CHAPTER I

INTRODUCTION

1.1 Introduction

Land degradation, is one major problem facing Uganda, as in much of the sub-Saharan African (SSA) countries. Exacerbated by poverty, fast growing population, and inadequate tenure security; land degradation poses a threat to national and household food security and the overall welfare of the rural population in Uganda (Nkonya et al., 2004; Nkonya et al., 2005). The problem of land degradation is more serious in Uganda, where agriculture remains the main source of livelihood contributing about 40 percent of the GDP, 85 percent of export earnings, and 80 percent of employment and provides most of the raw materials to the mainly agro-industrial sector (GOU, 2004a; NEMA, 2002). One most important feature of Ugandan agriculture is the large subsistence sector, which makes agriculture more important for food security and poverty reduction.

Land degradation in Uganda is mainly manifested through soil nutrient loss and soil erosion (Pender et al., 2004). Studies of land degradation in Uganda are limited, but available estimates indicate that the rate of soil fertility depletion in Uganda is among the highest in SSA with an estimated average annual rate of total nutrient depletion of 70 kilograms of nitrogen, phosphorous and potassium, per hectare in the 1980's (Stoorvogel and Smaling, 1990; Wortmann and Kaizzi, 1998). Soil erosion is also a serious problem especially in the highland areas of Kabale, Kisoro, Kapchorwa and Mbale in Uganda, though there is limited empirical evidence on its extent as well as its household productivity and welfare impacts (NEMA, 2002). Extent and impacts of land degradation in Uganda varies from one district to another depending on the levels of poverty, awareness of the extent of the degradation problem, availability of extension services, population density, climatic and agro-ecological differences among others.

Surprisingly, despite the level and extent of land degradation and government effort to promote use of soil conserving and nutrient enhancing production techniques, the rate of adoption of these technologies remains very low in Uganda. Technology adoption is still below 30 percent (Nkonya et al., 2004). For example, Pender et al. (2001) found that fewer than 10% of smallholder farmers in Uganda use inorganic fertilizers. In an earlier study, Woelcke et al. (2002) also show that the level of adoption of inorganic fertiliser is inadequate to halt declining soil fertility. It is estimated that smallholder farmers in Uganda apply an average of one kilogram of soil nutrients per hectare (FAO, 1999), compared to an average of 13 kilograms in SSA (Heisey and Mwangi, 1996). These rates are far from what is required to curb soil nutrient depletion given the rate of 70 kg nutrient's removal noted above.

Land degradation has been mentioned as one major constraint to improved agricultural productivity and household welfare in Uganda (UPPAP, 2002). In fact, recent household budget survey studies show that the major cause of low incomes in Uganda's rural areas has been stagnating agricultural production (Deininger and Okidi, 2001). As a result, poverty in Uganda is still pervasive and highest among those households whose main source of living is crop agriculture. For instance poverty among households headed by crop farmers increased from 39 to 50 percent between 1999 and 2002 while poverty dropped from 47 to 38 percent for those households the main occupation of which is non-crop agriculture (livestock and fishing) for the same period of time (Appleton and Sewanyana, 2003).

Using the Household survey data-2002, Appleton and Sewanyana (2003) also show that in general the proportion of the population whose incomes fall below the poverty line is 38 percent with poverty being more rampant in the rural areas where 41 percent of the rural residents are below the poverty line as opposed to 12 percent of the urban residents. This outcome is despite using poverty lines allowing higher food prices and non-food requirements in the urban areas. Apart

from the rural-urban differences, poverty also varies across regions, with the north being the most poor compared to other regions.

There is also a variation in poverty overtime. For instance, during the 1990's poverty in Uganda almost halved from 56 percent in 1992 to 35 percent in 1999/2000. Despite the progress made in the last decade, the rate of decline in poverty is still low in the rural areas. An important link between agriculture and poverty in Uganda relates to the fact that, the rate of decline in poverty in rural areas is less than in urban areas (Appleton and Ssewanyana, 2003).

Poverty has also been mentioned as one of the factors responsible for land degradation (NEMA, 2002; Shiferaw and Holden, 1999b; Nkonya et al., 2004). Poverty acts as a constraining factor on households' ability to invest in mitigating land degradation. Poor households are unable to compete for resources, including high quality and productive land and are hence confined to marginal land that cannot sustain their practices which perpetuate land degradation and further poverty (Kabubo-Mariara, 2003). The poor and food insecure households may contribute to land degradation because they are unable to keep fallow, make investments in land improvements or use costly external inputs (Reardon *et al*., 2001). Majority of the smallholder farmers in Uganda cannot afford these necessary inputs. Due to credit constraints, inadequate tenure security, as well as weak institutions, poverty can also cause farmers to take a short-term perspective, which limits the incentives for long-term investments in soil conservation (Holden *et al*., 1998; Shiferaw and Holden, 1999b; Pender, 1996).

These effects of the twin problems of poverty and land degradation require immediate public intervention. Designing appropriate intervention programs to address poverty and land degradation requires first, proper understanding of the factors that determine the adoption of soil fertility management (SFM) and conservation practices and in particular, the role of poverty in adoption of such practices and secondly to understand the factors that determine poverty in

Uganda. Given an agricultural economy like that of Uganda and the fact that government resources to eradicate poverty are limited, targeting specific aspects of poverty that critically limit farmers ability to invest in soil conservation and enhance agricultural productivity would help more rational and effective allocation of such limited resources.

Identification of the determinants of poverty and the design of government policies to address the poverty problem have been identified as priorities by the government of Uganda since the mid 1990's (GOU, 1997). The government commitment to alleviate poverty has culminated in the program for modernization of agriculture (PMA) (GOU, 2000a) and poverty eradication action plan (PEAP) (GOU, 1997, 2000b, 2004b). An important component of the Uganda anti-poverty policies focus on the provision of key services such as roads, education and agricultural extension among others. Equally important, however, is the social institutional framework through which the provision of such services may yield greatest benefits to society, but has however attracted minimum attention.

Earlier studies in Uganda attempted to explain poverty emphasising the differences in financial, physical and human capital endowments and paying less attention to the role of social capital (Appleton, 1999; 2001; Okwi, 2000; UPPAP, 2002). However, since the seminal paper by Putnam (1993b) on the role of social capital in explaining why the level of income in the northern part of Italy was higher than that in the south of Italy, there has been growing interest in understanding the role of social capital in economic development and on household welfare. Putnam's findings suggest that the regions in Italy, in which the population had a greater degree of horizontal connections (north) as opposed to vertical connections (south), had more efficient governments.

Recent analyses have demonstrated that access to social capital has a positive and significant effect on household per capita expenditure and/or incomes (Narayan and Pritchett, 1999; Grootaert, 1999; Grootaert et al., 1999; Tiepoh and

Reimer, 2004; Whitely, 2000 and Maluccio et al., 2000). In many cases, the social capital impact was as strong as and sometimes stronger than human capital impact. For instance Narayan and Pritchett (1999) in Tanzania find the impact to be 4-10 times stronger, Grootaert (1999) find the impact twice as much in Indonesia, while Whitely (2000) find the impact as strong as that of human capital.

The mechanisms through which social capital embedded in social networks, trust and norms, is said to reduce poverty can be summarised in; i) facilitating transmission of knowledge about technology and markets, reducing market failures in information and therefore reducing transaction costs (costs of obtaining information about technology, market, creditworthiness of contract parties among others). ii) Reducing problems of free riding and thereby facilitating cooperative action, iii) Coordination and monitoring effective public services delivery, iv) Ameliorating other conventional resource constraints such as market access or credit limitations and thus reducing vulnerability of households to poverty. In Uganda where most of the land is held under customary ownership, social institutions may also facilitate implementation of byelaws, which in turn may facilitate diffusion of technology.

More so, in Uganda, studies investigating how social structures that vary from one village to another may affect diffusion and adoption of SFM and conservation technologies are non-existent despite the existence of a wide heterogeneity of tribal affiliations, formal and informal social organisations in the country. This is also despite the fact that empirical literature suggests social capital affects adoption and diffusion of land management technologies (Isham, 2000; Reid and Salmen, 2000; Nyangena, 2005; Rogers, 1995). Rogers (1995) argues that the heart of technology diffusion consists of interpersonal network exchanges between individuals who have already adopted an innovation and those influenced to do so. Barbier (2000) also argues that the successes of the

Machakos[1] experience in Kenya may not be replicated elsewhere because communities in that area didn't appear to have rigid social structures, which inhibit individuals or sub-groups from collaborating.

Earlier attempts to investigate the impact of poverty on adoption of soil conservation practices in Uganda are limited. The only available studies (Pender et al., 2004; Nkonya et al., 2005) while providing good foundation for further analyses, gave inconclusive results. By using binomial decision models, the mentioned studies treat adoption choices as being independent of each other and exclude useful economic information contained in the interdependence and simultaneity of adoption decisions (Dorfman, 1996; Wu and Babcock, 1998; Bekele and Drake, 2003). Ignoring such information in the analysis may have led to the reported inconclusive results.

Secondly, the two studies on adoption of land management practices in Uganda (Pender et al., 2004; Nkonya et al., 2005) capture welfare using incomes other than consumption expenditure. In this study a consumption based welfare measure is used. The use of consumption-based, rather than income-based welfare measure has two major advantages. First, in a subsistence agricultural economy like Uganda where incomes are not regular, use of income measures would not yield adequate results. Farmers get high income during periods of harvest and receive very little during other periods. To the contrary, households spend their incomes throughout the year. Expenditure and consumption therefore is a smoother measure of welfare than income (Mukherjee and Benson, 2003). Thirdly, most of the household income in Uganda is derived from self-employed business or subsistence oriented agricultural production. Assigning income values to the proceeds of these enterprises is often problematic (Mukherjee and Benson, 2003; Hentschel and Lanjouw, 1996).

[1] See also English et al., (1994), Tiffen et al., (1994), on the success story of Machakos district in Kenya.

Verifying empirically the impact of household poverty on adoption of land management techniques is a much more complex task than what may appear at first sight. The literature postulates that poverty and adoption of various land management technologies are reciprocally interrelated. On one hand, poverty determines the level of adoption of particular technologies. At the same time however, level of adoption may have implications on land productivity and therefore on poverty. Introducing poverty on the right hand side may therefore introduce an endogeneity problem.

More so, verifying empirically the impact of social capital on household poverty is equally a difficult task. The reason is that there is also a causality problem, with some literature suggesting that the causality actually runs from household poverty to social capital. For instance, when joining associations involves actual cash contributions, poor households will choose those associations that are highly beneficial to them and/or those that do not require any contributions.

Before drawing any conclusions about the poverty-social capital relationship on one hand and poverty-adoption of SFM and conservation practices on the other, it is important therefore to follow a methodology that effectively controls for the possible endogeneity problem.

1.2 Objectives of the study

The main goal of this study is therefore two fold. First, to investigate determinants of SFM and conservation techniques in Uganda. Secondly, to provide an understanding on the causal relationships between social capital as measured by group membership and household level poverty in Uganda. Specifically, this study aims to analyse:

i) The impact of poverty, land tenure and social capital on adoption of SFM and conservation practices and which particular SFM and conservation practices are most affected by these factors.

ii) Importance of social capital in explaining the level of household poverty in Uganda

iii) Importance of poverty and other determinants in the decision to participate in social agrarian groups.

1.3 Approaches and methods of the study

As noted above, this study has two main objectives. First was to establish the determinants of SFM and conservation technologies. Secondly, to provide an understanding of the causal relationships between social capital and household poverty in Uganda. Different analytical tools were therefore used. First, considering the interdependent and joint nature of adoption decisions, a multinomial logit model (MNL) was used to estimate the effect of poverty, social capital and property rights on adoption of certain SFM and conservation practices. In this framework, farmers were expected to choose a mix of options that maximise their Utility. To correct for possible endogeneity effects, associated with the poverty-SFM and conservation relationships, a two-stage probit least squares 2SPLS was used.

Secondly, a linear regression model is used, to understand the determinants of poverty in Uganda while a probit model was used to establish the determinants of group participation. In order to correct for the endogeneity problem associated with poverty and social capital (involving discrete endogenous dependent variables), a two stage non-recursive procedure is used. The 2SPLS and two stage conditional maximum likelihood (2SCML) approaches were used to correct for possible endogeneity effects associated with social capital-poverty relationship.

1.4 Organisation of the thesis

The first chapter covered the introduction and motivation for the study. The second chapter gives a brief background on the Ugandan Economy, highlighting important issues in agriculture, poverty, and land degradation. The third chapter provides detailed description of the data and other selected socio-economic features of the study area. The fourth and fifth chapters are stand-alone papers, providing theoretical, methodological and empirical relationships being investigated. The fourth chapter for instance, discusses the role of poverty, land tenure and social capital on adoption of SFM and conservation technologies while chapter five discusses the determinants of poverty and determinants of social capital (group participation). The sixth chapter provides conclusions and policy implications based on the poverty, and the MNL models.