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Ephemeral rivers and their development: testing an approach to basin management committees on the Kuiseb River, Namibia

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Abstract

Ephemeral rivers are located in the world's drylands where aridity and climate variability are key environmental determinants. The Kuiseb River is one of two diversely developed ephemeral rivers in western-central Namibia. From up to down stream, freehold-tenure farmers, a national park, communal farmers and the port and municipality of Walvis Bay all derive water from this source. Upstream farmers impound surface water during brief rainfall periods while remaining stakeholders' abstract water from the alluvial aquifer. The draft Water Resources Management Act for Namibia devotes one chapter to basin management committees as mechanisms to ensure more equitable, efficient and effective sharing of water resources and their benefits. Two pilot committees are being established in Namibia, one of which is in the Kuiseb basin. The Environmental Learning and Action in the Kuiseb project, implemented by the Desert Research Foundation of Namibia in close consultation with Namibia's Water Resources Management Review with funding from the European Union, has brought all stakeholders together. The Department of Water Affairs, Nam-Water and the Gobabeb Training and Research Centre are contributing information to enhance understanding of the river's functions and services provided. All stakeholders are sharing information concerning their needs, expectations and contributions toward integrated management of the Kuiseb. After negotiation for one-and-a-half years, a formal committee is established and mechanisms for its functioning and sustainability are being identified. The main benefit to date is the dialogue, good will and interest that have been established amongst the stakeholders. If the momentum is maintained, this will lead to a new, more integrated approach to resource management in the entire basin.

Keywords: Ephemeral river; Basin management; Environmental learning; Climate variability; Sustainable management

1. Introduction

Ephemeral rivers are located in the arid, semi-arid and sub-humid drylands of the earth. Climate variability, strongly correlated with aridity, is a major factor influencing the ecological, economic and social sustainability of ephemeral rivers. Ephemeral rivers, with temporary surface flow that varies between seasons and years, nevertheless support ecological systems that have been used by wildlife and people for millennia (Jacobson et al., 1995). The ephemeral Kuiseb River, located in western-central Namibia (Fig. 1), provides an example of the characteristics, challenges and management options that may contribute to sustainable development of these focal systems.

Opportunities for use of surface waters or groundwater of the ephemeral Kuiseb River vary greatly between upstream and downstream (Dausab et al., 1994; Amoomo et al., 2000; Angula et al., 2001). The upstream section has surface water present more frequently than the downstream section as it occurs in an area of higher rainfall. Only larger, less frequent floods reach the downstream watercourse. On the other hand, storage capacity in the form of a well-developed alluvial aquifer is larger in the lower reaches of the Kuiseb (Jacobson et al., 1995). Consequently long-term benefits from occasional ephemeral river flow may be greater in the lower river compared with upstream.

2. The Kuiseb River environment

The Kuiseb River occupies a catchment area of 15,500 km^2 over a westward flowing course of 420 km (Jacobson et al., 1995). Headwaters of the river lie at 2280 m with mean rainfall of 335 mm/annum. Only 5% of the catchment has rainfall greater than 300 mm/annum

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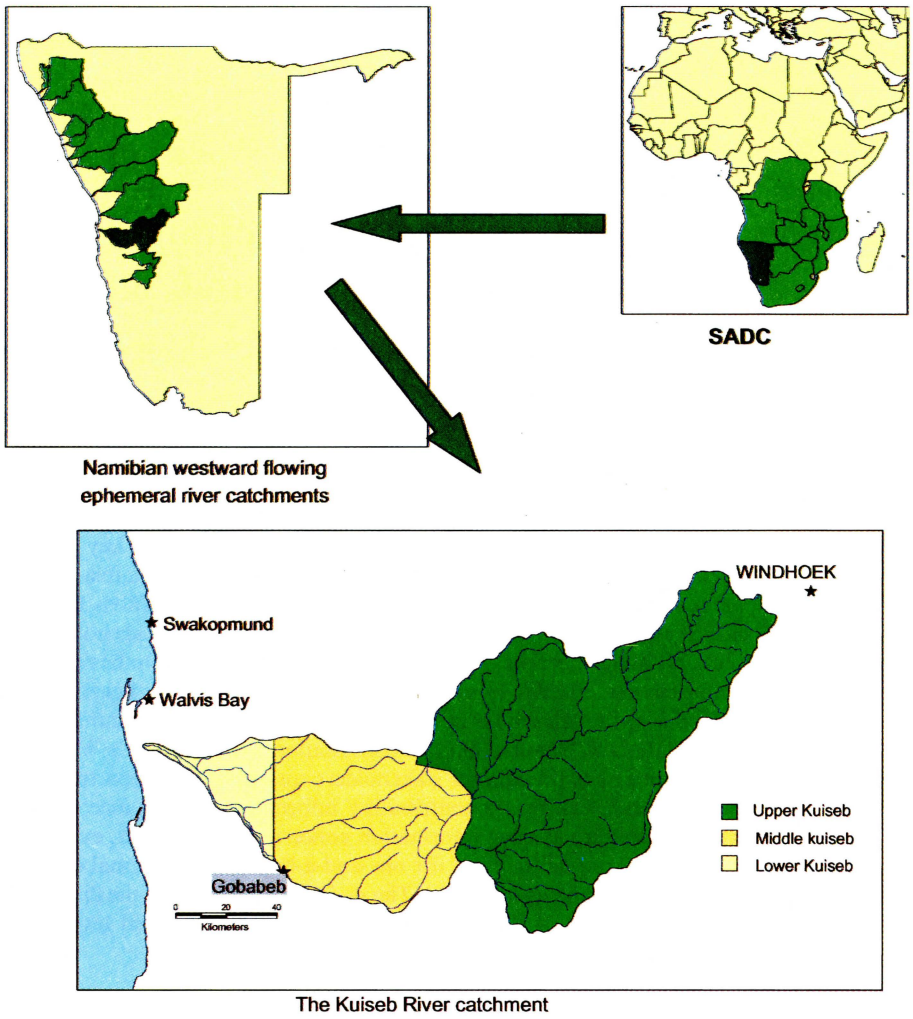

Fig. 1. This figure outlines Namibia's location in the SADC region, the ephemeral catchments of Namibia and the Kuiseb River catchment.

and 52% has more than 100 mm/annum, while mean rainfall at the coast is less than 20 mm/annum (Jacobson et al., 1995). Mean temperatures range from less than 16 °C on the coast, influenced by the cold Atlantic Ocean, to more than 22 °C further inland below the western escarpment (Mendelsohn et al., 2002). Mean evaporation ranges from between approximately 1680–2380 mm/annum, increasing from the coast inland (Mendelsohn et al., 2002). Surface flow in the Kuiseb, recorded at Gobabeb in its middle reaches, has varied from 0 to 102 days per year since 1962. Fourteen gauging points monitor variability and river flow (Jacobson et al., 1995).

3. Environmental learning and action in the Kuiseb

The vision and management objectives for the Kuiseb River as for other ephemeral rivers in drylands, must encompass sustainability of water resources as laid out in the Brundtland Report (WCED, 1987), in Agenda 21 (UNCED, 1992) and the Dublin Principles (1992). Experience shows, however, that these instruments are often only considered, if at all, in the case of perennial rivers. Similarly, application of these instruments is expected for international river basins, but shared basins within a country are often not managed with integrated water resources management taken into account. Basin management approaches that integrate ephemeral and perennial flows, surface and groundwater, and land as well as water, are essential to promote sustainable use and management of ephemeral river resources (Jacobson et al., 1995; NWRMR, 2000a,b). As emphasised in the UN Convention to Combat Desertification (UNCCD, 1996), participation of all resource managers and users is a key element for appropriate and sustainable management. Partnerships amongst agencies and institutions, coupled with full user and management participation and focused on integrated resource management, must be the core of vision and management objectives for ephemeral rivers (NWRMR, 2000c). The results of such an approach would encompass enhanced

livelihoods for those dependent on, invested in and using ephemeral river resources as well as for conservation of the services, biodiversity and landscapes these resources support.

In the past few years, the Namibian Water Resource Management Review (NWRMR) compiled the draft Water Resources Management Act for Namibia. This was undertaken in a participatory manner with numerous consultations among stakeholders throughout the country. One chapter of the draft Act is devoted to basin management committees. The document makes provision for these committees to eventually be established for all basins or inter-related groups of basins in the country. Although the legislation has not yet been promulgated, two pilot basin committees are currently being established. One is overseen by the NWRMR itself and is focused on the densely populated, ephemeral Cuvelai Delta in north-central Namibia, where half of Namibia's population engages in dryland farming. The Desert Research Foundation of Namibia (DRFN) is undertaking the other, in collaboration with the NWRMR. This latter pilot project is called environmental learning and action in the Kuiseb (Elak). Elak was created in 2001 in an attempt to introduce new approaches to basin management, encompassing all aspects of integrated water resource management, throughout the Kuiseb catchment. This three-year project was initiated by the DRFN, in collaboration with the Gobabeb Training and Research Centre and in consultation with the NWRMR, and is funded by the European Union. Elak facilitates communication, cooperative learning and integrated action among all people dependent upon or who have invested in the Kuiseb River basin with a strong focus on the requirements of the environmental system as well. Through establishment of a basin-wide dialogue, information exchange, data management, research, education, outreach, monitoring and evaluation, the Elak project plans to bring together all viewpoints of Kuiseb basin interests.

The objectives of this project are:

(1) To focus on an innovative approach to facilitation of communication, cooperative learning and action among all decision-makers within and dependent on the Kuiseb basin.
(2) To ensure that a common vision across the sectors or stakeholders is developed, well understood, shared and maintained on an interactive basis.
(3) To ensure that all levels of decision-makers in the Kuiseb River catchment have the capacity to understand and manage freshwater and other terrestrial natural resources in a sustainable manner.

The innovative approach that is being promoted has several elements. First, it attempts to bring all decision-makers, from rural farmers to government policy-makers, to the ongoing discussion. It is not just single representatives of, for example, rural farmers invited to one meeting, but a sustained, ongoing dialogue. Through an extended process of workshops and other interactions, the project has served to build relationships amongst stakeholders at all levels. At the same time, while the project coordinates the process, the stakeholders themselves drive it, moving at a rate acceptable to all.

4. Kuiseb River stakeholders and challenges to development

The Kuiseb River is one of the two most diversely developed ephemeral rivers in Namibia. Five major user groups share water along its entire course (Dausab et al., 1994). In addition to the natural environment these include freehold-tenure farmers in the upper catchment, communal farmers and the Namib-Naukluft Park in the middle catchment, and residents and industries of Walvis Bay in the lower catchment. Total population, assessed in 1995, was approximately 25,000 people living in areas dependent upon the Kuiseb River (Jacobson et al., 1995).

Over 2000 people on 109 freehold-tenure farms share the upper 63% of the catchment area (Jacobson et al., 1995), each excavating from one to twenty farm dams to facilitate capture and provision of water to their farms. The domestic water supply and water for livestock during much of the year is provided from groundwater boreholes (Angula et al., 2001). Groundwater in the middle reaches of the river supports communal livestock farmers as well as the wildlife of the Namib-Naukluft Park. Also located within the middle Kuiseb is the Gobabeb Training and Research Centre, with 20–30 residents.

Approximately 300 communal Topnaar farmers and their livestock live along the middle and lower Kuiseb within the park and the district of Walvis Bay. Eight villages pump water directly from the alluvial aquifer of the middle Kuiseb. In the lower Kuiseb, Namibia's bulk water supplier, NamWater, provides water from the aquifer to resident farmers. The alluvial aquifer of the lower Kuiseb sustains the harbour and fishing town of Walvis Bay with more than 30,000 residents.

Plans for a major dam on the middle reaches of the Kuiseb to provide water to a new uranium mine are also being pursued, which would reduce or eliminate recharge of the lower Kuiseb aquifer. Even now, accusations from downstream are made that commercial, freehold-tenure farmers are withholding more than their fair share of the water resources. These same communal farmers accuse the coastal towns of lowering the alluvial aquifer upon which their indigenous crops depend.

The most frequently overlooked stakeholder, in the Kuiseb and other ephemeral rivers, is the natural environment itself that provides services to all other users and upon which they depend (Seely, 1973; Loutit, 1991; Marsh and Seely, 1992; Jacobson et al., 1995; Seely et al., 1999). Management challenges presented by the Kuiseb and other ephemeral rivers differ in kind and in degree from those presented by endoreic perennial rivers or those flowing into the sea. Aridity leading to variability of flow is the primary factor influencing management actions on an ephemeral river system. If rivers flow for only a few hours or days in a year, the cost of a management intervention varies, depending upon flow characteristics and the scale of the proposed intervention. Moreover, because ephemeral river flow is episodic and because these rivers are located in drylands with a relatively sparse population, limited data is available for making decisions on management interventions.

5. Approaching basin management

During Elak's first year-and-a-half of implementation, a stakeholder forum with about 55 participants was established which holds meetings regularly. Stakeholders range from Namibia's bulk water supplier (NamWater), several ministries and the water review team to communal and freehold-tenure farmers, regional and local councillors, several non-governmental organisations and the Gobabeb Centre itself. Elak does not specify the number of representatives from a sector and some stakeholders send more than one representative to a forum meeting. An immediate benefit of this inclusive approach is that, even though the Kuiseb basin management committee is not yet formed, stakeholders consider a 'holistic basin approach' in making decisions on basin management. All the stakeholders' views and needs are considered. By facilitating ongoing interaction among the various users of Kuiseb resources, including groundwater, surface water, vegetation and tourism attractions, there is potential for resources to be managed in a more equitable and sustainable manner.

The Elak project involves a communication approach based on facilitated visualisation for all its meetings and workshops. Visualised, participatory monitoring and evaluation takes place at the conclusion of all these meetings as well. This approach has been used during three planning workshops, four stakeholder meetings and two Kuiseb Basin Management Workshops. Participatory training approaches have been used with the Topnaar community during training on livestock management, basic management training for water point committees and community development committees and a research meeting addressing enhanced use of indigenous fruit crops. Two facilitated excursions to different areas where other communities are using integrated planning and management approaches were also undertaken. Records are kept of all interactions and documentation is available to all participants for further referral. The result of this interactive, facilitated, visualised approach is an excellent rapport and improved understanding amongst all stakeholders.

At the first stakeholders' workshop in December 2001, 53 participants used facilitated visualisation techniques in a first attempt to identify a common vision. This draft vision was designed to be revised and to guide project development. After elaboration on various options, stakeholders agreed on a potential common vision: A Healthy Kuiseb River Basin, where "healthy" means to sustainably provide for livelihoods of its stakeholders and to maintain ecological integrity.

To contribute to the third objective—to enhance capacity of all decision-makers to understand and sustainably manage natural resources—a variety of approaches are being used. Five facilitated workshops and courses were undertaken with communal farmers of the Kuiseb who have strong opinions on water management, and more are planned. A draft written profile of the Kuiseb River was developed providing information about river services, the natural environment, climate, water, vegetation, people, wildlife, economic activities and development with an emphasis on relationships among basin components. Copies were disseminated at the second Management Workshop leading to immediate identification of a missing chapter and provision of additional information was volunteered. Monitoring and research is being undertaken by various student groups (e.g. Dausab et al., 1994; Amoomo et al., 2000; Angula et al., 2001) and by international scientists, degree students, interns, researchers and staff of the DRFN and the Gobabeb Centre (e.g. Henschel et al., in press) in coordination with Elak. In additional to this inclusive approach to enhancing understanding of the basin, specific topics are identified by the Kuiseb forum and carried out with funding and personnel from the project. Other projects are identified, discussed, funded and undertaken by persons who are not stakeholders in the basin but have an interest in it. These latter projects are opportunistically integrated into the programme as they enhance overall understanding of the basin, directly or indirectly.

To ensure that all stakeholders are involved and participating to their fullest capacity, a greater-than-expected emphasis has been placed on working with the Topnaar farming community living within the lower Kuiseb valley. The Topnaar people have lived there for hundreds of years using the shallow groundwater, harvesting indigenous fruits dependent on the shallow groundwater and raising goats that browse on the riparian vegetation. Increased use of Kuiseb water by other sectors influences their lifestyles in numerous ways.

Active participation of all decision-makers is a prerequisite for sustainable development at all levels, and this is one of the primary goals of Elak. The project collects information generated by monitoring and evaluation of current activities in the river basin, and promotes basin-wide information dissemination. The project has also undertaken a needs assessment wherein stakeholders identified their own information wishes and needs and also the information they already have that others could use. By doing this, Elak is helping to improve stakeholders' understanding of environmental systems and a more sustainable management approach can be agreed upon. Experiences from the entire Kuiseb River catchment, with its diverse land use characteristics and array of relevant decision-makers, will be actively and widely disseminated and promoted elsewhere in Namibia and the SADC region.

This project takes into consideration environmental as well as social and economic sustainability of the Kuiseb River, and brings together individuals from throughout the catchment, each with their own priorities, resource requirements and objectives. It focuses on facilitation of communication and cooperative learning and action among all decision-makers within, dependent on and managing resources in the Kuiseb River catchment. The initial establishment of a common vision across sectors, an innovation in management planning, is expected to enhance ongoing sectoral planning and implementation while reducing existing conflicts between sectors. The iterative, facilitated consultations, involving participatory monitoring, evaluation and adjustment support application of this contemporary approach.

Some of the important components of Elak are listed:

- Stakeholder meetings have had active participation of senior political figures, bringing their commitment to the process.
- The above-mentioned meetings were held in different localities within the basin, exposing some people to areas they have not seen or visited before thus promoting a greater understanding of the basin amongst stakeholders.
- The structure and terms of reference of the basin management committee are established, identifying issues that need to be addressed and activities to be undertaken.
- Minutes and proceedings of the above meetings and workshops, containing presentations and handouts, are compiled and circulated, to document the happenings for absent participants and future records.
- Training workshops have been provided to the Topnaar community, on livestock management, strategic planning, and water point management. These have been well received, and a newly developed strategy plan was presented at the most recent stakeholders forum.
- Exchange visits organised by Elak have taken members of the Topnaar community to learn about, for instance, community-based tourism, livestock management and diversification of livelihoods that are being undertaken by other rural communities in Namibia. This approach, known as Forum for Integrated Resource Management, is a key component of basin management.
- The project initiated meetings with individual stakeholders to facilitate development of plans and actions at the micro-level.
- Elak has supported research and publication of findings on the !nara plant used by the Topnaar community.
- Compilation of the Kuiseb Profile has drawn on many articles, books and other materials, bringing this scattered information together and making it accessible to other interested stakeholders. It also stimulated contributions from other stakeholders.
- The project has gained support for the basin management process through its involvement with the Namibian Water Resources Management Review, the Department of Water Affairs and other government authorities.

6. Reflections and conclusions

The Elak project acknowledges that land and water degradation and loss of overall productivity occur throughout Namibia and the SADC region, often because successful efforts are limited to pilot areas. Documentation remains with projects, with limited dissemination to decision-makers. In many moderately successful efforts, a sectoral rather than a holistic approach is undertaken, often involving demonstration sites rather than participatory, interactive learning. Despite talk about coordination and participation, inter-sectoral coordination usually focuses on logistics rather than concepts and action. Elak addresses this weakness through all three of its objects while facilitating basin-wide cooperation and interaction, ensuring that all people and groups with interests or investment in the Kuiseb can work together to develop sustainable management strategies for the Kuiseb River and its resources.

Now in its second year, the Elak project has already accomplished many things. The Kuiseb basin forum has been established with all stakeholders involved. This forum will be transformed into the basin management council when the basin management committee, with fourteen representatives, is formally established. Both components, the council and the committee, will work together toward integrated basin management with the

latter reporting to the former. This dual arrangement allows all to be involved in basin management as outlined in the draft water bill. The committee itself will report to the Minister of Agriculture, Water and Rural Development every four years.

For the first time, through five stakeholder workshops, stakeholders discussed their concerns with other users. As opposed to the results of a management plan that is developed by a limited group of decision-makers, the future of sustainable resource management in the Kuiseb is improving. The primary issue that has been identified by the forum to date is the perceived lack of information availability and sharing of information already gathered. Through the numerous community meetings, stakeholder meetings, workshops and training sessions, Elak has already succeeded in increasing communication, cooperative learning and action among all decision-makers dependent upon the Kuiseb basin.

It is planned that the basin management committee will be formed later this year, and given that a common vision of a 'Healthy Kuiseb River' has already been established, basin-wide cooperation and decision-making can become a reality. Currently, donor funding extends over three years but the committee expects to remain in existence on a permanent basis. Different approaches, from stakeholder contributions to government support, are being considered.

By focusing on the Kuiseb Basin, the Elak project has also attracted outsiders not directly dependent upon the river, but interested in how the process is working. Although well over 250 publications concerning the Kuiseb River, its surrounding environment and the people living on river resources have been published, Elak has promoted awareness of an issue on which little study has been done: the concept of a holistic system, integrating people, animals, vegetation, and ecosystems of the whole river. By considering the Kuiseb not as a river divided into parts, but instead looking at the entire system, a new approach to resource management is being developed.

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