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A Cross-Country Analysis on the Impact of Tourism on Threatened Plant Species

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Abstract

This study used a sample of 106 countries to investigate the link between the number of threatened plant species and tourism which was proxied by the number of international tourist arrivals. In the analysis, we also include GDP per capita, population growth, and land under crop, which act as the control variables. We find that using OLS, the number of international tourist arrivals, population growth rate and land cultivated with crop increases the number of threatened plant species, while GDP per capita reduces the number of threatened plant species. Our further analysis using quantile regression indicates that tourism affected positively the number of threatened plant species for all quantiles (0.05 0.25 0.50 0.75 0.90 0.95); crop production (positively) at middle quantiles (0.50 0.75); GDP per capita (negatively) at lower quantiles (0.05 0.25); and population growth (positively) at middle quantiles (0.50 0.75). Our analysis clearly indicates that using estimates from OLS may have serious “bad” policy implications on the number of threatened plant species, compared to the quantile method that can capture properly the dimension of the threatened plant species. As for tourism, our study supports the effort for biodiversity conservation and sustainable tourism worldwide.

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1. Introduction

The importance of the tourism sector can be related to its contribution to government revenues, national income, foreign exchange earnings as well as generation of job opportunities and business opportunities. Tourism has been an important sector to both the developed and the developing economies. Although we recognized the great benefits of the tourism sector to the national income, the tourism activities have also been connected to the negative impact on the economy in particular to the environment. One crucial aspect of the negative impact as a result of increased tourism activities is on the loss of biodiversity. Nevertheless, UNWTO (2011) reports that the number of international tourist arrivals worldwide is forecast to increase by 3.3% a year, on average, in the period 2010-2030. In terms of number, the international tourist arrivals will increase by 43 million a year on average between 2010 and 2030. Thus, it is inevitable that with this rise in the tourism number there follows an inevitable increase in negative environmental impacts (Pickering & Hill, 2007; Buckley, 2004).

The term biodiversity or biological diversity refers to the totality (number) and variability (types) of living organisms in the ecosystem, region and environment (Butler, 2006). Humans will eventually perish without biodiversity. According to the Convention on Biological Diversity (CBD) the definition of biodiversity includes diversity at the gene, species and ecosystem levels; the types of species; and the habitats and ecosystems within which they live. This includes the terrestrial rainforests, the freshwater lakes, the river systems, the coral reefs and the marine ecosystems. The healthy ecosystems provide food, clean air and water for humans to consume and survive. The rainforest, although covers less than 2% of Earth's surface, supports the greatest diversity of living organisms on Earth – houses more than 50% of the plants and animals on the planet (Butler, 2014). Therefore, the loss of biodiversity among other things; threatens our food supplies, interferes with essential ecological functions, reduces the productivity of ecosystems, and destabilizes and exposes the vulnerability of the ecosystems to natural disasters such as floods, droughts, hurricanes etc. (UNEP, 2014).

The main purpose of the present study is to investigate the impact of tourism on biodiversity for a sample of 143 countries in 2013. In this study, we used the number of threatened plant species as the measure of biodiversity. Apart from tourism which is proxy using the number of international tourist arrivals, we also include income per capita, population growth and crop production as control variables. The model is estimated using OLS as well as quantile regression analyses. Our results suggest that tourism has positive impact on the number of threatened plant species for the 143 countries investigated.

The paper is organized as follows. In the next section, we review some related literature on factors affecting threatened plant species. In Section 3, we discuss the model and method used in the study. In Section 4, we discuss the empirical results. The last section contains our conclusion.

2. Review of related literature

Tourism is always associated with sand, sea and sun and therefore dependent on coastal areas. To the tourists, tourism provides enjoyment and satisfaction by participating in tourism related activities such as sea-diving, snorkeling, and game fishing. On the other hand, nature-based tourism provides activities such as camping, horse riding, walking, off-road driving, mountain biking, mountain climbing and others. Recreation and tourism in natural areas account for 20% of all leisure travel and the tourist expenditure from these activities amount to US\$20 billion a year (Newsome et al., 2002).

Pickering and Hill (2007) have reviewed studies on the impact of recreation and tourism on plant biodiversity and vegetation in protected areas in Australia, and found out that vegetation was being crushed, sheared off and uprooted as a result of the nature-based tourism activities. Pickering and Hill further contend that those impacts result in changes to the vegetation including loss of height, biomass, reproductive structures (flowers, fruit, etc.), reduction in cover, increased litter, damage to seedlings and change in species composition. These activities will also lead to changes to the hydrology of the site, soil conditions including nutrients and erosion, as well as the introduction of weeds and pathogen. Tourism can also contribute to the severity of the pathogen's impact by increasing the stress on plants within areas already infected (Buckley et al., 2004).

On the other hand, Newsome et al. (2002), Phillips and Newsome (2002), and Smith and Newsome (2002) posit that the recreation and tourism activities result in root damage to trees by tethered horses or holes dug by humans or

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