



Analysis

Exploring the role of economic incentives and spillover effects in biodiversity conservation policies in sub-Saharan Africa



Ariane Amin

CERDI-CNRS, Clermont Université, Université d'Auvergne, 65, Boulevard F. Mitterrand, 63000 Clermont-Ferrand, France

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ABSTRACT

A vast array of empirical work investigates the issue of biodiversity conservation, but the focus is often limited on the search for possible causes of biodiversity erosion. Biodiversity conservation policymaking is still understudied. In this study, this gap is empirically addressed on a sample of 48 sub-Saharan countries over the 1990–2009 period taking the “Ecoregion protection” score provided by the Center for International Earth Science Information Network (CIESIN) as a measure of biodiversity conservation policies. It is sought whether economic incentives such as biodiversity targeted international transfers as well as tourism revenues have an impact on biodiversity conservation policies. Moreover, spillover effects are also hypothesized owing to the public good character of biodiversity conservation policies. International financial assistance as well as tourism are found to have an effect on biodiversity conservation policymaking. Our results also evidence complementary spatial spillover effects between biodiversity conservation policies.

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1. Introduction

‘Biodiversity’ is an umbrella term that covers all variety of life on the planet, from the genetic level to terrestrial, freshwater, and marine habitats and ecosystems (TEEB, 2009). It can be thought of as an economic good, as it is obviously scarce, it satisfies human needs, and it allows people to achieve certain ends (Baumgärtner, 2007; Heal, 2000). ‘Biodiversity’ is also considered to be a global public good (Rands et al., 2010), as some of the benefits from biodiversity usually have the characteristics defined in Kaul et al., (1999): for example, the regulating services provided by biodiversity such as carbon sequestration and storage, are marked by non-rivalry in consumption and non-excludability, along with being quasi-universal in terms of countries, people, and generations.

The supply of this “global public economic good” to humankind is increasingly threatened. The urgency has been borne out by different international reports (MEA, 2005; TEEB, 2010). A range of works have estimated the economic cost of biodiversity loss. To mention just a few examples: the costs of lost bio-prospecting, the costs of lost carbon sinks, the costs of lost tourism business, and the costs of diminished watershed protection, amount to many tens of billions of dollars (Heal, 2005); it is estimated that 25 to 50% of the pharmaceutical industry relies on genetic diversity for drug developments, and that about US\$ 650 billion per year is derived from genetic resources (TEEB, 2008); the total economic value of pollination worldwide amounted to 153 billion, 9.5% of the value of the world agricultural production in 2005 (Gallai et al., 2009). The overall cost of the current biodiversity loss is unknown, but the global recognition of the economic and human dimensions of biodiversity loss persists, along with the need for urgent action.

The debate on strategies for slowing the trend of biodiversity loss has led to an increasing interest on the part of practitioners and scientists regarding economic incentives for biodiversity conservation. As McNeely notes in his seminal work, “conservation needs to be promoted through the means of economic incentives to alter people's perceptions of which behaviors are in their self-interest, as resource exploitation is governed by the perceived self-interest of various individuals or groups” (McNeely, 1988). From the perspective of public economy theory, economic instruments are required to address externalities (OECD, 2010) and market failure associated with biodiversity, as it has public goods characteristics. This would lead to considering the real value of biodiversity and the broad cost associated with its loss when making decisions (Emerton, 2001). Economic measures in support of biodiversity are increasingly recommended to reinforce traditional ways of managing biological resources (Emerton, 2001; Holling and Meffe, 1996; OECD, 1999), since progress towards the slowing of biodiversity loss is still insufficient (Butchart et al., 2010).

A number of case studies exist at the micro level illustrating how economic incentives work in altering the decisions of individuals, farmers, landowners, local communities, and firms towards biodiversity conservation (see (Secretariat of the Convention on Biological Diversity, 2011) for a review of case studies). Empirical investigation at the country level is limited and cross-country analysis is quite sparse. Indeed, the question still remains of whether economic instruments can correct governments' dedication towards more stringent conservation strategies. The question of the effectiveness of economic instruments in conservation policies is especially important for tropical developing

countries. These countries are home to the majority of biodiversity (Jablonski et al., 2006; Stattersfield et al., 1998) and, at the same time, the threat on biodiversity is the greatest (Mittermeier et al., 1998; Myers et al., 2000). The maintenance of worldwide biodiversity therefore requires checking for the most efficient instruments for biodiversity conservation in these countries.

In this paper we propose to empirically test the contribution of economic incentives on biodiversity conservation at the country level for sub-Saharan African countries. The focus on the SSA region is guided by two considerations. First, the SSA region is home to the majority of the biodiversity “hot spots” (Myers et al., 2000) of Africa. Next, SSA is the poorest developing region, recording the highest (and relatively steady) poverty rate since 1981 (Haughton and Khandker, 2009). It is also a region where demographic transition is not complete (Conley et al., 2007) which may increase pressure on the environment. It is thus more likely that economic incentives would be more important in the implementation of national conservation strategies than anywhere else. Investigating the effectiveness of these instruments is then important. To the best of our knowledge, no empirical work exists on conservation policymaking for sub-Saharan African countries.

The contribution of the paper is twofold. First, we add to the literature on biodiversity conservation policy-making, where few empirical studies exist. There is a dearth of analyses that attempt to understand the mechanisms by which governments conduct conservation strategies and allocate public funds for biodiversity conservation. The studies that exist on governments' dedication to conservation are narrowed to species characteristics only (Dawson and Shogren, 2001; Mahoney, 2009; Metrick and Weitzman, 1998; Simon et al., 1995). A few studies focus on other determinants for biodiversity conservation policymaking (Archer and Orr, 2008; Dietz and Adger, 2003; Lightfoot, 1994). Lightfoot (1994) investigates whether a country's development level has a deterministic effect on its formal attempts to establish protected areas; he finds no conclusive result. Dietz and Adger (2003) find, on the contrary, that there is a possible tendency towards increased conservation efforts with increasing income. Archer and Orr (2008) test four groups of predictors of land protection: biodiversity, environmental threats, politics, and economics, ascertaining that environmental threats represent the strongest factor at the country level for land protection.

Second, we take into account the existence of spatial spillover as an important dimension to be considered for biodiversity issues. In fact, in conservation policymaking, the probability that country strategies are interconnected is high because several countries share and manage common resources. In SSA, examples of trans-boundary protected area initiatives exist, including: Nouabal-Ndoki National Park in Congo, contiguous with Dzanga-Ndoki in Central African Republic and adjacent to Lac Lobeke National Park in Cameroon; Kgalagadi trans-boundary Park shared by South Africa and Botswana; the W National Park shared between Niger, Benin and Burkina Faso. It is very likely to observe similar strategies or mimetic behavior between neighboring countries because of the similarity of ecosystems. Furthermore, we can observe strategic behavior induced by competition for economic benefits related to international economic incentives, especially for developing countries. Existence of spillover effects in policymaking is now a widely accepted hypothesis in various works on public policy (Brueckner and Saavedra, 2001; Devereux et al., 2008; Redoano, 2007). A few studies exist on environmental policymaking for climate (Fredriksson and Millimet, 2002; Murdoch et al., 1997; Sauquet, 2014), and more rarely on biodiversity conservation policymaking (Sauquet et al., 2012), although spatial patterns are strongly inherent to biodiversity (Kerr and Burkey, 2002; Pandit and Laband, 2007). This study is the first to consider spillover effects on biodiversity conservation policymaking in sub-Saharan Africa context.

The next section presents the main hypotheses of the study. Section 3 presents the data and methodology used in the analysis,

while Section 4 discusses the empirical results derived. Section 5 concludes.

2. Factors Explaining Conservation Efforts: Main Hypotheses

In this section we focus on determinants of biodiversity conservation efforts. Attention is firstly paid to the role of international transfers and tourism to act as economic incentives at country level for biodiversity conservation efforts. Secondly, the issue of spatial dependence in conservation efforts is discussed.

2.1. Financing Conservation Effort

Local land users as well as public authorities might have no incentive to conserve biodiversity unless it generates benefits (Dixon and Pagiola, 2001). Incentives may therefore help meeting development and environmental issues and by the way may incite or motivate governments to conserve biological diversity (McNeely, 1993).

At a global level, international financing mechanisms may cover the ‘incremental costs’ of countries which host a great biological patrimony and are likely to provide global environmental goods (Pearce, 2007). International financing mechanisms include international biodiversity transfers, debt forgiveness or swaps, eco labeling and certification, ecosystem services markets. Several of them have been implemented in the SSA region. For instance, Uganda National Parks receives funds from a credit-offset system relating to carbon emissions and greenhouse gases and also from a trust fund led by the Global Environment Facility. Madagascar, Zambia, Ghana, and Nigeria have benefited from debt-for-nature swaps in the 1990s. Ghana, Madagascar, Tanzania, and Zimbabwe have received concession fees and royalties from medical and pharmaceutical organizations for the in situ conservation of genetic resources (Emerton, 2000).

Direct financial transfer to countries is the main financing instrument for biodiversity conservation with the Global Environment Facility (GEF) established in 1991. GEF is considered to be the largest donor for environmental funds worldwide (Deke, 2008). Direct financial transfers, from GEF and other organizations paying for environmental services, to countries are important levers in the implementation of environmental strategies in most developing countries, which often have limited national budgets and face problems in areas, such as health and poverty. In Africa, GEF allocations amount to a total of \$219 million in 2012 (GEF, 2013). The official aid and development assistance of OECD targeted to environment policy objectives have increased from US\$ 865 million in 2006 to US\$ 2439 million in 2009 in the SSA region. One may therefore argue that the trend in international assistance give economic signals to poor countries in support of sustainable development and towards more effort in biodiversity conservation.

At local level, ecotourism which generates income from biodiversity amenities can also favor conservation efforts (Brandon, 1996; Dixon and Pagiola, 2001; Wunder, 2000). Many touristic attractions in developing countries are closely linked to biodiversity, such as protected areas, unspoiled mountains, beaches and islands, traditional ways of life and native culture, charismatic wildlife, as well as natural landscapes (CBD, 2008). In terms of competition with other destinations, a site's biodiversity profile might give the destination site a competitive advantage (Macagno et al., 2009). The tourism industry may therefore benefit from environmental management through demand stimulation (Huybers and Bennett, 2003). It would be then a plausible assumption that an upward trend of ecotourism demand gives efficient economic signals to poor countries, supporting sustainable development and greater effort in biodiversity conservation. Over the last decade, nature and adventure travel has emerged as one of the fastest-growing segments of the touristic sector, much of this growth taking place in mega-diverse sites, areas harboring many species unique to that region (Christ et al., 2003). Tourism has recently become one of the most dynamic economic sectors in many developing countries. It represented

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