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Management Planning For Tsomoriri - Tsokar - A Framework 2007



DEPARTMENT OF WILDLIFE PROTECTION, GOVERNMENT OF JAMMU & KASHMIR



In Collaboration with
WWF-INDIA



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Vision

“ Tsomoriri & Tsokar wetland ecosystems are conserved and sustainably managed for biodiversity and people ”

Guiding Principles for Management Planning

- Conserve the Natural and Cultural heritage of the area, which is of Regional, National and International Significance.
- Respect the interests of the Local Communities.
- Encourage visitors to appreciate, enjoy and understand this unique heritage and to help in its conservation.

Startsapuk Tso in Tsokar basin

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Photo Credit: Anupam Anand

Preface

The high altitude wetlands Tsomoriri & Tsokar of the Rupshu basin in the Trans-Himalayan biogeographical region of Ladakh, traditionally used by the nomadic Changpas for their livelihoods, are one of the most unique ecosystems of the world. These are repositories of ancient culture and religious practices, holding strong bond between nature and culture.

Ladakh wetlands including Tsomoriri & Tsokar, are very important breeding sites for waterfowl and represent the only breeding ground of Bar-headed Geese (*Anser indicus*) in India and the globally threatened Black-necked Crane (*Grus nigricollis*) outside China. In addition, this region also supports some of the most endangered species of mammals such as Kiang, Snow Leopard, Lynx, Tibetan Wolf, Himalayan Blue Sheep and Marmot.

Tsomoriri & Tsokar wetlands are facing the growing impact of tourism in the region which adds significantly to the biotic pressures on the adjoining grasslands, leading to pollution, disturbance of the wildlife and change in local life styles leading to a loss of cultural heritage. The degradation process can be checked through landscape improvement, sustainable development and responsible tourism with the participation of local communities.

The Government of India and the Government of Jammu and Kashmir have rightly selected these wetlands and its landscapes for biodiversity conservation and sustainable development under the Hon'ble Prime Minister's Reconstruction Package.

The project proposal developed by **WWF-India in collaboration with the State Wildlife Department** envisages improvement of the eco-fragile habitats of the rare birds and wildlife species, promotion of responsible tourism and livelihood improvement of the Changpas. Scientific research, surveys and development of management tools shall be jointly taken up with some of the leading research and management institutes.

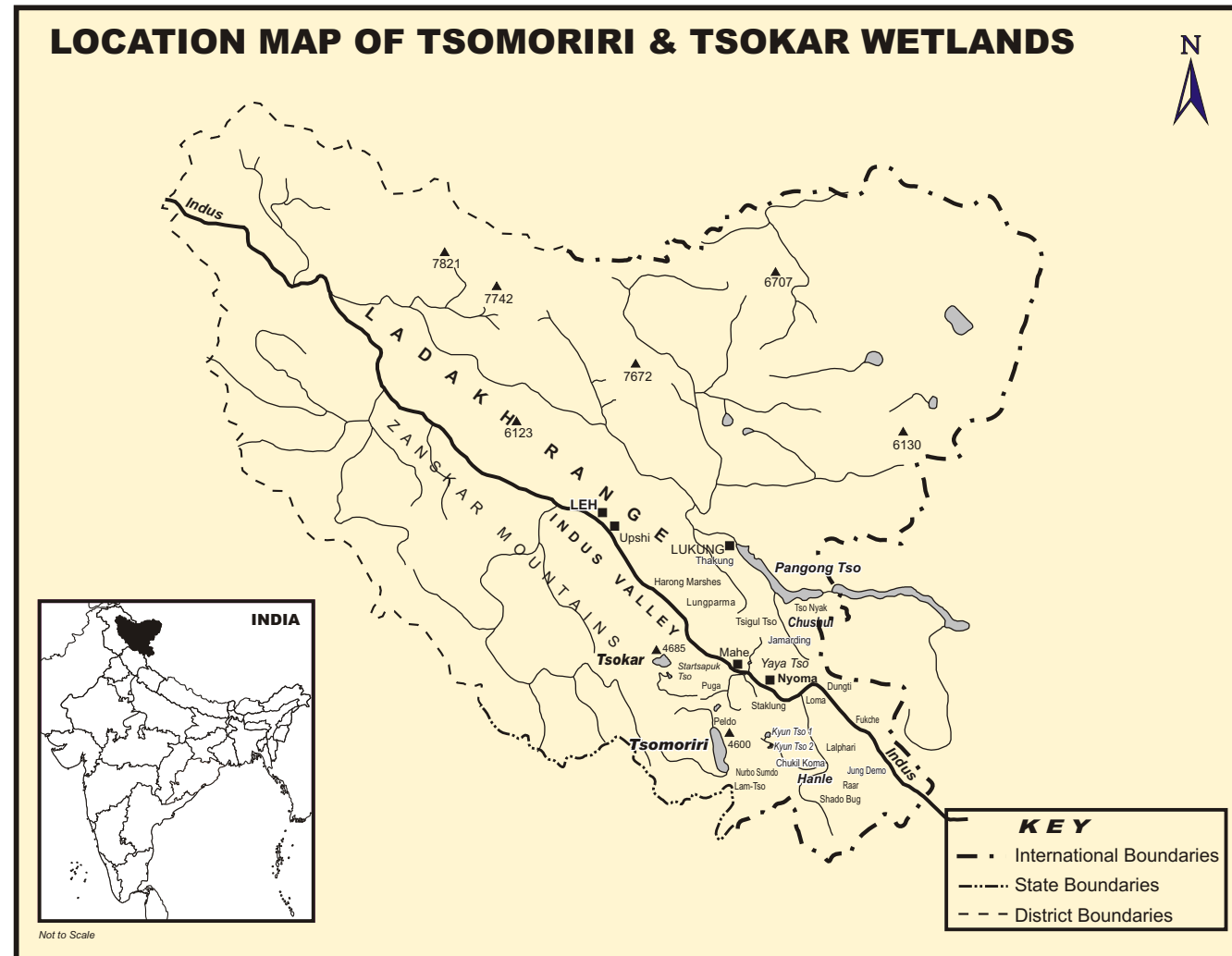
This project has been drafted by a team of officers and consultants from leading conservation organizations, after a series of landscape level and state level meetings/workshops with all the stakeholders and the local inhabitants. Mr. Jigmet Takpa, Conservator of Forests(Wildlife), Ladakh, Dr. Parikshit Gautam, Director, WWF-India, Mr. Saleem-ul-Haq, Wildlife Warden, Leh, Mr. Pankaj Chandan, Project Manager, WWF-India, Ms. Archana Chatterjee, Senior Programme Coordinator, WWF-India, Ms. S Vidya, Coordinator, WWF-India, Ms Seema Bhatt, Biodiversity Consultant, Dr. SA Hussain, Senior Scientist, Wildlife Institute of India and Dr. R S Chundawat, Regional Director, International Snow Leopard Trust have contributed significantly to this project, which is acknowledged.

I am also thankful to Shri Atal Dulloo, IAS, Commissioner/Secretary to Government, Forest Department and Shri Ravi Singh, Secretary General & CEO, WWF- India, New Delhi for their consistent interest in expediting formulation of this project.

It is expected that the Govt. of India, Ministry of Environment and Forests will consider the project for financial assistance expeditiously. Implementation of the project will go a long way in conservation of the high altitude cold desert biodiversity and promoting sustainable livelihood of the traditional Changpa graziers of the Rupshu basin in Ladakh.

(A.K.Srivastava) IFS
Chief Wildlife Warden
Government of Jammu & Kashmir

Introduction



Administratively Tsomoriri & Tsokar lie in the Nyoma block of Leh district of Ladakh region of Jammu and Kashmir state. Both these wetlands are situated in the eastern part of Ladakh, commonly known as Changthang. The changthang plateau in the eastern Ladakh represents an important biogeographic province within Indian Trans-Himalayas (Rodgers & Panwar 1988). This tableland forms the western extension of the Tibetan plateau and lies at an average altitude of 4400m. above mean sea level. This region exhibits harsh climatic conditions and unique assemblages of flora and fauna. Much of the plateau comprises

lake basins of varying size, sandy plains and mountains fringed by snow peaks. The internal drainage in some of the basins has resulted in concentration of salts and minerals over the millennia making the water bodies brackish (Rawat & Adhikari 2002). Less than 1% of the geographical area on the plateau is cultivated and most of the vegetated zone is used by migratory pastoral communities i.e Changpa herders as grazing ground (Rawat & Adhikari 2002). At present the, Changpa herders of Changthang are at the crossroad of rapid socio-economic changes and age old pastoral practice. So, far moderate

populations of herders and their livestock have co-existed with wildlife in the area. However, steady increase in the livestock number, limited areas for livestock grazing, rapid increase in the tourism and related developmental activities have caused pressure on the land and resultant conflicts between herders, wildlife managers and development agencies in the area. Despite poor vegetation cover and relatively low standing biomass and high anthropogenic pressure, the pastures near these wetlands sustains a considerably high livestock population.

As per the estimates of the Animal Husbandry Department Leh the population of sheep and goat has almost doubled since 1970's (Annon 1998). Currently the estimated number of sheep and goat in Changthang is ca. 185686. Of this, goats and sheep account for 64% and 36% respectively. Steady increase in the livestock population in the area is attributed to influx of nomadic herders from Tibet during recent decades and perhaps better health care by the government agencies (Rawat and Adhikari 2002). The local pashmina goat yield fine quality wool (Pashmina), which is currently sold in the area at the rate of Rs. 400-600 per kg. It is estimated that pashmina wool alone generates an annual revenue of Rs. 10 million in Changthang. During the recent past the local herders have started raising concern about the degradation of pastures and resultant shortage of forage.

The flora of the region has affinities with very diverse regions the Greater Himalaya, to the south, the Pamirs and Afghanistan, to the west and importantly, Tibet to the east and north. The vegetation is characterized by a life typical of desert environments and have a predominance of annual plants (therophytes, 33%) followed by dwarf shrub (Chamaephytes, 27%) and perennial herbs (geophytes).

The fauna of Changthang exhibit several characteristics which have evolved as adaptations to the regions extreme climatic conditions such as thick fur and fine underwool, bushy tails, large nasal cavities, seasonal migration and hibernation (Schaller 1977). Due to its unique geographical location in the Himalayan region and despite low biological productivity, the region hosts a surprisingly diverse fauna, mainly Palearctic in origin. The region's characteristic fauna includes mammal species, such as Royle's Vole, Tibetan argali and Snow leopard. Bird such as

the Black-necked Crane and the Tibetan Lark, herpetofauna such as the agamid lizard *Phrynocephalus theobaldi*, fishes such as Tibetan snowtrout and insects such as Pierid butterfly.

The recent increase in the tourism activities and unplanned developmental activities in the region are putting adverse impacts on these very fragile and productive ecosystems. One of the characteristics of mountain tourism is high degree of seasonality, which tend to concentrate and enhance its adverse impacts on the environment. This is true for the high altitude wetlands in Ladakh where tourist access is essentially restricted to summer months, which is also the peak period of biological activity and breeding season for much of the fauna (Chandan *et al.* 2005). This may adversely affect the breeding success of the wetland birds, which use these wetlands as their breeding grounds. In the event of any catastrophic disturbance or habitat degradation and modification, the information generated through various scientific studies would help in conserving these important ecosystems.

The traditional resource use of communities are undergoing tremendous change in the last few decades, having a potential influence over the wetland ecosystems. The socio-political situation is causing a great amount of economic changes amongst the communities living around these wetlands. These factors have had an enormous impact over the relationship and livelihood linkages of Changpas with their pasture resources, spread around the wetlands.

There is an urgent need to discuss pertinent conservation issues relating to conservation of these high altitude wetlands and for formulating management plans for these wetlands. This is crucial as a good management plan for a wetland enables focused and sustained efforts for conservation based on workable vision. It is also felt that

there is a need to encourage various stakeholders to recognize the importance of management plans and to emphasize to the state and central Governments for provisioning of separate funds towards implementation of these plans.

The present management plan for the Tsomoriri and Tsokar High Altitude wetlands have been developed through a participatory approach. The whole process was carried out over a period of one year and various stakeholders were consulted during various consultations aimed towards getting inputs from the stakeholders (Annex V, VI, VII & VIII). Besides the scientific community the local communities and local tour operators were also consulted through separate consultations with them. Several crucial issues which this management planning exercise has addressed are:

1. Regulation of Unplanned Developmental Activities.
2. Managing Tourism.
3. Reducing the Human Wildlife Conflict.
4. Ownership and Management of research done in these wetland areas.
5. Training of the Local Wildlife Staff.
6. Training of Local communities.
7. Education and Awareness

The plan tries to identify a way of making sure that wetland management decisions are better shared by all stakeholders, as are the problems of managing a large and a complex area.

Significance of Tsomoriri & Tsokar

Economic

These wetlands are very important as far as the economy of the Ladakh region is

concerned. A major group of the tourists visiting Ladakh, come to see these wetlands. Wetlands are also vital for pastures which are used by Changpas for rearing pashmina goats and sheep. 90% of the economy of local communities depends on pashmina wool.

Tourism

Both these wetlands are important tourist destinations for the tourists coming to Ladakh. The local tour operators and the tourism department are also promoting these wetlands as tourist destinations because of their scenic beauty and wildlife of the area. Tourism at present is developing very fast and many local people directly depend on tourism for their livelihoods.

Local Level

These wetlands are closely linked with the local communities. All the nomads of the area keep moving around these wetlands in search of valuable pastures near these wetlands. Thus these wetlands are the source of livelihood for the local communities.

National Level

Both these wetlands fall in the Changthang region of Ladakh. The wetlands in Changthang, are the only breeding sites for Bar-headed Geese in India and the only sites outside China where highly endangered Black-necked Crane breed. These wetlands also support the endangered mammal species like Kiang, Tibetan Argali, Snow leopard and Lynx.

Regional Level

These wetlands play a very vital role as a staging ground for the various migratory water birds using the Central Asian flyway.

International Level

One of the wetland Tsomoriri has already been declared as a wetland of International Importance: Ramsar site under the Ramsar Convention. The Tsokar wetland also qualifies all the criteria for designation as Ramsar site.

Guiding Principles for Management of Tsomoriri & Tsokar

Guiding principles for managing these wetlands are as follows:

Respecting Community Interests

The local nomadic community claims many key areas especially the grasslands and they are managing them as they are also the sources of livelihood for these people. These people also have economic and community development aspirations and need to maintain the obligations bestowed upon them by the community traditions. These rights and aspirations need to be supported as much as possible.

Caring for Natural & Cultural Heritage

Conserving the natural heritage of these wetlands is fundamental to managing them. Any use of natural resources should be ecologically sustainable and should not adversely effect the biodiversity conservation in the area. Caring for these wetlands includes management that conserves the wetland features. It is a place where people have kept up a lifestyle that has been closely linked to nature and shaped the area as we know it today. Local communities are continuing their association with these wetlands as these provide major pastures for their livestock.

Research and monitoring plays an important role in making sure that wetlands are managed in a more scientific way. A regular research & monitory programme needs to be evolved for long term conservation and management of natural and cultural heritage of these wetlands.

Managing Tourism and Development

These wetlands are an important place for tourism and recreational use. The tour operators at Leh share the scenic beauty of these wetlands with the visitors. In order to make sure that tourism in the area is sustainable, it is very important that all the tourism activities are carried out in a planned manner. Impacts of any tourism activity needs to be minimized and no breeding area or key habitat for the migratory birds should be allowed for activities eg. camping.

More and more community based tourism activities like local homestays and local guides should be promoted. Community based tourism activities on one hand help in providing livelihood to the local community and on the other hand help in conservation.

Like any other area, many developmental projects are coming up in this area too. The unplanned developmental activities are having adverse impacts on these very fragile ecosystems. Many developmental activities are being carried out by different agencies and many of these agencies are totally ignorant about the impacts of their developmental projects on these fragile ecosystems. All the developmental projects should be referred to wildlife department for clearance before implementation.

I General Information

Tsomoriri & Tsokar : Wetlands of National and International Importance

A. Tsomoriri

A1.1 Geographical coordinates: 32° 54'N Latitude, 78° 18'E Longitude.

A1.2 Elevation: (average) : 4600 m above MSL.

A1.3 Area: (in hectares): 25000 ha.

A1.4 General location: Tsomoriri is located 215 km Southeast of Leh town in Eastern Ladakh.

B. Tsokar

B1.1 Geographical coordinates: 33° 10'N Latitude and 77° 55'E Longitude

B1.2 Elevation: (average): 4685 m above mean sea level.

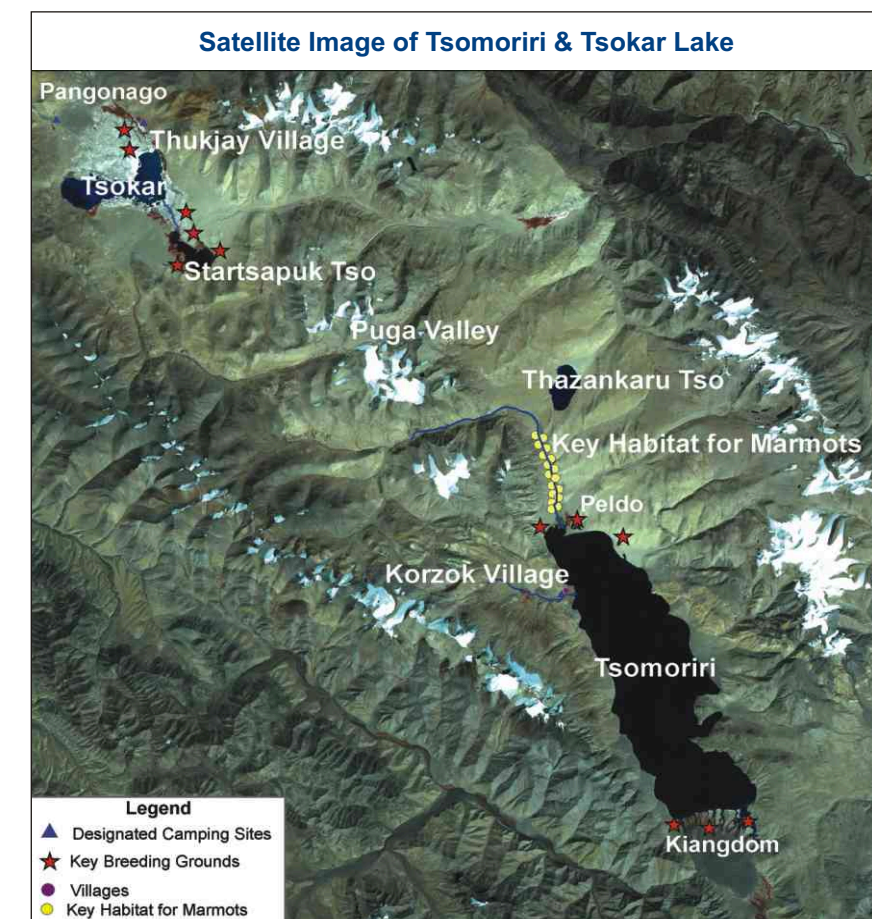
B1.3 Area : 4200 ha.

B1.4 General location: Tsokar is located at a distance of 150 Km southeast of Leh.

Tsomoriri is a fresh to brackish water lake (< 5.85 g/l NaCl) measured in mid-summer, spread over an area of 120 km² with a maximum depth of 40 m. This scenic wetland is among the most popular destinations of tourists visiting Ladakh. Wet meadows and borax loaded wetlands covering about 10 km² border its Northern and Southern shores. The

Nuro Sumdo wetland lies 5 km further South and forms part of the catchment of the Pare Chu river which flows 20 km South of Tsomoriri. Tsomoriri is an important Breeding Ground for Bar-headed Geese and many other key species of water birds. This is the southern most and largest amongst the lakes in Indian Changthang region of Ladakh. Originally the lake had outlets to the Suttlej river system but now it forms a huge enclosed basin fed by two main streams one from the north and other from south-west. This creates extensive areas of wetlands and sheltered bays with small islands. These wetlands constitute prime habitat for breeding waterfowl including the globally threatened, Black-necked Crane and Bar-headed Geese. A third stream which enters the lake from the west has formed a fertile alluvial plain, below the village Korzok, one of the highest areas to be cultivated in the world. The lake remains frozen from December to March.

Tsokar is a salt water lake with large heaps of salt around it (Hussain and Singh 2000). The lake receives water from the freshwater lake Startsapuk Tso through a small channel, which connects both the lakes. The lake also receives some water from the north eastern end. Tsokar is irregularly L-shaped waterbody. Tsokar is an important breeding ground for the migratory water birds like Bar-headed Geese and Brown Headed Gull. Two pairs of endangered Black-necked Crane regularly breed in this wetland (Chandan *et al.* 2005). The research on the floral diversity of Tsokar by Rawat and Adhikari (2003) has reported 232 species of vascular plants belonging to 38 families and 101 genera. Northern parts of Tsokar basin comprising the Shebug nala, Chumik Shaltay, Nabokhar



Map prepared by: IGCRC, WWF-India

and Tsabra catchment are among the best sites for Tibetan Argali in Ladakh. Of the estimated 300 argali in Ladakh, close to 200 occur in this region and mountains along the southern side of Tsokar (Namgyal *et al* 2003). This lake also remains frozen from December to March.

Tsomoriri: A Ramsar Site

Tsomoriri has been designated as a Wetland of International importance, a Ramsar site in 2002 based on following criteria:

- Unique example of a natural wetland type in the Trans-himalayan biogeographic region. Tsomoriri, one of the highest lake in the world lies in the Changthang region, between 4000-5000m altitude. Changthang's most

striking feature is the absence of a consistent slope, which would enable water to drain away. Rather the undulating land forms itself into huge basins, into which snowmelt streams flow, and finding no outlet settle into the brackish lakes, like Tsomoriri.

- Unique faunal assemblages with high diversity, endemism and number of rare or vulnerable species. These include at least 3 bird species: Black-necked crane, *Grus nigricollis* (endangered.), Ferruginous pochard, *Aythya nyroca* (Vul.), Black-necked grebe, *Podiceps nigricollis* (rare), species of large ungulates the Great Tibetan Sheep, *Ovis ammon hogdsoni* (Vul) and Tibetan Wild Ass, *Equus kiang* (Vul.) both

endemic to the Tibetan Plateau plus possibly a third, the Tibetan gazelle, *Procapra picticaudata* (threatened). Also included are a number of smaller herbivores species endemic to the region: one species of vole, *Alticola roylei*, three species of mouse hares, *Ochotona macrotis*, *Ochotona curzoniae*, *Ochotona ladacensis*, one species of hare, *Lepus oistolus* and one species of marmot, *Marmota himalayana*.

- Breeding grounds and key staging posts on migration routes for over 40 species of water birds belonging to 6 families indicative of wetland diversity and productivity (Podicipedidae, Ardeidae, Anatidae, Gruidae, Charadriidae and Sternidae plus the two raptor families Accipitridae & Falconidae).

II The Ecosystem and Resources

2.1 Physical features

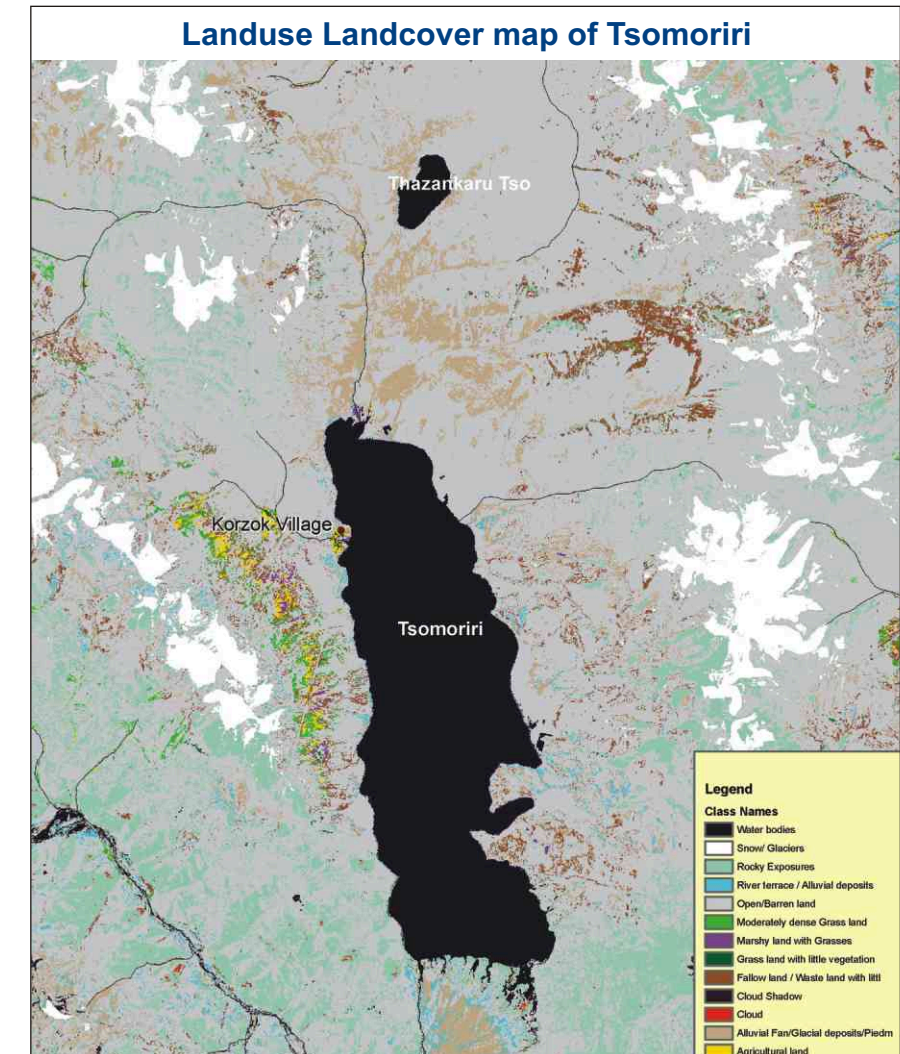
Geographically, Eastern Ladakh (where Tsomoriri & Tsokar are located) represents the western most extension of the Northern Tibetan Plateau or Changthang (Northern plains). The Changthang represents the portion of Tibetan Plateau which extends into India in Ladakh. With average elevations between 4500-5000 m in the plains, annual precipitation of 100 mm and temperature ranges of 0-30°C in summer, -20 to 40°C in winter, the area is a high altitude cold desert. Following the ancient trade route, and now major trekking route, linking Spiti to Rupshu, one travels, as it were, backwards in geological time, retracing along the way, in the well preserved rock and fossil record, major stages of Himalayan tectonic history: from the "recent" sedimentary formations of Upper Spiti (mesozoic) to the Cambrian/Pre-Cambrian terrains of the Tsomoriri & Tsokar lake and upper Indus region.

Tsomoriri is about 25 km long, 5-7 km (max. 8.6 km) wide and more than 40 m deep at the deepest point. The surface area of the lake is 148.8 sq km. Maximum depth was in the southeastern corner of 40m.

The salt water lake Tsokar is about 8 km long and greatest breadth at the eastern end is 4km (Gopal 2000). Most of the lake is about 2m deep although a section of the lake at the eastern end is upto 9m deep (Hussain and Singh 2000). The waters of the Tsokar contain considerable amount of potassium and sulfate.

2.2 Hydrological features

Six major lakes and riverine wetlands including Tsomoriri & Tsokar basins are



Map prepared by:IGCMC, WWF-India

clustered in South Eastern Ladakh within the upper-catchment of the rivers Indus and Suttlej. As such these important water bodies, still practically undisturbed, form an essential part of the hydrology of two of Asia's largest rivers providing fresh water to millions of people in India and Pakistan.

Tsomoriri receives water from several small mountain streams, notably one from the north which enters the lake through pasture land at Peldo laa. A single village, Korzok lies on the western

shore. Another stream, the Phirsa flows into the lake from the north-west, creating a wide, sloping plain or fan, which is bounded by a low ridge. The Phirsa wanders across the plain, at times reaching the lake, at others debouching into the Para river. The creation of the fan by the Phirsa stream is seen as the reason for the creation of the lake itself, by some scientists.

Tsomoriri is considered to be a relict of the ice age, formed by meltwaters of ice masses left behind by retreating glaciers.

Waters from surrounding areas drain into the lake, though the lake has no outflow. Due to desert like conditions, huge amounts of water evaporated very fast from the surface of the lake, changing, what had originally been a fresh water lake into a brackish, and finally saline water lake. During winters the surface of the lake freezes. The shoreline is mainly stony with some sand at the northern end near the Peldo-iaa estuary.

important vegetation cover, the main source of food for wildlife and livestock. While there appears to be no vegetation in the deeper part of the lakes and little macrophytic vegetation along their margins, the surrounding wet meadows and bogs have an abundant plant life including several species of sedge (*Carex*) and grasses e.g. *Pedicularis*, *Primula*.

Malayan and Peninsular India meet here. Creation of the Himalaya had provided dispersal corridors and new habitat for a host of life form from different biogeographic regions. As a result of these interactions, unique assemblage of flora and fauna has evolved and the Himalaya is considered one of the richest biogeographic regions in term of its biodiversity. Overall endemism is high, and the region supports several diverse



Pastureland near Tsomoriri

Tsokar is a salt water lake and Startsapuk Tso is a freshwater lake. Both these lakes together come under Tsokar Basin. The water from the freshwater lake Startsapuk Tso enters the saltwater lake Tsokar through a small channel which connects both these lakes. During the winter months this channel remains dry. These wetlands are mostly fed by underwater springs. Three main streams which feed these wetlands are Chemur and Nachuthang which feed Startsapuk Tso, whereas Pangunagu is the main feeding stream for Tsokar.

2.3 Ecological features

The Changthang's wetlands represent oases of productivity in an otherwise arid steppe environment. They thus play a key ecological role in sustaining a locally

Among the wet meadows which are also fertile pastureland for wild and domestic ungulates, the Nuro Sumdo wetland and Kiang dam pasture at the southern end of Tsomoriri, and the Korzok pastureland along the Korzok stream at the northern end are important, also as habitat for burrowing mammals and the insect fauna. The agricultural fields and nearby marshlands at the confluence of the lake and streams that flow into the lake from the village side serve as important feeding habitats for birds at Tsomoriri.

2.4 Biodiversity

In terms of biodiversity this region occupies a unique place. Five biogeographic zones viz., Palearctic, Mediterranean, Indo-Chinese, Indo-

biological units and provides life support systems for the people of the plains.

But this region is now exposed to recent development and unsustainable heavy exploitation of its rich natural resources and high human pressure, putting tremendous pressure on its fragile ecosystem. The lower and middle Himalayas which are easily accessible has already seen considerable damage to its environment and ecosystems. However, with increased accessibility to its remote valleys recently the higher Himalayas and the Trans-Himalayan regions are also facing similar threats from increased human activities.

Because Trans-Himalayan region falls in the rain shadow of the Himalayan ranges monsoon rarely reaches this region. It

receives very little precipitation and experiences extremes of cold and arid climatic conditions. This accounts for its low productivity, sparse vegetation cover, and typical alpine characteristic. The pasture can only support low densities and wild animals require larger areas to maintain their viable populations by moving between lower winter pastures and summer grazing grounds at higher altitudes. This limitation is recognised by the local herder communities who traditionally live a nomadic life style moving their herds between pastures on a regular annual cycle (Annex I), over a very large area.

To overcome extreme environmental conditions, both plants and wild animals have adapted themselves in many ways. This region may not be as rich as many other biomes of the world, in terms of number of species, but its highly variable topography, elevation, aspect and snow cover creates a highly diverse micro climatic condition which support a variety of plant communities. To survive in extreme environment their morphological, ecological and behavioural adaptations are unique. These diverse assemblages of communities, diverse life forms and adaptations contribute significantly to its biodiversity value. These highly specialised organisms adapted to the prevailing extreme environment also make them highly vulnerable to any change in the environment and perturbations to their environment. This vulnerability is what makes these high altitude systems one of the most fragile ecosystems of the world.

The Changthang region of eastern Ladakh is vastly different from western region characterised by steep rugged mountains and narrow gorges. In contrast to this, the Changthang region has, wide open valleys surrounded by rolling hills and creates a network of self drain areas, which forms a series of

lakes. These lakes may be of different origin and are mostly situated at very high altitudes ranging from 4400m to 5000m. At such high altitudes, these brackish water lakes with their adjoining marshes and lush grasslands provide several important habitats for a host of migratory and resident birds and mammals communities. These lakes with their blue waters and surrounding colourful mountain ranges provide breath taking views. Though these areas have remained un-noticed due to inaccessibility of the region but in recent past most of these lakes are now accessible to vehicular traffic and open to tourist and now tourists from different parts of the world travel to these lakes to admire the beauty of this unexplored region. This has also brought in with its own set of threats and which require urgent attention from all stakeholders may it forest department, wildlife department, tourism department, local communities, travel agents and tourist themselves.

2.4.1 Flora

The vegetation, of the Ladakh region, was classified by the early phytogeographers as *Caragana - Lonicera-Artemisia* formation (Osmaston 1922), Zone of dry bushes (Nakao 1955), Alpine steppe (Schweinfurth 1957), Dry alpine scrub (Champion & Seth 1968), Alpine stony deserts (Puri *et al.*, 1989) and High altitude cold desert (Rodgers and Panwar, 1988). However, the rain shadow effect of the Great Himalayan range, and influence on the flora of the region has been well recognised (Hooker 1906, Chatterjee 1939). Several botanical explorations and natural history records have contributed towards the advancement of the knowledge of the flora (Burkill 1965). In general, this region is considered as floristically impoverished as compared to the areas of same altitudes in main Himalayan ranges (Mani, 1978; Schweinfurth 1984).

Because of its unique location at the cross road of several floristically distinct region, the flora of the Ladakh includes characteristic of Afghanistan, Siberia, Tibet, and Himalayan flora along with its own unique communities, associations and endemic species. The adaptability of these plants to extreme climatic conditions and biotic pressures (e.g., grazing) is of utmost biological interest. Therefore, more attention is being given by the conservationists and biogeographic planners in recent years (Rodgers & Panwar 1988).

Diversity and affinities of the flora:

The review of the available literature on the flora of the Trans-Himalayan region suggest that approximately 750 species of flowering plants have been recorded so far (Rau 1974, Kachroo *et al.*, 1977). When this is compared with the flora of similar altitudes range of the main Himalayan region of Kumaun, where over 830 species have been recorded within 7,000 km² only (Rawat 1984).

The vegetation at Tsomoriri & Tsokar can be broadly grouped into scrub formations, desert steppe and marsh meadows. The major communities include Caragana-Eurotia, Artemisia-Tanacetum, Stipa-Oxytropis-Alyssum, and *Carex melanantha-Leymus sccalinus*. Very high altitudes (5000 m) have sparse fell-field communities with moss or cushion-like growth forms, e.g., *Thylacospermum caespitosum*, *Arenaria bryophylla*, *Androsace sarmentosa* and a variety of lichens. Stream banks and marsh meadows around both the lakes (except areas of borax and salt deposits) exhibit a characteristic sedge dominated vegetation represented by species of *Carex*, *Kobresia*, *Scirpus*, *Triglochin*, *Pucciniella*, *Ranunculus* and *Polygonum*. The shallow parts of both the lakes support dense growth of aquatic plants such as *Hippuris vulgaris*, *Potamogeton pectinatus*, *Potamogeton perfoliatus*,

Key Plant Species Recorded at Tsomoriri & Tsokar

Scientific Name	Family
<i>Astragalus confertus</i>	Fabaceae
<i>Calamagrostis pseudophragmites</i>	Poaceae
<i>Pedicularis oederei</i>	Scrophulariaceae
<i>Pedicularis pectinata</i>	Scrophulariaceae
<i>Leontopodium himalayicum</i>	Asteraceae
<i>Kobresia royleana</i>	Cyperaceae
<i>Kobresia nepalensis</i>	Cyperaceae
<i>Heteropappus altaicus</i>	Asteraceae
<i>Chenopodium glaucum</i>	Chenopodiaceae
<i>Delphinium brunonianum</i>	Ranunculaceae
<i>Ephedra gerardiana</i>	Ephedraceae
<i>Potentilla anserina</i>	Rosaceae
<i>Polygonum delicatulum</i>	Polygonaceae
<i>Sussurea gnaphalodes</i>	Asteraceae
<i>Ranunculus lactus</i>	Ranunculaceae
<i>Salix hastata</i>	Salicaceae
<i>Veronica biloba</i>	Scrophulariaceae
<i>Physochlaena praealta</i>	Solanaceae
<i>Poa lahulensis</i>	Poaceae
<i>Kochia indica</i>	Amaranthaceae
<i>Lamatogonium carinthiacum</i>	Gentianaceae
<i>Draba alpina</i>	Brassicaceae
<i>Chenopodium botrys</i>	Chenopodiaceae
<i>Eremopoa persica</i>	Poaceae

Zannichellia palustris, and *Ranunculus natans*.

The habitat diversity and life forms:

The habitat features (both macro and micro) across the Tsomoriri & Tsokar landscape vary considerably according to the topographic, elevation, aspect and hydrological features. Distinct habitat types must be identified and characterised so that their conservation status can be monitored for future change in the characteristics. Though at this early stage no detailed study has been carried out but based on the reports published and several field visits a tentative list of major habitat types and their characteristic floral elements are presented here to provide a guide to future classification after detailed floristic studies are conducted.

Following are some of the important habitat types visualised :

i. **Moist slopes:** These are found in north facing slopes close to the glaciers and are characterised by the alpine mesophytic elements and which are characterised by species such as *Delphinium*, *Potentilla*, *Leontopodium*, *Taraxacum*, *Aster*, *Polygonum*, *Astragalus*, *Poa* etc. These slopes are important summer pastures for both wild animals and livestock and require greater attention.

ii. **Middle drier slopes:** Gently rolling slopes where snow melts early and vegetation is sparse but these are extensive and cover a very large proportion of the region and range between 4500-5000 m. These slopes are

characterised by distinct features in the vegetation composition. Characteristic species include: *Carex nivalis*, *Oxyria digyna*, *Polygonum*, *Draba lasiophylla*, *Sedum ewersii*, *Oxytropis lapponica*, *Potentilla multifida* and *Nepeta*.

iii. **Flat moist grasslands:** These are large, flat areas close to lake banks. These are known as *Kobresia* meadows. These are important winter pasture for livestock. But these pastures are facing pressure from increasing number of trekking parties bringing horses and letting them lose for grazing. The water holding capacity of the marsh meadows is very high, largely due to high organic carbon.

iv. **Moist Kobresia meadows or marshes:** The flat areas around the rivers flowing into the lake and flat area around the lakes forms an extensive network of marshes. These are important habitat for breeding population of several migratory species. These are important winter grazing areas for the livestock also. They are characterised by species such as *Catabrossa aquatica*, *Chaerophyllum villosum*, *Euphrasia vulgaris*, *Pedicularis longiflora*, *Juncus* spp., *Carum carvii*,



Local nomads at Tsokar

Veronica beccabunga.

v. **Steep rocky slopes and screes:** The rubble slopes and stable scree areas are characterised by the species like *Axyris amaranthoides*, *Crepis tenuifolia*, *Oxyria digyna*, *Thermopsis inflata*, *Euphorbia tibetica*, *Lagotis globosa*, *Rheum tibeticum*, *Rheum webbianum*, *Saussurea tibetica*.

vi. **Snowline zone:** Extreme altitudes along perpetual snow (5200 - 5500 m) are with a very short growing season, and very poor in species diversity. A few species of this zone are *Sedum ewersii*, *S. tibeticum*, *Draba* spp., *Arenaria kashmirica*, *Christolea himalayensis*, *C. crassifolia*, *Chorispora subulosa*.

2.4.2 Fauna

2.4.2.1 Birds

Despite extreme climatic conditions and high elevation, Tsomoriri is surprisingly diverse. This is mainly due to its unique habitats. The high altitude lake provides important breeding ground for host of resident and migratory birds. A total of 280 species of birds have been reported from Ladakh alone (Pfister 2004) and more than 150 species from Tsomoriri & Tsokar region. Many species show local migration within the region and breed within the catchment. A large proportion of the avifauna of the region is represented by migratory species. Most of these visit during summer for breeding. The survival of these migratory species will depend on the adequate protection of their breeding grounds. A high priority must be given to the protection and conservation of these bird communities and breeding grounds of migratory birds, rare and endangered species such as Black-necked Crane, Bar-headed Geese, and other waterfowl.

Tsomoriri & Tsokar wetlands represent important breeding ground of the Bar-headed Geese, *Anser indicus* in India. They are also breeding ground for the globally threatened Black-necked crane, *Grus nigricollis*. The largest of these lakes within Indian territory is the Tsomoriri which, together with neighbouring Tsokar, is believed to be the most important breeding locality for waterfowl in Ladakh. Other than the Bar-headed Geese, the main water bird species breeding in the area include: the Ruddy shelduck, *Tadorna ferruginea*, Common redshank *Tringa totanus*, Brown-headed gull, *Larus*

List of water birds at Tsomoriri & Tsokar

S. No.	Common Name	Scientific Name
1.	Bar-headed Geese	<i>Anser indicus</i>
2.	Ruddy shelduck	<i>Tadorna ferruginea</i>
3.	Garganey	<i>Anas querquedula</i>
4.	Northern shoveller	<i>Anas querquedula</i>
5.	Red crested pochard	<i>Rhodonessa rufina</i>
6.	Common pochard	<i>Aythya ferina</i>
7.	Tufted duck	<i>Aythya fuligula</i>
8.	Ferruginous pochard	<i>Aythya nyroca</i>
9.	Common merganser	<i>Mergus merganser</i>
10.	Northern shoveller	<i>Anas clypeata</i>
11.	Common coot	<i>Fulica atra</i>
12.	Common redshank	<i>Tringa totanus</i>
13.	Common greenshank	<i>Tringa nebularia</i>
14.	Green sandpiper	<i>Tringa ochropus</i>
15.	Common sandpiper	<i>Actitis hypoleucos</i>
16.	Temminck's stint	<i>Clidris temminckii</i>
17.	Black winged stilt	<i>Himantopus himantopus</i>
18.	Lesser sand plover	<i>Charadrius mongolus</i>
19.	Brown headed gull	<i>Larus brunnicephalus</i>
20.	Pallas's gull	<i>Larus Ichtyaetus</i>
21.	Common tern	<i>Sterna hirundo</i>
22.	Great crested grebe	<i>Podiceps cristatus</i>
23.	Eurasian wigeon	<i>Anas penelope</i>
24.	Gadwall	<i>Anas strepera</i>
25.	Mallard	<i>Anas platyrhynchos</i>
26.	Common teal	<i>Nettapus coromandelianus</i>



Bar-headed Geese with chicks

S. No.	Common Name	Scientific Name
27.	Black-necked Crane	<i>Grus nigricollis</i>
28.	Common moorhen	<i>Gallinula chloropus</i>
29.	Common snipe	<i>Gallinago gallinago</i>
30.	Little curlew	<i>Numenius minutus</i>
31.	Whimbrel	<i>Numenius phaeopus</i>
32.	Bar-tailed godwit	<i>Limosa lapponica</i>
33.	Black-tailed godwit	<i>Limosa limosa</i>
34.	Wood sandpiper	<i>Tringa glareola</i>
35.	Red necked phalarope	<i>Phalaropus lobatus</i>
36.	Glossy ibis	<i>Plegadis felcinellus</i>
37.	Marsh sandpiper	<i>Tringa stagnatilis</i>
38.	Terek sandpiper	<i>Xenus cinereus</i>
39.	Ruddy turnstone	<i>Arenaria interpres</i>
40.	Little stint	<i>Calidris minuta</i>
41.	Curlew sandpiper	<i>Calidris ferruginea</i>
42.	Ruff	<i>Philomachus pugnax</i>
43.	Pied avocet	<i>Recurvirostra avosetta</i>
44.	Pacific gloden plover	<i>Pluvialis fulva</i>
45.	Grey plover	<i>Pluvialis squatarola</i>
46.	Whiskered tern	<i>Chlidonais hybridus</i>
47.	Gull-billed tern	<i>Gelochelidon nilotica</i>
48.	Black-necked grebe	<i>Podiceps nigricollis</i>
49.	Grey heron	<i>Ardea cinerea</i>



Black-necked Crane on nest

brunnicephalus, Lesser sand plover, *Charadrius mongolus* and Great Crested Grebe, *Podiceps cristatus*.



Blue Sheep

2.4.2.2 Mammals

Ungulates

The trans-Himalayan region harbours the richest wild sheep and goat community, which includes eight species and subspecies. All these species are nationally and globally threatened. Tsomoriri & Tsokar supports three mountain ungulate species all of them are listed under Schedule I of the Indian Wildlife (Protection) Act 1972 (WLP Act, 1972) and in Appendix I of CITES. This gives an indication of the present precarious conservation status of animals in the region. These include blue sheep *Pseudois nayaur*, Tibetan argali *Ovis ammon hodgsoni* and Kiang *Equus kiang*. Of these, three, Tibetan argali are highly threatened and in the past they have become locally extinct from a large part of their distribution range. A substantial population of argali is distributed widely on the higher slopes of

the Tsomoriri catchment in relatively low densities. In some areas due to severe competition with livestock and loss of habitat and its quality resulting due to increasing human and livestock



Kiangs

populations, the density is also very low (Ranjitsinh, 1981; Osborne *et al.*, 1983). The Tsomoriri catchment support a small population of kiang but local communities resent its competition with livestock.

Most of these populations and species are not studied in detail and therefore very little is known on the ecology of these critically threatened species. The paucity of this ecological and biological information on these populations is one of the major limitations in developing a comprehensive specific management or conservation plan for these species but a general approach can be taken in the planning process to include the ecological requirement of these ungulate species.

Carnivores

Predators include the Pale weasel, the Red fox, the Wild dog, the Tibetan wolf, Lynx, and Snow leopard, all of whom are globally or nationally threatened. In the open rolling mountains near these wetlands, Wolves are the major predator species in the region and are in direct conflict with local herders. Among all the carnivore population, wolves are considered menace in the region mainly due to the loss suffered by local herders.



Snow Leopard

Photo Credit: Joanna Van Gruisen

Photo Credit: Joanna Van Gruisen

In the high rugged mountains snow leopard stalk prey like bharal, but are rare in the region compared to areas further west. Lynx and wild dog are extremely rare predators, but their sightings have been reported by many scientists. Predator abundance and basic aspects of their ecology are poorly understood and much needs to be done to understand this along with the emerging intensification of conflicts.

Lagomorphs, Rodents and Other Groups

At least 7 species of Lagomorphs are found in Ladakh including two hares and five mouse hares. The Woolly Ladakh hare is widely distributed in eastern part (Mallon 1990). Three species of pikas have been reported from the Changthang region the Plateau pika *Ochotona curzoniae*, Ladakh pika, *Ochotona ladakensis* and the large-eared pika *Ochotona macrotis* (Chundawat *et al* 1994, Pfister, 2001). A large rodent of the region includes the Himalayan marmot *Marmota himalayana bobak*. Other than the species occurring commensally with man, some four rodents have been reported from the region the yellow necked field mouse *Apodemus flavicollis*, Ladakh hamster, *Cricetulus alticola*, Royle's vole, *Apodemus roylei* and Stoliczka's mountain vole, *A.stoliczkanus*. However it is likely that others are also present, especially amongst the Cricetidae (Vole



Agriculture fields near village Korzok

& hamster family), as the group as a whole has been barely investigated so far. Tsomoriri supports three to four species of mouse hare and more than two species of voles and can be an indicators community for quality of the *Kobresia* grassland and marshes which are the important feeding and breeding ground of host of migratory bird species.

2.5 Social and cultural values

The village Korzok is situated at the northern end of the lake. This is the only village near lake Tsomoriri which is inhabited by Changpas. There are at present, approximately 149 households comprised of both settled and nomadic communities. Of these 23 households are settled in the village. Among the nomads, the *Tigazong* group comprises of 80 households and the *Phestse* group comprises of 25 households. Besides these, there are 21 households belonging to Tibetan refugees. These

families have associated livestock, grazing land and small agricultural field in the catchment. The wetland provides rich pastures for domestic livestock. The area has recently been opened to foreign tourists, thereby providing local community direct as well as indirect employment. Korzok monastery in Korzok village, some 400 years old unlike most of gompas in Ladakh is built on gentle slope and is not multi-storeyed and attracts many tourists. The wetland is considered 'Sacred' by the local Buddhist community and the water of the wetland is not used by them. At the WWF Annual Conference, Nepal, Nov, 2000, Tsomoriri was committed as a 'Sacred Gift for a Living Planet' by the local community. This was possible mainly due to WWF-India's efforts and trust building with local community.

The village Thukjay is situated on the North eastern end of Tsokar. Unlike Korzok village most of the villagers here are nomads. According to 2001 census, Tsokar area has 89 households. Most of the time of the year people live in the nomadic tents made out of the yak hair, commonly known as rebos. Every household has a house at village Thukjay, which is used mostly to store goods. People seldom live in these houses. It is only recently that the number of houses has increased as Ladakh Autonomous Hill Development Council (LAHDC) has provided small houses to these nomads at Thukjay. The local government has also constructed buildings for the school, fodder storage, ration storage and medical facilities in the settlement. The local community at Tsokar also share their resources with the 22 households of the Tibetan refugees, who came here in 1959. People of the area are the only group of nomads in Changthang who do not practice crop cultivation and are entirely dependent on the pastoral pursuit for their livelihoods. Their main source of cash income is generated through

Mammals near Tsomoriri & Tsokar

Species	Scientific Name	Conservation Status	
		WLP Act 1972	IUCN Category
Tibetan Argali	<i>Ovis amon hodgsoni</i>	1	Critical
Ladakh Urial	<i>Ovis orientalis vignii</i>	1	Endangered
Bharal	<i>Pseudois nayaur</i>	1	Low Risk
Tibetan Wild Ass	<i>Equus kiang</i>	1	Vulnerable
Wild Yak	<i>Bos grunniens</i>	1	Critical
Snow Leopard	<i>Uncia uncia</i>	1	Endangered
Lynx	<i>Lynx isabellina</i>	1	NA
Tibetan Wolf	<i>Canis lupus chanko</i>	1	Vulnerable
Wild Dog	<i>Cuon alpinus laniger</i>	11	Critical
Red Fox	<i>Vulpus vulpus</i>	11	Low Risk



Nomads at summer pastures

pashmina hair, most valuable goat's hair, reared by them. They rear livestock like sheep, goat and yaks. Produce from their livestock like meat, hair, wool etc. are sold or bartered in exchange of cultivable produce and other goods. The barter exchange is very rare now and mostly it is cash driven. These livestock products are also predominantly consumed at the household level because they practically provide them with everything like clothes, shoes, tents and food and predominantly it is the cultivable produce which is accessed from outside.

Before 1962 war between India and China, local nomads used to bring salt in the area from Tibet. Following the 1962 war, the nomads used to buy salt from Leh and Manali for seven to eight years. Then they discovered a site at the south east end of Tsokar, suitable for salt collection and fenced off the area. They regularly use to collect salt in the months of September and October and it was equally distributed with in the community. The salt was taken to Zanskar and Leh for trading, where it was exchanged for barley and cash. For the past seven years no salt has been extracted from Tsokar because a rise in the water level of the lake has drowned the particular site where they used to collect salt. This has led to loss of livelihood for people of the area.

The pashmina hair is rarely used for self-consumption whereas sheep wool is primarily used for making cloths and carpets and only the surplus wool is sold. Traditionally, yak hair is kept for making or repairing nomadic tents, while the wool is sold for making rough carpets. The meat of the sheep and goat are also sold to butchers from Leh who come to village to buy the same. A large amount of the money the locals have is spent on travelling to Leh, in the absence of any public transport system. The ever fluctuating market prices of pashmina leave the local communities vulnerable. The local communities also borrow money from private traders who come to buy wool and pashmina hair regularly. At present people wish for a sedentary life and are intended towards cultivation. Few households find work as road-building labour or go to Leh for other jobs as labourer in summer months. Besides all this local communities still identify livestock rearing as the most important livelihood income for them.

2.6 Land tenure/ownership

(a) Site:

- Both the lakes are owned by the Government of Jammu and Kashmir and are part of the Changthang cold desert Sanctuary.



Local nomadic tent

(b) Surrounding areas:

- Surrounding area is largely State owned and ITBP establishments have taken possession of some area near lake Tsomoriri. Most of the land of the village Korzok near Tsomoriri and Thukjay near lake Tsokar is owned by the local communities.

2.7 Current land use

(a) Site:

- The lake Tsomoriri is held sacred by local community. Couple of years back tour operators held a 'regatta' in which boating was organised. But this is not a regular feature.
- There used to be regular Himalayan Car Rallies in the Tsokar Basin till 2005. But now this has been stopped.
- Many areas close to wetlands are used by tourists for camping.
- Local people at Tsokar were regularly extracting salt from the southern end of the lake, some seven years back. Before salt extraction began at Tsokar they used to go to Tibet to collect salt from Medum Tso in Tibet. It used to take months to bring back the salt home and it was coordinated with their yearly migration to winter pastures in Tibet (China).

(b) Surrounding areas:

- The marshes and pasturelands around lakes are grazed by domestic and nomadic livestock. These high altitude pasturelands of Changthang are historically the home of Pashmina Goat and main centre for production and supply of Pashmina wool from these areas to the Indian plains and Kashmir valley. Several species of Ungulates and big herds of *Kiang* also depend on these pasturelands for grazing. A small portion on the periphery is used by the people of Korzok village for agriculture. The barley fields at Korzok are considered to be the highest cultivated land in the world. As tourism increases the new land use emerging out of this is the camping by tourists right near the

lake shore. In a recent survey, 66 tents and 640 sheep and goats in an estimated pasture area of less than 20 sq km at Korzok Phu, which is the main summer settlement upstream of Korzok village were recorded.

- Local nomads at Tsokar customarily enjoy rights over its pastureland and its territories are respected by the neighbouring communities. All its pasturelands are common pastures and there is no individual ownership. According to the government records, however, all the pasturelands belong to the government and the customary rights of the people are not considered legal. The government records term these pasturelands as barren lands.

Local communities are not aware of such a legal status of their pasturelands and assume a complete control over their resources, whereas building of Manali-Leh highway and other civic infrastructure are not considered to be any breach of customary land tenure. With a history of losing out their pastures to Tibet, the people of Samad are cautious of losing any more of their pasturelands. There are inter community conflicts over the limited pasture resources around these wetlands since anymore loss of their pastures would be extremely harmful to their livelihoods.



Caragana bushes for use as fuel wood

III Problems and Threats



Campin at key Marmot habitat near Tsomoriri

3.1 Tourism

The construction of a road right up to the lake has opened up this once remote basin for tourism and economic activities. The increased human activity, if not managed properly, is likely to affect the breeding waterfowl population. Tsomoriri lake region is experiencing a rapid and considerable development of tourism ever since it was opened to outside visitors in 1992,93, as it lies at the confluence of three important trade and now tourist routes: Spiti in the South, the Tsokar basin accessible from the Manali-Leh road in the North West and the jeepable road leading to Upshi and Leh in the North East. The vast majority of tourists come from Western countries attracted by the area's remoteness and novelty, a recently opened and unspoilt

destination, its pristine high desert landscape and lively cultural tradition, all widely advertised by a number of tourism agencies and adventure tour operators. Direct disturbance, willful or not, is another serious threat closely associated with uncontrolled tourist access to areas of high biodiversity e.g. Kiang chased by jeep safari, disturbance to the Black-necked crane in its feeding and breeding grounds. Increasing pollution levels in areas of tourist concentration like trekking routes and campsites is gradually becoming a problem, in places a serious one, affecting both people and wildlife. In the absence of garbage disposal facilities, the practice of dumping garbage into nearby streams as well as into marmot, mouse hare or vole burrows, has become common in recent years.

One of the characteristics of tourism and mountain tourism in particular, is a high degree of seasonality, which tends to concentrate and enhance its adverse impact on the environment. This is especially true of fragile high altitude ecosystems such as Spiti and Ladakh where tourist access is essentially restricted to the summer months, which is also the peak period of biological activity and breeding season for most of the bird and other fauna. Direct impact of tourism are: overgrazing, disturbance to wildlife, pollution, generation of solid waste. They can be severe especially when, as is the case here, tourism development is sudden, massive and the area totally unprepared for it. Records at Tsomoriri show that the lake received over 3000 tourists just in the 2006 season.



Pashmina goat at a pastureland

3.2 Grazing

In recent years the entire Rupshu valley is degrading because of over grazing by domestic livestock. Increasing pressure on pastures with the exponential rise in the numbers of trekkers and pack animals is of particular concern since the prospects for pasture regeneration are severely limited by the extreme climatic conditions in the region. Soil compaction and deep barren jeep tracks are an increasingly common sight around popular camping grounds. The entire shorelines of the lakes under high grazing pressure results in decreased availability of grazable biomass for the wild geese and wild ungulates such as kiang. The shorelines along the streams closer to Korzok and in some parts along the main lake Tsomoriri in recent years are being cultivated resulting in disturbance to wildlife, water abstraction and associated problems. Pasture

degradation also affects wildlife especially wild herbivores (marmots, hares, ungulates), which may be driven off the most severely affected areas.

Though trends in livestock holdings in Eastern Ladakh are not well documented, overstocking has been reported in the region at least from the 80s. The high levels of mortality that occurred then (Darokhan 1986) as well as more recently, including in 1999, in the survey area, are thought to be a manifestation of deteriorating pasture quality combined with particularly severe weather conditions. Still, the rising prices of the high quality "pashmina" or cashmere wool, the winter under fur of the local high altitude Changra goat, is a strong incentive to further increase stocking rates.

The growing number of Tibetan refugees, many of them herders from the Tibetan Changthang, who have acquired livestock, mostly sheep and goats, over the last decades, is adding further pressure on Eastern Ladakh rangelands. Finally, the rapid development of trekking tourism in recent years and the substantial number of pack animals that it introduces into the region during the summer season is becoming a serious threat to the available pastures.



Tourist camp at Tsomoriri

3.3 Degradation of Catchment area

The local population and the other nomadic population heavily exploit the vegetation of the catchment for source of energy, in particular for fuel wood leading to denudation of the catchment.



Construction activities near Tsomoriri

3.4 Water Pollution

With the onset of summers, large numbers of Rebos (nomadic tents) are pitched along the streams and people use these streams for domestic use. There is increasing evidence that these streams are bringing large amount of Nitrogenous compound into the lake resulting in unusually high concentration of Ammonium-N and Nitrate-N. Such concentration is high near the northern end (Hussain & Singh, 2001). Tsomoriri & Tsokar usually get large contingent of tourist from India and abroad. Most of them come to these sites by automobiles. In many cases the vehicles are being cleaned on the lake shores resulting in contamination of water with diesel and heavy metals.

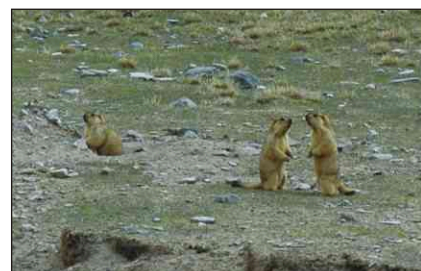
3.5 Habitat degradation

Based on topographic, physiographic and hydrographic evidences many workers have earlier concluded that the level of lakes had oscillated in past, first falling considerably since the ice age and then increasing during the recent past.



Road construction in catchment

At Tsomoriri the increase has accelerated in the recent years due to increased summer precipitation. The increased water level has submerged some of the islands particularly in the northern end of the lake. These islands were extensively used by nesting birds such as Bar-headed Geese and other waders. The disappearance of these islands has resulted in the decline in their abundance. Large number of vehicles in the Tsomoriri & Tsokar catchment and in fact in the entire Rupshu and Changthang are often plying outside of the designated road or tracks causing disturbance to wildlife, mortality of lizards and destroying the landscape and thereby decreasing the biodiversity and scenic values of the catchment. The tourist camp sites do not have solid waste disposal and sanitation facilities. As a result the breeding and feeding sites for biodiversity are getting impacted.



Degraded Marmot habitat

3.6 Human-wildlife conflict

The local Changpa community are now practicing subsistence agriculture by drawing water from the feeder streams. In recent years there are increased reports of human wildlife conflicts resulting from crop damage caused by wildlife and loss of livestock due to depredation by snow leopard and wolf.

3.7 Unplanned development

The development activities in the region are sectoral and there is lack of dialogue among development agencies leading to inter-sectoral policy inconsistency. Deployment of large contingent of paramilitary forces in the region has raised concern in various ways. The camp on the shoreline of Tsomoriri is a major disturbance to the breeding birds. The feral dogs thrive on the leftovers of the camp, eggs and fledgling of the breeding birds. Building of tourist facilities near the lake shore without proper impact assessment, installation of

generator near the lake for providing electricity facility to Korzok are some such examples. Such unplanned development will have detrimental impacts on biodiversity, scenic value of lake and the habitat quality in the long-term.



Tourist resort near Tsomoriri

3.8 Feral dogs

A major threat to the population of breeding birds especially Black-necked Crane and Bar-headed Geese is the feral dogs. These feral dogs eat away the eggs and chicks of the birds during breeding season. The population of these dogs is increasing at an alarming rate and at present there are no means to check this increasing population. Some of these dogs are kept by the units of Military and Paramilitary forces and once the unit moves, these dogs are left in area which later become feral.

IV Current Management

4.1 Jurisdiction

Territorial: State of Jammu & Kashmir

Functional: Department of Wildlife Protection, Govt. of Jammu & Kashmir, India.

4.2 Management

Tsomoriri & Tsokar are administratively designated as Wetland Reserves. Shooting wildlife is strictly prohibited. A check post has been established by the State Department of Wildlife Protection near Mahe bridge from where tourists enter towards the lake.

Tsomoriri is recognized as a wetland of National Importance. It has also been designated a Wetland of International Importance- a Ramsar site. Tsokar is also recognized as a wetland of National Importance.

In addition, Tsomoriri Conservation Trust legally formed by local community of Korzok also helps in conservation of Tsomoriri by regulating camping and vehicle movement around Tsomoriri. At Tsokar, Tsokar Conservation Trust legally formed by the local community of the area helps in conservation and tourism regulation.

4.3 Management authority

Wildlife Warden, Leh
Department of Wildlife Protection
Govt. of Jammu & Kashmir
Leh, Ladakh

V Management Planning

5.1 Approach

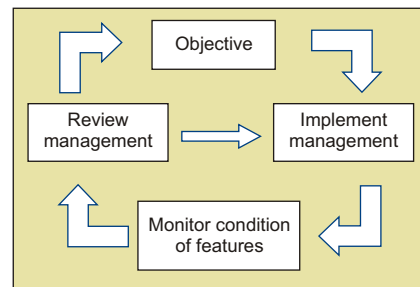
The threats impacting the integrity of Tsomoriri - Tsokar ecosystems and to the well being of its population are very serious but so are the prospects to mitigate them and to promote sustainable development if corrective measures based on local needs and support are initiated rapidly. Most important in this respect is the fact that degradation in terms of pollution and wildlife disturbance. The existence of traditional management systems such as low intensity pastoralism, which have made it possible for the wild fauna to survive till today. The lakes lie within the boundaries of the proposed High Altitude Cold Desert National Park in Eastern Ladakh. Tsomoriri was designated as a Ramsar site in year 2002. Management planning for Tsomoriri became imperative in face of both internal and external threats beginning to impact its ecological character.



Management Planning meeting at Leh

Management planning is an ongoing process. Adaptive management is the key element. Good planning requires continuous monitoring and evaluation to test the effectiveness of the plan.

Lessons learnt act as the feedback loop to review the appropriateness of management actions and policies and then used to either a) make adjustments to the original plan to keep it on the right track; or b) use the lessons to develop the next version of the plan.



The adaptable management cycle

Successful management planning will be characterised by these features:

- It is a **process**, not an **event** i.e. it does not end with the production of a plan, but continues through its implementation and beyond.

- It is concerned with the **future**: it identifies concerns and future alternative courses of action, and examines the evolving chains of causes and effects likely to result from current decisions.

- It provides a **mechanism** for thinking about threats and opportunities and other difficult issues, **solving problems** and **promoting discussion** between involved parties.
- It is **systematic**: most planning exercises work through a pre-determined sequence of steps that give structure to the process and encourage a logical approach. A systematic approach helps to ensure that decisions are based on knowledge and analysis of the subject and its context, and helps others to understand the rationale for proposed actions.
- It also involves **value judgements**. Management planning can be thought of as a "process which embraces the identification of what a [protected area] is and what it **should** become and how to maintain or attain that desired condition in the face of changing internal and external conditions"(Lipscombe 1987). The use of the word 'should' implies that value judgements help determine what 'should be', as well as 'what is'. Planning for protected areas is thus centred not only on analysis of the objective condition of the natural resource, but also on people and their opinions.
- It takes a **'holistic'** view. The planning process can, if carried out openly and inclusively, take into consideration a very wide range of issues, views and opinions. When applied to a particular area, it should be able to include all processes and issues arising within it, as well as those arising outside its boundaries. How integrated or

'holistic' the process is will depend, however, on how the process is carried out, who is involved and how the final decisions are made.

- It is a **continuous** process; it is never static; it must adjust to changing conditions and goals.



Management Planning meeting at village Korzok

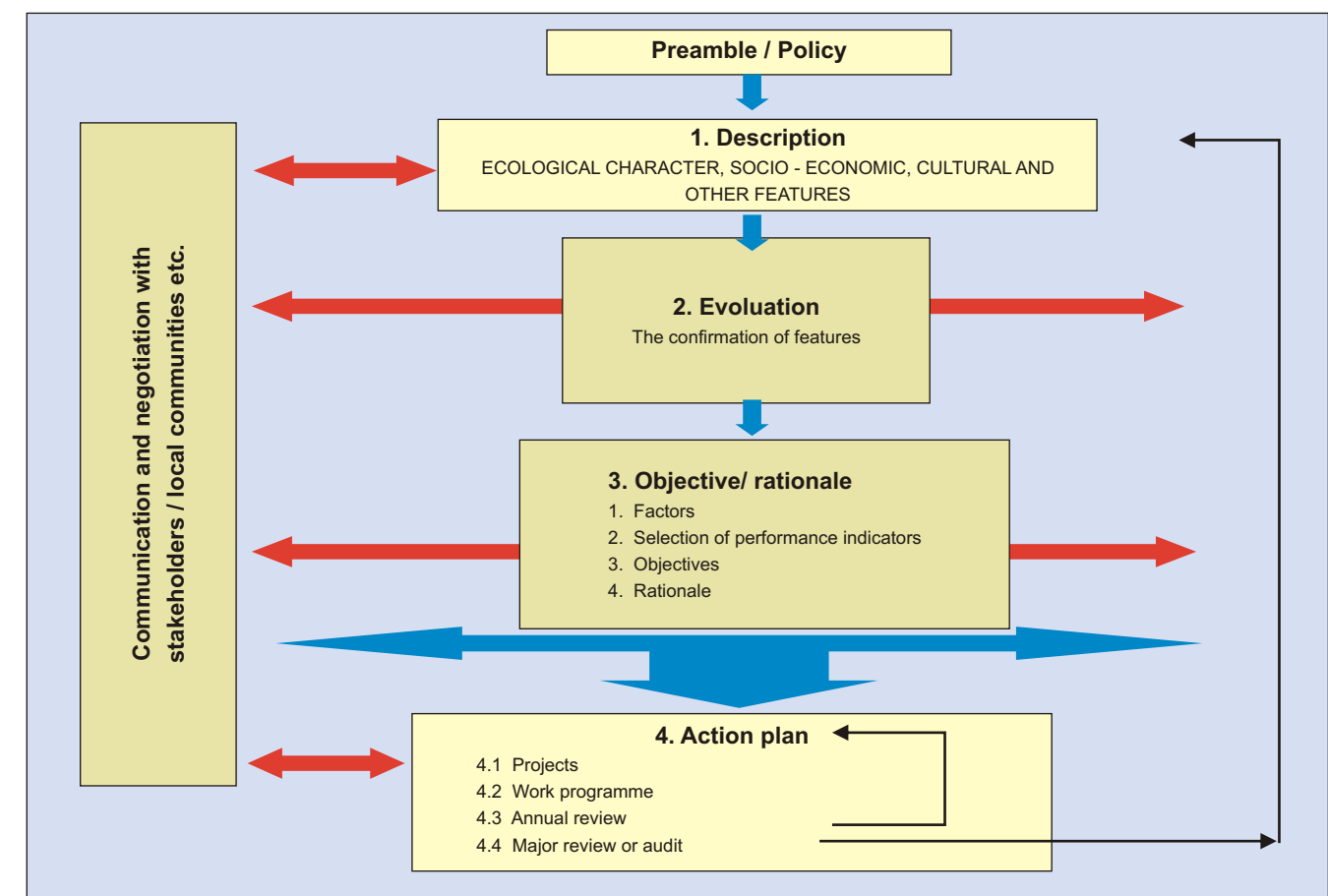
Adopting a participatory approach to management planning by involving legitimate stakeholders in the management planning process, particularly local communities and indigenous peoples, is beneficial in a number of ways.

- Involving stakeholders from the outset of the planning process helps to define priority concerns.
- Stakeholder interests can have positive or negative implications for site management. Likewise the proposed management interventions may have a considerable impact on the lives or livelihoods of local stakeholders. It is important therefore that those interests be considered and where they do not detract from the ecological character, incorporated into management planning.
- A participatory approach to identifying the values will build commitment towards managing for those values in the long term.
- Legitimate stakeholders can hold important knowledge about the site. Incorporating knowledge from

those directly related to the wetland facilitates valuable exchange of knowledge, combining traditional or historical knowledge with scientific knowledge.

- Involving stakeholders in the planning process will assist in the long term to develop a shared vision for the wetland and aids in the development of measures for achieving outcomes

WWF-India project 'Conservation of high altitude wetlands of Ladakh' has identified Tsomoriri & Tsokar as priority sites for conservation action. The project which began in July 2000 has been effective in working with multiple stakeholders for evolving the conservation strategies for the wetlands. Notable in this is the establishment of Tsomoriri Conservation Trust by the local community at Korzok village and Tsokar Conservation Trust at Tsokar.



Overview of steps in management planning

As an important initiative WWF-India was invited by J&K State Government to assist in management planning for Tsomoriri & Tsokar. WWF-India has steadily worked on the process of management planning for Tsomoriri & Tsokar, incorporating all elements of the standard Ramsar Guidelines for management planning of Ramsar sites.

WWF-India initiated the process by holding a meeting with officials of State Govt. in March -April 2006. This was followed by a planning meeting with identified experts and institutions at Leh including a field visit and interaction with local community at Korzok, Tsomoriri in July 2006. In addition WWF-India's field studies, scientific documentation, stakeholder consultations, GIS analysis and several technical reports and published studies, over the past seven years have also provided inputs for developing this framework.

5.2 Goal

The goal of the management and conservation of Tsomoriri & Tsokar and their catchment is to maintain the scenic, ecological and biological characteristics of the ecosystem.

5.3 Objectives

Following objectives have been identified for the conservation of Tsomoriri & Tsokar lake ecosystems, including the entire catchment. These are:



Local communities in a Management Planning meeting

1. To identify key species, important wildlife areas and develop specific conservation action plans for biodiversity conservation.
2. To develop a catchment management plan to maintain the biodiversity value of Tsomoriri & Tsokar and the overall ecological character.
3. To develop a comprehensive tourism management plan for Tsomoriri & Tsokar with benefits going to the village Korzok at Tsomoriri and village Thukjay at Tsokar.

5.4 Components of Management Plan

5.4.1 Biodiversity Conservation

To prepare detailed management / conservation plan, information on administrative aspects, biology, ecology, human activities including recent tourist influx and land use patterns are essential. These would require compilation of available information and new studies which will help in formulation of wildlife management plan. Any management approach would be ineffective unless it incorporates the scientific knowledge, local community welfare and aspirations of the tourism industry which is the main cause of the ecological destruction and potentially altering and affecting the livelihood of

local communities. In formulating strategies for an effective and improved management plan, such an approach will strengthen the management capabilities in restoring the world's most fragile and little known ecosystem.

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Birds during peak migration period

scientific knowledge, local communities welfare and caters to the tourism industry which is the main cause of the ecological destruction and potentially altering and affecting the livelihood of local communities. In formulating strategies for an effective and improved management plan, such an approach will strengthen the management capabilities in restoring the world's most fragile and little known ecosystem.

The focus for this component is to:

- maintain ecological integrity through a participatory approach with local population and other stakeholders.
- identify important wildlife areas for protection from new development activities.
- ensure successful and continuous breeding of populations of some of the important bird species through protecting the degradation and loss of breeding habitat and through restoration when necessary.
- identify and reduce the conflict between the wildlife population and human activities.

- maintain scenic beauty of the lake and its surrounding areas.
- identify threats to breeding populations and other ecological aspects from tourism activities.



Brahminy ducks

5.4.1.1 Flora

Before a detailed conservation plan is prepared for the Tsomoriri & Tsokar, detailed floral inventory, phytosociological studies and habitat characterisation will be essential. Currently very little work has been conducted on this aspect and therefore not available for review and planning conservation action plan.

Proposed action plan

A survey to assess the floristic characteristic of the landscape and mapping of important habitats is required to accomplish the following tasks:

- **Inventory of flora of the region**
A detailed protocol will be prepared for this activity outlining the need and how it will be used in the conservation planning process. It will also include methodology for gathering the information and later it will also direct where all this information and collected specimens will be kept for future reference.
- **Phyto-sociological study**
After an inventory is prepared the conservation plan will provide a plan for phyto-sociological studies to study the different plant association and community structure. It will be essential tool to

assess the biodiversity value and characteristic of the flora of the Tsomoriri & Tsokar ecosystems. This will establish base line for monitoring the changes occurring due to climatic change and new development activities.

- **Establish base line biodiversity values**

Information from the above studies will help assess the floral biodiversity of the Tsomoriri & Tsokar ecosystems. The conservation plan will outline a process for analysis of this information and also for future monitoring to compare the changing status from the base line established.

- **Identification of important habitat types**

Important habitat type will be identified and each of the habitat type will be characterised so that it can be monitored. The conservation plan will outline the process for monitoring.

- **Characterisation of these major habitats**

After identification of important habitat these areas will be quantitatively characterised.

- **Mapping the extent of these habitats**

Extent of each habitat will be mapped using satellite imageries. This mapping will be essential in planning process.



Brown headed Gull

- **Identification of major threats to each of these habitats**

For each habitat the conservation plan will identify the major threat and its likely effect.

- **Utilization pattern of these major habitats identified and mapped**

In addition to the threat, land use maps will also be prepared and overlaid with the map of the habitat type to identify the vulnerable areas.

- **Prescription for monitoring**

The conservation plan will provide detailed prescription for monitoring, mapping and analysis of the information collected to quantify and access the changes that are taking place. It will also outline a process for making decision to address the issue.

5.4.1.2 Fauna

5.4.1.2.1 BIRDS

Proposed action plan

- **Inventory of birds**

A detailed inventory will be prepared for the birds community of the area. A Checklist will be prepared and circulated to visitors interested in bird watching so that this check list could be updated on a regular basis.

- **Identification of important breeding/feeding habitats**

The conservation/management plan will identify all the breeding habitats and feeding areas of breeding populations such as Black-necked Crane, Bar-headed Geese, Great Crested Grebe, Ruddy Shelduck and other migratory waterfowls. These breeding habitats and feeding grounds are critical habitats and need highest priority of protection. These habitat will be mapped using GIS and will be clearly demarcated.

- **Utilization pattern of the breeding/feeding habitat**

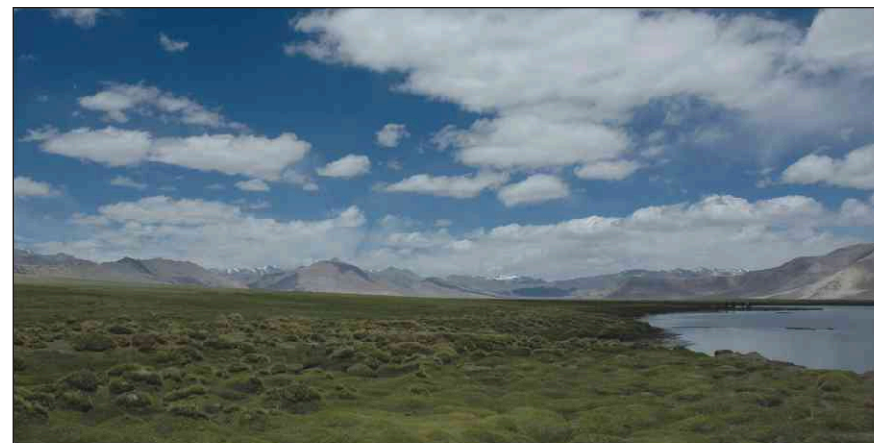
A spatial and temporal utilization pattern or the land use of these critical habitat will be documented. The extend of each of the seasonal activity will be mapped for these habitats. This information will be crucial in developing a conservation plan for the breeding populations.

- **Monitoring of breeding populations**

The conservation plan will provide a detail monitoring protocol for monitoring the bird populations specially the migratory bird population. This will include arrival and departure dates for different species and the habitat use pre-breeding, during breeding and post breeding. Estimation of population size in different breeding habitats will be an essential tool for monitoring. This conservation plan will out line a detail protocol for monitoring of these populations. Success of breeding will also be an essential part of the conservation plan. A careful assessment for nest density and chick survival will be planned and effect of the different activities on breeding success will be accessed on a regular interval. The conservation plan will incorporate these important aspects so that breeding populations can be monitored on a regular basis and immediate conservation actions taken as soon as changes in the breeding success or decline in breeding population is noticed. In addition to the monitoring of the population size and breeding success, this plan will also focus on the monitoring of the breeding habitat and its availability and characteristics of the feeding habitats.

- **Identification of major threats**

All the real and potential threats and their likely effect on the breeding bird population will be documented. Some of the threats identified in recent preliminary studies are: significant change in the water level of the lake possibly due to climate change. This may alter the availability of suitable breeding habitat for many species such as Bar-headed Geese and Great Crested Grebe. This would require intensive monitoring of water level and meteorological data and also extent of important breeding habitats. Loss of suitable breeding habitat due to change in water level, may require appropriate restoration activity, otherwise it can lead to loss of breeding population as this breeding population may move to an alternate site. The conservation plan will dwell in detail on restoration of breeding habitats. Once on principle a decision is made it will be reflected in the conservation plan and it will provide a strict do's and don'ts for such a delicate activity. Restoration if done wrongly can also make the breeding habitat completely redundant. Increased tourist activity near the feeding ground and some of the breeding habitats and on the habitats upstream can impact breeding grounds of other



Breeding habitat near Tsokar

species. The conservation plan will identify these threat and areas and prepare a plan to minimize the impact on breeding population and its habitats.

- **Prescription for management and protection for breeding habitat**

In the proposed conservation plan for each of the threats identified management actions required will be discussed. Several management zones will be demarcated for the management of successful breeding of the migratory bird populations. These demarcation will provide for full protection of important breeding habitat and breeding grounds, seasonal utilization of these resources by local communities after breeding season is over and tourism activities in area where it will have least impacts. Vehicular traffic by tourist, uncontrolled camping, grazing by pack animals and movement of visitor close to feeding habitat and breeding ground are some of the activities which seriously impact bird population. A separate tourism plan will be developed based on the management zonation discussed earlier so that tourism facilities can be developed without negatively impacting the breeding habitats and bird populations.

- **Pilot Study on Black-necked Crane**

A study on the habitat requirements and migration of Black-necked Crane using the Platform Transmitter Terminals (PTT's) needs to be done at Tsokar.

5.4.1.2.2 MAMMALS

Proposed Action plan

- **A comprehensive inventory of mammalian species**

A detailed list all the mammals found within the Tsomoriri & Tsokar catchments will be essential. This is especially necessary for rodent and mouse hare communities. In the proposed conservation plan to document the mammalian diversity we propose a comprehensive documentation and identification of mammals found in the region.

- **Distribution of major ungulate species and other indicator communities**

One of the first actions would be to prepare a detailed distribution map of the three ungulate species. This will be important to understand the competition with livestock herds. Based on this information a spatio-temporal plan can be developed in participation with the local community to reduce the conflict between the wild ungulate population and livestock. In addition to the documenting the distribution and abundance of ungulate species, documentation of important marmots and mouse hare colonies is essential.

- **Identification of conflict areas**

All the summer and winter grazing pasture will be mapped and through GIS help conflict areas will be mapped. These will be then discussed with local communities and a conservation plan to reduce

the conflict will be prepared which will be agreeable to both parties, the local communities and management. In recent time up-gradation of roads and development of roads are main source of threat to species such as marmots due to excessive trapping by the migratory labour population brought in from the plains. The conservation plan visualise this aspect and plans for an intensive education awareness programme for the road builders with the help of Border Roads Organisation (BRO) so that poaching problem can be minimised.

- **Mitigation of livestock depredation**

As far as the livestock depredation by wolves are concerned, it will require a continuous monitoring and assessment. Some very innovative approaches have been developed and successfully implemented in other parts of the trans-Himalyan region. Nature Conservation Foundation has been working on this aspect in Kibber area and successfully demonstrated how communities themselves can compensate the losses to sustain from carnivore depredation. This programme can be under taken as part of the community based conservation programme of the plan.

- **Monitoring of some of the key populations**

The conservation plan will include a monitoring protocol for the three ungulate species on a regular interval. Taking vole and mouse hare populations found in the feeding and breeding habitats of migratory bird species as indicator population for the health of these habitats, a detail monitoring scheme will be developed.

- **Veterinary health issues and control**

The conservation plan will also include a protocol for monitoring diseases in livestock and regular inoculation against the regularly occurring diseases. Losses incurred due to diseases are generally larger then the losses due to livestock depredation. One of the International Snow Leopard Trust programme in Pakistan has successfully documented that such an approach easily compensates for the losses sustained from carnivores and has substantially increased the annual income to the family. A similar programme urgently required for the region.

- **Monitoring of livestock depredation and control**

In addition to veterinary assistance and monitoring system for early detection of disease, health management of livestock is essential. Regular training camps for herder communities are proposed with the help of veterinary department and NGO community with relevant expertise on a more formal and regular basis.

5.4.2 Catchment Management

The main focus of this component is to:

- maintain integrity of the catchment of Tsomoriri & Tsokar.
- maintain water quality and hydrological features of Tsomoriri & Tsokar.
- improve biodiversity values of the Tsomoriri & Tsokar.

Proposed action plan

- **Development of Zone plans**
1. Based on drainage pattern, ridges and hills, the catchment of the lake

needs to be defined and mapped on a GIS domain. The entire area under consideration i.e. the lake proper and the catchment could be divided into different zones keeping each zone identifiable and distinguishable based on its characteristics and management objectives. As the Tsomoriri & Tsokar are part of Changthang Wildlife Sanctuary, the zone plan should be different from that of other protected areas, though thematically similar zonation approach could be adopted.

2. In view of the varied land use pattern and biodiversity value of the landscape, maintenance and regulatory measures and scope for habitat restoration as well as development measures following zones are proposed:

Core zone: The area covering lake itself and the surrounding land area up to a distance of 1000 m from the shoreline. This zone should include marshes of Peldo laa, Nuro Sumdo, Pangunago and others. The zone should exclude village Korzok and its impact zone. However, any form of commercial use of the village area should be discouraged. Tourist camps from this zone need to be removed.

Buffer zone: The surrounding land, streams and pastures between boundary of the core zone and up to 3000 m including the ridges and hills should be constituted as buffer zone. However, this zone should be extended up to 5 km wherever feeder streams exist. In this zone development activity such as construction of tourist huts, vehicle sheds, paramilitary camps, development of pastures for livestock grazing and corrals for keeping livestock need to be restricted.

Multiple use zone: This zone should cover remaining catchment including Lake Thatsangkaru. Development activities compatible to the surrounding landscape, pasture development activities by different agencies in the area in the past has not helped but instead has put adverse impacts in the areas in Thanzankaru Catchment and setting up of Rebos may be permitted.

3. Specific management plan for each zone needs to be prepared taking into account the constitution of the area under each zone, status of wildlife, present system of management including traditional grazing management, and objectives set forth for the zone.
4. The management prescription *inter alia* should include the protection measures for the core zone and restricted use of buffer zone with due emphasis on people participation.

- **Development of Theme plans**
The prescription proposed applies to the entire area of concern without limited to any specific zones:

1. Restore native vegetation in the Core zone through participatory protection measures and in the buffer by restricted grazing. However fuel wood collection by uprooting the *Caragana* bushes needs to be completely discouraged.
2. Winter pastures at alternative sites need to be developed. This should be done through consultative process with local communities.
3. Derive stocking density of the catchment in terms of livestock and wild ungulates so that optimal number of livestock is maintained.

4. Develop liaison with Sheep and Wool Department and initiate collaborative pasture management activities.
5. Provide alternative source of energy to the Korzok and Thukjay villages and to Rebos. Establish LPG and fuel wood depot at strategic points and made available to the local communities initially on subsidized rates.
6. Provide adequate sanitation facilities at the newly developed camp sites so as to prevent inflow of human waste and sewage into the feeder streams and main lakes.
7. Restrict washing of clothes, cleaning of vehicle etc along the feeder streams and in the lakes.
8. Conduct periodic water quality analysis. Develop and implement long term water level and water quality monitoring plan in association with local institutions.
9. Monitor breeding bird population and their nesting success particularly along the shorelines and on islands.
10. Restrict off track driving of vehicles through awareness campaigns, signages and by creating trenches along the road at strategic locations.
11. Develop appropriate interpretation facilities to educate visitors and local communities.
12. Create storage facilities for the garbage at camp sites till the time it is disposed off. Involve local communities in developing solid waste disposal plan for the entire Changthang.
13. Restrict entry of number of tourist and tourist vehicles into the Changthang by limiting the issue of permits. Create entry barriers for

vehicles at strategic locations. Restrict trekking by permitting it only along the limited and well defined routes.

14. Develop and implement community based tourism management plan for the area.
15. Provide adequate human resources and funds to implement catchment development, protection and tourism plans. Involve communities in planning and implementation process.
16. Develop liaison with LAHDC, Sheep and Wool Department, Tourism Department, Tour operators, Paramilitary forces and army, Local NGOs through consultative meetings for developing and implementing an integrated management plan for the area.
17. An extensive programme to control the problem of Feral Dogs needs to be initiated at Tsomoriri & Tsokar.

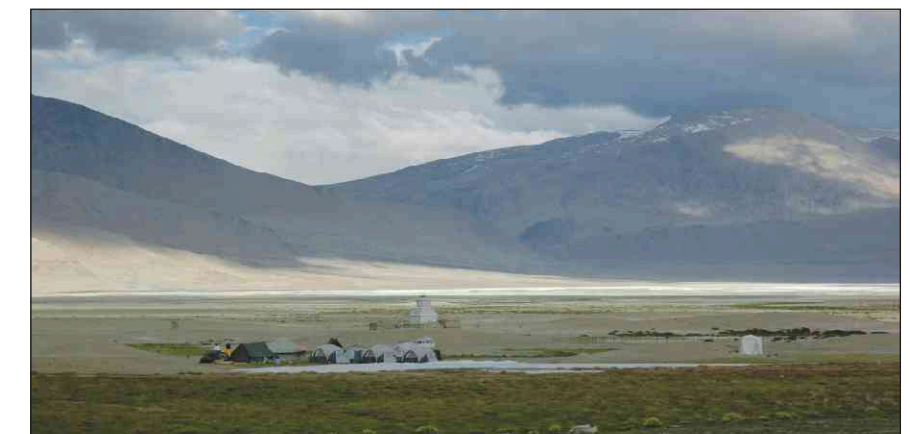
5.4.3 Tourism Management

Traditionally, the wealth of *Changpa* family is determined by the size of the herd they possess. However there is a concern over the decrease in pasture land and the lifestyle of *Changpas* has also changed ever since the opening of the road connecting this area to Leh and the subsequent increase in tourism. In the past ten years, tourism has come to assume an exceedingly important role in Ladakh's economy. Close to 25000 tourists came to Ladakh in the year 2005 (LAHDC 2005). Even in the limited tourist season (mid-May to mid-September), the local economy gets a considerable boost. However, tourism is a double-edged sword and if not adequately planned can have many negative effects.

5.4.3.1 Sustainable Tourism

Considering the ill effects of tourism in

fragile areas such as Tsomoriri & Tsokar, it is important to plan for this activity differently for such areas. Tourism in ecologically fragile areas needs to be sensitive and planned accordingly. Many terms are prevalent today for this kind of tourism. Most common among them is ecotourism. This term first developed by a tour operator in Costa Rica to promote tourism in the rain forests of the country has since become quite common in the tourism industry. According to the International Ecotourism Society,



Camping near Tsokar

ecotourism is "responsible travel to natural areas that conserves the environment, and improve the welfare of local people." A more comprehensive definition is "travel to fragile, pristine, and usually protected areas that strives to be low impact and usually small scale." (Ecoworks Foundation 2003). Key characteristics of an ecotourism initiative would include:

- Travel to natural areas
- Minimal ecological, social and cultural impacts
- Education for the traveler/tourist for environmental awareness
- Direct financial and other benefits to the local community
- Respect for different cultures

Ecotourism has today become a highly 'misused' term and every travel agent/tour operator claims that he/she is

promoting ecotourism, which is not the case in most instances. A more encompassing term is perhaps 'sustainable tourism' which according to the World Tourism Organisation is tourism that leads to the management of all resources in such a way that economic, social and aesthetic needs can be fulfilled with maintaining cultural integrity, essential ecological processes, biological diversity and life support systems (Ecoworks Foundation 2003). Ecotourism then becomes a subset of

sustainable tourism. Since ecologically, culturally and socially sensitive tourism encompasses a range of initiatives, it is advisable to use the word 'sustainable tourism' rather than 'ecotourism'.

Why Sustainable Tourism at Tsomoriri & Tsokar?

The Ladakh Autonomous Hill Development Council (LAHDC) in its Vision Document for 2025 (LAHDC 2005) puts the overall vision for Ladakh as, "By 2025, Ladakh will emerge as the country's best model of hill area development in a challenging environment, with its sustainability embedded in ecological protection, cultural heritage and human development". Further the LAHDC's vision for tourism in Ladakh is given as, "To connect tourists to the unique topographical advantage and cultural heritage of Ladakh without endangering its fragile ecosystem, while at the same

time scaling up tourism to contribute to the economic and social well being of the people of this region" (LAHDC 2005). Given this vision for the region and specifically for tourism, it is important that tourism in Tsomoriri is developed in a sustainable fashion and provides a model for development for other similar high altitude lakes. There are two other reasons for promoting sustainable tourism at Tsomoriri & Tsokar:

To Address the Threat from Unregulated Tourism

Perhaps one of the biggest threats to Tsomoriri & Tsokar today is from unregulated tourism. As mentioned earlier, tourism is a double-edged sword and can destroy or help conserve a fragile area depending on how it is planned and carried out. Despite all its failings tourism cannot be wished away. It is there to stay since it provides the much-needed revenue for further development of the region. The challenge is then to plan in it such a way that it is sustainable, economically beneficial to the local community and also helps in conservation. Sustainable tourism is thus the answer. Tourism if addressed right away and planned systematically will help in conserving the lakes in the long run. Very clear guidelines; rules and regulations and zonation will ensure that pressure from tourism does not cause harm to the lakes.



Nomadic women making local blanket

To Enable Local Communities to Derive Benefits from Tourism

Until very recently, there was a sense of resentment amongst the local community in Korzok and Thukjay that they derived very little benefits from tourism at the lakes. They were in majority, mere observers while tourists came to the lake, camped, trekked to surrounding areas and it was tour operators from Leh who profited from this venture. Subsequently there was very little interest among the local community in the conservation of the lake. A Participatory Action Research Initiative carried out by WWF-India in 2003 (Annex I), indicated that the nomadic households showed resentment against tourism because this activity degraded their pastureland, their only source of survival. People settled in the village of Korzok would like to have tourism as one of the sources of income, but don't know how. A sustainable tourism plan will enable the local community to derive benefits from tourism. This will also be in consonance with the LAHDC's vision for Ladakh wherein there is a major thrust towards promoting community-based tourism.

5.4.3.2 Model Village Development

The state government of Jammu and Kashmir is promoting a model village scheme where, one model village in each Block is being developed at a cost of Rs. 1.2 crore per village. Korzok

village has been selected for development under this scheme. There are 119 blocks and the total investment is Rs. 142.8 crore. Infrastructure facilities such as a Community Information Centre and others like water supply, drainage etc. are being provided to each model village. This is an opportunity for promoting integrated planning and management for Tsomoriri and its people.

5.4.3.3 Major Stakeholders

The major stakeholders involved in the development of a sustainable tourism initiative at Tsomoriri & Tsokar are:

The Ladakh Autonomous Hill Development Council (LAHDC)

LAHDC was constituted in accordance with the Ladakh Autonomous Hill Development Council Act, 1995 in August 1995. The Council came into being keeping in mind the difficult geographical problems and the need for greater public participation in the process of planning and development of the region. The democratic constitution of the Council has facilitated democratic decentralization of the planning process with the involvement of people at the grass root level.

The Department of Tourism, Jammu and Kashmir

This department is responsible for the overall planning and execution of schemes for the development, upgradation and improvement of the tourism infrastructure in different parts of the State. The department also provides support to the private sector industry through incentives for setting up various tourist facilities as well as for promotion and marketing of their products and services. The main centres of tourist information in Ladakh are the Jammu and Kashmir Tourist Offices at Leh and Kargil. The Kargil office also has a branch at Padum (Zanskar).



ITBP personnel near Tsomoriri

The Department of Wildlife Protection, J&K State. Wildlife Division (Leh)

The Department of Wildlife Protection (Leh) Division came into being in April 1988. The primary focus of the Department is to strengthen conservation measures in the high altitude protected areas of Leh district.

All Ladakh Tour Operators Association

Association of all the tour operators running tourism business through various travel agencies. This is a group of local tour operators which are based in Leh.

WWF-India

WWF-India initiated a conservation project on High Altitude Wetlands of Ladakh in 1999 with support from the global WWF network. Three of the largest and more vulnerable wetlands of Ladakh: Tsomoriri, Tsokar and Pangong Tso were chosen for focused conservation efforts. The conservation programme at Tsomoriri & Tsokar is part of this larger conservation project. The major objective of the programme is to develop a strategy and action plan for conservation of high altitude wetlands by involving all stakeholders.

Indo-Tibetan Border Police (ITBP)

ITBP was conceived on 24th of October, 1962. Presently ITBP is deployed on Border Guarding duties from Karakoram Pass in Ladakh to Diphu La in Arunachal

Pradesh. ITBP is basically a mountain trained force and are posted in various parts of Indian Himalayas.

The ITBP has a small unit based on the shore of the lake Tsomoriri.

Tsomoriri Ecodevelopment Committee

This committee has been formed by Department of Wildlife Protection, Leh for various ecodevelopment activities at Tsomoriri.

Tsomoriri Conservation Trust

The Tsomoriri Conservation Trust was established with support of the WWF-India as part of its efforts towards strengthening and capacity building of local institutions. It was legally registered under the Trust Act of the Jammu and Kashmir State in August 2002 and subsequently its constitution was drawn up. The head lama of the local monastery and a retired school teacher, were unanimously chosen by the villagers as the Chairperson and vice-Chairperson of the Trust (WWF-India 2000).

Tsokar Conservation Trust

The Tsokar Conservation Trust was established with support of the WWF-India as part of its efforts towards strengthening and capacity building of local communities at Tsokar. It was also legally registered under the Trust Act of the Jammu and Kashmir State in 2006 and subsequently its constitution was drawn up.

Proposed action plan

Tourism is not new at these lakes and has been on the increase ever since the enhanced development in the road infrastructure of the region. It is thus crucial at this point of time that a strategy and management plan to manage tourism sustainably at the lakes is developed. There are many components to this proposed strategy. Each is discussed in detail:

- **Zonation**

To ensure that the lake ecosystem is not directly affected by tourism activities, the area needs to be divided into definite zones. A map delineating these zones and superimposed on the GIS map of the region will be prepared as explained in the section 5.4.2. The area around the lake (Core Zone) needs to be kept completely devoid of any activity. Camping needs to be strictly banned from this zone. The two designated campsites in buffer zone would be the only areas where camping is permitted. At present there is capacity for over 200 tourists to be housed in Korzok and its surrounding area. No new hotels/resorts or other accommodation should be allowed in this area. There are two main treks that are conducted out of the area. Besides this, three possible day hike routes have been identified and these should also be part of the zonation exercise. A board with the map of the zonation could be developed and put up at the entrance to the lake site.

At Tsokar similar map also needs to be prepared clearly demarcating all the zones. Camping needs to be restricted at Thukjay and at Pangonago. At present there is no provision of any accommodation for the tourists at Tsokar. Travel agents from Leh and camping tourists bring their own tents for

camping at Tsokar. But few houses at Thukjay which have been recently developed by LAHDC can be developed as homestays for the tourists as local nomads hardly stay in these houses during summer months. Day hike routes between Thukjay and Startsapuk Tso and between Pangonagao and Startsapuk Tso have already been identified by WWF and can be managed by the local communities as part of CBT activities.

- **Code of Conduct/Environmental Guidelines**

A sustainable tourism initiative being different from other tourism endeavours, also has as a component a 'Code of Conduct' or Guidelines, which guide tourist behaviour at the tourist destination. This includes a set of guidelines indicating why the particular place is of interest and reminding tourist of certain 'Dos' and 'Don'ts'. Such guidelines have already been developed jointly by WWF-India; the J&K Department of Wildlife Protection; Ladakh Ecological Development Group; J&K Tourism Department and ALTOA. The guidelines are in the form of an attractive poster. However, there is need for these to be displayed more prominently. Several Boards need to be designed with these guidelines in four or five common foreign languages as well.

- **Carrying Capacity Study**

At present, the ITBP maintains a record of the number of tourists that enter the Tsomoriri lake area and also the number of vehicles that come on a daily basis. Records show that the number of tourists and vehicles is increasing every year. There will be a time when the number of tourists and vehicles will go beyond the carrying capacity of this fragile area. In other words the number of

tourists will go beyond what the area can sustain and this will lead to degradation of the area. Ecosystem carrying capacity provides the physical limits to economic development and may be defined as the maximum rate of resources consumption and waste discharge that can be sustained indefinitely in a defined planning region without progressively impairing bio-productivity and eco-integrity. This concept involves an integration of social expectations and ecological capabilities and minimising the differentials between resource demand/requirement and supply/availability. A detailed carrying capacity study of this area should be of prime importance and needs to become an integral part of the planning process. Once a range of numbers is arrived at, the Department of Tourism can restrict the number of permits being issued to tourist to visit this area. There have been attempts at carrying out such studies in some other protected areas. The Keoladeo Ghana National Park is one protected area where such studies have been carried out and these could provide a framework for similar studies in Tsomoriri and at Tsokar.

- **Visitor Survey**

Keeping in mind the need to involve the local community in tourism related activities and the LAHDC's own vision for tourism in Ladakh, it is important to first carry out a survey with the tourists who are visiting the lake site and analyzing what they expect in terms of tourists facilities. A survey like this is very important to determine what kind of facilities could be developed at the site. WWF-India did initiate such a survey in 2000-01 at the lakes

through questionnaires, to understand the tourist profile and what the tourists' expectations of hospitality were. A preliminary analysis was carried out and a draft report has been produced. The survey revealed that many tourists visiting Tsomoriri & Tsokar came for adventure. Most however came for the aesthetic and cultural experience. Further analysis showed that most tourists felt that the local communities should benefit from tourism and encouraged the development of home stays.

- **Home stays**

Taking into account the findings from the tourist surveys and also the fact that the residents of Korzok village have been increasingly feeling the need for a greater stake in the tourism industry, WWF-India started the process of exploring the development of home stays in Korzok. Discussions pertaining to this were carried out for over two years. The women folk of Korzok were in particular, very interested in the whole concept of 'home stays' where they could let out a room in their house to tourists and play their local host while also earning something from this endeavour. Such an initiative has already been tried in the Hemis National Park by the Snow Leopard Conservancy and is running successfully. At present ten home stays have been established in Korzok. The tourist season of 2006 is the first for these home stays, but has been very successful so far. The women who are running these are suddenly feeling empowered and energized. The people of Korzok feel that they are finally getting their fair share from tourism at Tsomoriri. The Tsomoriri Conservation Trust will

eventually take over the complete management of home stays.

In the context of village Korzok, home stays seem to be the most viable tourism initiative. Home



Tourist in a home stay

stays ensure that there is no development of new tourist resorts/ guesthouses etc. Home stays are also a good way of getting the local communities a stake in tourism activities, thus also increasing their pride and self esteem. Communities now see a clear link between the conservation of the lake and their own livelihoods and will be willing partners in conservation initiatives.

At the end of the season, there needs to be an analysis of how much increase there has been in the income that local communities derive from tourism.

At Tsokar no home stays are available at present. But local community is quite keen to start the same. There is a potential at Thukjay to start about 20 homestays, as local hill council has very recently provided some houses to the nomads, which they do not use during summer months.

- **Other Linked Activities**

Parachute cafes run by local women could be the next step towards increasing local stake in tourism. These cafes, besides refreshments could also sell local handicrafts. This initiative has become quite popular in the Markha valley.

Another activity that would increase participation of local people in tourism related activities is the activation of the Korzok Pony Union. This would encourage tourists to take ponies locally and also increase local people's share in tourist revenue. Very similar activities can also be carried out at Tsokar as similar potential also exists there.

- **Certification**

Certification is a procedure (generally, voluntary) that assesses, monitors, and gives written assurance that a business, product, process, service or management system conforms to specific requirements. It awards a marketable logo or seal to those that meet or exceed baseline standards, i.e. those that, at a minimum, comply with the national and regional regulations, and, typically, fulfill other declared or negotiated standards prescribed by the programme. Sustainable tourism certification is a programme or scheme that measures a range of environmental, socio-cultural and economic equity issues both internally (within the business, service or product) and externally (on the surrounding community and physical environment). In other words, a programme or scheme that includes a set of principles that tour operators can subscribe to (Ecoworks Foundation 2003).

To promote Tsomoriri as a site that follows sustainable tourism practices, such a certification could be thought of in the long run. A study to determine the feasibility of an ecotourism or sustainable tourism certification scheme for tour operators in Ladakh was carried out through WWF-India in 2003 (Annex II). The study

concluded that. Homegrown scheme could be developed keeping in view the ground realities - the peculiarities / difficulties associated with the region and the uniqueness of the ecology, culture and social practices. Discussions with All Ladakh Tour Operators Association (ALTOA) at that time indicated that the tour operators would be quite agreeable to initiate the process and be part of such a scheme. If Tsomoriri & Tsokar are used as pioneering sites to develop such a certification, then it would indeed be a landmark in the country. Activities (such as the development of environmental guidelines) towards this kind of certification are already underway.

- **Training and Capacity Building**

Training and capacity building needs to become an inherent part of the sustainable tourism initiative at Tsomoriri & Tsokar. As part of



Korzok monastery

the home stay initiation, a very interesting capacity building exercise was conducted at Tsomoriri with resource persons from Markha Valley. These people had been successfully running home stays in the Hemis National Park with the help of the Snow Leopard Conservancy. The objective of the workshop was to train the women of Korzok in how to manage these home stays by experience sharing and detailing of very practical aspects. This is indeed a unique training exercise where the women of Markha valley

shared their experiences on running home stays with their peers in Korzok.

Training also needs to be planned for local youth to be trained as guards and tour guides. At Tsomoriri three trails have been identified and these could be further developed. Trained guides could offer to accompany tourists on these trails and earn some more revenue in the process.

Local community members at Tsomoriri and at Tsokar could also be trained to monitor wildlife populations at the lake sites. They could also be taught how to maintain records for the same, thus giving them a greater stake in conservation initiatives.

Capacity building is also necessary for the monitoring of tourism related activities as also conservation related initiatives.

- **Education and Awareness**

Important for a tourist destination and particularly for a place of conservation significance, is the need for good communication to convey to tourists the ecological and cultural significance of the place. This could be done through a variety of communication tools and techniques. Primary among these are posters and handouts. WWF-India is in the process of developing a brochure for the lake and its environs. This brochure and other written material should be available at all the home stays. Bird and plant checklists should also be made available.

- **Interpretation Programme**

A significant move to promote the conservation ethic and at the same time create awareness would be the setting up of an interpretation programme. For this a Wetland Interpretation Centre needs to be

developed at Shey near river Indus at Leh. Shey is the place from where all the tourists pass while going to key wetland sites. This centre can act as a window to these high altitude wetlands before they actually visit these sites. This centre can provide good conservation orientation to all the visitors.

At wetland sites two information centres should be made, one at village Korzok & one at village Thukjay. These Centres could house conservation material about the lakes and surrounding ecosystems. These should also act as the central coordinating point for home stays. Local Community members could be trained to coordinate activities at the Centre. Tour guides could be made available from the Centres as also provide information about trekking trails and routes. The Centres could eventually become the hub for all conservation and tourism related activities for Tsomoriri and Korzok.

- **Cross-Site Visits**

Stakeholders in any such activity often learn a lot from other sites where similar activities are being carried out. There is much to learn from visiting new sites or sharing experiences with others from different regions. In the case of Korzok, the women learnt a lot from women of Markha Valley. As the home stay initiative grows, it would be valuable for these women to visit other home stays in the Himalayan region. This is an important component that needs to be built into the sustainable tourism plan.

- **Monitoring and Adaptive Management**

No activity is complete without a monitoring component built into it.

Tourism is an activity where constant monitoring is necessary. Monitoring for a sustainable tourism initiative would involve the monitoring of the ecological, social, cultural and economic aspects of this activity. Monitoring thus has to be well thought out and managed well. For this, the capacity of the local community will have to be built. Following this will be the development of monitoring protocols for all the aspects in consideration. Adaptive management would be an integral part of this plan where results from the monitoring are used systematically in management and the plan altered as and when required based on the information from monitoring. For example, if monitoring indicates that the lake and the surrounding ecosystem is degrading as a result of increased human presence, then the number of tourist visiting the area would need to be curtailed.

Management of these range of initiatives would require a collaborative effort and this could be made possible through a management body specially established for this purpose. This management committee would have representatives from all stakeholder groups mentioned in the earlier part of the report. This committee's mandate would be the overall monitoring of all tourism activities carried out in this area. This would include ensuring that the number of tourists does not exceed the carrying capacity of the area; regular collection and disposal of garbage; ensuring that conservation activities are carried out appropriately and also resolving any conflicts that arise.

VI Remote Sensing and GIS

6.1 GIS and Remote Sensing Application for Management of Wetlands

Remote sensing data has proved to be an economic means for inventory, monitoring and management of wetlands.

Comprehensive information on the spatial distribution of land use/ land cover categories is a prerequisite for proper planning, utilization and management of the land resources. Land use change in the study area is necessary to monitor the change pattern in land class. Satellite Data in association with geographical information system (GIS) provide cost and time effective tool for mapping and formulation of conservation and management plans.

Over the past few years, the sustainable management of wetlands has gained more and more recognition within the relevant government sectors, yet due to the economic development pressure and high population growth, it is a challenge to turn policies into action.

For a continuous and proper management of the wetland, decision makers and policy makers need to be provided with useful and understandable information on all relevant factors.

Consequently, geo-information on the distribution and nature of wetlands will provide crucial information for managing them. Scientific knowledge of both the ecological and the socio-economic values of wetlands, will prove to be critical when interventions such as site development, biodiversity protection, eco-tourism, etc. are to take place. With this advanced technology, a systematic approach to environmental monitoring of wetlands and their resources is possible.

6.2 Approach

Using Remote sensing data the spatial mapping is done and biologically important parameters are attached to it using GIS. Thus, by using digital remote sensing data it will be possible to map, analyze data and attain information at any scale for wetlands, according to the management and conservation requirements.

For reconnaissance survey satellite data is very effective. In order to test this approach and formulate a viable Programme of wetland inventory, a nationwide project has been initiated. This includes digital image processing of satellite data to identify the type of wetlands, turbidity levels and presence and absence of aquatic vegetation in various districts through out the country.

Remotely sensed data, particularly satellite imagery, are important for mapping wetlands at regional scales. New digital remote sensing technologies (e.g., medium- to high-resolution multiband satellite and airborne imagery of visible, near-infrared, mid-infrared, thermal, and radar spectral regions) may improve Wetlands mapping efforts by increasing map accuracy and reducing map production costs.

By use of advanced GIS software, such as ArcInfo and ERDAS Imagine, we can carry out analysis of wetland maps derived from remotely sensed data.

There are three major objectives for use of remote sensing and GIS for wetland management:

1. To develop wetland GIS database, including ecological characters and spatial information for management of Ramsar Site.
2. To integrate and incorporate natural resources and socio-economic data surveyed by various consultants and available at government agencies into GIS database.
3. To apply GIS data layers to assist in sustainable management planning and for smarter decision making for long-term wetland management.



Mammal survey in the catchment

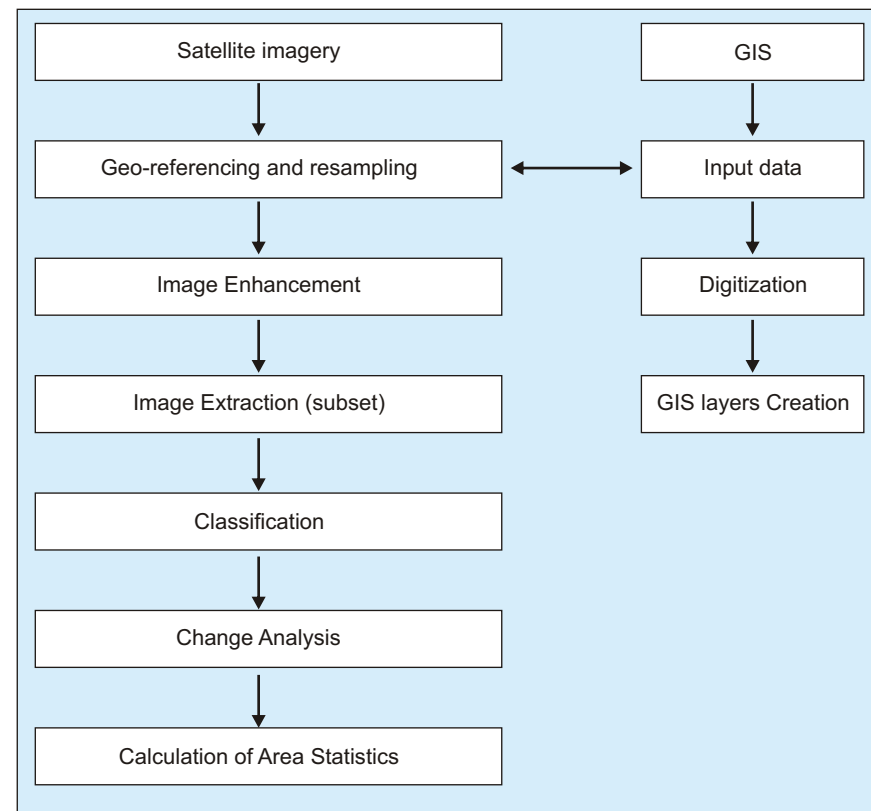
It is noted that the first two objectives are accomplished from the database development, while the third objective is an expectation for further use of GIS in planning process, some of which are:

1. GIS and remote sensing application for management planning helps to identify and evaluate existing wetlands and potential mitigation sites in the watershed.
2. Provide information to local planners, government officials, environmental consultants, and conservation agencies about local wetland locations, quality, and importance.
3. Create an up-to-date, accessible GIS-based map of wetlands
4. Identify watershed restoration needs and action strategies.
5. Zonation: Various zonation maps would be created based on the biophysical, ecological and socio-economic features persisting in and around Tsomoriri & Tsokar wetlands .
6. Provide for advisory and implementation groups to facilitate the success of the project.

6.3 Methodology Adopted for Thematic Data Extraction from the Satellite Imageries

ERDAS image processing software and ARC/GIS 9.1 Software will be used

Erdas 9.1 Image Processing Software is used for digital processing of the spatial data. Digital image processing techniques are applied for the mapping of the land use/land cover classes of the provided area from the satellite data. The methodology applied comes under following steps:



Methodology involved in Satellite Data Processing

1. Image Restoration
2. Geo-Rectification
3. Image Enhancement
4. Classification
5. Land use /Land cover extraction
6. Class recoding

Land use and land cover classes are:

Classes

- a. Vegetation
 - b. Grassland
 - c. Open field/ Cultivation
 - d. Built -up
 - e. River
 - f. Plantation
 - g. Water Bodies
 - h. Rocky exposure
7. Overlay Analysis

8. Area Calculation
9. Layout Creation

Various steps involved in the methodology are given below.

6.3.1 Image Restoration techniques

This compensates for data errors, noise; geometric distortions introduced during the scanning, recording, and playback operations.

- Restoring periodic line dropouts
- Filtering of random noise
- Correcting for atmospheric scattering
- Correcting geometric distortions

Geometric correction: In geometric correction of the satellite images, polynomial equations are applied to convert source coordinates (image coordinates) to rectified coordinates. Least square regression method is used

to calculate the transformation matrices from the GCS. First order transformation is a linear transformation. Transformation of second or higher one is non-linear transformations. The computation and output of higher order polynomial equation are more complex than that of a lower order polynomial equation.

Therefore, higher order polynomial equations are applied to perform more complicated image rectification. The other referral material is used to validate and support the findings of data analysis Root mean square (RMS) error is calculated with a distance equation:

$$RMS = \sqrt{\{(Xr - X1)^2 + (Yr - Y1)^2\}}$$

Where X1 and Y1 are the input source coordinates and Xr and Yr are transform coordinates.

Resampling method is used to create the output data file. Since the grid of Pixel in source images rarely matches the grid for the reference image, the pixels are resample to calculate the new data file values. Nearest neighborhood method is used in resampling the output pixel values. The decision rules that have to be applied for the rectified images for supervised classification are as here under:

- Non parametric rule - Parallelopiped
- Overlap rule -Parametric Rule
- Unclassified rule -Parametric rule
- Parametric rule -Maximum likelihood

6.3.2 Image Enhancement Technique

Following will be used:

1. **Single image manipulations**
 - Contrast enhancement

- Spatial filtering
2. **Multiple Image Manipulations**
 - Band rationing
 - Slicing
 - Addition and subtraction
 - Vegetation components
 - Principal component analysis
 3. **Colour Enhancement**
 - BGIR - Coding
 - HIS Coding

6.3.3 Image classification

The overall objective of image classification procedures is to automatically categorize all the pixels in an image into land cover classes or themes. Classification is usually performed on multispectral data. Digital image classification uses the spectral information represented by the digital numbers in one or more spectral bands to classify each pixel based on the spectral information. This process assigns each pixel in an image to a particular class or theme based on the statistical characteristics of the pixel brightness values. There are a variety of approaches taken to perform digital classification. In the present study two most commonly used approaches were performed, namely supervised and unsupervised classification.

The input data to be used is as follows:

- IRS satellite images
- Paper maps
- SOI topo maps.
- NATMO maps
- Geological maps
- GPS points

- Meteorological Data
- Soil Maps
- Height data
- GPS data
- Field information (pre and post survey)
- Census data (socio-economic data)

The data base to be developed will comprise, among others the following parameters.

1. Wetland Location maps
2. Wetland type(based on classification system)
3. Area analysis data
4. Wetland extent (monsoon and dry season)
5. Water turbidity and quality
6. Diversity of selected area
7. Geographical coordinates(GPS/SOI coordinates)
8. Location (village, tehsil, district, state)
9. Socio-economic values
10. Conservation potential (short and long term)
11. Wet land status of Eco-region (GIS output with inputs from above)
12. Development of an efficient system of dissemination of data
13. Action program to be taken up
14. Eco-region map
15. Various Zone maps

6.4 GIS Training

For effective use of tools and database for management of wetlands, training for

officials of wildlife department is very important. The details of the proposed 15 days training module are:

- Fundamentals of GIS Introduction to basic concepts including definition of GIS, History, the principles, techniques, procedures and terminology of GIS, and digital representation and data acquisition.
- Mapping the spherical Earth including, geodesy, grids, datums, and projection systems.
- Geographic data concepts Geospatial data components, data types/models, database management, RDBMS concepts, database design.
- Raster based GIS. Spatial referencing in raster based GIS: definition and representation of raster data, concepts of raster based GIS data structure, data capture and basic operations of spatial analysis with raster GIS.
- Vector based GIS: Definition, concepts of vector based GIS, data structures, data capture and operations of spatial analysis with vector GIS.
- Advantages and disadvantages in raster and vector based GIS.
- Elementary spatial analysis and modelling.
- Introduction to networks in GIS: Definition, components and operations/applications
- Surfaces and TINs.
- Introduction to remote sensing and digital image processing as a source of input to geographic information systems.
- High Resolution Images for Developmental Mapping.
- Overview of GPS and its applications.
- Software and hardware requirements for GIS.
- GIS project planning, management and implementation techniques.
- Applications of GIS including WebGIS.
- Hands -on practical exposure using ArcInfo®, ERDAS

VII Education and Awareness



School children on a nature trail
Education and Awareness are most crucial components for the success of any management plan. There is a need to develop a well integrated comprehensive education and awareness programme which should have following components:

7.1 Resource material/ publications

- Site map folder
- Brochure
- Checklist of Birds
- Postcard and pocket cards
- Posters and stickers
- Calendars

7.2 Development of Signages (both in English and Ladakhi)

- Trekking route signages
- Boundary signages
- Regulatory signages
- Information signages
- Directional signages
- Wayside exhibits (for Nature and Cultural trails)

7.3 Visitor Interpretation Programme

7.3.1 At Leh

A Visitor interpretation centre at Leh which can also act as data management unit for high altitude wetlands.

7.3.2 At Wetland Site

Two Information centers one at Korzok and at one Thukjay using local materials architecture and artists, may be put up. Following are the proposed components:

- Interactive exhibits
- Small auditorium
- Bookshop/ local handicraft sale shop
- Small library
- Office space
- A Nature trail
- A Culture trail

Centre at Tsomoriri may be maintained by Tsomoriri Conservation Trust.

Centre at Tsokar may be maintained by Tsokar Conservation Trust.

7.4 Target Specific Training and Capacity Building Programme

- **For Students-** Talks/ Lectures, Slide shows/Film shows, Competitions, Project work
- **For Teachers-** Workshops, Seminars
- **For General Public-** Slide/ film shows.
- **For Youth-** For local youth training could be provided as Nature and Culture Guides, For University/ college students long term project work could be identified.
- **For Local NGOs-** Training on use of Education and awareness package, training on environmental laws etc.
- **For Local community-** Awareness through local language materials, training on homestays, training to women on local handicrafts
- **For Monasteries:** to build the capacities of Lamas (local Buddhist monks) for their involvement in conservation
- **For Government officials/ politicians-** to create awareness
- **For Military & Paramilitary forces-** to create awareness.
- **For Tour operators-** to conduct their tours in an ecofriendly and responsible manner.
- **For Cooks and Guides-** for better management of garbage along the trekking routes and at camp sites.



Ecology workshop for paramilitary forces

VIII Institutional Arrangements

The implementation of Management plan for Tsomoriri & Tsokar involves multi disciplinary activities. At present several different government departments are investing and or associated in different ways. Although the area is managed by Wildlife Department there is no coherent mechanism / clearinghouse for the proposals for development as road construction, implementation of government schemes, and other such numerous examples are there. It is thus important to define a clear cut institutional mechanism.

Proposed action points:

- Institutional mapping for Tsomoriri & Tsokar to identify the number, scope and extent of various institutions involved in Tsomoriri & Tsokar.
- Organising a high level meeting of representatives from institutions identified above to chalk out the best possible mechanism.
- Notification of the Institutional mechanism to all departments concerned.
- Setting up the mechanism.

Bibliographical References

Anon. (1995): Workshop on Sustainable tourism initiatives in Himachal Pradesh. Minutes of a workshop organised by State Council for Science, Technology & Environment, HP; Department of Tourism, Govt. of Himachal Pradesh, ICIMOD, Equitable Tourism Options, Bangalore & Spiti Tourism Management Society. Simla 14-16.11.1995.

Anon. (1996): *Asia-Pacific Migratory Waterbird Conservation Strategy: 1996-2000*. Wetlands International – Asia Pacific, Kuala Lumpur, Publication No 117, and International Waterfowl and Wetlands Research Bureau – Japan Committee, Tokyo.

Anon. (1998): *Operational Guidelines for the Implementation of the World Heritage Convention*. UNESCO, Paris.

Bhattacharji, R D (1994): Back to Rupshu. *The Himalayan Journal* 50:125-143.

Ceballos-Lascurain H. (1996): *Tourism, ecotourism, and protected areas: The state of nature-based tourism around the world and guidelines for its development*. IUCN, Gland, Switzerland and Cambridge, UK.

Champion H G & Seth S K (1968): *A revised survey of the forest types of India*. Government of India Publications, Delhi.

Chandan P, A Chatterjee, P Gautam, C M Seth, J Takapa, S Haq, P Tashi ans S Vidya (2005): *Black-necked Crane-Status, Breeding Productivity and Conservation in Ladakh, India 2000-2004*. WWF-India and Department of Wildlife Protection Government of Jammu and Kashmir.

Chundawat R S and G S Rawat (1994): *Indian Cold Deserts: A Status Report on Biodiversity*. Wildlife Institute of India, Dehradun.

Mallon, D P (1990): *An Ecological survey of the Protected Area Network in Ladakh*. Report Submitted to the Department of Wildlife Protection Jammu & Kashmir Government.

Darokhan, M D (1986): Animal husbandry in Ladakh: an ecological perspective. Ladakh Project, *Ecology and principles for sustainable development*. Proceedings of a conference co-housed by the Ladakh Project and the Ladakh Ecological Development Group in Leh, Ladakh, pp. 71-74.

Fox, J L, Nurbu, C, Bhatt, S and Chandola, A. (1994): Wildlife conservation and land-use changes in the Trans-Himalayan region of Ladakh, India. *Mountain Research and Development* 14(1): 39-60.

Goldstein, M S (1981): High-altitude Tibetan populations in the remote Himalaya: social transformation and its demographic, economic, and ecological consequences. *Mountain Research and Development* 1:5-18.

Hussain S A & R K Singh (2000): *Bench Mark Ecological Status of Wetlands of Ladakh*. Conserving Biodiversity in the Indian Trans-Himalaya: New Initiatives of Field Conservation in Ladakh. Wildlife Institute of India.

IUCN (1990): *Rabbits, Hares and Pikas: Status Survey and Conservation Action Plan*. IUCN Gland, Switzerland.

IUCN (1996): *Red List of Threatened Animals*. IUCN, Gland, Switzerland.

Kachroo, P, Sapru B and Dhar U (1977): *Flora of Ladakh, an Ecological and Taxonomical Appraisal*. Bisen, Singh and Maheddra Pal singh Publ, New Delhi.

Kaushik, S (1993): *Towards a tourism strategy in Spiti*. Equations, Bangalore.

Kitchloo NA (1997): *Unified Ecosystem Management Plan for the Changthang Wilderness Area*. Department of Wildlife Protection, J&K Government, Srinagar.

Kothari, A, Suti S. & Singh, N (1996): Rethinking Conservation of India. *The Ecologist Asia* Vol. 4 (1): 54-71.

Kala C P (2000): *A Study of Traditional Health Care and Medicinal Plants*. Conserving Biodiversity in the Indian Trans-Himalaya: New

Initiatives of Field Conservation in Ladakh. Wildlife Institute of India.

Maitland, P S and Morgan N C (1997): *Conservation Management of Freshwater Habitats*. Chapman & Hall. London.

Mallon, D P (1991): Status and Conservation of Large mammals in Ladakh *Biological Conservation* 56: 101-119.

Mani, M S (1978): Ecology and Biography of High-Altitude Insects. W. Junk, The Hague.

Miller, D J (1998): Conserving Biodiversity in Himalayan and Tibetan Plateau Rangelands. Paper prepared for the Himalaya Eco-regional Co-operation Meeting organised by UNDP, February 16-18, 1998, Kathmandu, Nepal.

Mishra, C (1997): Livestock depredation by large carnivores in the Indian trans-Himalaya: conflict perceptions and conservation prospects *Environmental Conservation* 24 (4): 338-343.

Mishra, C and Humbert-Droz, B (1998): Avifaunal survey of Tsomoriri Lake and adjoining Nuro Sumdo wetland in Ladakh, Indian trans-Himalaya. *Forktail* 14: 865-7.

Mulhauser, B and Monnier G (1995): *Guide de la Faune et de la Flore des Lacs et des Etangs d'Europe*. Delachaux et Niestle S.A. Lausanne, Switzerland and Paris.

Namgail, T (2003): Gya-Miru, last refuge of the Tibetan Argali. *Sanctuary Asia*. 23.

Osmaston A E (1922): Notes on the Forest Communities of the Garhwal Himalaya. *The Journal of Ecology*, Vol. 10, No. 2. (Nov. 1922).

Polunin, O and Stainton A (1984): *Flowers of the Himalaya* Oxford University Press, Oxford.

Prins, H T T (1992): The pastoral road to extinction: competition between wildlife and traditional pastoralism in East Africa. *Environmental Conservation*, 19: 117-123.

Pfister O (2004): Birds and Mammals of Ladakh. Oxford University Press, New Delhi.

Rawat G S & B S Adhikari (2002): Vegetation Characteristics and Pattern of Livestock Grazing in Changthang Plateau, Eastern Ladakh. Unpublished Report Submitted to International Centre for Integrated Mountain Development Kathmandu, Nepal & Wildlife Institute of India, Dehradun, Uttaranchal India.

Rodgers, W A and H S Panwar (1988): Planning a Wildlife Protected Area Network in India. Vol. 1 Report. Wildlife Institute of India, Dehradun.

Steck, A, Epard, J L, Vannay, J C, Hunziker, J, Girard, M, Morard, M & Robyr M (1998): Geological Transect across the Tsomoriri and Spiti areas: The nappe structures of the Tethys Himalaya *Eclogae Geol. Helv.* 91: 103-121.

Sonobe, K and Usui, S (ed.) (1993): *A Field Guide to the Waterbirds of Asia*. Wild Bird Society of Japan, Tokyo.

Williams, M (ed.) (1997): *Wetlands: A Threatened Landscape*. Blackwell, Oxford UK & Cambridge USA.

WWF-India (1997): *Biodiversity of Jammu & Kashmir*, New Delhi: WWF-India.

WWF-India (1997): *Wetlands Conservation in Jammu & Kashmir*, New Delhi: WWF-India.

A N N E X E S

Annex I

Participatory Research Initiative High Altitude Wetland Conservation - Changthang

A WWF-India report, November-December, 2003

The Changthang region in Ladakh is a Trans-Himalayan area, of approximately 15,000 square kilometres in size. Contiguous to the Tibetan Plateau, the region undulates from 4,000 metres to nearly 7000 metres above the sea level. It is a high-altitude cold desert with very low annual precipitation, extended winters with sub-freezing temperatures, characterised by high wind speeds and intense solar radiation. The landscape is characterized by high mountains, rolling hills and vast plains on the valley floors, which are dotted with streams, marshes and some large oligotrophic lakes.

Introduction to the high altitude wetlands of Changthang

Changthang is one of the most unique ecosystems of the world comprising of high altitude wetlands, lying in the western extension of the northern Tibetan plateau or Changthang. The extreme environment of Changthang supports a unique and varied, albeit a very fragile, biodiversity and inter-species linkages. Being a high-altitude cold desert, human habitation as well as flora and fauna are very sparse in Changthang. It is the wetlands around which human, as well as other forms of life have been primarily surviving.

The wetlands and their catchments are a rich source of fodder and support domestic and wild herbivores and also sustain the carnivores and bird life. It is believed that the wetlands of Changthang are the most important breeding ground of Bar-headed geese (*Anser indicus*) in India and the only

breeding ground for globally threatened Black-necked cranes (*Grus nigricollis*) outside China. The region also supports some of the most endangered species of mammals such as Kiangs, Snow Leopard, Tibetan Wolf, Lynx, Blue Sheep etc.

Changthang is also known for its rich and diverse cultural landscape, inhabited by Changpas, a pastoral nomadic community, whose livelihood linkages are intrinsically linked to the vast landscape of the Changthang and locally available resources. The pastures found around these wetlands are a rich source of food for the livestock reared by them. Changpas rear goats, sheep, yaks for their produce and horses for transportation and seasonally migrate over large tracts of pasturelands to provide grazing for their livestock.

Changpas have lived for several centuries around these wetlands. The special characteristics of the high altitude environment especially the limited resource base define their natural resource use and management through various customary rules and regulations.

Management Issues

The traditional resource use practices of Changpas have seen a tremendous change in the last few decades. From 1947 when the Changthang/Ladakh became an integral part of India to the Indo-China war in 1962, the region has seen changes which have influence over the wetland ecosystems. The encroachment of traditional pasture resources by the army after 1962 war

with China, preceded by the sudden influx of the political refugees with their livestock from Tibet in 1959 have had an enormous impact over the relationship and livelihood linkages of the Changpa herders with their pasture resources, spread around the wetlands. With losing their rights and access to a vast amount of pasture resources in Tibet, the local herders had slowly readjusted in terms of their resource use. The increased tourism and development activities in and around their pasturelands are some of the new challenges for them.

The local herders carry perceptions and opinions about such changes. Like, large scale army deployments on their pasturelands are no more challenged as the army posts have helped them with various consumable goods. The traditional social and cultural similarities and relationship with the Tibetans have helped them to accept and accommodate refugees in spite of the marginal resource base. Tourism is welcome but grazing by the trekking animals of tourists is a matter of concern to them. Similarly protective fencing around wetlands by the administration is deeply resented on the grounds of hindered access to their pastures around the wetlands.

These perceptions and readjustments have a significant role to play in the changing resource use around the wetland and are also reflected in the current state of health of the wetlands of Changthang. The participatory research initiative was an effort to understand from the Changpas' perspective, the

Note: The complete report is available with WWF-India. Here we are presenting the Tsomoriri & Tsokar sections of the report.

significance of these wetlands in this environment and gain from their intrinsic perception, an account of the current status of these wetlands and the biodiversity they support. The programme also explored the changing linkages of the inhabitants with these wetlands and the tools, capacities and limitations of the Changpa society to relate to and conserve their environment.

PARTICIPATORY RESEARCH INITIATIVE

This participatory research initiative was first of its kind conducted for the high altitude wetlands of Changthang. The main objective of this exercise was to assess how the local communities living around the high altitude wetlands in Changthang interact with the wetland's ecosystem? What are their livelihood patterns and how are they dependent on the resources around these wetlands? This also included to observe and analyse how indigenous resource practices are losing away and what kind of new livelihood arrangements are being contemplated by the local communities for their survival around these wetlands. In this case important consideration was also to find out under what kind of socio-economic and political situation the resource depletion is occurring?

This research initiative primarily looked at the following issues:

- The relationship between local people and the wetlands
- The resource use around the wetlands
- How the resource use around these wetlands are changing and what are the factors affecting these changes.

To find answers to all the above queries, WWF-India undertook a participatory research initiative exercise in 4 high altitude community settlements of Changthang between 16th November to 10th December, 2002. These four

settlements have direct habitat relationship with the four major high altitude wetlands of Changthang. A dialogue process was initiated with these communities on the issues of conservation of wetlands and wetland management, with the final aim of identifying potentials for a co-management approach to conserve the wetlands in Ladakh.

Methodology

The exercise tried to enable people living in the vicinity of these wetlands to highlight their changing relations with the wetlands and participate in preparing a management plan for the future conservation of these high altitude wetlands. To accomplish this, a number of methods and techniques were used so that people could analyse their changing relationship with the wetland ecosystem:

- Resource Mapping
- Seasonality Maps
- Transect walks
- Pair wise Ranking and Scoring
- Livelihood analysis
- Institutional analysis
- Causal impact analysis
- Focus Group discussions
- Interview guides
- Group Meetings

Before initiating this exercise, a 3 day preparatory training was organised for the WWF- Ladakh team to introduce and train them in the various methods/techniques/tools, to be used for the field visits. This included hands-on exercises of rapport building, interviews etc. Special emphasis was put on due respect to local customs and sensitivity to local attire and general social decorum. The team also prepared a tentative check list of the issues which

were supposed to provide a preliminary judgement of the situation for the WWF-team. They were given a free hand to exhaust this list and make a new one after interacting with people. Keeping in mind the fact that an open discussion can go haywire, the tentative check list helped to keep the discussion precise.

Since this was the first PRA exercise undertaken by the WWF team, selection of the first site was based on the extent of established rapport with the local community. The team was also provided with onsite assistance during the exercise. Night sessions were organised to discuss and find solution to various issues and problems emerging out of the field situations like lack of cooperation amongst the women, long distances to cover etc. Daily diaries were maintained by the team members, used essentially to collate and share information with each other.

The whole team visited each wetland together. These were selected on the basis of their importance in terms of the presence of endangered species and the changing resource use. A team consisting of six members were divided into three groups consisting of two members each (one man and one woman) to conduct the exercise in four wetlands. The wetlands/settlements covered:

1. Tsomoriri / Korzok
2. Regul and Startsapuk Tso /Samad
3. Hanle marshes/ 8 hamlets of Hanle
4. Tsigul and Tsonyak/ 3 hamlets of Chushul

The teams spent three to four days in each settlement. They documented livelihood details, emerging changes and the resource use around the wetlands. All these issues were put together and prioritised with the help of local communities. Later, each team member

compiled draft settlement reports and analysed the gathered information during the night sessions.

Tsomoriri

KORZOK

17th to 20th November, 2002

On 7th November 2002, we started off at 6:30 am from Leh, the district capital of Ladakh region to a pastoral nomadic community settlement, korzok located on the banks of a high altitude wetland named Tsomoriri. The settlement is located in south eastern Changthang region which is widely spread in few thousand kilometres along the river Indus and extends into Tibet (China).

When we reached the Mahe bridge, over river Indus at around 12:30 pm, our travel permits issued by the district commissioner of the Leh district were checked by Jammu and Kashmir state police posted at the bridge. This bridge notifies the eastward extension of the inner line area of Leh district restricting foreign tourist entries beyond this point. It is only since 1994 that the government has permitted tourism into part of Changthang region and the Mahe bridge has become an important landmark for tourists visiting the Tsomoriri wetlands.

When we crossed the bridge on a dirt road for the korzok settlement, another 55 kms away, the day temperature hovered around 4 to 5 degrees celsius, with clear signs of recent snow.

We crossed Namshang la, approximately 20 kms from the Mahe bridge and we could spot a few 'yak hair' tents or rebos (called rebo or rebos from here on) pitched around a small water body called Thazang karu. There were eight rebos in all surrounding the lake on its north eastern shores and we were told that due to an early snow season, the rebos were more scattered than usual and otherwise there would have been more than 20 rebos pitched in closer proximity.

As we reached close to these yak haired tents, a group of men approached our jeep. Since we were interested in meeting everyone from the community, they suggested we contact their headman at the next campsite, who would help us to arrange a meeting. At the other campsite, we discovered that the headman was visiting the korzok settlement in order to distribute periodic ration supplies.

We decided to head for the korzok settlement, following a road that mostly travelled along the banks of the Tsomoriri lake. It is a 27 km long water body with brackish blue water in otherwise a barren high altitude region and is famous as a breeding grounds for migratory avifauna species. On the way, we spotted a number of Bar-headed Geese in the lake who had not yet migrated to lower altitudes. We also sighted a few Coots floating in a group close to the geese.

It took us an hour to reach the settlement. There we found a large group of nomads visiting the settlement to collect their ration supplies, a quarterly distribution of sugar, rice and wheat by the state's public distribution department (PDS). The headman told us that we had arrived at an appropriate occasion and it was a good opportunity to meet most of the people together. Normally the nomadic campsites are scattered in far off region and meeting the whole community together is rare. We took support from the headman to plan a meeting for the next day. The exercise at korzok was very important the team as well because it would be their first actual on site PRA experience. The methodological improvisations and learnings from this work in korzok would be the essential tools of the team members to conduct the exercise in the other three wetlands.

Next day the meeting started at around 8 am and most of the men, women and children gathered in the courtyard of the

korzok monastery to be a part of the meeting. We started the meeting by introducing the team, WWF For Nature-India the NGO we were representing and are purpose for visiting them. We explained to them that we planned to visit all prominent wetlands in the Changthang region and understand various issues concerning these wetlands and compile them in the form of a report. The report, we told them, would be translated and shared with all the settlements living close to the wetlands and then forwarded to the state government, NGOs working in Changthang, researchers and other interested individuals. But what seemed to interest them most was our proposition that the report would be useful for them to share concerns with other settlements and follow up on certain issues with policy makers.

We took time to make it clear to the people that the exercise in itself did not mean promise for any support, but that it may trigger some support from interested organisations to take up development issues in the region and help in formulation of beneficial government policies.

After the familiarization, the people took initiative and drew a detailed resource map of their settlement, specifying drinking water sources, the pasture sites and their traditional migration routes. In time line, a group of men mentioned about their changing resource use pattern around the wetlands and how there is a shortage of winter pastures.

In response to queries about locations of various nesting sites of bird, some of them drew maps with twigs on the ground and indicated the locations. They also made seasonal calendars depicting the time schedule of the bird migrations.

After a two-hour long meeting, people started showing keenness to get back to their campsites as horse's laden with rations had waited for long during the

meeting. However, the herders invited us to visit their campsites and hold similar meetings where they would have relatively more free time, while also being close to their livestock and rebos.

After the meeting, we took a transect walk in the korzok settlement. We informally spoke with women, men and children during the walk and later visited the monastery to introduce ourselves to the head monk and others.

After we had lunch at the guest house, we split into three groups of two team members each and two groups went to the nomadic campsites and one group stayed at the korzok settlement to conduct the participatory exercise.

On the first day, we tried to gather details of local historical ties and myths related to the wetlands. It also led to information about the biodiversity supported by the wetlands. This day we kept our interactions short and tried to visit as many households as possible. The group that went to the Peldo campsite received an invitation to attend a marriage ceremony. This event helped the team to establish a good rapport within the community.

The teams returned to korzok around 7 pm and sat together to share the information. We crosschecked with the checklist made during the training programme at Leh and added a few more issues that had emerged following our interaction with the people.

This pattern of debriefing /feedback on information and refining the PRA techniques and focus of the team continued all through the exercise as standard practice and resulted in contextualizing the PRA exercise to the particular site situations and optimum use of WWF team capabilities

Next day, all teams went to the same nomadic campsites. A few group members went out with shepherds to the

grazing grounds close to the wetlands, while others stayed back to hold more focused discussions with the people.

The issues pertaining to their livestock, grasses and their nomadic movements around the wetlands were discussed in details. We also conducted some preference ranking exercises with them and made some causal impact diagrams. All of us were invited to have lunch with the families with whom these exercises were being conducted.

Later that day, we continued with matrix scoring for livestock composition, grasses found around the wetlands and migratory birds and mammals. On the issue of winter pastures, people gave us details of various problems in accessing their traditional pastureland, some of which have now become part of China following the Indo-China war in 1962. People also talked about increased tourist activities around the wetlands.

On return to korzok settlement we had another interactive session with the head monk of the korzok monastery to learn about the religious significance of the Tsomoriri wetlands.

We visited more campsites on the last day and held detailed discussions on specific issues with the help of interview guides.

Since the campsites were scattered, it was not possible to hold another group meeting with all the households on our last day. Therefore we decided to hold a group meeting at the Peldo campsite, where the headman had his rebo and the maximum number of the herders could gather.

During this group meeting, the people were informed in detail about various issues that had emerged as a result of this participatory process. They were appreciative of the exercise and agreed to the outputs generated from the information gathered by the team in the last four days of the PRA exercise.

TSOMORIRI

Tsomoriri is a brackish water lake, located in the Changthang region, 200 kms south east of Leh. It also neighbours another wetland Thazangkaru, from which it is separated by a small river gorge.

Located at an altitude of 4,600 metres, Tsomoriri wetland is encircled by snowy mountains. The lake is 27 kms long and 6 kms wide. According to a local legend it was part of another lake called Tsokar, located 70 kms south west of Tsomirri.

Tsomoriri is known to attract a number of migratory birds from all over the world every year. Local herders know of 16 kinds of birds, which are found in and around Tsomoriri. The prominent ones are Nagpa, Muru, Chiyung, Pupushelle, Gyatong, Cha Thung Thung karma (see the list). The specific shores, which are frequented by these migratory birds are Kyangdom, Peldo, Chumik Shiltey and Thazang karu and these are also the local nomadic campsites.

Seasonal calendar drawn up by the local herders showed that the birds migrate to Tsomoriri around the month of May and live here for 4 to 5 months till the end of October month. The seasonal calendar made by the herders depicted their population with predominance of two migratory birds i.e. Bar-headed Geese or Nagpa and Brahmini ducks or Muru. According to them the number of geese migrating to Tsomoriri has been rising since 1990, whereas the number of Brahmini ducks have remained same. There is also two pairs of Black-necked cranes or Cha Thung Thung karma which have started to breed here but their number is always fluctuating. Like this year, the cranes didn't nest here. The herders believed that it happened because of recent government fencing on northern shores of the wetlands. Although it is not clear whether Black-necked cranes didn't nest due to rise in the water levels of wetlands and

submerging of their nesting sites or due to the recent fencing. The herders are not in favour of the government fencing on the wetland shores as it is considered to restrict their access to the pastures as well and they often complain against it.

The herders accept to hunt these birds. During the discussion it was found that the herders prefer hunting eggs of geese as these birds seem to destroy their meagre crops.

Hunting?

While discussing the sensitive issue of bird hunting, the herders remembered about an incident where one man was carrying a large number of eggs on his back from an Island of Tsomoriri. While making his way to the shores he got stuck in the marshes. His son, who was waiting for him saw his father in trouble and went to help. Unfortunately he also got stuck in the same marshes and died. The local people say this happened to them because they ate a large number of Bar-headed gees' eggs, and that they frequently hunted Bharals and Partridges.

People say that whenever a Bar-headed Geese is hunted or its eggs is eaten, the KORZOK people light Chodme, a holy lamp to take care of the sins. If locals eat large number of eggs, the bird destroys their crops. The local dogs do not eat geese eggs because they are always laid on islands, far away from shores.

There are also a number of mammals around the Tsomoriri wetlands like-- Bharals, Tibetan wolves, high Himalayan wild asses, Lynx, and Snow leopard. Herders have also sighted Tibetan Argalis and Gazelles around the wetlands but they are rare as compare to other mammals.

Mammal sightings by the local herders in decreasing order of frequency
Kiang
Shangkhu
Na
Nyan
Snow leopard
Yee

The local herders believe that the mammal population around the wetlands is always fluctuating and it is difficult to give a number to them. However a relative estimate is possible. Like herders informed us that the Snow Leopards had always been rare around Tsomoriri wetlands, while Tibetan Wolves is frequently found. It is commonly assumed amongst the local herders that after a ban on hunting in 1987 by the J&K government, number of Tibetan Wolves has increased and subsequent attack on their livestock as well. Therefore retaliatory killings of Tibetan wolves are common. Bharals are hunted for food, especially when they get stuck in frozen waters of wetland. Partridges and Bar-headed Geese are amongst the others which herders accepted to hunt.

Retaliatory killings

Wolf traps around the wetlands are most common sights. A big stone standing erect with the help of a little stone is a trap where meat is stuck and whenever prey attracts towards the meat and try to grab it, the big heavy stone falls over the prey, wounding it badly. This is mostly retaliatory killings and take place after the wolves attack or kill livestock

There are incidences of wild high Himalayan asses and marmots being hunted for its meat. There is a belief that they are hunted only by the Tibetan refugees and not by the local population of Changpas.

Increasing number of Kiangs?

Kiangs are frequently sighted at the Phirtse and Tegayung in groups of 2 to 20. The local herders complain of a recent increase in number of Kiangs in their pastures. One perception is that the number is growing because Chinese hunt them for food and the animals often escape towards the Indian borders. Because the local herders in Indian side do not hunt them and is often a refuge for the animal. The growing number of Kiang is considered a serious pressure on their scarce winter pastures and as a result the herders wish to fence their winter pastures.

Water sources

There are six feeding streams of Tsomoriri wetlands (see Annex). These streams surround the wetlands and are named as Phirtse Phu, KORZOK Phu, Chumik-shiltey, Chakshan, Dachung and Peldo. These streams also make the fresh water source for the local herders and traditionally the local nomadic campsites are chosen close to these water streams. Their traditional migration pattern is designed in such a way that their dependence on these water streams is distributed. While scoring the present dependency on these water sources, it is found that herders maximum rely on the KORZOK Phu water stream as it flows through the KORZOK settlement and also feed the summer campsites for more than a period of 3 months. Since the number of sedentary households is rising in the settlement, the number of people depending on the KORZOK phu has also risen. A guest house for tourists in the KORZOK settlement also plans to lift water from the KORZOK phu through a motorized generator to have a direct supply in the guest house. The local people also cultivate land around the wetlands and stream water is diverted

every season for irrigation purposes. The feeding stream has also come under heavy pressure especially with the advent of tourism and army posts also depending on it. The tourists are seen camping closely to the stream and polluting it with cooking, washing and defecation, which ultimately mixes with the wetland water. With the increase in tourist numbers, many of tourists have started camping close to the other feeding streams of the Tsomoriri like Chakshan and Chumik shiltey. The change of human use of all these feeding streams is sure to affect the wetland's water quality. Finding plastic wraps, used tin containers, plastic water bottles is not rare on the certain shores of these wetlands.

Tsomoriri water is not used for drinking purposes. Herders believe that Tsomoriri water is harmful to human health and therefore is mostly used feeding their livestock only. While making seasonal calendars, herders shown an increase in the snowfall which has contributed to the increased water levels of the wetlands. From 1990 onwards they have experienced heavy snowfall quite often and during the 1996 precipitation the Tsomoriri levels rose to alarming levels, submerging nesting sites of birds and the only road reaching the KORZOK settlement. These heavy and sudden snowfalls have also been responsible to kill a large number of local livestock.

The local herders do not worship the wetlands, as it holds no religious significance for them. An old man added at this point of our discussion, how even dead bodies used to be thrown in the Tsomoriri wetland, a practice that has been discontinued after a request from their religious leader.

KORZOK SETTLEMENT

There are 179 households in KORZOK with a total population of 930. The people

primarily rear livestock and graze them on pasturelands located around the Tsomoriri wetlands. Most of these households are nomadic and live in yak hair rebos. There are only 22 households out of 179 which are either semi-nomadic or settled and live in the permanent houses at the KORZOK settlement in the vicinity of a Buddhist monastery whereas the rest move with their livestock and only their storehouses are located at the KORZOK settlement.

Korzok:	
Total no. of households for KORZOKg-	179.
Total population :-	930.
Male :-	459.
Female :-	471.
Total Agriculture Land :-	633 streams.
Cropping Pattern as per the agriculture deptt. is	Barley and Wheat.

Source: Leh District Records, 2002

LIVLIHOOD STRATEGIES

Livestock rearing is the predominant livelihood activity of KORZOK households. They rear goats, sheep, horses and yaks. The wool/hair of sheep and goats are sheared every year to be sold in the market whereas horses and yaks are used as travelling and pack animals respectively.

Traditionally the local herders reared large number of sheep as well as goats. The sheep wool was bartered to access their essential staple diet barley from the neighbouring agricultural communities. This barter trade has declined and with rising cash value of pashmina hair from the goats as compare to sheep wool the herders show a clear preference to rear more goats than sheep. The sheep wool has a very less market value now as compared to pashmina hair. The pashmina hair sell for Rs.1500/- per kg

whereas sheep wool is sold for Rs. 150 to 200/-. It is the pashmina hair which bring the maximum cash to a household followed by the livestock sold for meat to butchers.

There are relatively very few yaks reared by the local herders and they do not have any commercial value until and unless its meat is sold. Milk products of all the animals are kept for self-consumption and not sold in the market. Similarly the livestock produce like hides, wool etc. are used for making shoes, clothing, rugs etc. at household levels.

All the saleable animal products are sold to traders who visit the KORZOK settlement and their nomadic campsites during summer months. The income from selling the animal produce is primarily used in buying the most valued and essential market good for the local herders i.e barley, their staple diet and is only accessed from outside as the high altitude land is not successful for cultivation.

A few households also earn incomes from government and army jobs. Beside the jobs, these families retain their livestock. Similarly there are households who have migrated to Leh but their animals still graze the pasturelands around the wetlands.

With an advent of tourism in 1994, two households have started to run guesthouses in the KORZOK settlement and three of them have opened grocery shops. With a large number of households converting their old storehouses into bigger houses, a demand for human labour has increased. This demand is also generated by the Indo Tibetan Border Police depot at the KORZOK settlement established two years ago. This depot hires local labour and their animals to do the periodical recce trips and to ferry loads to the border posts.

Occupation Preference:

Occupation	Preference wise ranking
Livestock	1
Cultivation	2
Jobs	3
Guest house	4
Shop	5
Trekking/hiring horses	6

Livelihood Changes

The need of cash to access the basic goods like barley, medicines etc. is more than ever with in the Changpa community. The decline in barter trade with their neighbouring agricultural communities for barley is almost diminished and they have to entirely rely on the market to access their staple diet. For that large amount of borrowing and lending is present within the community. Like the family of ex-gowa (headman) is considered to be a rich household which owned the maximum number of livestock. They have now sold their animals to build a guesthouse and to buy a jeep. They now also lend money to households in distress or needing cash. Many households frequently borrow money from private traders also who come to buy livestock goods.

LAND USE AROUND THE WETLANDS

1 Pastoral Use

1.1 Pasture rights

Pastures are the most critical natural resource for the herders. Like other pastoral groups in Changthang, the KORZOK herders have lost out a vast portion of their winter pastures to Tibet after the Indo-China war in 1962. The first livelihood impact in this regard was in a shrunken livestock size with a drop from 1,000 livestock per household to 200 to 300. The local herders believe that the available pastures are

insufficient and not enough to feed their livestock, whereas the government officials are of the opinion that the KORZOK herders own a high livestock population and livestock size per household is higher than the carrying capacity of the pastures.

To fulfil their livelihood needs the herders from KORZOK buy pasture rights from their neighbouring communities to fulfil their resource requirement.

Fencing Tsomoriri!

Fencing on the northern shores of the Tsomoriri wetlands has been resented by the herders. It was erected two years back by the wild life department to save the Black-necked cranes from tourist traffic. The herders however complain that the fence restricts their migratory movements from one pasture to another. According to many locals, the fencing doesn't serve the conservation purpose as they had observed a decline in number of many migratory birds on the northern shores of Tsomoriri ever since the fencing of the shores. There is no proper ornithological research to support this, but this year the Black-necked crane has also not nested around Tsomirri.

According to people, fencing is appropriate if it is done completely as it will also save grasses from the trekking parties' horses. Although locals are a bit wary of government taking this initiative and fear the fenced off area might be locked in and disallowed for grazing as well.

Name of Village	1999-2000		2001-2002		2002-2003		2002-2003	
	Goat	Sheep	Goat	Sheep	Goat	Sheep	Goat	Sheep
Korzok	10815	18077	21305	20376	26133	25844	29880	26452

Department of Sheep Husbandary, Nyoma, Leh district, 2002

1.2 Livestock

The average livestock holding of sheep and goats of the KORZOK settlement is highest amongst all the settlements of Changthang area which fluctuates between 50 to 300 per household. Some households own less than 50 livestock whereas some have more than 300. On an average, every household has one or two horses for travelling whereas yaks are few. Few semi-nomadic families have also kept donkeys necessary to collect fuel wood with only few dzomo (a cross between cow and a yak)The local herders find the government figures wrong and resent the fact that number of the livestock owned by them has increased.

1.2.1 Changing Livestock Composition

The declining market value of sheep's wool has pushed the local herders to rear more goats, which produces precious pashmina hair, sold at a very high market price. The percentage increase of goats and sheep is comparable and it can be seen that goats are increasing fast in the region. Says a herder who owns one of the largest number of livestock, "We had more sheep in the past but now we try to raise more goats, as its produce fetches better returns in the market and the barter trade between sheep wool and barley is diminishing". There are only few families who still undertake traditional trading expedition to Spiti, a neighbouring high-altitude agricultural region for bartering their sheep wool with the barley grown in Spiti.

Their clear preference in livestock is also visible in the preference ranking exercise, conducted for livestock preferences.

Livestock Preference:

Livestock	Preference ranking
Goats or Rama	1
Sheep or Luk	2
Horses or Sta	3
Yaks	4

1.3 Nomadic movements

Before the 1962 Indo-China war, the local herders owned pasturelands in Tibet as well. The traditional headman — Tsering Dorjee still remembers their land resources, which were spread over a huge area on the banks of river Indus, in Tibet.

According to the herders, they used to spend relatively lesser time around the Tsomiriri wetlands before 1962 when they could access their pastures in Tibet. At present they spend all the autumn and spring months around wetlands and graze their livestock in closer vicinity of the Tsomiriri wetlands. The rest of the time their livestock graze closes to the water catchment zones and are relatively far off from the actual wetlands.

Annual Migratory route:

Months	Location	Time
Summer	KORZOK phu	3 to 4 months
Autumn	Peldo, Chakshan —on the wetland shores	1to 2 months
Winter	Tegazung	3 to 4 months
Spring	Kyangdom, Chumik shiltey-on the wetland shores	1 to 2 months

Management systems

It is interesting to note that the herders have rearranged their migration patterns after 1962 and survived with limited pasturage. As per their tradition, the pasture management is the main responsibility of their gowa, who decides

the time and location of pasture usage. Their migrations are seasonal and pre-determined. Once the decision is agreed upon, the schedule and movements are followed strictly and any violation is discouraged with heavy fines of money and livestock.

It is a duty of the gowa to 'assign' dates of occupancy and migration and make all the nomadic households 'adhere' to these. The households divide themselves into sub groups and distribute themselves around these pastures for certain assigned periods.

Efficient management systems of pasture allocation also grade a gowa as weak or strong. The present gowa is perceived 'weak' as the people found there are many deviations in following of assigned dates for migrations.

Gowa!

On asking various people about the rules and regulations governing the use of pastures, people say that now it is not followed as strictly as it used be. The elected gowa is blamed for not being able to manage the pasture use properly. On the other hand, the present gowa says assigned dates are declared in consent with all but even then they are not followed and many people occupy fresh pastures before others. Since he also represents his community outside, he has to travel often to Leh for meetings with government officials etc. Therefore many a times it is not possible for him to follow up on decisions taken earlier. He also said that nowadays the gowa is not given his due respect and it has become difficult to make people follow traditional resource use practices.

1.4 Grasses

The winter times are always a tough period for their livestock grazing because of insufficient pasturage. During this period, reduced grass growth is often coupled with natural calamities, which put the very survival of their livestock at stake.

The herders define the quality of a particular pastureland, based on the kind of grasses grown there. However they also insist that the grading based on this factor should be considered tentative at best, because the most preferred state of pastures is during a good rainfall season.

There are a number of grasses which are found in these pasture lands and are very well known to the herders. According to them, the common grasses available around Tsomiriri are Bol, Shyot, Longma, Nyalo, Gyapshen, Burtze, tolo, trama etc. (a complete list is annexed). The most abundant grasses found around the Tsomiriri wetland are Gyapshen and Trama whereas Nema is the rarest kind available around the wetlands. In the preference ranking exercise it was found that the livestock most preferred Tolo and least preferred

Trama (the distribution and preference wise ranking of grasses are annexed). The herders also reported decline of precious grasses in their pasturelands and in the ranking it was discovered that Tolo is declined the most followed by pang sewo. The local herders think that increased fluctuations in the precipitation, rising vehicular traffic on their pastures, foreign livestock/animals etc are the main causes for this decline. Since the last decade or so, grass growth around the wetlands has been fluctuating between normal, high and low

Chilse and lachu

Few grasses found in their pastures have special characteristics. Some are eaten seasonally and many are completely avoided like Chilse. This grass is found close to sweet water streams and its consumption can be fatal for their livestock. Grasses like lachu grow in the month of April-May and have to be eaten after a flash of rain, otherwise they can make their livestock blind

based on the precipitation received in that particular year. The herders say that 1999 was a good year for grasses as the previous year experienced extreme snowfall in autumn. But after that there was a sharp decline, reaching to very low levels by 2002.

The local herders grade the Tegazung pastures as the best pastures for animal grazing, followed by KORZOK phu, Thazang karu and Parley.

1.4.2 Winter Grasses

The local herders face a serious shortage of pasturage during winter months. People site two reasons for it one is restricted access to their traditional pasturage in Tibet and the second is that they have to share their pastures with the Tibetan refugees, who fled Tibet in 1959 and settled in Changthang with their livestock on their resources.

At present, the winter fodder for their livestock is largely augmented with government provisions of subsidised animal feed, distributed every year, before the onset of winter season. But the herders do not find the government feed enough for their requirement and also buy fodder from the open market. During any kind of natural calamities or livestock sickness, which restrict movement or limit available fodder the herders are forced to share their

household supplies of barley with their livestock.

1.5 Fuel wood/Medicinal herbs

The herders complain that now collecting fuel wood and medicinal herbs is becoming difficult as they have to go to longer distances to find them. The herders agree that the fuel wood have been over-extracted for the commercial purposes.

People prefers using animal droppings for fuel purposes whereas the fuel wood grown around the wetlands is also regularly collected on a daily basis. There are predominantly 5 kinds of fuel wood found around the wetlands i.e Gyapshen, Trama, Ambang Burtze and Burnek and most of them overlap with the grasses. Like the Gyapshen leaves are eaten whereas its roots serve as a fuel wood for the local herders. A number of other plants, found around the wetlands, are used for medicinal purposes too like Trolo, Taksha, Karo Pangdok, Gya and Langthang. Few plants are used for dyeing as well. Moksi is a famous plant, and is extracted in large quantities for its dark red colour to dye traditional robes worn by every one. Moksi is frequently collected from the hill slopes on the northern shores of the wetland.

2 Crop Cultivation

The few settled households in the KORZOK settlement cultivate on the shores of Tsomiriri wetlands. It is around 633 kanals of land which is cultivated for a single annual crop of barley and vegetables, besides fodder grasses. The cultivable land is stretched along the banks of KORZOK phu and the water of phu is diverted for irrigation purposes. For that the herders have constructed irrigation channels to divert water of the KORZOK phu to the fields before it feeds

into the Tsomiriri wetlands. Beside using local manure, people heavily rely on chemical fertilizers acquired from the Leh market.

3 Tourism

The state government had exposed the Tsomiriri wetlands for tourism in the year 1994 subject to seeking of a permit from the district administration at Leh in groups of four for a duration of only seven days.

There are two kinds of tourist who visit Tsomiriri :

1. Pleasure tourists
2. Adventure tourists

The Tsomiriri wetland is favourite amongst pleasure-seeking tourists coming to Ladakh who visit the wetlands in large numbers every year. The tourists mostly arrive here in the summer months between May and September, when the wetlands has melted and attracts a number of migratory birds. The herders mention that 5 to 20 Jeeps of these tourists arrive daily between the months of May and September.

Tourists in search of adventures, who climb the mountain peaks encircling the wetlands or trek on the wetland shores are generally less in number. The popular treks of the region are the one arriving from Spiti over the Parangla and the one arriving from Manali- Leh highway through Raldo.

There is a government guest house close to the shores of the wetlands in 1984. Till 1994, it had served as a refuge for all the government officials but with the tourists' arrival it is also used by the tourists who do not camp on the shores. From the last two years, monastery has leased out a piece of land on the banks of the KORZOK phu water stream to a private travel agent from Leh town, to be run as a camping site for the tourists. Similarly a monastic building is also

constructed close to the shores of the wetlands and is frequently visited by tourists for meditation etc.

The tourist activities around the Tsomoriri wetlands include large scale camping and cooking. The trekking horses also graze the pastures on the wetland shores without a local consent and the herders often complain about such activities. Some tourists also swim in the lake and are also seen driving upto the wetland shores which disturbs the nesting and breeding sites of the migratory birds. The local herders say that this nuisance scares the birds away.

Tourism does not generate much benefit for the local people. It is the meagre cash income through camping fee and hiring out animals for trekking purposes.

4 Army

For the last two years, Indo Tibetan Border Police (ITBP) has established its ration depot at KORZOK on the wetland shores. As a result, number of army officials and their families visiting the wetlands for recreational purposes are relatively increased. There are also large army expeditions, which do extensive reconnaissance trips around the wetlands. It includes large scale camping, cooking and washing around the wetlands.

With the WWF-Ladakh initiative, the ITBP soldiers perform cleaning campaigns with the KORZOK school children and have also attended environment educational courses. Now they have garbage stored and burnt at regular intervals.

EMERGING ISSUES

Tsomoriri is a water body, which every Changpa relates to if not in concrete terms of religion or resource use, then definitely as a part of the environment they live in. They have conserved the wetlands through their regulatory land management for a long time.

People's knowledge about the biodiversity found around their wetlands is enormous. They are also well informed about the status of various species of flora and fauna. The most pertinent concern amongst the KORZOK people is about losing access and control over their pasture resources. After the 1962 war, and influx of Tibetan refugees, their pasture resources have shrunk tremendously and now with an advent of tourism, army and fencing, they have further reduced while threatening their livelihoods. Till date they face a serious shortage of grasses in every winter season, causing livestock mortality.

Shrunken Pasturage

After the 1962 Indo China conflict, the herders have lost out on their winter grazing land and pressure on their pasturelands around the wetlands has increased in terms of the number of days spent. The herders mention about a number of Tibetan refugees who arrived here with livestock after the war and had to be accommodated within these meagre resources. There are many families who now have to pay money to use grazing resources of the neighbouring settlements like Hanle.

Changing Pastoral Practices

The KORZOK herders are passing through a transformation in their pastoral livelihood practices. The shrunken pasturage and fluctuating market trends of their livestock produce have increased their livelihood vulnerability. Since Pashmina from goats sell for a good cash price, the locals have started preferring and rearing more goats than sheep and hence it raises more questions regarding the pastureland ecology around the Tsomoriri wetlands. Many of the older generation do not think it is a positive sign, because for them sheep is much more hardy than goats.

According to the people, their need for cash has risen and they say, "If we do

not make our pastoral practices more viable to the market needs, we will be much poorer". For this if they need to change their livestock composition or use some intense practices of cross breeding, they welcome them. They do not want their children to follow the same pursuits, instead want them to live a settled life and that poses another readjustment towards the resources surrounding the wetlands.

Weakening local institutions

The sustainable pasture use around Tsomoriri is highly dependent on the community's age-old management practices. Through various kinds of influences, these management practices are undergoing many changes. The local institutions, facilitating the indigenous pasture use, are facing a decline and it is an issue of concern. Experts believe that there is a need to do a great amount of capacity building of their local institutions to enable them to remain effective.

Livestock-wildlife conflict

Livestock are the only wealth for herders and any threat to them is considered serious. Therefore, retaliatory killing of Shangkhui is common amongst the people. Similarly, Kiangs' sharing of the same habitat with their livestock is also resented and people want to fence off their pasturelands.

Tourism

The tourist season coincides with the nesting and breeding time of many migratory birds to the Tsomoriri wetlands every year. Tourists driving down till the wetland cause much noise and harm. The problem of solid waste and water pollution is becoming serious with the increasing number of tourists' arrivals in the region.

The local herders say in the last nine years, they have not earned much from tourism and it is only travel agents from

Leh town who earn from it. There are many nomadic households who showed resentment towards tourism, which degrades their pasture resources their only survival source. On the other hand, herders who live a sedentary life at the KORZOK settlement, prefer to have tourism as another income source.

There is an inequity towards tourism benefit sharing and the households which can invest in tourism infrastructure are likely to have a larger share of benefits from tourism. According to many herders, charging camping fee and trekking horse fee can benefit the community much more in an equitable manner.

Insensitive Policies

With most of the government interventions centred on the KORZOK settlement, there is a frequent travel between the nomadic campsites and the settlement. All the roads reaching the settlement are on the wetland shores and are frequented more often than ever by government officials, army, tourists and local people themselves. Now a weekly public transport has also been planned from the KORZOK settlement to Leh.

Regul and Startsapuk Tso SAMAD

20th to 24th November 2002

On 20th November 2002, we reached Samad around 10 pm. It took us five hours to drive from the KORZOK settlement. We crossed back the Namshang la and climbed another mountain pass the Pologonkola to reach the Samad Settlement.

Next day morning, we approached the people living in the settlement and discovered that most of the families were at Ponganagu nomadic campsite with their livestock. The people present at the settlement were mostly old aged who have retired from their nomadic life. They

happily cooperated in the group meeting at a short request and were willing to support our participatory exercise.

After an introduction round, these people took interest and drew a resource map on the ground using stray sticks. They used stones, grasses, ice and snow to identify wetlands, pasturelands, the Manali-Leh highway and water sources etc. They marked yearly location of their nomadic campsites around the wetlands. It was interesting to realize that for them Tsokar lake was known with different names of Regul Tso and Startsapuk Tso. Similarly Samad settlement used to be a nomadic campsite with a name of Rale'. They also discussed the change in land use in post Indo-China war and the economic implications of Manali-Leh highway construction in 1982.

After having a group meeting at the Samad settlement, we all decided to go to the nomadic campsite at Ponganagu with Tharchen, the ex-headman of Samad as most of the nomadic families were camping there. After reaching Ponganagu, we explained our interest and requested the headman to help us to hold a group meeting with all the nomadic families at the campsite. The headman showed reluctance and asked a few questions about how can such a meeting be conducted or managed since the nomadic families were illiterate. We explained that participatory nature of the exercise would not require them to write or read or fill any forms and it would be more like an informal interaction. He agreed and promised us to arrange the meeting around 3pm in the afternoon when the graziers started to come back from the higher pastures with their livestock.

The group meeting was arranged in a livestock pen. Most families turned up and arrived with their portable spindles. After a brief introduction, a resource map was drawn by them with their pasture locations, water sources, campsites and

other land marks like Manali-Leh Highway, Thaglangala and Regul and Startsapuk tso. They also informed us that they would be shifting to Samad settlement with their livestock in another two days time, and will be relatively busy with their packing and shifting from now onwards. Although they didn't seem to mind our visiting them.

Next day, our team split up into two groups. One group stayed at the Samad settlement while the other went to the Ponganagu campsite again.

At the Samad settlement, we found that the people were busy visiting Nuruchen that day, to collect their winter fodder crop and our request to accompany them on their Nuruchen visit was humbly accepted.

Despite heavy snow that day the people continued distributing fodder crop grown in Nuruchen, their only patch of cultivable land. The distribution has to be done in the presence of government officials, who had helped them to grow these fodder crops and they were on a short visit to Nuruchen. We observed the whole distribution process, while helping them carry some fodder loads. During their resting breaks, we asked them about their deficit winter fodder requirements and tried to understand their traditional methods to suffice their winter fodder needs. From how long back did they need to cultivate the winter fodder?

During our third day of the stay, we saw the nomadic families from Ponganagu campsite starting to move towards the Samad settlement as part of their yearly migration cycle. After celebrating their new year these families were supposed to move out of Samad to the Startsapuk Tso wetlands for another three months or so.

We walked with the migrating families and discussed about their pasture conditions and the various factors affecting the growth of grasses around the wetlands. People also made flow

chart diagrams while they were taking short rests from time to time and discussed about the growing physical pressure on their pasturelands due to tourism etc. They also showed us the tourism campsites overlapping with their pasture locations and water sources.

Since children carry a different perception and likely to give direction to the future of the community, we also conducted a small PR exercise with them. We held a preference ranking exercise with them about various occupations and their interest in carrying on traditional pastoral livelihoods.

Before leaving on the morning of 24th, a group meeting was organised to share the information that had emerged out of our participatory exercises at the Samad settlement. People showed great interest to have a copy of the report once it was complete.

REGUL TSO AND STARTSAPUK TSO

Regul Tso and TStartsapuk Tso wetlands are four to five hours drive away from the Leh town after crossing the Thaglang la pass, on the Manali- Leh highway which connects this part of Changthang to rest of Ladakh. They can also be approached through the Mahe bridge by crossing Pologonkala, a mountain pass. These wetlands are located at an altitude of 4,600 metres and are the highest wetlands in the Changthang region.

Both these wetlands are fed mostly by underground springs and three big water streams. The nomadic families say that water of Startsapuk Tso also flow into Regul Tso at certain times of the year, despite the fact that Regul Tso is a brackish waterbody, whereas Startsapuk Tso's water is sweet.

These wetlands are famous for being home to a number of endangered flora and fauna. According to the people, these wetlands attract rare migratory water birds like Brahmini ducks, Bar-headed Geese, Black-necked Cranes,

Tsokar or ?

During the first group meeting while drawing a resource map on the ground, the herders of Samad didn't refer to the popular wetland known as Tsokar. Since it is a big geographical landmark, we asked about its whereabouts. Herders said there is nothing like Tsokar lake or basin. The lakes are called Regul and Startsapukh and the separation between them is called Tso-Aar, meaning a kind of path between the two water bodies. According to them, Tsokar is erroneously interpreted and only used by outsiders.

History of wetlands

Changpas who are the local inhabitants narrate the history of these wetlands. According to the legend, once the Tsokar basin was full of water and it was only after a giant devil drank water from this basin that it went dry. The devil then threw some of the water towards the KORZOK, which turned into Tsomoriri and Thazang karu wetlands, and the Starspapukh and Regul Tso, were formed by the rest of the water which came out of the devil's nostrils.

Zalmo, Chagaratze and Kongmo which come here to nest and breed. Amongst all, the Bar-headed Geese is the most frequent visitor to these wetlands while the Black-necked crane is seen most seldom. According to a famous local belief, the black-necked crane is also considered as a low-standard bird, none could recall the reason for such an opinion and attributed it to inherited connotations.

According to them, a recent rise in water levels of the Startsapuk Tso lake has benefited growth of fishes, algae etc. But this rise in water level has unfortunately

submerged traditional nesting and breeding sites of water birds.

Traditionally the local people hunt eggs of Bar-headed Geese and catch fish in the Startsapuk Tso lake. The people say that these incidents have relatively slowed down after local budhist monks requested the locals not to hunt and fish in the lake.

Amongst mammals there are Kiang- the Himalayan wild ass, Shangkh- Tibetan Wolf, Pheya- Marmots, Watsey, Yee, Shawa, Rebong and Ridaks who live in the vicinity of these wetlands. It is the Tibetan Wolf which is sighted regularly around the wetlands, while the Tibetan Gazelle, considered now to be extinct (here), was last seen some 40 years ago.

During the exercise it was found that the local people perform retaliatory killings of predators and there are incidents of hunting Tibetan Wolves in the region. These people consider Tibetan wolf to be a menace which stalks them. It is said that the Wolves are generally sighted in packs of 7 to 10 and a single attack by them kills a number of livestock. It is when their precious animals like yaks and horses are killed by the wolf attacks that herders hunt back these wolves. They kill these animals by setting up traps and wish to acquire guns to hunt these animals. On the other hand, the high Himalayan wild ass is not killed for unknown reasons but is considered a growing pressure on the limited pasture resources because it also feeds on the same habitat as their livestock. Therefore, these animals are generally scare away to farther areas, in order to save the pastures for their livestock grazing.

WATER RESOURCES

The water of Regul Tso is brackish and not appropriate for drinking, whereas Startsapuk Tso is a fresh water lake and the water is drunk by the local people.

Regul Tso was a source for collecting salt till four years back, but after an increase in the water level, it has been difficult to extract the salt. Patza, a frothy layer found over the surface of the lake water is also used as an ingredient in various traditional medicinal preparations and is primarily sold in the Leh town. The livestock also drink the water from the Regul Tso occasionally for their salt intake.

There are 3 main water streams, which feed these wetlands. Chemur and Nagchuthang feed Startsapukh whereas Pongonagu is the main feeding stream for the Regul Tso. Beside these, there are a number of underground springs, which feed these wetlands. For most part of a year, herders depend on these streams for meeting their drinking water needs, washing and cooking purposes. The dependence on two recently installed hand pumps in the Samad settlement is relatively less.

SAMAD SETTLEMENT

According to 2001 census, Samad has a population of 509 in 89 households. Most of the time in a year, people live in nomadic tents. Their houses in vicinity of the Regul Tso, are used mostly to store goods. Herders seldom live in these houses. They say that the number of houses are increasing in the settlement as there are many nomadic families who have started to spend relatively more time in these dwellings since school, fodder storage and medical facilities are only available around the settlement

Samad also shares its land resources with 22 households of Tibetan refugees, who migrated from Tibet in the year 1959.

SAMAD:

Total number of households at Samad	89
Total population	509
Male	266
Female	243

Source: Leh District Records, 2002

LIVELIHOOD STRATEGIES

The Samad group of herders in the Changthang region are predominantly dependent on pastoral pursuits for their livelihoods. Their dependence on recently cultivated land in the Nuruchen is considered negligible by them.

They rear livestock like sheep, goats and yaks. Produce from their livestock like meat, hides, hair and wool are sold or bartered in exchange of cultivable produce and other goods. The barter exchange of their animal goods is very rare in present times and most of the trade is now cash driven.

For all the market or cash exchange, they are dependent on the pashmina hair because of its high cash value. It fetches them Rs 1,000 to 1,500 per kg whereas sheep wool is relatively sold at a very low price. Traditionally the sheep wool had a high value for economic/barter exchange because the sheep wool was used to make local clothing, shoes, rugs, carpets and other goods. Now with the increased availability of market goods the traditional value of sheep wool is incredibly reduced. The produce from yaks like milk, hides and hair have traditionally been kept for local use and not sold. The yak hair is used in making or repairing nomadic tents, while the yak wool is used for making rugs and carpets.

The meat from sheep and goats also help a household to earn cash income. The surplus livestock is sold to visiting butchers every year. It is considered as a good source of cash income as it fetches a good amount of cash for each household with each animal selling for more than Rs 1,500 or so.

Expenditure pattern of households

An ever-fluctuating market price of the pashmina hair and their increasing

demand for market goods have created an imbalance in their incomes and expenditures. As one man puts it -"all 'our' products are becoming cheaper and market products are becoming expensive". Their need to buy market goods are increasing: -Barley -Wheat - Rice -Sugar -Refined cooking oil -Spices -Butter -Fodder -Shoes -Medicines - Clothes -Veterinary treatments whereas the informal trade of pashmina hair is growing to be non beneficial to them. Beside a large amount of their cash income is spent on traveling to the Leh town by hiring private transport in the absence of any regular public transport.

The trends to borrow money from private traders (who come to buy sheep wool and pashmina hair) is becoming frequent and rearing more pashmina goats as compared to sheep to maximize cash income is also witnessed. According to the nomadic families, the cash demand is inevitable everyone wants to build permanent houses, educate children, have access to modern medicines and treatment in the city etc..

The increased uncertainties around the pastoral occupation have made the

Fluctuating market trends!

While talking to herders about sale of pashmina hair, herders complained of private pashmina traders who have not quoted a good price this year and they could not sell pashmina hair. According to these traders, the price of pashmina has really gone down in the Chinese markets where pashmina procured from them and taken for sale. Herders of Samad are still holding on to their pashmina produce this year. Its been a difficult year, because in the absence of enough cash, they could not buy other essentials like barley, wheat, rice, lentils, sugar, cooking oil etc.

herders wish for a sedentary life. In future, they want to cultivate land around the wetlands and few households are interested to invest in guest houses and restaurants for tourism business by selling their animals.

On changing livelihoods

With the grown uncertainties around their pastoral pursuits, herders do not want their children to herd livestock and want them to get educated and have jobs. They also want to cultivate land as many herders say that they want water, fencing, seed of Nyugpa/Nus/shenma and green houses to grow vegetables.

"We want to save money and also invest in livestock rearing but do not want a nomadic lifestyle. We want to settle down," is what most locals say. They also said, "We want to keep Thaglang-la open during winter times so that we can have an year round access to Leh and other facilities and even the tourists can come to visit us".

Other Income Opportunities:

Besides a great deal of shepherd labour available within the community, herders do not have many other ways to earn cash. Few households find work as road-building labour or go to the Leh town for other jobs as labourers in summer times. One household has bought a sewing machine and makes shoes and repairs clothes for the other households. Chospa, holy prayers are also performed by a few households as a source of income.

Although in a preference scoring and ranking exercise, herders identified livestock rearing as still the most important livelihood income for them.

Occupation Preference:

Occupation	Preference ranking
Livestock rearing	1
Chospa	2
Shepherd labour	3
Cultivation	4
Other labour opportunities	5
Tourism	6

LAND USE AROUND THE WETLANDS

1 Pastoral Use

1.1 Pasture rights

According to Leh district records, all pasturelands in Changthang region belong to the government and the customary rights of the herders are not considered legal. The government documents term these pasturelands as 'barren' land whereas the nomadic families are not aware of such a legal status of their pasturelands and assume a traditional control over their resources. Building of Manali-Leh highway and other civic infrastructure are not perceived to be any breach of customary land tenure.

With a history of losing out their pastures to Tibet, the herders of Samad are cautious of losing anymore of their pasturelands. There have been inter community conflicts in the past over the limited pasture resources around these wetlands since any more loss of their pastures can be detrimental to their livelihoods.

1.1.1 Inter community conflict over limited natural resources:

a. Over Pastures:

The Samad herders have a history of conflict with Kharnak, a neighbouring pastoral community over the use of pasturelands. Till 40 years back, the

Samad herders used to visit Skakyung pastures in Tibet for winter grazing and the pastures around Regul tso and Startsapuk Tso wetlands were grazed by the Kharnak livestock.

After 1962, the Samad herders had to stay back and graze their animals around Regul tso during the winter months. Kharnak herders objected to this shift. Samad herders claim that the pastures around the wetlands are owned by them and had been handed over to the Kharnak herders for grazing temporarily, while they took their animals through for grazing to Tibet.

After a long fight stretching over years, the Samad herders have reclaimed most of their pastures, except the Zara pasturelands, which are grazed by both the communities. These pastures are located relatively far off from the wetlands and constitute autumn pastures, close to Manali-Leh highway.

b. Over Salt extraction:

Another burning issue of inter-community conflict is salt extraction. The Samad herders started extracting salt from the southern shores of Rigul Tso some 15 to 20 years back. Before salt extraction began from the Rigul tso, the locals collected salt from the Medum Tso in Tibet and it was coordinated with their yearly migration to winter pastures in Tibet (now china).

Following the post war restriction to access their winter pastures in Tibet, the locals had to buy salt from Leh and Manali before they discovered salt in the Regul Tso and fenced off the area.

Normally the salt would be collected during September and October by the local people. The salt was also carried to Zanskar valley and the Leh town for barter trade, where it was exchanged for Barley or cash.

From the past four years or so, due to a rise on water level of the Regul Tso no salt has been extracted from the Tso.

Fight for Salt!

15 years ago a fight between the Kharnak and Samad Changpas erupted over salt. According to the Samad herders, the Kharnak herders stole salt from the Tso. It led to a huge fight between two parties when the Kharnak herders convinced government officials to secure their access and ownership over the wetlands. The fight was so serious that the Jammu and Kashmir police had to intervene. On the suggestions of a local leader Sonam Wangyl, an agreement was done and it was decided that the Kharnak herders can collect 700 battis (1400 Kgs) of salt from the Tso in exchange for Tolu (wood used to make roof). It was also decided that salt would be left at Zara pastures, and the Kharnak herders would not be allowed to collect it from the Rigul Tso directly.

1.2 Nomadic Movements

Their present nomadic movements are spread around these two wetlands. During winter months between November and April, all the herder families move to the pastures spread closer to the two water bodies whereas their summer migrations are relatively far off from these water bodies. It is interesting to see that their movements do not coincide with the nesting and breeding time in summer months of the migratory birds and are also regulated by local rules and regulations.

After celebrating Losar in the winters, all herder families move to the Startsapuk Tso and divide themselves into sub-groups by scattering themselves around the pastures of Startsapuk Tso so that all their livestock get enough to eat, without over-grazing a particular area. While moving in and out of winter pastures, they also spend some time grazing around Regul Tso. One of the most

important pasture sites for this time of the year is Ponganagu, close to the main feeding stream to Regul Tso.

The main summer pastures are far away from these wetlands. For accessing these summer pastures herders cross the Manali-Leh highway and many a time, camp very close to the road itself.

During most of the year, the Tibetan refugee herders move separately from the Samad herders. These herders also move closer to the Startsapuk wetlands during the winter months, but their camp sites are located relatively far off from the shores.

Changes in the Nomadic movements :

Post 1962

Till forty years back, all the Samad herders migrated to Tibet every year for three months in the winter times. Herders recall an abundance of winter grasses in their Tibetan pastures and their livestock stayed healthy grazing those pastures. After the 1962 war, access to these pastures was restricted as the border between India and China remained closed for all purposes. As a result, their nomadic movements got tremendously restricted and they had to restrain themselves towards Indian side and survive on limited pastures available around the Regul and Startsapuk Tso.

Sendentarization

There are also changes in the nomadic movements after herders have shown interest in building houses at the Samad settlement. From the last 10 years, herders spend more time in their built houses, before leaving for the Startsapuk Tso wetlands for winter grazing. According to them they spend between one to two weeks in the settlement whereas earlier it was only one or two days. This has surely affected the pasture conditions around their settlements close to the Regul Tso.

1.3 Livestock

On an average, the number of livestock owned by each household is approximately 100. Predominantly it is sheep and goats, with a sprinkling of yaks and horses, reared by every herder family. There is a conflict between government records and what herders mention about the livestock population trends. The government census shows a steady increase in the number of animals in Samad, although herders refute it. According to them, with inadequate pasturage available for their livestock, it is a doubtful proposition that livestock size is increasing.

Tibetan Refugees

There are 23 households of Tibetan refugees who also share the same resources. Herders in Samad have made certain rules and regulations for the Tibetan families to adhere with. They have to restrict their livestock holding to 25-30 animals per head. They can add more animals if a new child is born. A refugee cannot rear more than 5 yaks and 5 horses at a time. These rules have been in force since 1962.

Herders say that the number of yaks found in Samad are relatively more than KORZOK because apparently the habitat around Rigul Tso and Startsapuk Tso are more suitable for yak grazing. Yaks prefer marshy, flat wetlands compared to slopes (Camille Richards, Rangeland specialist, pers. commn) and Tsokar basin provides this environment.

Out of all the animal produce, it is the pashmina hair from goats, which brings them hard cash. Other animal produce are for self-consumption or for bartering agricultural produce with their neighbouring communities.

Annual Migratory route:

Name of Village	1999-2000		2000-2001		2001-2002		2002-2003	
	Goats	Sheep	Goats	Sheep	Goats	Sheep	Goats	Sheep
Samad	3924	2658	5382	3651	3775	6410	7529	4030

Department of Sheep Husbandry-Nyoma , Leh district,2002

The value of sheep wool, once the most sought after wool for trading for cultivable produce, has declined dramatically with the changing market value. Similarly, yak's hair, which was used to make tents, face competition from white parachute tents now.

1.3.1 Livestock population trend

While making yearly trends for livestock size over the last few years, herders perceived a marked variance in animal numbers from the 1980s to present days:

- The 1980s show normal number of animals, followed by a sharp decline to register very low numbers in 1990. This was preceded by a severe drought in the region.
- In 1995, the numbers rose high following a good season.
- 1998 saw a sharp decline in livestock numbers, due to foot-and-mouth disease caused by heavy rains and snowfall.
- Since then the numbers have been looking up till 2000. In 2002, the number has again gone down with not enough snowfall.

Fluctuating livestock size is a natural phenomenon in the Changthang region, as many of the herders put it. Because the Changthang region has an extreme climate and after every two or three years, it faces droughts or sudden snowfalls. According to the herders, droughts are much more frequent than heavy snowfalls. During these times, livestock mortality goes up steeply and the number is replenished only after a good season.

1.3.2 Livestock preference

With the changing market value for livestock produce, the livestock composition reared by the Samad herders is also changing. The herders say they would prefer to rear more sheep due to its ability to withstand extreme climates and use of its meat for consumption.

But an increasing market value for goat products like pashmina hair are forcing them to rear more goats. Since the pashmina hair fetches them 10 times more money than the sheep wool, herders have started rearing more goats than sheep. The livestock preference scoring and ranking is found that herders preferred goats over sheep, and yaks over horses.

1.4 Grasses

The herders understand that their pasturelands are located in such a way that grasses and water are not readily available to their animals, unless they regularly move. In order to balance the use of grass and water, they extensively migrate around the region, using a keen perception and knowledge of grass resource distribution.

According to the herders, most grasses around the wetlands are seasonal, barring a few perennial ones. Grass distribution also depends on the availability of water and soil conditions. Grasses found on hill slopes are different compared to the ones available on the plains. There are only few grasses which are available both at plains and hill slopes and the distribution of grasses often decides where animals are grazed and when.

The herders know of 21 kinds of grasses (list is annexed) which are available to their livestock spread around these wetlands. They say, it is the pang grass, which is the most abundant, followed by Gyapshen, Trama and Jamak whereas Samday and Trolo are the most rare kinds. In pair-wise ranking, herders revealed that their livestock prefer Nyargal over other grasses like Sewoo, Jamak, and pang whereas shot and Umbang (which also double up as fuel wood) are least preferred by their animals.

Winter pastures which are located close to Stastsapukh wetlands are abundant with longma, pang, shyot, jamak, sewoo, nyargal, and umbang grasses. Some of these grasses like umbang double up as fuel wood also.

The Samad herders faces a great shortage of the winter grasses for their livestock. As one man said, it is only the first 10 days in winter months which are good for their animals to graze in these pastures, after that, it is a struggle for the animals, he added. Therefore normally the animal feed is augmented by stocking up through private buying and also by the feed made available by the government. The herders feel that the availability of winter grasses is further declining due to water scarcity as their water sources have relatively less water. The herders found that their summer pastures are abundant with grasses as they get sufficient fresh green grasses during these times.

1.4.1 Shortage of winter grasses

The Samad herders lost their crucial winter pasture resources after the Indo-China war in 1962 and with a large Tibetan refugees influx to their shrunken

Winter grass decline around Startsapuk Tso

While ranking 'winter grasses' decline around Startsapuk Tso, herders marked the decline in following order: Shyot
Sewoo and Pang
Jamak
Longma
Nyargal

pastureland, faced a severe shortage of winter grasses. The herders also interpret it as a decline in productivity of their pastures. According to them, their livestock health was much better in days gone by. Livestock looked bigger and stronger, but now they are susceptible to diseases.

To compensate for the lost forage, the herders with the help of the Sheep husbandry department ,Nyoma has selected a tract of land for winter fodder cultivation in Nuruchen, Located on the southern shores of the Regul Tso. The harvest does not meet the entire fodder need of the livestock and the herders have to depend on the other sources as well.

Kyangs help for Winter feed!

While talking to herders about how they fulfill their fodder need in winter months, a few herders mentioned how they used to regularly collect Kyang droppings to feed their animals. This is a traditional practice to provide extra feed to their animals, which is a common practice in the whole of Changthang region. But since the government started making extra feed available every year, the practice is dying out. Herders infact now complain of the increased number of Kyangs and accuse them of using up their scarce winter pastures, close to the wetlands.

Natural calamities

On asking about traditional risk management practices against natural calamities, herders said ,that earlier they used to keep a large number of livestock so that they were always left with some stocks to build back from, after a natural calamity. The larger numbers were possible to rear because of the vast amount of pasturelands available to them. Now they do not have a large livestock and have to depend on outside/government support during these calamities. During a natural calamity, relief takes time to get to them, which can be disastrous for them and their animals. Usually one of them have to cross Thaglang-la and reach Leh on foot to inform authorities about the disaster. There are no emergency plans by government to deal with such natural calamities. The support is in the form of fodder, animals, food, blankets, tents, clothes etc. which are welcome. Herders referred to the last natural calamity in October 1998, when a sudden spell of snowfall had killed 70 per cent of their livestock. The government then had distributed: - fodder and grasses. They had also received help from Leh-based NGOs like Apt Tibet, Leh Nutritional Project and Women's alliance. The NGOs had given tent, blankets, stove, hand gloves, clothes and snow goggles to each household.

According to herders, government or NGO support during such calamities have become necessary and important for their livestock as they do not have enough livestock to recuperate from, after an attack of drought or massive snowfall.

The Department of Sheep husbandry also distribute subsidised feed to all the herders every year. The herders also buy the feed from open market to meet their livestock needs. In tough times, livestock are also fed on the household dry rations of barley especially during the times of natural calamities like a drought or a heavy snowfall.

2 Tourism

The wetlands attract a number of tourists every year now. According to the herders, tourists started coming here about 15 years ago. Since then, their numbers have been on the increase. Most of the tourists arrive in summer months, between June and September. There are two kinds of tourist who arrive here –One kind of tourist comes on motorized vehicles like Jeep/motorcycles/bicycle and second category is of trekkers who come with the pack animals and porters etc. According to herders, it is the second category or

trekkers who spend more than 6 days on average here whereas the tourists coming on the Jeep etc. spend less than three days. They both camp around the wetlands. To the herders, tourists come here to watch birds and mammals and to camp close to the wetlands. Initially, the herders were scared of these outsiders, as tourists in large numbers would often arrive on motorcycles in the night.

For the last two years, the Samad herders have started collecting a fee for camping and trekking horse grazing. They assign two men from the community to go and guard the pastures from insensitive camping and grazing and collect camping fees. They also direct tourist groups to camps at particular places. The assigned fee is Rs 30 per tent and Rs 20 per horse. Last year, locals collected a total sum of Rs 2,000 and have handed over this money to the monastery. They have not yet decided on how to use this tourism income.

According to the Samad herders, following are their concern vis a vis tourism:

1. Inappropriate garbage disposal, polluting their wetlands and pastures. They point to the death of a yak who once ate plastic garbage and died on the spot.
2. There is no defined road or trail, so tourist vehicles race around their pastures and trample precious grass. Herders say grasses now smell of petrol and diesel and their livestock cannot eat them. According to them, Kedang and Gyapshen grasses have been affected the most.
3. Tourists arriving on foot come with packhorses. These horses graze on their pasture sites.
4. Camping close to water sources by tourists and cooking, washing and defecation by them lead to serious problems of pollution to their already meagre water sources.
5. Tourist guides do not cooperate and do not pay camping fees. Guides accuse them of being backward and poor, and not keeping the area clean. The Samad herders face more abuse from the guides of Leh, Choglamsar, Spituk etc while they find the guides from Manali and Spiti more cooperative.
6. Bad habits like cigarette smoking have been picked up by the herders of Samad.
7. Tourists take their pictures without permission and do not pay them.

On asking the reasons for not trying to save their pastures from the harmful tourism activities, they say:

- Their headman is not strong
- Having less herders, as many have migrated to Leh

- We are not strong as a community.

Despite all these problems, the herders want tourism to be a source of income. They want to accrue tourism benefits and for that many herders propose to make hotels and restaurants close to the wetlands, as tourists would have like

Fighting exercise grounds!

At one point in the past, the wetland area was used for a massive army exercise for Indian army stationed at Ladakh. The southern shores of Startsapuk Tso were used extensively to conduct such exercises. It included aerial exercises which had scared livestock away, forcing them to run haywire causing a few injuries. According to herders, they had protested against such an exercise in Leh and after that army has stopped the exercises. Although for months after the exercise was over, herders kept on collecting unexploded bomb shells that killed their livestock and injured herders.

such locations. They are interested to construct metalled roads, camping sites with parking facilities around the wetlands.

3 Army Camps

At present, there is only one army post, which is located on a hillock near the Samad settlement. The local herders find no negative impact of such an army post. On the other hand, they appreciate the subsidised goods they receive from them which save their expensive trip to the Leh town. The herders only fear the army exercises which have killed and injured their livestock in the past.

EMERGING ISSUES

The dynamics of resource use around the Startsapuk Tso and Regul Tso have

changed drastically over the last four decades. Due to shrunken pasturage, their dependence on the pastures around these wetlands have increased. Accommodating 22 households of Tibetan refugees on the already-shrunken resources have increased pressure on the meagre resources. The recent influx of tourists and army has further put pressure on the available natural resources. Therefore in the present context the various issues pertaining to sustainable resource use around the wetlands are the:

Shrunken pasturage

After an influx of Tibetan refugees in 1959 and closure of access to winter pastures in Tibet, the Samad herders have faced a serious shortage of winter grasses. Their perception about decreasing grass productivity around the wetlands is corroborated in the form of declining livestock health. The herders want to increase the cultivable land around the wetlands to grow fodder crops in order to sustain their livestock during the tough winter months.

Changing Pastoral Practices

According to the herders, shrunken pasturage has a direct effect on the livestock rearing practices. In contrast to large flock of livestock per household, herders have started to prefer a smaller flock, preferably of pashmina goats, since the cash inflow from pashmina selling can be exchanged for other market goods. The changing livestock composition reared by Samad herders raises questions about the ecological impact on the pastures around the wetlands.

Pressure on Water Sources

Samad households meet their water requirements by prudently managing their halts at various water sources, as part of their nomadic lifestyle. Water scarcity will emerge as a major issue, if

Samad herders want to settle down or perform agriculture. That will have a further impact on the wetland ecology. At present, water sources are also shared with seasonal tourists and the army post. The sources also suffer from serious garbage and pollution issues. Herders want their pastures to be irrigated to increase its productivity and similarly they want to develop irrigation facilities for cultivation of fodder crops. The only source of water to do these activities is the feeding streams of the wetlands.

Livestock-wildlife conflict

Livestock depredation by Tibetan wolf is quite common around the wetlands, as well as retaliatory killings of Wolves by the locals. Killings by Tibetan wolf put tremendous pressure on their livestock

practices. Since herders do not get any compensation for the death of their livestock, they are angry with government wildlife officials for wanting them to stop killing Wolves. They expect government to support them in killing these wolves, rather than conserving them.

Unfriendly Tourism

The issues like trampling of the grass resources, inappropriate garbage disposal mechanisms and non-inclusion of the local community in benefit sharing are the predominant concern of the community. They want to accrue benefits from tourism but in the absence of proper planning and decentralised means, they are unable to do so. Herders also want Thaglang-la to remain open for

winter tourism, so that they can benefit from tourism the year round. At present, tourism does not bring large benefits to Samad herders and is considered degrading for the conservation of their pasture resources. Although a number of herders in Samad have shown interest to organize themselves with the help of WWF-India to plan tourism activities around these wetlands.

Fear of relocation

Herders do not want the wetland areas to become military exercise grounds and want to protect these wetlands against it. Despite promises to the contrary, the community retains the fear of military exercises. They know if the problem persists, they might have to relocate themselves to some other place.

Annex II
Introducing Ecotourism &
Sustainable Tourism Certification
in Ladakh
A Feasibility Study Report

OCTOBER 2003

Prepared by



ECOWORKS FOUNDATION, INDIA

Prepared for



WWF-India

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LIST OF COMMONLY USED ABBREVIATIONS, ACRONYMS, SHORT FORMS & EXPLANATION OF SELECTED TERMS

DC	District Commissioner
GoI	Government of India
ISO	International Organisation of Standards
J & K	Jammu & Kashmir
LAHDC	Ladakh Autonomous Hill Development Council
LEDeg	Ladakh Ecological Development Group
MoEF	Ministry of Environment & Forests
NGO	Non-Governmental Organisation
UNEP	United Nations Environment Programme
SECMOL	Students Educational and Cultural Movement of Ladakh
SLC	Snow Leopard Conservancy
TAAL	Travel Agents Association of Ladakh
TIES	The International Ecotourism Society
WAL	Women's Alliance of Ladakh
WTO	World Tourism Organisation
WWF	World Wide Fund for Nature

EXECUTIVE SUMMARY

WWF-India initiated a major conservation project of High Altitude Wetlands of Ladakh in 1999 with support from the global WWF network. Three of the largest and more vulnerable wetlands of Ladakh – Tsomoriri, Tsokar and Pangong Tso – were chosen for focused conservation efforts. In addressing the challenges in these three wetlands and also realising the conservation significance of Ladakh as a whole, WWF-India recognised the need to consider certain other initiatives to support its focused conservation efforts. One of these initiatives is the promotion of ecotourism and sustainable tourism certification schemes for tour operators. Realising that this can be an effective way of controlling the pressures / impacts caused by the visiting tourists on these wetlands and other ecologically sensitive areas, WWF-India initiated this feasibility study. Given that 2002 was the United Nations International Year of Ecotourism, the conduct of this study had added significance.

Ecotourism is “responsible travel to natural areas that conserves the environment, and improve the welfare of local people” and sustainable tourism is “nature tourism done in an ecologically,

socially and culturally responsible manner.” Both these concepts are firmly established in the developed world, and programmes / initiatives in many countries have been successfully implemented. These include ecotourism and sustainable tourism certification schemes as well. However, in the Indian context, there are only a few ecotourism initiatives, no specific sustainable tourism initiatives and no certification schemes.

As a part of the study, a number of meetings with tour operators, NGOs / stakeholders and Government agencies were undertaken. In general, the feedback was positive. There was overwhelming support for introducing both ecotourism and sustainable tourism concepts in Ladakh. The study revealed that it is premature to introduce ecotourism certification as there are no ecotourism packages being offered by tour operators. But the potential to introduce ecotourism packages exists and needs to be harnessed. With the technical support from the NGOs working on conservation issues, there is clearly scope for tour operators to develop and offer ecotourism packages. On the other hand, the study revealed that the timing is right to introduce sustainable tourism certification. It is also evident that Ladakhis have a greater awareness,

appreciation and realization of the need to conserve their ecology, culture and social practices when compared to other regions in India. Therefore, there is a greater chance that a sustainable tourism certification scheme will be successful in Ladakh. The study provides some directions on how a sustainable tourism certification scheme should be developed and introduced in Ladakh.

1 Background

1.1 Genesis

WWF-India initiated a major conservation project of High Altitude Wetlands of Ladakh in 1999 with support from the global WWF network. Three of the largest and more vulnerable wetlands of Ladakh Tsomoriri, Tsokar and Pangong Tso were chosen for focused conservation efforts. In addressing the challenges in these three wetlands and also realising the conservation significance of Ladakh as a whole, WWF-India recognised the need to consider certain other initiatives to support its focused conservation efforts. One of the identified initiatives was the promotion of ecotourism and sustainable tourism certification schemes for tour operators to subscribe. This can be used to control the pressures / impacts caused by the tour operators on these wetlands and other ecologically sensitive areas. Given that 2002 has been declared as the International Year of Ecotourism, WWF-India found it appropriate to initiate this feasibility study.

1.2 Objective

The primary objective of the feasibility study was to determine whether or not ecotourism and sustainable tourism certification can be introduced in Ladakh. If feasible, the related objective was to outline an approach that WWF-India can adopt to initiate activities in this field.

1.3 Scope

The scope of this study was restricted to determining the feasibility of an ecotourism or sustainable tourism certification scheme for tour operators in Ladakh. The scope did not include environmental certification of forests or national parks or other ecosensitive areas. The scope did not also include certification of hotels, restaurants and other service providers in the tourism sector.

The terms associated with tourism certification are mass tourism certification, ecotourism certification and sustainable tourism certification. In the context of Ladakh / this study, mass tourism covering businesses with a mass market or conventional tourism is not relevant. Hence, this was not included in the scope. Both ecotourism and sustainable tourism were covered in the study and in this report.

1.4 Methodology & Timeframe

The feasibility study included three distinct stages: (i) secondary research on ecotourism and sustainable tourism and Ladakh, (ii) visit to Ladakh (Leh, Tsomoriri & Tsokar) & meetings and (iii) report drafting and finalisation. The study did not have a quantitative-orientation. For instance, it was not intended to determine the percentage of tour operators who will be favourably disposed to ecotourism or sustainable tourism. No questionnaires or surveys were conducted as a part of the study. The discussions were purely qualitative in nature. Three categories of people were met during the study: (i) tour operators, (ii) NGOs / stakeholders and (iii) Government representatives. Feedback obtained from them formed the basis of establishing the feasibility. The first two stages of the study and the drafting of the report were completed

between August and September 2002. This report was finalised in October 2003.

1.5 Structure of the Feasibility Report

The main text of this report has four chapters. This first chapter gives the background to the feasibility study. The second chapter presents an overview of ecotourism and sustainable tourism certification. The third chapter discusses the findings and analyses the same. And, the last chapter includes the study recommendations. The report includes a one-page executive summary. There are Annexures that provide information to support the main text. The primary meetings conducted, the list of references used in drafting and finalising this report, the list of functioning certification programmes in the world and the 14 principles of the GoI's New Tourism Policy form the Annexures.

1.6 Accompanying Feasibility Report

This feasibility report forms one part of the two-part study conducted. In the same timeframe and in parallel, the feasibility of undertaking the assessment of all of Ladakh's development policies, programmes, practices and institutions in the tourism sector and the other sectors was also carried out. This assessment focused on measures that will be required in the various sectors in order to ensure that the impact on Ladakh's ecology is reduced.

1.7 Limitations

The study was done over a two-month period and included a one-week visit to Ladakh. Every effort has been taken to collect as much information as possible during this timeframe. Nevertheless, the short timeframe was one of the constraints of the study. Therefore, the

findings and recommendations should be seen as based on whatever information has been collected within this timeframe. The other limitation was that the one-week visit to Ladakh was undertaken during the end of a fairly poor tourist season. In fact, the current year 2002 was one where the tourist arrivals were particularly poor. This was due to the prevailing political tensions along the Indo-Pak border and the aftermath of the 11 September 2003 incidents in US. As not many tourists were present at the time of the visit, the impacts caused by the tourists were not physically evident. But the feedback received during the meetings / discussions (not as much the physical observations) formed the basis of the understanding of the ecological, social and cultural impacts caused by tourists in Ladakh.

2 OVERVIEW ON ECOTOURISM & SUSTAINABLE CERTIFICATION

2.1 Introduction

This chapter provides an overview of ecotourism, sustainable tourism & certification approaches, the global scenario and the Indian scenario in relation to these concepts.

2.2 Definitions

Given that terms associated with tourism certification tend to be used differently in various parts of the world, this section provides the definitions of the key terms and clarify how these have been used in the context of this study / report. Wherever necessary, a brief analysis follows the definition.

2.2.1 Ecotourism

According to the International Ecotourism Society, ecotourism is “responsible travel to natural areas that conserves the

environment, and improve the welfare of local people." A more comprehensive definition is "travel to fragile, pristine, and usually protected areas that strives to be low impact and usually small scale." The key characteristics of a typical ecotourism package will usually include the following:

- Involves travel to natural sites.
- Minimizes impacts ecological, social and cultural.
- Educates the traveller / tourist and builds environmental awareness
- Provides funds for conservation
- Provides direct financial benefits and empowerment of local communities.
- Fosters respect for different cultures and for human rights.

2.2.2 Sustainable Tourism

Sustainable tourism is a concept that is integrally associated with ecotourism. According to the World Tourism Organisation, sustainable tourism is envisaged as leading to management of all resources in such a way that economic, social and aesthetic needs can be fulfilled with maintaining cultural integrity, essential ecological processes, biological diversity and life support systems. According to Agenda 21 for the Travel and Tourism Industry, sustainable tourism products are those that operate in harmony with local environment, community and cultures, so that these become the permanent beneficiaries. In other words, sustainable tourism implies nature tourism done in an ecologically, socially and culturally responsible manner.

2.2.3 Ecotourism Vs Sustainable Tourism

Sustainable tourism contains a set of principles that can be superimposed of any tour package. Consider a trekking

tour package in Ladakh. The principles of sustainable tourism can be built into the trekking package to ensure that it is ecologically, socially and culturally responsible. This will require modifications to how the trekking package is managed and administered. For instance, no throwing of garbage along the trekking route is generally a principle that is accepted. However, it will not require any modification to the basic structure of the package itself. On the other hand, ecotourism package requires certain elements implementing in an ecologically fragile area, educating the tourist, providing funds for conservation, involving the community and developing a sense of respect for local, indigenous social and cultural practices. These are so integral to the tour package and hence cannot really be superimposed to existing tour package. Most often, ecotourism tour packages are separately developed and implemented.

In a certain sense, ecotourism is a subset of sustainable tourism. All ecotourism packages will necessarily include sustainable tourism principles but the vice versa is not true. Generally, the "broad brush" reference to ecotourism certification includes both ecotourism certification and sustainable tourism certification. This report assesses the viability of both forms of certification.

2.2.4 Certification

Certification is a procedure (generally, voluntary) that assesses, monitors, and gives written assurance that a business, product, process, service or management system conforms to specific requirements. It awards a marketable logo or seal to those that meet or exceed baseline standards, i.e. those that, at a minimum, comply with the national and regional regulations, and, typically, fulfil other declared or negotiated standards prescribed by the programme.

2.2.5 Ecotourism Certification

Ecotourism certification is a programme or scheme for businesses, services and products that describe themselves as involved in ecotourism. They focus on individual or site-specific businesses (tour operators or hotel owners or restaurant owners), have standards that are tailored to local conditions and are largely or totally performance-based.

2.2.6 Sustainable Tourism Certification

Sustainable tourism certification is a programme or scheme that measures a range of environmental, socio-cultural and economic equity issues both internally (within the business, service or product) and externally (on the surrounding community and physical environment). In other words, a programme or scheme that includes a set of principles that tour operators can subscribe to.

2.3 Global Scenario / Experience

2.3.1 Earth Summit in Rio de Janeiro, 1992

The 1992 United Nations Conference on Environment and Development (UNCED) or so-called Earth Summit held in Rio de Janeiro provided an important impetus for a variety of efforts to "green" industries through voluntary compliance, governmental regulation and international treaty. The Travel and Tourism industry also commenced on a number of new initiatives to express its commitment to the concept of sustainable developed that was put forward in the Earth Summit. A number of new tourism certification programmes were started with the aim of measuring environmentally and socially responsible practices. In November 2000, Italy's Institute of Policy Studies conducted the Ecotourism and Sustainable Tourism

Certification Workshop, which had participants from around the world's tourism industry. As an outcome of the Workshop, a compilation of functioning certification programmes was made. The list of the various programmes is included in Annexure C.

2.3.2 International Year of Ecotourism, 2002

Currently, Ecotourism and Sustainable tourism as a whole and certification in specific got another boost due to the United Nations declaring 2002 as the International Year of Ecotourism. During the year, United Nations Environment Programme (UNEP) and the World Tourism Organisation (WTO) carried out several activities such as regional meetings and conferences to achieve the year's objectives. A World Ecotourism Summit was conducted in May 2002, the World Summit on Sustainable Development in September 2002 discussed ecotourism and a wrap-up event of the year's activities was held in October 2002. There were a number of activities on Ecotourism and Sustainable Tourism internationally during the course of the year.

2.4 Indian Scenario / Experience

2.4.1 Ecotourism and sustainable tourism in India

Only a few ecotourism and sustainable tourism initiatives in India were identified during the study. These included work being done by the Sikkim Ecotourism and Conservation Society, Kerala's Thenmala Ecotourism Promotion Society, Himachal Pradesh's Policy on ecotourism development with special emphasis on the involvement of the local forest community, the ecotourism activities initiated by the Forest Corporations of Uttarakhand and West Bengal, and jointly by the Forest and Tourism Departments in the other states.

All of these initiatives got a further fillip with the announcement of the New Tourism Policy as that gave an additional thrust to ecotourism and sustainable tourism. New initiatives were also likely to be promoted, as the policy framework is more conducive.

2.4.2 Government of India (GoI)'s New Tourism Policy

In 2002, the New Tourism Policy superseded the GoI Tourism Policy of 1982. Unlike the 1982 Policy, which was formulated in an environment of a closed economy and where the roles of the private sector and foreign investment were not envisaged, the New Tourism Policy has a completely new orientation and new thrust. The Policy defines 14 principles and these are included in Annexure D. Many of these principles refer directly or indirectly to concepts of ecotourism and sustainable tourism. To quote one of the principles, "Sustainability should serve as a guiding star for the new policy. The development and management should be so worked as to ensure that tourism largely acts as smoke-less industry and its ecological footprints remain as soft as possible. Neither over-exploitation of natural resources should be permitted nor the carrying capacity of the tourist sites ignored." This principle is in direct support of sustainable tourism.

2.4.3 Substantial increase in Plan outlay for tourism development

The New Tourism Policy was announced by the dynamic Minister of Tourism, Mr. Jagmohan. It is understood that Mr. Jagmohan played an important part in ensuring a substantial increase in Plan Outlay for promoting tourism in the country. The last five year plan had Rs. 545 crores, while the ongoing 10th Five Year Plan has an outlay of Rs. 2,900 crores. This is indicative of likely future efforts to actively promote tourism in India. In this context, it is critical that concepts such as ecotourism and

sustainable tourism are made practical and implemented. The framework New Tourism Policy is already in place and is conducive to implement these concepts.

2.4.4 International Year of Ecotourism in India

In observance of "International Year of the Ecotourism", the Ministry of Tourism initiated ecotourism in hill states like Uttarakhand and a national committee under the Minister's chairmanship was formed. Mr. Jagmohan proposed to put the Himalayas on the forefront of Indian tourist destinations and, at the same time, recognized the importance of doing it in ecologically, culturally and socially responsible way. Apart from many other initiatives, the Tourism Ministry also proposed an eco-friendly park on the Dehradun-Mussorie road to promote hill culture. All of these initiatives are indicative that ecotourism and sustainable tourism will be given greater importance in the coming years.

2.4.5 Ecotourism and Sustainable Tourism Certification in India

At the time of the study, there were no ecotourism and sustainable tourism certification programmes / schemes in India presently. However, some service providers to tourists such as hotels had obtained certification. For instance, selected hotels have obtained Eco-tel certification. Other hotels have obtained the ISO 14001 certification on Environmental Management Systems. These environmental certifications are not directly connected to the tourism sector.

2.4.6 Other Environmental Certifications in India

The most successfully implemented certification scheme in India is ISO 14001: Environmental Management Systems Specification. This is a voluntary certification scheme, which is internationally recognised, and is meant

for organisations, whose activities, products or services may cause direct or indirect environmental impacts. Over the last decade, a number of Indian organisations have adopted management systems in line with this international standard. On the other hand, the certification scheme that has turned out to be ineffective is the product certification introduced by the Central Pollution Control Board, Ecomark. This scheme was administered by the Bureau of Indian Standards (BIS). There were several efforts to promote Ecomark but all of them were in vain. Apart from these two certification schemes, there are forest certifications and sustainable farming certification that have been introduced in India. At the time of the study, these were at a nascent stage.

2.4.7 Successful certification scheme Lessons from the Indian experience

From the Indian experience, the following emerge as important characteristics for a successful certification scheme or program:

- Subscribers to the scheme obtain tangible benefits such as improved internal management or recognition from external stakeholders.
- Policies and principles of the certification scheme (requirements) by the subscribers are not too stringent. In other words, the benchmarks either process or performance standards are possible to be met.
- Subscribing to the certification scheme is simple, direct and straightforward. It should necessarily not be bureaucratic.
- The award of certification is a marketable feature. In other words, external stakeholders recognise that the subscriber is more responsible.

- Policies and principles of the certification scheme are so formulated that the employees of the subscribing organisation (say, tour operators) are able to relate with it easily.
- The policies and principles of the certification scheme are in line with the other policies, e.g. the industrial policy, environmental policy and, in this case, the tourism policy.

3 Findings

3.1 Introduction

This chapter includes a brief description on the existing ecotourism and tour packages of a similar kind in Ladakh. Then it presents the findings on ecotourism certification and sustainable tourism certification. The findings are based on the primary meetings, physical observation on site and review of secondary sources of information.

3.2 Existing Ecotourism and Similar Packages

3.2.1 Ecotourism Not Yet

At the time of the study, ecotourism packages were yet to be offered by tour operators in Ladakh. One or two packages that have elements of a typical ecotourism package were identified. However, these were still in the nascent stage and were not being implemented on a commercial basis. These are described in this section.

3.2.2 Snow Leopard Conservancy (SLC)'s Initiative on Community-based Tourism

SLC had a conservation programme in the Hemis National Park. As one of their initiatives, they provided four village families in Rumbak (within the Park) homestay training in June 2002. By offering homestay facilities to tourists, the

village families generated additional household income. The village families offered to tourist basic facilities and an opportunity to live a Ladakhi lifestyle. So far, there were about 5 tourists, who were on the package. All of them provided a very positive feedback. Snow Leopard Trails, a tour operator, administered this tour package. SLC will be working towards further promoting this concept of community-based tourism. They were active in conducting workshops and surveys to establish the foundation / basis for popularising community-based tourism so that the local Ladakhis obtain direct financial benefits from tourism.

3.2.3 Culture-oriented tourism

Some tour operators attempted to promote culture-oriented tourism with tourists spending time with Ladakhi families. One tour operator explained such a culture-oriented tour package that he had operated. Nineteen families in three villages - Sakti, Matho and Nimoo were identified and 30 tourists spent some weeks with these families. The feedback obtained from both the tourists and the families were positive. The tourists benefited due to an in-depth exposure to the culture, and the families benefited from the interactions with the foreigners and additional source of income that they received. This tour operator was running this package on a no-profit basis. Though more such culture-oriented tour operators will be offered, it appears that these will remain a small proportion of the mainstream commercial tour packages.

3.3 Feedback on Ecotourism Certification

3.3.1 Tour Operator Perspective & Response

None of the tour operators met during the study knew about ecotourism packages and had not heard about

certification schemes. During the primary meetings with the tour operators, the concept of ecotourism certification had to be explained. Almost all the tour operators were favourably disposed to developing ecotourism packages and expressed keenness to know more about how this should be done. However, they were sceptical about being able to charge a premium for such ecotourism packages. As there are really no ecotourism packages, tour operators

agreed that it was premature to introduce an ecotourism certification scheme.

3.3.2 NGO / Stakeholder Perspective & Response

NGOs / stakeholders noted that ecotourism packages are not being offered by tour operators presently and, therefore, it will be too early to introduce ecotourism certification. NGOs agreed that there has to be collaborative effort between the NGOs and tour operators to

develop ecotourism packages. As there are a number of NGOs working on preserving / conserving Ladakh's ecology, culture and social practices, technical information is readily available. Collaborative effort between NGOs and tour operators can result in good, well-designed ecotourism packages. Some NGOs also noted that ecotourism will bring about financial benefits directly to the community. Therefore, local Ladakhis will be keen on this form of tourism.

Table 3.1 Tour Operators – Perspectives / Response

1. Travel Agents Association of Ladakh (TAAL) is willing to take the initiative to promote the Sustainable Tourism Certification scheme for tour operators.
2. TAAL will prefer if there is a formal involvement of the J & K Department of Tourism in the management of the scheme.
3. TAAL will aim to get all the registered tour operators (about 85 presently) subscribe to the scheme.
4. Tour operators are likely to be willing to pay a fee (possibly, between Rs. 50-500 per year) as subscription to the scheme.
5. As an acknowledgement of their efforts, tour operators will like to display a certificate in their office that they will be able to use in the marketing of their tour packages.
6. Tour operators do not expect to be able to charge their tourists a premium because their businesses are certified to sustainable tourism.
7. Tour operators opined that many of their tourists – mostly foreign - are inclined towards being eco-friendly and will be appreciative of efforts towards sustainable tourism. Tour operators also noted that they inform their tourists about good practices to be adopted and agreed that sustainable tourism certification will systematize / formalize the adoption of these practices.
8. The fact that the tour packages are certified to sustainable tourism may not be sufficient to attract tourists. This may offer a marketing advantage for some large tour operators, who market their packages in Europe. For the rest, there will not be any marketing benefits. Nevertheless, tour operators will subscribe to the Certification scheme as they understand that they need to conserve Ladakh's ecology, culture and social practices.
9. Last year, tour operators conducted a one-off clean-up campaign in Markha and Stok valley. This was organised by the TAAL. The tour operators will see subscription to a sustainable tourism scheme as an ongoing contribution to conserving the ecology instead of doing it in a sporadic basis.
10. Tour operators opined that such a sustainable tourism scheme is more relevant to trekking / climbing tours and jeep tours, and less relevant to river rafting, horse riding and cultural tours. And, garbage management will be the greatest challenge.
11. Tour operators felt that the requirements for certification should not be made too stringent. It should be practical, achievable and should encourage as many tour operators to subscribe to the scheme.

3.3.3 Government Perspective & Response

Government Department / Officials such as the Chief Executive Councillor (LAHDC), District Commissioner (LAHDC) and J & K Tourism Department's Director agreed that ecotourism is a good concept and needs to be introduced in Ladakh. As all the tourism draws its revenue primarily from the uniqueness of the ecology, culture and social practices of the region, there is all the more reason for ecotourism to be introduced. Their feedback was that tour operators should be assisted in developing such ecotourism packages and these should be preferably focused only in particular ecosensitive areas such as Tsomoriri and Hemis National Park.

3.3.4 Observations from the Site Visit

There is no doubt that the tourists are creating adverse impacts on ecosensitive areas such as Tsomoriri. As confirmed by a parallel study Participatory Action Research Initiative - done by WWF-India, there are impacts such as the increased pressure on scarce resources (water and pasture land), vehicular trampling of grasses and poor waste management practices including in the immediate precincts of ecosensitive areas. This can be definitely controlled or reduced using ecotourism as there will be a positive contribution from understanding and appreciating nature that will form an integral part of an ecotourism package. The community appear to be willing to participate in tourism activities. This has also been confirmed in the parallel study. The community is even willing to participate in tourism planning efforts in the region. The community recognise that tourism can be a much required opportunity for local community to augment their incomes. But the money earned by the region through tourism is mainly with the travel agencies in Leh and Manali, and none of it reaches the community. To change this scenario,

community training and awareness-building efforts are required. There is enough technical information & capacity to deliver training within NGOs. An assemblage of these parameters can result in the development of good ecotourism packages that can be offered by tour operators.

3.4 Feedback on Sustainable Tourism Certification

3.4.1 Tour Operator Perspective & Response

Generally, the few tour operators met during the study had not heard about sustainable tourism and certification schemes / programmes. On explaining the concepts, all of them were strongly in favour of introducing a sustainable tourism certification scheme in Ladakh. The strong supportive sentiment was also expressed by the President of the Travel Agents Association of Ladakh (TAAL). Table 3.1 summarizes the salient points of the perspective of / response obtained from tour operators.

3.4.2 NGO / Stakeholder Perspective

All the NGOs met during the study were positive about sustainable tourism certification working in the Ladakh's context. Some NGOs expressed reservation over tour operators taking the initiative, and one cautioned about misuse as the requirements of certification may be diluted. Most of them were keen that such a certification scheme be introduced as they recognised that it was the need of the hour. NGOs felt that the tour operators may not be willing to pay for the development of the scheme and in meeting the recurring costs of maintaining the scheme. Though the tour operators may be willing to pay a certification fee, this may not cover the development and recurring costs. External funding support will be required

to kick-start and establish the certification scheme.

3.4.3 Government Perspective / Response

As in the case of ecotourism, Government Department / Officials such as the Chief Executive Councillor (LAHDC), District Commissioner (LAHDC) and J & K Tourism Department's Director agreed that sustainable tourism can also be introduced in Ladakh. Once the principles are defined, the tour operators can subscribe to them and certification can be awarded based on their performance. The Government Perspective is that the TAAL and tour operators should undertake this initiative by themselves. Support from the Department of Tourism in the form of being a member of an advisory group to oversee and direct the Sustainable Tourism programme / scheme should be forthcoming.

4 Conclusions & Recommendations

4.1 Introduction

This chapter presents the conclusions and recommendations of this study. This chapter also presents recommendations on the approach to be adopted to introduce these concepts in Ladakh.

4.2 Ecotourism Certification Scheme Not Viable, but piloting Ecotourism packages viable

4.2.1 Not enough Ecotours for a Certification Scheme

Ecotourism certification scheme requires ecotourism packages. At present, there are no such packages. Some tour

packages have elements of a typical ecotourism package but these cannot really be categorized as ecotourism packages. Without ecotourism packages being offered, it is premature to introduce an ecotourism certification scheme. If tour operators develop ecotourism packages in the future, then the certification of these packages can be considered.

4.2.2 Developing Pilot Ecotourism packages

The findings of this study reveal the potential for introducing ecotourism packages. NGOs such as SLC and WWF-India can work with selected tour operators to develop ecotourism packages. Two or three tour operators can be selected and ecotourism packages can be jointly developed with

them. Discussions with a few tour operators revealed that they would be interested and, therefore, it is likely that two or three tour operators come forward to actually develop and run these pilot ecotourism packages. SLC's focus is in the Hemis National Park, while WWF-India's conservation work is in the wetlands such as Tsomoriri & Tsokar. Tour operators can be urged to develop ecotourism packages with the support of these NGOs. In developing these ecotourism packages, SLC and WWF-India can work together so that they can share their experiences during the process of developing these tour packages. These pilots can be developed during the next six months and implemented during the summer of 2003.

4.3 Sustainable Tourism Certification Scheme Viable

4.3.1 Proceeding with Sustainable Tourism Certification

There has been an overall positive feedback from tour operators, NGOs / stakeholders and Government for introducing sustainable tourism certification for tour operators. Once a scheme is in place, tour operators will have to subscribe a basic minimum to make the scheme a success. Even if 20% of the TAAL registered operators subscribe in the first year, there will be about 20-25 tour operators who can be moved towards sustainable tourism. This will be good achievement to begin with. As the feedback received from tour

Table 4.1 Characteristics of the Scheme

- The scheme should include principles, standards, generic guidelines and specific guidelines. All principles, standards and guidelines should be in simple language. Specific guidelines should be developed for each type of tour package and for important ecosensitive locations.
- Principles are to be adopted by the tour operators subscribing to the scheme. Tour operators should use the generic and specific guidelines to meet the standards established under the scheme.
- The scheme should be housed in TAAL and should be adopted as a voluntary compliance procedure.
- There are three important parties / groups involved in the scheme: TAAL, tour operators and verifiers. TAAL houses the scheme, tour operators subscribe to it and verifiers are individuals / organisations to assess the compliance of tour operators based on physical and documented evidence.
- The scheme should include an advisory group comprising representatives from TAAL, LAHDC, Dept of Tourism, Hotel Owners Association and NGOs.
- Principles should be demanding but not too stringent that the tour operators cannot meet the requirements.
- The scheme should include checks and balances that ensure that the certification is not misused.
- The scheme should include both process-based and performance-based standards
- The principles, standards and guidelines should cover ecological, social and cultural issues. It should not be restricted only to environmental management.
- The scheme should place both initial and recurring training of all tour operator staff and associates as an important feature.

operators was very positive, it appears that obtaining a 20% participation from the TAAL-registered operators in the first year will not be difficult. As things establish themselves, all the tour operators can be ushered into the scheme. This will necessarily be a gradual process and will require that the scheme be effectively managed.

It is also evident that Ladakhis have a greater awareness, appreciation and realisation of the need to conserve their ecology, culture and social practices. Therefore, there is a greater chance that a sustainable tourism certification scheme will be successful in Ladakh when compared to other regions in India.

Considering the above, the study concludes and recommends that sustainable tourism certification should be introduced in Ladakh.

4.3.2 Developing a Home-grown Scheme

The sustainable certification scheme should be home-grown. As mentioned earlier in the report, there are a number of sustainable certification schemes in the world. Importing these schemes and introducing in the context of Ladakh should not be done as this is likely to be irrelevant. A home-grown scheme should be developed keeping in view the ground realities - the peculiarities / difficulties associated with the region and the uniqueness of the ecology, culture and social practices. At a later date, once the scheme is established, possibilities of association with global sustainable tourism schemes should be explored. Developing such a scheme can be easily accomplished within a four-six months timeframe and is best done with constant feedback from tour operators, NGOs and

community representatives. If the scheme has to be introduced in the summer of 2003, then the preparatory activities should commence by November / December 2002.

4.3.3 Characteristics of the Scheme

Table 4.1 provides the characteristics of the Sustainable Tourism Certification scheme that will be required. These are to be seen as recommendations to be used at the time of developing the scheme.

4.3.4 Introducing and administering the scheme

Following the development, the scheme has to be introduced. Given that Ladakh has a very short tourist season, i.e. May-September, a number of activities will have to be done during that period. At the outset, a half-day briefing session should be conducted for the members of TAAL, preferably in early-May. This is best done during their quarterly general body meeting as that will ensure maximum participation. During this briefing, the draft scheme should be presented and comments / feedback sought. The advisory group should also be formally announced during this briefing. A date for finalising the scheme should be decided and subscription to the scheme should be invited. Training sessions for tour operators, cooks, guides, helpers and guides should also be announced. As the best time for training is end-May or early June, most of the training should be planned during this period.

In the first year, the tour operators will work towards obtaining the sustainable tourism certification. As it is based on their performance, the certification can

be given only after the completion of the season. During the season, the tour operators can use "Working towards sustainable tourism certification" in their marketing brochures. At the end and during the season, the verifiers will undertake the review of the tour operator's performance. This verification will involve checking the written feedback obtained from the tourists who have used the services of the tour operators and certain physical spot checks. Those tour operators who have been cleared by the verifiers will be recommended for the award of certification. At the end of the season, a function will be organised to declare those who have been certified. This certification will be valid for a period of one year. The process of subscription, verification and renewal of certification will be repeated year after year.

4.3.5 Costs / revenue model for the Scheme

The findings revealed that TAAL will be willing to pay a fee for obtaining / retaining the sustainable tourism certification on an annual basis. However, this amount will not be sufficient either for developing the scheme or for administering the scheme on a recurring basis. Assuming that 20% (25 members) of the TAAL-registered operators subscribe in the first year and the fee is Rs. 250 per operator, the revenue generation will be about Rs. 6,250. This will partly meet the administrative costs for running the scheme in the first year, but will not cover for the technical inputs to develop the scheme. Therefore, it will be required to approach donor agencies to raise money for developing the scheme and administering the scheme for the first three years.

Annex III Checklist of Birds of Ladakh

S. No.	Common Name	Scientific Name	S. No.	Common Name	Scientific Name
		GALIFORMES			APODIFORMES
		Phasianidae			Apodidae
1	Snow Partridge	<i>Lerwa lerwa</i>	31	Alpine Swift	<i>Tachymarptis melba</i>
2	Himalayan Snowcock	<i>Tetraogallus tibetanus</i>	32	Common Swift	<i>Apus apus</i>
3	Tibetan Snowcock	<i>Tetraogallus tibetanus</i>	33	Fork-tailed Swift	<i>Apus pacificus</i>
4	Chukar Partridge	<i>Alectoris chukar</i>		House Swift	<i>Apus affinis</i>
5	Tibetan Partridge	<i>Perdix hodgsoniae</i>			STRIGIFORMES
		Daytsak, De-shrak			Strigidae
		Common Quail	34	Pallid Scops Owl	<i>Otus brucei</i>
		Rain Quail	35	Eurasian Eagle Owl	<i>Bubo bubo</i>
			36	Little Owl	<i>Athene noctua</i>
6	Greylag Goose	<i>Anser anser</i>	37	Long-eared Owl	<i>Asio otus</i>
7	Bar-headed Geese	<i>Anser indicus</i>	38	Short-eared Owl	<i>Asio flammeus</i>
8	Ruddy Shelduck	<i>Tadorna ferruginea</i>			Caprimulgidae
9	Gadwall	<i>Anas strepera</i>	39	Eurasian Nightjar	<i>Caprimulgus Europaeus</i>
10	Eurasian Wigeon	<i>Anas penelope</i>			COLUMBIFORMES
11	Mallard	<i>Anas platyrhynchos</i>			Columbidae
12	Northern Shoveler	<i>Anas clypeata</i>	40	Rock Pigeon	<i>Columba livia</i>
13	Northern Pintail	<i>Anas acuta</i>	41	Hill Pigeon	<i>Columba rupestris</i>
14	Garganey	<i>Anas querquedula</i>	42	Snow Pigeon	<i>Columba leuconota</i>
15	Common Teal	<i>Anas crecca</i>		Yellow-eyed Pigeon	<i>Columba eversmanni</i>
16	Red-crested Pochard	<i>Rhodonessa rufina</i>	43	European Turtle Dove	<i>Streptopelia turtur</i>
17	Common Pochard	<i>Aythya ferina</i>	44	Oriental Turtle Dove	<i>Streptopelia orientalis</i>
18	Ferruginous Pochard	<i>Aythya nyroca</i>	45	Laughing Dove	<i>Streptopelia senegalensis</i>
19	Tufted Duck	<i>Aythya fuligula</i>		Spotted Dove	<i>Streptopelia chinensis</i>
20	Common Merganser	<i>Mergus merganser</i>	46	Red Collared Dove	<i>Streptopelia tranquebarica</i>
				Eurasian Collared Dove	<i>Streptopelia decaocto</i>
					GRUIFORMES
					Gruidae
21	Eurasian Wryneck	<i>Jynx torquilla</i>	47	Demoiselle Crane	<i>Anthropoides virgo</i>
22	Scaly-bellied Woodpecker	<i>Picus squamatus</i>	48	Black-necked Crane	<i>Grus nigricollis</i>
				Siberian Crane	<i>Grus leucogeranus</i>
					Rallidae
					Rallidae
					Rallidae
23	Common Hoopoe	<i>Upupa epops</i>	49	Water Rail	<i>Rallus aquaticus</i>
		CORACIIFORMES	50	Corn Crane	<i>Crex crex</i>
		Coraciidae	51	Baillon's Crane	<i>Porzana pusilla</i>
24	European Roller	<i>Coracias garrulous</i>	52	Spotted Crane	<i>Porzana porzana</i>
	Indian Roller	<i>Coracias benghalensis</i>	53	Common Moorhen	<i>Gallinula chloropus</i>
		Alcedinidae	54	Common Coot	<i>Fulica atra</i>
25	Common Kingfisher	<i>Alcedo atthis</i>			CICONIIFORMES
		Meropidae			Pteroclididae
26	Blue-cheeked Bee-eater	<i>Merops persicus</i>			Syrhaptes tibetanus
27	European Bee-eater	<i>Merops apiaster</i>			Scolopacidae
		CUCULIFORMES	55	Tibetan Sandgrouse	<i>Syrhaptes tibetanus</i>
		Cuculidae	56	Solitary Snipe	<i>Gallinago solitaria</i>
28	Pied Cuckoo	<i>Clamator jacobinus</i>	57	Pintail Snipe	<i>Gallinago stenura</i>
29	Eurasian Cuckoo	<i>Cuculus canorus</i>	58	Common Snipe	<i>Gallinago gallinago</i>
30	Asian Koel	<i>Eudynamis scolopacea</i>			

S. No.	Common Name	Scientific Name
59	Black-tailed Godwit	<i>Limosa limosa</i>
60	Whimbrel	<i>Numenius Phaeopus</i>
61	Eurasian Curlew	<i>Numenius phaeopus</i>
	Spotted Redshank	<i>Tringa erythropus</i>
62	Common Redshank	<i>Tringa tetanus</i>
63	Marsh Sandpiper	<i>Tringa stagnatilis</i>
64	Common Greenshank	<i>Tringa nebularia</i>
65	Green Sandpiper	<i>Tringa ochropus</i>
66	Wood Sandpiper	<i>Tringa glareola</i>
67	Terek Sandpiper	<i>Xenus cinereus</i>
68	Common Sandpiper	<i>Actitis hypoleucos</i>
69	Little Stint	<i>Calidris minuta</i>
70	Temminck's Stint	<i>Calidris temminckii</i>
71	Dunlin	<i>Calidris alpine</i>
72	Curlew Sandpiper	<i>Calidris ferruginea</i>
73	Ruff	<i>Philomachus pugnax</i>
74	Ruddy Turnstone	<i>Arenaria interpres</i>
75	Red-necked Phalarope	<i>Phalaropus lobatus</i>
		Jacaniidae
76	Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>
		Charadriidae
77	Ibisbill	<i>Ibidorhyncha struthersii</i>
78	Black-winged Stilt	<i>Himantopus Himntopus</i>
79	Pied Avocet	<i>Recurvirostra avosetta</i>
80	Pacific Golden Plover	<i>Pluvialis fulva</i>
81	Grey Plover	<i>Pluvialis squatarola</i>
	Common Ringed Plover	<i>Charadrius hiaticula</i>
82	Little Ringed Plover	<i>Charadrius dubius</i>
83	Kentish Plover	<i>Charadrius alexandrinus</i>
84	Lesser Sand Plover	<i>Charadrius mongolus</i>
	Greater Sand Plover	<i>Charadrius leschenaultia</i>
85	Northern Lapwing	<i>Vanellus vanellus</i>
		Glareolidae
86	Collared Pratincole	<i>Glareola pratincola</i>
		Laridae
87	Parasitic Jaeger	<i>Stercorarius parasiticus</i>
	Heuglin's Gull	<i>Larus (fuscus) heuglini</i>
88	Pallas's Gull	<i>Larus ichthyaetus</i>
89	Brown-headed Gull	<i>Larus brunnecephalus</i>
90	Black-headed Gull	<i>Larus ridibundus</i>
91	Little Gull	<i>Larus minutus</i>
92	Gull-billed Tern	<i>Gelochelidon nilotica</i>
93	River Tern	<i>Sterna aurantia</i>
94	Common Tern	<i>Sterna hirundo</i>
	Arctic Tern	<i>Sterna paradisaea</i>
95	Little Tern	<i>Sterna albifrons</i>
96	Whiskered Tern	<i>Chlidonias hybridus</i>
97	White-winged Tern	<i>Chlidonias leucopterus</i>
		Accipitridae
98	Osprey	<i>Pandion haliaetus</i>
99	Oriental Honey-Buzzard	<i>Pandion haliaetus</i>
100	Black-shouldered Kite	<i>Elanus caeruleus</i>
101	Red Kite	<i>Milvus milvus</i>
102	Black Kite	<i>Milvus migrans</i>
103	Pallas's Fish Eagle	<i>Haliaeetus leucoryphus</i>
104	Lammergeier	<i>Gypaetus barbatus</i>
105	Egyptian Vulture	<i>Neophron percnopterus</i>

S. No.	Common Name	Scientific Name
106	Himalayan Griffon	<i>Gyps himalayensis</i>
107	Cinereous Vulture	<i>Aegypius monachus</i>
108	Short-toed Snake Eagle	<i>Circaetus gallucus</i>
109	Eurasian Marsh Harrier	<i>Circus aeruginosus</i>
110	Hen Harrier	<i>Circus cyaneus</i>
111	Pallid Harrier	<i>Circus macrourus</i>
112	Montagu's Harrier	<i>Circus pygargus</i>
113	Eurasian Sparrowhawk	<i>Accipiter nisus</i>
114	Northern Goshawk	<i>Accipiter gentiles</i>
115	Upland Buzzard	<i>Buteo hemilasius</i>
116	Long-legged Buzzard	<i>Buteo rufinus</i>
117	Greater Spotted Eagle	<i>Aquila clanga</i>
118	Steppe Eagle	<i>Aquila nipalensis</i>
119	Golden Eagle	<i>Aquila chrysaetos</i>
120	Booted Eagle	<i>Hieraetus pennatus</i>
		Falconidae
121	Common Kestrel	<i>Falco tinnunculus</i>
122	Merlin	<i>Falco columbarius</i>
123	Eurasian Hobby	<i>Falco subbuteo</i>
124	Peregrine Falcon	<i>Falco peregrinus</i>
125	Saker Falcon	<i>Falco cherrug</i>
		Podicipediidae
126	Little Grebe	<i>Tachybaptus ruficollis</i>
127	Great Crested Grebe	<i>Podiceps cristatus</i>
128	Black-necked Grebe	<i>Podiceps nigricollis</i>
		Phalacrocoracidae
129	Great Cormorant	<i>Phalacrocorax carbo</i>
130	Little Cormorant	<i>Phalacrocorax niger</i>
		Ardeidae
131	Little Egret	<i>Egretta garzetta</i>
132	Grey Heron	<i>Ardea cinerea</i>
133	Great Egret	<i>Casmerodius albus</i>
134	Cattle Egret	<i>Bubulcus ibis</i>
135	Indian Pond Heron	<i>Ardeola grayii</i>
136	Black-crowned Night Heron	<i>Nycticorax nycticorax</i>
137	Little Bittern	<i>Ixobrychus minutus</i>
138	Great Bittern	<i>Botaurus stellaris</i>
		Threskiornithidae
139	Glossy Ibis	<i>Plegadis falcinellus</i>
		Ciconiidae
140	Black Stork	<i>Ciconia nigra</i>
		PASSERIFORMES
		Laniidae
141	Red-backed Shrike	<i>Lanius collurio</i>
142	Rufous-tailed Shrike	<i>Lanius Isabellinus</i>
143	Long-tailed Shrike	<i>Lanius schach</i>
144	Grey-backed Shrike	<i>Lanius tephronotus</i>
145	Lesser Grey Shrike	<i>Lanius minor</i>
146	Southern Grey Shrike	<i>Lanius meridionalis</i>
		Corvidae
	Eurasian Jay	<i>Garrulus glandarius</i>
	Black-headed Jay	<i>Garrulus lanceolatus</i>
	Yellow-billed Blue Magpie	<i>Urocissa flavirostris</i>
147	Black-billed Magpie	<i>Pica pica</i>

S. No.	Common Name	Scientific Name
148	Hume's Groundpecker	<i>Pseudopodoces humilis</i>
149	Red-billed Chough	<i>Pyrrhocorax pyrrhocorax</i>
150	Yellow-billed Chough	<i>Pyrrhocorax graculus</i>
151	Eurasian Jackdaw	<i>Corvus monedula</i>
152	House Crow	<i>Corvus splendens</i>
153	Carrion Crow	<i>Corvus corone orientalis</i>
		<i>Corvus corax sharpie</i>
154	Large-billed Crow	<i>Corvus macrorhynchos</i>
155	Common Raven	<i>Corvus corax</i>
156	Eurasian Golden Oriole	<i>Oriolus oriolus</i>
157	Black Drongo	<i>Dicrurus macrocerus</i>
		Cinclidae
158	White-throated Dipper	<i>Cinclus cinclus</i>
159	Brown Dipper	<i>Cinclus pallasi</i>
		Muscipidae
160	Rufous-tailed Rock Thrush	<i>Monticola saxatilis</i>
161	Blue Rock Thrush	<i>Monticola solitarius</i>
162	Blue Whistling Thrush	<i>Myophonus caeruleus</i>
163	Tickell's Thrush	<i>Turdus unicolor</i>
164	Eurasian Blackbird	<i>Turdus merula</i>
165	Dark-throated Thrush	<i>Turdus ruficollis</i>
166	Dusky Thrush	<i>Turdus Naumanni</i>
167	Song Thrush	<i>Turdus philomelos</i>
168	Spotted Flycatcher	<i>Muscicapa striata</i>
169	Dark-sided Flycatcher	<i>Muscicapa sibirica</i>
	Asian Brown Flycatcher	<i>Muscicapa dauurica</i>
170	Rusty-tailed Flycatcher	<i>Muscicapa sibirica</i>
171	Red-throated Flycatcher	<i>Ficedula parva</i>
172	White-tailed Rubythroat	<i>Luscinia pectoralis</i>
173	Bluethroat	<i>Luscinia svecica</i>
174	Orange-flanked Bush Robin	<i>Tarsiger cyanurus</i>
175	Rufous-tailed Scrub Robin	<i>Cercotrichas galactotes</i>
176	Rufous-backed Redstart	<i>Phoenicurus erythronota</i>
177	Blue-capped Redstart	<i>Phoenicurus coeruleocephalus</i>
		<i>Phoenicurus ochruros</i>
178	Black Redstart	<i>Phoenicurus ochruros</i>
179	Common Redstart	<i>Phoenicurus phoenicurus</i>
	Hodgson's Redstart	<i>Phoenicurus hodgsoni</i>
180	White-winged Redstart	<i>Phoenicurus erythrogaster</i>
		<i>Phoenicurus frontalis</i>
181	Blue-fronted Redstart	<i>Phoenicurus frontalis</i>
182	White-capped	<i>Chaimarrornis leucocephalus</i>
		<i>Grandala coelicolor</i>
183	Little Forktail	<i>Enicurus scouleri</i>
184	Common Stonechat	<i>Saxicola torquata</i>
	Hume's Wheatear	<i>Oenanthe alboniger</i>
185	Variable Wheatear	<i>Oenanthe picata</i>
186	Pied Wheatear	<i>Oenanthe picata</i>
187	Desert Wheatear	<i>Oenanthe deserti</i>
188	Isabelline Wheatear	<i>Oenanthe isabellina</i>
		Sturnidae
189	Brahminy Starling	<i>Sturnus pagodarum</i>

S. No.	Common Name	Scientific Name
190	Rosy Starling	<i>Sturnus roseus</i>
191	Common Starling	<i>Sturnus vulgaris</i>
		Sittidae
192	Wallcreeper	<i>Tichodroma muraria</i>
		Certhiidae
193	Bar-tailed Treecreeper	<i>Certhia himalayana</i>
194	Winter Wren	<i>Troglodytes troglodytes</i>
		Paridae
	White-crowned Penduline Tit	<i>Remiz coronatus</i>
195	Fire-capped Tit	<i>Cephalopyrus flammiceps</i>
196	Rufous-naped Tit	<i>Parus rufonuchalis</i>
197	Great Tit	<i>Parus major</i>
198	Green-backed Tit	<i>Parus monticolus</i>
	Yellow-browed Tit	<i>Sylviparus modestus</i>
		Hirundinidae
199	Sand Martin	<i>Riparia riparia</i>
200	Plain Martin	<i>Riparia paludicola</i>
201	Eurasian Crag Martin	<i>Hirundo rupestris</i>
202	Barn Swallow	<i>Hirundo rustica</i>
203	Wire-tailed Swallow	<i>Hirundo smithii</i>
204	Red-rumped Swallow	<i>Hirundo daurica</i>
205	Northern House Martin	<i>Delichon urbica</i>
	Asian House Martin	<i>Delichon dasypus</i>
		Regulidae
206	Goldcrest	<i>Regulus regulus</i>
		Sylviidae
207	Long-billed Bush Warbler	<i>Bradypterus major</i>
208	Sedge Warbler	<i>Acrocephalus schoenobaenus</i>
		<i>Acrocephalus bistrigiceps</i>
209	Black-browed Reed Warbler	<i>Acrocephalus agricola</i>
210	Paddyfield Warbler	<i>Acrocephalus dumetorum</i>
211	Blyth's Reed Warbler	<i>Acrocephalus arundinaceus</i>
212	Great Reed Warbler	<i>Leptopoeile sophiae</i>
213	White-browed Tit Warbler	<i>Phylloscopus collybita</i>
214	Common Chiffchaff	<i>Phylloscopus sindianus</i>
215	Mountain Chiffchaff	<i>Phylloscopus neglectus</i>
	Plain Leaf Warbler	<i>Phylloscopus fuscatus</i>
216	Dusky Warbler	<i>Phylloscopus affinis</i>
217	Tickell's Leaf Warbler	<i>Phylloscopus griseolus</i>
218	Sulphur-bellied Warbler	<i>Phylloscopus humei</i>
219	Hume's Warbler	<i>Phylloscopus pulcher</i>
220	Buff-barred Warbler	<i>Phylloscopus trochiloides</i>
221	Greenish Warbler	<i>Phylloscopus magnirostris</i>
222	Large-billed Leaf Warbler	<i>Phylloscopus collybita</i>
		<i>Phylloscopus tytleri</i>
223	Tytler's Leaf Warbler	<i>Phylloscopus Occipitalis</i>
	Western Crowned Warbler	<i>Garrulax lineatus</i>
	Streaked Laughingthrush	<i>Garrulax variegates</i>
	Variogated Laughingthrush	<i>Garrulax variegates</i>
224	Garden Warbler	<i>Sylvia borin</i>

S. No.	Common Name	Scientific Name
225	Greater Whiterthroat	<i>Sylvia communis</i>
226	Lesser Whiterthroat	<i>Sylvia curruca</i>
227	Barred Warbler	<i>Sylvia nisoria</i>
		Alaudidae
228	Bimaculated Lark	<i>Melanocorypha bimaculata</i>
229	Tibetan Lark	<i>Melanocorypha maxima</i>
230	Greater Short-toed Lark	<i>Calandrella brachydactyla</i>
231	Hume's Short-toed Lark	<i>Calandrella acutirostris</i>
		<i>Calandrella cheleensis</i>
232	Crested Lark	<i>Galerida cristata</i>
233	Oriental Skylark	<i>Alauda gulgula</i>
234	Horned Lark	<i>Eremophila alpestris</i>
		Passeridae
235	House Sparrow	<i>Passer domesticus</i>
236	Spanish Sparrow	<i>Passer hispaniolensis</i>
		<i>Petronia petronia</i>
237	Tibetan Snowfinch	<i>Montifringilla adamsi</i>
238	White-rumped Snowfinch	<i>Pyrgilauda taczanowskii</i>
239	Plain-backed Snowfinch	<i>Pyrgilauda blanfordi</i>
		<i>Pyrgilauda ruficollis</i>
240	Forest Wagtail	<i>Dendronanthus indicus</i>
241	White Wagtail	<i>Motacilla alba</i>
242	White-browed Wagtail	<i>Motacilla maderaspatensis</i>
		<i>Motacilla citreola</i>
243	Citrine Wegtail	<i>Motacilla citreola</i>
244	Yellow Wagtail	<i>Motacilla flava</i>
245	Grey Wagtail	<i>Motacilla cinerea</i>
246	Tree Pipit	<i>Anthus trivialis</i>
		<i>Anthus hodgsoni</i>
247	Olive-backed Pipit	<i>Anthus hodgsoni</i>
		<i>Anthus cervinus</i>
248	Red-throated Pipit	<i>Anthus cervinus</i>
		<i>Anthus roseatus</i>
249	Water Pipit	<i>Anthus spinoletta</i>

S. No.	Common Name	Scientific Name
	Siberian Accentor	<i>Prunella montanella</i>
250	Alpine Accentor	<i>Prunella collaris</i>
251	Altai Accentor	<i>Prunella himalayana</i>
252	Robin Accentor	<i>Prunella rubeculoides</i>
253	Rufous-breasted Accentor	<i>Prunella strophia</i>
254	Brown Accentor	<i>Prunella fulvescens</i>
255	Black-throated Accentor	<i>Prunella atrogularis</i>
		Fringillidae
256	Brambling	<i>Fringilla montifringilla</i>
257	Fire-routed Serin	<i>Serinus pusillus</i>
258	European Goldfinch	<i>Carduelis carduelis</i>
259	Twite	<i>Carduelis flavirostris</i>
260	Eurasian Linnet	<i>Carduelis cannabina</i>
261	Plain Mountain Finch	<i>Leucosticte nemoricola</i>
262	Brandt's Mountain Finch	<i>Leucosticte brandti</i>
		<i>Rhodopechys sanguinea</i>
		<i>Leucosticte sillemi</i>
263	Mongolian Finch	<i>Bucanetes mongolicus</i>
264	Common Rosefinch	<i>Carpodacus erythrinus</i>
265	Red-mantled Rosefinch	<i>Carpodacus rhodochlamys</i>
		<i>Carpodacus thura</i>
266	White-browed Rosefinch	<i>Carpodacus thura</i>
267	Streaked Rosefinch	<i>Carpodacus rubicilloides</i>
268	Great Rosefinch	<i>Carpodacus rubicilla</i>
269	Red-fronted Rosefinch	<i>Carpodacus puniceus</i>
270	Yellowhammer	<i>Emberiza citrinella</i>
271	Pine Bunting	<i>Emberiza leucocephala</i>
272	Rock Bunting	<i>Emberiza cia</i>
		<i>Emberiza buchanani</i>
273	Ortolan Bunting	<i>Emberiza hortulana</i>
274	Little Bunting	<i>Emberiza pusilla</i>
		<i>Emberiza rutila</i>
275	Chestnut Bunting	<i>Emberiza rutila</i>
		<i>Emberiza bruniceps</i>
B276	Red-headed Bunting	<i>Emberiza bruniceps</i>
		<i>Emberiza schoeniclus</i>

Source: Pfister (2004).

Annex IV Checklist of Medicinal Plant Species found in Ladakh and used in Tibetan Medicine System

S. No.	Species (Scientific Name)	Local Name	Habitat type
1	<i>Acantholimon lycopodioides</i>	Longze	Rocky slopes
2	<i>Achillea millefolium</i>	Chuang	Plateau
3	<i>Aconitum balfourii</i>	Bonga nakpo	Moist areas
4	<i>Aconitum heterophyllum</i>	Buma	Moist areas
5	<i>Aconitum rotundifolium</i>	Bonkar	Dry scrub
6	<i>Aconitum violaceum</i>	Yangtso (Zinba)	Moist areas
7	<i>Actinocarya tibetica</i>		Undulating area
8	<i>Adonis chrysocyathus</i>	Semshi	Plateau, Passes
9	<i>Allium carolinianum</i>	Gogcheegma slopes	Scrubby
10	<i>Allium humile</i>	Pocha pastures	Alpine
11	<i>Anaphalis contorta</i>	Telgang	Alpine Slopes
12	<i>Anaphalis nepalensis</i>	Tawa	Moraines
13	<i>Anaphalis cuneifolia</i>	Simula places	Rocky
14	<i>Anaphalis triplinervis</i>	Phulu Mentock	Rocky slopes
15	<i>Androsace aizoon</i>	Sgatik mugpo Pasture	Alpine
16	<i>Androsace mucronifolia</i>	Zigsolo	Alpine Slopes
17	<i>Androsace rotundifolia</i>	Zigsolo	Alpine Pastures

S. No.	Species (Scientific Name)	Local Name	Habitat type
18	<i>Anemone rivularis</i> <i>Buch-Ham</i>	Zupka	Alpine pastures
19	<i>Anemone rupicola</i>	Simaso	Moist areas
20	<i>Aquilegia fragrance</i>	Zadul-dorje	Moist areas
21	<i>Arabidopsis multiflorum</i>	Imatso	Stony Places
22	<i>Arabis glandulosa</i>	Umnako	Rocky places
23	<i>Arctium lappa L.</i>	Miah areas	Dry sandy
24	<i>Arenaria bryophylla</i>	Lekhum slopes	Stony
25	<i>Arenaria griffithii</i>	Sokhtam slopes	Stony
26	<i>Arnebia euchroma</i>	Demok	Rocky slopes
27	<i>Artemisia biennis</i>	Khampa	Wastelands
28	<i>Artemisia brevifolia</i>	Khamchu slopes	Stony
29	<i>Artemisia desertorum</i>	Khamlol	Wastelands
30	<i>Artemisia dracuncululus</i>	Burtse	Wastelands
31	<i>Artemisia gmelinii</i>	Khampa shridhi	Dry slopes
32	<i>Artemisia laciniata</i>	Binso	Dry slopes
33	<i>Artemisia minor</i>	Furnag	Dry slopes
34	<i>Artemisia martima</i>	Furnag	Dry slopes
35	<i>Artemisia moorcroftiana</i>	Phurnag	Wastelands
36	<i>Artemisia parviflora</i>	Khamang	Plateau

S. No.	Species (Scientific Name)	Local Name	Habitat type
37	<i>Artemisia salsoloides</i> Willd.	Amango	Dry slopes
38	<i>Artemisia scoparia</i>	Khamtso	Dry slopes
39	<i>Artemisia sieversiana</i>	Khamchu slopes	Rocky
40	<i>Artemisia stracheyi</i>	Rumonlo	Plateau
41	<i>Astragalus rhizanthus</i>	Sarma	Stony slopes
42	<i>Aster diplostephiodes</i>	Ba-sha-ka, Lugchung	Moist slopes
43	<i>Aster flaccidus</i>	Lugmig slopes	Moist
44	<i>Aster strachey</i>	Lugmig	Rocky
45	<i>Astragalus strictus</i>	Serpang	Rocky slopes
46	<i>Astragalus tribulifolius</i>	Yanglo	Cultivated field
47	<i>Atelanthera perpusilla</i>		Sandy places
48	<i>Berberis ulicina</i>	Sherpa	Riverine areas
49	<i>Berberis zabeliana</i>	Sherpa areas	Sandy
50	<i>Bergenia stracheyi</i>	Dak-kya-hawo, Gatikpa	Rocky
51	<i>Betula utilis</i>	Takpa	Rocky
52	<i>Biebersteinia odora</i>	Khardung	Alpine slopes
53	<i>Bistorta affinis</i>	Langna	Dry rocky
54	<i>Bistorta vivipara</i>	Naram, Langangpa	Moist slopes
55	<i>Blumea bifoliata</i>	Leuman	Plateau
56	<i>Bupleurum himalayense</i>	Sah-kuchak	Alpine pastures

S. No.	Species (Scientific Name)	Local Name	Habitat type
57	<i>Bupleurum marginatum</i>	Zira-sherpo	Alpine Pastures
58	<i>Capsella bursa-pastoris</i>	Sah-kuchak	Alpine pastures
59	<i>Caragana gerardiana</i>	Zomosing	Gullies, dry slopes
60	<i>Caragana versicolor</i>	Zonsing	Sandy slopes
61	<i>Carum bulbocastanum</i>	Gosnyod	Dry slopes
62	<i>Carum carvi</i>	Gonyot	Dry slopes
63	<i>Centauria picris</i>	Konpa	Dry slopes
64	<i>Cerastium cerastoides</i>	Spangian karmo,	Moist areas
65	<i>Chenopodium botrys</i>	Sanyek cultivating fields	Dry areas,
66	<i>Chenopodium foliolosum</i>	Sanyek	Sandy riverbeds
67	<i>Chenopodium</i>	Sanyek	Wastelands
68	<i>Christolea crassifolia</i>		Stony slopes
69	<i>Chrysanthemum</i>	Serpan	Plateau
70	<i>Chrysanthemum pyrethroides</i>	Serpan (Bhurse-khampa),	Rocky slopes
71	<i>Chrysanthemum tibeticum</i>	Phemantso	Rocky slopes
72	<i>Cicer microphyllum</i>	Seri-jriboo	Wastelands, alpine slopes
73	<i>Cirsium arvense</i>	Soh-chlia	River valley
74	<i>Cirsium wallichii</i>	Kakar	River valley
75	<i>Clematis orientalis</i>	Emong nakpo	Dry slopes
	<i>Emong nakpo</i>		Dry slopes

S. No.	Species (Scientific Name)	Local Name	Habitat type
76	<i>Clematis tibetina</i>	Zakzic areas	Cultivated
77	<i>Codonopsis clematidea</i>	Ludut dorje	Marshy
78	<i>Codonopsis rotundifolia</i>	Klupdud dorje	Marshy
79	<i>Codonopsis ovata</i>		Marshy
80	<i>Conringia planisiliqua</i>	Khaskar	Alpine slopes
81	<i>Convolvulus arvensis</i>	Grachi	Dry slopes
82	<i>Corispermum</i>	Seimso	Dry rocky
83	<i>Corydalis govaniana</i>	Tongru-silva	Marshy
84	<i>Corydalis meifolia</i>	Tonzil	Marshy
85	<i>Corydalis rutifolia</i>	Chimlo	Roadsides
86	<i>Corydalis tibetica</i>	Stong zil	Plateau.
87	<i>Cousinia thomsonii</i>	Chansar	Wastelands
88	<i>Cremanthodium</i>	Rekonpa	Moist areas
89	<i>Cremanthodium ellisii</i>	Dariya kan	
90	<i>Crepis flexuosa</i>	Remang	Stony places
91	<i>Crocus sativus</i>		Village areas
92	<i>Cuscuta approximata</i>	Amarlata	Wastelands
93	<i>Cuscuta capitata</i>	Amarlata	Wastelands
94	<i>Cuscuta europea</i>	Amarlata	Village areas
95	<i>Cuscuta reflexa</i>	Amarlata	Undulating areas
96	<i>Dastylorhiza hatazirea</i>	Sanchu (Angbolakpa, wangluk)	Moist places
97	<i>Daphne mucronate</i>		

S. No.	Species (Scientific Name)	Local Name	Habitat type
98	<i>Delphinium brunonianum</i>	Lunde-kaown	Moist rocky slopes
99	<i>Delphinium cashmerianum</i>	Lunde-kaown (Cha-gotpa)	Stony slopes
100	<i>Delphinium viscosum</i>	Bilamonokh	Moist stony area
101	<i>Descurainia sophia</i>	Teri-latchij	Alpine pastures
102	<i>Dianthus anatolicus</i> Boiss.		Alpine pastures
103	<i>Dracocephalum heterophyllum</i>	Zinkzer, Driangu, Priyanku	Stony slopes
104	<i>Dracocephalum moldavicum</i>	Kirmir	Roadsides
105	<i>Dracocephalum staminium</i>	Ghiromanko	Slopes
106	<i>Echniops cornigerus</i>	Ekzema (Zanskar)	Village areas
107	<i>Echinops niveus</i>	Ekzema	Plateau
108	<i>Ephedra gerardiana</i>	Chhapat (Tse)	Stony slopes, gravelly soil
109	<i>Epilobium angustifolium</i>	Utpal-wanbo	Shady Areas
110	<i>Epipactis helleborine</i>	Penginlo	Moist places
111	<i>Eragrostis poaeoides</i>	Gieng	Dry slopes
112	<i>Erigeron alpinus</i>	Repan	Rocky
113	<i>Eritricum canam</i>	Changser, tukse	Roadsides
114	<i>Ermania lanuginosa</i>	Measlo	Moist places
115	<i>Erodium tibetanum</i>		Alpine slopes

S. No.	Species (Scientific Name)	Local Name	Habitat type	S. No.	Species (Scientific Name)	Local Name	Habitat type
116	<i>Euphorbia stracheyi</i>	Tingling	Sandy	135	<i>Geranium tuberaria</i>	Yusiang	Rocky slopes
117	<i>Euphorbia tibetica</i>	Tingling	Alpine pastures	136	<i>Gnaphalium affine</i>	Gandha pattra	Moist areas
118	<i>Euphrasia laxa</i>	Kianglo	Sandy places	137	<i>Gnaphalium stewartii</i>	Peo	Sandy places
119	<i>Ferula jaeschkeana</i>	Thunak, Risho	Dry slopes	138	<i>Halepestes tricuspis</i>		Rock-crevices, marshy area
120	<i>Fritillaria roylei</i>	Chikmo	Alpine slopes	139	<i>Heracleum lanatum</i>	Tunak, tukar	Marshy
121	<i>Galium pauciflorum</i>	Phomongo	Plateau	140	<i>Herminium monorchis</i>		Moist places
122	<i>Galium serpilloides</i>	Pemantso	Higher passes	141	<i>Hippophae rhamnoides</i>	Tar-ngoo, Starbu, Zing	Riverbeds
123	<i>Gentiana algida</i>	Pungen carpov	Moist places	142	<i>Humulus lupulus</i>		Village area
124	<i>Gentiana carinata</i>	Ziang	Moist places	143	<i>Hyoscyamus niger</i>	Thangdum, langtang-tse	Village area
125	<i>Gentiana kurroa</i>	Pangyin	Moist slopes	144	<i>Hypericum leptocarpus</i>	Meerang	Grazing Ground
126	<i>Gentiana nubigena</i>	Pangyin	Moist slopes	145	<i>Hyssopus officinale</i>	Jip-chi, chibu	Dry slopes
127	<i>Gentiana olivieri</i>	Khilche Nagpo	Moist slopes	146	<i>Inula rhizocephala</i>	Riamko	Moist rocky places
128	<i>Gentiana squarrosa</i>	Ziang	Alpine slopes	147	<i>Inula racemosa</i>	Manu	Cultivated
129	<i>Gentiana stracheyi</i>	Ziang	Moist places	148	<i>Inula royleana</i>	Ukchha	
130	<i>Gentianella moorcroftiana</i>	Teekta	Moist slopes	149	<i>Iris ensata</i>	Banpijaj	Dry areas
131	<i>Gentianella paludosa</i>	Pallutso	Moist slopes	150	<i>Junglans regia</i>	Akhrot	Planted
132	<i>Gentianopsis detonsa</i>	Shiti	Moist Places	151	<i>Juniperus communis</i>	Shukpa	Dry slopes
133	<i>Geranium pratense</i>	Gagchuk (Ngon-boo)	Stony slopes, wet places	152	<i>Juniperus recurva</i>	Shukpa	Dry slopes
134	<i>Geranium sibiricum</i>	Eyاملom-entok	Sandy & wastelands	153	<i>Jurnea ceratocarpa</i>	Chholmong	Dry & sandy Areas
				154	<i>Koelipinia linearis</i>	Nodar	Alpine pasture
				155	<i>Lactuca serriola</i>	Dudej	Alpine slopes

S. No.	Species (Scientific Name)	Local Name	Habitat type	S. No.	Species (Scientific Name)	Local Name	Habitat type
156	<i>Lagotis kunawurensis</i>	Tsermo	Alpine Pature	178	<i>Morina coulteriana</i>	Khundaj, Kare	River valley
157	<i>Lancea tibetica</i>	Payak-tsa	Marshy	179	<i>Morina longifolia</i>	Biskandara	River valley
158	<i>Leontopodium nanum</i>	Palu	High Passes	180	<i>Myricaria rosea</i>	Hombuk	River Valley
159	<i>Lepidium latifolium</i>	Shangshu	Dry slopes	181	<i>Myricaria squamosa</i>	Ombu	River Valley
160	<i>Leucopoa albida</i>	Fukche	Sandy areas	182	<i>Nepeta cataria</i>	Gandhsoi	Dry slopes
161	<i>Lomatogonium rotatum</i>	Tsemrang		183	<i>Nepeta coerulescens</i>	Neimlo	Dry slopes
162	<i>Lonicera spinosa</i>	Lamora	Rocky slopes	184	<i>Nepeta discolor</i>	Nyomalo	Rocky slopes
163	<i>Lloydia serotina</i>	Kangkar (Tsaawa), Anwa	Alpine passes	185	<i>Nepeta erecta</i>	Eripantso	Sandy places
164	<i>Lupula barbata</i>		Wastelands	186	<i>Nepeta eriostachia</i>	Zimthik le	Dry slopes
165	<i>Lychnis nutans</i>	Lappu	Moist places	187	<i>Nepeta floccosa</i>	Shamalolo slopes	Stony
166	<i>Lycium ruthenicum</i>	Umila	Roadsides	188	<i>Nepeta glutinosa</i>	Gimanko slopes	Stony
167	<i>Malva verticillata</i>	Chiroti	Alpine pasture	189	<i>Nepeta leucolaena</i>	Beimtso	Dry slopes
168	<i>Malva sylvestris</i>	Sotsal	Alpine pasture	190	<i>Nepeta longibracteata</i>	Teyanku	Rocky places
169	<i>Marrubium vulgare</i>	Tropper	Dry areas	191	<i>Nepeta podostachys</i>	Shangukaram	Rocky slopes
170	<i>Mattiastrum thomsonii</i>		Slopes	192	<i>Origanum vulgare</i>	Lachung	Dry areas
171	<i>Meconopsis aculeata</i>	Serthun, Tsergnon	Stony desert	193	<i>Oxyria digyna</i>	Chur-tse, chum tse	Sandy
172	<i>Meconopsis horrdula</i>	Udpal snogpo	Stony areas	194	<i>Oxytropis microphylla</i>	Stagsha Nagpo	Dry areas
173	<i>Meconopsis simplicifolia</i>	Udpal snogpo	Stony areas	195	<i>Oxytropis microphylla</i>	Taksha, rechakpa	Dry
174	<i>Meconopsis sinuata</i>	Udpal snogpo	Stony areas	196	<i>Oxytropis tatarica</i>	Sarkash	Dry areas
175	<i>Medicago lupulina</i>	Gunyok	Dry areas	197	<i>Parquilegia microphylla</i>	Gyamobd-ebyin	Moist areas
176	<i>Melica persica</i>	Tandi	Dry sandy slopes	198	<i>Pedicularis cheilanthifolia</i>	Kikimo	Moist places
177	<i>Mentha longifolia</i>	Phololing	Moist places				

S. No.	Species (Scientific Name)	Local Name	Habitat type	S. No.	Species (Scientific Name)	Local Name	Habitat type
199	<i>Pedicularis longiflora</i>	Phakchang, Lungri zarpo	Moist places	218	<i>Primula denticulata</i>		Alpine pasture
200	<i>Pedicularis megalantha</i>	Lungruk makpo	Marshy	219	<i>Primula macrophylla</i>	Sulumentok (Kilche)	Moist rocky slopes
201	<i>Pedicularis pectinata</i>	Lungi muppo	Moist places	220	<i>Primula rosea</i>	Sulumentok	Damp places
202	<i>Peganum harmala</i>	Sepan	Roadsides	221	<i>Prunella vulgaris</i>	Syangave	Alpine pasture
203	<i>Perovskia barotanoides</i>		Village areas	222	<i>Psychrogeton andryaloides</i>	Lukchung ba	Alpine Pasture
204	<i>Physochlaina praelta</i>	Langthang	Stony slopes, roadsides	223	<i>Pterocephalus hookerii</i>	Spang-tsi-dowo	Dry areas
205	<i>Picrorhiza kurrooa</i>	Honglen	Moist slopes	224	<i>Renunculus brotherusii</i>	Maokiang	Dry slopes
206	<i>Plantago major</i>	Riew kai	Roadside, moist area	225	<i>Ranunculus laetus</i>	Sharchang	Moist places
207	<i>Plantago himalaica</i>	Karache, Nikto	Moist area, roadside	226	<i>Ranunculus lobatus</i>	Zamtos	Moist places
208	<i>Plantago depressa</i>	Tharam	Roadside	227	<i>Rheum emodi</i>	Tukshu	Moist rocky
209	<i>Plantago erosa</i>	Tharam	Trailside	228	<i>Rheum moorcroftianum</i>	Tukshu	Marshy
210	<i>Pleurospermum angelicoides</i>	Chhipi	Marshy	229	<i>Rheum webbianum</i>	Tukshu	Marshy
211	<i>Podophyllum hexandrum</i>	Demobkusu, (Tandik)	Moist shady areas	230	<i>Rhodiola heterodonta</i>	Sholo-marvo	Rocky
212	<i>Polygonum polystachium</i>	Chutzi nagpo	Moist area	231	<i>Rhodiola imbricata.</i>	Shrolu	Moist Rocky
213	<i>Polygonum paronychiodes</i>	Nhachu	Moist areas	232	<i>Rhododendron</i>	Balu	Rocky slope
214	<i>Potentilla anserina</i>		Cultivated, irrigated fields	233	<i>Rosa sericea</i>	Rongsal, Syan, Sia	Rocky slope
215	<i>Potentilla atosanguinea</i>	Chisheng	Alpine slopes	234	<i>Rosa webbiana</i>	Shulik, Rongsal, Syan, Sia	Dry
216	<i>Potentilla fruticosa</i>	Khiamgar	Plateau	235	<i>Rumex dentatus</i>	Shoma	Marshy
217	<i>Potentilla salesoviana</i>	E-mong karvo	Dry	236	<i>Rumex nepalensis</i>	Shomang, shobna	Marshy
				237	<i>Sagina saginoides</i>	Kanganchoo	Moist area

S. No.	Species (Scientific Name)	Local Name	Habitat type	S. No.	Species (Scientific Name)	Local Name	Habitat type
238	<i>Saussurea bracteata</i>	Pang-tsi dowo	Moist rocky, Passes	259	<i>Tamaricaria elegans</i>	Hombuk	River valley
239	<i>Saussurea ganphaloides</i>	Yuliang, Pangtsi	Moist slopes, scree	260	<i>Tanacetum dolichophyllum.</i>	Seigmanlo	Rocky Slopes
240	<i>Saussurea lappa</i>	Kut	Cultivated	261	<i>Tanacetum gracile</i>	Khamchu	Stony areas
241	<i>Saussurea obvallata</i>	Spangse tobo	Rocky slopes	262	<i>Tanacetum longifolium</i>	Bhurse Khampa	Dry
242	<i>Saussurea taraxifolie</i>		Higher passes	263	<i>Tanacetum nanam</i>	Phulumentok	Plateau
243	<i>Saxifraga flagillaris</i>	Suchutlihk	Glacial moraines	264	<i>Tanacetum tenuifolium</i>	Autang	Dry slopes
244	<i>Saxifraga oppositifolia</i>	Sasomantso	higher Passes	265	<i>Tanacetum tibeticum</i>	Khurmang	Sandy Places, stony slopes
245	<i>Selinum vaginatum</i>		Moist slopes	266	<i>Taraxacum officinale</i>	Han (Khurmang)	Marshy
246	<i>Scorzonera virgata</i>		Sandy places	267	<i>Thalictrum alpinum</i>		Plateau
247	<i>Scrophularia koelzii</i>	Yarma	Moist area	268	<i>Thalictrum foetidum</i>	Haichinsah	Cultivated areas
248	<i>Scrophularia dentata</i>	Hamchi	Plateau	269	<i>Thalictrum minus</i>	Chak-choo	Wastelands
249	<i>Scutellaria prostrata</i>	Haunching	Rocky Slopes	270	<i>Thermopsis inflata</i>	Khymang chudup	Scree
250	<i>Sedum crassipes</i>	Churuppa	Moist bouldery	271	<i>Thlaspi arvense</i>	Bumak	Roadside, cultivated fields
251	<i>Sedum ewersii</i>	Churuppa	Moist bouldery	272	<i>Thlaspi montanum</i>	Bumak	Rocky
252	<i>Senecio leatus</i>	Hechiang	Roadsides	273	<i>Thymus Linearis</i>	Taksha nakpo	Rocky
253	<i>Senecio graciliflorus</i>	Zerjum	Alpine pastuer	274	<i>Tragopogon gracilis</i>	Thar-noo, A	Dry
254	<i>Senecio tibeticus</i>	Niyamgar	Plateau	275	<i>Tribulus terrestris</i>	Zema ravo	Roadsides, sandy places
255	<i>Silene moorcroftiana</i>	Timuksa	Marshy	276	<i>Triglochin palustris</i>	Puga, Gaike	Dry slopes
256	<i>Silene indica</i>	Shukoa, Lugsuk	Moist area	277	<i>Trigonella emodi</i>	Bhusu hung	Farmland
257	<i>Swetia petiolata</i>	Heising	Dry slopes	278	<i>Urtica hyperborea</i>	Pachoo, Zasot	Wastelands
258	<i>Swertia thomsonii</i>	Tikta	Moist area	279	<i>Urtica urens</i>	Zabo, Zatsut	

S. No.	Species (Scientific Name)	Local Name	Habitat type	S. No.	Species (Scientific Name)	Local Name	Habitat type
280	<i>Veronica macrostemon</i>	Shimiogar	High Passes	299	<i>Delphinium cashmerianum</i>	Lunde-kaown (Chagotpa)	Stony slopes
281	<i>Viola biflora</i>		Alpine pasture	300	<i>Ephedra gerardiana</i>	Chhapat (Tse)	Stony Slopes, gravelly soil
282	<i>Viola odorata</i>		Alpine pasture	301	<i>Ferula jaeschkeana</i>	Thunak, Risho	Dry slopes
283	<i>Waldheimia tomentosa</i>	Makungla (Lugmik serpo)	Stony slopes	302	<i>Fritillaria roylei</i>	Chikmo	Alpine slopes
284	<i>Waldemia glabra</i>	(Sa-palu)	Higher Passes	303	<i>Gentiana kurrooa</i>	Pangyin	Moist slopes
285	<i>Youngia tenuifolia</i>	Stathis, Jampa	Rock-crevices	304	<i>Geranium sibiricum</i>	Eyamlom-entok	Sandy, wetlands
286	<i>Acantholimon lycopodioides</i>	Longze	Rocky slopes	305	<i>Heracleum lanatum</i>	Tunak, tukar	Marshy
287	<i>Aconitum balfourii</i>	Bonga nakpo	Moist areas	306	<i>Heracleum monorchis</i>		Moist places
288	<i>Aconitum heterophyllum</i>	Buma	Moist areas	307	<i>Hippophae rhamnoides</i>	Tar-ngoo, Starbu, Zing	Riverbeds
289	<i>Aconitum rotundifolium</i>	Bonkar	Dry scrub	308	<i>Hyoscyamus niger</i>	Thangdum, langtangtse	Village site
290	<i>Aconitum violaceum</i>	Yangtso (Zinba, Dusilama)	Moist areas	309	<i>Indula racemosa</i>	Manu	Cultivated
291	<i>Anaphalis contorta</i>	Telgang	Alpine Slopes	310	<i>Juniperus communis</i>	Shukpa	Dry slopes
292	<i>Arnebia euchroma</i>	Demok	Rocky slopes	311	<i>Juniperus recurva</i>	Shukpa	Dry slopes
293	<i>Artemisia maritima</i>	Khamchu	Stony slopes	312	<i>Lancea tibetica</i>	Payak-tsa	Marshy
294	<i>Bergenia stracheyi</i>	Dak-kya-hawo, Gatikpa	Rocky	313	<i>Lloydia serotina</i>	Kangkar (Tsa-awa), Anwa	Alpine passes
295	<i>Betula utilis</i>	Takpa	Rocky	314	<i>Meconopsis aculeata</i>	Serhun, Tsergnon	Stony desert
296	<i>Cremanthodium ellisii</i>	Dariya kan		315	<i>Physochlaina praealta</i>	Langthang	Stony slopes, roadsides
297	<i>Dactylorhiza hatagirea</i>	Sanchu (Angbolakpa, wangluk)	Moist places	316	<i>Picrorhiza kurrooa</i>	Honglen	Moist slopes
298	<i>Delphinium brunonianum</i>	Lunde-kaown	Moist rocky slopes				

S. No.	Species (Scientific Name)	Local Name	Habitat type	S. No.	Species (Scientific Name)	Local Name	Habitat type
317	<i>Podophyllum hexandrum</i>	Demobkusu, (Tandik)	Moist shady areas	325	<i>Saussurea lappa</i>	Kut	Cultivated,
318	<i>Primula rosea</i>	Sulumentok	Damp places	326	<i>Saussurea obvallata</i>	Spangse tobo	Rocky slopes
319	<i>Rheum emodi</i>	Tukshu	Moist rocky	327	<i>Selinum vaginatum</i>		Moist slopes
320	<i>Rheum moorcroftianum</i>	Tukshu	Marshy	328	<i>Tanacetum nanam</i>	Phulumentok	Plateau
321	<i>Rheum webbianum</i>	Tukshu	Marshy	329	<i>Thymus linearis</i>	Taksha nakpo	Rocky
322	<i>Rhododendron anthopogon</i>	Balu	Rocky slope	330	<i>Waldheimia tomentosa</i>	Makungla (Lugmiks-erpo)	Stony slopes
323	<i>Saussurea bracteata</i>	Pang-tsi dowo	Moist rocky, passes	331	<i>Waldheimia glabra</i>	(Sa-palu)	Higher passes
324	<i>Saussurea gnaphaloides</i>	Yuliang, Pang-tsi	Moist slopes,				

Source: Kala (2000).

Annex V

Meeting with Government of Jammu and Kashmir

2-3 March 2006, Jammu

2nd March, 2006

Meeting at office of Chief Wildlife Warden

1. Mr. R L Bharti, CWLW, Department of Wildlife, J&K (**RLB**)
2. Mr. Naseer Kitchloo, Regional Wildlife Warden Jammu(**NK**)
3. Mr. Jigmet Takpa,(**JT**) Regional Wildlife Warden, Department of Wildlife, J&K
4. Dr. Parikshit Gautam (**PG**), Director, WWF-India.
5. Mr. Pankaj Chandan (**PC**), Senior Project Officer, WWF-India
6. Ms. Vidya. S. (**SV**), Coordinator, Policy & Programme Development, WWF-India.

Agenda:

- Brief introduction of WWF-India's conservation of High Altitude Wetlands of Ladakh initiative.
- To discuss modalities and future course of the management planning exercise for the wetlands of Ladakh based on the ground work done by WWF-India.
- Prospects for establishing Model Community Based Tourism at Tsomoriri & Tsokar jointly between Department of Wildlife, Department of Tourism and WWF-India with partnership from Community trusts and Hill council.

The WWF-India initiative on conservation of High Altitude Wetlands of Ladakh was briefly explained and a few discussion points on the threats section included aspects like the electric pole inside the marshes at Hanle and issues related to fencing of Wetlands. **JT** said that the fencing issue is also being sorted out.

PC laid the stress on the complexity of the wetland ecosystems of Ladakh and explained the site specific problems being faced by each wetland including the problems as a result of unscientific management interventions.

Regarding the **management planning** the future course as presented was agreed to with a suggestion from **JT** saying that the individual duties and responsibilities should be clarified from the beginning in the form a MOU.

The future course of action is as follows and to be proposed to the Commissioner Cum Secretary Forests, Govt. of Jammu and Kashmir.

Participatory Management Plan for High Altitude Wetlands of Ladakh in partnership with the Department of Wildlife, J & K Govt. for its integration in the larger conservation plan for Ladakh.

- Develop and agree on the framework for the management plan.
- Constitute Expert group for writing the management plan.
- Procure and analyze GIS imageries on land use in the past and changes now.

- Mark zones of wetland and high priority conservation areas using the GIS images.
- Consultative workshop with major stakeholders to discuss the draft management plan.

Agreements

- A framework of the management plan for the five identified wetlands would be discussed and agreed to be WWF-India and Department of Wildlife
- An expert committee which would write the plan could be constituted of representatives from Department of Wildlife, WWF-India, Mr. B. C. Choudhury from Wildlife Institute of India, Dr. Raghu Chundawat, Ms. Seema Bhatt for their expertise in Ladakh and its biodiversity as well as exposure components of a well envisioned and drafted management plan.

- The existing GIS analysis and imagery would be reviewed with the GIS expert and the differences smoothed out before.
- Once the frame work approved and expert committee formalized a time line would be agreed upon
- At the end of the agreed time line a larger consultation would be organized by WWF-India where in all the representative stakeholders and other experts would be called to review and give inputs on the draft management plan.

- Post consultation the agreed management plan would be submitted to the Government.

Regarding the **community based tourism** for Tsomoriri & Tsokar, the concept with the envisaged activities was presented for in principle agreement with the Wildlife Department, the same would be presented to the Dept. of Tourism also for their agreement as well.

RLB agreed that around 27,000 tourists visited Tsomoriri & Tsokar last year within a time span of just 4 months and which confirms the fact that the effort for establishing community based tourism with basic infrastructural facilities for environment friendly camping facilities at both these fragile sites.

NK added that Yaya Tso is also a potentially important site and a similar initiative should be taken up for that site as well. B replied that the current phase would target Tsomoriri & Tsokar and Yaya Tso could be targeted for the next phase.

PG informed that Yaya Tso is also an important site for WWF and Field Team at Leh is regularly conducting the field surveys in this wetland.

3rd March, 2006

Meeting at the office of Commissioner cum Secretary Forests, Government of J&K

Meeting was attended by:

1. Mr. Najamul Saqib (**NS**), Commissioner Cum Secretary Forests, Govt of J&K.
2. Mr. Saleem Baig (**SB**), DG Tourism Govt. of J&K.
3. Mr. R L Bharti, CWLW (**RLB**), Department of Wildlife, J&K
4. Mr. Abhay Kumar (**AK**), Secretary Technical, Deptt. Of Forests, Govt of J&K.

5. Mr. Jigmet Takpa,(**JT**) Regional Wildlife Warden, Department of Wildlife, J&K

6. Dr. Parikshit Gautam (**PG**), Director, WWF-India

7. Prof. Sashi Kant (**SK**), Chairman WWF J&K state office.

8. Ms. Vidya. S. (**SV**), Coordinator, Policy & Programme Development, WWF-India.

9. Mr. Pankaj Chandan (**PC**), Senior Project Officer, WWF-India.

Agenda:

- Brief introduction of WWF-India's conservation of High Altitude Wetlands of Ladakh initiative.
- To discuss modalities and future course of the management planning exercise for the wetlands of Ladakh.
- Prospects for establishing Community Based Tourism at Tsomoriri & Tsokar jointly between Department of Wildlife, Department of Tourism and WWF-India with partnership from Community trusts and Hill council.

Background:

PG explained the WWF-India's role as conservation NGO in India and the presence internationally in more than 100 countries. He also explained how WWF-India's work is based on thematic areas of priority importance. He then added that globally the High Altitude Wetlands are of immense importance to WWF as a family and Ladakh is especially a priority landscape for WWF-India.

SV made a presentation of the WWF-India's intervention in Ladakh for the past six years. Explaining that the initiative was strategized after a National Consultation where experts from all the

field were invited and their inputs taken. The mandate and the practice of WWF has been to initiate and implement a participatory conservation programme, as has been done in Ladakh. The high point of the project has been that it is a participatory programme with the complete involvement of all the stakeholders.

PC gave his inputs on various technical issues related to wetlands of Ladakh and stressed the need for strengthening the ongoing CBT activities at Tsomoriri & Tsokar.

Discussion Points

NS appreciated the effort and said that he is aware of WWF-India's conservation work in Ladakh and added that such a participatory approach should be carried forward. He added that since ground work related to the Wetland conservation management in the form of various feasibility studies and a PRA exercise has already been done by WWF-India it should the logical course of action to take it forward into developing a management plan.

RLB - to this added that a number of organization including a large world bank project on management planning is on going. However to this NS replied that convergence of all the work and building in synergy is important for the region, and there should be one nodal agency which would along with Wildlife department synergize the work. He also added that with the J& K government there is a lot of potential and knowledge base which should also be tapped and used in the synergy building process.

JT quoted that the GIS data would have to be re verified after ground truthing, to which WWF agreed that this exercise would be taken up.

Regarding the Community Based Tourism for Tsomoriri & Tsokar, **AK** stated that the Department has already prepared a plan for Tsomoriri and

comments from WWF and WII have been procured. He added that the same may be reviewed and submitted in consultation with WWF-India. **PG** replied that the inputs / comments already given by WWF may be incorporated and submitted to the Government.

PG informed that senior officials of WWF-India recently held a meeting with the tourism ministry at Delhi. Accordingly he informed that Ministry of Tourism GOI is keen in funding a CBT project at Tsomoriri and at Tsokar.

SB agreed that this is a good idea and further followup should be taken up.

PC informed that there are two components of this CBT initiative at Tsomoriri and at Tsokar. There are Software as well as hardware. Referring

to the detailed account of software and hardware components given by **SV** during her presentation, **PC** informed that based on our expertise in Ladakh WWF is keen on taking the software component and would like to partner with a local NGO for the hardware component.

RLB added that JLR is also looking at developing an ecotourism concept for Tsomoriri and possibly WWF could have a meeting with JLR and the departments of Wildlife and Tourism of J&K Govt and develop a comprehensive CBT component.

SK added that it would be the right process and the meeting should be in Jammu for all the people to be involved in it.

Agreements

- Finally the process for management planning for the five selected wetlands in the Ladakh region as presented by WWF - India was agreed to.
- A meeting in Late March with Dept of Wildlife for agreement on framework of the management plan.
- A meeting between JLR, WWF and Dept of Wildlife and Tourism to review and prepare a comprehensive plan Tsomoriri & Tsokar.

Annex VI Meeting with Government of Jammu and Kashmir

4 April 2006, Jammu

Meeting was attended by:

1. Mr. Najamul Saqib. (**NS**)
Commissioner Cum Secretary
Forests, Govt of J&K.
2. S D Swantra, (**SD**) PCCF, J&K
Govt.
3. Vinay Luthra, (**VL**) Jungle Lodges
and Resorts.
4. Mr. Saleem Baig (**SB**), DG Tourism
Govt. of J&K.
5. Mr. R L Bharti, CWLW (**RLB**),
Department of Wildlife, J&K
6. Sataya Kumar (**SK**), Wildlife
Institute of India, Dehradun.
7. Mr. Abhay Kumar (**AK**), Secretary
Technical, Deptt. Of Forests, Govt
of J&K.
8. Mr. Jigmet Takpa, (**JT**) Regional
Wildlife Warden, Leh, Department
of Wildlife Protection, J&K.
9. Dr. Parikshit Gautam (**PG**),
Director, WWF-India.
10. Ms. Archana Chatterjee (**AC**),
Senior Programme Coordinator,
Freshwater & Wetlands
Programme.
11. Ms. Vidya. S. (**SV**), Coordinator,
Policy & Programme Development,
WWF-India.
12. Mr. Pankaj Chandan (**PC**), Senior
Project Officer, WWF-India.

Agenda:

- Agreement on the process to be followed during the course of

preparation of Management Plans.

- Prospects for establishing
Community Based Tourism at
Tsomoriri & Tsokar in collaboration
with Jungle Lodges and resorts.

Background:

AC made a detailed presentation on various technical steps to be followed during the course of a effective management plan.

Followed by Archana's presentation **S Vidya** made a presentation related to various technical issues on CBT in Ladakh. She also stressed on the importance of organizations like JLR in making the ongoing CBT activities in Ladakh more successful.

Discussion Points

After both these presentations a discussion was held on the various ideas thrown during the course of presentations.

SB stressed the need that everybody's role must be defined very clearly. He expressed his reservations about locals taking over the whole of CBT activities.

VL explained about JLR's experiences in Karnataka and about how they used ecotourism as a strategy for forest conservation. He also gave examples of Bhutan and Rwanda as a model to be copied.

SD explained various issues related to threats to the breeding areas of Bar-headed Geese at Tsomoriri.

PG mentioned that WWF has already lot of information about the area and this will

be part of the management plans. He further added that WWF has already started the process of identifying the technical persons to be involved during the management planning exercise.

SK stressed on the need for longterm research studies. He explained the during the 2002 meeting organized by WII at Leh it was found that different departments are working in isolation with each other. He also stressed that Wildlife Department should be the lead in preparation of the management plans.

SV added that WWF also feels that Department of Wildlife should be a Lead in this process

NS expressed his satisfaction about the pace of work as a followup to the earlier meeting. He also stressed the need for active involvement of Hill Council in this process.

RLB mentioned that a followup meeting is being organized WWF representatives in the evening on the same day, as a followup to this meeting. He also informed that specific TOR's are being prepared for WWF as well as JLR.

NS added that Ecotourism should be a part of this management planning exercise. He further suggested that smaller issues should be immediately addressed and wildlife department needs to do the homework as early as possible.

The meeting concluded with the agreement to meet at Leh at convenient dates to be decided by the participants in the evening meeting.

Annex VII

Meeting with Chief Wildlife Warden, Jammu & Kashmir

27 July 2006, New Delhi

27 July, 2006, Board room WWF-India

11AM-1 PM

Participants:

Mr. A.K. Srivastava, CWLW, J&K

Dr. R.S.Chundawat, Wildlife expert

Ms Seema Bhatt, Consultant CBT

Ms Archna Chatterjee, Senior Programme Coordinator, FWP, WWF-India

Ms S Vidya, Senior Programme Coordinator, FWP, WWF-India

Mr. G. Areendran, GIS Incharge, IGCMC, WWF-India

Mr. Pankaj Chandan, Project manager, Ladakh wetlands project, Leh, WWF-India

AGENDA

Setting the Context

11:00 - 11:05 - Introduction by Participants

11:05 - 11:10 - Introductory remarks WWF-India

11:10 - 11:20 - Introduction to WWF-India project 'Conservation of high altitude wetlands in Ladakh, Pankaj Chandan, WWF-India.

11:20 - 11:30 - A snapshot of the Management Planning progress so far in Tsomoriri, Archna Chatterjee, WWF-India

11:30 - 11:40 - CBT framework for Tsomoriri, S. Vidya, WWF-India

Tsomoriri Management planning

concept notes :

11:40 - 11:50 - Key species and their conservation action plan, Dr. R. S. Chundawat, ISLT

11:50 - 12:00 - GIS application for land-use planning for Tsomoriri Mr. G. Areendran, WWF-India

12:00 - 12:10 - Tourism planning for Tsomoriri, Ms Seema Bhatt, Consultant

12:10 - 12:40 - Discussion

12:40 - 12:50 - Remarks by Mr. A. K. Srivastava, CWLW, J&K

12:50 - 1:00 - Conclusions
1:00 PM - Lunch

Minutes of the meeting

After a brief round of introductions, Archna Chatterjee welcomed Mr. A.K. Srivastava and briefly explained the purpose of the meeting. The main purpose was to provide an update on the Management Planning process for Tsomoriri that has been ongoing for past one and a half year, and to plan for next steps in concurrence with CWLW J & K so that the requisite document could be prepared without any delay.

Pankaj Chandan, presented the overview of WWF-India project for conservation of high altitude wetlands in Ladakh followed by Archna Chatterjee presenting the progress under the Management Planning Component. WWF-India was invited by J&K Govt. in February 2005 to prepare the Management Planning document for Tsomoriri. While WWF-India has been carrying out background

work for production of the document, frequent change of guard in the CWLW, J&K, has slowed the process considerably. WWF-India had also sent the Terms of Reference and request for transfer of Rs 2 lakhs to Dept. WWF-India has invested approximately Rs 9-10 Lakhs by way of technical background studies, GIS-based assessments, field surveys for collection of data, travel and meeting costs for organizing various meeting in Jammu and Leh with the Department.

Ms Vidya presented the Community based tourism frame work for Tsomoriri. It was emphasised that the Management Plan would look closely at tourism management planning due to the fragile nature of wetland and tourism emerging as a major threat. The focus would be on local communities generating livelihood opportunities from sustainable tourism at Tsomoriri. It was also explained that WWF-India is helping the Tsomoriri Conservation Trust to establish ten homestays in Korzok village.

Dr Raghu Chundawat, Wildlife expert and Consultant to Management Planning for Tsomoriri presented briefly his ideas for scientific conservation plan for key species. Dr Chundawat stressed that instead of just key species, it would be better to work with communities viz. Breeding populations, feeding populations. Not only wetland management but elements of watershed management are also crucial to successful management. Species like Kiang, Marmots and Tibetan Argali would also be part of the plan.

The monitoring component would identify specific performance indicators.

Mr.G.Areendran gave an overview of the GIS work that has been carried out by WWF-India on Ladakh wetlands with focus on Tsomoriri. The Macro analysis clearly shows that the marshy areas the real wetlands on which species depend for breeding and feeding have been reducing due to external pressures like tourism and grazing. For management plan preparation, satellite imageries are being procured for detailed land use analysis, breeding and feeding area demarcation, different zones like tourism infrastructure, wildlife, agriculture etc.

Ms Seema Bhatt, CBT expert working on Tourism management plan component emphasized the community based model of tourism to be most appropriate for Tsomoriri instead of infrastructure based commercially exploitative tourism . In response to a query by CWLW whether

this is linked to promotion of tourism which is mandate of another Govt. Dept., it was clarified that the Management plan would clearly demarcate the parameters under which tourism should operate in the fragile wetland be it by tourism department or by the tour operators. This was extremely important to be put into place to prevent unsustainable development of tourism as Tsomoriri.

After these basic presentations, an open discussion took place. Mr. Srivastava briefly apprised of his meeting at MoEF for submission of the management plan for Tsomoriri. The submission of the plan for funding under the P.M.'s reconstruction package for J&K is already delayed and he agreed that action from department side has been delayed. He also informed that WWF-India request for sanction of an amount of Rs 2 Lakhs has been submitted by him to the Govt for clearance.

He emphasized that it is crucial to submit the plan document as soon as possible to the MoEF. While the detailed studies required with respect to management planning could be planned for future, the immediate need is to prepare the basic document outlining the detailed studies and budgetary requirements. While WWF-India agreed to the urgency of plan submission, it was emphasized that a field visit by consultants during August is a prerequisite for formulating the basic plan document. WWF-India was optimistic that basic plan documents could be submitted to the department by middle of October 2006. Field visits have also been planned for this purpose between 15th August 15 September 2006.

Archna Chatterjee thanked everyone for attending the meeting and the meeting was closed.

Annex VIII

Management Planning Workshop Organised by Department of Wildlife Protection, J&K and WWF-India

Forest Guest House, Leh, Ladakh,
23rd May, 2006

Participants

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| <ol style="list-style-type: none"> 1. Mr. Jigmet Takpa, Regional Wildlife Warden Ladakh. 2. Mr. Saleem ul -Haq, Wildlife Warden, Leh. 3. Dr. Parikshit Gautam, Director, WWF-India 4. Mr. Pankaj Chandan, Project Manager, WWF-India 5. Ms. Vidya, Coordinator, WWF-India 6. Ms. Archana Chatterjee, Senior Programme Coordinator, WWF-India 7. Ms. Nisa Khatoon, Project Officer, WWF-India 8. Mr. Phuntsog Tashi, Project Officer, WWF-India. 9. Ms . Tashi Lashkit, WWF-India 10. Mr. Chotar Tsering, Korzok Councilor 11. Mr. Gurmet Dorjay, TCT Korzok 12. Mr. Mehboot Ali, Tourist Officer 13. Mr. Tsering Namgail, Secretary, ALTOA 14. Mr. Nawang Lundup, ALTOA 15. Ms. Seema Bhatt , Biodiversity Consultant 16. Dr. S. A. Hussain, WII | <ol style="list-style-type: none"> 17. Dr. Raghu Chundawat, ISLC 18. Mr. Mohammed Abass, Range officer Forest (Changthang). 19. Mr. Tsering Angchuk, Range Officer (Wildlife)Changthang <p>Introduction: Mr. Jigmet Takpa welcomed the participants. Explained initiative taken by the J & K Govt, which is very unique and started during the tenure of Mr. C. M. Seth, when he was the CWLW. WWF-India was invited by the J & K Government to develop the management plan for the High Altitude Wetlands of Ladakh and WWF- India is taking the pioneer effort in the same. The uniqueness of Changthang, the precious wetlands which are breeding ground for several birds is a heritage that needs to be conserved and managed well. For long it has not been managed properly and there is no governing guideline or a management plan. This is the great opportunity, an initiative taken for Management of the wetland for prosperity and benefit of the stakeholders.</p> <p>Government could do a restrictive management plan, but the department wants to take a participatory approach, wants to take consensus of the stakeholders and inputs from experts in the field so that a comprehensive plan is arrived at and all get the benefit. There were several meetings before this workshop including a high level one held</p> |
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in April with the Commissioner and Secretary Environment and Director General Tourism at Jammu. They have all been in favour of a participatory management plan in which WWF-India would be the facilitating agency. The most recent meeting at Korzok with the community and the experts sharing the inputs was a very successful one and would pave way for a sound management plan. With this he welcomed all and thanked all the participants.

Dr. Parikshit Gautam, Director WWF-India added that it is for the first ever time in India where such a step is being taken to involve the stakeholders in the formulation of the management plan.

Ms. Archana Chatterjee presented the management planning framework.

Need for mgmt planning arises when the manager feels that unplanned activities are hampering the environment and finally affecting the people.

With a protected area status the Local Community feels threatened that their rights would be taken away. It is here that a well thought out management plan comes handy in achieving a balance between the development and conservation.

The rotation and turnover in the management could potentially cause conflicts and this is where a sound

management plan provides the continuity.

Mr. Pankaj Chandan presented the inputs from the meeting held with the community in Korzok village on 20th May 2006.

Overriding concern: Tourism to Tsomoriri has increased over past years but the benefits have not come to villagers. Tourism at Tsomoriri should be developed in a manner that benefits should come to Korzok village. Suggestions that came from the villagers and their representatives are as follows:

- ALTOA's trekking route Rumtse-Tsomoriri not favorable for Korzok as their horses are not used for the trek. One alternative is to change trekking route and start from Tomoriri or else the horses could be taken to Rumtse at the pre determined time to Rumtse. ALTOA representative explained that routes are chosen by the customer. However, if the horses from Korzok are registered with tourism dept. and there is surety that horses would be readily provided then ALTOA could devise a system that the horses from Korzok are regularly used by them.
- Home stays in Tsomoriri should be encouraged so that benefits of tourism come to the villagers. Dept. of tourism explained the process of registration for receiving subsidy for such efforts by the villagers.
- Camping and taxi movement could be restricted towards beginning of Tsomoriri. Horses and yaks could be used to come to the village and enjoy the natural and cultural heritage.
- Tents could be provided for villagers for gaining tourism benefits. Suggestion was made by Dr. Hussain that a revolving fund could be created under the TCT
- Pony Union of Korzok needs to be revived. First step to do complete listing and then register with Dept. of Tourism. Also fix standard tariff for ALTOA to build these costs in their packages.
- There was a concern that if taxis are stopped before Tsomoriri then tourists may not come to Korzok at all so any regulatory mechanisms need to be well thought of.
- Taxi drivers need to be trained to respect local laws and respect for the lake.
- Capacity building of local community specially women needs to be carried out for managing home stays, camping, etc.
- Increasing number of tourists leave back lot of garbage. Villagers along with ITBP have been involved in cleaning up the lake and its surrounding areas. Sporadic efforts by Dept. of Tourism and ALTOA have also been taken up. However with increasing number of tourists a garbage management system needs to be put in place. Example of a tour operator who marks all tins before field visit and recovers them upon return was explained. Concern over the bottles of mineral water left behind was also expressed.
- Three Self Help Groups were set up in the village last year by the women. Their request is for support to set up a tea stall in the village, set up a handicraft centre in Korzok and provides channels for selling their wool.
- Camping fee collection by the Trust needs to be streamlined.
- Control over the number of permits

which could give interest free loans for this purpose.

issued for visiting Tsomoriri. An example of a bus load of film crew spoiling the lakeshore and surroundings was explained.

- Lake water is used by livestock for drinking purpose. Water quality of the lake is impacted by pollution such as a vehicle washing, washing clothes etc. and this needs to be checked.
- Tsomoriri Conservation Trust is a legally registered trust formed by people of Korzok. Lack of funds has restricted the activities of the Trust. This could be effectively used for providing support to villagers for developing sustainable tourism. Other windows that exist in village are the Panchayatetc. There is thus no need for building any separate local institution.

Other concerns from Korzok inhabitants

1. Increasing number of wild animals causes problem for livestock. Compensation scheme has stopped. Dept. of Wildlife explained that govt. provides Goral Pens for protection of livestock from attack by snow leopard, wolves.
2. Kiangs destroy their winter pastures. Fencing may be provided.
3. Fencing to protect the agricultural lands needs to be completed.
4. Winter camp at Chumur : villagers require water, request for 10 hand pumps
5. LPG cylinders may be made available to stop exploitation of local flora for fuel wood purposes.
6. Medical centre
7. Telephone connection
8. Hand Pumps at various locations during the rotation of Nomads.

9. Electricity connection in Korzok. Generator has been provided, electric poles have been provided but the location of generator near the lake has been objected o by Wildlife dept. After the meeting a group of experts with Wildlife warden and village representatives went to identify the alternative site. The site was identified and marked to begin process of installation of the generator.

Discussion points

Mr. Takpa mentioned that for remote areas in Ladakh solar is the best and only option. The genset should be totally removed as it causes noise and air pollution. Korzok Councillor was requested to discuss with the villagers and the genset should be totally taken out and only solar should be used. Use of renewable and good energy would

lead to improved environment. Mr. Takpa assured that he was committed to equal output and capacity of solar if the community is interested.

Korzok Village Councillor stressed on the fact that people's demand is for immediate power and also apprehensive for long term functionality of the solar power.

Issues	Modus operandi for finding solution
Tourism benefit not reaching local community - not equitable: cost benefit sharing	To gain support from local community for the conservation of the Lake.
Lack of communication	Correct communication required for garnering greater support
Lack of training / capacity building	Domestic tourist can be targeted by addressing the Taxi drivers, Local community
Feeder stream pollution	Health of Tsomoriri is affected by the stream health and hence the same needs to addressed
Garbage at Tsomoriri, dumping of organic wastes very near to the lake	Target tourist, villagers, and operators. Strategy of dumping in pits is not very advisable.
Pollution levels at Tsomoriri	Agriculture/ washing/bathing chemicals entering lake. As no outlets & levels of chemicals increase
Damage to pasture land	Off track driving, wild domestic animal conflicts, domestic animals consuming the pasture land of the villagers,
Increase in water levels in the recent times	Drowning of the nests of the birds
Crop raiding by the Bar-headed Geese	Wild animal human conflicts
Lack of Interpretation Programme	Education on conservation / culture etc
Loss of vegetation in the catchment area	Fuel wood extraction.
Infrastructure development around the lake - unplanned	Lack of Interdepartmental coordination
Lack of guidelines for sustainable tourism	
Lack of adequate administrative support- staff	Addressing resources, building capacity, adding staff resources and finances
Lack of information base to develop future plan	Collect already available, collate and collect
Stocking capacity of the pasture land, carrying capacity of tourism, Multiple entry points into the area.	Trekking routes
Decline in Marmot population	Trapping by laborers
Inter Community differences in resources sharing	

Identifying and Prioritizing issues for finding a solution on a scale of 1-3 (1 is high priority, 3 is least priority)

Issues	Priority list
Tourism benefit not reaching local community - not equitable : cost benefit sharing	1
Lack of communication - dialogue among stakeholders	2
Lack of training / capacity building for all stakeholders	1
Feeder stream pollution	3
Garbage at Tsomoriri, dumping of organic wastes very near the lake	1
Damage to pasture land	1 / 2
Increase in water levels in the recent times	3
Crop raiding by the Bar-headed Geese	3
Lack of Interpretation Programme ,	2 / 3
Loss of vegetation in the catchment area / alternate energy	1
Infrastructure development around the lake - unplanned including Tourism	1
Interdepartmental coordination	1
Guidelines on code of conduct of the tourist	1
Lack of staff of enforcement, management , monitoring	1
Lack of information base to develop future plan	2
Multiple entry points into the area	2 / 3
Long term Research & monitoring	3
Alternate livelihoods	2
Strengthening community institutions (monastery, trust, eco-development committee)	2
Address interest of nomadic community	3

Based on above discussion a rough framework for Objectives was arrived at, which is as follows:

1.	Maintain the water quality of lake and its value.
2.	Maintain biodiversity values.
3.	Maintain the scenic value of landscape.
4.	To provide benefits of tourism to local community.
5.	To respect socio-cultural aspects of Korzok.
6.	To empower local communities.
7.	To ensure adequate resources.

Concerns from both sides, discussion to continue and a final input to be added to the plan in terms of energy for the village. The other option is LPG, but again there is no guarantee of the LPG reaching on time

Session 1:

Identifying issues and setting objectives for management planning

This was a facilitated discussion. Dr. Hussain, WII led the discussion in an interesting manner comparing Tsomoriri

to an ailing patient.. The participants animatedly contributed to the discussion and the table below summarises the issues identified with pointers to a possible solution.

Tsomoriri is a Wetland of International importance a Ramsar site and thus it is important to develop the management plan within the ambit of the Ramsar Convention. Using the rough framework for objectives, the following Vision and specific objectives for management planning were agreed to:

Limiting factors: seasonality

Key elements: tourism management, including local economy, degradation of pastures, health of local people

Vision: Long-term conservation of Tsomoriri for maintaining its biodiversity values and for ensuring long term benefits to local community.

Objectives:

- To develop a comprehensive tourism management plan for

Tsomoriri with benefits going to the Village Korzok

2. To develop a catchment management plan to maintain the biodiversity value of Tsomoriri
3. To identify key species and develop specific conservation action plans

	Issue	Info available	Info required	Source of Info
1.	Tourism benefits to local community ; information on following components would be required:			
1.a.	Horses			
	Horses	Listing of Horses at Korzok		Councillor
	Horses		Demand, Projection	ALTOA
1.b.	Home stays			
	Home stays (number)	Number of tourists permits issued		DC's Office
	Home stays (structure)		Profile of the tourists	WWF-India
	Home stays (Training)	Village profile – Number of people willing to take up home stays	Type of training	WWF-India
	Home stay (resources)			Dept of Wildlife
1.c.	Vehicles			
	Vehicles (number)	Through number of permits issued		Taxi Union / Dc's office permits
1.d.	Pollution			
	Garbage (quantity, type and disposal mechanism)		Study on per camp / per month garbage	Dept of wildlife
	Water quality	Information analysis		WWF-India, WII
	Sources of pollution			WII & WWF-India
1.e.	Carrying capacity			
	Carrying capacity of tourism at Korzok including type of tourism		Commission study	Explore options for funding and resource persons
	Development plans for Tsomoriri			Dept of wildlife and DC's office
	Alternate livelihood options (winter)	Current livelihood practices		WWF-India
			New options of livelihood – feasibility study	
2.	Health	Existing disease / health profile		Ladakh Disease prevention NGO– Dr. Norbu
3.	Alternate energy	Families using , Govt subsidies,		Dept of Wildlife
	Energy profile	Socio economic profile		PRA report – WWF
4.	Wildlife / livestock conflicts			
4.a	Kiang Pasture conflict	Livestock population		PRA report – WWF
		Rebos location - GPS		WWF-India
		Kiang Population		Dept of wildlife
		Pasture locations		WWF-India
4. b	Livestock – Wolf	Status, Population trends, distribution , listing , key habitats of wildlife	Biological resource mapping	WWF, WII, Wildlife dept.

	Issue	Info available	Info required	Source of Info
5.	Land use patterns			
		Community records.	Councillor Korzok.	
		Mapping pastures.	Gompa/Revenue deptt.	
6.	Wildlife Status			
		1. Listing. 2. Distribution. 3. Key Habitats. 4. Population trends. 5. Mapping of Biodiversity resources including catchments.		

4. To develop capacity building and training modules for all the identified stakeholders.
5. To develop an interdisciplinary / interdepartmental coordinating body for monitoring management of Tsomoriri

total of 37,000 tourists came to Leh in 2005. As per govt policies areas up to Nyoma may be opened up to tourism. J & K has a tourism policy under which subsidies are given. There exists categorization of developed and developing areas with respect to tourism in Ladakh. Leh for example falls into developed area and no subsidies are thus available. Changthang falls into developing area for which govt. subsidies are available, however as of now subsidies are reaching Nubra people and Changthang community is not coming forward. Loop holes in policies for subsidies like minimum 8 beds, western toilets and running water as a requirement for giving loans for guest house etc, such a policy should be thought into as this affects the environment as well as the community does not always have all the pre requisite for the loan.

Eco tourism policy for the whole Ladakh region could be a pioneering effort in the direction. Specific policies for Ladakh could be very difficult at State level. However at the council level developing tourism policies for Ladakh within the overall framework would be a very good opportunity. 'Enterprising Ladakh', with focus on tourism is a forth coming policy, where these elements could be built in.

A discussion on the havoc being caused by flush toilets in the fragile environment of Ladakh followed. Tour operators stressed that tourists look for such amenities and would not accept Ladakhi Toilets. ALTOA, representatives committed to explore the environment friendly toilets facilities available globally / in other parts of the country.

Mr. Takpa was requested to elaborate on the role for Jungle Lodges and Resorts(JLR), Government of Karnataka

Session 2:

Information base for scientifically sound management planning

This session was facilitated by Dr. R. Chundawat, ISLT

Session 3 :

Community Based Tourism strategies for Tsomoriri:

Tourism dept. representative Mr. Mehboot Ali, began by giving current scenario in ladakh. He informed that a

Roles and Responsibilities with timeframes for Drafting the plan

What	Who / point responsibilities	Team	When	Resources
Operational				
Overall Facilitation	WWF		8 months	
Nodal agency	Dept of Wildlife		Life long	
Information base	Various as per list above			
Technical / Objectives				
To identify key species and develop specific conservation action plans	ISLT	WWF, DWL, WII		
To develop a catchment management plan to maintain the biodiversity value of Tsomoriri				

enterprise , a company that has been invited by state govt. to develop ecotourism plan for Tsomoriri. Mr. Takpa explained that the role of JLR is as a consultant and would be developing the tourism model for Tsomoriri including tourism plans for additional 3 sites

identified in J& K . At policy level they were also preparing an ecotourism policy for the J& K Govt. JLR has the expertise and their inputs could be used considering the larger management planning goal. The inputs provided in tandem with the goal and objectives of

the overall management plan could be considered.

What	Who / point responsibilities	Team	When	Resources
1. Management of Water Quality	WII	WWF,DWL		
2.. GIS data, land use guidelines, development planning				
To develop a comprehensive tourism management plan for Tsomoriri with benefits going to the Village Korzok	SB	WWF, Dept of Tourism, ALTOA, JLR, DWL		
Procedural				
Infrastructure & administration + inter departmental coordination	DWL			
	Biodiversity Expert			

B U D G E T

Budget for the Activities Proposed in the Management Plan

S.No	Activity	Year					Budget	
		2007	2008	2009	2010	2011	Total Five Years (Rupees in Lakhs)	Grand Total (Rupees in Lakhs)
	SOFTWARE COMPONENT							
1	Biological Assessment							
A	Monitoring of breeding Population of Migatory Birds through annual counts	1	1	1	1	1	5	
B	Monitoring of large Mammals population by conducting annual surveys	2	2	2	2	2	10	
C	Assessment of Water Quality	0.5	0.5	0.5	0.5	0.5	2.5	
D	Identification of major habitat types and its use	1	1	1	1	1	5	
E	Assessment of Pasture quality in the catchments area of Tsomoriri and Tsokar basin	1	1	1	1	1	5	
F	Ecological impact of Developmental Important Activities in the Catchment	2	2	2	2	2	10	
	Sub Total	7.5	7.5	7.5	7.5	7.5	37.5	37.5
2	Socio economic Assessments							
A	Monitoring of Livestock population & Health	1	1	1	1	1	5	
B	Assessment of Socio-Economic status of the local nomadic community	1	1	1	1	1	5	
	Sub Total	2	2	2	2	2	10	10
3	Research studies							
A	Study on Economic Evaluation of Wetlands	2	3				5	
B	Study to determine the Carrying Capacity of the area in terms for livestock population, tourist influx and other developmental activity	3	3				6	

S.No	Activity	Year					Budget	
		2007	2008	2009	2010	2011	Total Five Years (Rupees in Lakhs)	Grand Total (Rupees in Lakhs)
C	Study on Impact of Climate Change on Wetlands	1	1	1	1	1	5	
D	Study to assess the habitat requirement of important breeding population such as the Black-necked Crane and Bar Headed Geese.	2	4	4			10	
E	Study on ecology of important carnivore and ungulates species.		6	5	4		15	
F	Study on Bird flu and migration	1	1	1	1		4	
G	Impact of locusts on the ecosystem	0.5	0.5	0.5	0.5	0.5	2.5	
H	Impacts of Tourism	1	1	1	1	1	5	
I	Study on human- wildlife Conflicts	4	4	2			10	
J	Study on Solid waste management	1	1	1	1	1	5	
K	Study on legal issues related to land tenure, customary rights etc	1	2				3	
	Sub Total	16.5	26.5	15.5	8.5	3.5	70.5	70.5
4	Application of Geographical Information System and Remote Sensing (GIS & RS) to strengthen Management							
A	Procurement of Satellite imageries	1			1		2	
B	Processing satellite Imageries to fulfill Management requirement.	2			2		4	
C	Development of Layer such as land use, Habitat types, digital elevation Model etc.	4					4	
D	Topographic analysis and biodiversity data base creation	3					3	
E	3D surface view	1					1	
F	Field Surveys and ground truthing.	1	1	1	1	1	5	
G	Annotation and Map Composition							
H	Integration of biological, spatial and socio-economic elements for				1	1	2	

S.No	Activity	Year					Budget	
		2007	2008	2009	2010	2011	Total Five Years (Rupees in Lakhs)	Grand Total (Rupees in Lakhs)
	Management of Tsomoriri & Tsokar Lake Basin.							
	Sub Total	12	1	1	5	2	21	21
5	Training and Capacity Building (includes cross-site/exposure visits)							
A	Training & Capacity Building Programmes for Local communities to provide opportunities for alternate livelihood .	4	4	4	4	4	20	
B	Training relevant to Community Based Tourism	2		2		2	6	
C	Training and Capacity building for tour operators, cooks, guides	2		2		2	6	
D	Teacher Training workshops to increase awareness about the conservation among the younger generation.	2	2	2	2	2	10	
E	Training for Army/ ITBP/ Himank to gain support to achieve conservation goals.	1	1	1	1	1	5	
F	Training for wildlife staff in Wildlife Monitoring and fields techniques.	2	2	2	2	2	10	
G	Training for wildlife staff in GIS and Remote Sensing	2		2		2	6	
	Sub Total	15	9	15	9	15	63	63
6	Strengthening Participatory Natural Resource Management							
A	Strengthen community institutions e.g. Conservation Management committees.	10	10	10	10	10	50	
B	Initiate Livestock Insurance/ Compensation.	5	5	5	5	5	25	
C	Programmes to encourage Community participation in nature conservation	2	2	2	2	2	10	
	Sub Total	17	17	17	17	17	85	85
7	Target Specific Education & Awareness Programmes							

S.No	Activity	Year					Budget	
		2007	2008	2009	2010	2011	Total Five Years (Rupees in Lakhs)	Grand Total (Rupees in Lakhs)
A	For School Children	5	5	5	5	5	25	
B	For Tourists	1	1	1	1	1	5	
C	For Army and ITBP	1	1	1	1	1	5	
D	For Monasteries	0.5	0.5	0.5	0.5	0.5	2.5	
E	For Tour Operators	2	2	2	2	2	10	
	Sub Total	9.5	9.5	9.5	9.5	9.5	47.5	47.5
8	Communications							
A	Publication of Education and Awareness Resource Material	5	5	5	5	5	25	
B	Scientific Reports	2	2	2	2	2	10	
C	Developmet of website, films, slide shows and other Audio visual programmes.	10	20	5	5	5	45	
	Sub Total	17	27	12	12	12	80	80
10	Database						0	
A	Establish database at Leh	4	2	2	2	2	12	
	Sub Total	4	2	2	2	2	12	12
11	Participatory Monitoring and Evaluation of the Project							
A	Tracking tool for assessment of Performance Indicators, Management effectiveness	3	3	3	3	3	15	
B	External Evaluation	2	2	2	2	2	10	
	Sub Total	5	5	5	5	5	25	25
	TOTAL SOFTWARE COMPONENT							451.5
	HARDWARE COMPONENT							
1	Catchment Area Treatment							
A	Pasture development and Management in the catchment 100 hect of pasture @Rs. 2lac/ hect.	40	40	40	40	40	200	

S.No	Activity	Year					Budget	
		2007	2008	2009	2010	2011	Total Five Years (Rupees in Lakhs)	Grand Total (Rupees in Lakhs)
B	Water conservation (artificial glaciers, springs and streams, strengthen local water management practices)	20	10	10	10	10	60	
C	Development of nurseries, medicinal plants, fodder species	10	5	5	5	5	30	
	Sub Total	70	55	55	55	55	290	290
2	Restoration and rehabilitation of endangered species							
A	Restoration of key breeding areas of migratory birds	15	15	15	15	15	75	
3	Interpretation Centres and Programme							
A	Construction of Nature Interpretation Centre & Resource Centre at Leh for the visitors, Tourists and General public for orientation/briefing before visiting the wetlands	100	100	50			250	
B	Wetland Information Centre at Korzok	30	30				60	
C	Wetland Information Centre at Thukjaj	30	30				60	
D	Operational Cost	5	5	5	2	2	19	
	Sub Total	165	165	55	2	2	389	389
4	Manpower (Contractual staff)							
A	Project Manager, GIS and RS specialist, Community and Education & Awareness specialist, Interpretation Centre officers(3), Computer operator , Clerk/steno, Accountant, wildlife/patrol guards (3+3), check post guards (3+3), Driver (2+2), office assistant/ peon, chowkidars (2)	15	15	15	15	15	75	
	Sub Total	15	15	15	15	15	75	75
5	Camping Sites							
A	Camp Site with basic facilities At Tsokar (Pangonago)	40	30	10	0	0	80	

S.No	Activity	Year					Budget	
		2007	2008	2009	2010	2011	Total Five Years (Rupees in Lakhs)	Grand Total (Rupees in Lakhs)
B	Solar Lighting, Local Toilets, Garbage Bins at Tsokar.	20	10	5	1	1	37	
C	Camp Site with basic facilities at Tsomoriri (Korzok)	40	20	20	10	10	100	
D	Solar Lighting, Local Toilets, Garbage Bins at Tsomoriri	40	20	20	10	10	100	
E	Solid Waste Disposal (Transportation to Leh after segregation at source and disposal using appropriate techniques)	5	5	2	2	2	16	
	Sub Total	145	85	57	23	23	333	333
6	Pollution Control						0	
A	Infrastructure for Solid Waste Management	5	5	1	1	1	13	
B	Control direct sources of water pollution	2	2	1	1	1	7	
	Sub Total	7	7	2	2	2	20	20
7	Construction of Corral Pens, sheds to reduce livestock depredation	5	5	5	2	2	19	
	Sub Total	5	5	5	2	2	19	19
8	Support to Renewable energy resources (wind, solar, energy efficient chullas, passive solar heating)	30	30	20	10	10	100	
	Sub Total	30	30	20	10	10	100	100
9	Vehicles for Wildlife Staff (Four-wheelers -4, Motorbikes-6)	25					25	
	Sub Total	25					25	25
10	Field Equipments (Cameras, Binoculars, GPS, Monitoring Kits, wireless sets)	20					20	
	Sub Total	20					20	20
11	Studies Using Platform Transmitter Terminals							

S.No	Activity	Year					Budget	
		2007	2008	2009	2010	2011	Total Five Years (Rupees in Lakhs)	Grand Total (Rupees in Lakhs)
	20 PTT's for bird flu and migration studies	20	15	15			50	
	Sub Total	20	15	15			50	50
12	Research and Monitoring Labs							
A	Monitoring Station and Lab at Tsomoriri	50					50	
B	Monitoring Station and Lab at Tsokar	50					50	
	Sub Total	100					100	100
13	GIS Lab and Database							
A	Workstation	20					20	
B	Double tri linear colour scanner	5					5	
C	Printer, Plotter	3					3	
D	GPS and DGPS	4					4	
E	GIS / Image Processing Software: ARC GIS 9.2 and ERDAS 9.0	6					6	
F	Operational Cost	5	5	5	5	5	25	
	Sub Total	43	5	5	5	5	63	63
14	Three Checkposts						0	
A	Mahe	30					30	
B	Puga	23					23	
C	Pangonago	20					20	
	Sub Total	73	0	0	0	0	73	73
15	Two Inspection huts							
A	Tsomoriri	25	25				50	
B	Tsokar	25	25				50	
	Sub Total	50	50	0	0	0	100	100
16	Two Accommodation facilities for field personnel							
A	Tsomoriri	15	15				30	
B	Tsokar	15	15				30	

S.No	Activity	Year					Budget	
		2007	2008	2009	2010	2011	Total Five Years (Rupees in Lakhs)	Grand Total (Rupees in Lakhs)
C	Operational Costs for 14, 15 and 16	10	10	10	5	5	40	
	Sub Total	40	40	10	5	5	100	100
17	Livelihood improvement							
A	Community Based Tourism	30	30	40	20	10	130	
B	Promotion of Local Handicrafts	30	30	20	10	10	100	
C	Health	5	5	5	5	5	25	
D	Revolving fund	50	40				90	
	Sub Total	115	105	65	35	25	345	345
	TOTAL HARDWARE COMPONENT :							2177
GRAND TOTAL FOR SOFTWARE AND HARDWARE							2628.5	



Village Korzok near Tsomoriri

Photo Credit: Anupam Anand

Cover Page:

Main picture: Tsokar; starting from left: Local Community at Korzok Village, Crane nest at Tsokar and Korzok Monastery.

Cover Inside: Black-necked Crane with a Chick.

All pictures credit: Pankaj Chandan/WWF-India.