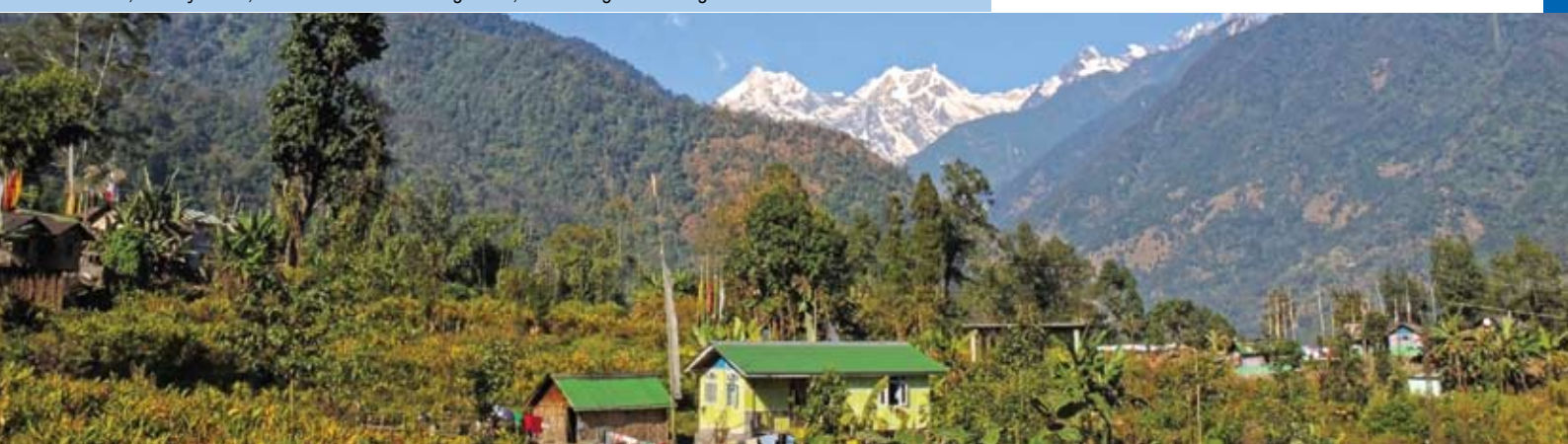
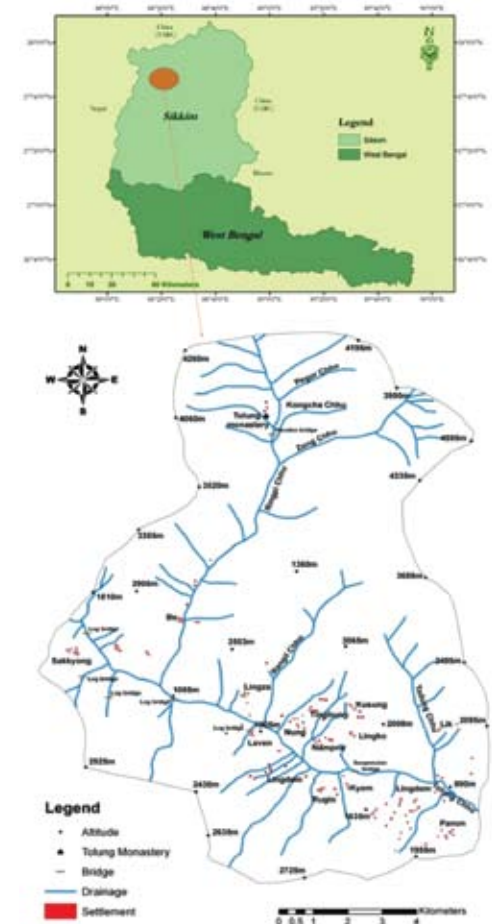


DZONGU

A potential pilot site for conservation and development Khangchendzonga Landscape Conservation and Development Initiative (KLCDI)-India

Dzongu in north district of Sikkim state, a Lepcha community reserve falls within the transition zone of Khangchendzonga Biosphere Reserve, has been considered as one of the potential sites under KLCDI, India for long term conservation and development initiatives. The ancient tribe of Sikkim, 'the Lepchas' holds unique cultural practices for centuries. Coupled with, the associated rich biodiversity makes this area bio-culturally exceptional. Thus this site has largely contributed to the recent inscription of Khangchendzonga National Park as the World Heritage Site. Numerous cultural symbols are embedded in the landscape with diverse eco-climate zones, offering suitable ecological niches to numerous globally sensitive biodiversity elements. Dzongu pilot site covers 149 km² area across 800 m to 4595 m asl, encompassing 03 Gram Panchayat Units (GPUs) namely, Lingthem-Lingdem, Tingbung and Sakyoung Pentong. The site has an immense scenic beauty and affluent natural resources. The word Dzongu means "a place with nine districts" derived from Bhutia Language. Dzongu site is surrounded by Tholung chu (river) at north-eastern side and at the western side lies the guardian deity the Mt. Khangchendzonga. Located at 27° 32'18" N latitude and 88°28'2" E longitude, the Lingthem-Lingdem GPU in upper Dzongu is selected as pilot village under KLCDI-India programme, having five wards inhabited by 186 households for a total population of 987. Individually, the Ruklu-Kayum ward has 33 households (142 person), Lingdem consists of 42 households (189 persons), Laven holds 20 households (113 people), Lingthem with 64 households (387 people) and Mantam ward supports to 27 households (156 persons).

Khangchendzonga Landscape (KL) represents a part of the global biodiversity hotspot, having with unique bio-cultural and geo-climatic assemblage, covering a total area of 25,085.8 Km² (26°21'40.49" and 28°7'51.25" N latitudes and 87°30'30.67" to 90°24'31.18" E longitudes), which is shared by India (56%), Bhutan (23%), and Nepal (21%). The KL offers life support systems to over 7.25 million people (87% in India, 11% in Nepal and 2% in Bhutan). Whereas, Indian part of KL covers 14,061.7 Km² area stretching along the elevation gradients from 40 m representing foot hills (Alipurduar and Jalpaiguri districts of West Bengal) to 8586 m asl of Mt Khangchendzonga, the third highest peak of the world, in Sikkim. The entire state of Sikkim and the West Bengal (three districts, viz. Alipurduar, Darjeeling and Jalpaiguri) are included in delineating the KL- India (26°29'13.56" to 28°7'51.6" N latitudes and 87°59'1.32" to 89°53'42.96" E longitudes). Indian part of KL has 16 protected areas, including recently inscribed, in July 2016, UNESCO World Heritage Site, the Khangchendzonga National Park in Sikkim.



Significance of the Dzongu site

Associated with World Heritage Site (Khangchendzonga National Park)

Dzongu site entirely falls under Khangchendzonga Biosphere Reserve (KBR); the core zone of KBR is known as Khangchendzonga National Park (KNP), which has become UNESCO's World Heritage Site, as first of its kind in India under mixed category of nature and culture. The site combines the religious and cultural practices of Buddhism and holds high ecological significance, and stands out as an outstanding example of traditional knowledge and environmental preservation.

Eco-climatic complexity

The ecological and climatic linkages vary along the elevation ranges, Subtropical (>1000 m asl); Warm temperate (1000-2200 m asl); Cold temperate (2200-2800 m asl); Sub alpine and Alpine (>3600 m asl).

Biodiversity

Floral: Area represents unique biodiversity. Major tree species are *Abies densa*, *Acer* spp., *Betula utilis*, *Symplocos* spp., *Quercus* spp., and *Viburnum* spp., with pure or mixed stands of over 25 *Rhododendron* species. Important shrub species include, *Aconogonum* spp., *Berberis* spp., *Daphne cannabina*, *Rubus* spp. and *Urtica* spp., and the dominant herbs are *Iris decora*, *Rubia cordifolia*, *Eragrostis* spp., *Drymaria cordata*, *Hemiphragma heterophyllum*, *Viola bicolor*, *Anaphalis contorta*, *Anaphalis margaritacea*, *Fragaria nubicola*, *Cautleya spicata*, etc. Some of the important medicinal plants include *Aconitum palmatum* (Bikhma), *Aconitum ferox* (Bikh), *Artemisia vulgaris* (Titepati), *Bergenia ciliata* (Pakhanbed) *Swertia chirayita* (Chirato), *Zanthoxylum acanthopodium* (Boke timur), *Litsea citrata* (Sil timur), *Heracleum wallichii* (Chingphing) and *Evodia fraxinifolia* (Khanakpa). The region harbors many varieties of Bamboo species, some of which are *Bambusa tulda*, *Sinarundinaria hookeriana*, *Yushania maling* and *Phyllostachys manii* are common.



Faunal : Species like red Panda (*Ailurus fulgens*), clouded Leopard (*Neofelis nebulosa*), Himalayan Palm Civet (*Paguma larvata*), Musk Deer (*Moschus chrysogaster*), Yellow throated Marten (*Martes flavigula*), Goral (*Naemorhedus goral*), Nepal House-Martin (*Delichon nepalensis*), Himalayan black Bear (*Selenarctos thibetanus*), Jackal (*Canis aureus*), Himalayan Thar (*Hemitragus jemlahicus*) and Barking Deer (*Muntiacus muntjak*) are the important animals of this area. Important avifaunal diversity includes the Blood Pheasant (*Ithaginis cruentus*), Himalayan Monal (*Lophophorus impejanus*), Darjeeling Pied Woodpecker (*Dendrocopos darjellensis*) and Red-tailed Minla (*Minla ignotincta*) make the site unique.

Agrobiodiversity: Major crops like finger millet, potatoes, sweet potatoes, yam, maize, vegetables like cabbage, spinach, beans, peas, broccoli, radish, carrots, lentils, pulses, nakima, etc. are cultivated here. Cash crops like ginger, large cardamom, orange, guava, etc. are largely grown. Livestock consists of pig, goat, cow, duck, and hen, etc.

Dependency on forest resources: Villagers are quite amicable with the extraction and use of natural resources for various purposes like fodder [*Ficus hookeriana* (Nebara), *Ficus nemoralis* (Dudilo), *Ficus benjamina* (Kabra), *Sauria* spp. (Gagun), *Symplocos* spp. (Kholme/ Kharaney), *Eurya japonica* (Jhinganay), *Evodia fraxinifolia* (Khanakpa), etc.], fuelwood species [*Alnus nepalensis* (Uttis), *Castanopsis hystrix* (Patle katus), *Castanopsis tribuloides* (Murray Katus), *Engelhardia spicata* (Mawa), *Nyssa javanica* (Chilawnee)] and wild edibles [*Diplazium* spp. (Ningro), *Laportea bulbifera* (Patle sisnu), *Urtica dioica* (Gharia sisnu), *Girardinia diversifolia* (Bhangre sisnu), *Elatostema platyphyllum* (Chiplay), *Spondias axillaris* (Lapsee), *Juglans regia* (Okhar)] and collection of leaf litter from the forest floor for agricultural purposes.

Ecotourism opportunity

With unique bio-cultural and traditional social settings including natural trails, the Dzongu pilot site has wide scope of accelerating ecotourism services. In addition, the site is well-known for its age-old monasteries and associated festivals.

Resource Mapping of Lingthem-Lingdem GPU of Dzongu Site

Participatory Rural Appraisal (PRA) study was conducted in the Lingthem-Lingdem GPU through community participation in the planning process for natural resource management in the area. Several useful PRA tools like Resource mapping, Venn diagram, Mobility mapping, Trend lines, Historical timelines, Seasonal calendar, Pair wise ranking, Matrix ranking, Problem tree analysis and Forced field analysis were exercised with the local people of Lingthem-Lingdem GPU .

The resource map of the Lingthem-Lingdem GPU developed with the help of villagers shows many streams and rivers, patches of agricultural fields, barren lands which were ones used for large cardamom cultivation, culturally important places, etc. The GPU has road connection up to Lingdem, further, a walking trail reaches to Laven village. Almost every household owns a private forest from where they extract various Non Timber Forest Products (NTFPs) like leaf litter, fodder for cattle, fuel wood, flag poles and timber for constructive purposes.

The GPU has a primary school, two community hall, three Integrated Child Development Services (ICDS) centers, a health center, two cremation shed, a rope way (no longer in use). Main income generating crops are vegetables, large cardamom, ginger, orange, maize, tomato, nakima, amliso/kuchoo (used in making broom). However, the present scenario indicates a declining trend in agricultural practices. The agricultural production has been adversely affected as a result of increasing pest infestation (red ants), poor soil quality, human wildlife conflicts, labor shortage, storage problem, poor market linkages, shortage of organic manure, unavailability of seeds in the sowing period, and climate change, etc.

People use different varieties of bamboos like Katha prayerbaas/ Gyashi (*Phyllostachys mannii*) used for the construction and fencing, Bhalu baans/ Pudyang (*Dendrocalamus sikkimensis*) for construction of shed for the domestic animals, Pareng (*Sinarundinaria hookeriana*), Malu baas (*Bambusa tulda*) and Choyabaas (*Dendrocalamus hamiltonii*) for weaving of basket, etc. in the GPU. In addition, people mostly use the bamboo for making the flag poles.



The village can be recognized as an emerging tourist destination because of its aesthetic beauty, fresh and healthy environment and the cultural ethnicity of the inhabitants. The hot spring, the two waterfalls, and viewpoints also add up to its value as a tourist destination. Besides, the sacred groves, sacred Mulon-Mong cave, Songbeng cave, two mother trees, Lingdem monastery, and others are some of the places of the historical importance.

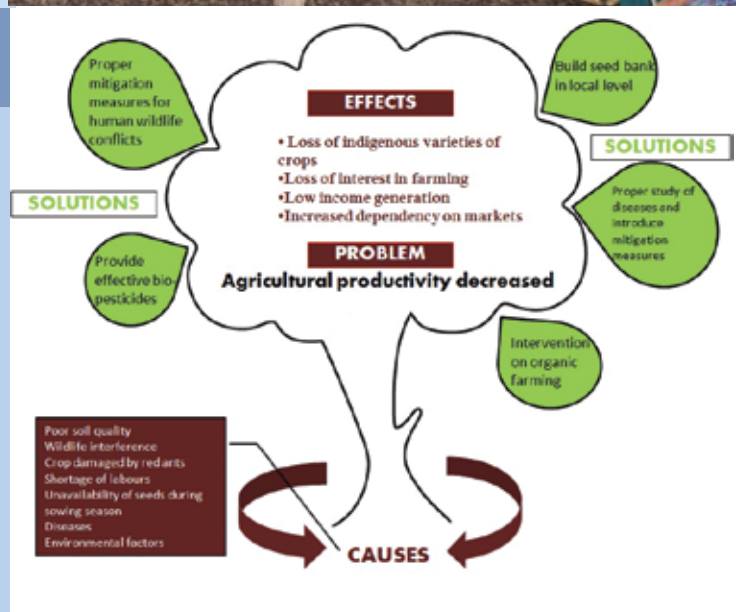
The village is associated with various departments and organizations like Forest, Environment & Wildlife Management Department (FEWMD), Rural Management Development Department (RMDD), Public Work Department (PWD), School, Physical Health Service Centre (PHSC), Self Help Groups (SHGs), Agriculture, Horticulture, Tourism and Fisheries' departments, Panchayat and village Gumpa committee for local development. The villagers avail benefits from various government scheme like MGNREGA, rural development programmes, etc, which often provide them direct economy .

In Lingthem-Lingdem GPU, the use of available resources is insufficiently utilized, under the current approaches and planning. During PRA, close conversation with community helped developing vision map for the area through planning method for next 10 or 20 years. The villagers shared their common vision to have sustainable tourism development in GPU by utilizing available resources with other governmental and private aids. Native people desires that the degraded lands scattered at different places should be managed for re-plantation of fodder or other multipurpose species.

Recently, In upper Dzongu, a massive Landslide slashing down a huge portion of a hill at left bank has created a temporary dam. The dam checked the natural flow of Kanaka (Rongyoung) river and consequently there has been the formation of a big lake of about one kilometer in length and very wide across both hill sides engulfing one village and submerging main bridge connecting lower Dzongu to Tingbung. The current Situation calls for an immediate assessment of the lake and its surrounding environment.

Socio-economic and Livelihood Dependency

There are many agricultural products which support livelihoods of the villagers of Lingthem-Lingdem GPU. Various types of local products are made from the available resources either for self consumption or for the sale in local markets. The crops like large cardamom and ginger gain much importance because of their high market demand and comparatively greater price, followed by orange and broom grass cultivation. Local round Chilly (Dalle-khursaini), is highly sought for by the locals and visitors for its excellent taste and flavour and that earn good prices. Villagers show their willingness to initiate mass seedling production of indigenous variety of large cardamom of the Dzongu, locally known as 'Golsay', that maintains high quality and higher market demand. The study explored that the productivity of almost all the agricultural and cash crops have been gradually declining over the years. Its causes, effects and solutions, as per villagers' perception, are tabulated below:



Causes	Effects	Solutions
Poor soil quality	Low productivity	Organic manure (vermi-composting)
Crop damage by wild life	Loss of agricultural produces	Application of suitable mitigation measures
Damage by red Ants	Loss of indigenous crop varieties	Provide effective bio pesticides
Shortage of Labour	Increased dependency on the markets outside village	Skill development and capacity building
Harsh environmental factors	Crop damage and declined productivity	Effective government intervention on organic farming
Unavailability of seeds during sowing period	Left over fields and low productivity	Establish seed bank at local level
Infestation by diseases mainly in large Cardamom	Low productivity and loss of indigenous varieties	Proper study of the diseases, and develop good crop management

Some priority initiatives for Dzongu pilot site

- ❖ Promote large Cardamom cultivation
- ❖ Improve agricultural productivity through promoting bio fertilizer and pesticides
- ❖ Conservation of water and natural resources
- ❖ Capacity building through exposure visits and trainings on eco-tourism and organic farming
- ❖ Encourage re-introduction of endemic crop varieties of Dzongu
- ❖ Strengthen biodiversity conservation and management
- ❖ Promote food processing and value addition to local produce
- ❖ Encourage traditional bio-cultural practices
- ❖ Increase outreach of the site to promote eco-tourism

KLCDI, India Programme

Guiding Agency: Ministry of Environment, Forest & Climate Change, Government of India

Facilitating Agency: International Centre for Integrated Mountain Development (ICIMOD), Nepal

Lead Agency: GB Pant National Institute of Himalayan Environment & Sustainable Development, India

National partners: Forest, Environment and Wildlife Management Department, Government of Sikkim and Directorate of Forests, Government of West Bengal

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