

# **A functional connectivity approach to identify conservation areas in a changing landscape. A case study of the Eastern Andes in Colombia**

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## **Abstract**

The Eastern Mountain Ranges in Colombia is one of the priority places for conservation biology worldwide because of its species diversity and high level of endemism. However, the species in the area are threatened by habitat fragmentation due to a high human population and intense land use.

In order to find ways to increase the connectivity of the landscape, high quality habitat patches and potential ecological corridors between protected areas were modeled with an expert based approach for eight species of mammals, amphibians and birds, using InVEST Habitat Quality and Linkage Mapper Toolkit. In addition, stakeholder interviews were carried out and analyzed with MAXQDA, to gather a comprehensive understanding of the main challenges and possible measures to cope with those.

The outcome from the habitat modeling confirm that the existing national protected areas play an important role as core habitats for multiple species, even though not all biomes are protected. Moreover, the results display that the regional protected areas are important as well, since they complement the national protected areas. The corridor modeling shows that there is a potential for multiple species corridors between the protected areas in the north and the protected areas in the south for passage species. In contrast, there is a lack of connectivity for corridor dwellers, especially the amphibians in the study have a limited mobility. Besides, the most corridors hold bottlenecks and there is a lack of connectivity throughout the whole area.

The main challenges causing habitat fragmentation mentioned by stakeholders include underlying social drivers, agricultural activities, expansion of infrastructure and extraction of natural resources. The stakeholders suggest that in order to achieve biodiversity conservation and sustainable development at the same time, new laws and institutions are needed to generate equality. Besides implementing ecological corridors, the stakeholders advise, firstly, to involve the people living in the areas surrounding the protected areas as stepping stones by using economic incentives and educate them about benefits with conservation. Secondly, to improve the management of the existing protected areas instead of implementing new ones. Lastly, to use a research approach that goes beyond

structural connectivity and includes both habitat generalists and specialists and that takes costs, adaption for expected climate change and the history of the armed conflict into consideration.

