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Cattle Management Strategies of Smallholders in the East-african Highlands and their Contribution to Livelihoods

MARIANA RUFINO¹, MARIO HERRERO², MARK T. VAN WIJK¹, PABLO TITTONELL³, KEN GILLER¹

¹*Wageningen University, Plant Sciences, The Netherlands*

²*International Livestock Research Institute (ILRI), Kenya*

³*International Centre for Tropical Agriculture, Tropical Soil Biology and Fertility, Kenya*

Abstract

Livestock has multiple purposes in smallholder systems. It provides food and income for the household, nutrients to replenish soil fertility and it is a key asset for insurance purposes in times of scarcity. Depending on the importance assigned to these functions, farmers will manage livestock in different ways to suit specific purposes. Given the diversity of strategies that farmers follow, there is a need to evaluate those that contribute the most to farmers' long-term own goals. Seasonal feed availability and quality are considered key constraints affecting the productivity of livestock in crop/livestock systems. These usually follow the rainfall patterns implying that there contrasting body weight changes during the rainy and the dry season. The magnitude of the nutrient transfers at farm scale follows this seasonality. We analysed management decisions that affect both cattle productivity and nutrient management within the farm. We compared intensive dairy systems, with zero-grazing crossbreed cattle with extensive systems with grazing local zebu breeds. We developed a model to analyse long-term effects of management decisions around cattle management, and the consequences in terms of income and its variability. The model includes two components: a simple dynamic livestock model and an organic resources management tool. This integrated model allows the analysis of i) the role of the livestock in terms of nutrient and labour flows, ii) the temporal variability of flows iii) different production systems. An economic balance is included to assess impact of management on livelihoods. Different farmers' objectives around cattle keeping were included in the analysis: 1. Generation of cash through milk production (give priority females with high potential); 2. Cattle as an insurance (prioritise number above productivity) relevant for zebu breeds, and 3. Cattle to provide manure for fertilising crops (feed low quality feedstuffs). Tradeoffs between different objectives arise, e.g. effects of supplementation (using improved legumes) on animal production vs contribution of cattle production to income. There were evident long-term benefits of targeting management groups within a herd.

Keywords: Dynamic modelling, farmers' objectives, fuzzy logic, trade-offs