



CASE STUDY

Tanzania: Critical analysis of river basin management in the Great Ruaha



Summary

The Great Ruaha River is important in terms of the utilisation of its water for agriculture, meeting the ecological needs, and the generation of hydroelectric power. During the early nineties, a series of zero flows in this previously perennial river alerted the authorities to hydrological and environmental change. A project investigated the reasons and possible solutions and illustrates the critical role of long-term, large-scale, interdisciplinary research in approaching complex problems.

Background

This case study describes different responses to growing water scarcity in the dry season in the Usangu Plains, a catchment of the Great Ruaha River in South-West Tanzania. The Great Ruaha River is of national importance in terms of the utilisation of its water for significant rice production, maintaining a RAMSAR wetland site, meeting the ecological needs of the Ruaha National Park and the generation of hydro-electric power.

The background to the issues is best described via the rationale for the project “Sustainable Management of the Usangu Wetland and its Catchment” (SMUWC) which resulted from national and local concerns about the management of water and other natural resources in the Usangu Basin in Southern Tanzania.. In particular, national power shortages in the mid nineties were attributed to low flows to the Mtera/Kidatu hydropower schemes from the Ruaha River. A reduction in low flows in the Great Ruaha, where it passes through the Ruaha National Park, was also noted. There has now been a succession of years in which the river in the park has dried up completely during the dry season, and for increasing

periods. An increase in competition for water was noted in Usangu itself, leading to conflict and sometimes violence. Concern was also expressed that the wetlands in the project area were diminishing and were becoming degraded, and that a valuable natural asset was being lost.

The Usangu Basin, or Upper Ruaha Basin, covers an area of 21,500 km² and forms the headwaters of the Great Ruaha River, itself forming a major sub-basin of the Rufiji River. Usangu may be broadly divided into the central plain and a surrounding higher catchment. On average, the plain receives 600-800 mm annual rainfall, and the high catchment up to 1500 mm. Most of the rain falls in one season from mid-November to May. Six water users are differentiated:

- Rainfed farmers and domestic water users in the high catchment;
- Irrigators in the plains at the base of the escarpment;
- Domestic users and rainfed maize cultivators in the plains;
- Pastoralists and fishermen and women in the central wetland;
- Wildlife and tourists in the Ruaha National Park that surrounds the riverine reach;
- The Mtera/Kidatu hydropower schemes.

Actions taken

In the Usangu Plains, essentially three key river basin programmes have been devised and implemented under the Ministry of Water and Livestock Development (MoWL) within the last five years. These are:

1. The Rufiji Basin Water Office (RBWO): Basin Water Offices represent the new basin structure that the MoWL is gradually implementing nation-wide, with the Rufiji, the Pangani and Lake Victoria as the first pilot basins. A sub-office for the Usangu Plains in Rujewa, Mbarali District, was opened in 2001. The main activity of this sub-office is the issuing of water allocations.
2. The River Basin Management and Smallholder Irrigation Improvement Project (RBMSIIP): This project started in 1996 and is funded via a World Bank loan. The aims are:
 - To strengthen the government's capacity to manage water resources and address water-related environmental concerns both at the national level, and in the Rufiji and Pangani Basins (the river basin management (RBM) component under the MoWL);
 - To improve the irrigation efficiency of selected traditional smallholder irrigation schemes in these two basins principally by the construction of concrete weirs and intake structures with control gates (the SIIP component under the Ministry of Agriculture and Food Security). In the Usangu Plains, the RBM component is funding the sub-office of the Rufiji Basin Water Office. Also, two concrete intake structures have been constructed in streams shared by a number of traditional irrigation schemes under the SIIP component of the project.
3. The "Sustainable Management of the Usangu Wetland and its Catchment" (SMUWC): SMUWC ran from 1998 to 2002. The direct client of this DFID-funded project was the MoWL (Rufiji Basin Water Office). The project also worked closely with the district administrators of the project area, as well as with the Ministry of Agriculture and Food Security. SMUWC intended to investigate the nature and causes of hydrological changes, and to assist the Government of Tanzania and key stakeholders (both local and national) in the development of a sustainable natural resource management

strategy. Ultimately, it expected to contribute to the maintenance and improvement of rural livelihoods.

In partnership with the World Bank project, SMUWC contributed to the drafting of a national water policy, strengthening of basin management institutions and the rehabilitation and upgrading of the hydrometric network. In addition there were a number of specialist studies, the outcomes of which were shared.

Outcomes

The analysis – based on results of two DFID (Department for International Development) projects, SMUWC (Sustainable Management of the Usangu Wetlands and its Catchment) and RIPARWIN (Raising Irrigation Productivity and Releasing Water for Intersectoral Needs) – incorporates a critical examination of the appropriateness of newly established river basin management structures to the problems and issues found.

1. **Contested Water Resources Assessment:** SMUWC and the Ministry of Water and Livestock developed a hydrological model and a monitoring programme that suggested multiple causes of the changes in the Ruaha and wetland flow regimes. These assessments challenged the original assumptions that the wetland shrinking and the zero flows in the Ruaha were mainly due to overgrazing and excessive consumption of water by livestock and a reduced ability of the wetland to act as a 'sponge' holding back water for later release into the Ruaha. The studies also refuted the strongly held belief that climate change and deforestation had caused a reduction in the baseflows of rivers flowing off the escarpment.
2. **Contested Water Allocations:** The Rufiji Basin Water Office has been charged with the introduction of water allocations and fees at all irrigation intakes on the Plains and has records of approximately 300 irrigation users. These allocations are flow rate based (e.g. 0.6 cumecs), and focus on wet season rice – though allocations are generally halved for the dry season. While the water allocations promoted widely by the RBWO appear elegant (a simple flow rate) and may have worked in other countries, they may not be appropriate in Usangu.
3. **Contested Intake Structures** The pursuance of an irrigation intake upgrading programme by the World Bank project utilizing irrigation-focussed engineering procedures is another case of mixed and unintended outcomes. Whilst this is supposed to raise irrigation efficiency, under close examination, the provision of concrete weirs and intake works shows that reliance on intakes alone does not, and cannot, raise irrigation efficiency to the levels expected by RBMSIIP.

A key conclusion is that managers of IWRM should continuously review and enrich the knowledge base, perceptions and processes of hydrological and system change in river basins with the aim of refining 'an appropriate institutional response'.

In other words, we should not be satisfied with what appears to be an integrated water resources management approach, but critically unpack its components and identify modes of IWRM that are fully cognisant of the science, issues and responses at stake, and therefore deliver effective tailored solutions.

Lessons Learned

The critical role and benefits of long-term, large-scale, interdisciplinary research, in partnership with key stakeholders, to identify complex factors underlying environmental and hydrological change.

The difficulty in addressing entrenched views of “normal professionalism” (a term used to describe a rather inflexible discipline-focused approach) or the powerful local elite that result in misdistribution of water or inappropriate natural resource management;

Understanding the role of the local, regional and national elite in decision-making and effecting change, although this does not fit with the mainstream notion that advocates local level user participation

From a livelihoods’ perspective, local water development solutions are a more desirable solution to manage basin-level water scarcity than the originally proposed reallocation of water from poor to powerful water users

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Related IWRM Tools

International Water Law, Regulatory Bodies and Enforcement Agencies, Basin Organisations, Training Water Professionals, Socio-Hydrological Modelling

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