

## **Identification of forest ecosystems providing relevant ecosystem services to the hydroelectric power sector of Nicaragua**

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Tropical Forests produce important ecosystem services for hydroelectric power generation. Nicaragua is promoting investments for utilizing renewable sources of energy, particularly hydroelectric power generation. The objective of this study was to identify forest ecosystems providing ecosystem services relevant for climate change adaptation of the hydroelectric sector in Nicaragua. A model based on geographical information system was developed. This model considers vulnerability criteria at the watershed level, position of the hydroelectric plants according to the projected installed capacity (MW), land uses (ha), drainage system and micro watersheds, a matrix relating ecosystem services production and land use, and a matrix of utility of ecosystem services for hydroelectric plants. The results of the study demonstrated that 35% of upstream forest landscapes relevant for hydroelectric power generation are located in areas with high sensibility to climate events. Approximately 8,300 and 1,425 km<sup>2</sup> of forest landscapes and perennial crops, respectively, are considered of high and very high importance for ecosystem services to hydroelectric power projects or plants. Most forest ecosystems relevant for hydroelectric sector are located in the Rio Grande de Matagalpa watershed, in the central region of the country, and the Rio Coco watershed. Agroforestry systems based on coffee were the most important perennial crops producing ecosystem services. Additionally, <10% of forest landscapes producing ecosystem services for hydroelectricity are outside the protected areas system of Nicaragua. The results of this study indicate that it is important to link ecosystem service users with the forest ecosystem providing those services, thus improving the adaptive capacity of the ecosystems of interest and the provision of ecosystem services for the future.

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