Impact Assessment Concepts Integrative Case Study: Great Ruaha River Basin (Tanzania)

The case study of the Great Ruaha River basin is intended deepen our understanding of the key impact assessment concepts briefed in the preceding session (cumulative and indirect impacts, ecosystem services and treatment of GCC issues) by illustrating how these concepts manifest and why they matter in a complex, consequential, real-life example.

Instructions. Following review of the materials associated with the case study, your task as a group is to respond to the following questions, as well as to consider how the case study lessons could be applied to current or anticipated USAID projects, particularly where USAID is a collaborating or contributing partner in a larger regional or sectoral development program or initiative.

Report-out will take the form of a facilitated discussion.

Case Study Questions:

1. Who are the stakeholders in the region?
2. What are the primary activities occurring in the water basin/impacted area?
3. What are cumulative, indirect, direct impacts to this system related to the activities occurring?
4. What ecosystem services are being impacted via the various activities in the region?
5. Identify social impacts/issues of concern arising from these activities.
6. How does climate change affect the severity or significance of these impacts?
7. Identify3-4 " lessons learned" that could be applied more generally to USAID projects, especially where USAID is a collaborating or contributing partner in a larger regional or sectoral development program or initiative

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SETTING

The Great Ruaha River (GRR), located in south-central Tanzania, flows through the Usangu wetlands and the Ruaha National Park east into the Rufiji River. The Ruaha River supplies approximately 22% of the total flow of the Rufiji River catchment system. The basin catchment area of the Ruaha River is ~84,000 km2[1]; it is one of three major tributaries of the Rufiji River. The inhabitants of the basin depend upon irrigation and water-related livelihoods, such as fishing and livestock, while it is a biologically diverse and important area. Thirty-eight species of fish have been identified in the Great Ruaha River system.

From 1993-1999, the population of river basin inhabitants doubled from 3 to 6 million people, increasing pressure on water resources and other ecosystem services. Irrigated rise has increased from about 3000 ha in 1958 to around 40,000 ha in 2005.

Temperature ranges from lows around 15-18C up to 32C in October/November/December. From January-August high temperatures are around 29C, while lows are around 19C in January-May and 15C June-September. The rainy season generally runs from November through April, with the heaviest rains

[1] *Estimate varies depending on the source and how the basin is measured. Another figure is 63,000 km2*

occurring December through March. The plains area is semi-arid and the rainfall has considerable variability from year to year, while the highlands area is much wetter (1.47 m annual rainfall vs 0.72 m annual rainfall).

The Ruaha River's headwaters are in the Kipengere Range. From there, the river descends to the Usangu wetland plains, an important region for wildlife, irrigated agriculture and livestock in Tanzania. The wetlands are a Ramsar wetland site and an important wildlife area, particularly for large wildlife herds and birds. The park is home to Tanzania's largest elephant population, as well as large herds of buffalos, greater and lesser kudus, Grant's gazelles, wild dogs, ostriches, cheetahs, antelopes, and more than 400 species of birds. The Ruaha National Park is unique in that it encompasses a transition zone between East African savannah lands and the miombo woodlands, which are more common to the south. The park is home to plant and animal species from both ecological zones.

The wetlands cover about 2000 km2 and the core wetlands support a high species diversity of birds. The eastern wetlands are located inside the Usangu Game Reserve and from the outlet of the reserve, the river flows northeast through the Ruaha National Park and its buffer zones of wildlife reserves to finally discharge into Lake Mtera, formed by one of two dams on the river. Two dams are located on the river, the Mtera Dam (80 MW) and the Kidatu Dam (240 MW), which generate approximately 50% of Tanzania's electricity. Further downstream, it joins the Rufiji River.

The GRR is of national importance for rice production, maintenance of ecological function of the wetlands and national park, while providing enough flow for generation of electricity via two dams downstream. Resource users have been identified as:

1. Farmers who depend on rainfall and domestic water users in the high catchment area
2. Irrigators in the plains at the base of the escarpment;
3. Domestic users and rainfed maize cultivators in the plains;
4. Pastoralists, fishermen, and women in the central wetland;
5. Wildlife and tourists in the Ruaha National Park
6. Mtera/Kidatu hydropower dams

Surface water flows are used for domestic and agricultural purposes; most of the irrigation is located in the upper parts of the plains and consists of several different types of farms including large-scale state-owned farms; traditional smallholder; "improved" smallholders and smallholders peripheral to the state farms.

Long-term trends

Decreased flows in the Great Ruaha have been recorded since the early 1990s and some sections of the river have dried up completely at different times throughout the year. The once perennial river flows have become more unpredictable with negative impacts on ecological and socioeconomic aspects in the region. For example, the dry periods coincide with peak tourism and wildlife season, where viewing of game is a primary economic driver for the park. However, without water in the river, the wildlife now seek water elsewhere outside of the park. Furthermore, competition for water was not only noted among wildlife, but amongst inhabitants of the basin leading to conflict and sometimes violence. Uncontrolled and poor water management coupled with large rice irrigation schemes have been attributed for the drying of the river. Originally, the rice cultivation areas released water back into the GRR through irrigation canals, however in at least the last decade this water has been captured for use by other farmers (both with and without water licenses).

The drying of the river has severe socio-economic consequences, including hindering hydroelectricity production and causing a phase-shift in the Ruaha National Park; the ecosystem is shifting from a wet tropical environment to a dry tropical environment, with significant consequences for wildlife as well as tourism.

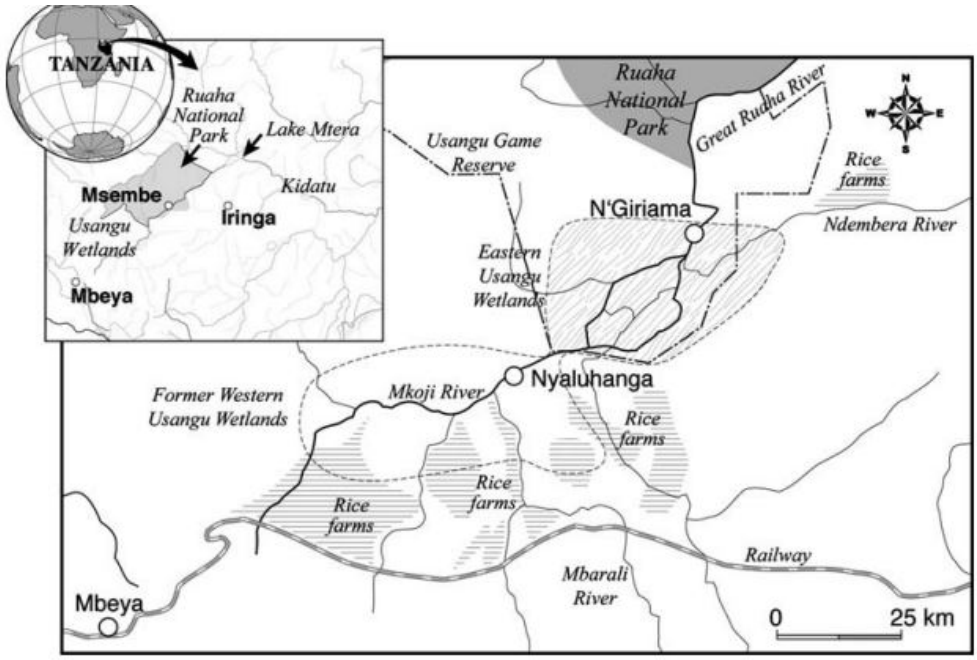

Figure 1. Map of the Usangu plains, showing the drainage pattern, key locations, and approximate location of rice farms. The inset is a general location map of the GRR. Nyaluhanga and N'Giriama are river gauging stations located at, respectively, the inlet and the outlet of the eastern Usangu wetlands. Much of the eastern Usangu wetlands are located in the Usangu Game Reserve. Msembe is the river gauging station in the RNP. The GRR flows into Lake Mtera, and this water is used to generate hydroelectricity at the Mtera and Kidatu plants.

RESOURCES

Provided in sourcebook: Global Water Partnership. Tanzania- Critical Analysis of River Basin Management of the Great Ruaha Case #121. http://www.gwp.org/Global/ToolBox/Case%20Studies/Africa/Tanzania.%20Critical%20analysis%20of%20river%20basin%20management%20in%20the%20Great%20Ruaha%20(%23121).pdf

Provided in sourcebook: Kiishweko O. 2013. Great Ruaha river that helps feed Tanzania under 'alarming stress.' The Guardian January 15, 2013. http://www.theguardian.com/global-development/2013/jan/15/great-ruaha-river-tanzania-stress

Mtahiko et al. 2006. Towards an ecohydrology-based restoration of the Usangu wetlands and the Great Ruaha River, Tanzania. Wetlands Ecology and Management. http://www.coppolillo.com/uploads/1/1/2/3/11231708/mtahiko.et.al.2006.ruaha.ecohydrology.pdf

Kashaigili JJ et al. 2005. Environmental flows allocation in river basins: Exploring challenges and options in the Great Ruaha River catchment in Tanzania. Physics and Chemistry of the Earth, Parts A/B/C Vol 30: 11-16, pp 689-697. http://www.sciencedirect.com/science/article/pii/S147470650500080X

Map credit: Mtahiko et al. 2006. Towards and ecohydrology-based restoration of the Usangu Wetlands and the Great Ruaha River, Tanzania. Wetlands Ecology and Management.DOI 10.1007/s11273-006-9002-x