lepcha, Passingdang, 28 August 2025).

The ritual begins with the lighting of soang (ལྷ་ཁྲུང་), incense, whose rising smoke is understood to alert the more-than-human beings and invite them into communication with humans. In addition, a mixture of different seeds, grains, rice, and fragrant herbs, often mixed with butter, honey, and sugar, called soor (ལྷ་ཁྲུང་), is burnt as an offering for the souls of those who died under unnatural circumstances. This act is intended to clear negative influences associated with the place (Interview, Namgyal Lepcha, Passingdang, 28 August 2025). Specific offerings, such as chhyo soor and mutnyaam soor are directed toward malevolent beings (Interview, Namgyal Lepcha, Passingdang, 28 August 2025).

Then, the ritual specialists offer chiphut (fermented millet, འཇུག་པོ་), suk (life, ལྷ་ཁྲུང་), offered in form of animal sacrifice, which can either be a rooster or a goat), tufa (beaten rice or maize, puff rice, etc.) (Namgyal Lepcha, Passingdang, 28 August 2025) or uncooked rice grains (zo hyu, མཇུག་པོ་), and oong (water, རྩ་ལྷ་). The chiphut is presented in a ci sunkyo (འཇུག་པོ་ལྷ་ཁྲུང་), a wooden bowl specifically used for millet beer offerings, prepared with dollops of butter (moargyen, མཇུག་པོ་) on the rim, usually it would be five. Animal sacrifice is only required for the construction of larger bridges (Interview, Tshering Lepcha, Sangdong, 04 October 2025).



Documenting the ritual, 4 November 2025, JB

After completion of the construction, again ritual practice plays an essential role in the completion, activation, and safe use of the Lepcha cane suspension bridge (ru soam): A ritual is performed to declare it open for use. This ritual is conducted by a padim (ritual specialist) and has a similar structure as the one in the beginning. The religious specialist begins with offerings of chiphut (འཕྱུག), millet beer offering) to both sides of the bridge. Subsequently, man (མེ) and shaaphut (ཤམ་ཕུག), meat offerings, are burnt and presented to the guardian deities (Namgyal Lepcha, Passingdang, 28 August 2025). The meat offering may consist of a chicken or a goat; in the case of a chicken, the wings are used, while for a goat, the legs and head are offered. Internal organs, excluding the heart, are included as part of the ritual offering.

These offerings are directed to multiple protective beings, including the lungzi (ལུང་མཚོ), the protective deities of the land and water, to Oongkyong (འུང་མཚོ), the more-than-human protectors of rivers, and Chooram Biraam (འུར་མཚོ་བུ་རུང་མཚོ), which translates as the source of mountains and hills. Additional offerings are made to the creator



and guardian of cane, Rusaa lungzi (རུསཱལ ལུངམི), who is also known as Chootheeng Bitheeng (ཅུཐེང་བིཐེང་), the masters or lords of mountain and hills as well as Rumyaang Rudaar (རུམཡཱང་རུདཱར་), the deities of cane. An offering is also made to Poboang-Pomeek (པཔའང་པཔེཁ་), the creator of bamboo. The name itself can be translated as bamboo grove and the inner joint of the bamboo (Tamsang [1980] 2009, 477). Depending on locality, further lungzi associated with trees, rocks, stones, and soil may also be invoked (Interview, Sangdong Padim Tshering Lepcha, 15 November 2025).

A kaado (ཇཱཱའོ) (ceremonial scarf) is tied to the bridge. In the past, a wooden sculpture representing the male reproductive organ of Namkurbu (the one who guards the soam) was also affixed to ward off all evil (Interview, Namgyal Lepcha, Passingdang, 28 August 2025). Known as mungkoong (མུངཀུང་) in Lepcha, the object is understood to ward off evil spirits, protect the builders, and ensure longevity. According to K.P. Tamsang, Mungkoong munglaa (མུངཀུང་མུངལཱལ་) refers to the “the guardian spirit of longevity and life” (Tamsang [1980] 2009, 579). Through these acts, guardian deities are explicitly requested to protect all those who cross the bridge (Interview, Namgyal Lepcha, Passingdang, 28 August 2025).



Ritual after the bridge building is completed, 15 November 2025, PYL



Following the completion of the ritual, the bridge is formally opened for use. Before crossing, Lepcha community members customarily place freshly picked flowers or leaves at the entrance of the bridge. This act signifies a bowing down to the deities, an offering, and request for safe passage (Interview, Namgyal Lepcha, Passingdang, 28 August 2025; Interview, Ugen Palzor Lepcha, Sudur, 30 September 2025). These practices express the community's spiritual relationship with the natural environment and their reverence for the bridge as a space of transition requiring care and mindfulness (Interview, Ugen Palzor Lepcha, Sudur, 30 September 2025).

These ritual practices form an integral part of the intangible cultural heritage of the ru soam. They reinforce ethical conduct, collective responsibility, and respect for the more-than-human environment, while contributing to the continued transmission and cultural meaning of the Lepcha cane bridge as a living tradition. Importantly, these practices situate the bridge within a broader cultural framework of care, responsibility, and respectful engagement with the surrounding environment, reinforcing the understanding that safe passage depends not only on technical skill but also on proper relational conduct.

4.5. Teaching Safe Passage: Practices of Care Surrounding the Ru Soam

Crossing the Lepcha cane suspension bridge (ru soam) is widely understood as an activity involving potential risk and therefore requires specific forms of care, attentiveness, and instruction. Beyond ritual practices that frame bridge crossing as a moment of communication and protection involving human and other-than-human beings, the Lepcha community has developed a range of embodied practices through which safe interaction with the bridge is taught and maintained. These practices constitute an important dimension of the intangible cultural heritage associated with the ru soam.

The ability to cross a cane bridge safely is not assumed to be intuitive; rather, it is learned gradually and taught to children by elders through direct guidance and demonstration (Interview, Dupden Lepcha; Jigmee Lepcha, Passingdang, 28 August 2025; Interview, Namgyal Lepcha, Passingdang, 28 August 2025). Elders employ a variety of techniques to protect children and help them develop confidence. One common practice involves placing a leaf or a piece of bamboo bark between a child's teeth so that the child keeps their gaze fixed forward toward the opposite



bank, preventing them from looking down at the flowing water and becoming dizzy. When a child is carried across the bridge, a thread may be drawn to symbolise the child's soul, ensuring that it does not become disoriented or lost during the crossing (Interview, Namgyal Lepcha, Passingdang, 28 August 2025). Alternative protective practices include the use of a stone or wooden stick to represent a "child bridge," through which protection is sought from deities for the child's safety (Interview, Tshering Lepcha, Sangdong, 4 October 2025). Structural elements of the bridge itself also reflect this ethic of care: bamboo railings are installed specifically to provide children with support as they cross (Interview, Namgyal Lepcha, Passingdang, 28 August 2025).



Safe crossing of the bridge, 11 November 2025, JB

Community knowledge further emphasises correct bodily comportment while crossing. Individuals are instructed to walk steadily and avoid looking down, as observing the movement of water below may induce dizziness, a condition referred to as *soam gyoakboo* ("one made delirious by the bridge") (Interview, Tshering



Lepcha, Sangdong, 4 October 2025). If dizziness occurs, elders advise closing one's eyes while continuing forward, a simple but effective technique that highlights the value of oral and practical wisdom in ensuring safety and confidence (Interview, Ugen Palzor Lepcha, Sudur, 30 September 2025).

Care is also expressed through collective responsibility. If a person is afraid, experienced walkers position themselves both ahead of and behind that person to ensure a safe crossing. It is commonly observed that when a bridge is crossed calmly and without excessive movement, even animals such as dogs can cross safely (Interview, Namgyal Lepcha, Passingdang, 28 August 2025).

Finally, clear practices exist to prevent accidents when a bridge is not yet complete. If construction must be paused, both the entrance and exit are barricaded with bamboo or logs. This temporary barrier, known as plyok, signals that the bridge is unsafe and must not be crossed (Interview, Namgyal Lepcha, Passingdang, 28 August 2025).

Knowledge of safe passage is transmitted through everyday interaction, oral instruction, and collective vigilance, reinforcing both the physical safety of community members and the continuity of the cultural values associated with the Lepcha cane bridge.

4.6. Maintenance: Collective Responsibility and Embedded Knowledge

Maintenance is continuous and based on attentive use rather than formalised oversight. After two to three months, the condition of suspension elements, pillars, and walking surfaces is carefully observed by those who regularly cross the bridge. Signs of wear, moisture damage, or fungal growth are assessed through visual inspection and by cutting into affected areas to determine the depth of deterioration. Where necessary, materials are replaced or reinforced, and load limits are adjusted accordingly (Interview, Namgyal Lepcha, Passingdang, 28 August 2025).

While components such as cane loops and bamboo walkway elements are designed to be replaced periodically, core structural elements—such as pillars and suspension vines—cannot be fully replaced once installed. Instead, they may be reinforced if signs of weakening appear (Interview, Dupden Lepcha; Jigmee Lepcha, Passingdang, 28 August 2025). If a bridge is deemed unsafe despite reinforcement, a new structure



is constructed rather than attempting further repair.

Responsibility for maintenance is collective rather than assigned to a specific individual or committee. Traditionally, those who built and regularly used the bridge monitored its condition, drawing on embodied experience to recognise early signs of risk. Elders possess the most extensive diagnostic knowledge, while younger community members learn informally through participation and observation as they cross and maintain the bridge together (Interview, Namgyal Lepcha, Passingdang, 28 August 2025). In earlier periods, frequent use of bridges to access agricultural fields, hunting grounds, and forest resources ensured continuous familiarity with their condition, reducing the need for formal maintenance structures (Interview, Dupden Lepcha; Jigme Lepcha, Passingdang, 28 August 2025).

In recent years, increased usage—particularly by visitors and tourists—has led to a growing emphasis on more regular and organised maintenance. Community members note that coordination through local institutions, such as the *gyaapan-yoomi*, combined with the participation of villagers, has become increasingly important to ensure safety while maintaining traditional practices (Interview, Ugen Palzor Lepcha, Sudur, 30 September 2025).

Under favourable conditions, and provided that usage remains moderate and materials are of good quality, a Lepcha cane bridge can remain functional for approximately two years (Interview, Namgyal Lepcha, Passingdang, 28 August 2025), with some knowledge holders estimating up to three years (Interview, Dupden Lepcha; Jigme Lepcha, Passingdang, 28 August 2025; Interview, Tshering Lepcha, Sangdong, 4 October 2025). These estimates assume regular inspection and the timely replacement of cane loops and other secondary components.

Taken together, these practices demonstrate that the sturdiness of the *ru soam* depends not solely on initial construction, but on a culturally embedded system of shared responsibility, skilled observation, and ongoing maintenance. This system constitutes a key component of the intangible cultural heritage of the Lepcha cane bridge, linking technical knowledge, social organisation, and intergenerational transmission.





5. Ecological Knowledge, Taxonomy, and Sustainability

As its name indicates, the ru soam is predominantly constructed from cane, while bamboo and selected tree species are used for key structural and construction elements. The selection, sourcing, processing, and use of these materials are embedded in Indigenous ecological knowledge and long-standing cultural relationships with the environment.

5.1 Ru – Cane

“Since the time of our forefathers who gathered the knowledge of using ru, we the Mootunchee Roangkup descendants of our forefathers have been living alongside ru with innate knowledge of its usage and so far, the community have been known to have the knowledge of building ru soam over rivers using ru and its several varieties.” (Interview, Namgyal Lepcha, Passingdang, 28 August 2025)

In the Sikkim and Darjeeling regions, eight species of cane are documented (S.R. Lepcha 2025). Of these two species are traditionally used for the construction of cane bridges: *Calamus acanthopodius*, known as ruyaang (རྟེང་ལོ) in Roangreeng, and *Calamus inermis*, rubrool (རུ་བོ་ལོ) (Interview, Jorden Lepcha, Lingdong, 21 October 2025; S.R. Lepcha 2025).

At present, ruyaang (རྟེང་ལོ), *Calamus acanthopodius*, locally known in Nepali as gauri bhet, has become the dominant species used for bridge construction due to its greater availability (Interview, Namgyal Lepcha, Passingdang, 28 August 2025; Interview, Dupden Lepcha, Jigmee Lepcha, Passingdang, 28 August 2025; Interview, Jorden Lepcha, Lingdong, 21 October 2025; Interview, Ugen Palzor Lepcha, Sudur, 30 September 2025; Interview, Tshering Lepcha, Sangdong, 4 October 2025, confirmed by Sonam Rinchen Lepcha). K.P. Tamsang describes ru (རྟེང་ལོ) as “a strong climbing cane with strong stems of the lower and middle hill forests, the best species of cane in the hills and formerly employed by the Lepchas for making cane bridges.” (Tamsang [1980] 2009, 655) The scientific name for ru is *Calamus acanthosphathus* Griff, belonging to the genus *Calamus*.” (Tamsang [1980] 2009, 655). Ruyaang is valued for its durability, tensile strength, and flexibility (S.R. Lepcha 2025). Ruyaang also has a cultural connection to the Lepcha. They should avoid eating it, as both the Lepcha and ruyaang originated at the same time. Hence, it is believed that eating it



can cause epilepsy (Interview, Tshering Lepcha, Sangdong, 4 October 2025).

Historically, rubrool was also widely used, it is “a robust climbing cane found in middle plain forest and lower hill forest.” (Tamsang [1980] 2009, 656). Its scientific name is *Calamas inerimis T.*, of the genus *Calamus* (Tamsang [1980] 2009, 656). In addition to its use in houses and bridges, its fruit was traditionally used for treating diabetes. Today, however, this cane species is endangered and very rare due to past unsustainable harvesting practices. After being absent from records for over a century, it was rediscovered in Dzongu, North Sikkim, after over a century in 2023 by a team of the Department of Science and Technology (DST), Government of Sikkim, under leadership Sonam Rinchen Lepcha, then Joint Director cum Senior Scientific Officer of the DST (Deccan Herald 2024; Lepcha & Lepcha 2023).

Cane is typically found in difficult terrain, including steep cliffs and densely forested areas. Locating and sourcing cane can therefore extend the time required for bridge construction (Interview, Namgyal Lepcha, Passingdang, 28 August 202). Knowledge of cane locations is held by community members who continue to use and traverse forest areas; these individuals support the bridge building by sourcing the cane at the appropriate sites and advise on quality and maturity (Interview, Namgyal Lepcha, Passingdang, 28 August 2025). While the location of cane is generally known within the community, sourcing remains time-consuming and physically demanding due to remoteness, thorny bark, and the tendency of cane to become entangled in surrounding vegetation.



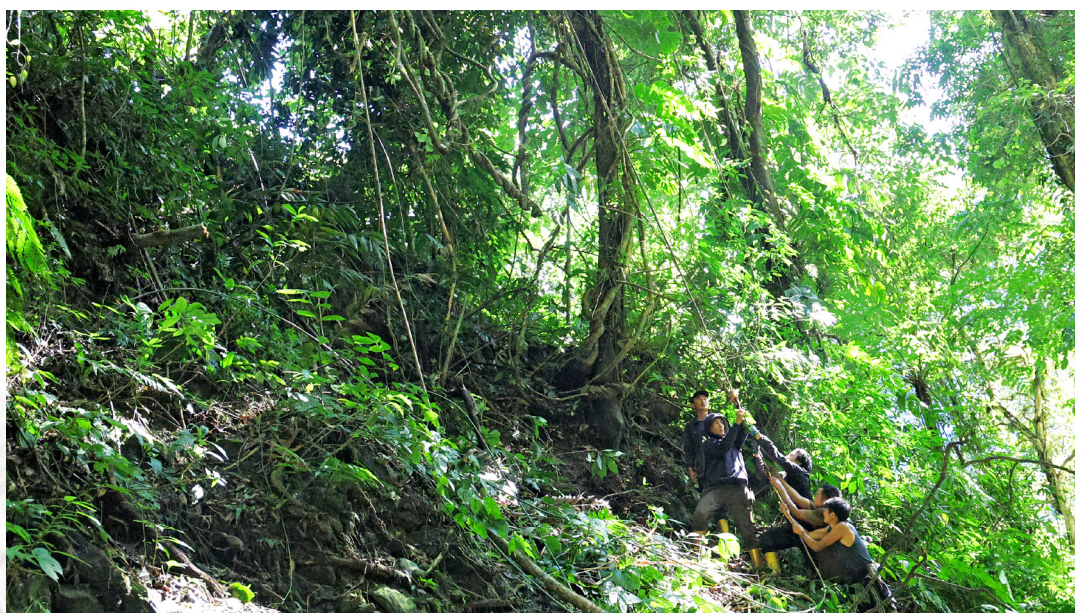
Harvesting cane, after 2.5 hour steep climb through the forest, a total of 10 men worked for 5.5 hours, under the guidance of a knowledge keeper in his 70s, 4 November 2025, PP



Because of these challenges, bridge builders often harvest more cane than immediately required. Excess cane is traditionally dried through smoke, over the open kitchen fireplace, where it was placed on a rack known as punthop. Dried cane can later be soaked in water for two to three days to restore flexibility and used for bridge repair (Interview, Namgyal Lepcha, Passingdang, 28 August 2025, 21:05–21:68; Interview, Jorden Lepcha, Lingdong, 21 October 2025).

Cane possesses specific characteristics that make it essential for ru soam construction. Long, unbroken cane vines are used as suspension ropes (soamglyaang) because of their strength and durability, while split cane strips are used to bind elements together and form loops due to their flexibility. Cane is ideally used raw, immediately after harvesting, to maintain optimal strength and pliability (Interview, Namgyal Lepcha, Passingdang, 28 August 2025).

The cutting of cane follows both ritual and practical protocols. The day for harvesting is selected by Lepcha shamans or Buddhist monks. Cane is cut using a baan (knife) without swinging it in the air; the stalk is pulled and cut carefully, after which the spikes are removed. For bridge construction, vines are kept as long as possible, while for weaving or loop-making they are split lengthwise. Cane grows approximately five metres per year and can reach lengths of up to 400 metres (Interview, Jorden Lepcha, Lingdong, 21 October 2025).



Pulling the cane and braving the terrain is a difficult task, 4 November 2025, PP



5.2. Po – Bamboo

In the construction of the ru soam, bamboo plays a complementary but essential role in ru soam construction. It forms the walking planks of the bridge and is also used to manufacture specialised tools. Bamboo is selected for its stability and reduced slipperiness compared to other materials.

The primary bamboo species used for the bridge is po yaang in Roangreeng (པཤེང་པཤེང་), *Dendrocalamus hamiltonii*, known as choya bhas in Nepali. This species is thick, strong, and widely available in Lepcha regions, growing between 300 and 1,500 metres above sea level. It is the common bamboo, therefore often just called po, as for example by K.P. Tamsang who defines it as “the woody or treelike grass of the genus *Bambusa* or *Bambos*, the hollow woody stem of the plant is used for building purposes and for making furniture poles etc. *Dendrocalamus hamiltonii*.” (Tamsang [1980] 2009, 476). Mature bamboo is preferred, and it is used directly after cutting rather than being cured (Interview, Ugen Palzor Lepcha, Sudur, 30 September 2025; Interview, Namgyal Lepcha, Passingdang, 28 August 2025; see also S.R. Lepcha 2025).



Dendrocalamus hamiltonii (l) and *bambusa nutans* (r), Lower Dzongu, Dupzang Lepcha



Another species used is maatlu (མཇུ་ལུ་), bambusa nutans, locally known as malla bhas in Nepali. Valued for its straightness and strength, it is commonly used for pillars, beams, and other load-bearing structures (Interview, Dupden Lepcha, Jigme Lepcha, Passingdang, 28 August 2025; Molommu 2018b).). In emergency situations, po dyaang པོ་དཔལ་ལྔ་ (bhalu bhas in Nepali, Dendrocalamus sikkimis) may also be used, although it is considered more slippery. This type of bamboo is found between 1000 and 1800 meters above sea level. According to Tamsang it is “a very large bamboo for the lower hill valley and up to 6,000 ft culms sheaths densely covered with golden brown hair and having a long-fringed auricle on either side, Dendrocalamus sikkimensis Gamble.” (Tamsang [1980] 2009, 476)



The bamboo used during bridge construction, 9 November 2025, JB

Sourcing bamboo can be challenging, as bamboo groves thrive for only ten to twelve years before dying off, after which regeneration may take time. In response, initiatives to increase bamboo plantations have been undertaken (Interview, Jorden Lepcha, Lingdong, 21 October 2025). For bridge construction, bamboo is ideally harvested at three to four years of age to ensure durability (Interview, Ugen Palzor Lepcha, Sudur, 30 September 2025).



5.3. Rooted Knowledge: Sourcing and Preparing Cane and Bamboo

The sourcing of cane and bamboo constitutes a crucial stage in the construction of the Lepcha cane suspension bridge (*ru soam*) and relies on detailed ecological knowledge, collective organisation, and careful resource management. Prior to construction, groups are assigned specific tasks related to material procurement, based on the location of available resources. Villagers who live closer to cane-growing areas, and who possess knowledge of the terrain, quality, and maturity of the plants, are designated to source cane. A similar process is followed for the procurement of bamboo.

Cane is typically harvested in high-altitude forest areas and carried to the bridge site, where it is processed directly. Particular care is taken during harvesting to ensure safety. When cutting cane, the base of the plant—where it is rooted—is cut last. This practice is intended to prevent serious accidents in steep and hazardous terrain: if a person slips while cutting, the still-attached cane can be held onto, reducing the risk of falling (Interview, Dupden Lepcha, Jigme Lepcha, Passingdang, 28 August 2025). Traditionally, the Lepcha do not apply curing or treatment to the cane, relying instead on knowledge of appropriate timing and material selection.

Bamboo is similarly cut and transported to the construction site. The primary tool used for sourcing and preparing both cane and bamboo is the *baan poak*, a knife with a wooden handle and iron blade traditionally worn and used by Lepcha men for cutting and crafting. This tool reflects the continuity of traditional practices and skills associated with material preparation.

When sourcing materials, careful attention is paid to sustainability. Only mature cane and bamboo are selected, while younger plants are left to regenerate for future use (Interview, Namgyal Lepcha, Passingdang, 28 August 2025). This practice contributes to the long-term availability of resources and reflects an ethic of ecological balance embedded in Lepcha environmental knowledge.

Once harvested, materials are transported to the bridge site. While vehicles may be used where access allows, the terrain often requires that materials—particularly long and flexible cane—be carried by hand. This task can be physically demanding, as cane tends to become entangled in surrounding vegetation during transport. The process nevertheless remains an integral part of collective labour and experiential learning associated with *ru soam* construction.

6. Historical Documentation of the Ru Soam

6.1. Colonial Written and Photographic Historical Documentation

Historical sources attest to the technical sophistication and cultural distinctiveness of the ru soam. During his travels in Sikkim in 1848–1849, botanist J. D. Hooker described the Lepcha cane bridge as “the most characteristic Himalayan objects of art, a *cane bridge*” encountered at “the most wild and beautiful spot” when crossing into Sikkim over River Rangit in 1848–1849 (Hooker 1854, 149, 150). This early account reflects not only the bridge’s aesthetic qualities, but also the Lepcha mastery of materials, terrain, and collective labour required to sustain mobility in a challenging environment.

“And here the Lepchas had thrown one of their cane bridges across it [the river], much as a monster spider might have thrown its thread.” (Ronaldshay 1923, 144)

As is the case with many cultures whose histories are primarily transmitted through oral tradition, the origins of the Lepcha cane suspension bridge (ru soam) cannot be traced through written sources beyond the period of early colonial documentation. Existing historical references are therefore largely derived from travel accounts, administrative reports, and visual records produced during the nineteenth and early twentieth centuries. While Tibetan sources do not mention cane bridges, British colonial records consistently document their presence across the Sikkim–Darjeeling region.

Some of the earliest and most prominent cane suspension bridges spanned major rivers such as the Rangit and the Teesta. A well-documented bridge crossed the Rangit River below Darjeeling, linking British-administered territory with the former Kingdom of Sikkim; it was photographed by Samuel Bourne in the mid-1860s and earlier sketched by J. D. Hooker during his travels in 1849 (Hooker 1854, I: 149).



Sketch of Rangit Bridge (Hooker 1854)



Lepcha Cane Bridge over Rangit, Bourne 1872b (The J. Paul Getty Museum, Los Angeles)

Another major cane suspension bridge crossed the Teesta River upstream from what is now the Sevoke rail gate, appearing in photographs by Johnston and Hoffman and by Bourne in the 1860s (Johnston & Hoffman 1880; Bourne 1872a).



Bridge over the Teesta, Bourne 1872a (The J. Paul Getty Museum, Los Angeles)

Further cane bridges were located within Sikkim itself, including one at Samdong on the route to present-day Gangtok. This bridge was first mentioned by Campbell in 1848 (Campbell 1869) and later described by multiple travellers and officials throughout the late nineteenth century (Edgar 1874; Macaulay 1885; Graham 1897; O'Connor 1900; Waddell 1900).



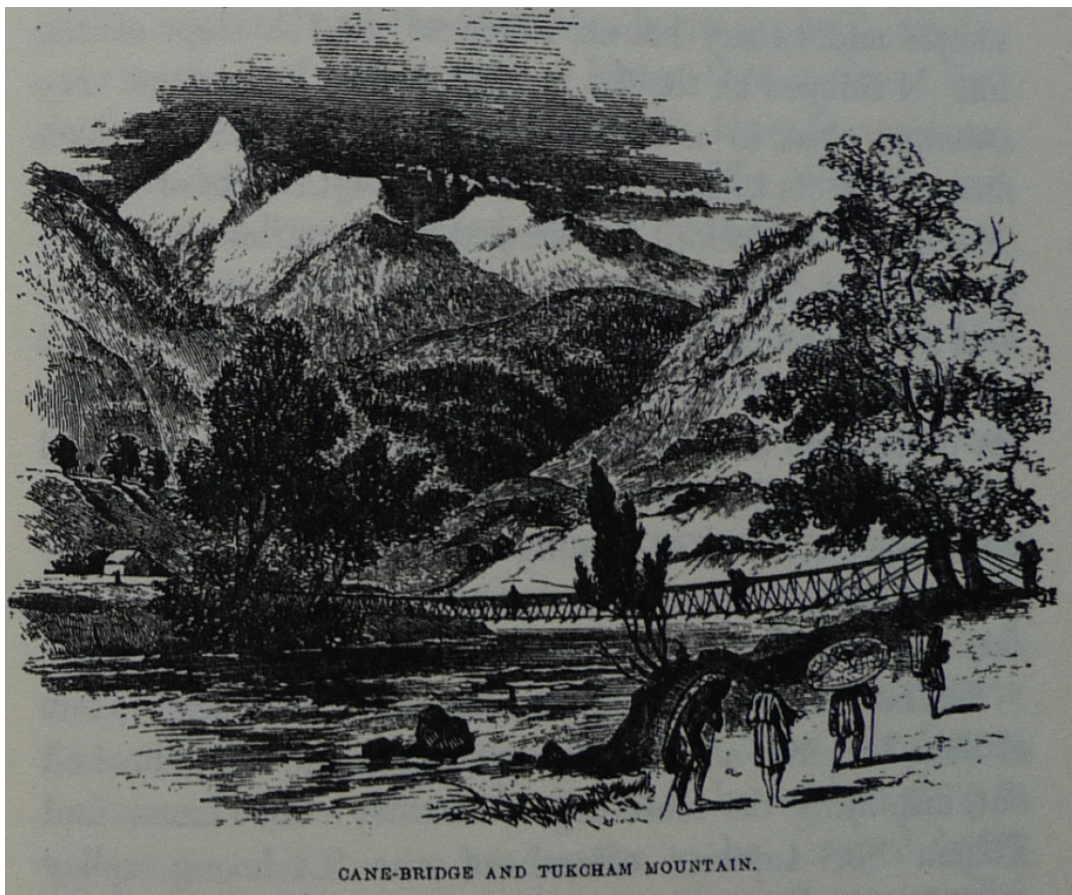
Bridge at Samdong, Waddell 1900



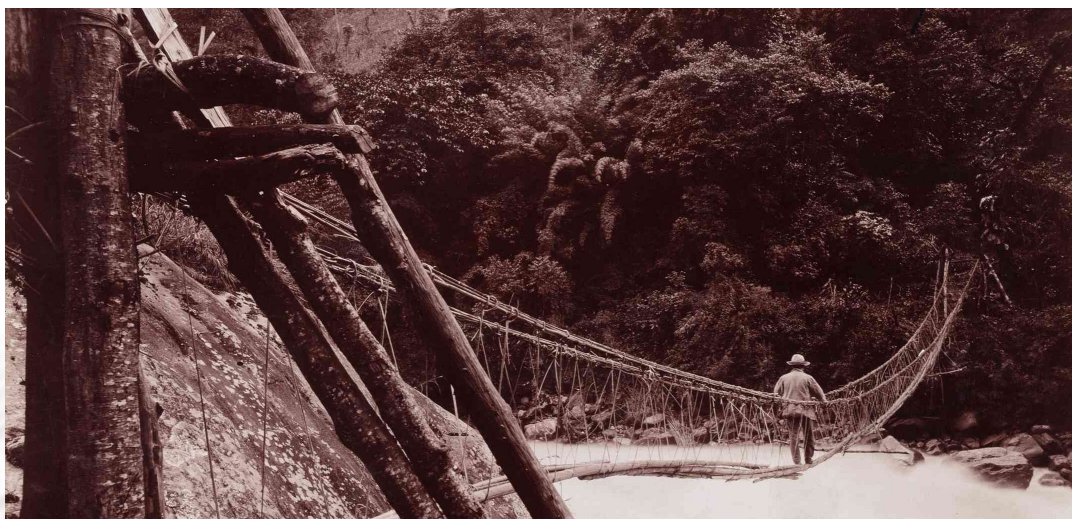
Taken together, these written and visual sources indicate that, prior to the introduction of iron structures, cane suspension bridges were the principal means of spanning even the largest rivers in the region.

Colonial accounts also corroborate oral histories within the Lepcha community that identify Lepcha knowledge holders as the principal builders and maintainers of these bridges. L. A. Waddell, for example, recounts sending “one of my Lepchas” to repair a cane bridge when he encountered it in a damaged state, acknowledging their specialised expertise in sourcing, preparing, and repairing cane structures (Waddell 1900). He further notes that many others in his entourage—described as “natives of these hills”—lacked both the training and the confidence required to cross such bridges, even without loads. Similar observations by travellers and officials emphasise the speed, skill, and courage with which Lepcha builders constructed and repaired cane bridges, consistently recognising them as the custodians of this craft (Bodsohn 1901; Ronaldshay 1923; Morris 1938).

By the end of the nineteenth century, most cane suspension bridges along major transport routes were replaced by iron structures introduced during the colonial period (Waddell 1900, vii). Designed to accommodate wheeled traffic and facilitate administrative movement, these bridges gradually displaced locally embedded technologies and the intangible knowledge systems associated with cane bridge construction. In North Sikkim, however, cane suspension bridges on important routes—such as those in the Rang-Rang area—remained in use for longer periods (Hooker 1854; Macaulay 1885; Sella 1899; O’Connor 1900; Brown 1917; Ronaldshay 1923; MacDonald 1930; Dyhrenfurth 1931; Morris 1938; Siiger 1976).



Cane bridge over Lachen Chu, Hooker 1848 (Hooker 1854)



*A cane bridge on the way from Tumlong to Chungtang, Vittorio Sella 1899, © Fondazione Sella
(<https://www.fondazionesella.org/photo-funds/sella-vittorio-5/>)*

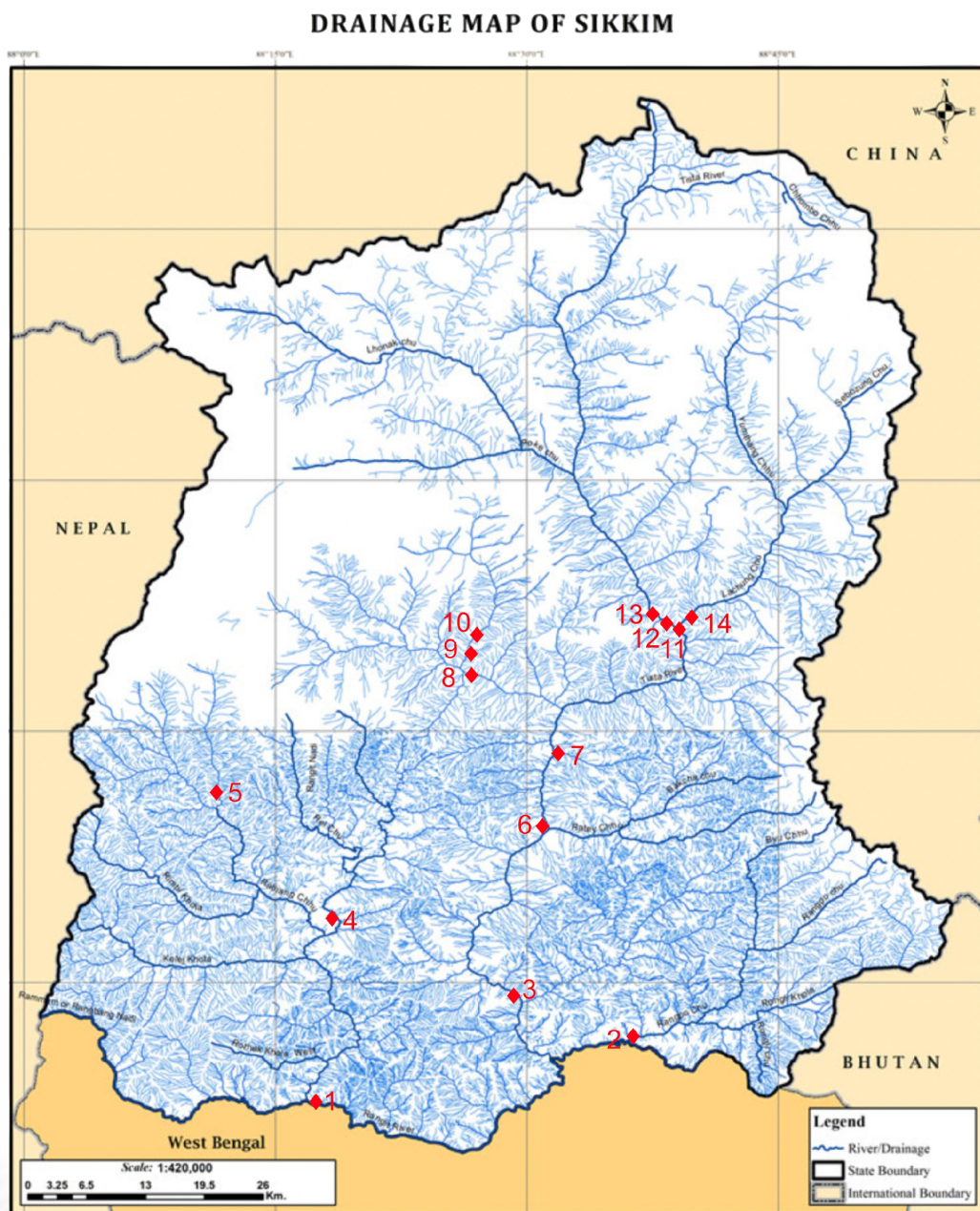


According to A. R. Foning, during his lifetime (1913–1987), cane suspension bridges continued to cross rivers such as the Dikchu, Talung, and Rongnyu, and were built and maintained by the communities of Dzongu themselves (Foning 2003 [1987], 260). The Sangklang and Phidang bridges—key entry points to Dzongu and essential links to marketplaces in Mangan and Gangtok—were cane suspension bridges well into the twentieth century (S. R. Lepcha 2025). Notably, the Sangklang bridge was rebuilt with modifications in 2023 after a glacial lake outburst flood destroyed the modern structure, demonstrating the continued relevance and adaptability of Lepcha cane bridge knowledge in contemporary contexts.

This historical trajectory illustrates both continuity and transformation. While colonial infrastructure development led to the decline of cane bridges on major routes, the knowledge, skills, and cultural meanings associated with ru soam construction have persisted within Lepcha communities. This continuity underpins the significance of the cane bridge for the community, sustained through practice, memory, and adaptation over generations.



6.2. Map of Cane Bridges in Sikkim Mentioned in Historical Sources



(c) ENVIS Hub: Sikkim, http://sikenvs.nic.in/Database/Rivers_781.aspx

1. Bridge over River Rangit, just after the confluence of Rungmo with Rangit (Bodsohn 1901; Campbell 1869, 149; Dozey 1916; Hooker 1854; Maccaulay 1885; Ronaldshay 1923; Waddell 1900)
2. Bridge over River Rangpo, close to Pedong (Bodsohn 1901)
3. Samdong, Balla Ghat, over Teesta River (Campbell 1869; O'Connor 1900; Maccaulay 1885; Waddell 1900)
4. River Rangit from Tashiding to Sumnook (Hooker 1854)
5. River Praig, below Bakyim, Jongri (Brown 1917; MacDonald 1930)
6. River Dikchu (O'Connor 1900; Waddell 1900)
7. River Rangrang (Ronaldshay 1923; MacDonald 1930)
8. Lingsha, Dzongu (Brown 1917)
9. River Teesta at Be (O'Connor 1900)
10. Tholung (Morris 1938)
11. Chuntang, River Ben (Macaulay 1885)
12. River Lachen (O'Connor 1900); Kaedum (Macaulay 1885; Waddell 1900, Hooker 1854)
13. River Lachen, above Latong (O'Connor 1900), Lamteng (Macaulay 1885), Waddell 1900
14. River Lachung (Hooker 1854)





6.3. Map of Existing and Historical Cane Suspension Bridges in Dzongu based on Community Memory

One existing cane suspension bridge is in the core zone of the mixed UNESCO World Heritage Site Khangchendzonga National Park (KNP), while several of the historical bridges (3, 4, 19, 23, 30) border the KNP buffer zone IV.



- ★ existing in 2025
- ◆ historical bridges

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