

This paper derives logistic models for Grant's gazelle *Gazella granti*, Thompson's gazelle (*Gazella Thompsonii*) and plains Zebra (*Equus burchellii*), in a game ranching system. The study was conducted on an 8100 hectares savannah ecosystem in Machakos district, with an average annual rainfall of  $514 \pm 159.3$  mm. Modelled as discrete-time logistic equations with fixed carrying capacities, it captures the wildlife herbivore population dynamics. Time series data, covering a period of 16 years, is used to generate the fixed carrying capacities and the interaction parameters endogenously. The estimation of the logistic models involves estimation of econometric models for each herbivore species, followed by the recovery of the carrying capacities, mathematically. The model-generated carrying capacities are 144.30 AU, 75.53 AU and 54.65 AU; the equivalent number of animals is 986, 929 and 144; for Grant's gazelle, Thompson's gazelle and Zebra, respectively. The derived -maximum sustainable yield- (MSY) stocking levels is 44 AU, 24 AU and 29 AU; the equivalent animal number is 297, 393 and 76; for Grant's gazelle, Thompson's gazelle and Zebra, respectively. Similarly, the MSY off-take level is 10.42 AU, 8.39 AU and 6.37 AU for these species respectively. These results show that the discrete-time logistic models are applicable to sustainable management of game ranching enterprise.