

# CLIMATE CHANGE AND DAMS

The case of Lesotho Highlands Water  
Project

# Background

- Climate change poses both risks and opportunities
- Climate change is altering hydrological cycles meaning that historic data MAY no longer BE a reliable predictor of future hydrological pattern
- The dams that were designed for climate of their time are ill-prepared for rapid shifts in river flows and precipitation
- Dam engineers design dams based on historic records without consideration of the future climate projections
- For example if a dam is designed on a 30 years period that had marked higher rainfall levels than today, as a result of recurring droughts, the dam MAY operate at A DIFFERENT POINT FROM the potential of its capacity. Therefore, new mechanisms have to be put in place to cope with the lower OR HIGHER water levels.

# Hydro-power potential in Lesotho

- Lesotho has relatively high potential for hydropower resources. The country is believed to have a potential of 450MW, but only 76MW is currently being exploited (Muela-72mw, Mantsonyane-2mw, Mokhotlong-0.67mw, Tsoelike-0.4mw and Semonkong-0.18mw).
- Since completion of Muela HYDROPOWER STATION, Lesotho has been self-sufficient in its domestic electricity requirements except during peak periods in winter.
- Droughts and floods are amongst the most significant natural hazards that might impact negatively on dams.

# Climate Change Vulnerabilities

- Lesotho is prone to natural disasters, liable to drought and desertification making it highly vulnerable to climate change.
- Future scenarios show reduced surface and sub-surface run-off under climate change as a result of predicted lower precipitation, recurring droughts and increased temperatures.
- It is estimated that the country will enter a water stress period by 2019 which is expected to worsen by 2060.

# Climate Change Vulnerabilities Cont.

- Reduced rainfall under climate change translate itself into reduced run-off in the catchments. Therefore water based activities in the RSA are likely to be affected.
- Depending on the length of the dry spells, the yields of many storage dams in the LHWP are likely to be lower, leading to reduced water exports hence lower royalties incomes for Lesotho.
- Country overall hydro-electricity generation and irrigation potential are likely to be affected due to expected lower surface and sub-surface flows. Other sectors like tourism are also likely to be affected.

# Challenges

- Current water infrastructure and management practices may not be robust enough to cope with the impacts of climate change.
- Poor environmental management practices.
- Adequately balancing needs for water and energy security.
- Ensuring climate change resilience with limited available resources.

# Challenges Cont.

- Water managers routinely deal with the uncertainty of historical climate variability, but climate change introduces additional uncertainty, difficult to address.
- It is difficult to convince decision makers to act now, because of the uncertainty.
- Policy makers and politicians are not comfortable with risk and probability. They want hard and convincing statistics/numbers.

# LHWP – Possible Adaptation Strategies

- Increased flood storage capability
- Provisions for future parallel outlet tunnels
- Provisions for future off-stream storage
- Operational changes to mitigate climate change impacts
- Raise awareness on the importance of dams and climate change
- Enhance efforts towards adaptation and obtain required national and international support
- Share experiences on reducing climate change risks
- Promote data exchange and research



# Conclusion

- There is urgent need to integrate climate change into water strategies and policies.
- Need to develop sufficient surface storage and reticulation infrastructure to avoid conflicts between RSA and Lesotho.
- More research on water, eco-systems and hydro power potential.
- Dams remain a sustainable development issue and offer opportunities for green economy initiatives.