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DESERT or PARADISE

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Experts for Natural Water Retention

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Natural Water Retention Systems

for Land Regeneration in Africa

presented by Rommel Roberts & Susi Gubler



**Manitoba
Canada**

**Montana
USA**

**Styria
Austria**

**Tamera
Portugal**

South Sudan?

Kenya?

Plattfontein?

**Bloemfontein
South Africa**

Does it work here?



TAMERA/Portugal



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Problem: dry steppe, semi-arid / 135 ha
Initial consultation: 2007



TAMERA

TODAY



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TAMERA

BEFORE



AFTER



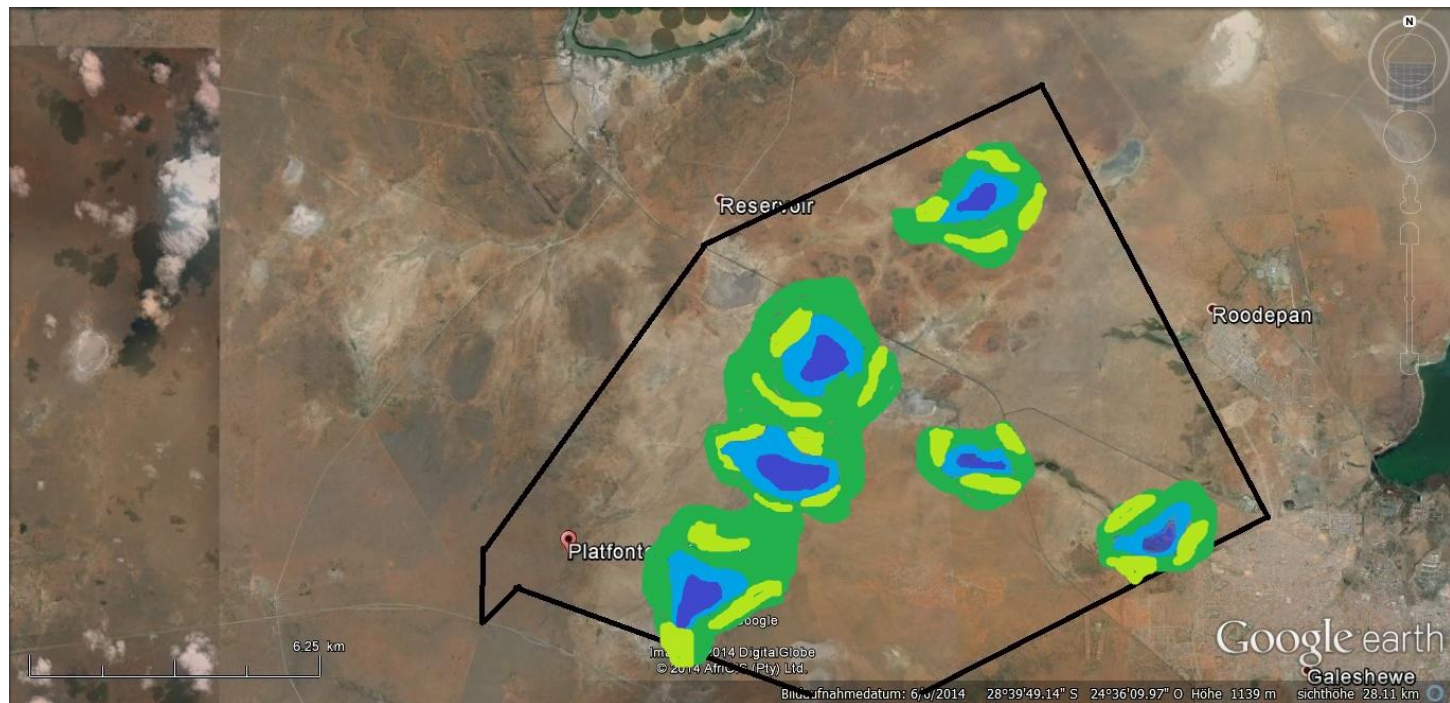
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Platfontein, San Community, SA



Platfontein – seen from planned lake





Where does the water come from?

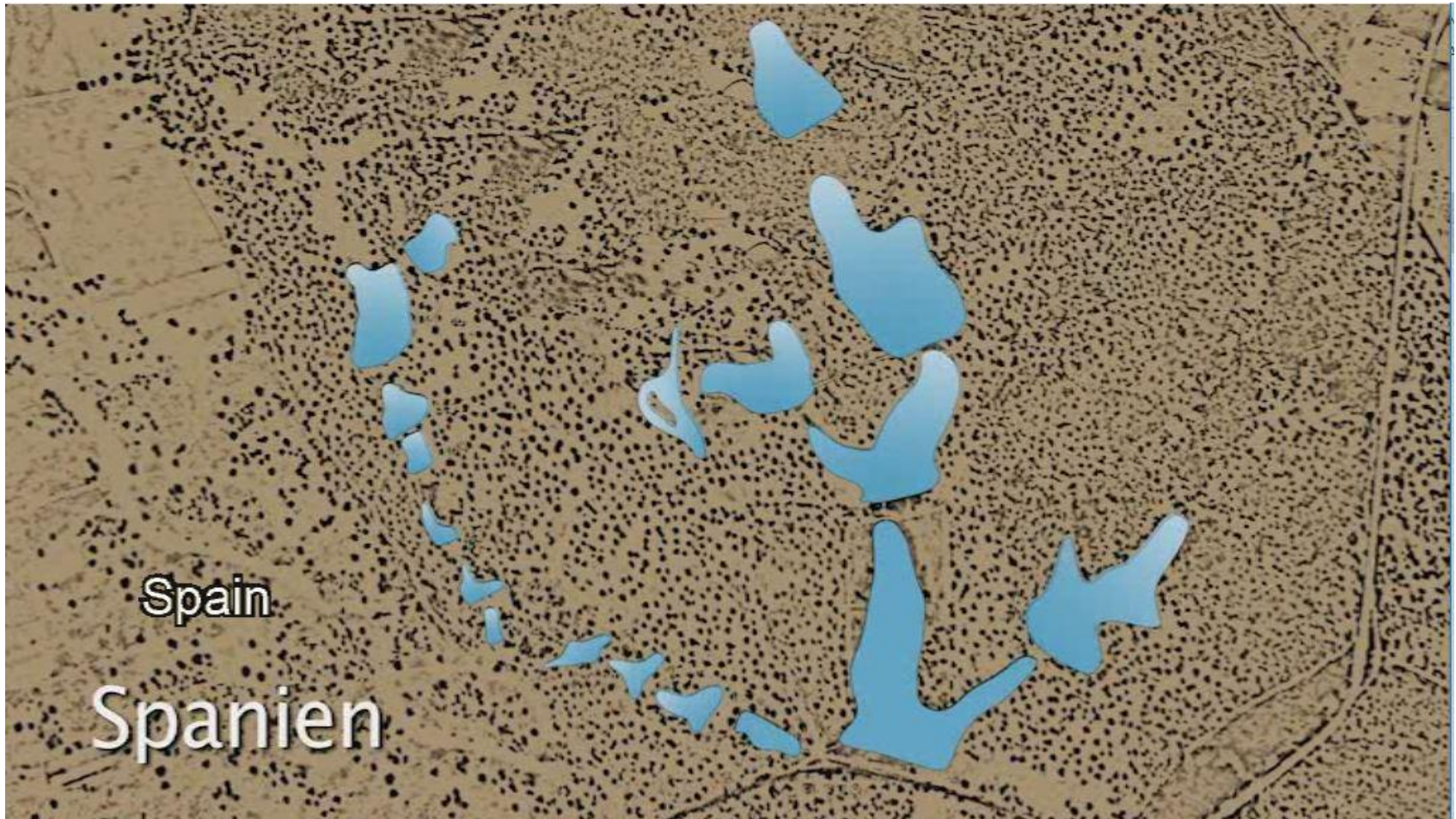
Example Platfontein

2011: more than **1000mm** precipitation

Per 1 km²1 000 000 m³ rainwater

1 ha10 000 m³ rainwater

18 lakes for a semi-arid area in Spain



Same area after realisation of NWR



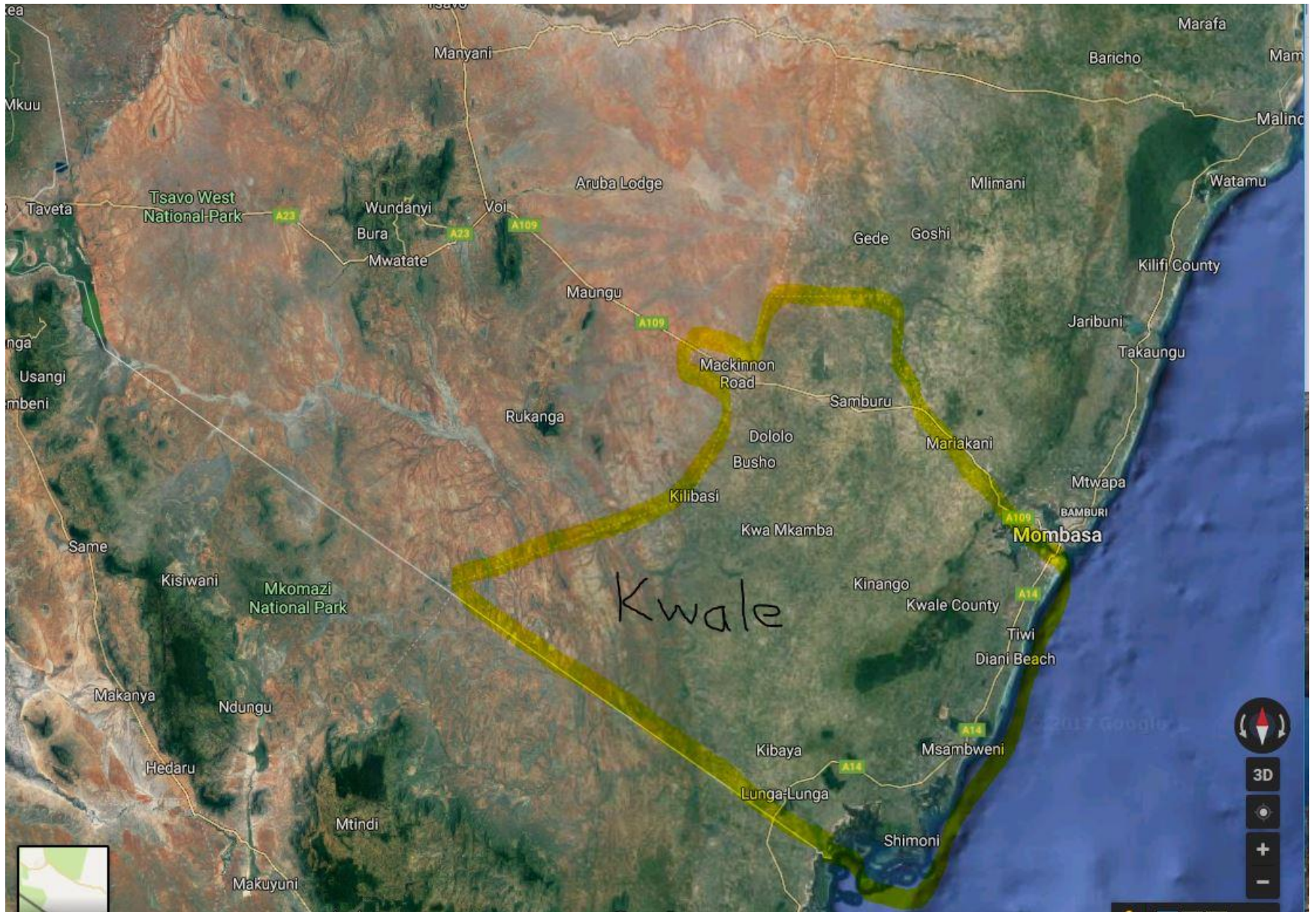
How does the lake fill with water?

- No concrete nor plastic sheets. Just materials that are onsite.
- Nature offers water retention spaces given by the contours.
Use the natural hollow, depressions and so forth.
- Barrier Layer, filled with clay like fine soil – moistened and compressed → planting & mulching
- **The lakes are filled with rain water only**
 - Example: average rainfall 500mm = 5000m³ water/ha/year**
in a catchment area of 100 ha = 500'000 m³ water
= 15'000 tanker trucks
- Consider main wind direction
- Terraces with vegetation around the lakes
- The less rainfall/year the bigger the catchment area and lake

Kenya



Kwale County & Tsavo National Park

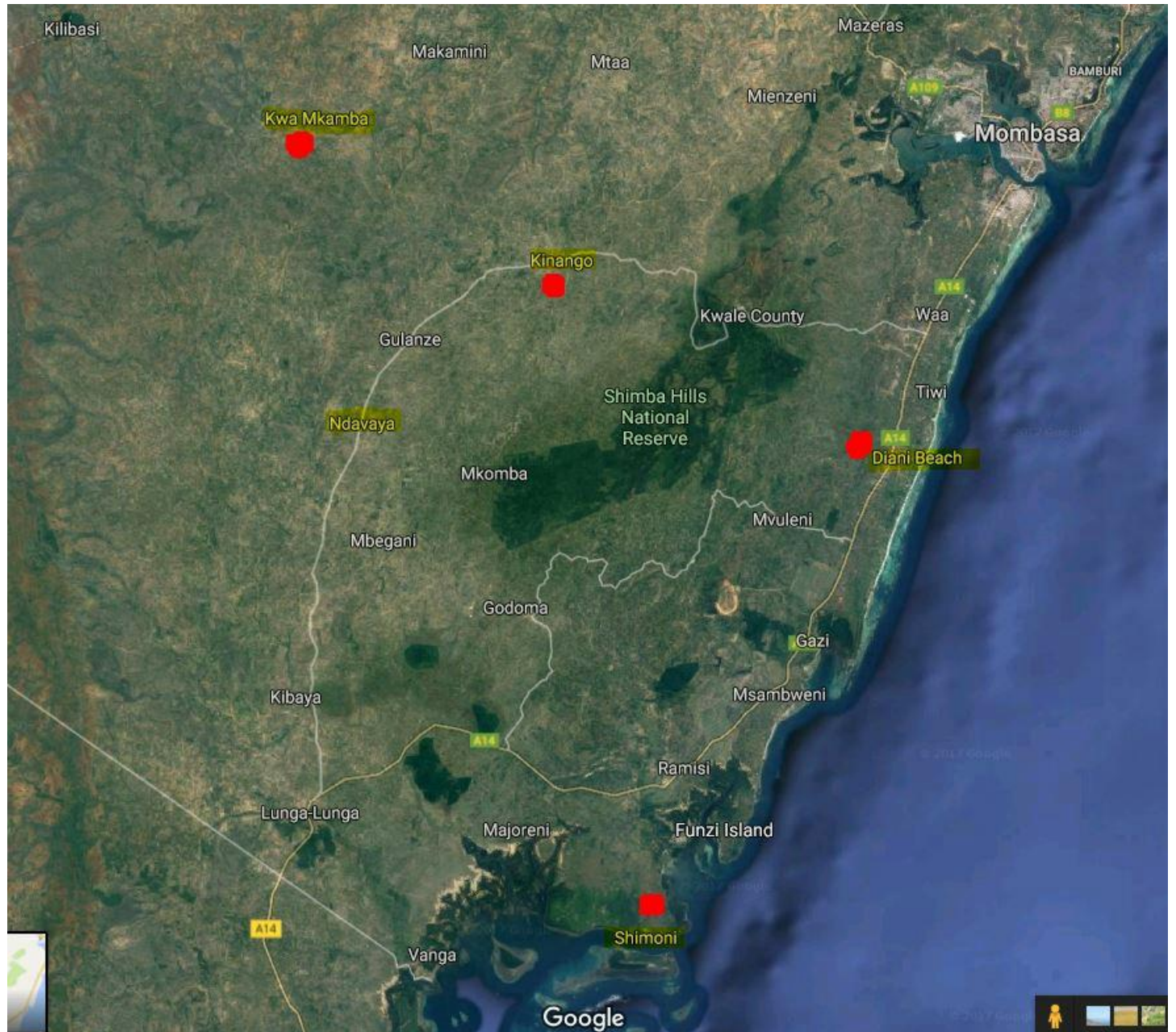


Mkamba

Kinango

Ukunda

Shimoni

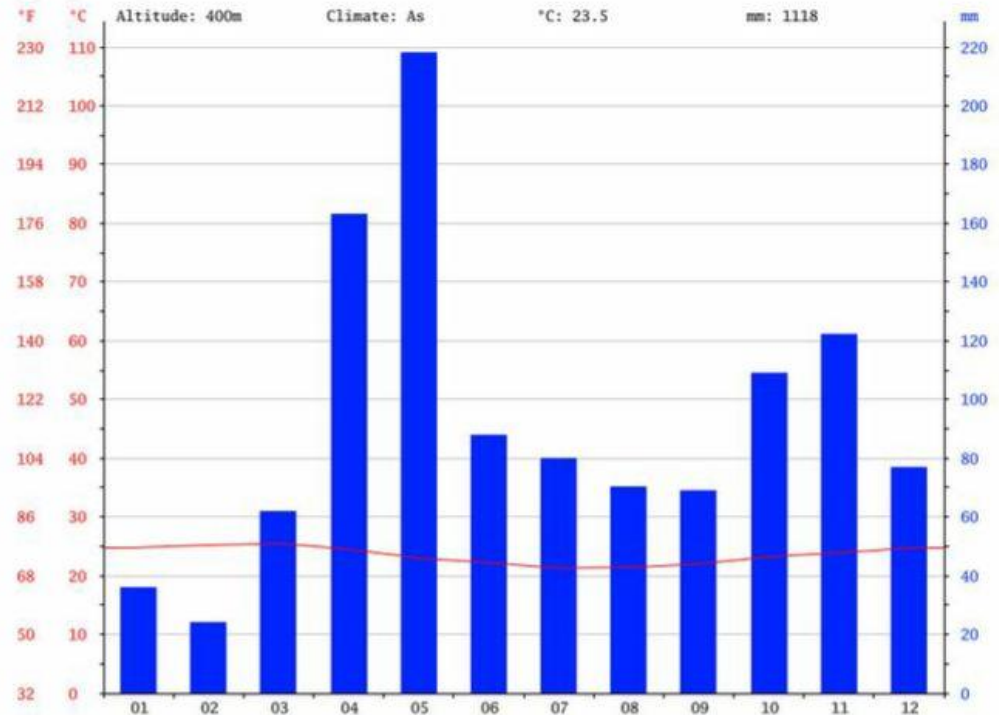


Average Rainfall & Temperature

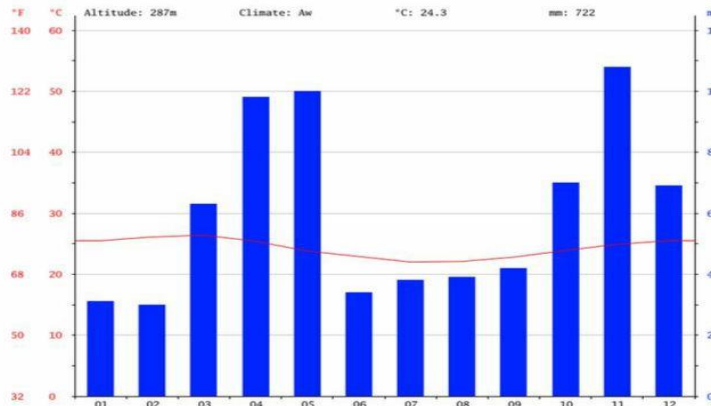
Mkamba – 50km East of Coast
average rainfall **722mm/year**

Ukunda – at Coast
average rainfall **1118mm/year**

CLIMOGRAPH KWALE TOWN



CLIMOGRAPH KWA MKAMBA



Benefits of Natural Water Retention

- **Arable land** – brings life and wealth
- **Prevents costs** for fertiliser & irrigation
- Self-sustained **fish ponds** with money output
- **Community projects:**
 - gardening
 - fruit trees, orchards
 - staple & other crops
 - cattle
 - fish
 - re-forestation
- **Changed micro-climate**
- **Tourist attraction**
- Maybe combined with **training centre for land regeneration**

Preparations

before detailed analysis by expert

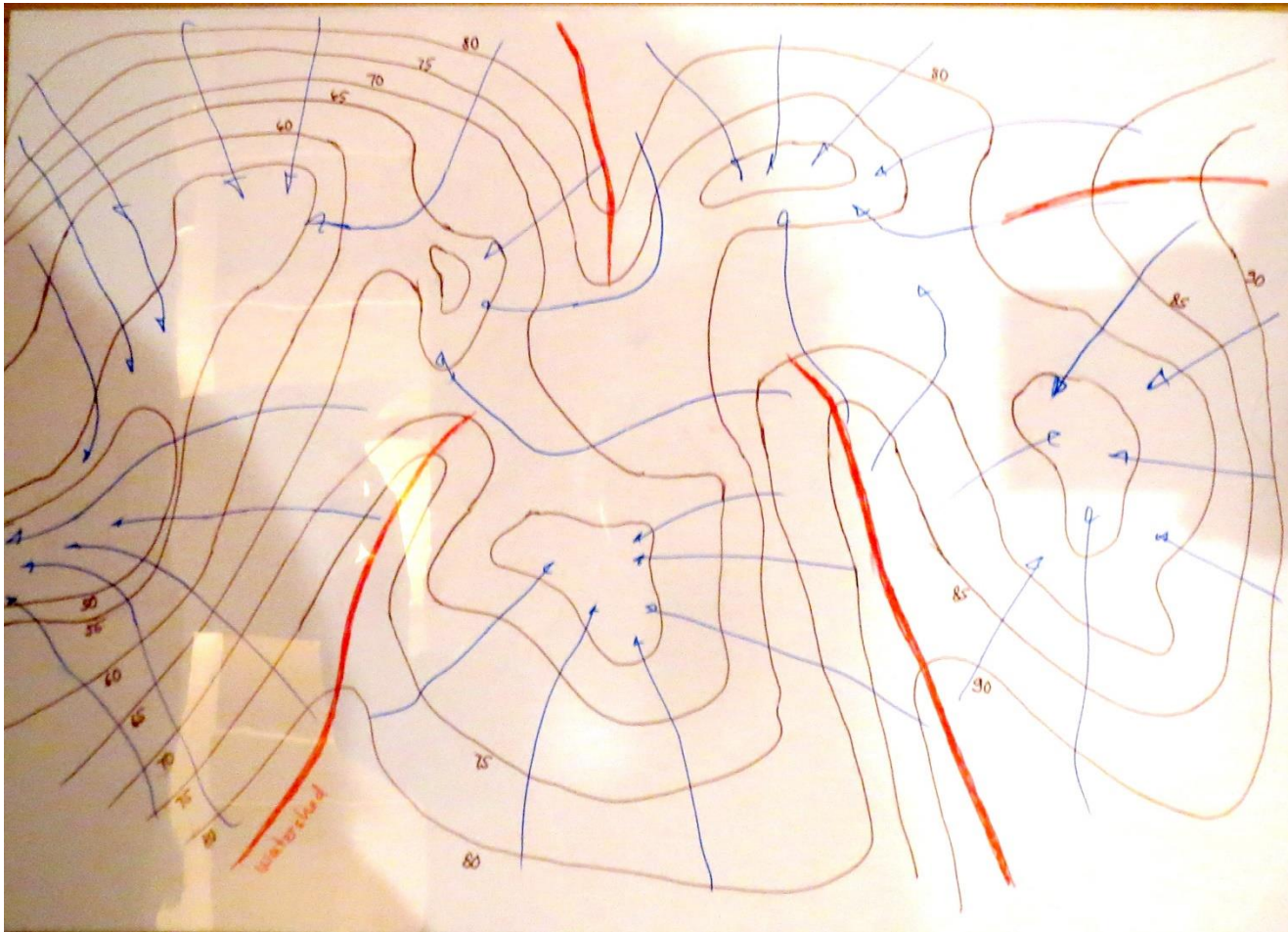
- exact **coordinates** of all corners of the envisioned land
- map with **contour lines**
- **geological situation**: e.g. layers of rocks, available clay
- **land & water rights** cleared
- **climate** (local and bigger area)
- average **rain fall** – peaks: high and low
- main **wind direction**
- **local plants**
- **planned use**: gardening, agriculture, re-forestation, fish pond, cattle, ...?

Overview Landscape on Google Map



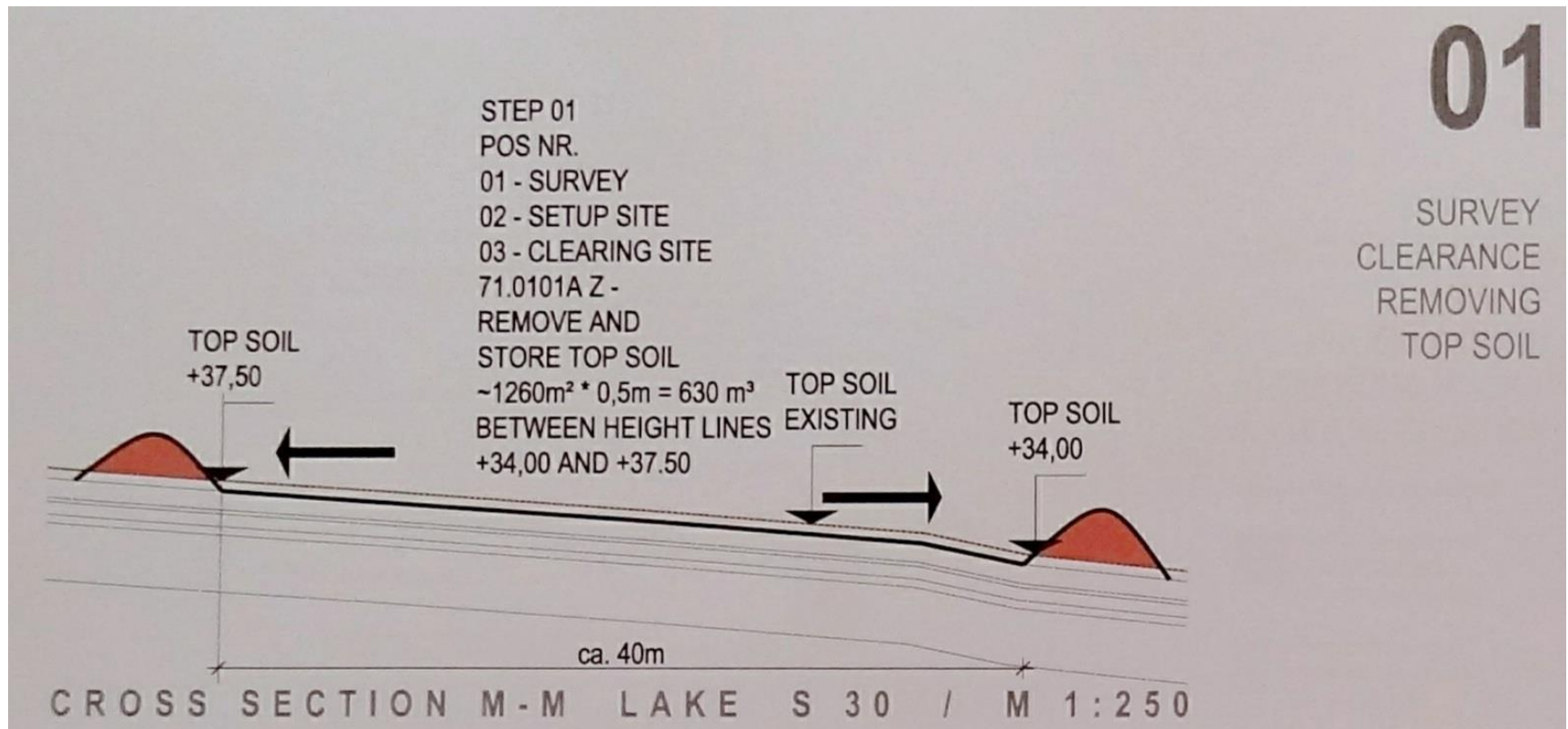
Contour lines

<http://www.maphill.com/south-africa>



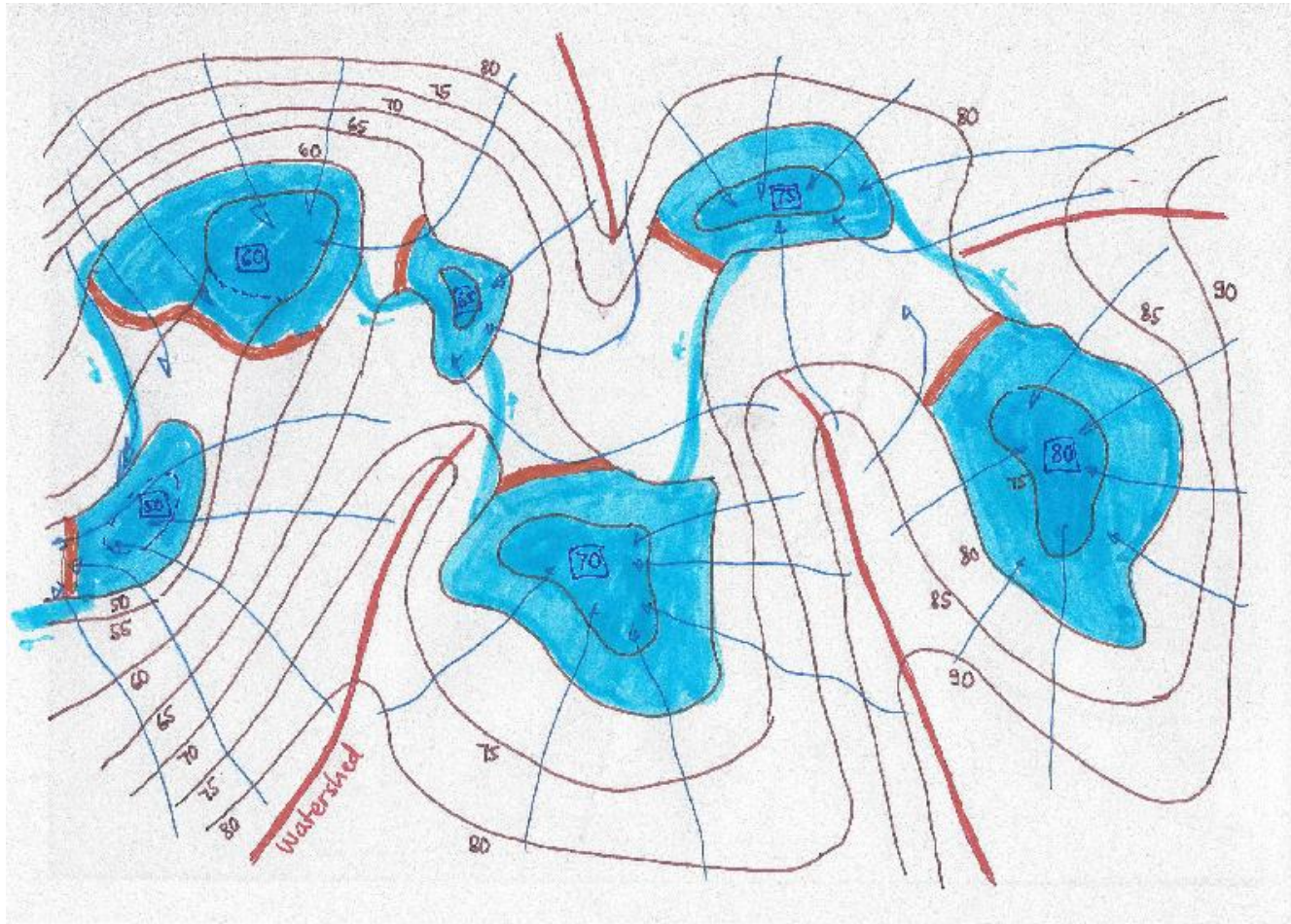
Geological Situation

e.g. layers of rocks, available clay

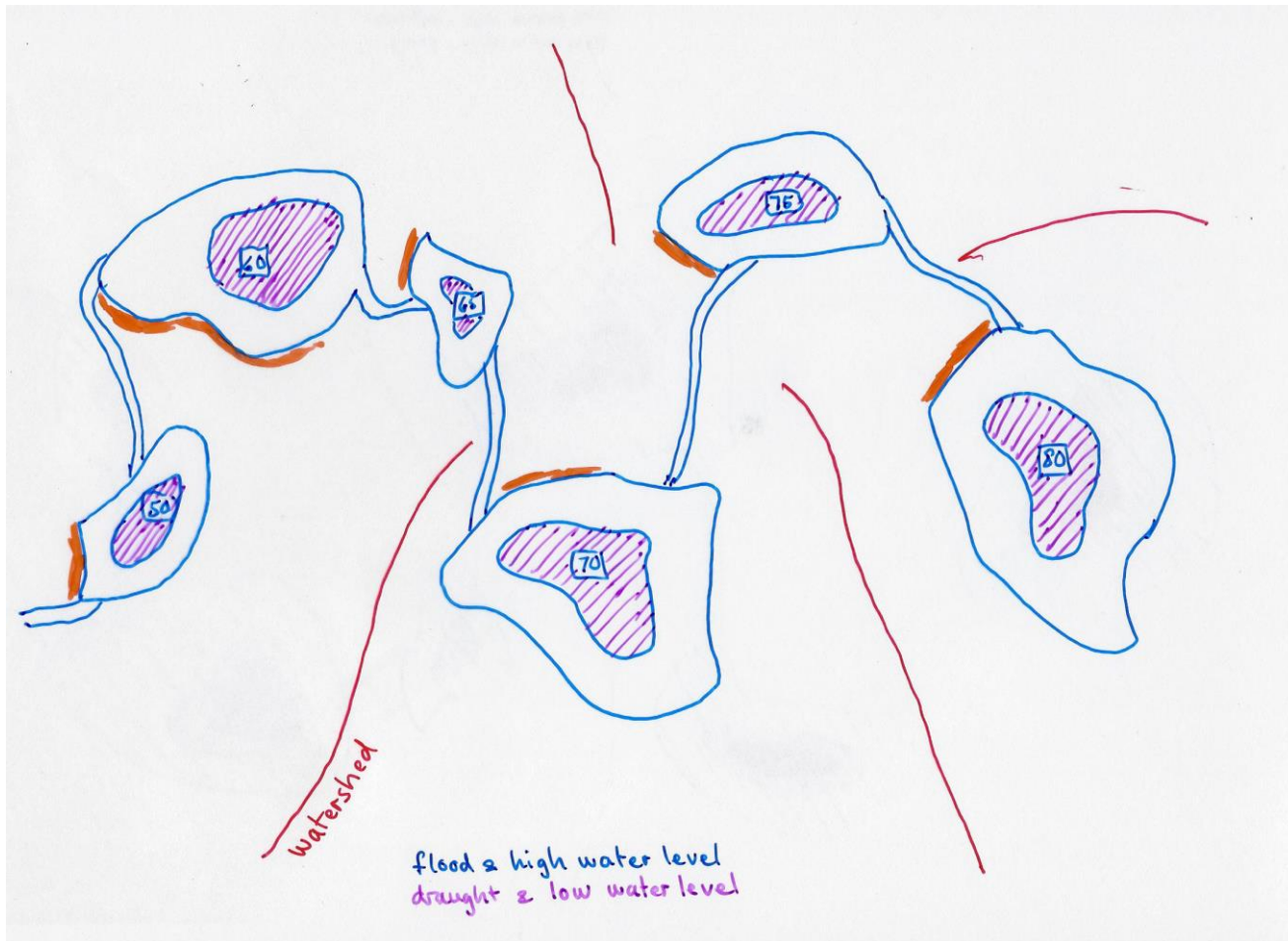


Planning Phase

system of dams with natural materials

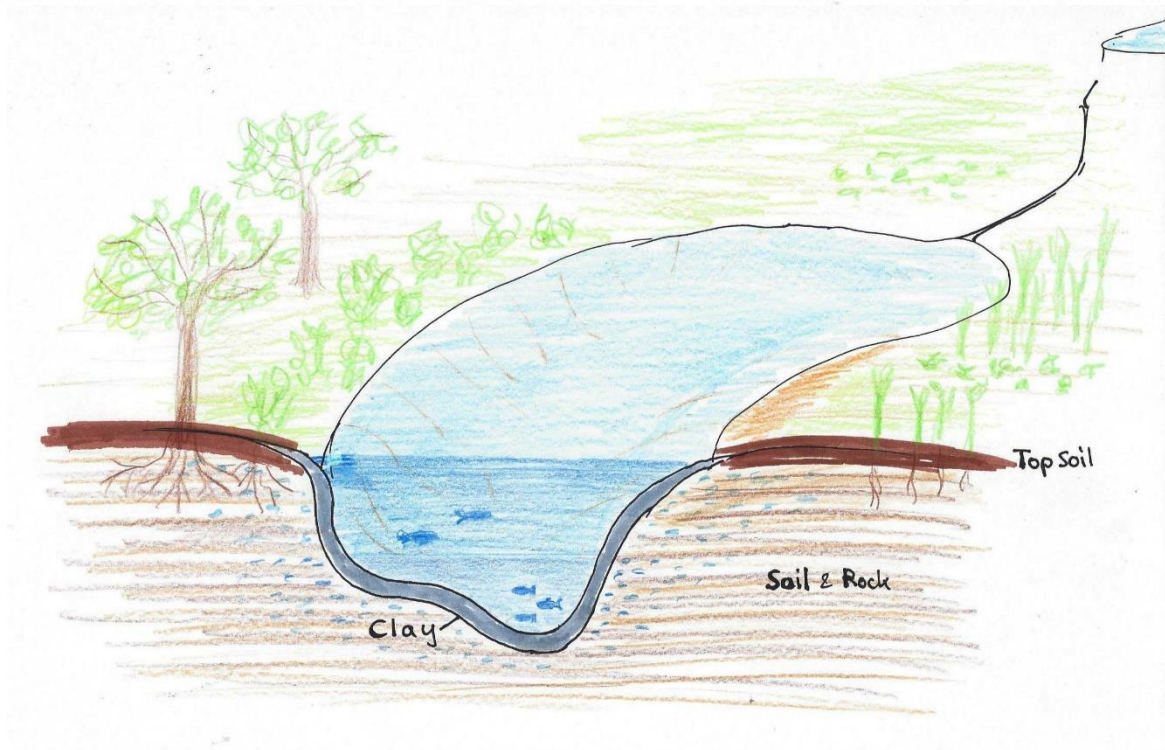
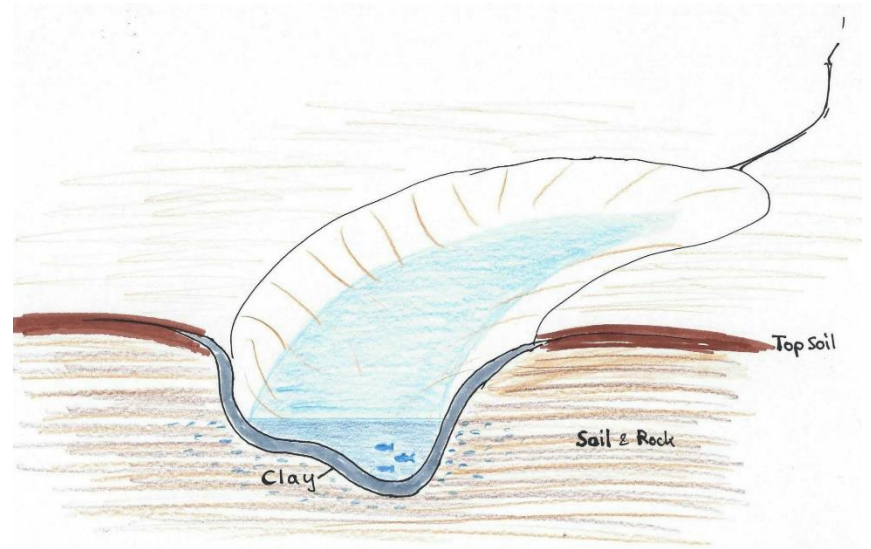
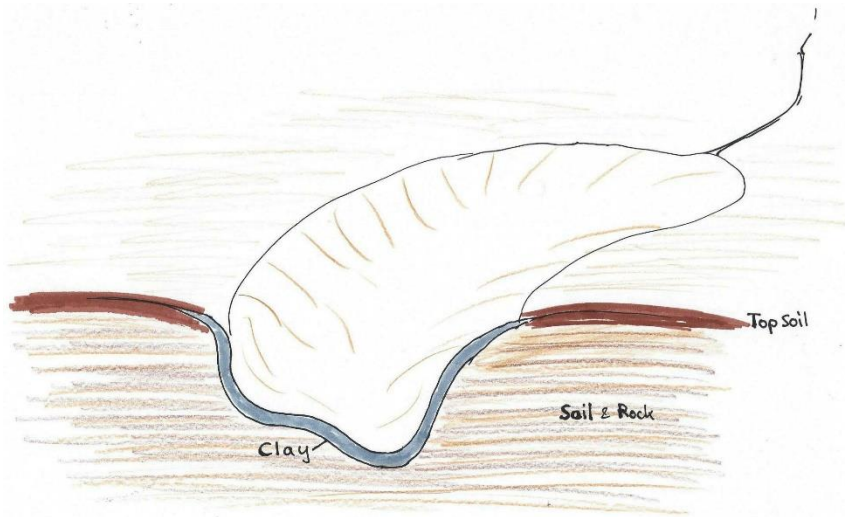


Water Levels: high and low

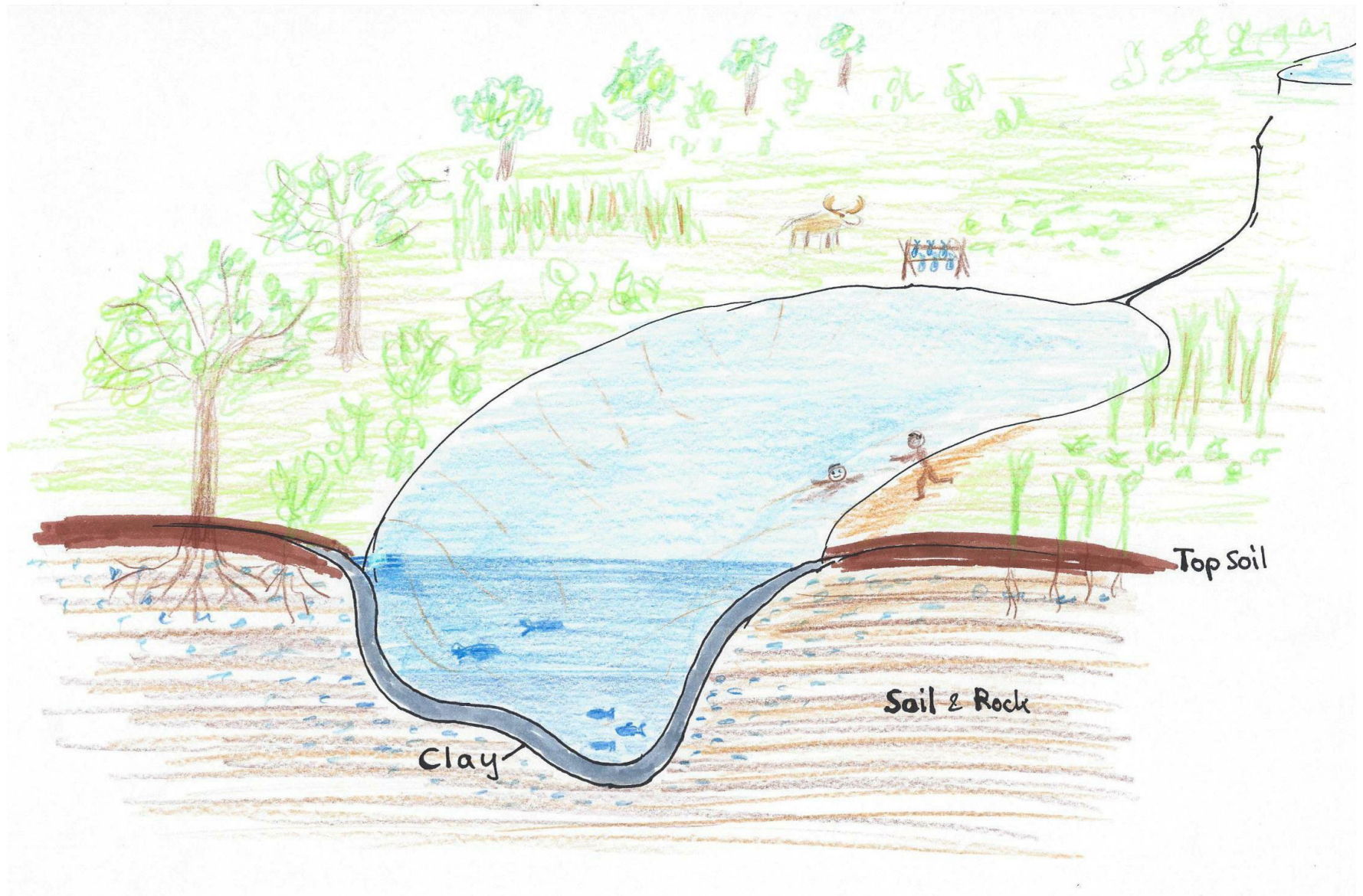


Preparing Dam with Natural Material





Change of Micro-Climate





Check the Internet

Search for 'Natural Water Retention', 'Holzer'
'Permaculture', 'Peham'

- <https://www.youtube.com/watch?v=-XNDbg5UuNU>
- <http://zafor.org/contributors/speakers/presentations>
- <https://www.youtube.com/watch?v=4hF2QL0D5ww>

look for **Peham, Sandra & Johann - Desert or Paradise**

Preparations

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- **local plants**
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How to build a Dam



Compressing clay like fine soil



Compressing the base of the Dam



The first water fills the deepest parts





Overflow of lake



Vegetable Garden at the Lake



Micro-Climate Change - Mist





Natural Water Retention in a Desert?



Water System in the Desert Sossusvlei



Dams for water under sand layer



