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The WRC operates in terms of the Water Research Act (Act 34 of 1971) and its mandate is to support water research and development as well as the building of a sustainable water research capacity in South Africa.

POLICY BRIEF

Water infrastructure development

Monitoring impacts of the Mzimvubu water project

A completed study funded by the Water Research Commission (WRC) proposes long-term monitoring of agriculture, environmental and socio-economic aspects to be impacted in the area to be affected by the new proposed Ntabelanga Dam.

Background

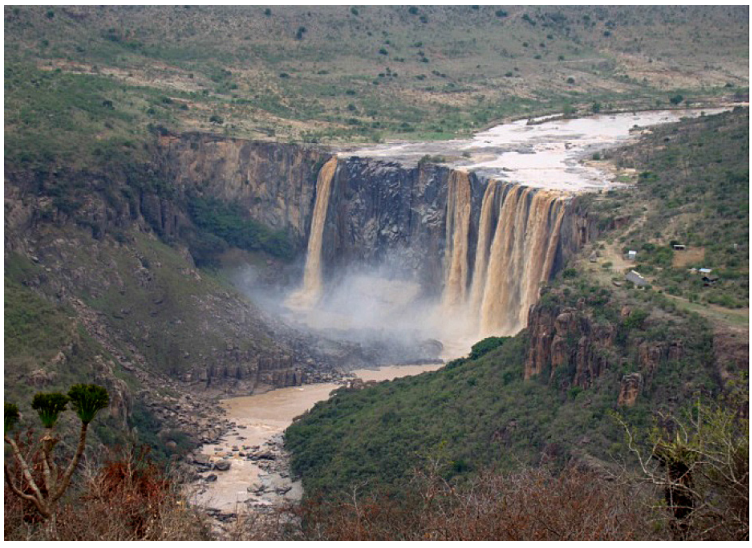
The Mzimvubu River is the largest undeveloped river in South Africa. This is despite the fact that the river has high annual runoff, high environmental status, high tourism potential, and is suitable for afforestation and moderately suitable for dryland/rainfed and irrigation agriculture.

For these reasons, the Department of Water Affairs (DWA) investigated the potential of building a multipurpose dam in the Mzimvubu basin to serve as a catalyst for economic and social development. After studying 19 potential sites, the then Minister of Water & Environmental Affairs stated in her budget speech announced that the Ntabelanga site in the Tsitsa River was chosen as the most appropriate site for the multipurpose dam. An additional, smaller dam downstream of Ntabelanga site will also be built for the generation of hydroelectricity.

Importance of long-term monitoring of dam construction impact

Despite the widely acknowledged benefits of large dams, dam development continues to come up against important questions of social and environmental sustainability. The success of a dam project is no longer just a matter of it being 'technologically feasible' – it is equally an important socio-logical and environmental matter.

Success is increasingly being measured by the extent to which a dam project coheres with specific social and envi-ronmental dynamics in the local area – in the short, medium



Tsitsa Falls, part of the Mzimvubu River system

and long term. Studies have shown that a failure to pay close attention to specific socio-cultural dynamics in the local area could expose the project to invidious local resistance, if not immediately, then certainly in the long run. There is also the crucial question of environmental impact which requires attention.

This project, funded by the WRC and undertaken by the University of Fort Hare, proposes a procedure for long-term monitoring of environmental, agricultural and socio-economic changes associated with the building of the Ntabelanga Dam. The final report describes the current situation in Ntabelanga with the focus on the physical environment, the dominant agricultural practices as well as the perspectives, hopes and fears of communities in the study area.

The ***status quo*** is followed by suggested monitoring actions and methodologies that should be followed to capture the impact of the dam (before, during and after construction) on the environment, agriculture and people.

The physical environment

Long-term climatic data shows the distinct seasonal distribution of rainfall. Long-term streamflow data illustrates that the Tsitsa River is prone to extremely high peak flows and that baseflow in this river seldom ceases.

In general, the soils bordering the proposed dam site are unsuitable for crop production and irrigation due to their high susceptibility to erosion. However, areas with deep, sandy soils that have the potential to be developed intensively were identified. The extent of erosion in the study area is extreme.

Wetlands and a natural forest in the study area were identified; however, a number of smaller wetlands (not delineated) exist.

Environmental aspects that will be impacted by the dam include streamflow regimes, streamflow volumes, water pollution, dissolved oxygen levels, sediment and nutrient loads, groundwater quality and quantity, changes in stream morphology, aquatic biodiversity and abundance as well as destruction of riparian vegetation. All of these aspects will have to be subject to long-term monitoring.

The social environment

There are two main communities that will potentially be directly affected by the dam. Ndzebe Village lies on the banks of the Tsitsa River about 3 km downstream of the proposed dam wall. In turn, Lower Sinxaku is located on the edge of the anticipated footprint of the Ntabelanga Dam.

Preliminary sociological data reveal a deep-lying narrative and vision of the 'good life' in the study area (i.e. a general wish and expectation the dam will bring improvement in, for example, access to basic services). Though evidently submerged under the gloom of poverty, hidden by barren hills, and somewhat eclipsed by a deep distrust in the government, such a narrative and vision, nonetheless exists.

The respondents' sophisticated articulation of the choices the dam project opens up, and of their readiness to take advantage of the project to attain self-reliance and improve their lives, is a strong case for a scientific project that monitors the socio-economic impact of the dam. This is despite the fears expressed about the potential socio-ecological risks that the dam poses at the local level.

Hopes and fears of the kinds expressed by respondents are powerful ingredients for constructing a robust 'social sustainability matrix' that will boost the overall understanding of the long-term local impact of the dam. The hopes and fears of communities affected by the dam should be captured and related to the actual changes in the socio-economic situation.

A number of socio-economic aspects that should be subjected to long-term monitoring were identified, including, increased occupational and entrepreneurial opportunities, enhanced household incomes and skills development, as well as impacts on socio-cultural and capital resources.

The agricultural environment

The agricultural data indicate that activities, such as livestock, crop and vegetable production, were used to provide enough income to sustain members of the two communities in the past. However, this is not the case anymore. Agriculture is now only a supplementary activity.

While agriculture does provide food security and, in some instances, additional income, the lack of sophisticated production inputs (quality seeds, fertiliser) and the absence of crop rotations and mulching, in addition to the dependency on unsteady rains, prevent agriculture from playing a more important role in the livelihoods of the two communities.

The construction of the dam and the consistent availability of water it will provide, may indeed provide the opportunity for increasing agriculture's importance in terms of contribution to livelihoods. Consequently, it would be

interesting to monitor how the communities may take advantage of the dam.

Rejuvenation of the agricultural sector is one of the main motivations behind the Mzimvubu water project. The impact of the dam on agricultural practices should be quantified, however, including measurement of yields; areas cultivated and used for crop grazing; crop diversity; ratios between irrigation and rainfed agriculture; ratios between livestock and crop production and household income from agriculture.

Conclusion

The success of large infrastructural projects is increasingly being measured by the extent to which the project coheres with social and environmental dynamics in the area affected, the expectations and fears of the communities to be impacted by the dam should be understood and quantified where possible.

Continuous monitoring of changes in local perspectives in relation to actual impacts should be conducted. Examples of socio-economic aspects to be monitored include occupational and entrepreneurial benefits, improved skills and income as well as loss of resources.

Holistic monitoring of the interactive relationships between the environment, agriculture and the socio-economic welfare of the people is integral in the proposed long-term monitoring of the impacts of the Ntabelanga Dam.

Further reading:
To order the report, ***Conceptualising long-term monitoring to capture environmental, agricultural and socio-economic impacts of the Mzimvubu water project in the Tsitsa River*** (**Report No. KV 328/13**) contact Publications at Tel: (012) 330-0340, Email: orders@wrc.org.za or Visit: www.wrc.org.za to download a free copy.