



Deutscher Tropentag, October 11-13, 2005, Hohenheim

“The Global Food & Product Chain—
Dynamics, Innovations, Conflicts, Strategies”

Modelling of Biomass Dynamics under Grazing Conditions and Regional Water Balance Aspects for the Drâa Catchment in South- Eastern Morocco

ANDREAS ROTH, FRANK GRESENS

University of Bonn, Institut of Plant Nutrition, Germany

Abstract

The ecosystem simulation model SAVANNA (Coughenour 1999) is used to represent biomass dynamics under grazing conditions in rangeland landscapes in southern Morocco. This study is embedded in the IMPETUS project (Integratives Management Projekt für einen tragfähigen Umgang mit Süßwasser), an interdisciplinary project of the universities Cologne and Bonn. SAVANNA was calibrated for a characteristic rangeland area of the northern Draa valley at Taoujgalt (1900 m a.s.l.), located at the southern slope of the High Atlas mountains and having a homogeneous plant cover. The dominant perennial species are *Artemisia herba-alba* and *Teucrium mideltense* which were parameterised by transpiration studies and calibrated by biomass determination measurements carried out in the years 2001—2003. For validation of the model, a vegetation specific database with biomass allocation and transpiration rates was created for the local species. Since spring 2004, measurements of biomass and plant growth parameters of species such as *Adenocarpus baquie*, *Hertia maroccana* and *Stipagrostis*, as well as auxiliary soil data round up the SAVANNA database for input parameters and calibration purposes in this area. Explicit animal diet and plant preference data, for sheep, goats and dromedaries, which are the most abundant animals in this area, were provided by pastoralists and zoologists at the OSS/ ORMVAO (Benidir 2005, Ramdane 2005). Biomass withdrawal by trespassing nomadic people and their herds and by human activities sum up to 500 t/haa (El Moudden 2005) and are considered for model objectives. Model results indicated an underestimation of root (leaf-) water uptake and reproduction rates for *Artemisia herba-alba*. The consequence is a high mortality rate during the hot summer season. The modelled population density of *Artemisia herba-alba* overestimated real values in spring by 10% and was 23% too low in the flowering season in autumn. On the other hand, the seasonal biomass calculated by SAVANNA exceeded observed data values. Further areas within the catchment area, having a long tradition as rangelands for goats, sheep and dromedaries of nomadic people and semi-sedative farmer population will be simulated.

Keywords: Biomass dynamics, grazing, Morocco, pastoralism, Savanna model