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Watershed Payments for Ecosystem Services and Climate Change Adaptation Case Study on Rugezi Wetlands, Rwanda

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ABSTRACT

A majority of East African nations rely heavily on hydropower for their energy supply. However, climate change experts predict significant changes to total precipitation and seasonal weather patterns in this area. Consequently, in the near future these nations should expect hydrologic stress across all watershed scales. Resilience of East Africa's energy sector to these climate change impacts will rely on coordinated environmental and economic policy. It will depend on the ability of governments to quickly improve management of important ecosystems and water basins. However, effective decision-making must balance the watershed needs of local livelihoods, such as subsistence agriculture, with national energy needs, such as expansion of electricity infrastructure. Environmental policy increasingly leans to economic mechanisms to find resolutions to ecosystem dependency conflicts. Payments for Ecosystems Services (PES) is one environmental economic mechanism that could effectively and rapidly improve environmental management in this region. This paper investigates the feasibility for using local PES schemes in a major Rwanda watershed as both a tool for community vulnerability reduction and for energy sector resilience to climate change impacts.

Payments for Ecosystem Services in developing countries involves local-level environmental negotiations between the public and private sectors. The mechanism has two goals. Primarily, it gives physical value to specific resource improvements. Secondly, PES reorganizes funding streams towards particular environmental objectives using positive incentives. In effect, it can develop a sustainable, locally-driven, conservation funding mechanism. PES most strongly emerged as a conservation tool in the early 1990's in Latin America. Uncertainty in its ability to achieve restoration targets and questions about its ability to achieve financial independence does not deter PES' popularity. PES schemes and informational networks now exist in Latin America, Asia, Africa, and Oceania.

The first portion of this paper looks at the capacity-building potential of PES mechanisms. It relates these to adaptive capacity needs for climate change given by the United Nations Framework Convention on Climate Change (UNFCCC). The second portion of this paper organizes key literature describing different feasibility criteria for PES implementation in the Rwandan context. To verify whether watershed PES is plausible, the paper then investigates the political, social, and environmental context of Rwanda's major watershed and compares these to fourteen international PES case study sites. The final portion of the paper links potential PES scheme designs in the Rugezi area to specific capacity building potential and then to climate change adaptation objectives.

Successful implementation of watershed PES in Rwanda will depend on careful scheme design and persistent trust-building in order to harmonize wetland inhabitant and electric utility needs. Existence of contextually parallel projects in Indonesia, South Africa, and Columbia, gives evidence that these challenges can be creatively overcome. Findings show that Rwandan decision-makers will need more hydrologic data to make ecologically informed and efficient decisions and to set targets. With several necessary conditions in place, watershed PES in Rugezi may be a feasible tool for climate change adaptation and energy sector resilience. However, there is need for cost-benefit analysis to clarify short term, long term, and distributive costs and benefits of such a project.

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