



Water Resources and Water Accounts in Mauritius

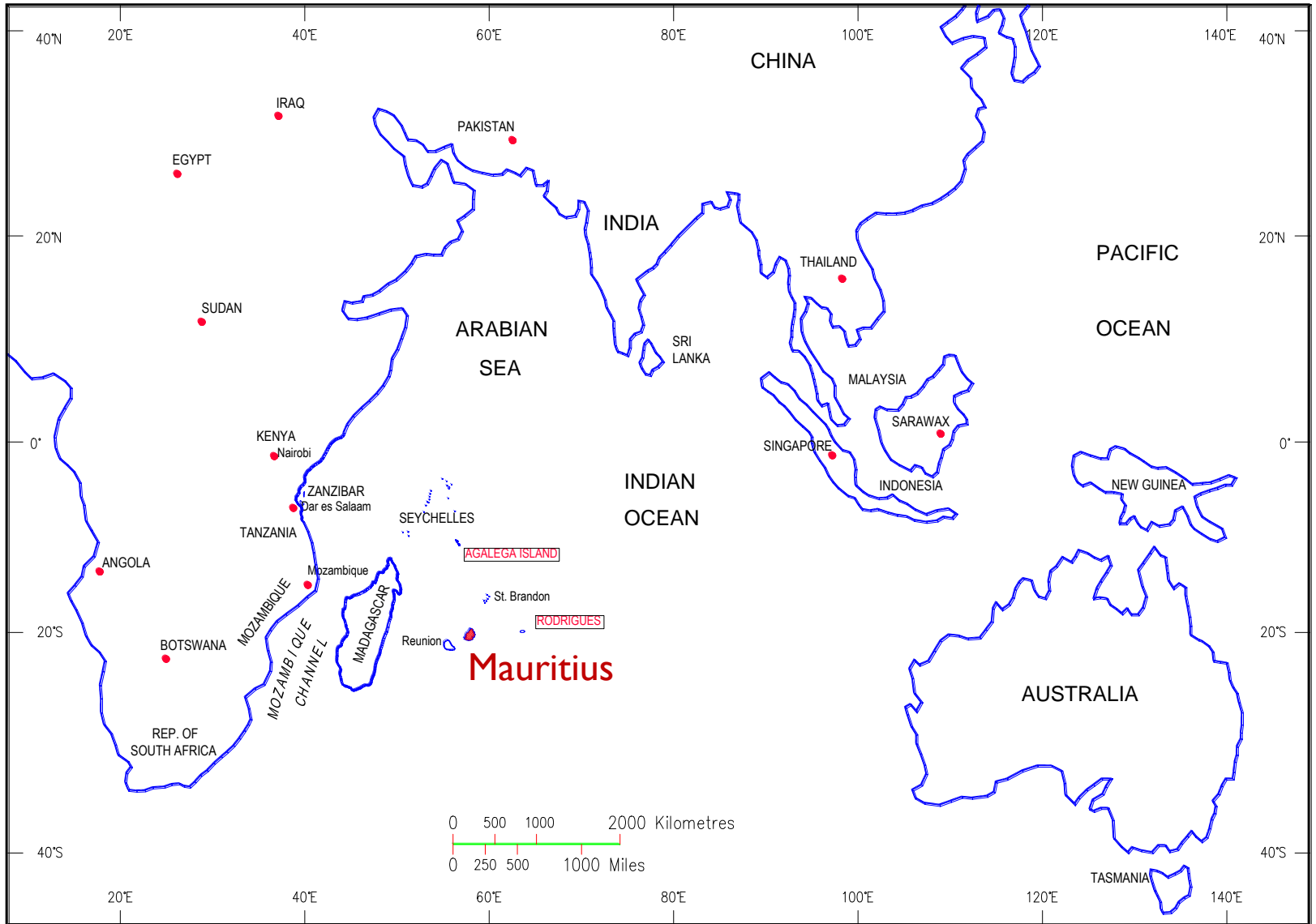
Workshop for the implementation of SEEA-Water and IRWS
Pretoria, South Africa

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Mauritius

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Physiography



Volcanic Formation

Volcanic activities - 10 million years - 25,000 years ago.



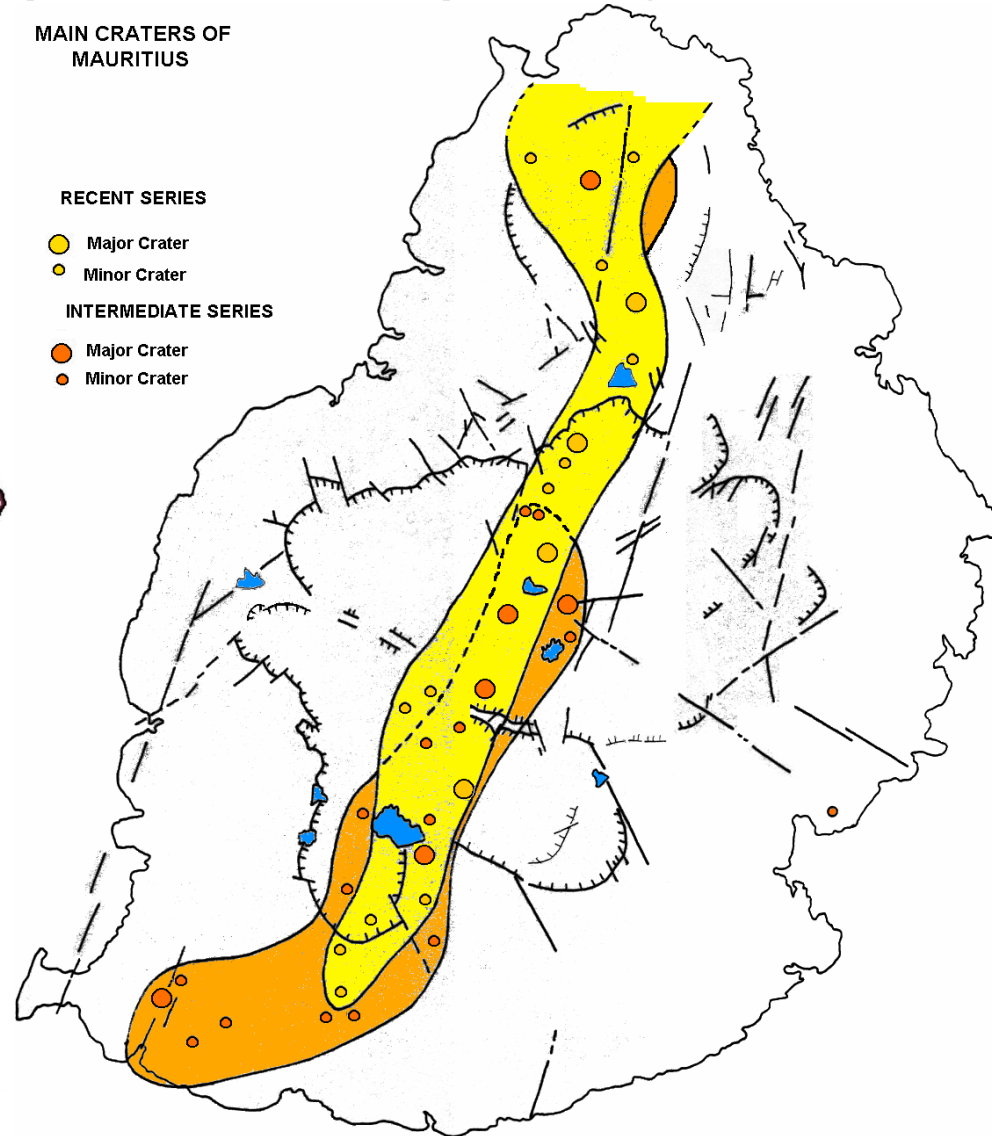
MAIN CRATERS OF MAURITIUS

RECENT SERIES

- Major Crater (yellow circle)
- Minor Crater (orange circle)

INTERMEDIATE SERIES

- Major Crater (orange circle)
- Minor Crater (red circle)



Mauritius

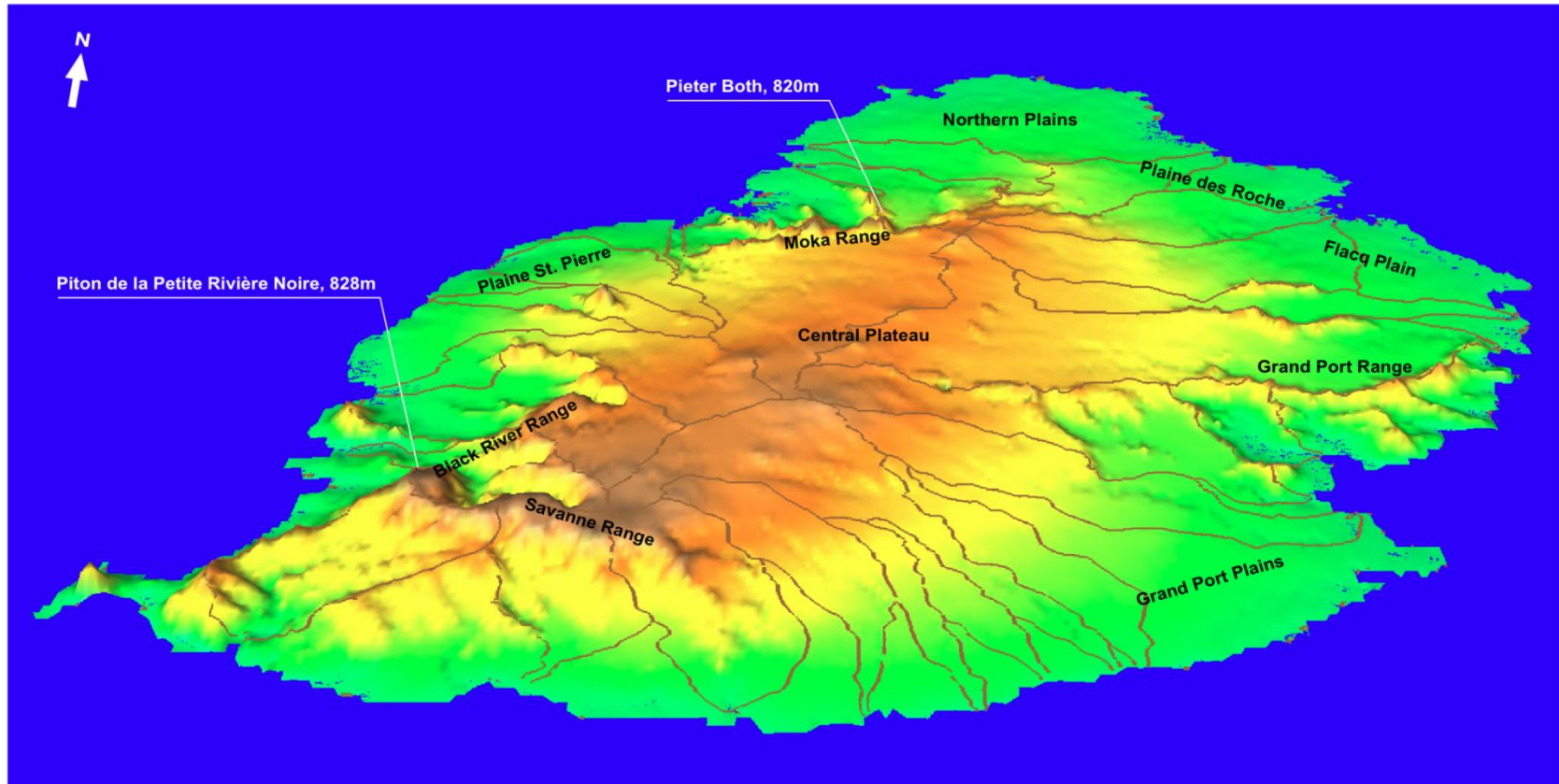


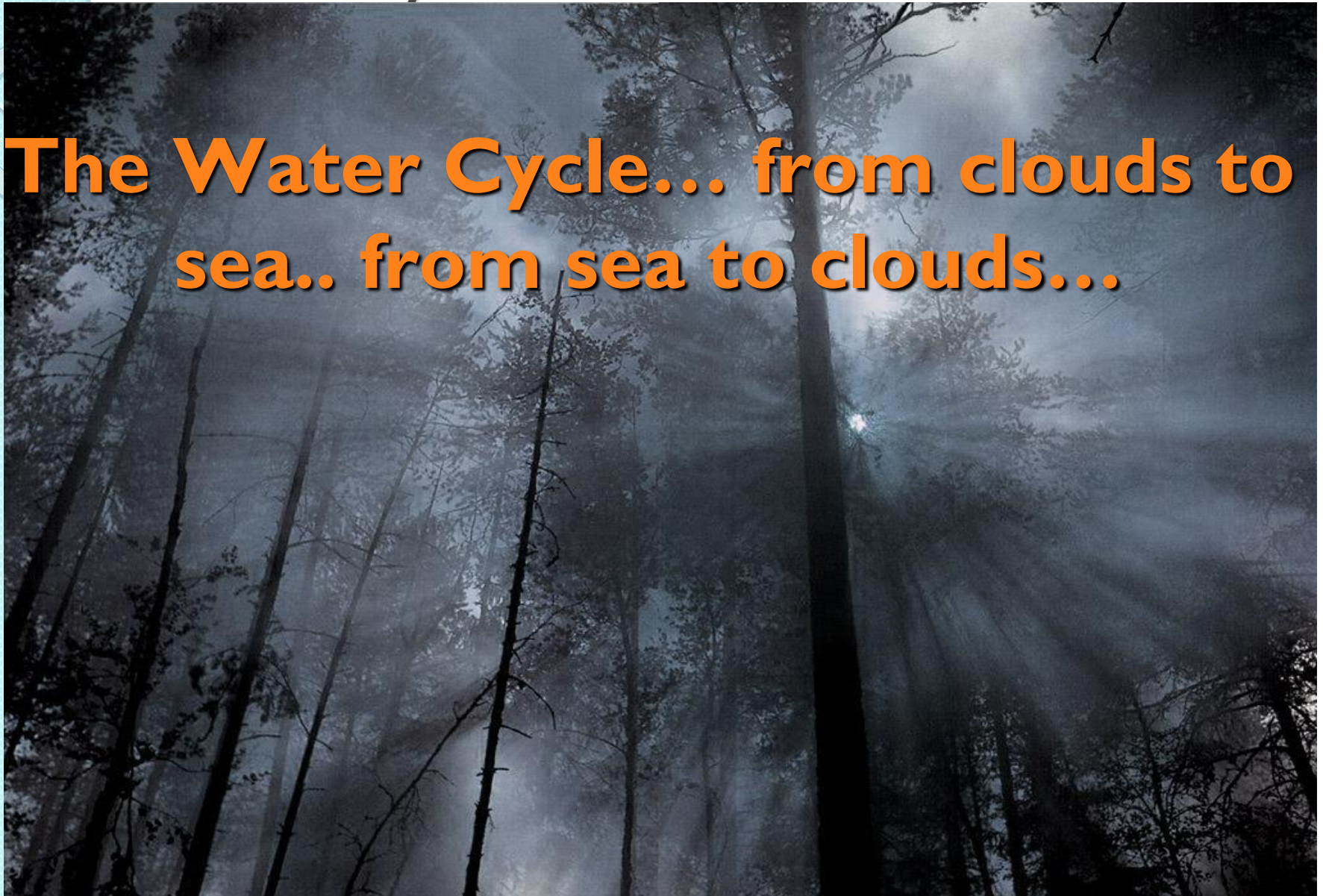
Fig. 2: Digital elevation model (DEM) of Mauritius seen from South at a level of 2000 m

General Information

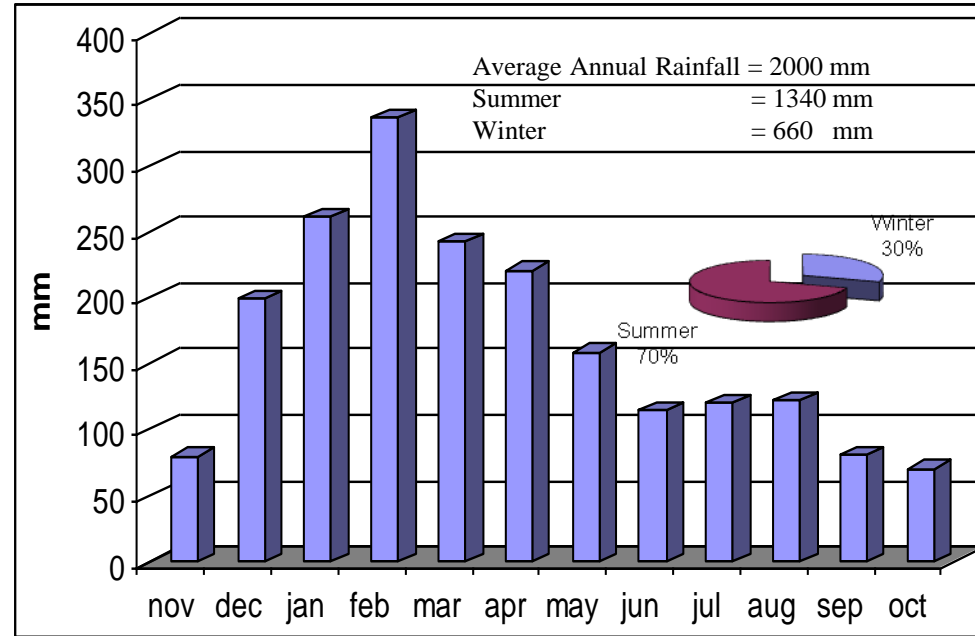
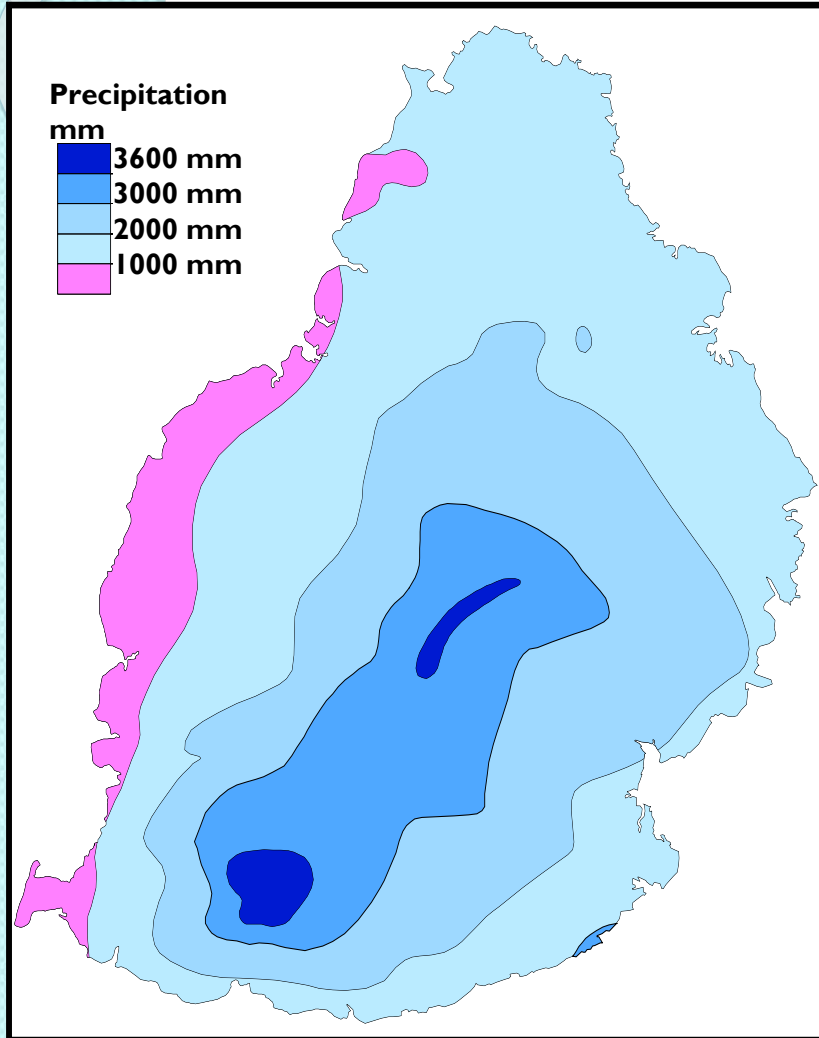
- The island is of volcanic origin. The volcanic activity of the island ended about 25,000 years ago.
- Population : 1.27 Million
- Area of Mauritius : 1865 km²
- Major Climatic Conditions : Sub Tropical Summer & Winter
- Sources of water supply : Surface water & Groundwater

Country's Water Profile

The Water Cycle... from clouds to sea.. from sea to clouds...

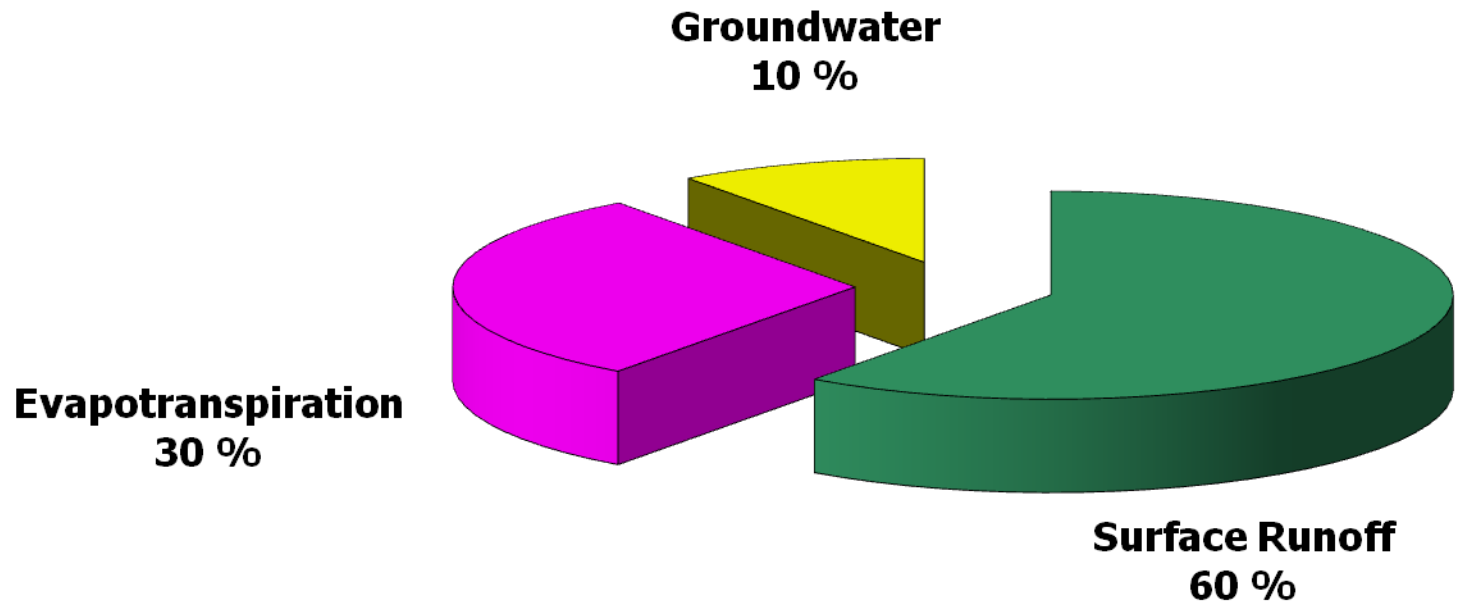


RAINFALL PATTERN

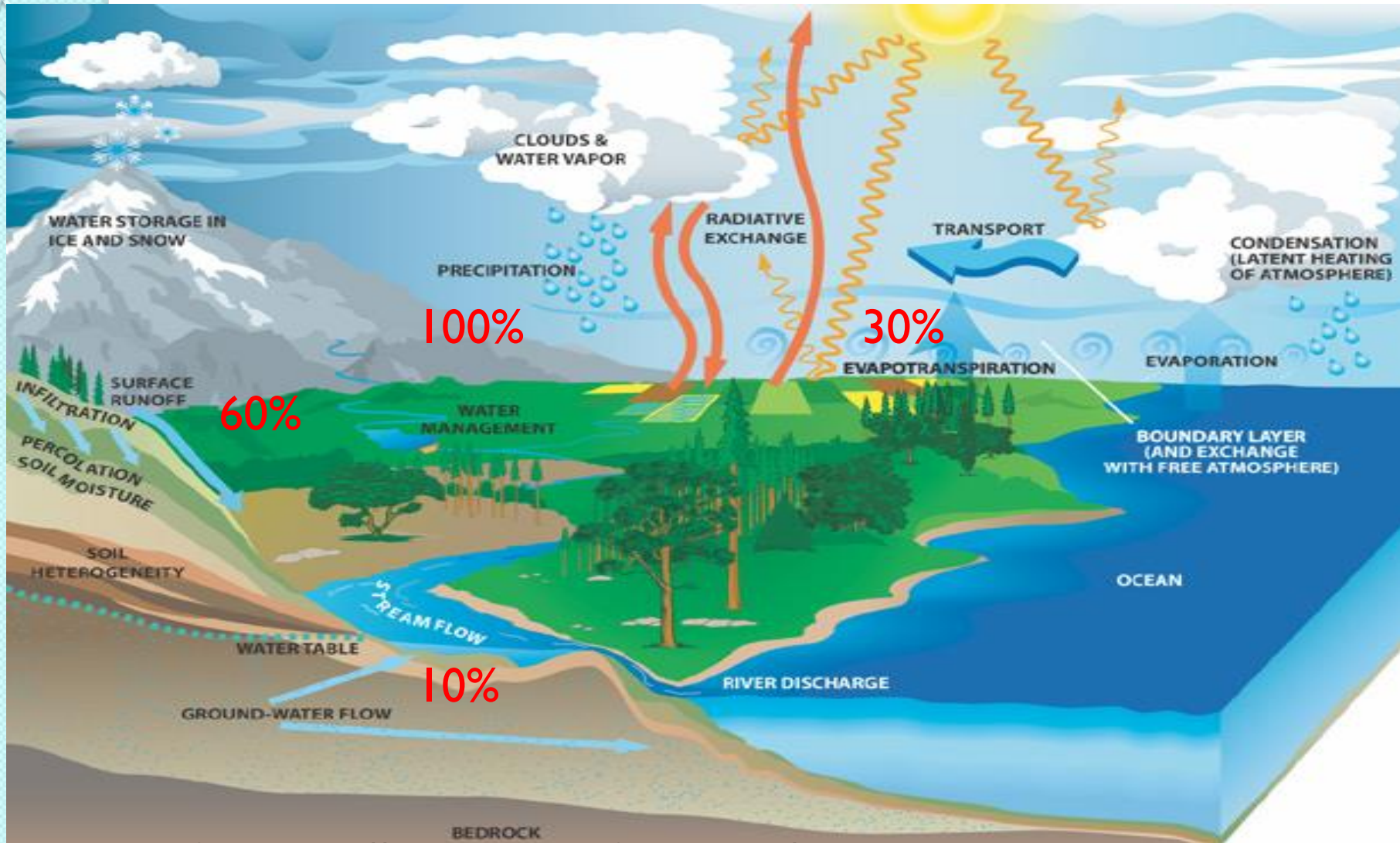


Water Balance

Area of Mauritius : 1865 km²
Annual average rainfall : 2000 mm
Annual volume of raw water : 3700 Mm³
Estimated water utilisable potential (33%) : 1250 Mm³

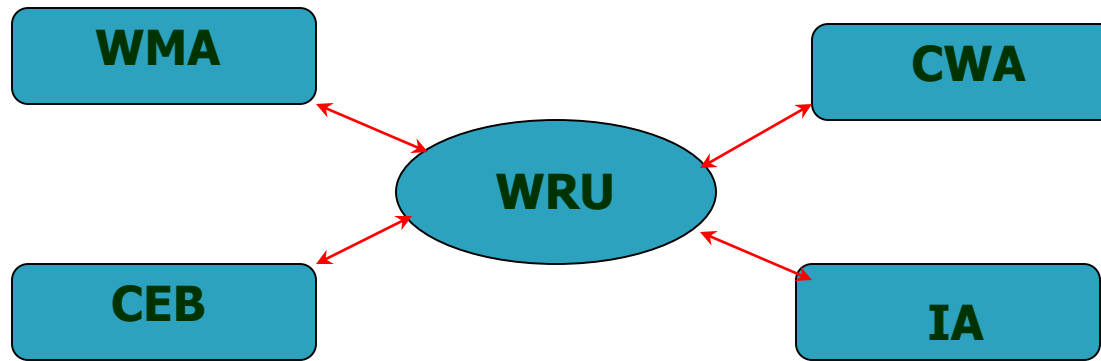


The water cycle overview in Mauritius



Adapted from: <http://watercycle.gsfc.nasa.gov/>

INSTITUTIONAL ARRANGEMENT FOR WATER RESOURCES



Water Resources Unit

Responsible for the assessment, mobilisation, control, development, management and conservation of water resources

Central Water Authority

Responsible for treatment and supply of water for domestic, commercial and industrial purposes

Water Resources

➤ Surface water resources

- 6 impounding reservoirs

total capacity = 77.4 Mm³

annual yield = 135 Mm³

- 6 Potable Water Treatment Plants

- 3 major river abstractions (for Potable Water Supply)

➤ Groundwater resources

- 406 wells

Hydrological data

Surface water - 25 major river basins

- 107 Flow measuring station
- 350 river run off takes

Groundwater - 5 main aquifers

- 300 Observation Wells
- 114 potable (90 % of total G/w production)
- 156 private agricultural (5%)
- 136 Industrial (5%)

Water Stress & Water Scarcity

- **Water Stress:**
A supply less than 1700 m³/person/yr
- **Water Scarce:**
A supply less than 1000 m³/person/yr
(UNDP 1998)

Today

Mauritius is already water stressed.

(actual supply is 1028 m³/person/yr)

By 2025

Mauritius will be water scarce.

(supply expected to drop to 862 m³/person/yr)

WATER UTILISATION

(Million cubic metres per year) Year 2009

Purposes	Surface Water		Groundwater	Total
	River-run Off-takes	Storage		
Municipal (<i>Domestic, Industrial & Tourism</i>)	36*	76	111	223
Industrial (<i>Surface- Groudwater</i>)	5	-	5	10
Agricultural (<i>including Water Rights</i>)	320	74*	7	401
Hydropower	199	169*	-	368
OVERALL UTILISATION	560	319	121	1000*
TOTAL WATER MOBILISATION	524	254	121	899

** includes 101 Mm³ used for irrigation/potable purposes after hydropower generation at Réduit, Magenta, Tamarind Falls and power generation at Le Val and La Ferme, twice.*

Potable water VolumeM ³	Tariff- US\$ Domestic	Non domestic			
			commercial	Tourism	Industry
1 st - 10	0.15	1 st - 100	0.42	0.60	0.33
Next 5	0.18	Next 150	0.53	0.80	0.40
Next 5	0.25	All add..	0.70	1.00	0.53
Next 10	0.32				
Next 20	0.45				
Next 50	0.60				
Next 100	0.80				
All additional	1.00				
Waste water Tariff					
First 10	0.18	All	0.67		
Next 10	0.22	non			
Next 30	0.50	Domestic			
All additional	1.13				

Water Accounts

- Data Sources:
 - Census of Economic Activities, CSO
 - Water Resources Unit
 - Central Water Authority – Water Supplier
 - Wastewater Management Authority

Potable Water Use by sectors

- Domestic -66%
- Industrial (manufacturing) - 8%
- Commercial - 8%
- Tourism - 5%
- Vegetables -6%
- Govt. Buildings -5%
- Others -2%

Economic Evolution

Time	Per capita income	Economy	% GDP
Year 1968 (At independence)	US\$260	Sugar-cane monocrop	6.8%
Present	US\$6700	Sugar, manufacturing and tourism	23.6%

Economic Accounting For Water

- Water Asset Account & Physical Supply and Use accounts have been compiled and used to calculate indicators:
 - ❖ Water use intensity
 - ❖ Water productivity

Water Use Intensity: amount of water required to produce one unit currency

Sector	Water intensity
Average for Economy	40litres/US\$
Agriculture	820 litres/US\$
Industry	4.2 litres/US\$

Agriculture requires:

20 times more water as compared to the average for whole economy

200 times more water as compared to industry

Source: SADC Economic Accounting of Water Use Account

Water Productivity: contribution of water to economy

Sector	Water Productivity
Average for Economy	27.41 US\$/m ³
Agriculture	0.38 US\$/m ³
Industry	236.74 US\$/m ³

Average Economy contributes **70 times** more than agriculture

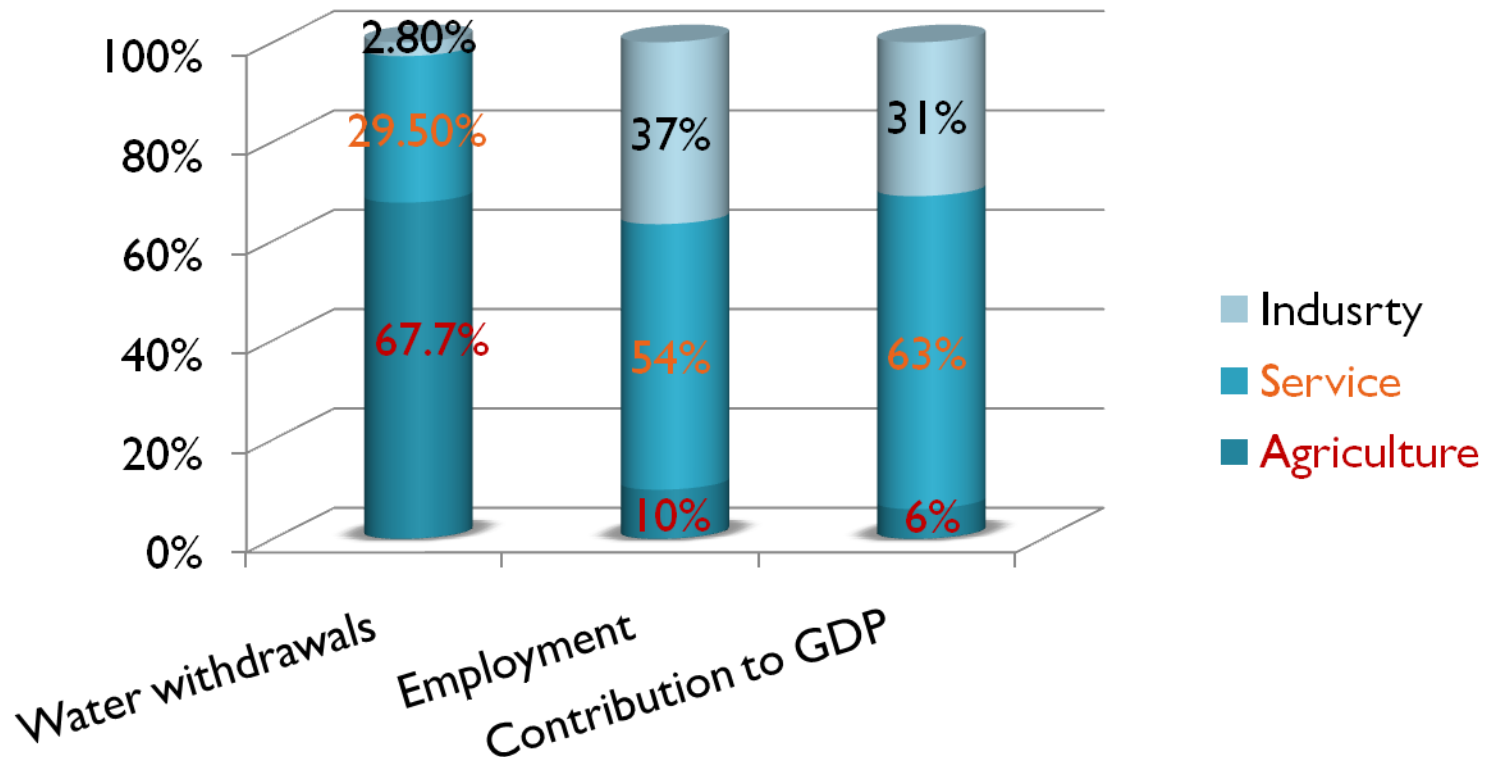
Industry contributes **600 times** more than agriculture

Source: SADC Economic Accounting of Water

Use Account

Water use and economic contribution

Agriculture uses 67.7% of water but contributes to 10% of employment and 6% of GDP



Source: SADC Economic Accounting of Water Use Account

Water Accounts

Sector	Direct abstractions (withdrawals)	Public Water Supply	Total use	Gross Value Added	Water efficiency Gross Value Added/water use
	Thousand m ³	Thousand m ³	Thousand m ³	Rupees Million	
Agriculture, forestry and fishing	514,000	10,133	524,133	79,090	0
Mining and Quarrying		5	5	81	16
Food, drink beverages and tobacco manufacturing	10,000	1,817	11,817	7,566	1
Manufacture of Textiles, wearing apparels, leathers, bags, etc	...	6,402	6,402	12,935	2
Manufacture of Wood and products of Wood		40	40	142	4
Manufacture of Paper and Paper products	...	56	56	316	6
Publishing, Printing and Reproduction of recorded media	...	93	93	1,150	12
Manufacture of chemicals and chemical products, rubber and plastics	...	424	424	1,546	4
Manufacture of other Non-Metallic Mineral products		522	522	1,012	2
Manufacturing of Basic Metals	...	165	165	1,220	7
Manufacture of Machinery and Equipment n.e.c		15	15	268	18
Other manufacturing	...	336	336	2,071	6
Production, collection and distribution of electricity	249,000	45	249,045	3,012	0
Collection, purification and distribution of water	101,235	...	101,235	634	0
Construction		435	435	7,168	16
Wholesale and retail trade and repairs	...	1,858	1,858	14,728	8
Hotels and restaurants	...	4,084	4,084	8,923	2
Transport and communications	...	664	664	16,944	26
Financial Intermediation, insurance, pension and real estate	...	504	504	16,614	33
Public administration and defense; compulsory social security	...	283	238	8,140	34
Education	...	2,117	2,117	5,603	3
Health and social work	...	2,147	2,147	3,812	2
Refuse disposal, cleaning services etc	...	6	6	636	106
Sewerage	...	17	17	...	0
Households		67,618	67,618

Source: CSO

MAJOR CHALLENGES

- Climate change leading to:
 - Reduction in the average rainfall -Reduction of 10% over 30 years –more occurrence of short duration high intensity rainfall-flash floods
 - Sea level rise impacting on the groundwater quality in the coastal regions
- Low coverage of sanitation facilities:
 - Degradation of raw water quality -Public Sewerage Coverage presently 30% to reach 50%by 2015
- Industrial development :
 - Control of Discharge of effluent into open environment- Enforcement of effluent Discharge Regulations
- Non Revenue Water:
 - Reduction of NRW to acceptable level- 2000 km of old CI,Ac,Steel pipes to replace-Cost 400 M US\$

• **Socio-Economic Development and the Environment**

- Finite & vulnerable natural resource
- Social & economic good

• **Drinking and Sanitation**

- Access to safe water supply – Practically 100%
- Integrated sanitation & water supply services - Practically 100%

• **Agriculture and Food Security**

- Sustainable irrigated agriculture
- Increase in water use efficiency
- Re-use of treated effluent

• **Energy Development**

- Use of hydro-power – 5% of total energy

• **Industrial Development**

- Water at economic value

• **Environment**

- Control of quality of effluent discharged into water bodies flow

Conclusion

- The challenge for water accounting is to have all the above

Thank

you...