

¹ Resolving these

increased use (IUCN, 2003). Several studies show that the Pangani basin is already over-stressed the river's flow has decreased dramatically in recent years and water demand is expected to double by 2015 (see, e.g., IUCN, 2003).

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The basin's water originates largely from rain falling on the mountains of Meru, Kilimanjaro, and Pare, and partly from snow melting from Kibo Peak (Mt. Kilimanjaro). The lowlands have reserves of underground water and springs, which are recharged by rain from the mountains. The climate of the Pangani basin varies widely by location and altitude. The rela-

20 Although essential for human survival,

water is inherently inequitable, as it is

rarely evenly distributed among popu-

lations. Local users compete to obtain their

Population and Migration in the Pangani River Basin

Population Growth

The population of both rural and urban areas of the Pangani River basin—currently home to 3.7 million inhabitants—is rapidly growing (IUCN, 2003). In the first half of the 21st century, the population is predicted to double every 20 years in rural areas and every 10 years in urban areas (University of Dar es Salaam & United Nations, 1993). Ninety percent of the population lives in the highlands, leading to a population density of up to 300 people per sq. km, compared to 65 people per sq. km in the lowlands (IUCN, 2003). This rapid population

clan furrows, amplifying water conflicts. Small farmers in the lowlands reported that their share of the water was not adequate because upstream users used their



Mt. Kilimanjaro, Tanzania (© R. Strickland, courtesy of USAID).

run dry, leading to power rationing in the country in 1992, 1994, 1997, and 2000 (Ministry of Water, Energy and Minerals [MWEM], 1995; “Power sharing to begin very soon,” 2000).

Hydrological data collected by TANESCO suggest that water supply for its dams is declining due to uncontrolled irrigation in the upper part of the basin. TANESCO believes that since hydroelectricity is essential for industrial production and domestic consumption, it should be granted the entire right to withdraw water from the Pangani River, which is in violation of the 1991 Water Right Act.

The Water Right Act of 1991 established the first river basin authority in Tanzania in the Pangani River basin. Since that time, small-scale irrigators have complained that these water rights were introduced to protect the power generating plants, and feel that either they do not get their share of water or they get too little, too late. On the other hand, the large water users lament that they do not get enough water to produce power or food because the small farmers withdraw too much water and return very little to the river systems. The large-scale planters maintain they withdraw only enough water to supplement rainfall moisture and return excess water

to the river systems, arguing that the amount they use does not significantly affect power production. In this conflict, where the national interests are in jeopardy, large users like TANESCO and the plantations are likely to win. Nonetheless, all stakeholders must be involved if efforts to resolve this conflict are to be sustainable.

Communities and Donor Agencies

The competition among donor agencies in the basin generates confusion in the community. These donor agencies are largely run by expatriates who serve the interest of their countries. At the same time, they exacerbate water problems in the basin because they compete for the same resources.

The donor agencies operating in the basin include the World Bank, United Nations Development Programme, Food and Agriculture Organization, International Labour Organization, JICA, GTZ of Germany, and the Norwegian Agency for Development, in addition to NGOs from the Netherlands and Belgium. Most of these agencies are involved in projects that rehabilitate existing irrigation schemes, encourage soil conservation, and improve water management.

Some of the projects collapsed after the donor left because they were directly funded by the agencies and thus bypassed the local community and ministries. A resident in Kisangara village describes a typical situation:

The whole Kisaranga village received clean water 10 years ago when the donor agency called JICA constructed gravity water pipes from River Kisangara. After their departure there is no single drop of clean water and so we are forced to rely on one pipe, which belongs to the sisal estate. Unfortunately the owner is an Indian who does not care about the welfare of the people. He has allocated about just an hour in the morning for all these people to fetch water and so most women sleep near the pipe just to get one bucket of water. (Mzee Sangiwa, personal communication)

Farmers and Pastoralists

The study revealed a number of conflicts emerging from the co-existence of farmers and pastoralists. In my survey, every household raised serious concerns about the increasing number of livestock in the basin, which has risen dramatically over the last 20 years as low-land pastures far from the river degraded due to heavy use and drought.² Some blamed the high numbers of cattle for the current crisis at the Nyumba ya Mungu hydroelectric dam, due to their heavy consumption of water and land degradation from overgrazing.

Cattle entering fields and destroying crops and irrigation structures is a major source of conflict, sometimes leading to bloodshed or imprisonment. Agro-pastoralists established villages in areas reserved for livestock and have thus interfered with routes to cattle watering points (Campbell, 1999). Both farmers and pastoralists openly blame each other, categorically stating that in the past the boundaries between farmers and pastoralists were well-defined. In addition, the influx of cattle and other livestock in the basin has created a wave of cattle thefts, which is exacerbated by the Maasai belief that all cattle belong to them so they have the moral right to “recover” cattle from other tribes.

The large amount of livestock and cultivation in the lowlands’ more marginal lands has accelerated land degradation. Serious competition between livestock, population, and wildlife has far exceeded the basin’s carrying capacity leading to the heavy deterioration of biomass, which endangers the entire ecosystem. This conflict is clearly revealed by the Maasai residents of the Mbuguni village, one of whom categorically stated:

The people from the regional headquarters and Pangani Water Basin Office keep on telling us that this water belongs to the nation and we are supposed to share it with other people who do not know the importance of livestock to the Maasai. The name Kikuletwa is a Maasai name showing that the river belongs to us from time immemorial. We know they have big guns but we



Population growth and migration in Tanzania’s Pangani River basin—arguably the most water-stressed basin in the country—have intensified local water conflicts. Resolving these conflicts requires understanding the socio-cultural context of the local communities and increasing stakeholder involvement in water management.

are going to defend it with our spears. (personal communication)

Rural-Urban Competition

As the people migrate to urban areas, the demand for water in towns such as Arusha and Moshi rapidly increases for both domestic and industrial activities. Moreover, some large rivers have been dammed in order to supply the water for these towns, reducing the flow of water downstream and causing some of the rivers to dry up completely during the dry season.

In addition, these urban centers generate solid and liquid waste that pollutes the major source of water (Kalwani, 2001). In both Arusha and Moshi, less than 5 percent of the population is connected to the central sewage system and the rest use pit latrines or other elementary sanitation facilities (Chapuis, 1999; Kalwani, 2001). Water pollution increases as the urban areas grow and as farmers use more chemical inputs to grow enough food to feed the fast-growing population. As a result most downstream households are forced to drink spring water or boil their drinking water.

Communities and River Basin Authorities

The government has attempted several times to introduce systematic state intervention in the

worse, once these water rights are issued other people are barred from using the resource. To resolve this conflict I recommend that the 1999 Land Act, which transfers all land and resource matters to the villages, be enforced.

The conflict between hydroelectric generators and other users can only be resolved if institutions like TANESCO realize that other users were there before them. They should also realize that proper management of the basin's water resources must include all stakeholder users

