

## Economic Aspects of Carrying Capacity

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According to calculations undertaken by PFLAUBAUM (see contribution Pflaumbaum) the ecological carrying capacity of the natural pastures in the eastern Central Butana lay within the range of 110,000 to 140,000 TLU.<sup>2)</sup> The demand for ecological carrying capacity does not correspond to the rational economic behaviour of animal holders as reality shows nowadays (concerning degradation of the vegetation see contribution Akhtar). Therefore the figures of Pflaumbaum need to be seen in more relative terms from the animal holders' point of view. The following economic models have been developed on the basis of a ten-year-period<sup>3)</sup>. It outlines the economic consequences for animal holders facing the ecological demands on carrying capacity (Fig. 1). The calculations considered the high interannual and seasonal fluctuations of production conditions in animal keeping and agricultural production, the changes in market prices, consumption patterns and expenditure by the animal holders (see contribution: Income Generation for Animal Holders' Households).<sup>4)</sup>

In order to ensure their livelihood and consumption requirements, livestock owners of the eastern Central Butana are forced to have more animals than ecologically justifiable. Before the drought of 1984/85, 4.9 TLU/person could cover approximately 77% of their consumption requirements (ten-year-average). Nowadays, a herd size can not cover this proportion because, since the drought of 1984/85, crop residues - which were formerly free of charge - have to be bought.<sup>5)</sup> They need this to meet the fodder requirements of the animals. Hence, these low production costs have to be covered by husbandry. Due to only very limited alternative income resources in the region, at present about 7.6 TLU/person are needed to cover 77% of the consumption requirements of the animal holders' family. Considering an estimated population of 20,000 persons, this will lead to 190,000 TLU, which exceeds by far the ecological carrying capacity of the natural

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- 2) TLU = Tropical Livestock Unit. One TLU corresponding with 250 kg Live-weight: A camel is equivalent to 1 TLU, a cattle 0.7 TLU, sheep and goats 0.1 TLU (JAHNKE 1982).
- 3) The calculations are the results of the interdisciplinary teamwork of H. Pflaumbaum and G. Rahmann. The full presentation can be found in: PFLAUBAUM, H. & G. RAHMANN (1994): Ökonomische Implikationen ökologischer Tragfähigkeit. Chapter C 4.2 of the final project report 'Tierhaltung im Sahel - Reizante Entwicklung und Perspektiven in der Republik Sudan', ed. by Mensching, H.G. & H.S.H. Seifert (1994).
- 4) The preliminary data for the calculations were collected in two Shukriya settlements of Um Sarha in the years 1988/89 to 1991/92.
- 5) The farmers charge the animal keepers for using the crop residues although it is not scarce. The crop residues of the Gedaref-Durra-Belt only could cover the fodder needs of 500,000 TLU.

pastures.<sup>6)</sup>

In order to restrict livestock to an ecologically justifiable level (110,000 to 140,000 TLU), only 4.9 TLU/person are tolerable. Additional income sources have to be found to reduce the contribution of animal keeping to a level of 50% (calculation figures) of the consumption requirements or a proportion of animal holders (in the calculations 35%) has to abandon husbandry altogether.

Alternative income sources can often be found in agricultural areas: however very low wages can not substitute the income from animal keeping. Two factors led to the process of overexploiting natural pastures, gradually destroying the ecological basis (see contribution Akhtar) of livelihood of pastoral nomads: First, animal holders continue to practise animal keeping because of missing income alternatives. Secondly, they are forced to avoid using crop residues as long as possible because of the high costs. Finally, especially the poorest animal holders have to abandon animal keeping altogether without alternatives. Ultimately, they have to migrate to irrigation schemes or towns in search of jobs or to live on charity.

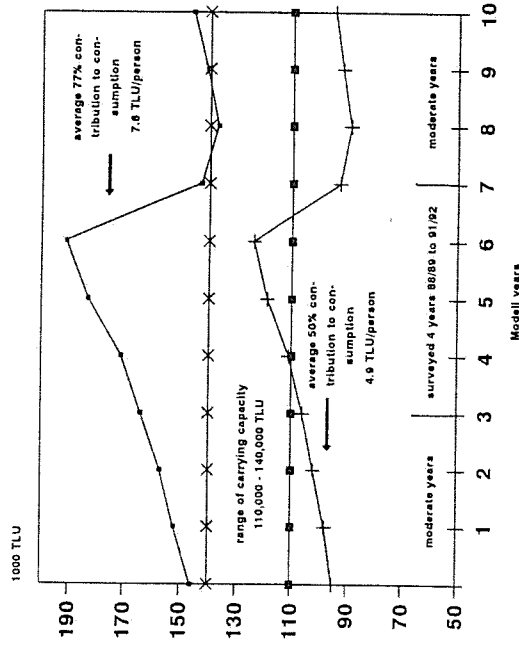


Fig. 1: Model calculations of the development of herds in the Central Butana, considering the ecological carrying capacity.

Source: Calculations and draft by G. Rahmann

- 6) This figure does not consider the livestock of owners in agricultural areas (about 20,000 to 40,000 TLU), who additionally exploit the natural pastures.

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