

# **A DETAILED SCIENTIFIC ANALYSIS OF THE IMPACT OF LAND USE CHANGE ON WATER RESOURCE PROVISION TO BOGOTÁ D.C. AND IMPLICATIONS FOR THE DEVELOPMENT OF PES SCHEMES**

## **Policy brief**

by

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2007

This study used the FIESTA (<http://www.ambiotek.com/fiesta>) model and implemented two other model components : a runoff model with a paramo component and a reservoir dam filling component, in order to help understand the impacts of land cover change and conservation through PES schemes in areas surrounding Bogotá city, Colombia's capital. Main results indicate that inputs of water from fog (which occur more efficiently to forest than to other land uses) are seasonally important for the maintenance of river flows for the dams located in the driest areas of the region (Sisga, Tomine, Chivor and Copa dams and Tota lake). However, continued forest loss is likely to increase river flows in the whole region leading to increases in the availability of water quantity for drinking water provision and hydroelectric production in spite of the potential decline in fog interception. This is because forests evaporate more water than other land uses and the increased availability of surface water on deforestation (because of reduced evaporation) is greater in most cases than the losses of surface water because of reduced fog interception.

On the other hand, conversion of Paramo to other land uses tends to lead to a significant decrease in local water storage. Since this water is stored during wet periods and released slowly during dry periods, a loss of this storage could lead to seasonal water shortages. PES implementation in paramo areas could thus potentially help maintain water resources to dams for hydroelectric power generation and drinking water provision.

**Keywords: FIESTA, Cloud Forest, Paramo, Chingaza Park, Bogotá, PES**

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The work was carried out to provide an improved scientific basis to progress in the understanding of the role of Payments for Environmental Services (PES) schemes in the maintenance of water resources for drinking water and hydroelectric power generation provided by cloud forest (TMCFs) and paramo ecosystems to the Bogotá city, Colombia's capital.