Black-necked Crane Conservation Through Regional Cooperation Amongst India, China & Bhutan

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Abstract

Black-necked Crane *Grus nigricollis* is one of the 15 existing species of family Gruidae, presently distributed over the alpine regions of India, China and Bhutan. The main breeding range of the species encompasses Qinghai-Tibetan Plateau in south central China and adjacent parts of India; mainly the Changthang region of Ladakh. The wintering range of the species is at relatively lower altitude in India, China and Bhutan. In China, the wintering range of the species lies on the southern and eastern parts of Qinghai-Tibetan Plateau and on the Yunnan-Guizhou Plateau. Perhaps due to the difficult terrain, inhospitable climatic conditions and inaccessibility to the area, it is the last of the world's crane species to be discovered. Black-necked Crane was first described by the Russian Naturalist Nikolai M. Prjevalsky at Lake Koko-Nor in Qinghai Province of China in North - Eastern Tibet in 1876. Being an inhabitant of the Tibetan Plateau this species is the finest symbol of wildlife conservation in Himalayan high altitude region. Black-necked Crane has a great potential to act as a tool for high altitude wetland conservation and as a vehicle for international cooperation between India, China and Bhutan. The present paper highlights the current status, threats and importance of regional cooperation for the conservation of Black-necked Crane in its entire range and issues and challenges associated with the same.

Keywords : *Black-necked Crane, High Altitude Wetland, Regional Conservation, Tibetan Plateau.*

Introduction

Black-necked Crane *Grus nigricollis*, the last of the world's cranes to be discovered by the scientific community is presently distributed over the alpine regions of India, China and Bhutan (Harris &Mirande 2013). Black-necked Crane was first reported from India (Ladakh) in 1919 by a naturalist F. Ludlow at Tsokar (Ludlow 1920) during a bird collection trip. This is the only species that the crane specialist Dr. Laurence Walkinshaw was not able to study in the wild (Archibald and Oesting 1981). Due to geographical and political inaccessibility across much of its range, until the 1980s this species was the least known crane species. In the past two decades, significant research and surveys have been conducted. The wintering range of the species lies on the southern and eastern parts of Qinghai-Tibetan Plateau and on the Yunnan-Guizhou Plateau of China (Harris & Mirande 2013). A sizable population of about 500 birds winters in Bhutan and another small population of about 10-15 birds winters in Indian state of Arunachal Pradesh (Based on personal observations). Black-necked Crane or Tibetan crane *(Grus nigricollis)* is known by various vernacular names in different parts of its distributional range. In Ladakh it is called as Cha Thung Thung Karmo, in Arunachal Pradesh, ThungThung (Sangti valley), Kindha (Apatani valley), in Sikkim Tcha Tung-Tung, in Bhutan Thung-Thung, in Tibet Thrung-Thrung-Ke-Nak while Chinese call it He Jing Hu, Chailao and Yan-e. The birds breeding in Ladakh in India and in China migrate to the lower lying Himalayan areas of India, China or Bhutan during the winter months. Therefore in order to protect this species regional collaboration among these three range states is a must. Any conservation strategy or a conservation plan for this species needs to take all the range countries on board to ensure survival of the species. A species-focused regional conservative initiatives not only contribute to the conservation of the species but also create an atmosphere of peace and goodwill (as this will facilitate the scientist to scientist interaction in the region and promotion of this initiative through media) in the region.

During the past few years since 2011 WWF in collaboration with other partners has been trying to promote the idea of regional collaboration for the conservation of this species (Chandan 2011). As a part to this, besides the ground conservation actions in India, China and Bhutan, a regional workshop for the conservation of this species in India, China and Bhutan was also organized at New Delhi. These activities have been carried out under the regional programme for conservation of Himalayan high altitude wetlands. Also in order to promote the regional conservation of this species

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through CMS (Convention on Conservation of Migratory Species) WWF, MoEF (Ministry of Environment and Forests Government of India) and Wetlands International jointly organized a special event at Bergen in Norway during CMS COP 10 which further highlighted the significance of regional collaboration for the conservation of this species.

Current Status & Distribution

After the discovery of the species, the naturalists and conservationists have initiated observations on the species and started documenting site specific records of species occurrence, observations on migratory flocks, wintering and/or breeding sites and breeding pairs, describing breeding season and nesting sites. For instance, Bailey (1911) recorded the presence of Black-necked Crane in Tibet while compiling the checklist of game birds. Ludlow (1920) reported presence of three Black-necked Cranes at the Tsokar Chumo lake, Osmaston (1927) reported breeding sites of Black-necked Crane in Ladakh. Similarly, occurrence of Black-necked Crane at various sites mainly from southern Tibet and Ladakh region along with some natural history observations were described (Ali 1947; Battye 1935; Hingston 1927; Meinertzhagen 1927; Schaffer 1938). Other such records on occurrence of Black-necked Crane were reported from western Szechwan (Dolan 1939) and from Yunnan (Stevens 1930). Betts (1955) observed a flock of Black-necked Crane which regularly wintered in the Apa Tani valley of northern Assam (now in Arunachal Pradesh). Khacher (1955) reported breeding sites of Black-necked Crane in south western Tibet while on a bird watching expedition.

Considering the paucity of information on the species, more focused attention was paid to document status of Black-necked Crane within the Indian limits, particularly in Ladakh region. Systematic surveys were conducted by the joint efforts of the WWF-India and the Bombay Natural History Society (BNHS) (since the summers of 1976). These surveys have enhanced the knowledge on the status, distribution of the species, nesting sites, nest characteristics and some behavioural aspects of Black-necked Crane breeding in Ladakh in India (Ali *et al.* 1986; Gole 1981, 1983; Hussain 1984, 1985; Hussain 1976). Similar studies were carried out in Bhutan and Arunachal Pradesh (Khachar 1981). Later, Chacko (1992, 1993a, 1993b, 1994, 1995, 1996, 1997) conducted detailed surveys to estimate wintering population of Black-necked Crane in Bhutan and breeding population in Ladakh.

Despite the fact that the species was discovered in China way back in 1876, the information on its status and distribution remained scarce until 1980. The reasons include physical obstacles and political barriers as described by Archibald and Oesting (1981). Once the accessibility to the remote areas was enhanced, political barriers were removed and people were allowed to visit Tibetan region which is the main wintering and breeding area of Black-necked Crane, a lot of information on its status and distribution was generated through coordinated surveys. For instance, Zongbao *et al.* (1980) and Zongbao (1983, 1986) carried out status surveys in several parts of China to document the status of wintering Black-necked Cranes. Fengshan and Mingjing (1985) reported the species status during winter in Cao-Hai. Binyuan and Shauchu (1987) conducted an ecological assessment of the wintering population of Black-necked Crane in Tibet. The other studies on the wintering Black-necked Crane include those conducted at Dashanbao in Yunan Province, Cao Hai and at Poyang lake, (Fengshan 1997), East Dongting lake (Xiaojie 1990), Cao-Hai (Zhikang *et al.* 1991), Rouergai marshes of Sichuan province (Scott 1993) and in Yunnan (Tianhao *et al.* 1993, 1994).

Status surveys were also conducted on breeding populations of Black-necked Crane. Jianchu (1982, 1986) documented the distribution and status in Qinghai Province of China. Guozhou (1990) and Fuzhang *et al.* (1980) conducted surveys of wintering populations of Black-necked Crane in certain parts of China. Kemin (1989) carried out extensive surveys to document status of breeding Black-necked Crane in different counties of Tibet. Dehao *et al.* (1991) reported the status of a breeding population of the species in Songpan meadows of Sichuan Province, China. Xiaorui *et al.* (1995) surveyed Pearl River for documenting status of the species.

Apart from the few reports on the occurrence of Black-necked Crane in South Tibet during the early to mid- twentieth century as mentioned in the preceding section, not much information was available as the area was not open to outsiders. After 1980, when Tibetan Autonomous Region was opened for foreign visitors, more information on Black-necked Crane started pouring in. First comprehensive survey on the status of species in Tibetan plateau was conducted by Dehao (1987). Prior to this Shaochu (1986) compiled the information on the birds of Linzhi county. It was followed by the work of Kemin (1989), documenting the distribution and the population size. Dwyer *et al.* (1992) carried out work on the nesting sites of the species. Bishop (1993) organized a winter count of Black-necked Crane in Tibet.

Yarlung Tsangpo National Nature Reserve along the middle reaches of Brahmaputra covers almost all the wintering areas of Black-necked Crane in Tibet (Harris & Mirande 2013). A small population of about 500 individuals winters at five different locations in Bhutan (present study). The maximum numbers of wintering population in Bhutan are at two different valleys; the largest being in Phobjika valley (c. 340 individuals) and Bomdeling (c. 135 individuals). Phobjikha and Bumdeling together have 95% of the total population of Black-necked Crane in Bhutan. Perhaps the earliest published account on the occurrence of Black-necked Crane in Bhutan was of Khachar (1981). Later, Clements (1986) carried out a status survey of wintering population of Black-necked Crane in Bhutan. It was followed by several studies

on status and distribution (Bishop 1989a, 1989b; Chacko1992a, 1992b; Clement 1992; Dorji 1987a, 1987b; Futehally 1989; Gole 1989; Gaston 1989).

As per the latest information and survey results, currently there are three wintering subpopulations (1. The eastern population in North-Eastern Yunnan and North -Western Guizhou provinces. 2. The central population in North Western Yunnan and 3. Western population in South Central Tibet, Bhutan and north east India) in the entire distribution range of Black-necked Crane (Fig. 1). The current population of Black-necked Crane in its entire distribution range is between 10,000 to 11,000 birds and is stable and increasing (Harris & Mirande 2013).

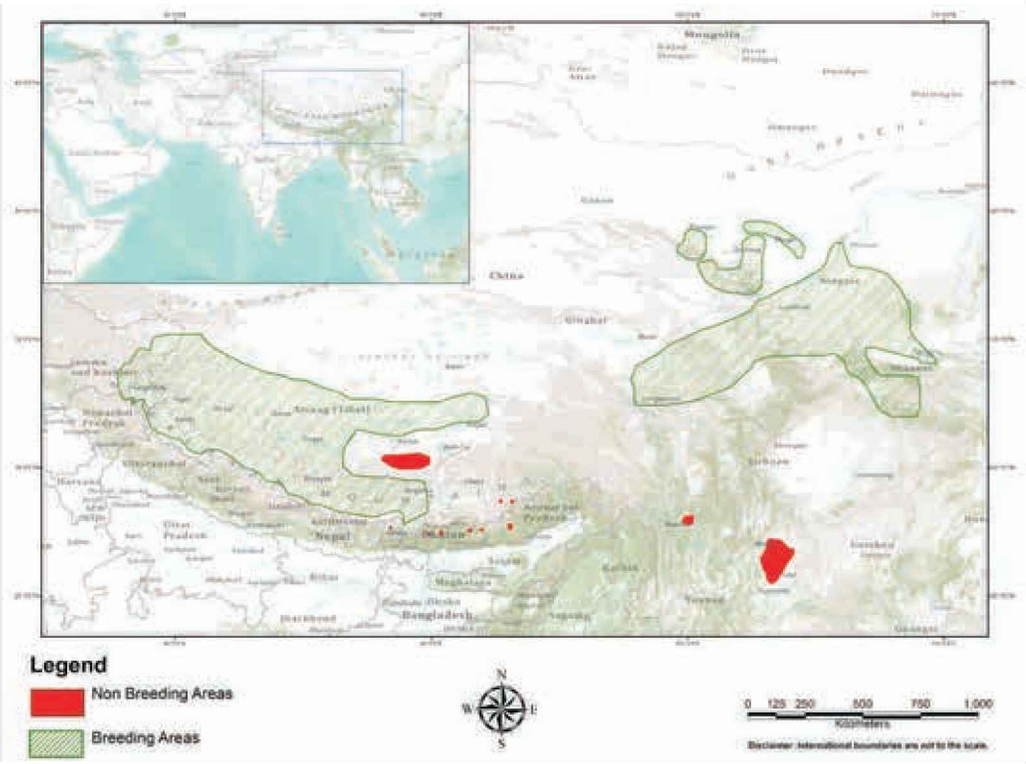

Figure1 : *Distribution of Black-necked Crane*

Habitat in India, China & Bhutan

Among 15 surviving species of cranes in the world, Black-necked Crane is the only alpine species that breeds at elevations ranging between 2950 and 4900 m in high altitude freshwater wetlands (Gole 1992; Meine and Archibald 1996). Earlier to this, it was known, that Black-necked Cranes breed on Tundra like marshes and bogs around the margins of, and on islands in lakes in the Tibetan Steppes (Ali 1947; Ludlow 1928; Osmaston 1925; Schafer 1938). The breeding habitats on the Qinghai-Tibetan Plateau have been classified into three categories viz alpine bog meadows, lacustrine marshes and riverine marshes (Dehao 1986; Juting 1981). Nests of Black-necked Crane were found in wetlands of varying sizes ranging from 0.02 sq. km ponds to 70 sq. km lake (Dwyer *et al.* 1992). Families of Black-necked Cranes at Chushul and Hanle in bogy marshes, streams and pools, rarely venturing away from water and greenery were observed (Ali et al. 1986). The species is very selective in its habitat, preferring marshes and wetlands even if it may be living in a mixed flock and using the same habitat again and again in breeding as well wintering seasons (Fuzhang *et al.* 1987). In breeding areas, *Phragmites communis, Carex* and *Eleocharis sp.* are the key plant species with the presence of arthropods and fish in the wetlands (Zongbao 1986). In these areas the human population density is low, animal husbandry is mainly the only agricultural industry and breeding areas of cranes are scattered over a large geographical region (Fengshan 1997).

The breeding and wintering grounds of Black-necked Crane differ dramatically (Fengshan 1997). The wintering grounds in China, Bhutan & India are located at high altitude; in wetlands and on agricultural land. Based on the available information, Zhikanget al. (1994) concluded that in China there are three wintering regions of Black-necked Cranes: South-central Tibet, northwest Yunnan and northeast Yunnan/northwest Guizhou. The crane's winter habitats in southern Tibet and western China are cultivated areas where the birds feed on the remains of the previous year's harvests (Bishop and Li 2002; Stevens 1930; Zhong and Dao 2005) and grasslands where naturally occurring plants and

scarabid beetles can be found. At the wintering habitats, the cranes roost in flocks at night in marshy areas or in shallow river waters (Betts 1955; Ludlow & Kinnear 1944). During the peak and harsh winters birds also frequent the numerous natural hot springs that dot the Tibetan Plateau (Archibald and Oesting 1981). At the wintering grounds at Cao Hai in China, three types of groups viz. families, single species flocks and mixed species flocks are formed (Fengshan 1997).

Wintering grounds in Bhutan are located in large U shaped valleys with wide valley bottoms consisting of un-drained mires and agricultural land (Clements and Bradbear 1986; Caron 1994). At Bumdeling, cranes feed in rice fields on the valley floor as well as on the lower hill sides (Bishop 1989) while in Phobjika, they forage mainly in agricultural fields and roosting in marshes (Caron 1994). During winter, cranes were found spending 50-80 percent of their time in croplands while rest in wetlands and riverine areas (Gole 1993). In south central Tibet they were found using barley and spring wheat fields during morning and using secondary river channels and reservoir shore lines for roosting (Bishop et al. 1998). The wintering habitat at Gelephu in Sarpang district of Bhutan at an elevation of 270 m amsl. is the lowest elevation within the present distributional range of the species. This area is characterized by more moist and warmer climate as compared to other wintering grounds of the species.

Black-necked Crane Migration

Earlier studies on migration suggest that the Black-necked Cranes migrate from their wintering grounds in late February and early March (Betts 1955). At the wetlands of Western Szechwan the birds arrive in mid March (Schafer 1938) and at Koko Nor they arrive by late March (Prjevalsky 1877). At the wetlands of Ladakh the birds arrive during the months of March-April and leave these wetlands by early November (Chandan *et al.*2005). Major Studies, however, on migration routes and stopover sites were initiated during 1990s. Zhikang *et al.* (1994) investigated migration pattern of Black-necked Crane and it was concluded that the eastern population of Black-necked Crane in China migrate north to the Ruoergai marshes in northern Sichuan and southern Gansu Provinces, whereas the central population migrate to the Longbaotan wetland in southeast Qinghai province. Based on the recovery of the banded birds it was confirmed that birds breeding at Ruoergai Wetland Nature Reserve, located in the Upper Yellow River Valley on the eastern Tibetan Plateau migrate to Guizhou (Zhikang *et al.* 1994) and Yunnan Province (Yang 2005). Qian *et al.* (2009) using satellite telemetry on six Black-necked Cranes carried out a study on the migration routes and stopover sites during autumn and spring in China and it was established that the migration distances covered by Black-necked Crane and duration of migration are shortest as compared to other species of crane.

Lhendup and Webb (2009) on the basis of information from locals' identified four migration routes and six stopover areas in Bhutan. A team of researchers from International Crane Foundation (ICF) in 1998 attached a satellite transmitter on Black-necked Crane at Bumdeling in Bhutan. Latter the bird was followed to a staging area near Shigetse in southern Tibet and then on to a breeding area in north-central Tibet near Shensa (Lhendup and Webb 2009). In 2005, a migration study was conducted by the scientists of Royal Society for Protection of Nature (RSPN) Bhutan in collaboration with researchers from Japan. As part of this study three PTT's (Platform Transmitter Terminal) were fixed on different birds, which were latter followed upto Bamtsho Lake in Chumbi valley of Tibet. Two of these birds were observed wintering in Phobjikha valley, Bhutan. Through the placement of PTT's on wintering population of Black-necked Crane two migration routes were established (Lhendup and Webb 2009). During the winters of 2010-2011, Royal Society for Protection of Nature (RSPN) Bhutan in collaboration with the Ugyen Wangchuk Institute for Conservation and Environment, Bumthang, banded four adult cranes with GPS Accelerato-meter in Phobjikha valley. Latter the same cranes returned to the valley during the winters of 2011-2012 (Anon 2011). The data downloaded from these GPS Accelerato-meters showed that the cranes travelled about 130 km from Phobjikha to their summer habitat, near Bamtsholake in Tibet. Based on the GPS locations it was also confirmed that cranes used a route over Punakha, Gasa and Jomolhari mountain ranges to reach their summer habitat in Tibet (Anon 2011).

So far eighteen Black-necked Cranes have been tracked using satellite telemetry in China and Bhutan. These studies have shown that different populations of Black-necked Crane follow different migration routes (Liu *et al.* 2012). The shortest migration route is from Phobjikha in Bhutan to Bam-tsho in Tibet, covering a distance of about 120 km and the longest is from Cao hai marsh in Guizhou to Rouoergai marsh in Sichuan, covering a distance of about 1351 km (Liu *et al.* 2012). The duration of migration can also vary from 1 to 21 days (Zhang 2007). Although the migration routes of Black-necked Crane are short but these require negotiating areas of high altitudes from 1800 to 5000 m amsl.

Chacko (1995) initiated a study to establish the migratory routes of Black-necked Crane breeding in Ladakh. As part of the study he ringed three birds and also placed tags on the wings, however, the study could not yield any information on the migration routes or stopover sites as required data could not probably be collected. Considering this, Chandan *et al.* (2005) emphasised the need of conducting studies on migration of breeding population of Ladakh using PTT. Recently Wildlife Institute of India with support from the Department of Wildlife Protection, Government of Jammu & Kashmir has initiated a migration study on Black-necked Crane breeding in Ladakh. As part of this study two PTT's were fixed on two

cranes in Ladakh and the preliminary results of this study have shown that the birds travelled a distance of 279 and 329 km's close to marshes where these PTT's were fixed (WII 2014).

Threats to Black-necked Crane in the region

Due to the prevalence of Buddhist culture in most of the areas where Cranes are found, this species has been protected by the locals from a long time (Betts 1955; Chacko 1995; Chandan *et al.* 2005; Gole 1981; Ludlow 1928; Ludlow 1944; Meinertzhagen 1927; Nurbu 1983; Pfister 1998). However, with the influx of Chinese into Tibet since the 1950's, Buddhist doctrines have become less dominant and there is an increasing tendency to use wildlife as an economic resource (Archibald and Oesting 1981). On the other hand, better accessibility to remote areas and development of infrastructure especially in the Tibetan Plateau, has lead to encroachment of the crane habitat. Fengshan (1997) investigated the compatibility of local people and Black-necked Crane at Cao-Hai, China and concluded that changing landuse practices in the wintering grounds are a major threat to the wintering population of Black-necked Crane. More or less similar situation is occurring in breeding habitat of the species within Indian limits particularly in Ladakh, where changing landuse pattern coupled with a boom in tourism industry is posing serious threats to the species (Chandanet al. 2005). Since the species shares the same habitat which the nomadic herders use for grazing their livestock, presently excessive grazing practices are another major threat to the species during its breeding season. Also the dogs owned by these herders eat the eggs and chicks of the cranes during breeding season(personal observations). In Ladakh, (India) the dogs owned by nomadic herders and by the armed forces pose a serious threat to successful breeding of these birds (personal observations).

Fencing of pastures for exclusive use by nomadic communities is another major threat to the species during breeding season (personal observations in India and China).The winter habitat in Bumdeling in Bhutan has been severely affected due to Baragangchu summer-monsoon floods which have washed away most of the paddy fields; the key feeding areas for wintering cranes (Lhendup and Webb 2009). As a result of this, the wintering population in Bumdling valley of Bhutan is declining. Apart from this, unplanned developmental activities such as expansion of human habitation, construction of roads and changing agricultural practices are some key threats to the wintering population(personal observation). In Phobjika valley, the main threat is draining of wetlands for agricultural expansion leading to shrinkage and fragmentation of habitat (personal observation). In Apa Tani valley, Arunachal Pradesh, it seems hunting is a more serious threat as compared to changing landuse pattern and/or tourism(personal observation). Khachar (1981) opined that cranes which earlier used to visit Apa Tani valley are no longer found there as locals have firearms and they use these to kill them. Global climatic change has been regarded as one of the major factors causing unpredictable impact on Black-necked Crane population (Harris 2008). Ma et al. (2000) has concluded that due to climate change, the Black-necked Crane has extended its range to Xinjiang and Gahai lake in Gansu province and to Cao-Hai in Guizhou province. Such changes in the crane habitat as a result of climate change can be considered good for short term but in the long run this can have disastrous consequences and has the potential to severely impact the overall population of the species. Black-necked Crane is also sensitive to diseases transmitted by domestic animals (Fengshan 1997). During the winters of 1986-87, mortality of six Black-necked Cranes occurred due to new castle disease transmitted by domestic animals at the Cao Hai reserve of China (Yonglian *et al.* 1990).

Conservation actions & future challenges

Efforts for conserving Black-necked Crane populations were initiated at various levels, once the species came in prominence. Initially conservation measures were suggested by crane researchers and naturalists, for instance Ali (1976) advocated for direct protection by employing guards around the nests and by creating more wildlife reserves for the species. In order to protect the nesting sites in Ladakh, construction of rubble walls was suggested to enclose meadows surrounding the wetlands (Khacher 1981). Prohibition of all activities within the 1 km perimeter of the nest and regulation of water level at the nesting sites was proposed by Hussain (1985). Gole (1983) opined that the future of Black-necked Cranes in the Indian Subcontinent is linked with the active management and study of their population and habitat they prefer. The most important measure for the protection of wintering Black-necked Crane in China was achieved through conservation of the wetland habitats needed by the birds (Zhikang *et al.* 1991).

In 2001, International Crane foundation (ICF) established Black-necked Crane Conservation Fund and its income are directly being provided for species conservation in China and Bhutan (Lhendup and Webb 2009). Currently RSPN (Royal Society for Protection of Nature) is actively engaged in Black-necked Crane conservation in Phobjika valley. The nature conservation division of the Royal Government of Bhutan in close collaboration with WWF Bhutan is working for the conservation of species through rural livelihood uplifting activities in Bumdeling valley of Bhutan. In India WWF India in collaboration with the Department of Wildlife Protection, Government of Jammu & Kashmir through its high altitude wetlands conservation programme is actively involved in conservation of the species (Chatterjee *et al.* 2001; Chandan *et*

al. 2008). WWF in collaboration with Ministry of Environment and Forests, Government of India, BNHS (Bombay Natural History Society) and IBCN (Indian Bird Conservation Network) has also organized a regional workshop for the conservation of this species in India, China and Bhutan (Chandan 2011). The Wildlife Protection Act, 1972 of the Govt. of India, has listed the species in Schedule 1 (WPA 1972). Black-necked Crane has been declared as state bird of the Indian state of Jammu and Kashmir (Sinha 2001). The government of China has listed the species under the category of endangered, in class 'A' (Pfister 1998). Plantations in the high altitude wetlands are another major threat to the survival of this species (personal observation at Hanle in ladakh). Currently lack of a formal regional conservation initiate is a major challenge to the regional level conservation of the species.

Significance of regional cooperation

At the international level, efforts have been made to provide protection and conservation by way of making policies. The species is listed in the Appendix 1 of CMS (Convention on Migratory Species) and is also listed in Appendix 1 of CITIES (Birdlife International 2014). IUCN has categorized the species as vulnerable, under criteria A1b, c, d, A2c, C1 (Bishop 1996). There is a need to declare more and more wetlands with presence of Black-necked Crane as Ramsar sites and this will give international recognition to the habitat of the species. Also regional cooperation is must to improve understanding of the impact of changes in climate parameters and habitat for the survival of the species. There is an urgent need to strengthen monitoring of Black-necked Crane in the high altitude wetlands through inclusion of crane habitats in the Asian Waterbird Census and Important Bird Areas Monitoring programmes. A regional information centre with all the information related to the species need to be established. Bhutan and India should be encouraged to join the East Asian - Australasian Flyway Partnership and to designate sites of International importance for Black-necked Crane and other migratory waterbirds to the East Asian - Australasian Flyway Site Network and improve their management. There is also an urgent need to promote Black-necked Crane as a symbol of international cooperation and to invite site specific measures for the conservation of high altitude wetland ecosystems of the Himalaya, Trans-Himalaya and Qinghai - Tibetan Plateau. Also there is a need for scientific restoration (according to international guidelines to maintain the ecological character) of wetlands of national and international importance for Black-necked Crane including traditional rangeland management practices.

A regional level single species action plan for Black-necked Crane under the CMS and East Asian - Australasian Flyway Partnership should be developed. This plan should act as a guiding tool for the future conservation of the species in the region. A regional forum and an international working group to promote conservation of Black-necked Crane and its habitat needs to be established with active participation of the scientists from India, China and Bhutan.

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