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Barsey-Singalila

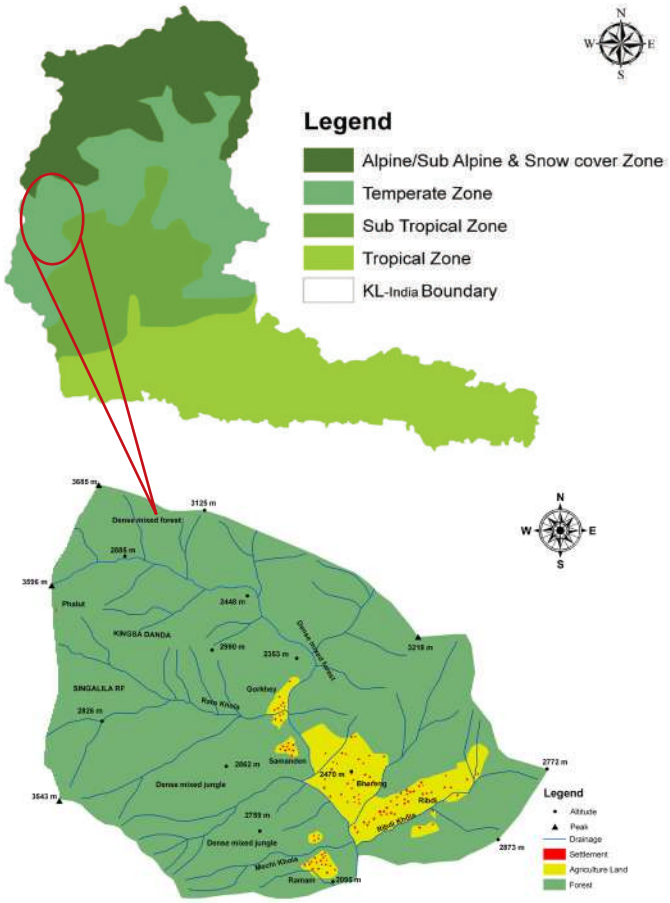
A potential pilot site for conservation and development

Khangchendzonga Landscape Conservation and Development Initiative, India

Following the outputs of a number of regional and national consultations and several interactions with the forest departments (Sikkim and West Bengal), other stakeholders and subject experts, etc., held during the preparatory phase of the Khangchendzonga Landscape Conservation and Development Initiative (KLCDI), India, the Barsey-Singalila site has been identified as one of the important areas for the long-term implementation of KLCDI in Indian part, which is one of the six identified and prioritized pilot sites in Khangchendzonga landscape, India.

As unique transboundary location with eastern Nepal, the Barsey-Singalila pilot site covers parts of west district of Sikkim and Darjeeling district of West Bengal. The site has distinct elements of: a) complex cultural and social assemblage (Nepali and Tribal); b) diverse eco-climatic zones spread along sub-tropical to sub-alpine range; c) close connectivity among PAs, i.e. Barsey Rhododendron Sanctuary (Sikkim) and Singalila National Park (West Bengal); and d) major issues, such as, human wildlife conflicts, limited socio-economic opportunities, weak tourism management and coordination, huge collection of natural resources, unorganized grazing, and other transboundary problems, etc.

Spatially, the Barsey-Singalila site covers 80 km^2 area, which spreads along 1800 m to 3685 m asl. In addition, the site shares parts of Singalila National Park and Barsey Rhododendron Sanctuary. The Khopi-Ramitey, lower Ribdi, upper Ribdi, lower Bhareng and upper Bhareng (under Ribdi and Bhareng GPU of West Sikkim) and Gorkhey, Samanden and Raman (Darjeeling district) are the existing villages spread within identified site.



The Khangchendzonga Landscape (KL): A part of global biodiversity hotspot, representing unique biodiversity, bio-cultural and geo-climatic assemblage (26°21'40.49" and 28°7'51.25" latitude and 87°30'30.67" to 90°24'31.18" longitude), the KL covers a total area of 25,085.8 Km^2. The KL 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). However, part of KL which lies in India covers a total area 14,061.7 Km^2 along the altitudinal gradient, ranging from 40 m in Alipurduar and Jalpaiguri districts of West Bengal to 8586 m asl of Mt Khangchendzonga in Sikkim. The KL-India comprises the state of Sikkim, and northern part of West Bengal (three districts, viz. Alipurduar, Darjeeling and Jalpaiguri), located along 26°29'13.56" to 28°7'51.6" latitude and 87°59'1.32" to 89°53'42.96" longitude. Mean temperature varies from 2°C to 19°C in Darjeeling, 7°C to 27 °C in Gangtok and 11°C to 32°C in Jalpaiguri. A significant amount of snow ice and glaciers (11 major high mountain peaks) offers sustained down streams, and multiple land use provides wider biodiversity patterns, i.e. needle leaved forest, broad-leaved forest, mixed forest, shrub land, grassland and agricultural land with high frequency of lakes/ponds (wetlands - 431 in Sikkim and 775 in northern West Bengal) linking with strong socio-economic and cultural fabric. The KL-India comprises rich floral diversity (more than 5500 species), and the faunal taxa (over 1500 in record). With an aim of conserving and governing the rich biological diversity, KL-India has 16 notified protected areas (PAs).

Significance of the Barsey-Singalila Site

Transboundary nature: As an International transboundary location, the site is connected with Nepal and falls in Sikkim and West Bengal states of India. Such close connectivity offers opportunities to the communities of both the nations and domestically in either states for continuing maintaining their long term traditionally woven socio-cultural and economic relationships. The rich and unique biodiversity assemblages commonly represented by either regions provide forum to strengthen common conservation measures by respective area management systems.

Socio-economic pliability: Community of the pilot site is highly depended on the agricultural practices and tourism in identified part of West Bengal (Gorkhey and Samanden Villages); while in Ribdi-Bhareng village (Sikkim), farming is the major occupation. Community people in the site heavily depend on the utilization of natural resources for their livelihood i.e. firewood, wild edible, fodder, timber, etc. Such activities for livelihood are also associated with PAs and close surroundings. The livestock, i.e. Cow, Fowl and Goat, provides average income to the households of the villages.

Protected Area (PA) connectivity: This site shares parts of Singalila National Park and Barsey Rhododendron Sanctuary. The Barsey Rhododendron Sanctuary, situated in the south-western boundary of the West Sikkim district, it extends from temperate to sub-alpine meadows, with magnificent rhododendron (a flagship taxa) forests. Similarly, the Singalila National Park, situated in the extreme north-west corner of Darjeeling district, West Bengal and spreading along the sub-tropical to sub-alpine meadows, has abundance of the rhododendrons. The Red Panda, yet another flagship species is commonly found in either protected areas.

Eco-climatic variability: Barsey-Singalila site is broadly categorized into , a) Sub-tropical (1800 - 2000m asl, b) temperate (2000-3400m asl), and c) sub-alpine (3400-3685m asl) zones.

Biodiversity

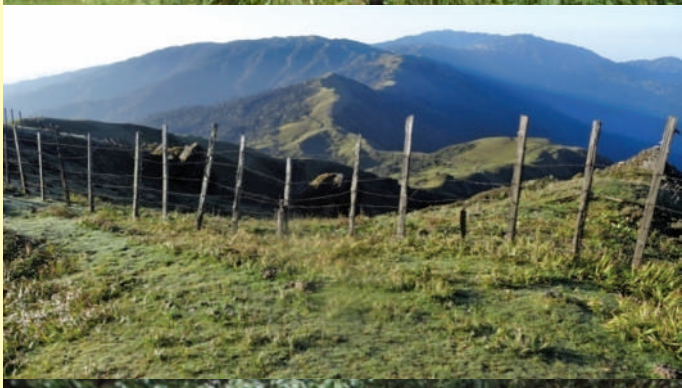
Dominant Floral diversity: **Trees:** *Quercus lamellosa, Castanopsis indica, Rhododendron arboreum*, *Abies densa* are the dominant species. There are unique stands of pure rhododendrons. **Shrubs:** *Berberis aristata, Aconogonum molle, Rubus ellipticus, Daphne cannabina and Cissus elongata* are the dominant species. **Herbs:** The dominant species include, *Iris decora, Rubia cordifolia, Eragrostis* spp, *Drymeria cordata, Hemiphragma heterophyllum, Viola bicolor, Anaphalis contorta, Anaphalis margaritacea, Fragaria nubicola, Rubus* spp, *Cautley spicata* are the dominant species. **Important medicinal plants:** Bikhma (*Aconitum ferox*), Pakhanbhed (*Bergenia ciliata*), Chimping (*Heracleum wallichii*), Panchaunle (*Dactylorhiza hatagirea*), Siltimbur (*Litsea citrata*), Kutki (*Picrorhiza kurrooa*), Chirayito (*Swertia chirayita*)

Faunal diversity: Red Panda (*Ailurus fulgens*), Leopard (*Panthera pardus*), Leopard Cat (*Prionailurus bengalensis*), Yellow-throated Marten (*Martes flavigula flavigula*), Common Palm Civet (*Paradoxurus hermaphroditus*), Goral (*Nemorhaedus goral*), Barking Deer (*Muntiacus muntjak*), Himalayan Asiatic black bear (*Ursus thibetanus*), Wild Dog (*Cuon alpinus*), Crestless Porcupine (*Hystrix brachyura*), Clouded leopard (*Neofelis nebulosa*), Himalayan Mouse Hare (*Ochotona* sp.) and unconfirmed records of Tibetan Wolf (*Canis lupus chanco*).

Avifaunal diversity: Blood Pheasant (*Ithaginis cruentus*), Satyr Tragopan (*Tragopan satyra*), Himalayan Monal (*Lophophorus impejanus*), Darjeeling Pied Woodpecker (*Dendrocopos darjellensis*), Nepal House-Martin (*Delichon nepalensis*) and Red-tailed Minla (*Minla ignotincta*) .

Agro biodiversity: Pilot site provides a variety of agricultural crops namely Maize, green Peas, Squash, Beans, Radish, Spinach, Cabbage, Pumpkin, Bitter gourd and Carrots. Different variety of potatoes are also cultivated as prime cash crop of the villages. Gorkhey and Ribdi-Bhareng villages of the site are known for one of the best quality Potatoes in KL-India. Livestock of the site includes Hens, Cows, Horses and Goats. Horses being used for the transportation of goods locally.

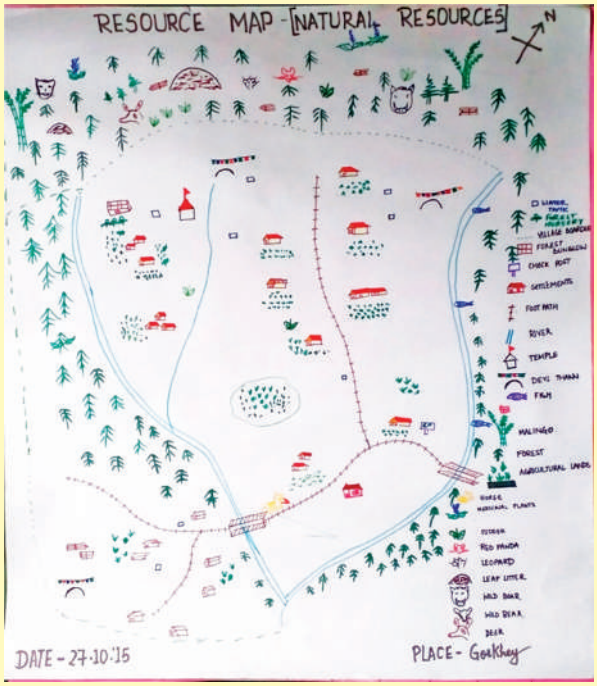
Sub-Alpine meadows of Barsey-Singalila site commands view of series of mountain ranges culminating in four of the five world's highest peaks such as Mount Everest, Mt. Lhotse, Mt. Makalu and Mt. Khangchendzonga



Natural Resources of Barsey-Singalila Site

Natural Resource Mapping for Gorkhey

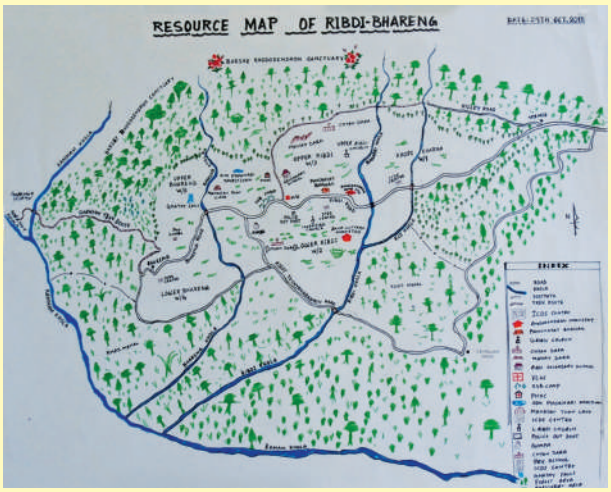
Resource map developed during Participatory Rural Appraisal (PRA) study for Gorkhey village provides availability of different natural resources. In Gorkhey village, there are two major rivers systems, i.e. Gorkhey and Ramam, which meet at the village boundary. River Ramam signifies the border between West Bengal and Sikkim, possessing the introduced species of fishes like Katley, Buduna and Asala. The village is surrounded by the forests and major tree species like, Dhupi, Hemlock, Kurlingo, Phalant, Bantey, lali-Gurans, Chanp, Alnus sp, Buk, etc. are quite frequent along the village boundary. The place is bestowed with rich diversity of floral and faunal species; among the floral components many of the species having rich medicinal values are also found in the area. The species like *Aconitum ferox, Paris periphylla, Acorus calamus, Swertia chirayita, Heracleum wallichii, Bergenia* sp., *Zanthoxylum* sp., *Astilbe* sp., etc are found either in the village or inside the forests. Malingo bamboo, leaf litter, poles, fuel- wood, fodder, etc. are other extensively used important natural resources. Among the faunal component there are animals like Red Panda, wild Boar, Himalayan black Bear, Leopard, barking Deer and a variety of birds and butterflies. Within the village there is marginal agricultural lands, sufficient water sources, and sacred groves. The village has rich cultural heritage posseing various places that are socio-culturally important like Devithan, Sang dara, Temple, two Crematoriums, etc. Other resources like forest check post, foot path, forest bungalows, forest nursery, and water tank are available.



Resource map of Gorkhey village (Barsey-Singalila Site) prepared during Participatory Rural Appraisal (PRA) study by the team of GBPIHED, Sikkim Unit and TMI-India, Gangtok with the help of local people (informants)

Natural Resource Mapping for Ribdi-Bhareng

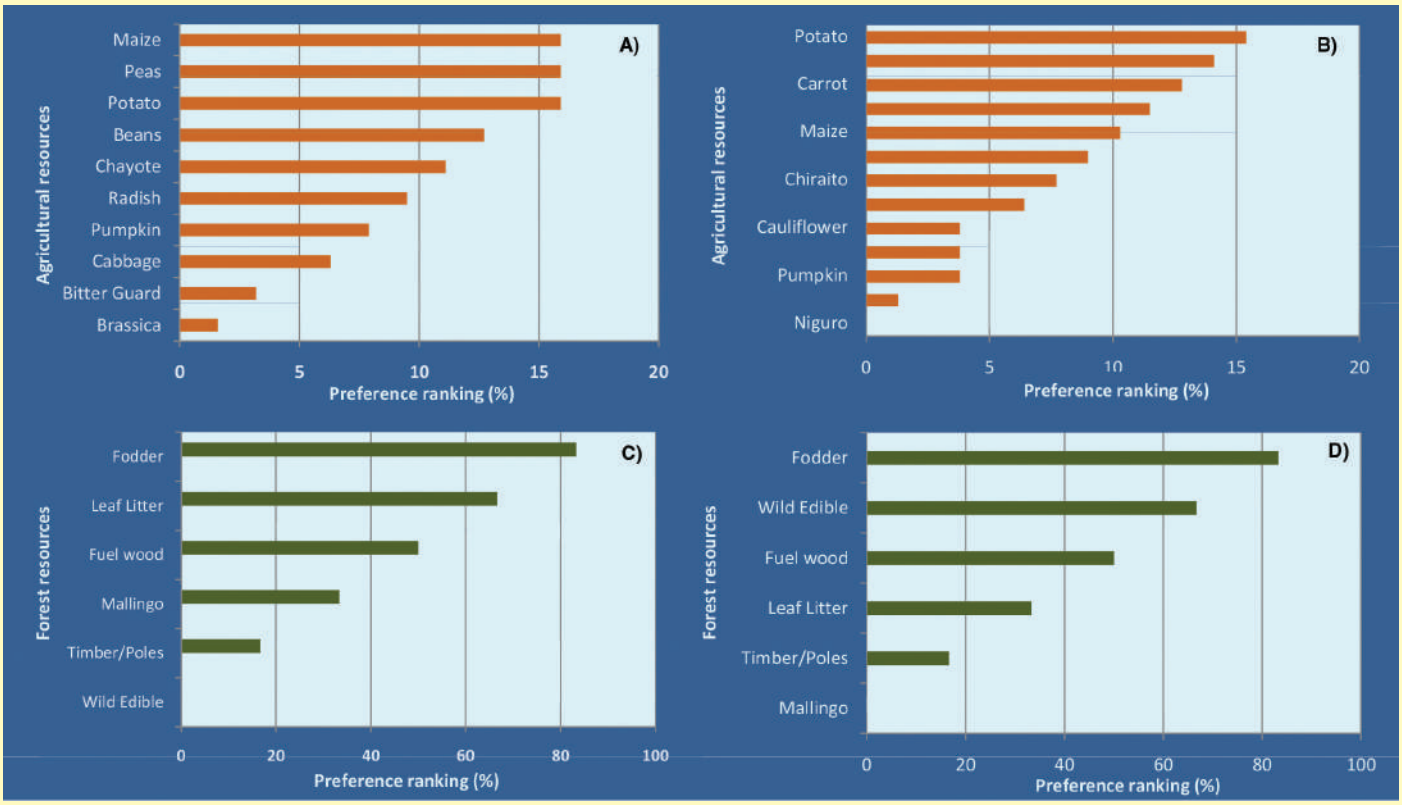
The village resource map for Ribdi-Bhareng village, prepared through PRA workshop focuses on natural resources, such as, water, firewood, grazing land, infrastructure, etc. Resource map also exhibits infrastructure (roads, houses, buildings, bridges, etc), water sites, agricultural lands (crop varieties and locations), forest lands, grazing areas; and shops, markets, health centers, schools, churches, and special places (sacred sites/ groves, cemeteries, shrines), etc. The resource map indicates that the Ribdi-Bhareng of Daramdin block in west Sikkim, which lies in the fringes of the Barsey Rhododendron Sanctuary and Singalila National Park shares its border area with West Bengal. Ramam Khola, Ribdi Khola and Bhareng Khola are three major streams flowing through the GPU, which are also the major water sources for the villagers. The area is accessible through a motorable road from Jorethang and Sombarey towns. The major natural resource base falls in the Barsey Rhododendron Sanctuary and the adjoining forest areas (Reserve Forests and Khasmal). Therefore, the local people are dependent on these natural reserves for NTFPs (wild edibles, poles/malingo, firewood, fodder/litter, medicinal herbs, and drinking water, etc).



Resource map of Ribdi-Bhareng village (Barsey-Singalila Site) prepared during Participatory Rural Appraisal (PRA) study by the team of GBPIHED, Sikkim Unit and TMI-India, Gangtok with the help of local people (informants)

Resource Use Patterns in Barsey-Singalila Site

Pair wise ranking was used to assess the degree of dependency of community people on the agricultural and forest resources during Participatory Rural Appraisal (PRA) in the villages of Gorkhey and Ribdi-Bhareng. According to local people (informants), Maize, Peas and Potato are the major preferred crops in Gorkhey village, while for the villagers of Ribdi-Bhareng, the Potato, Cabbage, Carrot and Radish are the preferred crops. Regarding wild resources, the people depend on the forests, especially for fodder, leaf litter and fuel-wood collection. Dependency on the forest for fodder is highest, because most of the village people own livestock, and the fodder collection becomes a primary need in either villages. Also, the collection of wild edibles is more frequent in Ribdi-Bhareng village as compared to Gorkhey, for their higher use and resource availability.



Resources use pattern in Barsey-Singalila Site, i.e. agriculture resources in A) Gorkhey (Darjeeling, West Bengal) and B) Ribdi-Bhareng (West Sikkim), and Forest resources in C) Gorkhey (Darjeeling, West Bengal) and D) Ribdi-Bhareng (West Sikkim)

Forces influencing socio-economics

Supporting forces	Opposing forces
❖ Centre place for the tourist	❖ Weak transportation and electricity, and poor telecommunication networks
❖ Rich floral and faunal diversity around the village	❖ Human wildlife conflicts
❖ Organic Farming	❖ Limited livelihood options
❖ Availability of water resources	❖ Lack of health, education, market, bank and other resources
❖ Unity among different community groups	❖ Weak functioning of local community groups, and high out migration
❖ Eco-tourism destination	❖ Inadequate eco-friendly manures
❖ Active women participation	❖ High dependency on forest resources

Barsey-Singalila site has been identified as a potential pilot site in KL-India for implementing the KLCDI programme, due to its *i) richness of biodiversity, ii) dependency on agricultural and forest resources, iii) fragmented transboundary complexity, iv) eco-tourism potential, v) organic farming opportunity and vi) promising women participation.* These suggest necessity of implementing the appropriate activities for sustainable conservation and management of the biodiversity and livelihood improvement.

For further information contact

At Head Quarters: Dr. PP Dhyani, National Coordinator (KLCDI, India) & Director GB Pant Institute of Himalayan Environment & Development, Kosi-Katarmal, Almora, Uttarakhand 263643, India
Tel +91-5962-241015, 241041 ; Email: psdir@gbpihed.nic.in

At Sikkim Unit: Dr. HK Badola, Nodal Scientist (KLCDI, India) & Scientist In-charge, GB Pant Institute of Himalayan Environment & Development, Sikkim Unit, Pangthang-Gangtok , Sikkim 737101, India
Tel +91-3592-237328; Email: hkbadola@gmail.com

KLCDI-India (GBPIHED, Sikkim Unit) Research Team

HK Badola (Nodal Scientist); KS Gaira (Scientist E); J Lepcha & Sheila Sinha (Field Researchers); Milan Rai (Sec. Assistant)

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KLCDI, India programme

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