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Impact Assessment of Ensembles of Small Reservoirs in Semi-Arid Regions.

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Abstract: In the semi-arid regions of the world, a single small reservoir will, in general, have a positive socio-economic impact on nearby villages. To extend the availability of water collected during the rainy into the dry season has advantages in terms of irrigation, household water supply, fishery, and cattle. Large dams tend to have many negative impacts (displacement of people, large scale destruction of ecosystems, poor governance, etc.) that small reservoirs do not have. It is, therefore, not surprising that small reservoirs are seen by governments, international donors, and NGO's as an important means to improve rural livelihoods. In Burkina Faso, for example, over two thousand reservoirs have been constructed over the past decades.

An obvious question now becomes what the overall impact is of ensembles consisting of a large number of reservoirs. What are the hydrological and ecological impacts on the river system? Are there health implications through increased occurrence of malaria and schistosomiasis? Do markets become saturated with crops grown with water from small reservoirs? Are conflicts reduced or exacerbated between migrating cattle holders and sedentary farmers? Some of these questions are very difficult to answer whereas others are subject to an analytical scaling approach. We will put forward some simple tools to calculate the hydrological impacts of reservoir ensembles at different scales. In addition, a review will be presented addressing health and other socio-economic impacts.

This paper presents results from the Small Reservoirs Project (www.smallreservoirs.org), which is part of the Challenge Program Water for Food (www.waterforfood.org), and analyzes small reservoirs in Brazil, Burkina Faso, Ghana, and Zimbabwe.

Keywords: Small reservoirs, dams, savanna, West Africa, irrigation, household water