Tsetse control and land-use change in Lambwe Valley, south-western Kenya

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A thesis submitted to the Department of Range Management, University of Nairobi, in partial fulfilment of the requirements for the Degree of Master of Science in Range Management (Ecology Option)

2002

DECLARATION

This thesis is my original work and has not been presented for award of a degree in any other University.

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ABSTRACT

In areas of Africa infested by tsetse, their control is usually seen as simultaneously contributing to human health and agricultural production. For a long time trypanosomosis* (both sleeping sickness and nagana), constrained human settlement and agriculture in the Lambwe Valley, south-western Kenya. Through many years of tsetse control, people have been encouraged to settle in the valley, and changes in land-use are taking place. The Ruma National Park, the only one in East and Central Africa with the roan antelope, is strapped in the midst of intensifying human habitation. This study was designed to assess changes in land use in the settled areas of the valley, and land cover change in the national park. It sought to establish the role that tsetse control may have played in these changes, and the implications of the changes in the settled areas of the valley, and on tourism and wildlife in the park. It employed time-series aerial photograph interpretation and social surveys to investigate changes in land-use between 1948 and 1993 in the valley. A demographic study of the processes of human population growth from 1948 to 1999 was complemented by a community time-line detailing important events in the area. Measurements of bare ground, litter, biomass and species abundance were taken to emphasise differences between the Ruma National Park and the settled areas of the valley. Findings indicated a 23% increase in cultivation in the settled areas over the studied period, with consequent decreases in woody vegetation and grasslands. In the Ruma National Park, shrublands expanded by over 10%, woodlands by over 3%, while grasslands decreased by over 14%. Human population growth rates were highest in the years following intensive tsetse control, attributed to immigration into the valley, and peaked at 7.14% between 1962 and 1969. The apparent merging of thickets in the park, which comprise the most potential tsetse habitat could precipitate an upsurge in tsetse, and are unsuitable for the mainly grazer wildlife populations therein, a phenomenon which could fuel conflicts with settlers in the valley, and potentially affect tourism in the park negatively. That most of the shrub species are fire-resistant calls for a combination of bush control methods to contain the trend. This study recommends continued tsetse surveillance and control. Due to the pressures being experienced in the settled areas of the valley, intensification of agriculture is proposed as a feasible option, if the trends in land-use continue as observed in this study. The settled areas have higher bare ground percentages and vegetation species of low graze value, and lower biomass and litter than in the park. These results emphasized the impacts of human-dominated land-uses in an initially similar ecosystem. Potential to improve the pastures for better output is recommended as a contribution to agricultural intensification. The control of tsetse is seen as having ameliorated an important constraint to human settlement and habitation through reduction in sleeping sickness, and its removal as playing a role in the land-use changes through livestock support to open up land for cultivation.

* This thesis follows the recommendation of the Committee for the Standardised Nomenclature of Parasitic Diseases (SNOPAD) in the use of the term trypanosomosis, derived from Latin, in preference to trypanosomiasis, derived from Greek (Kassai and Burt, 1994).