Project Title: **Investigation and Analysis of the Transient Hydrological Regimes of the Upper Nile Basin and Implications for Hydropower Development**

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Research Abstract

The Upper Nile basin is an important part of the Nile Basin. The lakes in this basin regulate the Nile flow through their large storage. The basin also supports the livelihoods of millions of people in six countries (Burundi, Congo D.R., Kenya, Rwanda, Tanzania and Uganda) which are some of the poorest in the world while the transboundary nature of the basin means there are often clashing interests and water resources management objectives. The interest in the basin dates back to the nineteenth century when several expeditions were made for the discovery of the source of River Nile. Interest in the basin has continued because of its complex hydrological setup. In addition Lake Victoria is important because its size means that it has a considerable impact on the regional climate. Its hydrology also controls the flow in River Nile which accounts for virtually all of the hydropower production and future development prospects in Uganda as well as being a key source of water supply for Sudan and Egypt.

However, the basin faces considerable challenges that threaten its ability to continue providing the above services. Rapid population growth is resulting in increased pollution of the water bodies, deforestation, etc which impact negatively on its socio-economic and ecological values like agriculture, fisheries, water supply, transportation, hydropower and others. There is therefore a need to understand the complex interactions between all these factors in order to be able to effectively plan and manage the resources for the betterment of the current populations without compromising the ability of future populations to enjoy the same benefits.

The current study seeks to contribute to this goal by investigating the drivers of hydrological change in the basin, analysing their implications and studying the possible future scenarios in view of current and planned hydropower development. The study involves extensive data collection within the basin, analysis of the hydrometeorological variables, water balance studies and Lake Victoria outflow regulation studies to build a clear understanding of the basin dynamics and possible impacts on the users. A review of the spatial and temporal characteristics of the variables is being carried out. The results will then be built into a regional water balance model that will be used for the lake regulation studies. Alternative options for regulating the Lake Victoria outflow will be proposed as one of the research outputs.