

Elephant corridors in Uttar Pradesh, India

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Introduction

The elephant habitat in the state of Uttar Pradesh was once continuous from Katerniaghat in Bahraich forest division in the east to river Yamuna in Shivalik forest division in the west. Over the decades, as a result of the growing demand for more land for the increasing human population, this continuity has been broken and now there are five isolated populations. The major population of elephants in this tract (ca. 650) occurs in the proposed Rajaji-Corbett Elephant Reserve (Johnsingh, 1992). This reserve spans from Kosi river which forms the eastern boundary of Corbett Tiger Reserve to river Yamuna on the west (Fig. 1). This forest tract includes the present Shivalik forest division, proposed Rajaji National Park (which includes the three former wildlife sanctuaries: Chilla, Motichur and Rajaji) Sonanadi wildlife sanctuary, Corbett National Park and parts of Lansdowne, Bijnor and Kalagarh forest divisions. Singh (1978) gives details of the distribution of elephants for this area.

Elephant conservation input in Uttar Pradesh should focus on the large Rajaji-Corbett population and its habitat which has already been broken into three isolated areas due to developmental projects. Fortunately the elephant bulls still migrate across the artificial structures thereby bringing about genetic exchange between the populations. This genetic exchange, however, would not continue for long if the fragile habitat continuity between the three areas is not immediately strengthened by the creation of corridors. Johnsingh, *et al.* (1990) have already highlighted the problems faced by the elephant corridors in this area.

Panwar (undated) has given detailed suggestions for the improved management of these corridor areas. This paper brings in more information.

The developmental projects and habitat fragmentation

The major developmental project that has almost divided the Rajaji-Corbett elephant habitat into two is the 14-km long Kunaunchilla power channel which was constructed on the east bank of Ganges in the early 1970s. This canal is 22 m wide and, with full flow of water, nine meters deep. The sides of the canal are at an angle of 45° and cemented, except for 500 m, and therefore do not offer foot-hold to the elephants. There are three places at which the elephant bulls cross the power channel and go the Ganges: one is the passage over Binj rau (rau = dry river bed) where the channel goes under the rau; the second is the 60 m long aqueduct connecting Dogudda with Ganges where in summer 1991 a tusker was seen crossing from Ganges to Dogudda; the third is the bridge across the power channel 2 km from Chilla which is being used by bulls at night in summer. Around the period when the channel was built there were developmental projects on the west bank of Ganges such as establishment of Hindustan Antibiotics factory, Raiwala army camp and the settlement of the evacuees from the submersion area of Tehri dam village. These have put an end to the access of elephant herds from Chilla and Motichur to Ganges (Johnsingh *et al.* 1990).

The second important development that has restricted the movement of elephants between Rajaji and Corbett is the

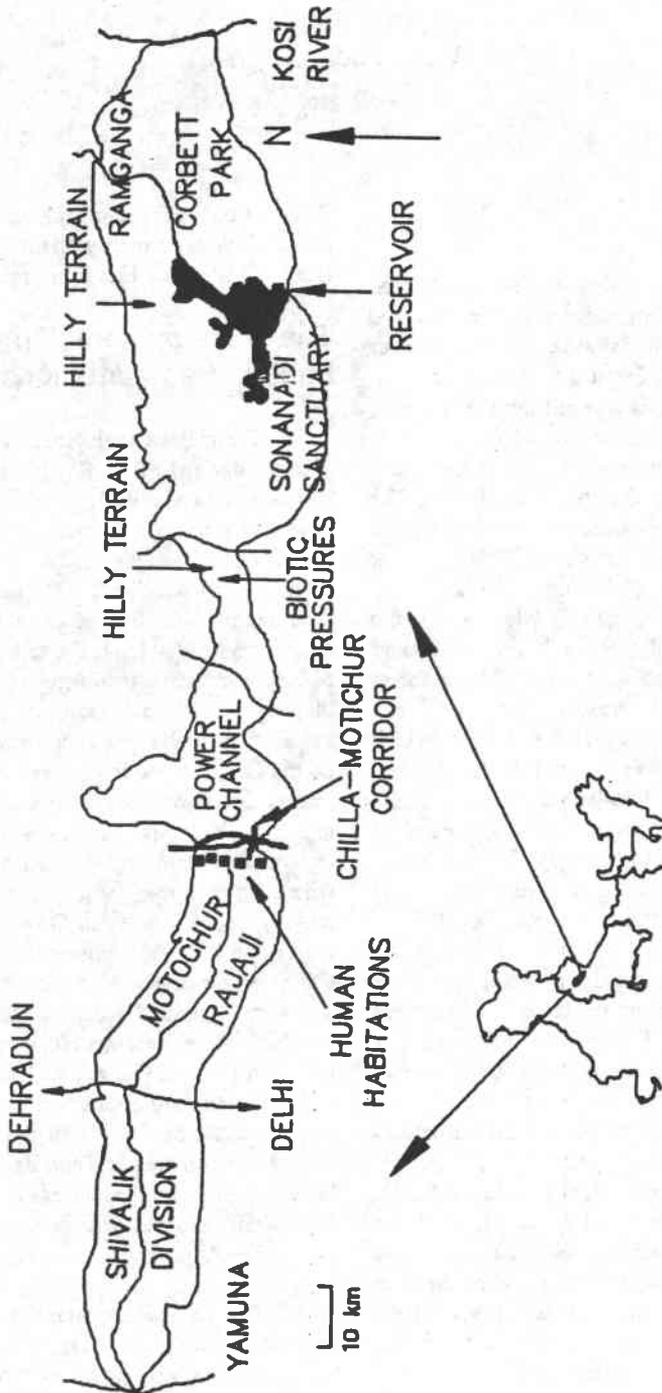


Fig 1. Rajaji - Corbett Elephant Range and factors affecting elephant movement

Kotdwar-Lansdowne road which runs across the narrow Rajaji-Corbett corridor parallel to Koh river. This road construction has resulted in steep edges and building of walls which impede crossing by elephants. This hilly corridor is used only by bulls. Cow groups ceased to cross Koh river when the extensive forests on the southern side of the hilly terrain were cleared for agriculture and human settlements possibly at the beginning of this century. Now this corridor area is beset with numerous problems largely arising out of the intensive biotic pressures from the southern and northern sides of the corridor. Sunderraj *et al.*, (in prep) have quantified biotic pressures and steepness of the terrain in the corridor for the area used and avoided by cow groups. They conclude that steep terrain and biotic pressures deter the cow groups crossing Koh river from Rajaji (Table 1)

elephants were never reported during the last 100 years (Singh, 1978). Although it is no longer possible for the elephants to move to the west of Corbett along its southern boundary because of the reservoir township, the elephant movement to Sonanadi has become normal as they have found a way across the hilly Gaujera block.

Measures taken by the Government

In fact precious little has been done to strengthen the habitat continuity where it has been broken by constructions. Across Ganges two corridors (Chilla-Motichur and Binj rau) have been identified by Uttar Pradesh forest department. The Chilla-Motichur corridor is approximately 3 km long and 1 km wide and is situated between Suni sot (sot = spring) in

Table 1 Biotic pressures and terrain rating for the area used and avoided by elephant groups in Rajaji - Corbett Corridor, 1989 - 1990. Data collected along 4 transverse and 11 longitudinal transects.

	Area Used	Area avoided
Steepness of terrain (mean value)	2.73	3.43
No. of people seen	593	1388
No. of livestock seen	246	351

In the past, elephants in Corbett National Park aggregated along the Ramganga river in summer and dispersed towards Adnala, Palain and Sonanadi (Hathikund) ranges of Kalagarh forest division after the rains in July. When the Ramganga reservoir, which was built in the early 70's and extends over an area of 90 sq. km, was filled up by rains in 1974 the dispersal pattern of elephants was upset. Many believed that the reservoir would become a permanent impediment to the migration of elephants to Sonanadi. The confused elephants were seen even in the eastern end of the Park where

Chilla on the east bank of the Ganges and Motichur forests on the west bank of Ganges. The Binj rau corridor lies on the west bank of the Ganges, 7 km north of Chilla-Motichur corridor, between Chilla and the Song - Suswa rivers which drain Motichur.

To give long term protection to the Chilla-Motichur corridor the Uttar Pradesh Forest Department has a proposal to acquire 46.6 ha from the evacuees of the Tehri dam (70 families) and to compensate them with 46 ha in the Patri Reserve Forest and 2.6 million

rupees. In addition, 63 ha from Raiwala army cantonment including the ammunition dump will be acquired. In exchange 220 ha of land will be given to the army and the cost of an ammunition dump construction will be borne by the forest department. There is also a proposal to widen the bridge 2 km from Chilla across the channel at a cost of 20 million rupees to enable herds to cross.

In spite of these proposals which are being discussed for well over seven years very little has been done to strengthen habitat continuity. Meanwhile the Binj rau corridor has become a lost case as numerous well established human habitations have come on the west bank which would deter elephant migration between Chilla and Motichur.

Recommendations for action

Of the three problem areas, except Ramganga area where elephants have resumed their original migratory patterns, the other two need immediate attention. For Rajaji - Corbett corridor and Chilla - Motichur corridor Johnsingh, *et al.* (1990) have given five recommendations which are emphasized below.

1. The narrow Rajaji - Corbett corridor should be totally protected from forestry operations and further development. Ecodevelopment projects should be initiated on the southern and northern side of the corridor area so as to reduce biotic pressures on the forest. The nursery between Kotdwar and Amsod should be closed down and stone walls on either side of Kotdwar - Amsod road in potential elephant crossing sites should be pulled down.

2. Acquisition of land from the evacuees of the Tehri dam and army should be carried out on a priority basis. The army should lead this conservation programme by vacating the area at an early date.

3. We believe that there is no need to widen the bridge. If disturbances around Suni sot (e.g., the gujar hutments) are eliminated even the

herds would start using the bridge. The money allotted for the proposed bridge construction could be used to relocate Gangabhogpur village between Dogudda and Binj rau. Otherwise the fodder, firewood and timber needs of this village of 25 huts and 250 people and their livestock situated on the bank of Ganges will eventually destroy the only natural vegetation between the channel and east bank along the entire length of the Ganges. This is the only patch of vegetation along Ganges which is being used by tiger and elephant.

4. After acquiring the land on the west bank, the corridor area should be protected by a suitable electric fence. A 2m high fence (southern fence) should extend from the level crossing along the north bank of Motichur rau to the Ganges and a similar fence (northern fence) parallel to this at least 1 km to the north. There should be one more fence 1 m high on the eastern side of the railway track, from the beginning of the southern fence to the beginning of the northern fence. The fence should however, have a 10 m gap at the southern end with a cattle guard which would prevent cattle from entering the corridor area but would allow elephants to pass through. One meter high electric fence is not a barrier to wild ungulates. This area should be systematically patrolled by guards to prevent fence damage and the cutting of vegetation by local people.

Conclusion

The political climate in the country, the enthusiasm of the Uttar Pradesh forest department and the compliance of the local people living around these corridor areas were much more amenable for conservation five years ago than it is now. One more fact that is emerging out of the present scenario is that any sacrifice, such as shifting of homes we expect the villagers to perform, will be done when they are convinced of the need for such a sacrifice and amply rewarded. Bearing these in mind an action plan needs to be drawn and implemented urgently to strengthen the existing corridors on the lines suggested above.

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News from Vietnam

Vietnam is a heavily populated country. Even close to Saigon, there are some elephants that are under serious threat as a result of escalating conflicts with man. The existence of two small "pocketed" herds of elephants north-east of Saigon was first reported by Do Tuoc & Charles Santiapillai in 1991 who recommended that they be captured and relocated to the nearby Nam Bai Cat Tien National Park. Later Shariff Daim on the basis of his survey in 1992, identified 3 groups totalling 37 animals and recommended their capture and relocation to the same national park.

But costs of moving these animals were so prohibitive that nothing was done until the Vietnamese themselves enlisted the help of a Singaporean company to capture all the elephants. According to Shanthini Dawson, who is working in Vietnam as a consultant for WWF-Vietnam Programme, "the entire cost of the operation is being borne by the company in return for 15 elephants (of their choice) or 40% of the total catch, whichever is greater". Shanthini Dawson estimates the population size of the elephants to be about 40-50 individuals.

According to Shanthini Dawson, the operation began in April 1993, and to date 15 individuals have been caught. Of these 4 adults have died, 6 sub-adults have been trained so far and are being retained by the Ministry of Forestry (MOF), and 5 are awaiting transportation to Singapore or release into a protected area. One Singaporean has been killed by an elephant in the operation. MOF plans to radio-collar some of the captured elephants and release them into the proposed Chu Yang Sinh nature reserve, given its relatively large size (90,000 ha), undulating terrain and small human settlement in the vicinity. Dawson recommends the domestication of these elephants for use by MOF in protected areas to transport tourists. One final thought: How will Singapore get the approval of CITES when it comes to taking the elephants listed in Appendix I, out of Vietnam into Singapore? (Ch. S.)