

Poaching habitat fragmentation and the high demand for land from an increasing human population have caused the eradication of elephants from most parts of their natural ranges and compressed them in few fragmented areas. In many areas, elephants have moved close to human settlements where risks of poaching are lower. The changes in elephant range and their presence in human-dominated landscapes have caused adverse ecological changes and seven conflicts with man.

The study provides experimental evidence to support the long recognized but largely unquantified keystone role of the elephants. It quantifies the impacts of varying densities of elephants on habitat structure and biodiversity and evaluates people's attitude towards elephants at different levels of conflict.

Ecological impacts of different elephant densities were compared in Tsavo and Aberdares N. Parks and in the ranches within the Laikipia plateau, areas representing a wide spectrum of elephant damage to trees were made. The role of elephants in the dispersal of seeds of various plant species was determined in Aberdares and Tsavo N. Parks. Their role in patch dynamics was also assessed in three forests in the Aberdares N. Park. The Point-Centre-Quarter method (PCQ) and pin-frame technique were used in vegetation sampling. Long-term changes in vegetation within the study areas were determined from aerial photographs while people in conflict areas were interviewed to assess their attitude towards elephants using questionnaires.

Statistical tests, including analysis of variance and regression analysis as well as indices of diversity and similarity were used to compare differences in vegetation parameters at different elephant densities.

The results show an inverse relationship between elephant density and tree height, density and biomass. Grass biomass was consistently higher in areas with higher elephant densities. Species richness and diversity were highest at intermediate elephant densities and low at both extremes. Closed-canopy forests had lower grass biomass and species richness than adjacent patches. Elephants were also found to act as seed dispersal agents for certain plant species, both in high and low rainfall zones.

Crop agriculture and commercial forestry were found to be largely incompatible with elephant conservation, while elephants in rangeland were found to promote livestock production by preventing bush encroachment, increasing grass biomass and promoting species diversity. The attitude of the people towards elephants was highly correlated to the intensity of human-elephant conflicts. Most of the people, however, recognized the economic value of the elephant.

Results indicate that conserving elephants in small, enclosed areas or in fragmented habitats causes loss of biodiversity and changes habitat structure and quality. The findings support management decisions that will advocate for the expansion of elephant range to cover areas beyond parks to ease elephant compression. Where range expansion is not possible, active management of elephant populations should be considered as a measure to avoid adverse ecological changes. However, adequate planning to reduce human-elephant conflicts must be prioritized by identifying land-uses that can accommodate both elephants and people.