



## Environmental flows in the context of small reservoirs in Ghana

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Modification of rivers by dams reduces the magnitude and frequency of floods, and impacts the entire flow regime. In many cases, these modifications have adversely affected the ecological and hydrological integrity of the watershed as well as impacting food security and livelihood choices of the local community. There is now an increasing consensus that modification to river flows needs to be balanced with maintenance of essential water-dependent ecological services.

Many small multi-purpose reservoirs have been built in West Africa, where rainfall is highly variable, and droughts and flash floods are frequent. These small reservoirs are an important source of water for domestic use, livestock watering, small-scale irrigation and other beneficial uses in rural communities. The small reservoirs are hydrologically linked by their associated stream network. The reservoirs alter the hydrology of the streams and the groundwater resources within the region. When an individual reservoir is considered, alteration to the entire watershed is usually not significant. However, when considered as a system, together the small reservoirs store a significant quantity of water and influence downstream flows. The small reservoirs have rarely been considered as a system, thus little consideration has been given to their collective impact on the natural environment and livelihoods of the local population in the long term. Furthermore, the impact is difficult to quantify given the diffuse nature of the small reservoirs. Therefore, a comprehensive environmental flow assessment is needed to investigate the effect of the small reservoirs as a system on the watershed, and appropriate water policy should be formulated to implement the finding from the assessment.

Our project is specifically aimed at addressing this topic. We will present a case study conducted in the Upper East Region of Ghana and will discuss the findings on the hydrological, ecological and socio-economic implications of small reservoirs. The goal is to maintain water related ecosystem services and adequate downstream flows as we make use of small reservoirs to improve livelihood in the rural area.