The Effects of Human-Elephant Conflict on Elephant Health and Conservation in Nepal

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Problem and Significance

Human-elephant conflicts in Nepal are increasing as the human population increases, and elephant habitat is lost. These physical conflicts often result in property loss, and occasionally result in human and elephant death. The endangered Asian elephant (*E. maximus)* population in Chitwan District of Nepal has most recently been estimated to be between 41 and 60 individuals. Since Asian elephants are a flagship species, whose survival will maintain biological diversity and ecological integrity in the environments in which they live, it is critical to prevent their extinction. Increases in crop raiding and tourism are resulting in more contact and shared space between elephants, livestock, and the Nepali people. Since many Nepali people rely on agriculture and tourism for their livelihood, it is extremely important to determine the affects of tourism on agriculture and community valuation of elephants, as well as which diseases can be transmitted between the livestock and elephant populations. Through the collection and compilation of ethnographic and elephant health data it will be possible to determine the effects of tourism on elephant health and conservation, and to establish a disease surveillance database in EpiInfo augmented by spatial analysis through the use of GIS.

Background

The Terai, which is inhabited by both working and wild elephants, is the agricultural heartland of Nepal, and is the country's most densely populated region. It is home to the Royal Chitwan National Park (RCNP) and the Parsa Wildlife Reserve, two of Nepal's most important protected areas. These areas are surrounded by a belt of villages known as the "buffer zone". The Narayani and Rapti Rivers define the park boundaries on three sides, while the southern border is contiguous with India. There are community forests that are contiguous with the buffer zone and the parks, and house an Elephant Breeding Centre.

Agriculture represents 80% of the livelihood of Nepal, also accounting for 41% of the country's GDP. Containing the majority of the cultivable land in Nepal (only 20% of the total area), the Terai region provides an agricultural surplus that is critical to Nepal's economy and food security. This income is augmented by tourism in certain areas, resulting in conflicts of interest. A thriving elephant population is financially beneficial for tourism communities, but detrimental for agricultural communities.

The buffer zone, which contains many communities and municipalities, will be the focus of the ethnographic portion of this investigation. Within this buffer zone, four communities, two of which contain working tourism elephants (Bachhauli and Jagatpur), and two that do not (Bharatpur and Ratnanagar) will be targeted for study. Each of the four communities has a close relationship with the local forest contiguous with the national park, and is dependant upon the forest for some of their resources. All four communities have been experiencing predation and crop depredation problems due to wild animals. Conservation efforts have established some "elephant corridors", where the land must remain unfarmed, to allow for more peaceful migration. However, the effectiveness of these corridors is being undermined as people move closer to borders of the corridors or illegally enter these zones. Not only are there elephant-human interactions, but there are elephant-livestock interactions as well. These interactions are cause for concern due to the potential for disease and parasite transmission between species. This has negative implications for the health of the people and elephants, and for the economy of Nepal.

The purpose of this study is to 1) determine the prevalence and significance of major livestock and zoonotic diseases found in captive and wild Asian elephants in the Chitwan region of Nepal, and 2) determine if the emergence of tourism as an economic factor in the Chitwan Buffer Zone has created a higher valuation for elephant conservation in communities dependant on tourism income. By combining this data in EpiInfo and augmenting it with spatial analysis using GIS, we will be able to determine possible correlations between areas of contact, disease transmission, community knowledge, and health of wild and working elephant populations.

This project will be in collaboration with the veterinarian of the RCNP, the King Mahendra Trust for Nature Conservation, and the faculty and veterinary students of the Institute of Agriculture and Animal Science (IAAS) School of Veterinary Medicine in nearby Rampur.

Methodology

Elephant Health Data Collection

Three separate populations of Asian elephants will be examined: captive elephants of the Elephant Breeding Centre, captive and wild elephants within the RCNP, and captive elephants working in private tourism and logging industries of the buffer zone communities. Retrospective health data and elephant locations will be collected by examining records of local, private, and government veterinarians. The following clinical health samples will be collected and transported to the IAAS for analysis: fecal samples collected for parasite analysis, urine samples collected for urinalysis and specific gravity, blood samples collected for complete blood counts and blood smears, and serum samples collected for appropriate serological tests. Excess serum will be saved, frozen and stored at IAAS. If possible, DNA will be saved for use in future genetic diversity studies. Testing will depend on the capacity within Nepal; samples will not be taken out of the country for analysis.

Ethnographic Data Collection

Rapid Rural Appraisal (RRA) techniques, such as focus group interviews and map-making, will be used to evaluate the communities of Bharatpur, Ratnanagar, Bachhauli, and Jagatpur. Within these communities J. Zambriski will survey various individuals such as elephant breeding center and national park employees, veterinarians, and mahouts (elephant drivers). Information obtained in these assessments will be used to develop general information about each community, such as the economic status and the types of employment. It will also be used to identify issues currently faced in each of the communities, such as how often crop depredation occurs, the disease concerns, and sufficiency of the community forest as a resource. Participatory tools such as ranking and scoring, will allow for areas of conflict to be defined, for attitudes held by the various individuals to be determined, and for the documentation of the relationships between people and elephants in the Chitwan Buffer Zone. Within each community, the population will be stratified based on economic status and gender. This will result in two groups of 64 interviews from elephant and non-elephant owning communities. In addition to evaluating the differences between these two groups, differences within each community will also be analyzed. This information, when combined with the qualitative data, will allow for the description of trends within smaller populations and communities.

Data Analysis

The elephant health and ethnographic data will be combined and entered into EpiInfo 2002 Revision 1 and then analyzed spatially using ArcGIS 8. We will collaborate with a Nepali veterinary student from the IAAS School of Veterinary Medicine in Nepal. He will be responsible for scheduling the interviews and acting as a translator. Upon completion of the project, he will maintain the newly created database, conduct follow-up tasks and continued research. Dr. I.P. Dhakal, Campus Chief of IAAS veterinary school, will be our field mentor.

Anticipated Results

Improved knowledge on elephant health and disease transmission, and its correlation with community valuation of elephants, will allow for the development of sustainable conservation policies that account for the best interests of the people, the elephants, and the ecosystem. A database will be created that will be maintained by our counterparts at the IAAS in Nepal. It will be used to guide livestock management and wildlife conservation policy, especially with respect to transmissible diseases in the region and how to monitor and control them in the future.

Statement of Long Term Goals

In conjunction with degrees in Veterinary Medicine, both students hope to complete the certificate program in International Medicine. Upon graduation, Jennifer plans to pursue a small animal medicine internship, and apply to the Masters Degree program in Animals and Public Policy at Tufts University. In the future she plans to continue to conduct research in international conservation medicine, and to author international conservation policy and law. Upon graduation, Karin plans to pursue veterinary medicine in the field of research, focusing on the area of international conservation medicine. She is most interested in exotics, wildlife and zoo animals.