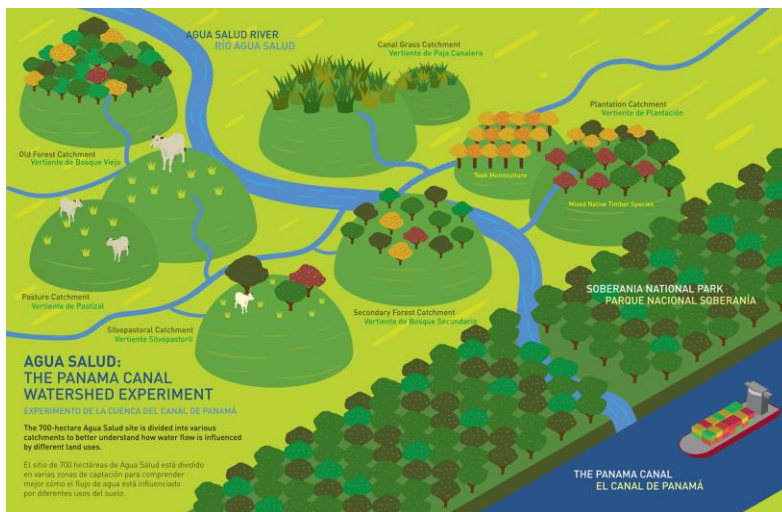


## **Agua Salud: Risk mitigation and land use management in tropical landscapes**

***Lloyd's Tercentenary Research Foundation (LTRF) is excited to be funding a two year research project, beginning in March 2017, led by the Smithsonian Tropical Research Institute (STRI) using science to advance risk mitigation and land use management strategies in tropical watersheds and landscapes***



The Earth's climate is changing, with increased likelihood of extreme weather events such as major storms and droughts, and variation in seasonal and spatial distribution of precipitation (Milly et al., 2008; Larsen, 2012). Access to abundant clean water is another significant global development challenge that we face in the 21st century. Tropical forests provide water-related ecosystem services: filtering water and regulating its

flow and decreasing the impacts of extreme events including droughts and flooding. Despite the critical importance of such services, scientific data and our ability to predict how different land uses impact ecosystem services are limited in the tropics. Water availability, carbon uptake and biodiversity protection are a few of the “ecosystem services” upon which we all depend to maintain stable and reliable water resources, mitigate climate change and manage other risks. Our ability to rely on these services varies according to how landscapes are managed. Thus, making smart land-use decisions requires an understanding of how hydrology, carbon sequestration and biodiversity change with land use.

This is a daunting task, particularly in the tropics, where soil hydrology differs significantly from that in the temperate zone and where there is very little pre-existing, quantifiable data on how land-management practices impact water flow and other services. As stated by Larsen (2016), “human use of forested watersheds and ecosystem services in the Americas, as elsewhere in the world, has

increased substantially as global population has grown to the current level of 7.3 billion. The intensity of this land-use in the tropics puts all ecosystem services at risk and requires attention at multiple societal and governmental levels so that these services are not severely compromised.”

STRI will collaborate with decision makers and stakeholders in the Panama Canal Watershed to develop realistic scenarios for future development. Projections of land cover change will be coupled with water, carbon and biodiversity studies to illustrate how planning decisions made today can affect near, mid, and long- term availability of ecosystem services. This scenario-building process and report will enable individual land-owners, land-use planners, governmental and other decision makers to understand and forecast the potential economic and environmental risks, benefits, and tradeoffs of a range of potential land-use choices at local to landscape scales and will be relevant to land-use planning throughout the steepland Neotropics. The final goal is to increase stakeholder understanding of the relationship between land management and water-related and other ecosystem services to design a more sustainable future. Stakeholders can be provided the information needed to understand the risks inherent to following different strategies as well as the options to mitigate such risks through planning and action.



This project will leverage existing Smithsonian scientific understanding of other ecosystem services such as carbon sequestration, biodiversity and economic opportunity through timber plantations and other land uses. The scenario building process will rely upon geospatial mapping and the development of scenarios to illustrate and quantify “pros”,

“cons”, and trade-offs of potential decisions, thus helping decision makers predict the outcome of their choices and minimize risk. Land and water use decision-making is often based on short-term needs rather than on longer-term interests and challenges. Furthermore, these issues are not unique to Panama. Land and water management challenges are ubiquitous through the tropics and elsewhere. Society has an ever-increasing need to do a better job managing these key resources.”

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[The Smithsonian Tropical Research Institute](#) (“STRI”) is a bureau of the Smithsonian Institution based in Panama dedicated to understanding biological diversity. STRI is one of the world's leading centers for basic research on the ecology, behavior and evolution of tropical organisms.