Governance, Cooperation and Practice: Water and Hydropower Development – The Role of Transboundary Water Cooperation: Case of the Orange Senqu River Basin

Hydropower Sustainability Forum. Oslo, Norway.

by: Lenka Thamae.
Executive Secretary
Orange Senqu River Commission (ORASECOM)
South African Development Community (SADC) Treaty and Declaration was signed in 1992. The Treaty provides for member states to agree on areas of cooperation; (Article 22) Water established as stand alone area of cooperation (sector) in August 1996. The Water Protocol (revised) signed in 2000 was the first such protocol adopted by SADC Member states. ORASECOM agreement signed in 2000 seeks to implement the SADC Protocol in the Orange Senqu River Basin.
Rainfall/Precipitation Distribution

- Windhoek
- Keetmanshoop
- Upington
- Kimberley
- Gabarone
- Pretoria
- Maseru

Legend:
- Basin perimeter
- Major Towns
- Major Rivers

Average rainfall:
- 0 - 200
- 200 - 400
- 400 - 600
- 600 - 800
- 800 - 1,000
- > 1,000
Orange-Senqu sources in highlands of Lesotho at around 3000 metres above mean sea level (alpine wetlands “sponges”) – very important for sustaining flows especially in dry season and during drought periods.
History of Trans-boundary Cooperation in the Orange-Senqu Basin; & 2011 agreement on LHWP Phase II; 2013 MOU on Lesotho Botswana Water Transfer Project.
Basin Context – Outcomes of Basin Planning Exercise

• Water scarcity and system yield are key limiting factors for development of water resources in the basin.
• The largest demand centres are located on the escarpment including the Gauteng/Johannesburg area – population estimated at +4 million inhabitants, coupled with industry, irrigation and mining.
• A complex water transfer network has been established and is operated to supply the demand centres.
• Very substantial deposits of coal exist within RSA extending into the upper catchment, and also continuing into Botswana.
• Climate change projections at the basin scale indicate overall future increase in temperature, and decrease in precipitation (except for the source area where models are divergent in projections).
Johannesburg city – population estimated at +4 million inhabitants
Sasol Petrochemical Plant Secunda

Produces >30% of SA’s Petrol/Diesel from coal
Sishen Iron Ore Mine

One of the largest single open pit excavation in the World
System of Water Transfers to Supply Demand Centres
Climate – temperature change

By 2050

Projected change in mean annual maximum temperature based on 6 dynamically downscaled GCMs

10th percentile

Median

90th percentile

degrees C per annum

Created by Claire Davis, 2011
Climate – precipitation change

By 2050
Major Hydropower Installations in the Basin

- Gariep Dam:
  - Full capacity: 360 MW
- Vanderkloof Dam
  - Full capacity: 240 MW
- ‘Muela Hydroelectric Power Facility:
  - Full capacity: 72 MW
- Both Gariep and Vanderkloof supply electricity during peak demand and emergency periods (peaking stations), through the Eskom national grid of South Africa.
- The dams also produce baseload during floods to utilise opportunity of low cost energy production.
- ‘Muela facility supplies electricity to the Lesotho national grid.
- New planned projects which include HEP generation:
  - Lesotho Highlands Water Project Phase II.
  - Lesotho Botswana Water Transfer Project.
Major hydroelectric power generation facilities in the basin
Gariep Dam, South Africa
Gariep Dam, South Africa
Issues and Challenges

- Most power generated in the Orange Senqu River basin is utilised by RSA.
- Around 80% of RSA power is generated from coal fired power stations.
- Most of the coal fired power stations utilise water from the Orange Senqu River basin at high assurance of supply.
- On the other hand HEP, although renewable, also faces high competition from other water uses especially during periods of drought.
- Climate variation and change adds more complexity.
- Providing for environmental flows for the river mouth, and downstream livelihoods – are yet more critical water management problems to be adequately addressed.
Sample Coal Fired Power Station in South Africa
Export grapes Aussenkehr Namibia
The River Mouth along the border between Namibia and South Africa has been declared a Ramsar Site on both sides of the border.
Opportunities and Closing Remarks

• Cooperation and joint planning at basin level optimises utilisation of water resources, including HEP generation, where feasible, and RBOs provide suitable convening platform.

• Some key ingredients for effective joint basin planning include: establishment of common understanding, building trust and confidence, transparency, and shared long term outlook.

• Agreeing on notification process and its consistent application enables timely delivery of priority projects.

• Nurturing political commitment and acknowledging interdependence of States broadens basket of benefits derived from regional integration and by extension transboundary water cooperation.
• The interconnected regional grid through the SADC Power Pool provides opportunity for power sales which is unlocking HEP potential in our region.

• *At times real cooperation is driven by the spirit of Solidarity.*