

## SEYCHELLES

1. Key issue addressed: **Adaptation to Climate Change**
2. Title of case study: Southeast Monsoon Variability and impacts in the southwest Indian Ocean: Predicting water resources
3. Lead institution(s): **Seychelles Meteorological Services**
4. Other implementation arrangements and stakeholders involved: **Public, private, NGOs and International support: GEF Adaptation Fund ,**
6. Collaborations and regional Interaction: **Comoros, Tanzania, Madagascar, Mauritius, Reunion**

7. Brief summary: The southwest Indian Ocean is characterized with strong southeast monsoon variability which impacts negatively on the water resources, activities and economy of the islands such as Seychelles, Comoros, and Madagascar. The rapid economic growth coupled with demography dynamics is increasingly putting more pressure on the potential available water resources in the case of Seychelles. Therefore, water has now become an important factor similar to Africa's reliability on rainfall for agriculture. The industrial, the tourism and the agricultural sector are much vulnerable to rainfall variability. It's temporal and spatial variability is accompanied with socio-economic disruptions, hence has potential adverse impact on the national economy, hence the importance of water for the future is of highest national priority.

8. Key challenges/objectives:
  - Analyze the oceanography and climate related to extreme dry/wet spells.
  - Explain the causes and mechanisms governing rainfall and water resource variability.
  - Answer questions related to future frequency, trends and intensity of extreme dry/wet conditions.
  - Use case study examples to compare/validate numerical model output
  - Provide maps of ocean and atmosphere circulation patterns of extreme cases.
  - Develop predictive models that relate environmental characteristics to the water resources.
  - Provide monitoring and timely early warning of climate extremes
  - Contribute to a larger benefit initiative to analyze the southeast monsoon variability in SWIO in relation to water resources to mutual benefit of the surrounding small island states.
9. Key features of the programme or policy initiative: Improve scientific understanding on the causes and mechanisms governing climate variability in the SWIO during southeast monsoon. A deeper understanding of the transient equatorial convective waves during southern hemisphere winter will form an important component of the research. The results could be useful for improving numerical model performance in the near equatorial tropical region of the Indian Ocean. Academic journal articles are also a benefit of such a research. Results will be made available to forecast centres, policy makers, water resource managers, agricultural and tourist managers to ensure wide application such that national capacities related to disaster mitigation, prevention and preparedness are strengthened and future risk of climate are reduced. Results of the research project will help to fulfill the recommendations of the project number 3 on 'water resource management in the Seychelles in the light of extreme events such a

prolonged drought', Seychelles Initial National Communication under the United Nations Framework Convention on Climate Change (2000).The final report will contain recommendations for downstream enhancements to the monitoring network to improve environmental data base in the region.

10. Timeframe: 2 years                      Year started: 2005

11. Status:  Ongoing       Completed in year 2007

12. Results achieved and known impacts

Outcomes are expected to provide platforms for improved prediction skills, better water resources management, and improvement in environmental data observation in the Southwest Indian Ocean and in formulating downstream enhancement of water storage facilities.

13. Sustainability, scalability and transferability:. The study will make use of climate reanalysis data, ocean general circulation model (oGCM) assimilated data (ocean surface and subsurface ), high resolution satellite data and insitu-data to study extreme cases of dry and wet spells in the southeast monsoon and its relation with the global–regional ocean climate environment. Numerical models will be validated and the water resource responses will be assessed. Statistical associations will be studied and predictive models for rainfall and water flow level will be developed and verified. The stability of the climate indices will also be evaluated.

14. Key lessons learned: There is a lack of knowledge on the near equatorial convection in the SWIO during the southeast monsoon. Many models are incorrectly predicting the transient convective waves during the southeast monsoon. There are also few studies on climate variability and its socio-economic impacts in the region. Current statistical models need to be improved to consider also the ocean subsurface, thermodynamic and kinematic processes of the atmosphere and the hydrological component.

15. Further information including relevant websites : <http://www.env.gov.sc>,  
<http://www.pps.gov/meteo/>