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Keibul Lamjao Conservation Area

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Criteria: (v)(vii)(ix)(x)

Category: Mixed

Submitted by: Permanent Delegation of India to UNESCO

State, Province or Region: Bishnupur district & Thoubal district, Manipur State

Coordinates: N24°40' - N24°25' and E93°48' - 93°50'

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Description

The Keibul Lamjao Conservation Area represents an extraordinary story of natural antiquity, diversity, beauty and human attachment. Keibul Lamjao Conservation Area (KLCA) comprises of a core area of Keibul Lamjao National Park (KLNP) (40 sq km) and a buffer of Loktak Lake (140 sq km) and Pumlun Pat (43 sq. km). The property area along with buffer area is located in the southern part of Bishnupur district and eastern part of Thoubal district of Manipur, India. The Loktak Lake has a unique ecosystem called '*Phumdi*' (a Manipuri word meaning floating mats of soil and vegetation). The largest area of the *Phumdi* in the Loktak lake is in the Keibul Lamjao National Park, which is home to Manipur brow-antlered deer (*Rucervus eldi eldi*) also popularly known as the *Sangai*. The habitat exclusively consists of floating meadows and an elevated strip of hard ground that dissects the park into northern and southern zones. For effective *in-situ* conservation of *Sangai*, Forest Department of Manipur in collaboration with Wildlife Institute of India has developed a plan to reintroduce *Sangai* in the adjoining area having similar habitat.

Loktak Lake is the largest natural freshwater lake in the north-eastern region of India and plays an important role in the ecological and economic security of the region (Tuboi *et al*, 2012). Loktak Lake has been broadly divided into three zones, *viz.*, northern, central and southern zone,

on the basis of vegetation type, *Phumdi* thickness, drainage network, open water area location and human activity. It has been reported that about 0.8 –2m *phumdi* area proliferate within 6 months in the main lake and 0.1m per 6 months in the KLNP area. The lake is oval in shape with maximum length and width of 26 km and 13 km respectively. The depth of the lake varies between 0.5 to 4.58 m with average depth recorded at 2.7 m. There are 14 hills varying in size and elevation, appearing as islands, in the southern part of the lake. The most prominent of them are Sendra, Ithing and Thanga islands. The lake is rich in biodiversity and has been designated as a wetland of International Importance under RAMSAR Convention in 1990. The catchment of the lake includes drainage sub-basins of the Manipur River Basin and its associated tributaries up to Ithai Barrage. The catchment covers an area of 4947 sq km and constitutes 22% of the total geographic area of the state.

People of Manipur are socially, economically, culturally and ecologically connected with the Loktak Lake and Keibul Lamjao National Park. The lake has been the source of water for domestic generation of hydro-electric power, irrigation, habitat for several plants used as food, fishing ground for local people, fodder, fuel, medicines, biodiversity, recreation, etc. Hence, Loktak Lake has been referred to as the ‘lifeline of Manipur’. Three type of communities live in the villages located around the Keibul Lamjao Conservation Area are the *Phum* dwellers (people living either temporarily or permanently on the *Phumdi*), island communities (those living on islands) and the lakeshore communities. Furthermore, in Moirang (located in south-western part of KLCA) there is a war memorial from World War II (INA Memorial), where the Indian National Army first hoisted flag on April 14, 1944. Moirang also holds an ancient temple of the pre-Hindu deity, Lord Thangjing. It was from the village of Moirang that the graceful Khamba-Thoibi dance originated.

Justification of Outstanding Universal Value

Criteria (v): Loktak Lake (Loktak Part) and Keibul Lamjao National Park (KLNP) are surrounded by many villages mainly inhabited by the *Meitei*, a dominant ethnic group of Manipur. These places are historically, culturally, economically and politically very significant in *Meitei* society as it is mentioned in various folk songs and folk tales of Manipur. There are many ancient chronicle (*Puyas*) written in *Meitei* mayek (script) namely, Kangbarol, Leisemlon, Pungkanbalol, Karallon, Umanglon, Leihou Naophamlon and Moirang Kangleirol Lambuba, in which the cultural and historical significance of Loktak Lake and KLNP are mentioned.

The *Meiteis* have rich culture out of which the floating huts exemplify uniqueness in their architecture. Three hillock island villages namely, *Karang*, *Thanga* and *Ithing* are located in the Loktak Lake with few floating huts erected on the *Phumdi*. *Phumdi* is a heterogeneous mass of soil, vegetation and organic matter at various stages of decomposition. They occur in all sizes and thickness, occupying almost half of the lake area and three-fourth of the Keibul Lamjao Area.

The *Umang-lai* (sacred groves/ forest deity) is worshiped in almost all the villages surrounding the Loktak Lake and KLNP. The folk songs, dance and other cultural rituals performed during umang-lai haraoba festivals (pleasing the sacred groves) in these villages are quite different from other such festivals performed in other villages of Manipur state. Indigenous boat race, water

transport systems, indigenous aquatic foods, etc are some of the significant features of that area. The Loktak Lake and Keibul Lamjao is also associated with the Epic love story of seven incarnations of '*Khamba Thoibi*'. There are many sacred places associated with *Khamba* and *Thoibi* epic which are still worshipped by the villagers.

On the other hand, many legendary stories are associated with *Sangai*. One of such legend is: a prince of Luwang clan (one among the nine clans of *Meitei* tribe) of Manipur had transformed himself into a majestic deer to be known as *Sangai*. Second, the ancient royal boat (*Hiyang Hirel*) had the decoration of *Sangai* head on its head part. Third, according to Moirang Kangleirol (Folklore of Moirang), a legendary hero called Kadeng Thanjahanba, once brought a gravid female *Sangai* as a loving gift for his beloved Tonu Laijingrembi and released the deer free in the wild of Keibul Lamjao, thence-forth the place became the only abode of the *Sangai*.

According to Meitei mythology, Ebuthou Thangjing, the divine ruler of the Moirang kingdom is worshipped as deity and deemed one among the creators of the universe. This kingdom was located near Loktak Lake, 45 kms from Imphal, was rich in culture and tradition. Apart from these symbolic cultural places, there are many other sacred places in and around Loktak Lake.

Land-use or human interaction with the environment

The vast agricultural fields surrounding the Loktak Lake is known as *pat-lou* (*pat* meaning 'lake' and *lou* meaning 'agricultural field') where indigenous paddy (such as *Touthabi*) are cultivated. The *Punghul* method (in this method, the land was to be tilled first and the seeds were sown over it again and finally the seeds were covered with soil by one more tilling) is generally employed in *pat-lou*.

The *Meitei* ethnic group is mainly dependent on Loktak Lake and KLNP. Agriculture and fishing are the main economy of the people living in and around the lake. Apart from these, the villagers collect the aquatic plants and other aquatic food products from Loktak Lake and KLNP which are very costly and popular indigenous cuisines of Manipur. However, the importance of Loktak Lake in the overall socio-economy of the people of Manipur state cannot be ignored as it is the main source of livelihood.

The agricultural use of the *Phumdi* in the Loktak Lake vividly exemplifies an exceptional system which has evolved organically and harmoniously over time. Wild rice and vegetables are commonly grown. Wild rice, locally known as *Kambong* or *Kambon-ishing* is an aquatic/wetland plant of Manipur and is used for various purposes by the ethnic people ranging from food to fodder, thatch roofing, firewood substitute, house wall plastering etc. The infected gall forming culm (infected with fungus *Ustilago Esculenta*) is highly priced by local people and regarded as delicacy.

The fish production of the state is mostly contributed by the Loktak Lake. *Athaphum* is a fishing technique using enclosures of strips of *Phumdi* arranged in a circular formation. This fishing technique has evolved over ages, where thin *Phumdi* and other plants such as *E. stagnina*, *Capillipedium* sp. etc. are put within the enclosure to attract fish. The harvest phase is called *phum namba*. The frequency ranges from once every fortnight to even three months.

Criteria (vii): The Keibul Lamjao Conservation Area is of superlative natural beauty and provides some of the most spectacular scenery on earth. It is located in the state of Manipur which is also called the Switzerland of east and is famous for many peculiar features. Adding more to its beauty like a sparkling diamond amongst the pearls, a beautiful lake known as “Loktak Lake” is situated in the north of Keibul Lamajo Conservation area. Loktak (LOK = stream + TAK = the end) is the journey end of several streams and rivers. Loktak looks like a vast sheet of water reflecting light like a mirror. It is the largest fresh water lake in North Eastern India. Some hillocks protrude from the water surface. There are floating swampy islands, the characteristic feature of the Loktak Lake, within KLCA, locally called *Phumdi*. *Phumdi* are the actual jewel of the lake, made of thick mat of humus and dead vegetation, one fifth of which is above water and the remaining four fifths are below the surface of water. The poets and singers of Manipur have often described the natural beauty of this lake in their poetry. A famous Manipuri Poet Khwairakpam Chaoba Singh has described the glory Loktak Lake in his poem Loktak Mapanda (on the banks of Loktak).

*Today new ripple break dancing
On the surging stream in my life.
In the mere of my thought, high waves with crests
Surge into my mind.
Such a sight of the shining Meitei Lake
These eyes have been blessed with
This is Loktak, our Loktak that stretches
Glittering before us, Meitei Lake
(Source: Singh, 2002)*

These lines describes about the dynamic role of Loktak Lake in the life of Meiteis. Similarly, ballad singers of Manipur often describe the Loktak Lake as the mirror of Manipur. It has different connotations. It may simply mean that its water surface looks like a mirror. In another sense it highlights the lake’s association with the history of Manipur. It is a mirror reflecting the history of Manipur and the changes in the society down the ages. The exceptional natural beauty of the Loktak Lake and Keibul Lamjao National Park can be seen by standing on various islands of the lake. The blooming of water lilies and lotus in the lake during the time of summer is the real feast for the eyes. From Sendra Island one can see it as a vast meadow with a hillock in the centre.

Criteria (ix): The fresh water lake ecosystem of Loktak with *Phumdi* represents significant ongoing ecological and biological processes. Southern portion of Loktak Lake forms the Keibul Lamjao National Park which is a continuous mass of *Phumdi* occupying an area of 40sq. Km. *Phumdi* are a heterogeneous mass of soil, vegetation and organic matter at various stages of decomposition. It provides a magnificent vista of green floating islands all over the lake. “*It is the only floating national park in the world*”. A *Phumdi* may be initiated with a small mass of undecomposed organic matter or dense growth of water hyacinth that accumulates some suspended silt and is gradually colonized by grasses and other herbaceous plants. The high proportion of vegetable matter in the *Phumdi* gives it a specific gravity and high buoyancy to keep it afloat. They float on the lake one-fifth of their thickness above and four-fifth under the water surface. The maximum thickness of a *Phumdi* is 8 ft. but its thickness varies in time and space depending on the conditions during its formative stage. The core of *Phumdi* is composed

of detritus material, which is black in colour and is highly spongy. It is constituted of organic carbon (36%), nitrogen (2.08%), organic matter (24.98%) and other residues including mineral matter (37.94%). All together *Phumdi* play an important role in the ecological processes and functions of the lake ecosystem. They provide a biological sink to the key nutrients and govern the water and nutrient dynamics of the lake. *Phumdi* plays a critical role in the maintenance of the lake hydrological regime.

Furthermore, *Phumdi* are an integral part of the lake and play an important role in the ecological processes and functions of the lake ecosystem. The life cycle of the *Phumdi* involves floating on the water surface during season of high water as in the monsoons. In the lean season, when the water level reduces, some area of the biomass comes into contact with the lake bed. When the rains come again and they become a float, the biomass has enough 'food' - the nutrient-stored in their roots and their life continues.

Criteria (x): KLCA comprises of unique ecosystem which is rich in biodiversity. A total of 185 plant species comprising 50 families and 121 genera were recorded. 90 species were recorded in the floating meadows and water, 19 species in the terrestrial habitat and 76 were common to both the habitats. The dominant species of the meadows are *Zizania latifolia*, *Hedychium coronarium*, *Impatiens* spp., *Cyperus difformis* and *Polygonum* spp. The species common to both the habitats are *Phragmites karka*, *Cappillipedium assimile*, *Leersia hexendra* etc. Overall, 22 economically important plant species used by the local inhabitants as food, fodder and medicinal purposes have been identified from KLNP compared to 33 economically important plant species recorded from the lake area. 54 fish species belonging to 18 families have been recorded from the lake. Out of the 54 species, 28 are common and available throughout the year while 26 species are rare and seasonal in presence. All together, 25 species of amphibians recorded from the lake and 32,855 water birds belonging to 58 different species have been recorded during the recent census conducted by the Forest department and local NGOs in association with the Bombay Natural Historical Society. Globally threatened species recorded in the lake were Black-necked Stork *Ephippiorhynchus asiaticus* Oriental Darter *Anhinga melanogaster* and Ferruginous Pochard *Aythya nyroca*. Recently, the rare, Mandarin duck (*Aix galericulata*) locally known "*Sana Manbi Nganu*" belonging to the family of Anatidae was recorded from Loktak Lake. Apart from that, rotifer communities of Loktak Lake contain 120 species belonging to 36 genera and 19 families and represent the richest biodiversity of *Phylum Rotifera* known from any aquatic ecosystem of the Indian subcontinent. Biogeographically interesting elements include one Australasian, three Oriental and seven Palaeotropical species of rotifers from the lake. 189 species of zooplankton have also been recorded from the Loktak Lake. Among mammals, Keibul Lamjao National Park also holds population of 212 Hog deer and 204 *Sangai* as per 2013 census, which generates considerable international interest and perfect example of *in-situ* conservation.

Emphasizing on the *Sangai*, the Manipur Brow-antlered deer is the Indian form of three sub-species of Eld's deer (first described by Col. Percy Eld). The others occur in Myanmar (formerly Burma) and Thailand. All three sub-species are considered "at risk" but the Manipur deer is perhaps the most endangered of the entire world's cervids. The name "Brow- antlered" refers to the peculiar shape of the antlers which are curved forward and down before continuing outwards

to the side, unlike any other species. It is known locally as “*Sangai*” which means literally, “one who looks at you”.

Historically *Sangai* occurs only in the southern part of Manipur and today only in the protected area of the National Park. *Sangai*, once thought to be extinct, was located by Edward Pritchard Gee, the then Honorary Secretary, Eastern region, Indian Board for Wildlife in 1953 at Keibul Lamjao (Manipur, India). In 1959, in an exercise to ascertain the status of the animals in the park, six heads were counted and this became the beginning of conservation efforts of *Sangai* at KLNP. Subsequently, the total population of *Sangai* in the park was estimated between 100 to 112 individuals. The first aerial census was carried out during 1975. It recorded the presence of only 14 individuals. Since then, the population of *Sangai* has increased from 14 to around 180 individuals by 2003 and to 225 in 2008. As per census conducted by Forest Department during 2013 the population of *Sangai* has been recorded to be 204 individuals.

Reintroduction of *Sangai*

Although the population of *Sangai* has increased over the last ten years, risks to survival persist, including: encroachment on the habitat, local dissatisfaction with the park, floods and other environmental perturbations; epidemic disease and other health threats; and further loss of genetic diversity. As a single, small wild population, backed up by an inbred and unstable captive population, the *Sangai* needs serious conservation efforts. To recover the *Sangai* population, Pumlen Pat has been identified for its reintroduction.

The Pumlen Pat is the second largest freshwater wetland in Manipur. It lies between 24°20'N and 24°35'N latitude to 93°50'E and 94°0'E longitude in Thoubal District at an elevation of 767 m asl. It lies at a distance of 40 km from Imphal city with an area of 58.06 km² towards the southern lowlands of the valley and the far east of the Keibul Lamjao National Park. It gets connected with other satellite wetlands during the rainy season such as the *Kharung pat* in the north, Loktak Lake in the west and *Lamjao pat* in the east. The lake receives water from precipitation, surface run off from its south-eastern denuded hills, indirectly from the Sekmai River through Khoidum pat on northern side and from the impounded Manipur River which runs along the western shore-line. The lake is surrounded on all sides by 13 settlements, namely: Komjao Khong, Chingjao, Hiyanglam, Arong and Tera in the North, Kakching Khunnou and Thongam in the South, Waitkong, Thanjao, Elangkhangpokpi and Langmeidong in the East and Sarik and Munshoi in the west.

The Pumlen Lake has rich floral and faunal diversity. Seventy-five plant species belonging to twenty-nine families, have been identified in the lake. The faunal diversity includes invertebrates like water beetle, giant water bug, snails and fresh water mussel; amphibians and reptiles like water cobra, viper and frog; fish species like *Channa punctatus*, *Clarias batrachus*, *Anabas testudineus* and *Monopterus albus*; birds like water cock, Indian moorhen, Egret and common teal; mammals like wild boar, hog deer, civet cats and otters (*Envis centre Manipur*).

The people living around the Lake collect vegetables and do fishing for their livelihood. The presence of the temple *Mondum Mahadeva* in the Thongam Mondum Hill in the southern side of the lake is a source of disturbance due to the high number of visitors. Aside from this, the temple

has also become a favoured tourist spot and it creates a market for the resources collected from the lake. (WII, 2012).

Based on the study of all the parameters, Pumlen Pat is the preferred site for reintroduction in terms of ecological factors like area of wetland and water and food availability. Among the five proposed sites, Pumlen has the highest wetland area with an additional forest area as well. The lake shares the unique characteristic feature of the KLNP, i.e, the floating *phumdis*; food plants are also readily available.

Statements of authenticity and/or integrity

KLCA is substantially intact and of sufficient size for the conservation of its biodiversity and other natural resources. The property is of a sufficient size to ensure the natural functioning of ecological processes. The property is further buffered by mountain systems in its fringe areas making it an excellent habitat for wildlife. It fully represents the unique natural features of national park and lake. The property forms a large conservation area for in-situ conservation of rare and endangered species while sustaining the evolutionary biological processes. The natural assets of the sites are well preserved as it is surrounded by lush green hills and Manipur River. An area of around 5200 ha in the southern part of Loktak lake, inclusive of the Keibul Lamjao portion, was declared a wildlife sanctuary in 1954, but the area was later reduced to around 4050 ha and was declared a national park, called Keibul Lamjao National Park (KLNP), in 1977 under the Wild Life (Protection) Act, 1972, and the Manipur Wild Life (Protection) Rules, 1974. In addition, the State Forest Department (Wildlife Wing) has proposed the core area of Loktak Lake as a Conservation Reserve for protection of Water Birds. Loktak Lake, which is also known as the lifeline of Manipur is contiguous to the Keibul Lamjao NP. Integrity and wholeness of the property depends heavily on the catchment area of the Loktak Lake. The lake is a designated RAMSAR wetland and is therefore also governed by the Environment (Protection) Act, 1986.

Comparison with other similar properties

Keibul Lamjao Conservation Area of Manipur is extraordinary in several ways. First, in its representation of the extent, integrity and diversity of the unique species found in the lake as well as in *Phumdi*. Second, in the symbiosis of natural and cultural values, through the depth of associations with indigenous people over time.

Although similar type of inland lake ecosystem (Keoladeo National Park, RAMSAR Site) was inscribed as a World Heritage Site in 1985. Keibul Lamjao Conservation Area is natural whereas Keoladeo is man-made.

As far criteria (vii, ix & x) proposed Keibul Lamjao Conservation Area can be compared with the lake Baikal (Russia) which is also a fresh water lake contains an outstanding variety of endemic flora and fauna, which is of exceptional value to evolutionary science. It is also surrounded by a system of Protected Areas that have high scenic and other natural values. Whereas, Keibul Lamjao Conservation Area also forms an exceptional scenic beauty, *Phumdi* ecosystem and in-situ conservation of endangered species viz., *Sangai* & Hog deer.