1 Introduction

There is growing worldwide awareness of the present and future values of biological diversity (OECD 2002: 85; BMBF 2004: 7; see Chapter 2.1.1). At the same time, however, extinction rates of species are currently between 1,000 and 10,000 times the historic rates (Blaikie & Jeanrenaud 1996: 4; O'Riordan 2002: 13; Lovejoy 2002: 33). South Africa as well as Namibia are biologically megadiverse countries (Young 2002: 169), but at the end of the 1990s, 11.5 percent of the total South African flora was threatened – which is one of the highest rates in the world (Tuxill 1999: 98). The causes of extinction are quite complex. Certain species have been intensively harvested (e.g. through logging). Habitats have been heavily destroyed through land conversion, degradation, pollution and habitat fragmentation (Ashley 1996: 4; Grimble & Laidlaw 2002: 1; Armsworth et al. 2004: 118f; Bochniarz & Bolan 2004: 80; OECD 2002: 72, 75). Wildlife is hunted as it competes with livestock for food and water (Ashley 1996: 4). A further threat for biodiversity is the introduction of alien species which invade and dramatically alter ecological systems (Young 2002: 171; Griffin 2002: 42; Armsworth et al. 2004: 119). In the long term, climate change in particular is likely to be an increasingly destructive factor for biodiversity (Armsworth et al. 2004: 119).

The costs of losing biological diversity can be hardly estimated. Nobody can predict how different species can be utilised in future. Numerous species have not even been discovered yet, making it impossible to estimate their different values. The long-term reliability on natural resource flows depends on the preservation of natural stocks and the continuing functioning of ecosystems. Biodiversity plays a major role in these systems (BMBF 2004: 10f). Science is not yet able to explain all links between different species and ecosystem functions which are crucial for the satisfaction of most basic human needs (Blaikie & Jeanrenaud 1996: 6; Raffaello 2001: 21; Armsworth et al. 2004: 127). Despite such problems of evaluation and measurement, the fact that biodiversity is a precious resource is clear just by looking at its present and regional benefits. The Namibian and South African economies are strongly based on mining, fishing, agriculture and tourism (GTZ 1998). All these activities depend on healthy natural resources. The conservation of biodiversity is therefore particularly important for the future of these countries (GTZ 1998).

In order to steer human behaviour towards maintaining biodiversity it is, however, very important to understand the interaction between people and nature. Obtaining and

communicating knowledge about the feasible and sustainable management of biodiversity in Southern Africa is the major objective of the research project Biodiversity Monitoring Transect Analysis (BIOTA) in Southern Africa (see also www.biota-africa.org). The project has been initiated and financed by the German Government/Federal Ministry of Education and Research (BMBF). It can be described as a cooperative network with goals, structures and activities jointly being defined by scientists, institutions and other stakeholders from Germany, Namibia and South Africa.

The BIOTA project uses standardised methodologies in order to enable a large-scale comparability of research results. An interdisciplinary team of natural and social scientists assesses changes of biodiversity and identifies the main factors influencing such changes. The research has been carried out along a rainfall gradient leading from the summer-rainfall area of northern Namibia to the winter-rainfall Cape region of South Africa (Figure 10). All major biomes of the region are covered along this transect (Jürgens *et al.* 2001).

This book represents a part of the socio-economic work during the pilot phase of BIOTA (2000-2003). The objective was to provide a broad understanding of the human impact on changes in biodiversity, and of changes in biodiversity on human livelihoods. In order to link the data of natural scientists with those of the social sciences the socio-economic working group was expected to provide an overview of the human impact on biodiversity as complete as possible. To achieve this, a wide range of social and economic factors has been assessed.

Research concentrated on four communal settlements in Namibia and South Africa. The focus on communal areas is justified on the one hand by the continuing scepticism amongst politicians and scientists as to whether a communal land management system can promote biodiversity preservation. On the other hand, communal areas are disproportional small areas of state land where the majority of black people live on a subsistence basis mainly under common natural resource management. Communal farmers' livelihoods strongly depend on natural resources. Therefore, particularly in communal areas, biodiversity maintenance is also an important aspect of poverty alleviation.

The four research sites represent four ecosystems and four ethnic groups of the region. The comparative case studies therefore, give a clear idea of the heterogeneity of ecological, social and economical conditions in communal areas along the BIOTA transect. It is difficult,

however, to make clear statements about how representative the presented study actually is, since BIOTA priorities forced the socio-economic subproject to work on research sites which are in particular representative for their ecological conditions but not necessarily representative for socio-economic ones. The main task was therefore to identify the main factors and linkages. The results of this highly explorative study are the basis for further in depth analysis during the second and third phase of BIOTA (2003 – 2009).

The first step of empirical research was an assessment of the main natural resource use activities. In a second step, the decision-making processes of communal farmers were analysed. Understanding the rationality of natural resource use decisions will help to predict human actions and to identify appropriate institutional incentives to maintain biodiversity. In order to achieve this, a conceptual framework has been developed to analyse communal farmers' decision-making. This "Capital-Need-Institution-Model" integrates different theoretical concepts of economic, social and psychological theory into one coherent framework. It describes the most important factors determining communal farmers' decision making. The starting point of the model is the availability of capital which provides opportunities but also constrains actors, such as farmers. The given capital set (financial, physical, social, human and natural capital) determines which action can be taken and which is constrained. Evaluating these options is the second step. Actors rank possible actions according to their potential to maximise individual utility. Since utility maximisation always occurs within a specific institutional framework, in the third step it is important to recognise that positive and negative institutional incentives alter the available choices (see Figure 1).

The methodology of the empirical research is thus based on the Capital-Need-Institution-Model. Capital access, internal motives and needs as well as institutional incentives of the four research communities were assessed based on interviews at a household level. Complimentary, a wide range of relevant documents were reviewed. All quantitative variables were analysed with descriptive statistics. As a significant number of variables only have an ordinal level of measurement, appropriate instruments have been chosen for correlation analysis and significance tests.

The overarching standardised BIOTA methodology and expectations of the natural science dominated BIOTA project restricted opportunities for socio-economic research and analysis. Socio-economic data had to be linked to the data of the natural scientists. Four settlements

were therefore prescribed as research units because natural scientists decided to work on the territories of these settlements. Each settlement has, however, only a low total number of households. These factors limited possibilities, e.g. the development of quantitative models.

The following Chapter 2 will develop and present the Capital-Need-Institution-Model. Chapter 3 briefly describes the BIOTA project background and the methods and instruments of the theoretical and empirical research process used in this study. Based on the Capital-Need-Institution-Model, the decision making of communal farmers in four comparative case studies will be analysed in Chapters 4 to 7. Special emphasis will be placed on institutional incentives for biodiversity conservation. In Chapter 8 an inter-regional comparison will be made and results discussed. Conclusions are elaborated in Chapter 9.