

Research on Small Reservoirs in the Volta Basin

The Volta River Basin is an international river basin, shared by six West African countries. Each of these countries faces challenges related to poverty, food security, water management, and environmental degradation. Although each of these countries has different types of problems and different opportunities for improving conditions, they all can gain from a better understanding of hydrological and socioeconomic dynamics at basin scale.

For all people dependent on the water of the Volta Basin, supply for domestic use, livelihoods, industry, hydropower, and agriculture is determined by patterns of rainfall, and connections between the upper and lower portions of the basin. A large part of the Volta Basin is arid with highly variable rainfall. Communities living in these areas experience droughts often have insecure livelihoods. Small multi-purpose reservoirs are a widely used form of infrastructure for the provision of water, which can buffer these populations against risk and support thriving communities. Although reservoir ensembles store a significant quantity of water and have a significant effect on downstream flows, they have rarely been considered as systems, with synergies and tradeoffs resulting from the number and density of their structures.

Water from reservoirs provides for agricultural derived income and nutrition related to irrigated fruit and vegetable production, livestock, and fisheries. By far the largest portion of agricultural water use is within rainfed cropping systems. Land use practices associated with rainfed agriculture can influence the functioning of small reservoirs and therefore can work against gains in productivity, health and livelihoods made possible by small reservoir development.

We are soliciting IFS applications to work on the linkages between 3 aspects of small reservoir design and management:

- 1 Basin-scale hydrological functioning/dynamics
- 2 Catchment scale land use and socioeconomic drivers of reservoir function
- 3 Community level reservoir management linked to community health and poverty issues

Areas of Particular interest include:

- 1) Large scale monitoring of small reservoirs; including automated monitoring with satellite images;
- 2) Community tools for sustainable development of reservoir drainage water re-use
- 3) Use of water from small reservoirs for domestic purposes, associated health risks and interventions
- 4) Ground water irrigation
- 5) Water productivity of small reservoirs, integrating crops, fisheries and livestock production.
- 6) Identification of causes and effects of human activities, land use and climate on reservoir function and small scale irrigation at catchment scale;
- 7) Modeling of landuse impacts under different socio-economic and climate scenarios to inform decision making regarding the location of future reservoirs
- 8) Land tenure, land and water access