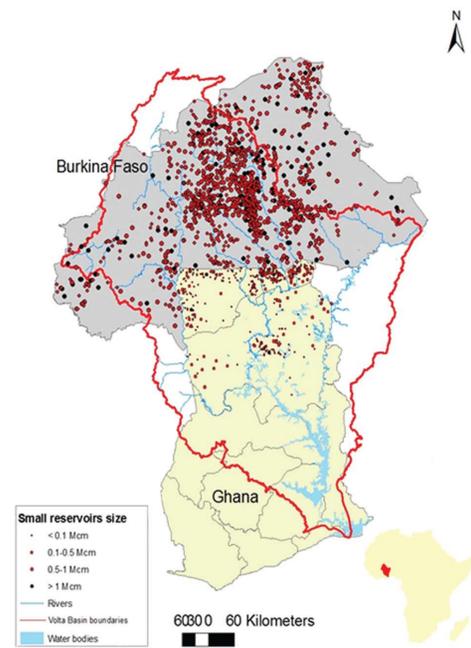


Evaluating Small Reservoirs as an Agricultural Water Management Solution

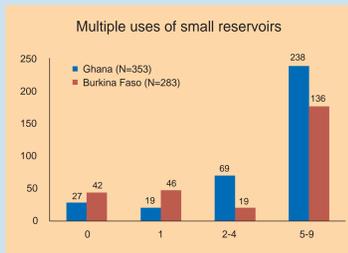
Introduction

The AgWater Solutions project is reviewing a number of agricultural water management (AWM) practices to determine which could be promoted to improve the livelihoods of smallholder farmers. The review of small reservoirs in Burkina Faso, Ethiopia, Ghana and Zambia has shown that well-managed investments can bring multiple livelihoods benefits, but to achieve this there needs to be changes in the way small reservoirs are planned, developed, managed and evaluated.

Distribution of small reservoirs in Burkina Faso and Ghana



Small reservoirs in sub-Saharan Africa



Small reservoirs benefit millions of smallholders in rural areas. On average, in sub-Saharan Africa, a small reservoir benefits 2,500 people who may use it for irrigation, livestock, fisheries, domestic use and recreation. Thousands of small reservoirs across Africa allow for soil and water conservation; drought proofing and famine protection; and productive water use. As a result, they are in high demand from local communities and also fit in with national strategies and policies, and have the support of international development partners.

Knowledge and information gaps

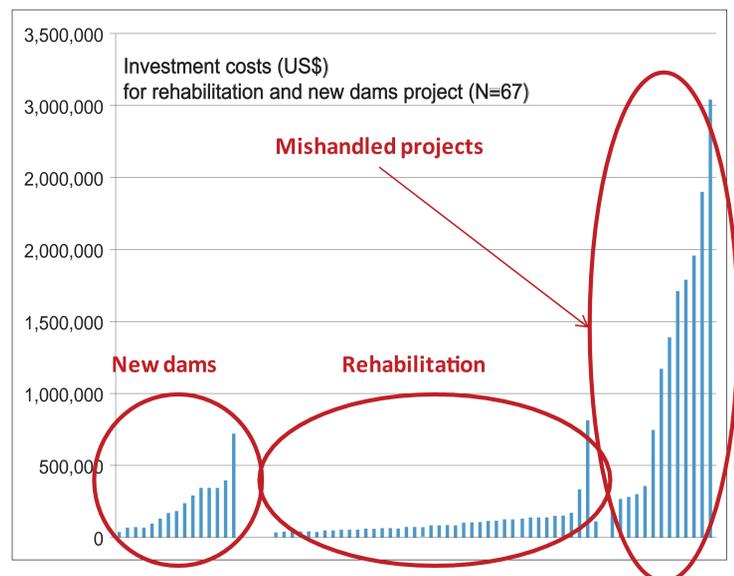
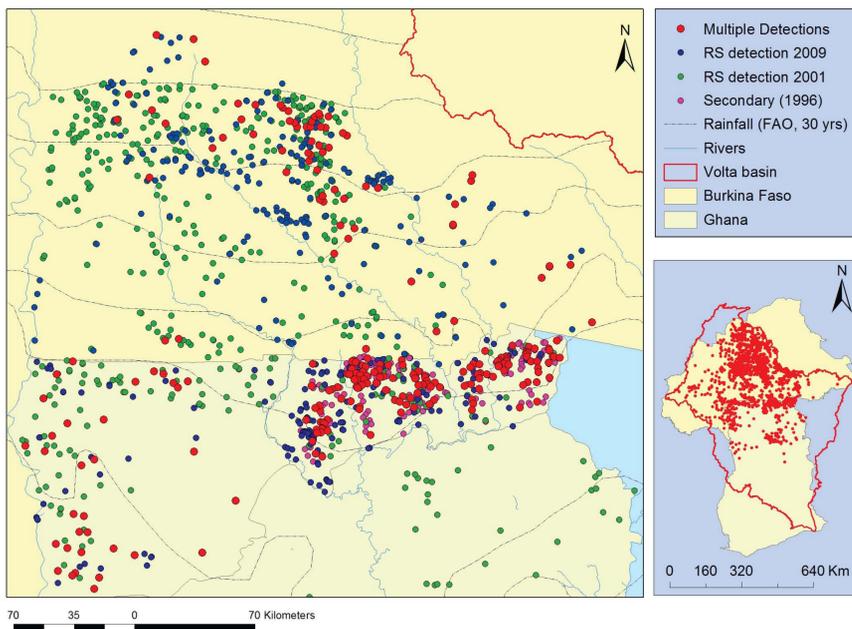
Despite the numbers and value of small reservoirs in sub-Saharan Africa, information about them is inconsistent. This leads to planning and management challenges and ill-defined strategies and policies with adverse environmental impacts. To address this, there needs to be investment in knowledge and information, for example, through: centralized data collection, regular monitoring, institutional changes, the use of remote sensing and GIS, data sharing procedures and improved accountability.

Calculating cost and benefits and managing investments

Storing surface water is often considered to be one of the most expensive ways to invest in ARM but it is sometimes the only way to grant rural communities access to water, especially those facing the challenge of climate change. To effectively evaluate small reservoirs and to compare them to other AWM interventions, a cost/benefit analysis needs to be considered per capita and for the whole lifetime of the project. If well managed, costs are comparable to investments in other types of interventions.

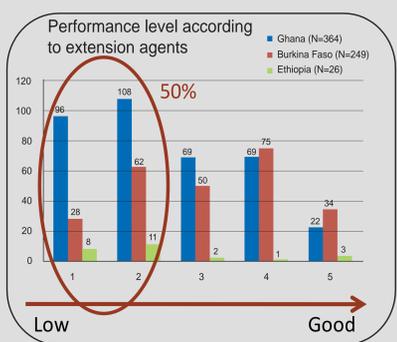
The investment costs for small reservoirs can be prevented from rising by improving procedures throughout the process. Accurate feasibility studies, proper preparation and stricter accountability to decision-makers, funders and local communities can all control costs and improve the outcome.

The challenge of comparing databases - the red dots represent overlap in three data sets



Data from the field: In Ghana, rehabilitation projects implemented between 1995 and 2010 cost an average of US\$100,000 per dam compared to US\$230,000 for new dams. Investments ranged from as low as \$3,000/ha for a dam that is performing well to as high as \$80,000/ha for a dam that is performing poorly. The average investment was US\$16,000/ha and the risk of high costs increased as the size of the designed irrigated area decreased, with the highest risk for command areas of less than 10 ha. Investment costs per household are US\$9/yr and US\$20/yr for rehabilitation and new construction, respectively, if a 30-year lifetime is considered.

Renewing the small reservoir model

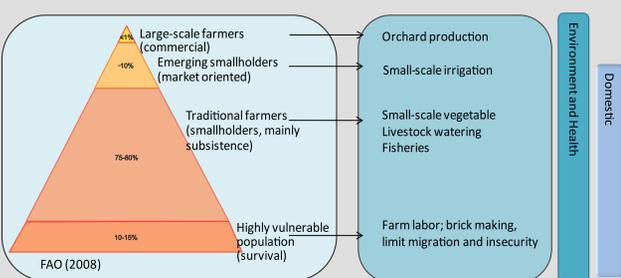


Currently, small reservoirs perform below expectations for irrigation but provide multiple benefits to multiple users that are often unaccounted for.

Small reservoir models and the performance evaluation criteria should be broadened to take account of this. An integrated approach that considers multiple uses, pre-existing farming systems and externalities is needed. Small reservoirs projects should make use of possible synergies, e.g., groundwater recharge and direct pumping. They should be accompanied by investments in irrigation extension and monitoring structures.

Data from the field: In Ghana, it has been evaluated that smallholder irrigators can derive **US\$500/ca/year**; small dams also enhance livestock production by **one fourth**. In Burkina Faso, conservative estimates show that an average small reservoir can produce **500 kg of fish per year**, improving nutrition and providing marginal "insurance revenues". **Research is needed on the economics of multiple uses.**

More attention to local arrangements: Collective management yields higher benefits



To be effective, small reservoirs also need an effective institutional component. Water user associations, for example, are not adequate "tools" as they ignore the multiple arrangements and scales that characterize natural resources management. To be successful, the approach should provide multiple organizational options to communities, and promote coordination with traditional and other authorities.

For irrigation, there is a trade-off between equity and profitability. Most projects promote small plots (0.1-0.25 ha) which improves nutrition but is not sufficient to produce surplus to sell.

Small reservoirs remain too often conceived as "societal fixes" by most development actors; more attention needs to be given to the way the "local" context shapes interventions in small reservoirs. If this is done, small reservoirs can be an extremely cost-effective AWM solution benefitting thousands of smallholder farmers and their families.