

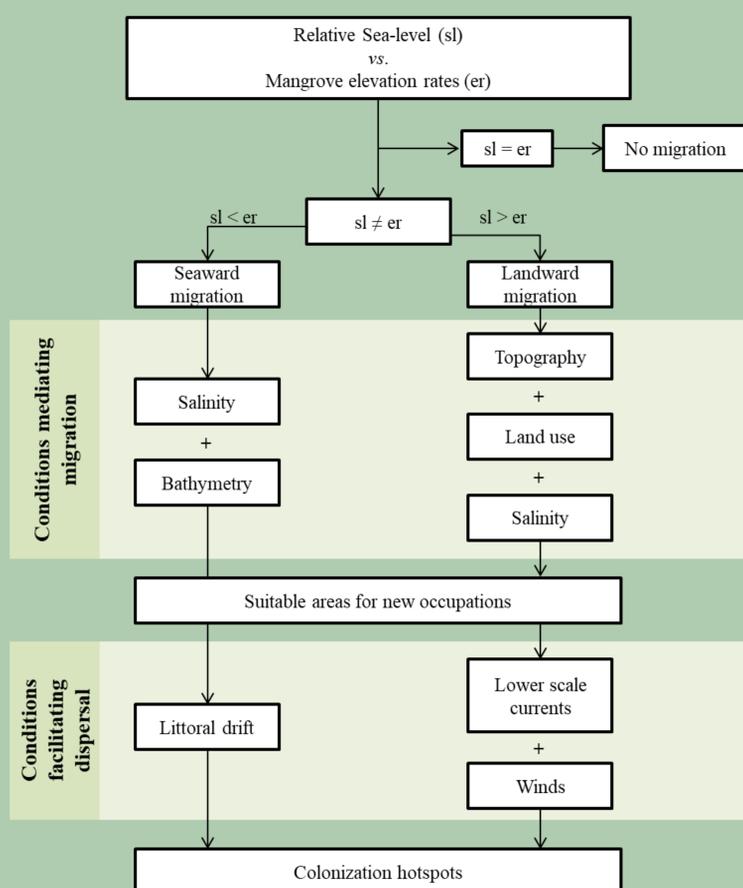
MANGROVE MIGRATION DUE TO CHANGES IN SEA LEVEL AND ELEVATION RATES: A METHODOLOGY TO IDENTIFY POTENTIAL COLONIZATION AREAS AND DESCRIPTION OF CASES IN COLOMBIAN ECOSYSTEMS

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INTRODUCTION

Mangroves are facing impacts driven by climate change effects and anthropic pressures. Forecasts foresee area losses worldwide due to Sea-level rise and changes in temperature and precipitation. Mangroves can keep pace with Sea-level rise through vertical elevation. This relation can lead to a migration seaward or landward. In both cases the areas where the ecosystem could establish and develop depends on variables like salinity, topography and land use. Based on a review of the conditions influencing mangrove migrating locally, and as a tool for conservation, we propose a methodology to identify which places are adequate for their colonization, and tried to apply it to 4 Colombian cases.

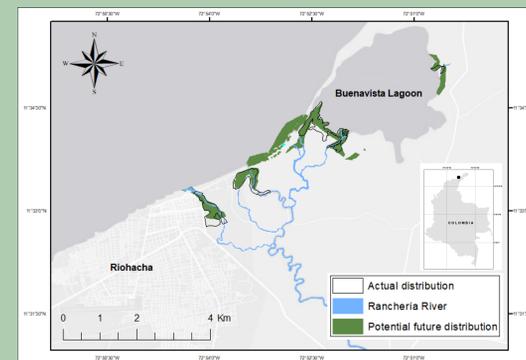
PROPOSED METHODOLOGY



DESCRIPTION OF COLOMBIAN CASES

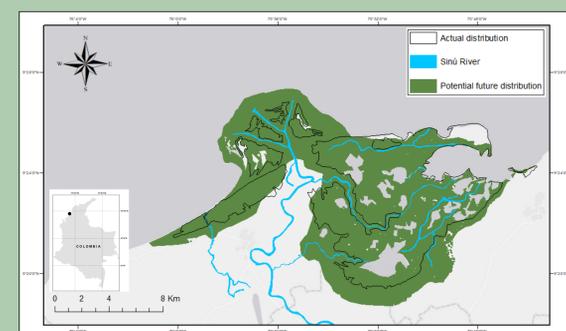
Mangroves associated to the Ranchería delta

This ecosystem owns different migration tendencies driven by coastal control infrastructure, changes on the Buenavista Lagoon, and their influences on sediment supply. Salinity could be higher in the future and restrict the populations to the channels of the river. Meanwhile, Buenavista Lagoon could reduce its salinity and be colonized. Climate change forecasts and anthropic pressures suggest the ecosystem is vulnerable to Sea-level rise, but dispersal variables could help to improve their genetic variability and make the mangroves more resilient.



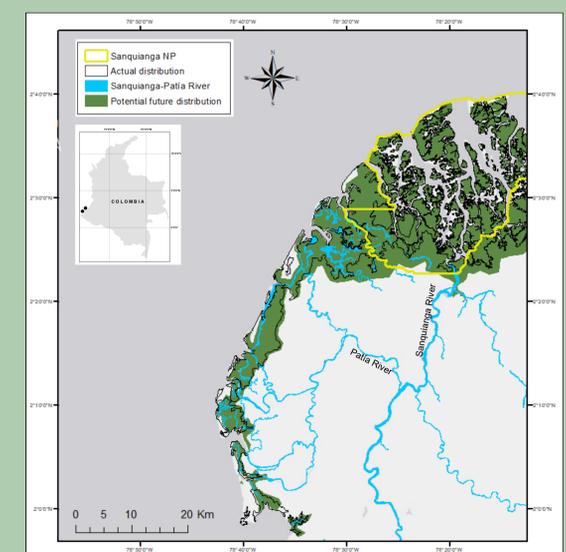
Mangroves associated to the Sinú delta

The mangrove placed over the delta tends to migrate seaward. Both littoral drift and bathymetry benefit mangrove occupation on the left side of the delta. On the other hand, the ecosystems placed on both sides of the delta tend to migrate landward. It is necessary to know lower scale currents to identify colonization hotspots in these locations. Land use conflicts, overexploitation and the Urrá I dam effects makes them vulnerable to Sea-level rise. Moreover, the Lagoon System presents erosive processes that could lead to its opening. In that scenery, mangroves would contract due to wave energy and changes in salinity regimes.



Mangroves associated to the Patía and the Sanquianga deltas

The Patía River channel was diverted to the Sanquianga River diminishing considerably sediments supply to the mangrove and generating tendency to migrate landward. Contrary to expected, the Sanquianga River also experiments landward migration tendency probably related to tectonic processes. Despite having the same tendencies, potential distribution areas differ on magnitude owing to land use and salinity. Dispersal variables studies are needed to identify colonization hotspots.



CONCLUSIONS

Lack of data led to a simplification of the methodology and resulted in a qualitative description of the cases. Thus, more research efforts in Colombia are needed to adequately represent the future.

The proposed methodology can give basic information related to changes in mangrove distribution at a local scale even in places with low available information. Nevertheless, mangrove distribution responds to a complex and delicate equilibrium. Probably the attempts to forecast would never be true to future reality.

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