A regional and multi-faceted approach to postgraduate water education – the WaterNet experience in Southern Africa

SUPPLEMENT

Integrated Water Resources Management for Improved Rural Livelihoods in the Limpopo River Basin (Limpopo PN17). (Source: Ncube et al., 2010 and Kileshye-Onema et al., 2011)

An integrated approach to water resource management is required to balance water for food and nature but also to unlock pathways to sustainable development. The semi-arid Limpopo basin is a hotspot area in terms of scarcity of water for food as well as poverty. Translating IWRM from concept to action here poses a great challenge. Water institutions adopt a conventional blue water framework, focusing on water supply for irrigation, domestic and industrial use. In semi-arid regions such a water resource strategy has its limitations, though. Blue water resources for irrigation are over-committed, while the bulk of agricultural produce sustaining lives of resource poor farmers originates from green water flows in rainfed crop and livestock production.

IWRM is a systems approach to water management, based on the principle of managing the full water cycle, including green water. The improvement in resilience that the IWRM approach can impart to rural livelihood systems has been investigated and described by a series of case studies. Community or catchment water resource assessments must become an essential precursor to food security interventions, due to the convergence of water scarcity and food scarcity, and the constraints that water resource availability impose on development initiatives in basins such as the Limpopo (Love et al., 2006, 2010).

Access to green water in rainfed farming can be improved through a package of conservation agriculture techniques. Conservation tillage methods, such as planting basins, help to concentrate rainfall that falls in the field into the root zone of the crops and decreases runoff out of the field (Ncube et al., 2009). Best results are obtained when such methods are combined with fertility improvements such as manure, or micro-dosing with nitrogen fertilizer or with measures such as mulching that improve the use of water by crops and also decrease evaporation (Mupangwa, 2009). Yield improvements in rainfed farming translate very quickly into major improvements in green water productivity (Ncube et al., 2007; Rockström et al., 2007). The farming system's resilience is thus raised without industrial scale interventions.

Supplementary irrigation, using micro-catchment or runoff farming incorporates small-scale utilization of blue water into rainfed farming. It thus represents a nexus between rainfed and irrigated farming and conjunctive use of green and blue water. Studies in the Limpopo Basin (Mwenge Kahinda et al., 2007; Magombeyi and Taigbenu, 2008) have shown that there is a substantial yield gap which supplementary irrigation can bridge. This is particularly the case especially during years with dry spells during the growing season, when conventional rainfed agriculture may fail completely.

A multi-stakeholder approach to decision-making builds resilience as negotiation processes between users result in new institutions, or new roles for existing institutions, such as school boards which take over borehole management. Such institutions often evolve and revolve around specific infrastructure (Mabiza et al. 2006). At the same time, these community-based institutions need linkage to formal water management structures (Dzingirai and Manzungu, 2009).

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