Critical Issues

- high variability in annual and short-term rainfall (irregular rainfall), drought and floods and high salinity of soil and groundwater (quality of water)
- critical water resources are distributed according to Angola's history: first, for hydrologically important upper reaches of the Kunene basin (basin boundary) and second, the Kunene river (stream), which feeds a long-distance pipeline system, currently the most important source for drinking water in North-central Namibia
- increasing demands on water (irrigation, household use) and energy (hydropower) due to Angola's recovery after the civil war and expansion by economic and agricultural development; recent plans for exploitation of 600,000 m³ in land in Angola causing potential loss of the Kunene river as a source for drinking water to Namibia
- high population density and migration to increasing demand for food and water (irrigation in North-central Namibia resulting in pressure on sand resources in the region and movement of local population)
- land and water reforms are currently insufficiently coordinated and regional dependencies from pipeline water.

Hydrological Situation

- average daily temperature: 0.7 °C (January); 18.7 °C (July)
- average rainfall: around 700 mm/a
- average potential evaporation: 2,500 mm/a

Adaptability in Regulatory Processes

The example of «Hessisches Ried» shows that high complexity and uncertainty can be managed in linear or prescriptive planning and implementation processes. In different spatial and temporal scales, actual developments must be evaluated and revised or alternative routes must be evaluated, based on auditing objectives and adjustment of objectives in the process.

The cognitions of the Hessisches Ried showed that not just regulatory processes for groundwater levels are important but also complete reversal or alternate routes must be enabled, based on auditing objectives and adjustment of objectives in the process. While having specific societal, economic and climatic conditions, in both cases water scarcity and water quality constitute a key obstacle in planning and implementation processes.

Hydrological Situation

- average daily temperature: 17°C (winter) and 25°C (summer)
- potential evaporation: 2,500 mm/a

Critical Issues

- periodical change of years with high and low rainfall
- high salinity because of high evaporation rates vs. high nitrate concentrations because of intensive agriculture.

Identifying Options for Action and Stakeholder Participation

Main challenge for implementing IWRM is to realize the specific problem of integration by developing adapted methods and instruments that match local conditions. With the mentioned dependencies in mind, integration of knowledge, technical innovations and patterns of resource utilisation become crucial. Depending on the context, establishment or forting of institutions and organisations as well as capacity building is important for stabilisation of management processes. Surmounting in integrated management plans and linked up tools effects could be unavoidable.

Struggling the Integration

It becomes obvious that in distinctive manners water management is closely connected to questions of land use, energy supply, society and regional development. Considering such interdependencies and finding a balance between multiple demands or conflicting interests builds the basis for resource management. Thus, decisions in water resource management must consider the interplay of societal and natural processes. But understanding the relevance of particular interactions and their role in problem dynamics needs an understanding of the specific context that is formed by the ecological, economical and cultural conditions.

Hydrosphere

- monthly climate with scarce in southern Angola, flowing southwest to Namibia, carry water seasonally
- groundwater: three aquifers of different depth, traditionally accessed by hand dug wells – especially in rural areas
- salinity: 1,000 mg/l TDS in the paragraphe inferior with 3,000 mg/l TDS in the centre
- long distance pipeline system serves drinking water to central region, fed from Kunene

Institutional Framework

- four national and political units which exist along ecological frameworks based on their legislative and political structures
- processes of integrated Water Resource Management and Land Reform have been initiated by the Ministry of Agriculture, Water and Forestry in 2004 (Water Resources Management Act 2004)
- implementing methods that match local conditions: capacity building is important for stabilisation of management processes. Surmount in integrated management plans and linked up tools effects could be unavoidable.

Reference

- Regional Distinctions and Similarities – Consequences for design of an IWRM
- THOMAS KLUGE, ANDREAS LE DU, NICOLE UNMUTH, WILHELM UNMUTH
- Institute for Social-Ecological Research (ISOE), Frankfurt/Main, Germany
- Hydrological Situation

Critical Issues

- periodical change of years with high water stress
- water stress because of climate vs. high groundwater withdrawal rates
- high salinity because of high evaporation rates vs. high nitrate concentrations because of intensive agriculture.
- in addition, both regions affected by increasing tourism and rural development, processes of Integrated Water Resource Management and Land Reform has been initiated by the Ministry of Agriculture, Water and Forestry in 2004 (Water Resources Management Act 2004)

While having specific societal, economic and climatic conditions, in both cases water scarcity and water quality constitute a key obstacle to problem dynamics.

Battle for water resources is close to water tables trying to be counteracted by installing infiltration plants in North-central Namibia resulting in pressure on soil resources by the combination of increased touristic and agricultural tourism.

Identifying Options for Action and Stakeholder Participation

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