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“Utilisation of diversity in land use systems:
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Integrated Assessment and Land Use Scenarios for a Sustainable Development of Al-Jabal-al-Akhdar Oases in Northern Oman

KATJA BRINKMANN¹, UTA DICKHOEFER², EVA SCHLECHT², ANDREAS BUERKERT¹

¹*University of Kassel, Organic Plant Production and Agroecosystems Research in the Tropics and Subtropics, Germany*

²*University of Kassel / University of Göttingen, Animal Husbandry in the Tropics and Subtropics, Germany*

Abstract

Since the beginning of the political opening and commercial oil exploitation in the early 1970s rapid social, and economic changes took place in Oman. These changes affect the development of the traditional cultural landscapes, particularly in the mountain areas, whereby the rural subsistence production lost its relevance and the agricultural land use declines. These transformation processes are described and modelled with a scenario analysis to determine strategies and methods for a sustainable development of mountain oasis systems.

The study is carried out at three selected villages in the central Al-Jabal-al-Akhdar mountain range where disciplinary studies investigate the agricultural use, the physical and biological characteristics, the economy of selected households and the regional socio-economic impacts. Within a Geographical Information System spatial data (terrain, land use, vegetation) are combined with non-spatial socio-economic data (working activities, products, produced values) to evaluate the actual land use system.

These evaluation results are used as indicators and descriptors together with additional aggregated data for the creation of a spatially explicit landscape model. This model describes the functioning of the system and is used to create future landscape scenarios under varying economic and political conditions and constraints.

The methodical approach is based on a combination of various statistical models: the Field module calculates the horizontal and vertical nutrient fluxes; non-spatial social and economic aspects of crop and livestock agriculture are analysed within the Household module; the Landscape module focused on the linkage between economic and ecological variables, the calculation of sustainable indicators, the assessment of the suitability of site to agriculture use and the allocation of land use changes.

Keywords: Land use strategies, landscape model, scenario analysis, sustainable indicators