

S-SW Madagascar

Madagascar;preamble

- Madagascar & abroad; 'our experiences
 - *Fortunat Rajaona 12.3.21*
 - *[presentation of 1983-84 project; relevant after 40 y ?]*
- Hoveraid; medical access via rivers
 - *Andy Mayo 10.12.21*
- Lemurs,Croc caves;bilhazia screening
 - *Jane Wilson-Howarth 2022*

Facts about Madagascar

- 30m population; poverty; 80% live on \$2/day; avg income \$510/year
- Little foreign investment (except Ti mining)
- a 'least developed country'
- Poor infrastructure & health provision
- low access to clean water & sanitation
- cyclones & flood, drought, pests
- Malnutrition; intestinal parasites, malaria etc

Facts about Madagascar

- Agricultural economy
- Droughts >16 famines since 1896
- Deforestation, burn-slash; charcoal
- soil erosion; Madagascar 'red from the air'
- pressure on endemic plants & animals
- Political instability; weak institutions
- Eastern Block barter trade in 1983

People

- Malgache; an Asian-African Bantu mix
- Highlanders/plateau people more ethnically Asian; the Betsilio & Merima (the hereditary rulers)
- Coastal (cotière) dwellers in S-SW; more ethnically Bantu. Resistant to state influence; independent

S-SW 'Le Grand Sud'

- *Project restricted to basement rock zone*
- *S-SW 'concentrates' Madagascar's ills!*
- Drought & famines, major impacts
- 2021-22 drought > famine; 1m at risk
- Eat less, eat shoe leather, cactus, seeds
- Sell cattle & tools > migrate
- Health impacts

S-SW 'Le Grand Sud'

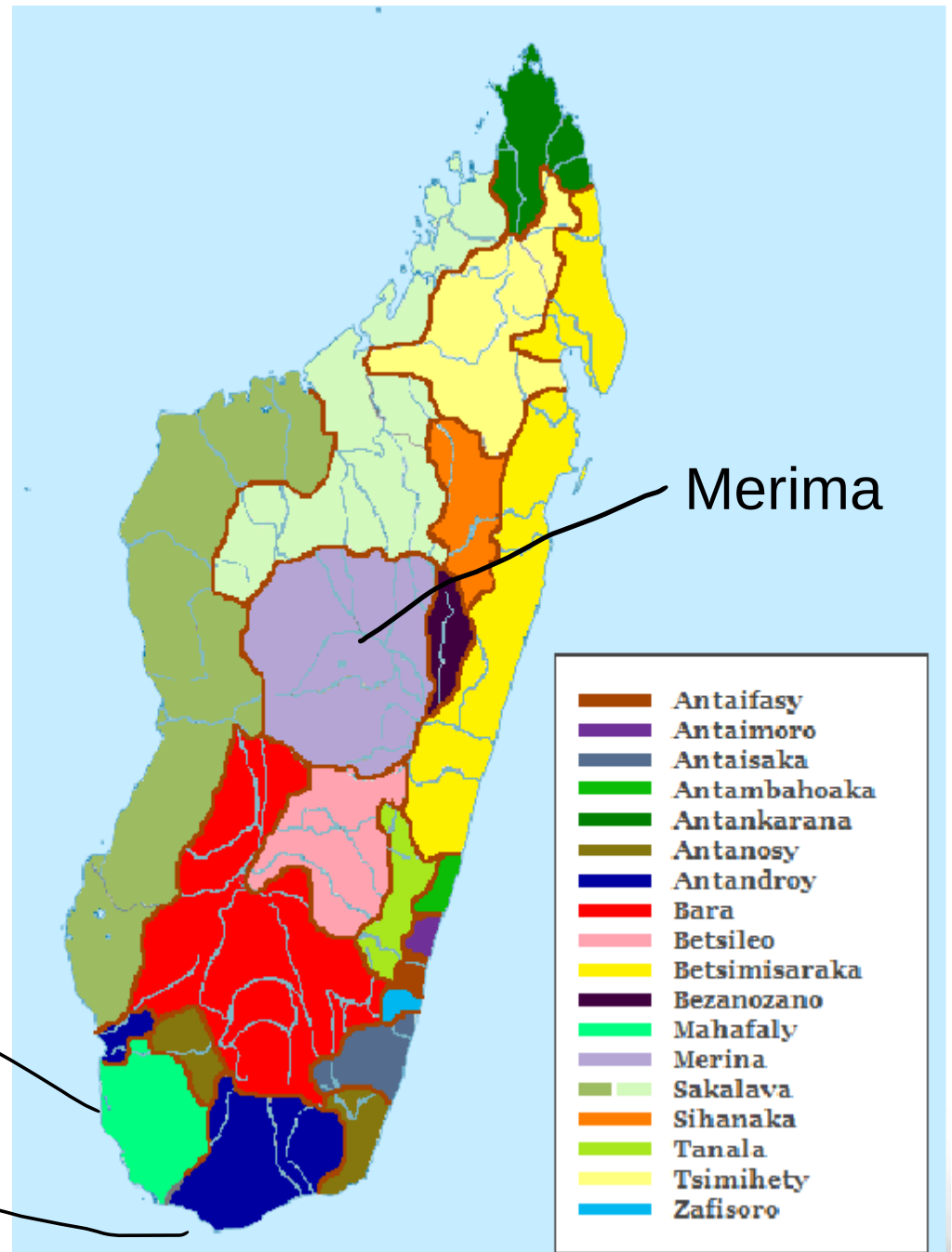
- Coast tribes; Mahafaly ('place of bats') & Antandroy ('people of the thorns')
- Fady; funeral art, ancestor worship
- Arid to semi-arid [*east coast is rain forest*]
- Deforestation, slash-burn > agric/charcoal
- Cassava, maize, potato; food insecurity
- Remote; RN13 & RN 10 bone shaking

Tribal Groups

In the S & SW
live coastal
dwellers:

Mahafaly

Antandroy



Roads & access

To Antananarivo
>750km;
>2 days

Taolanaro:
To Tulear on
RN13-RN10
24 hours



Remote-Travel Slow

RN 10; WW2 bridge



RN 10



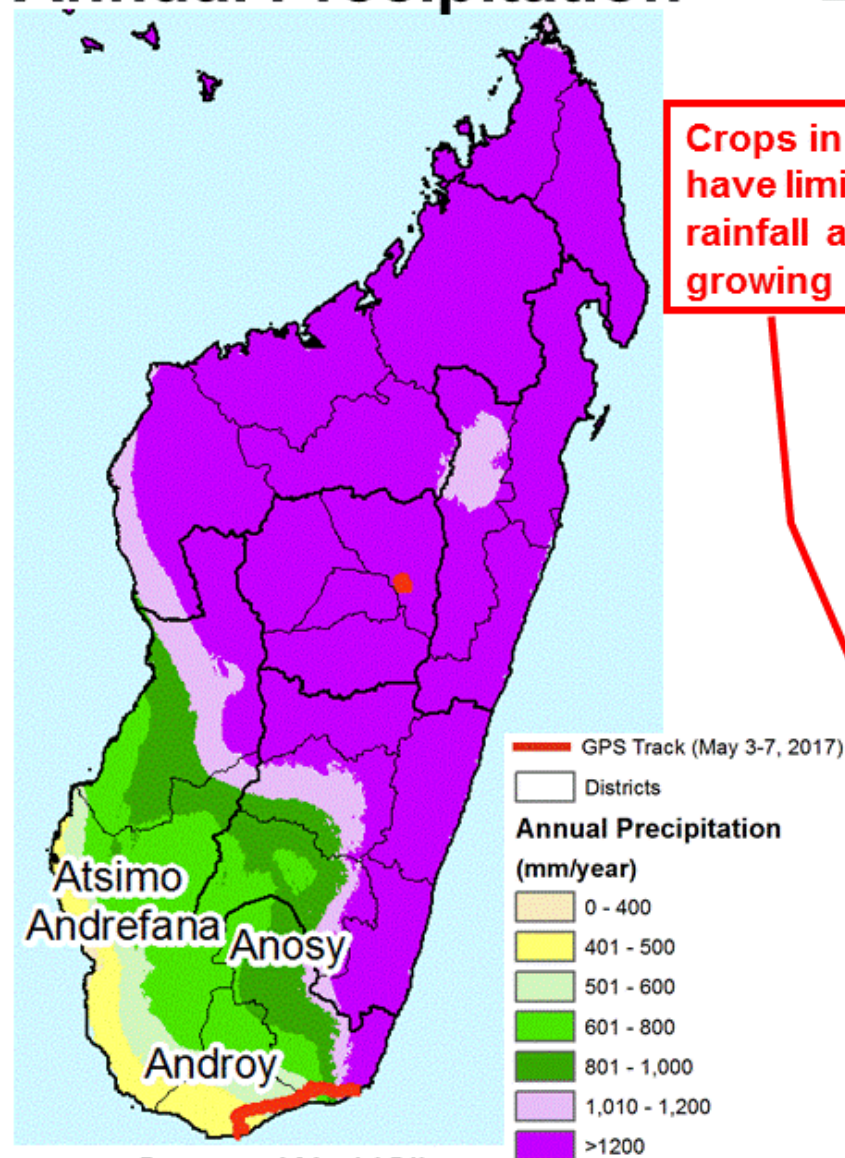




Water & soil

- erratic monsoonal rains: 300-500mm
- Arid to semi-arid; drought adapted vegetation; spiny forest
- Rivers not perennial; small catchments,
- Rainfed crops; cassava, maize, sweet potato; growth season short;
- Soil loss; deforestation
- Aridity + basement = water resource poor?

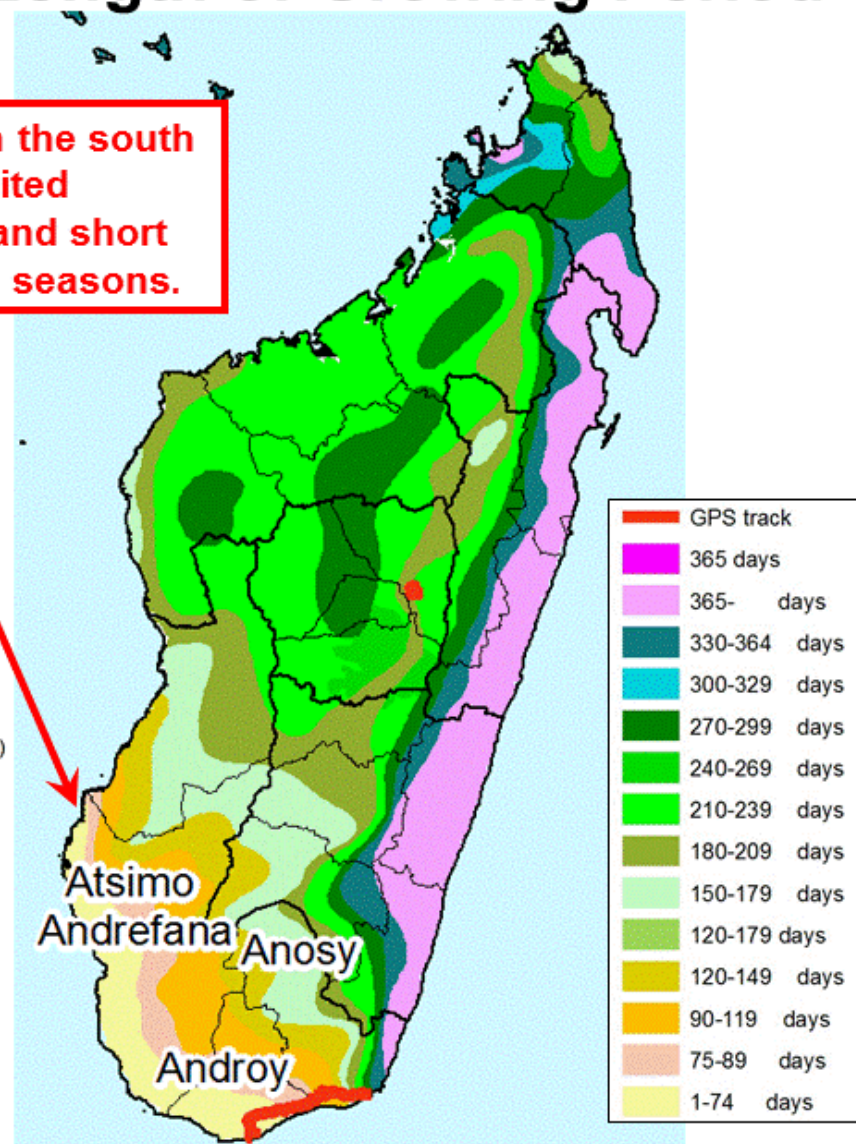
Annual Precipitation



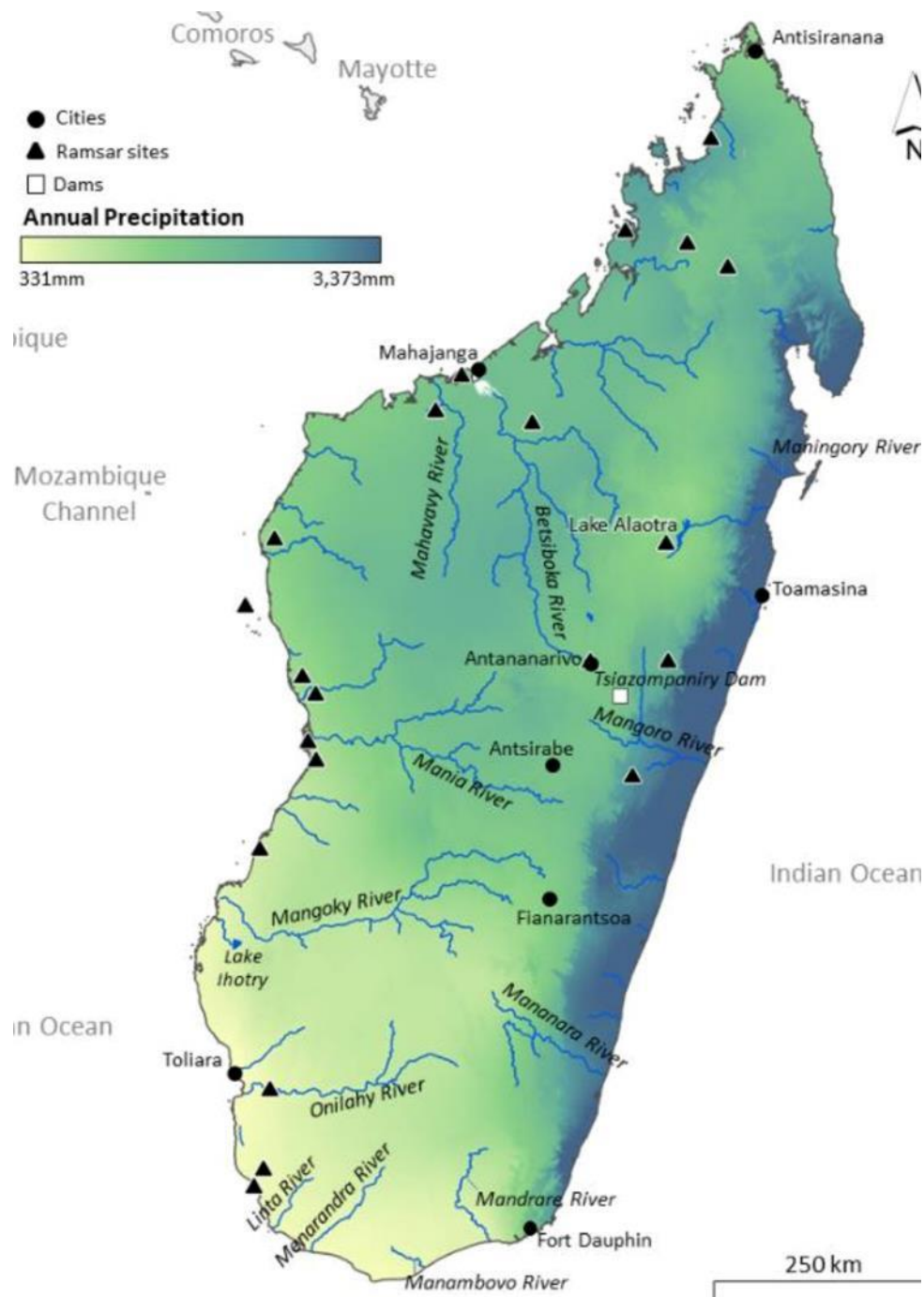
Source: WorldClim
<http://www.worldclim.org/>

Length of Growing Period

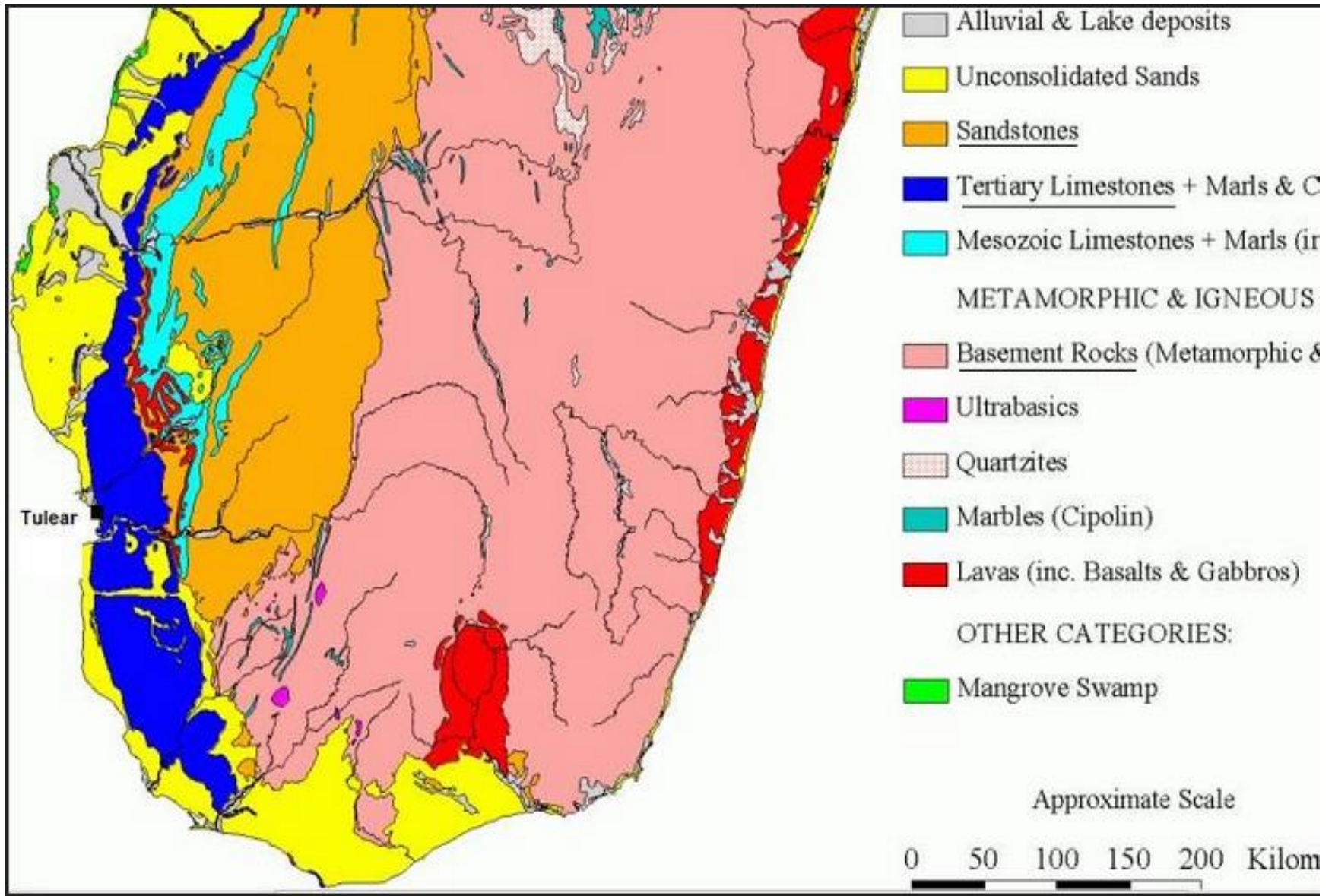
Crops in the south
have limited
rainfall and short
growing seasons.



Source:
 FAO Length of Growing Periods (LGP)



Geology



AES-EDF Project 1983

- *Find potable groundwater for villages*
- Poor village access to potable water
- Pits in sand river bed;
- Shallow wells, handpumps, windmills
- 1860 water points; only 545 work (2002)
- Project villages on basement rock only

AES-EDF Project 1983

- Basement rock is shist-granite-lava
- Crack-void or weathered rock targets located by geophysics
- But low rain infiltration & water storage
- No follow up test drill of geophysics target; but essential !

Basement rock; R Andratine



AES-EDF Project 1983

- AES capacity-funding poor
- Few AirMad flights; tourist booked
- Twin hire; bureaucratic EDF alarm
- Russian diesel; poor availability; purity!
- >6000 Malagasy francs = £1
- scarce/small note denominations
- Sack full to pay labour

No commercial flights!



Camping & geophysics

- Wild tent camping; old Mad Army gear
- no communications
- Wash in river/pools; bilhazia
- floods
- Live off land; beef, cassava, rice, bread, beer, chickens, fruit
- Hunts for food

Amboasary Camp







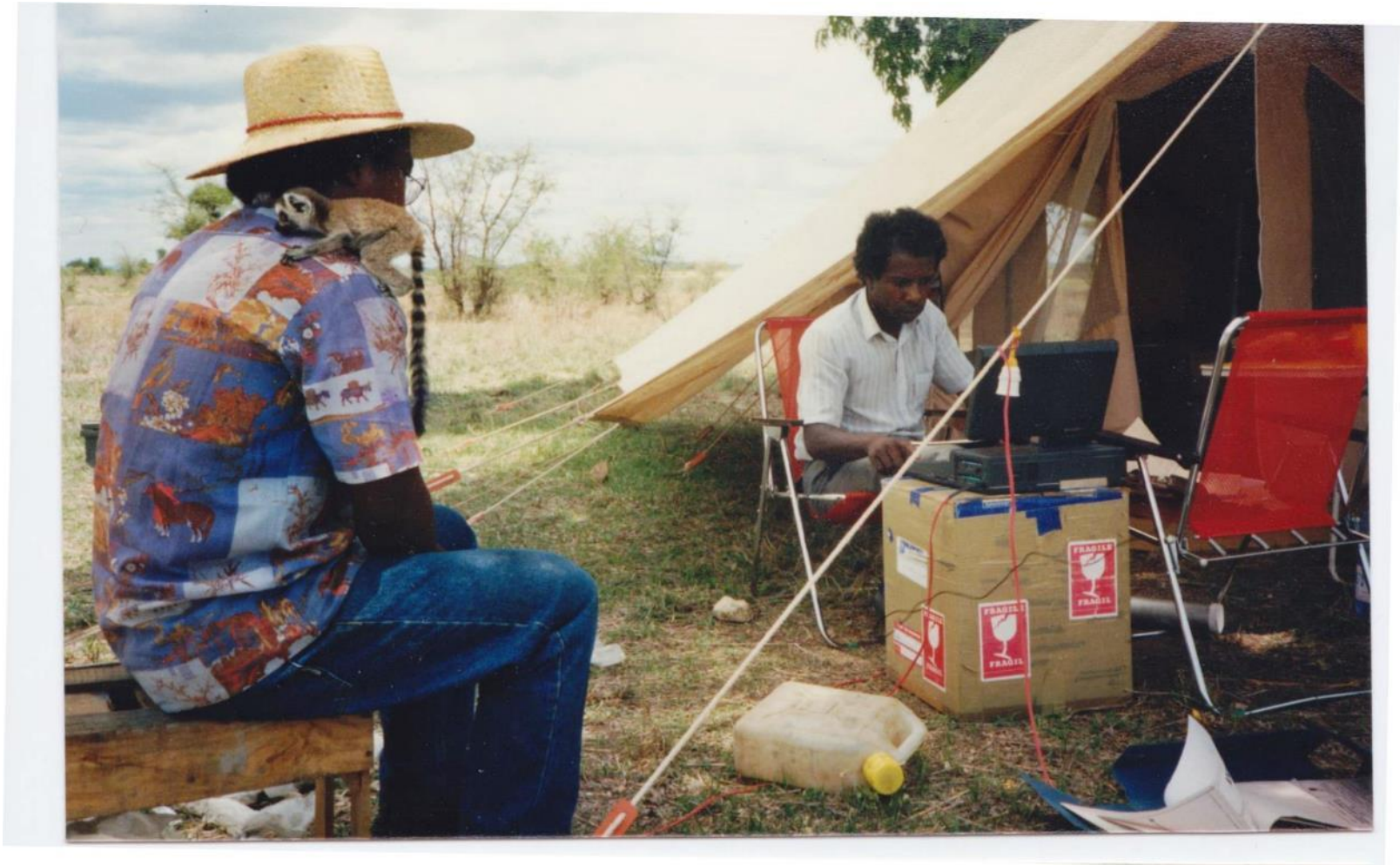
Flash flood



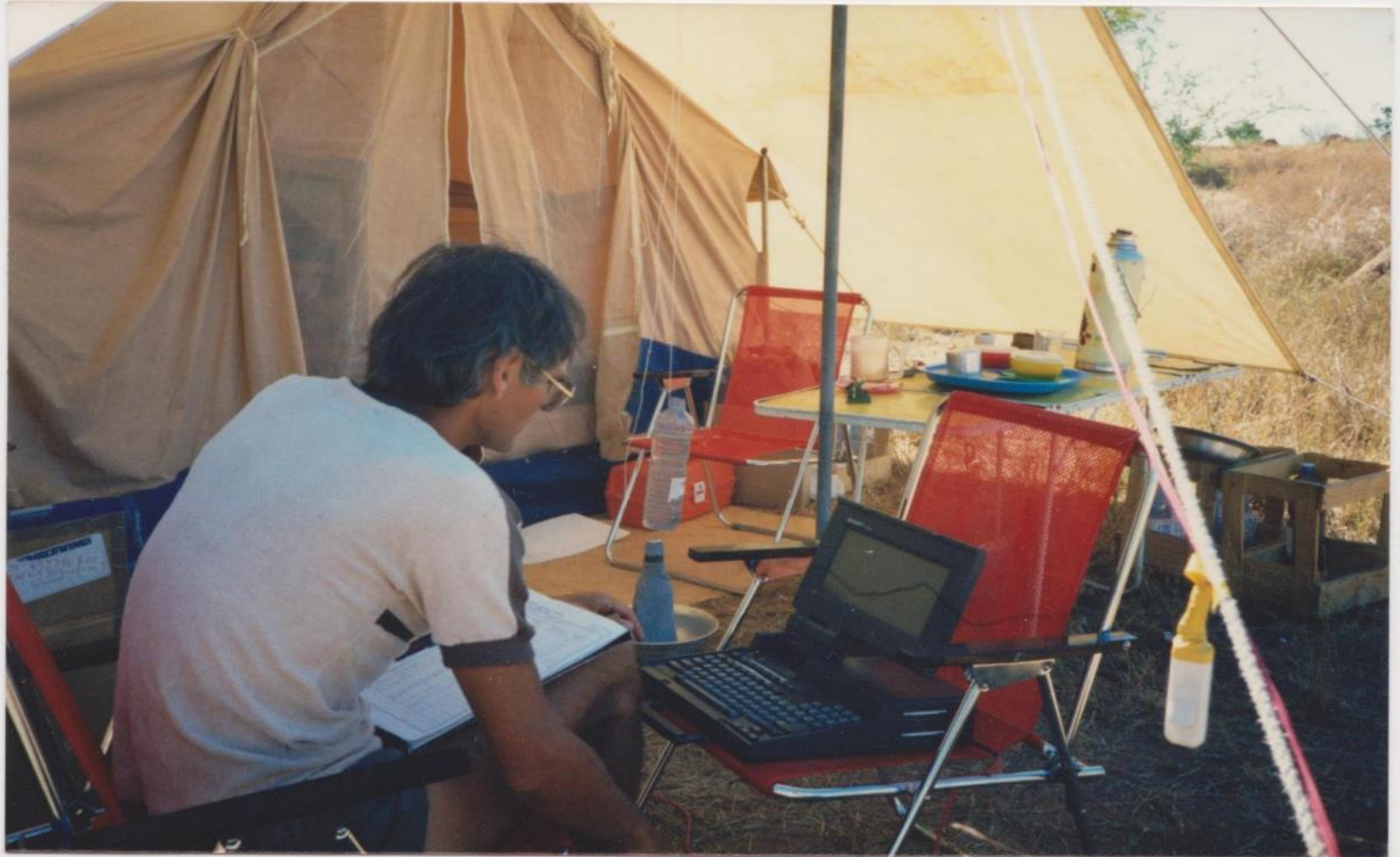
Geophysics

- VES (vertical electrical sounding) & EM (electromagnetic) survey
- resistivity of rock & EM response; seeks fracture, wbr, conductive rock
- Interp with Laptop; confirm?
- heat/dust & electronics
- Battery recharge; genset fuel availability
- Diet of vegetarian geophysicist

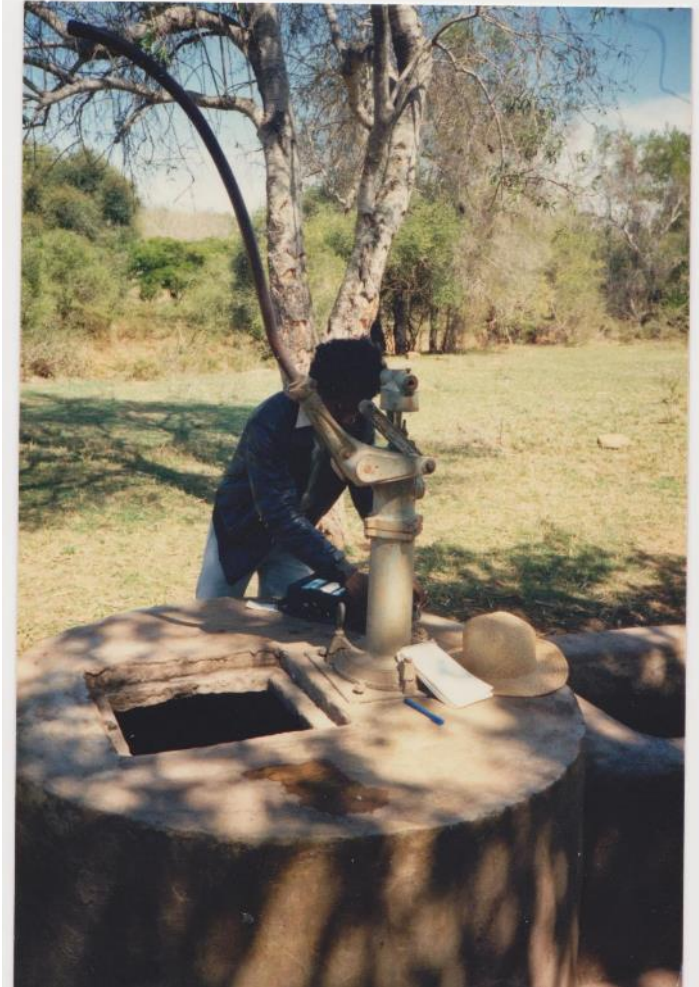
Interp of geophysics



Geophysics



Water sources



scrapes in sand river







Village & countryside

- Villages
- Ancestors
- Forests
- Charcoal
- Markets
- Health!
- Artisans in salt & wheels

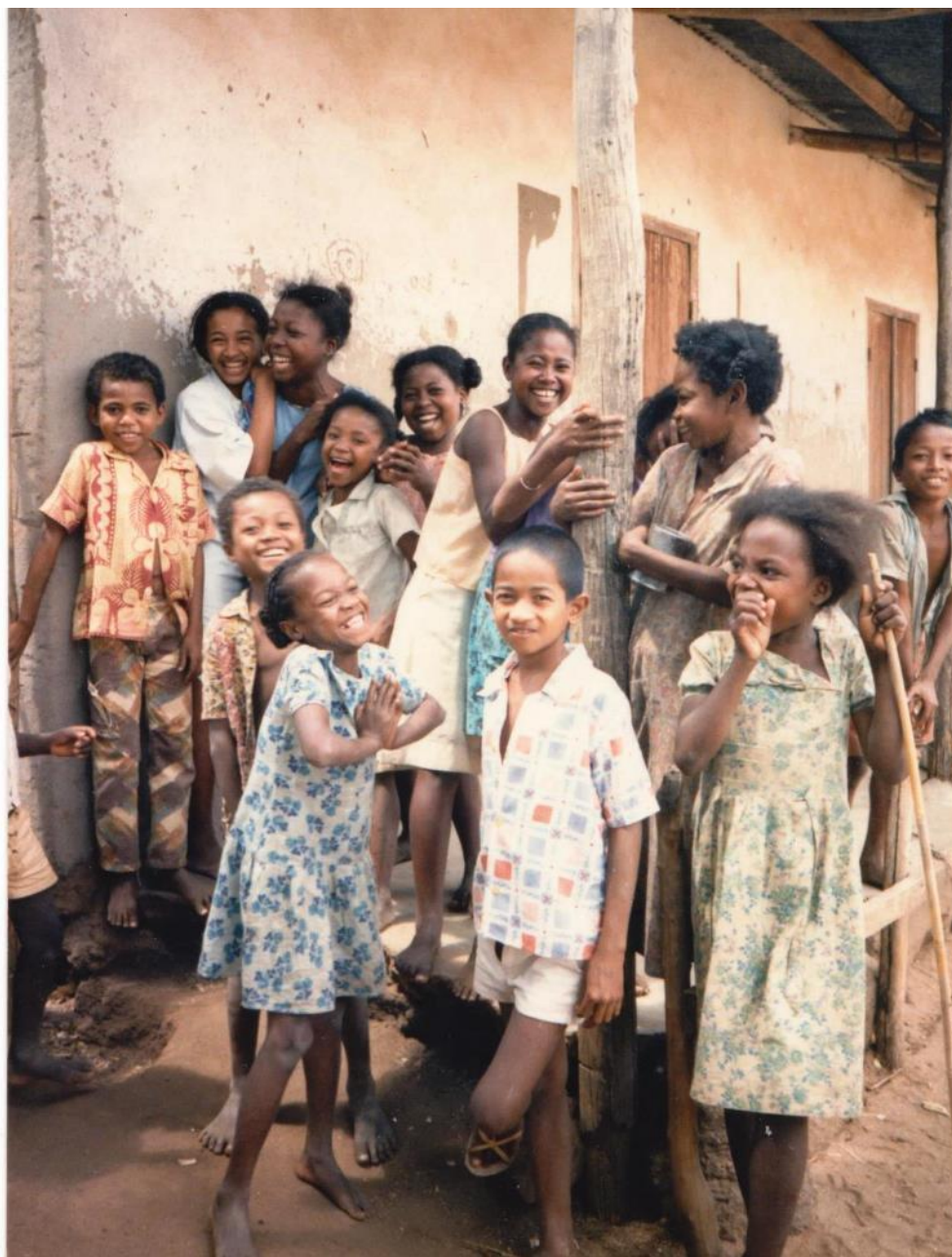
Villages

- French speaking Gendarme rare but vital
- Baguettes & beer available!
- Few wells; walk to distant water
- Collapsed windmills
- Few health posts
- No power; broken solar in tourist 'hotel'
- Cactus fencing













Ancestors

- Ancestor worship
- Assoc with fady; taboo, prohibition
- Cattle are wealth & status; cattle rustling
- Cattle sacrifice honours the dead
- Graves exhibit cattle wealth
- Funeral art

Ancestors





Boa Bab & spiny forest

- Drought adaptations
- Boa Bab as water reservoirs
- Boa Bab Gondwana distribution: Australia, Madagascar, Africa
- spiny forest; thin, sparse canopy
- Tiny hinged leaf forms
- Many endemic; face habitat loss

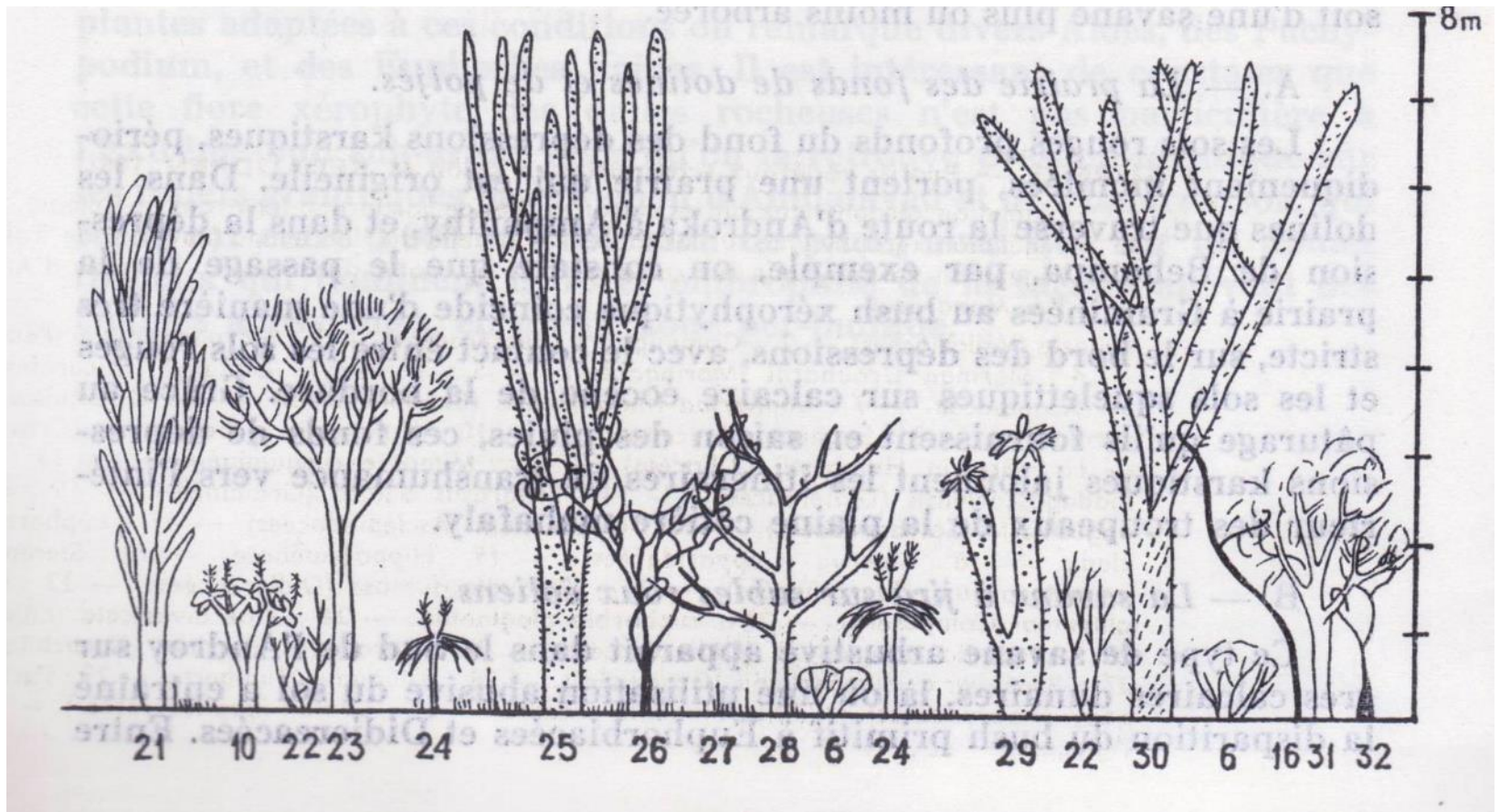
Boa-Bab & Spiny Forest











- | | | | | |
|----|-----------------------------|----|----|-----------------------------|
| 23 | <i>Euphorbia plagiantha</i> | ## | 25 | <i>Alluaudia adscendens</i> |
| 28 | <i>Alluaudia humberti</i> | | 29 | <i>Pachypodium geayi</i> ## |
| 24 | <i>Aloe divaricate</i> | | 30 | <i>Alluaudia procera</i> |







Charcoal







Markets



Cassava

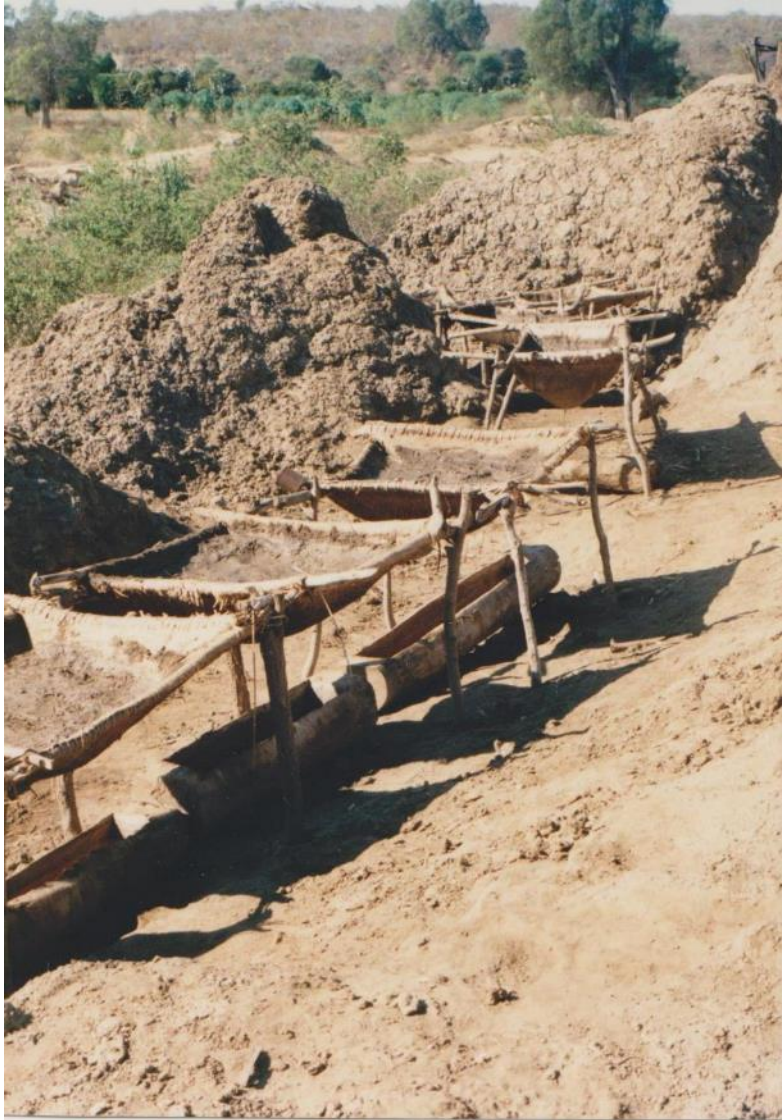


Health & malnutrition



High infestation of intestinal parasites inc. bilhazia in children
(*Wilson-Howarth*)

Salt



A Wheelright



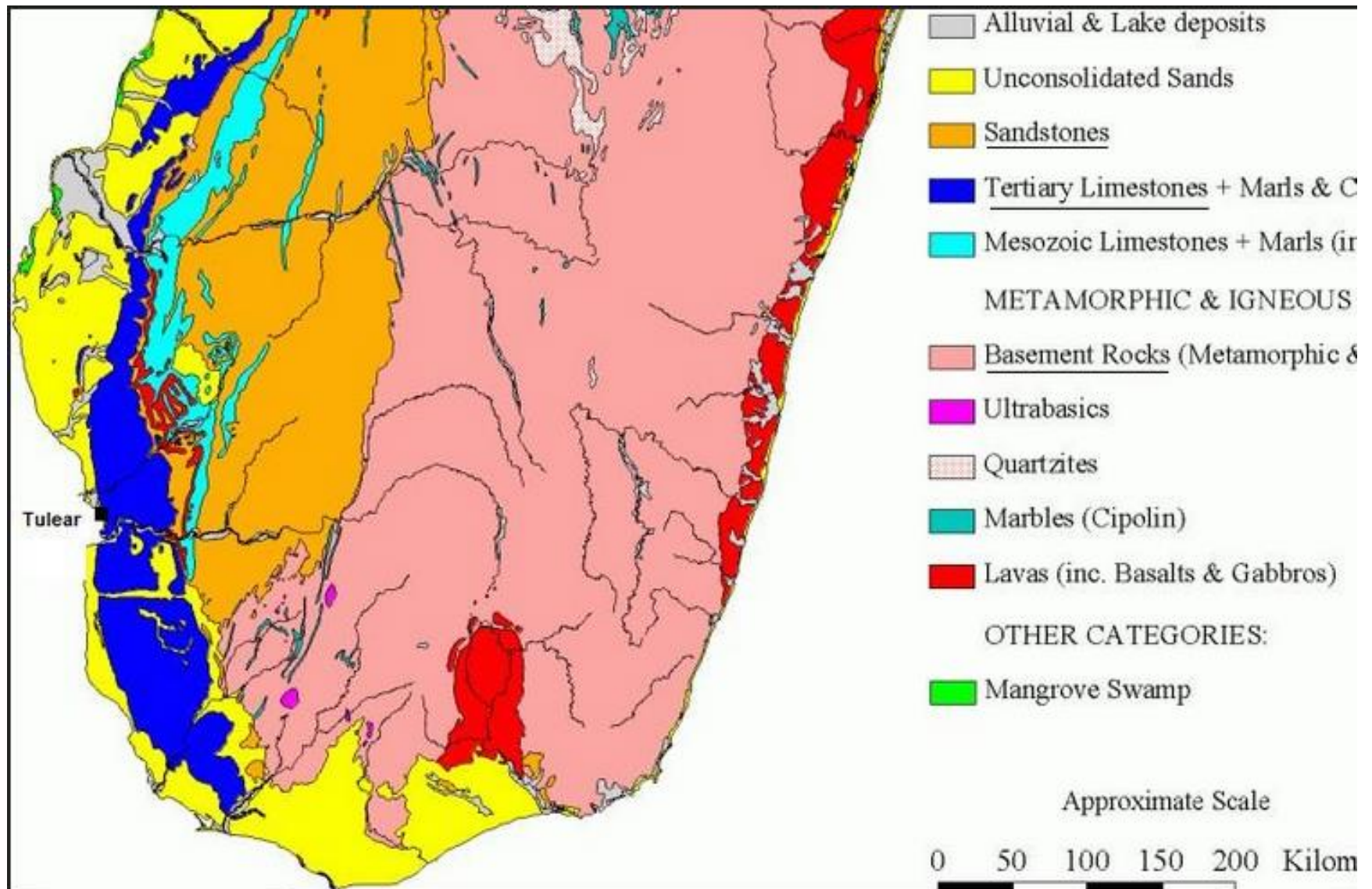
Prospects

- Limited AES results; no new wells drilled
- Later satellite & fracture analysis
- Low groundwater potential; 2m³/h wells
- ‘Project graveyard’; low Govt. priority
- Refocus- project to local well ownership ?
- Water transfer needed ?
- [Solar-smart phone impacts post 1983?]

Opportunity

- Sedimentary rocks to W & SW
- Isalo sandstone; artesian flows; local use, unregulated
- Limestone to W; caves; deep water
- Coal; Sakoa in WNW. French development then WW2 [rails now used for apex hut beams!]
- New coal development but for export !

Geology



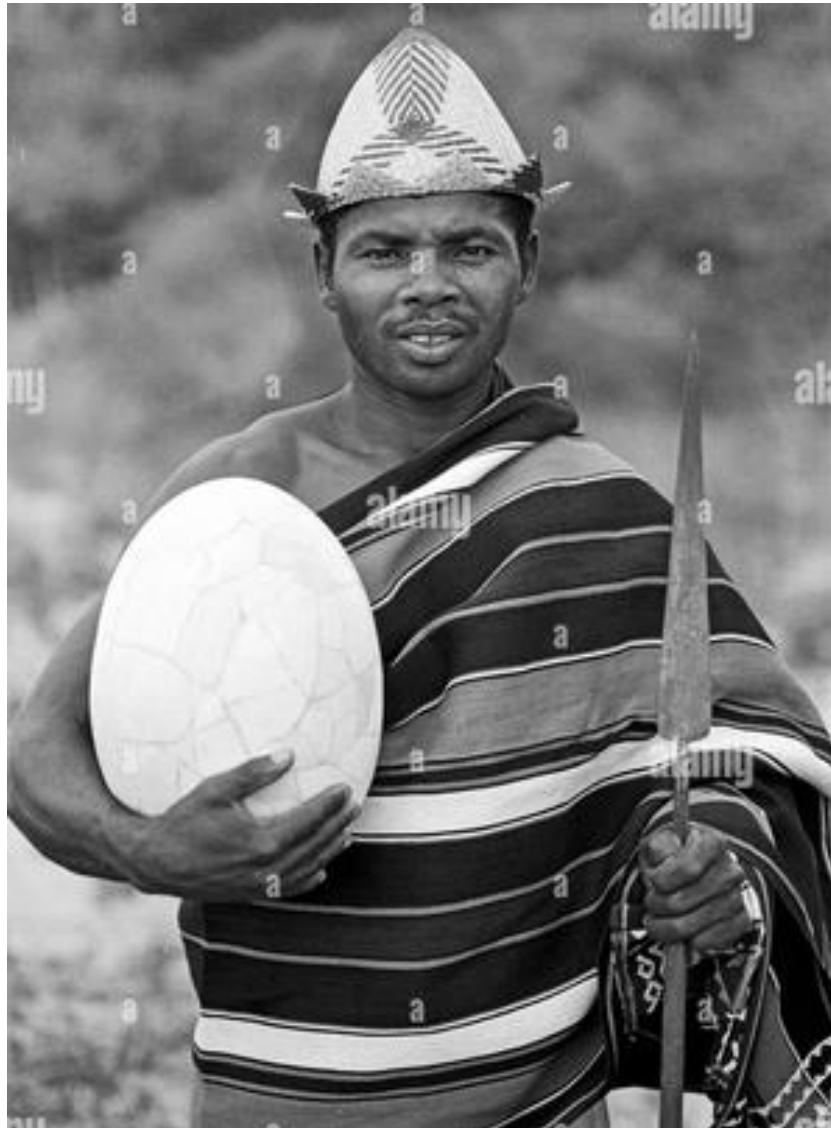


Artesian flow
from Isalo
sandstone



What could be?

- Develop artesian sandstone aquifer
- pipeline & storage to basement zone
- or use perennial river flows from east.
- Solve low maintenance-illegal offtakes
- Substitute Coal for charcoal; constrain deforestation of spiny forest / habitats.
- Govt & foreign interest in development ?



Reconstructed
egg of the giant
flightless
'elephant bird'
Aepyornis .

Bird became
extinct
after human
settlement ?

Final

*Read more; The World
Bank Group; The Deep
South. 2016-17. author:
Timothy Healy*

