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REDESMA expresa su agradecimiento con las Instituciones que a través de este boletín Extra, apoyan el trabajo que realizamos por más de diez años a nivel regional



**CHE - Conserving Hydrological and Ecological functions through
payment for watershed services, with special reference to South-Central
Bolivia**

Announcement

**PhD position available at UNESCO-IHE
in collaboration with the Vrije Universiteit Amsterdam
and Fundación Natura Bolivia**

An interdisciplinary research project was recently approved by the UNESCO-IHE Partnership Research Fund (UPaRF), which will be carried out jointly by UNESCO-IHE Institute for Water Education (Hydrology and Water Resources core, Delft, The Netherlands), Vrije Universiteit Amsterdam (Department of Hydrology: Amsterdam, The Netherlands) and Fundación Natura Bolivia (Santa Cruz, Bolivia). The title of the project is "Conserving Hydrological and Ecological functions through payment for watershed services, with special reference to South-Central Bolivia (CHE)". With this project one PhD position is available.

Project description

Payments for Environmental Services (PES) are increasingly common as an incentive-based form of natural resource management. Because hydrological services are valuable for most communities, these services are best-suited for locally developed incentive-based management such as PES. Though some of the nascent payments for watershed services (PWS) systems in Latin America have been studied, little attention has been paid to what is perhaps the most important basis of all such systems: the hydrological characteristics of the watersheds that are purportedly providing the environmental service. In most cases, there is simply an assumption that reducing forest degradation will maintain stream flow. In other words, most existing PWS systems have at their fundamental base the locally untested assumption of a direct forest/water relationship. The proposed research will fill this gap by quantifying the hydrology of Tropical Montane Cloud Forests (TMCf) as well as the impacts of its conversion to pasture in low rainfall areas in South-Central Bolivia. TMCfs are unique in that they receive additional inputs of water through the capturing of low clouds whilst their evaporative losses are low due to the particular climatic conditions. Thus, TMCf produce more streamflow per unit

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rain than any other forest types particularly in seasonal climates and, therefore, their conversion to pasture may lead to serious declines in water resources due to the loss of the former cloud-capturing capacity and soil compaction by cattle. At the same time, floods and erosion are likely to increase. Our main hypothesis is that converting Andean TMCs to pasture land leads to declines of water yields, especially during the dry season, through (i) the loss of the former forest's cloud water capturing capacity, and (ii) compaction of surface soils, thereby impairing groundwater recharge and causing increases in floods/erosion and droughts. We will undertake three groups of activities: (1) monitoring of hydrologic and meteorological variables, (2) study of the hydrological processes in forested and unforested areas and, (3) construction of a physically based hydrological model that will serve also as a "regionalisation" tool. The first group of tasks will gather the meteorological and hydrological data, which is needed to understand the hydrological processes and to feed the hydrological model. The second group will help understand interactions between water and forest, and comprise measurements of meteorological parameters, fog gauging, measurement of soil parameters (e.g. infiltration capacities), research on the role of epiphytes assessment of the water uptake by the forest etc. The third group of activities comprises the gathering of information of the watershed (existing maps, remotely sensed information etc.) and the construction of a physically based model of the catchment based on the results of activities in groups (1) and (2). The model, calibrated and validated at different scales, will be used for the assessment of the impacts of land use change and to make assessments beyond (regionalisation). Results will strengthen a recently initiated PES scheme benefiting local and downstream communities in the newly created Rio Grande Natural Area, and provide the necessary knowledge base at regional scale.

The PhD study will be jointly supervised by prof. Stefan Uhlenbrook (UNESCO-IHE; s.uhlenbrook@unesco-ihe.org), prof. Sampurno Bruijnzeel (VU Amsterdam, brul@geo.vu.nl) and dr. Nigel Asquith (Fundación Natura Bolivia, nigelasquith@naturabolivia.org).

Further requirements:

- The research will be carried out in a so-called sandwich construction with different phases at UNESCO-IHE/VU Amsterdam in the Netherlands and field and modeling research in Bolivia (with regular contacts with Bolivian and Dutch supervisors).
- The PhD position is funded with a fellowship for which the Dutch NUFFIC regulations apply.
- Expected starting date: as soon as possible, for 4 years.
- Qualifications: M.Sc. degree (average mark: 80% or above) in a discipline relevant to the topic, e.g. hydrology and water management, environmental sciences, environmental engineering, civil engineering, forestry, agricultural sciences and engineering etc.
- The applicant must demonstrate a strong interest and experience in conducting experimental and interdisciplinary research.
- The applicant should be willing to co-supervise MSc research projects.
- The applicant must be fluent in English and Spanish.
- Work experience in relevant fields of studies is desirable.

Applications, including curriculum vitae, the names and contact details of three contactable referees, and a motivation letter, should be sent by email (one PDF file) to **Nigel Asquith** (nigelasquith@naturabolivia.org) before **31st January 2010**. Please mention the subject heading "PhD application CHE project".

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We intend to contact short-listed candidates on or before 1 March 2011.

