

- Adapting to climate change and water shortages
- 適應氣候變化和水資源短缺



Fill time
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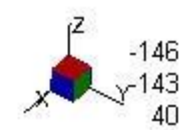
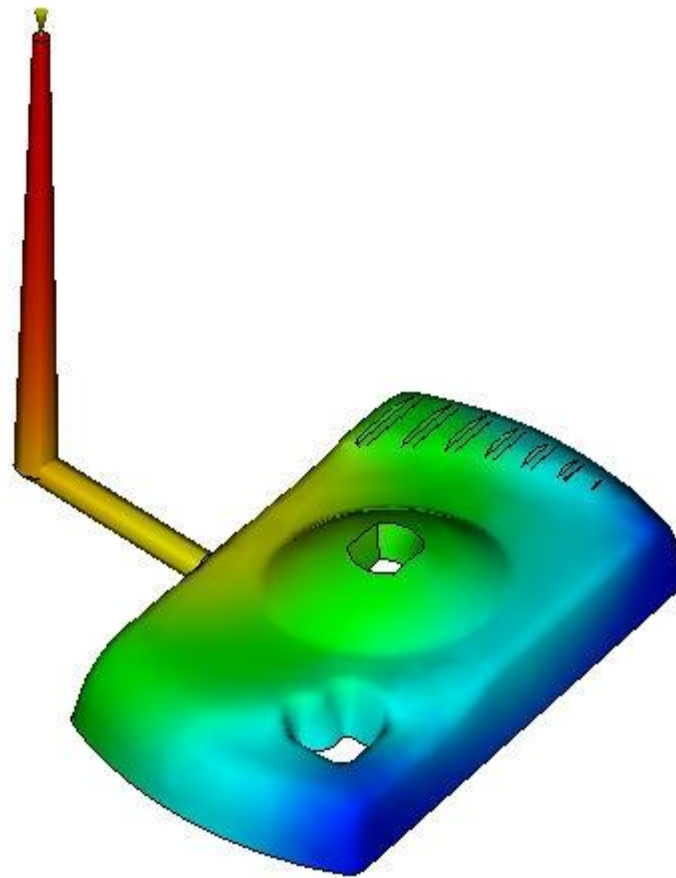
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0.6492

0.4328

0.2164

0.0000



moldflow
MOLDFLOW PLASTICS INSIGHT

Scale (100 mm)

Fill time
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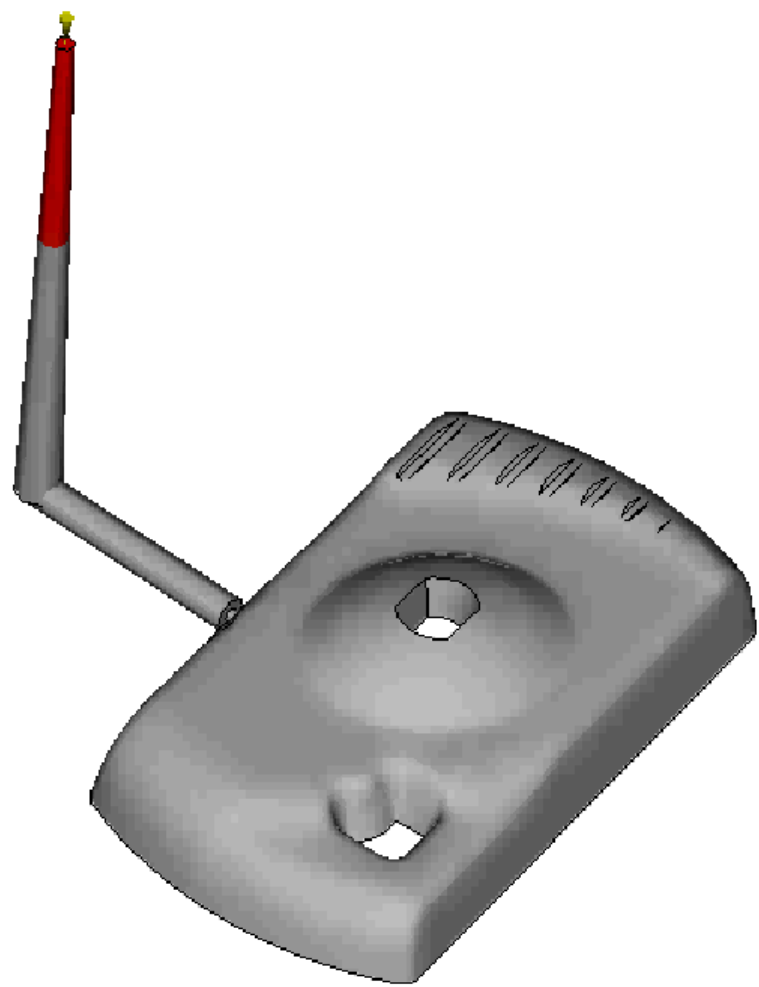
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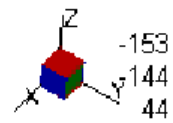
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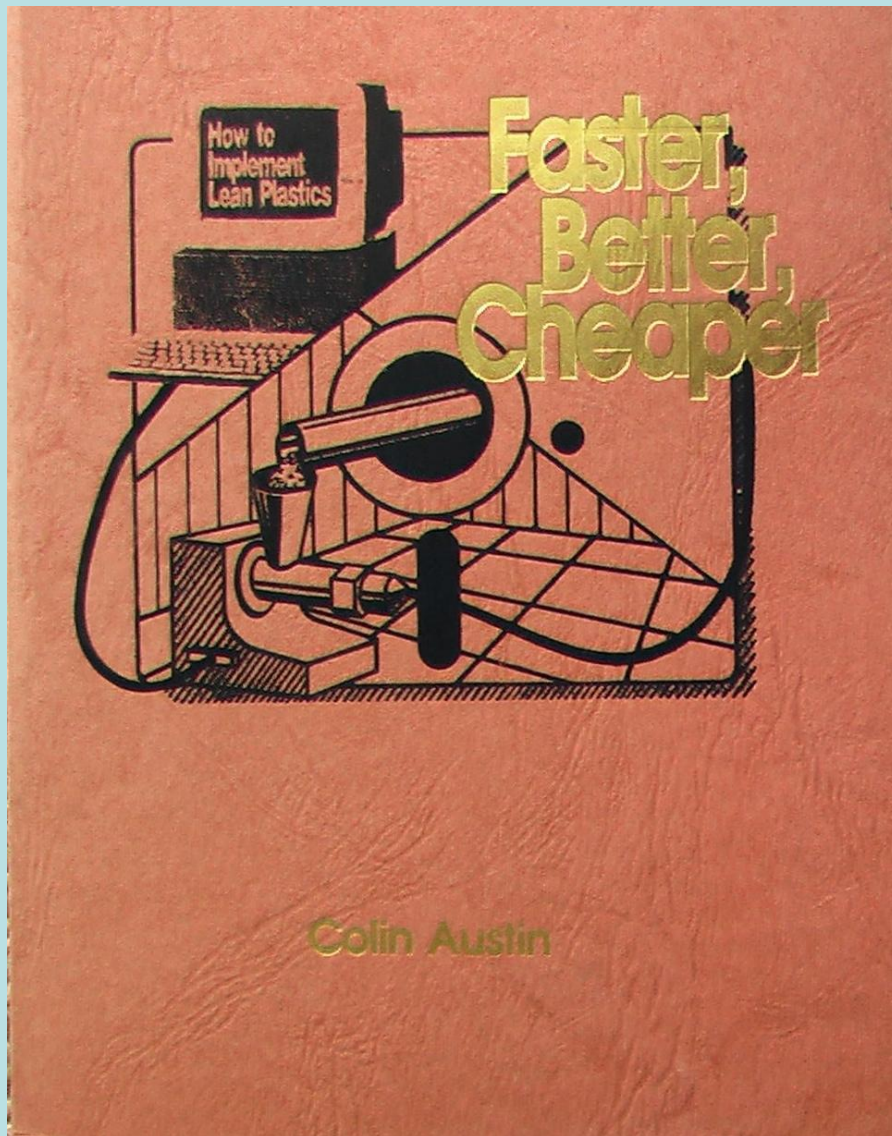
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moldflow
MOLDFLOW PLASTICS INSIGHT

Scale (100 mm)





- Faster
- Better
- Cheaper
- 更快
較好的
更便宜



- **Soil regeneration**
- 土壤再生

- **Micro biology regenerates soil**
- 微觀生物學再生土壤

- **Water plays a crucial role**
- 水起著關鍵的作用

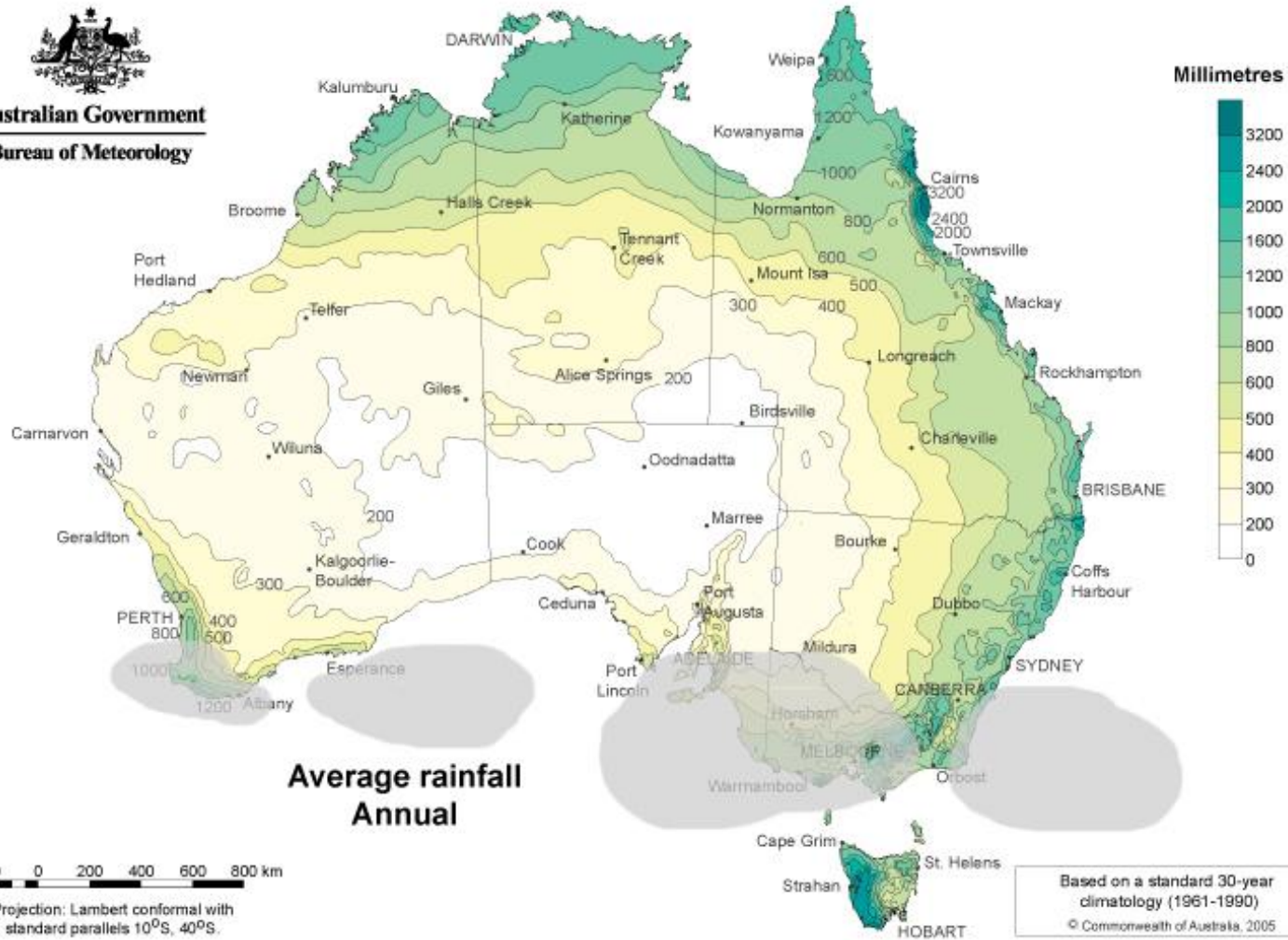
- **Climate shift**

- 氣候變化



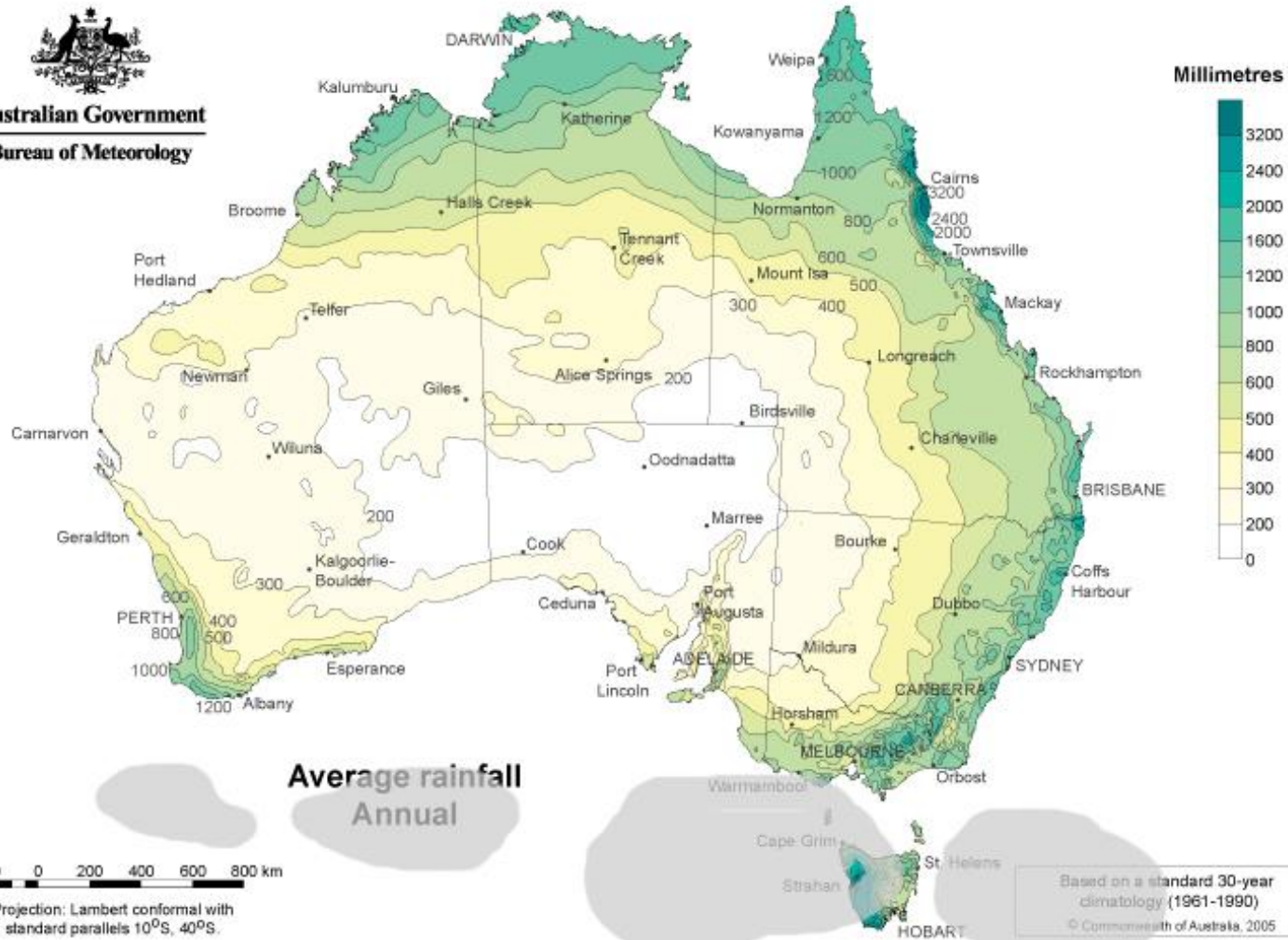


Australian Government
Bureau of Meteorology



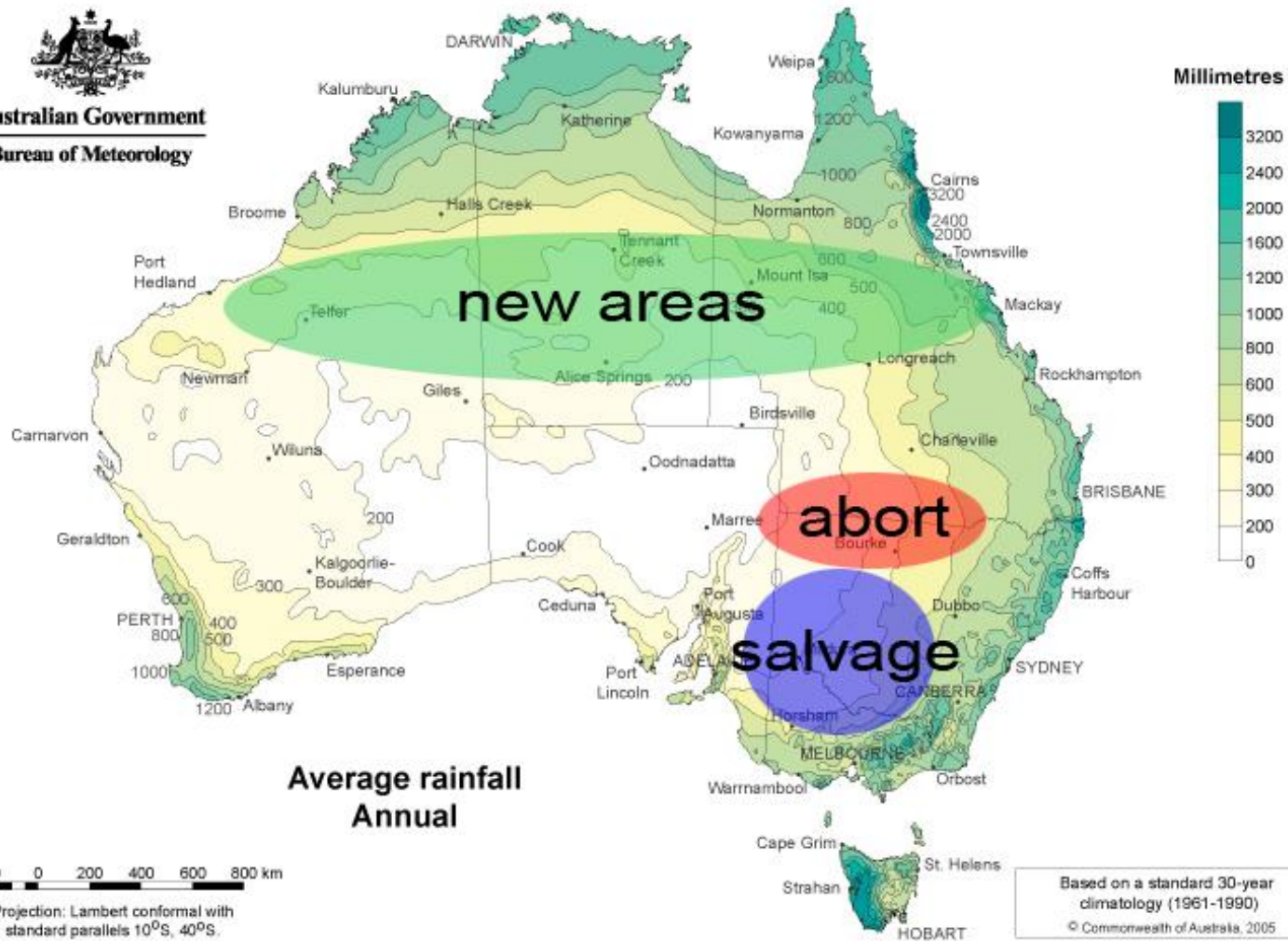


Australian Government
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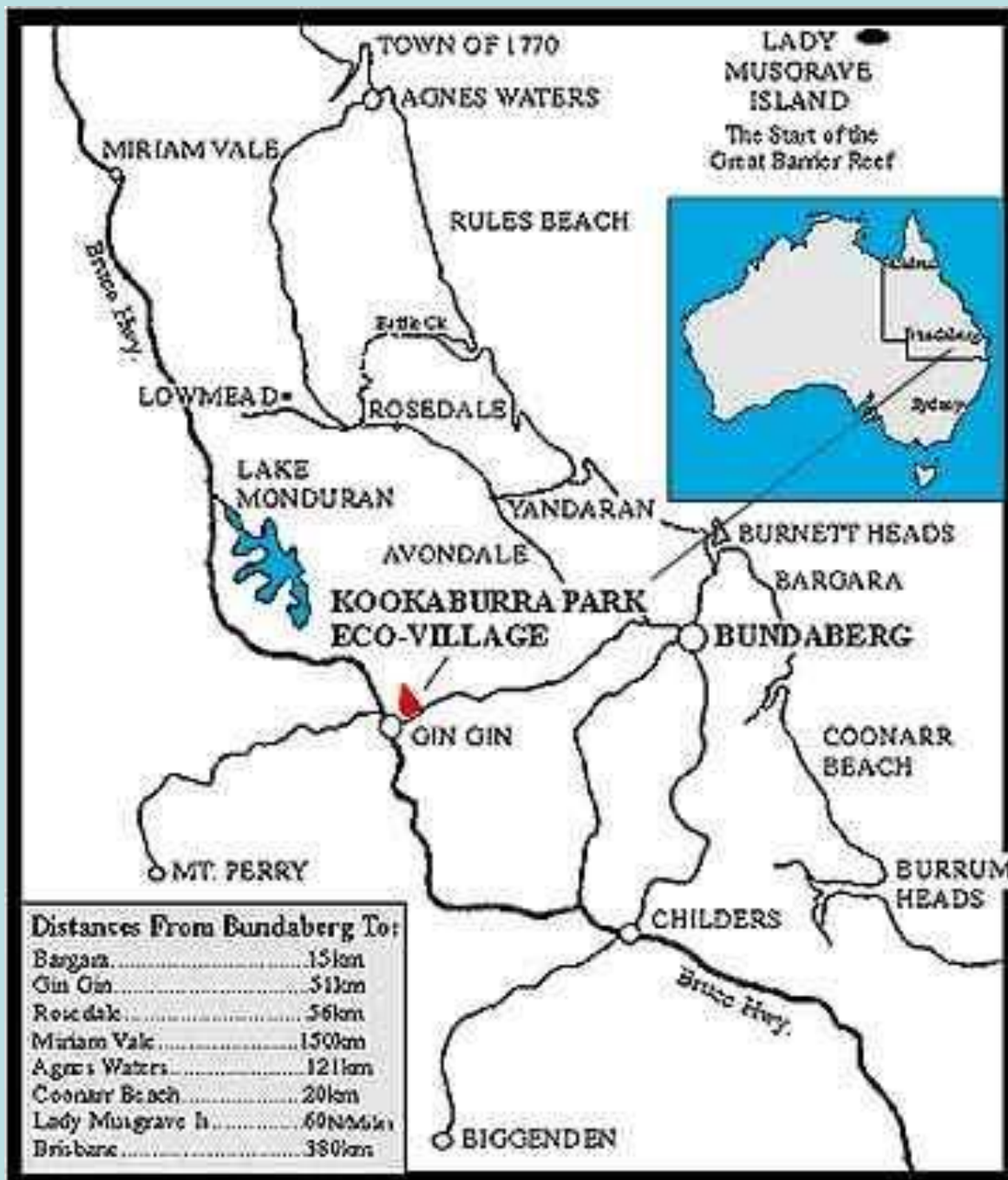




- **Competition for water**
- 對水的競爭













- We must manage all our own water and waste disposal

我們必須自己管理所有的水和廢物處理

Types of water

水的種類

- Premium water for drinking and cooking
- 溢價水飲用和做飯
- Utility water (for cleaning)
- 公用事業水（清潔）
- Grey water
- 灰水

Types of water

水的種類

- Sewage
- 污水處理
- Irrigation
- 灌溉
- Flushing
- 法拉盛

Drinking water



Household water



Irrigation



A photograph of a green field with several cows grazing, overlaid with yellow text. The text is arranged in a list format, with each item on the left and its corresponding value on the right. The values are 10, 300, 1,000, and 5,000. The background shows a grassy field with trees in the distance.

drinking	10
household	300
garden	1,000
food	5,000

- Premium water for drinking, cooking, washing etc
- 溢價水飲用，做飯，洗衣等
- No problem
- 沒問題

Premium water

溢價水

- Household tanks
- 家用坦克
- Filtration (carbon filter, reverse osmosis)
- 過濾（活性炭過濾器，反滲透）















Utility water

公用事業水

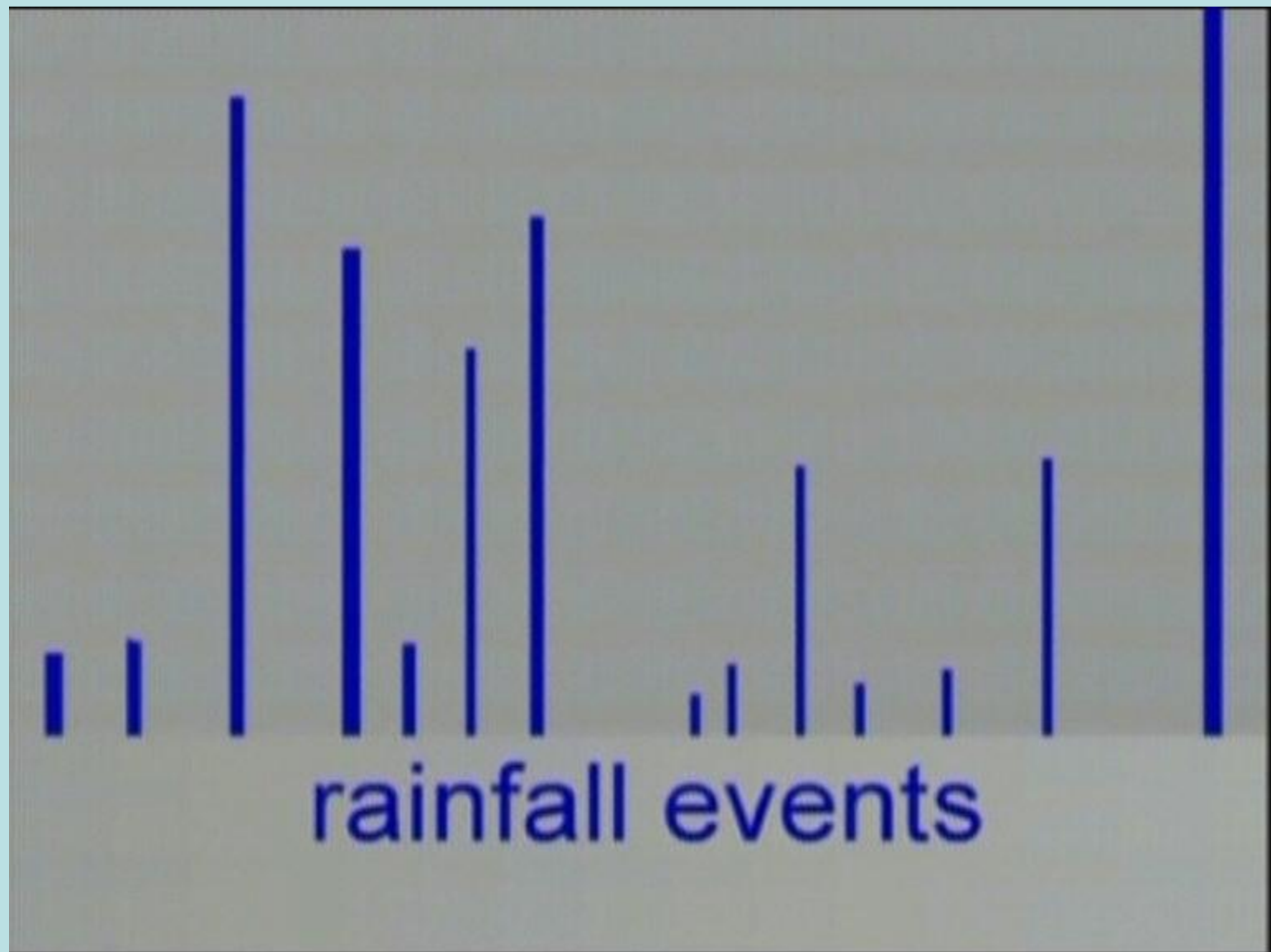
Australia hot dry continent

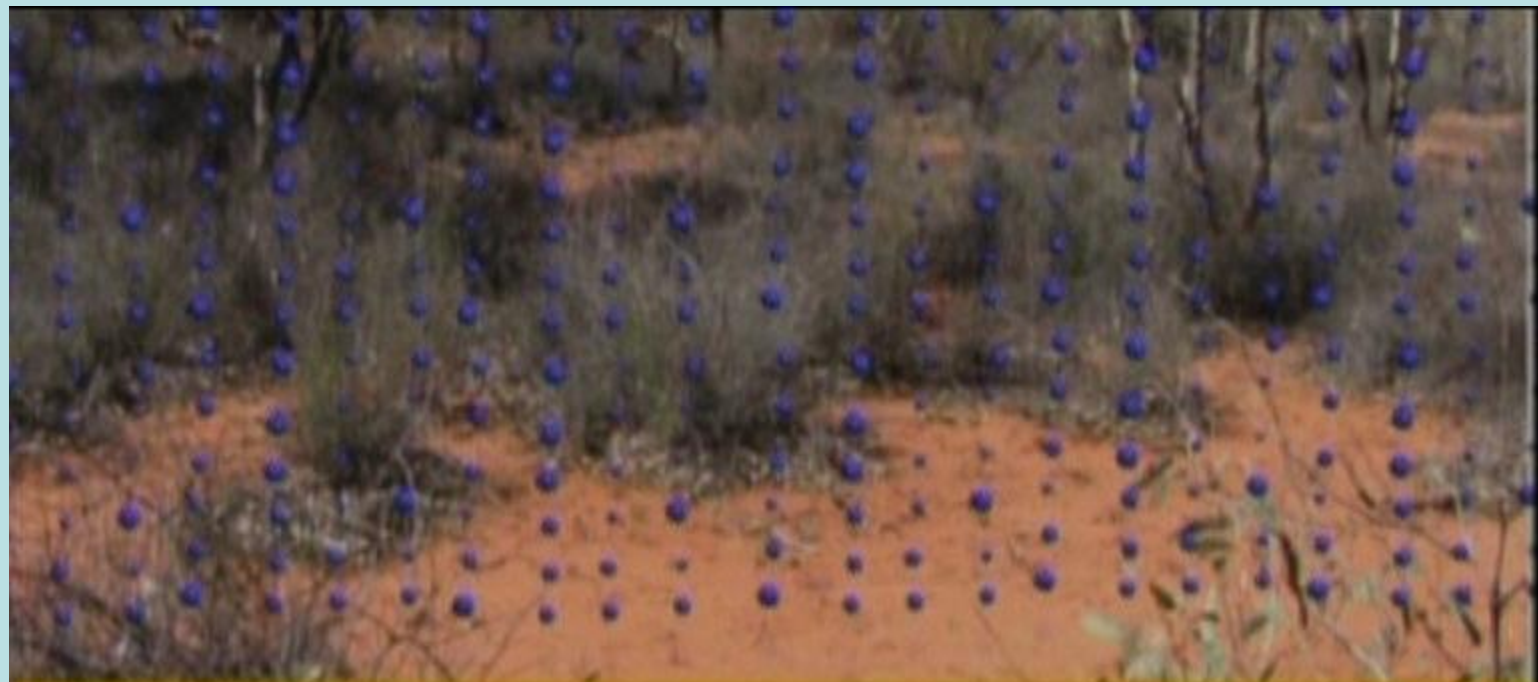




1 megalitre of
rainfall per
person per
day

LIA







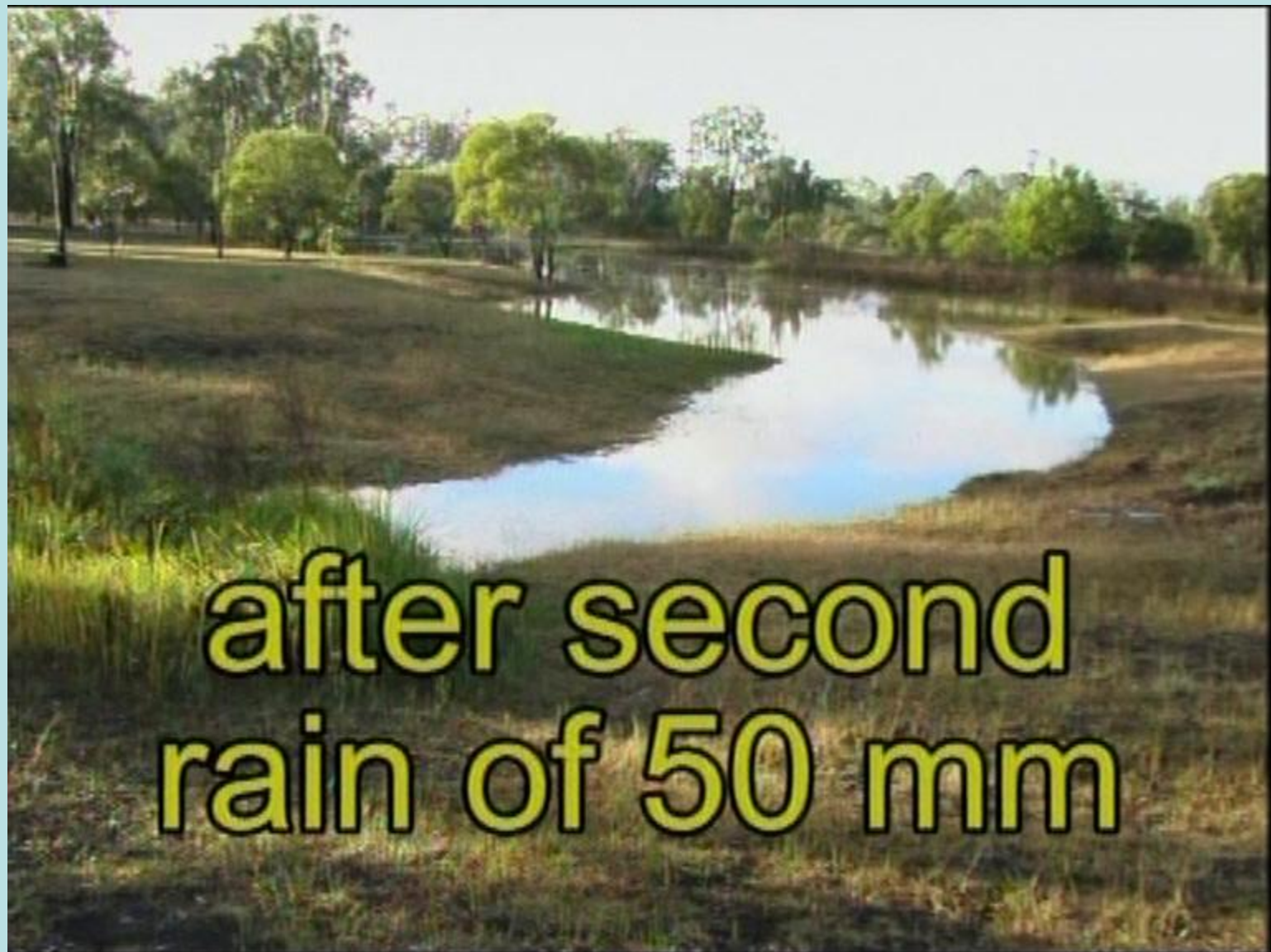




start



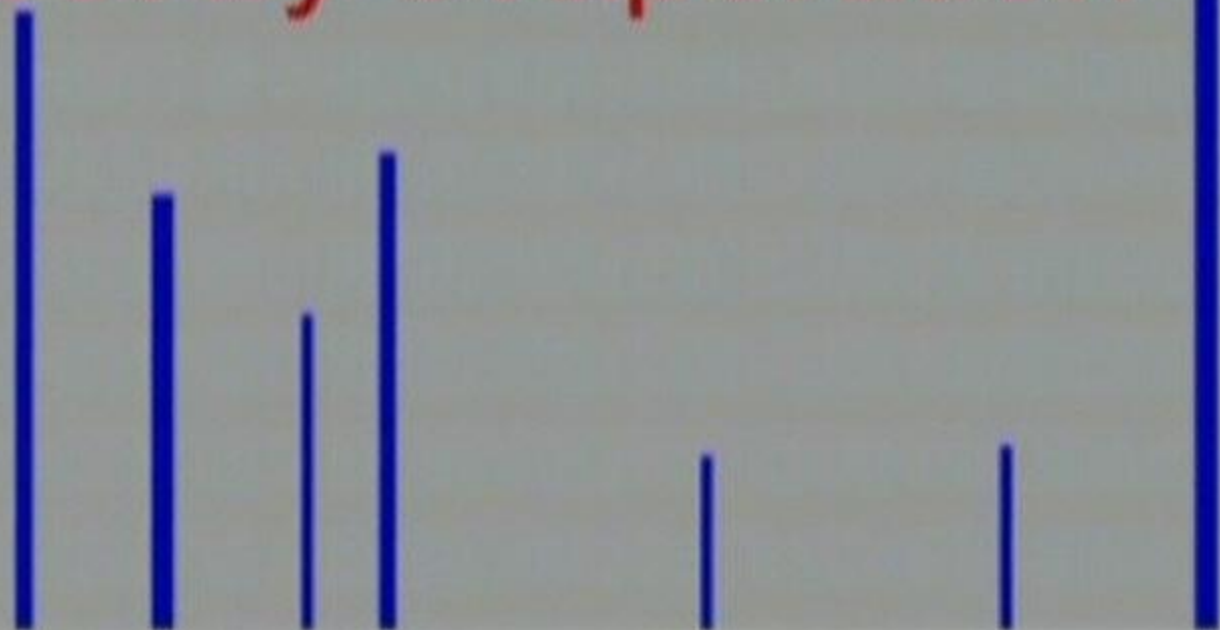
**after first rain
of 50mm rain**



after second
rain of 50 mm

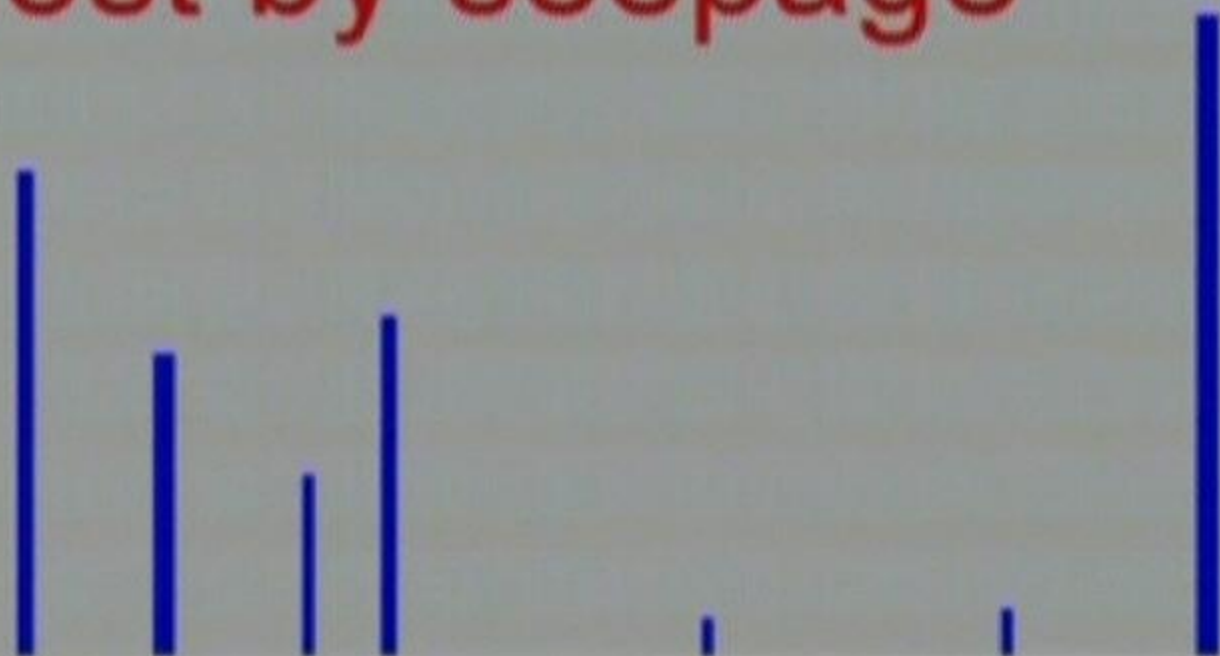


lost by evaporation



rainfall events

lost by seepage



rainfall events



caught in dams



rainfall events

- **Sturt and Simpson deserts**
- **Importance of micro hydrology**
- **重要性微型水文**



Chris Malcolm

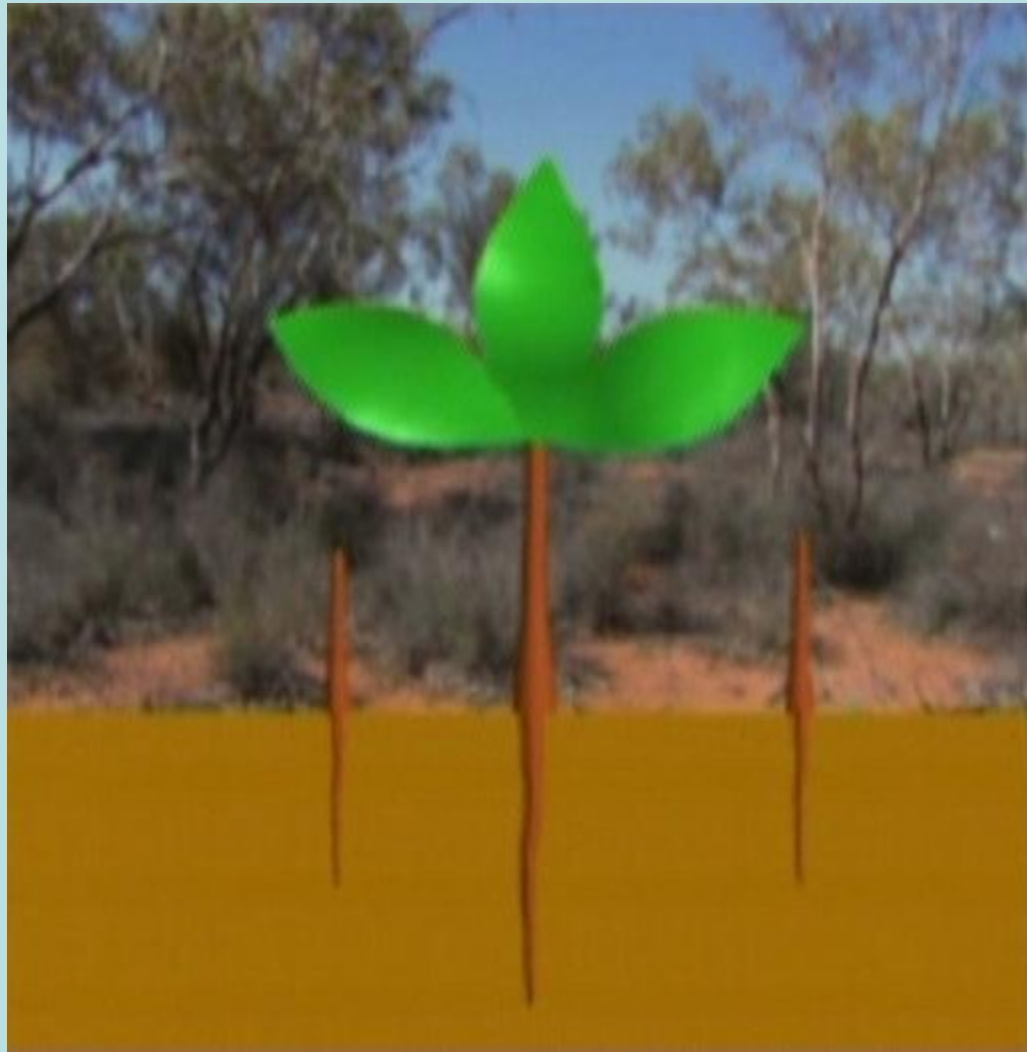


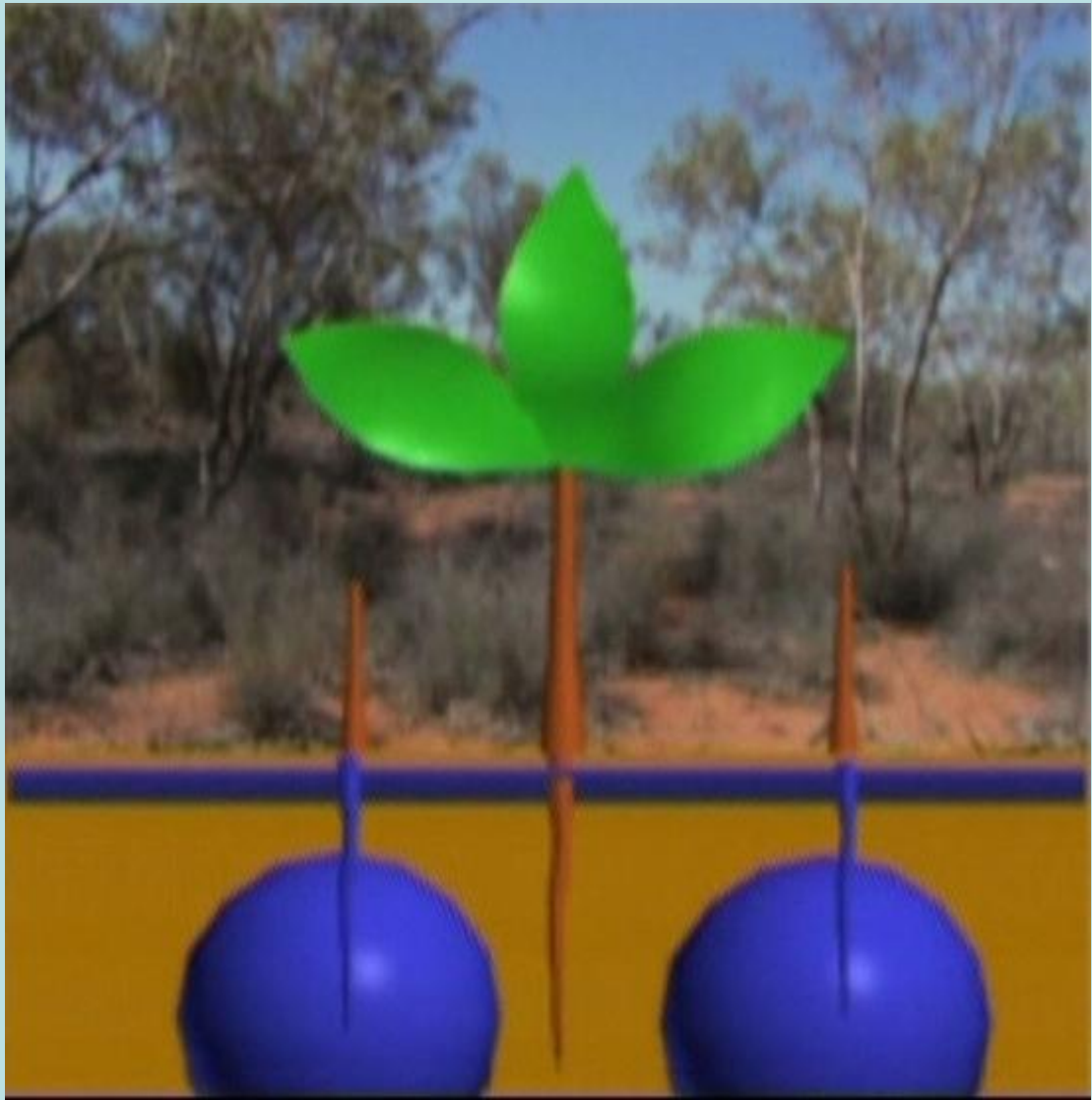


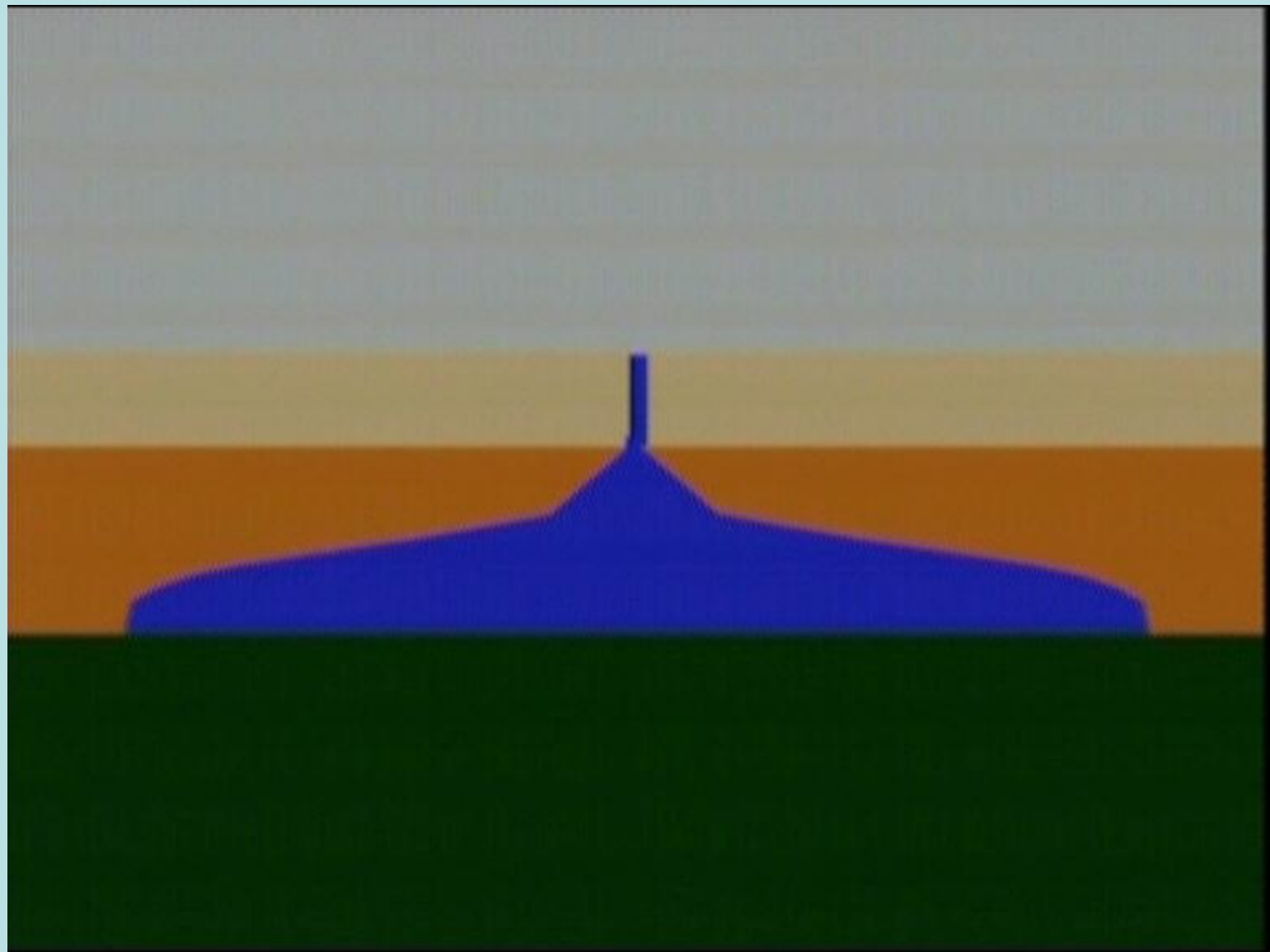
Gidgee tree (*Acacia Georginae*) in the Simpson Desert, Queensland, Australia





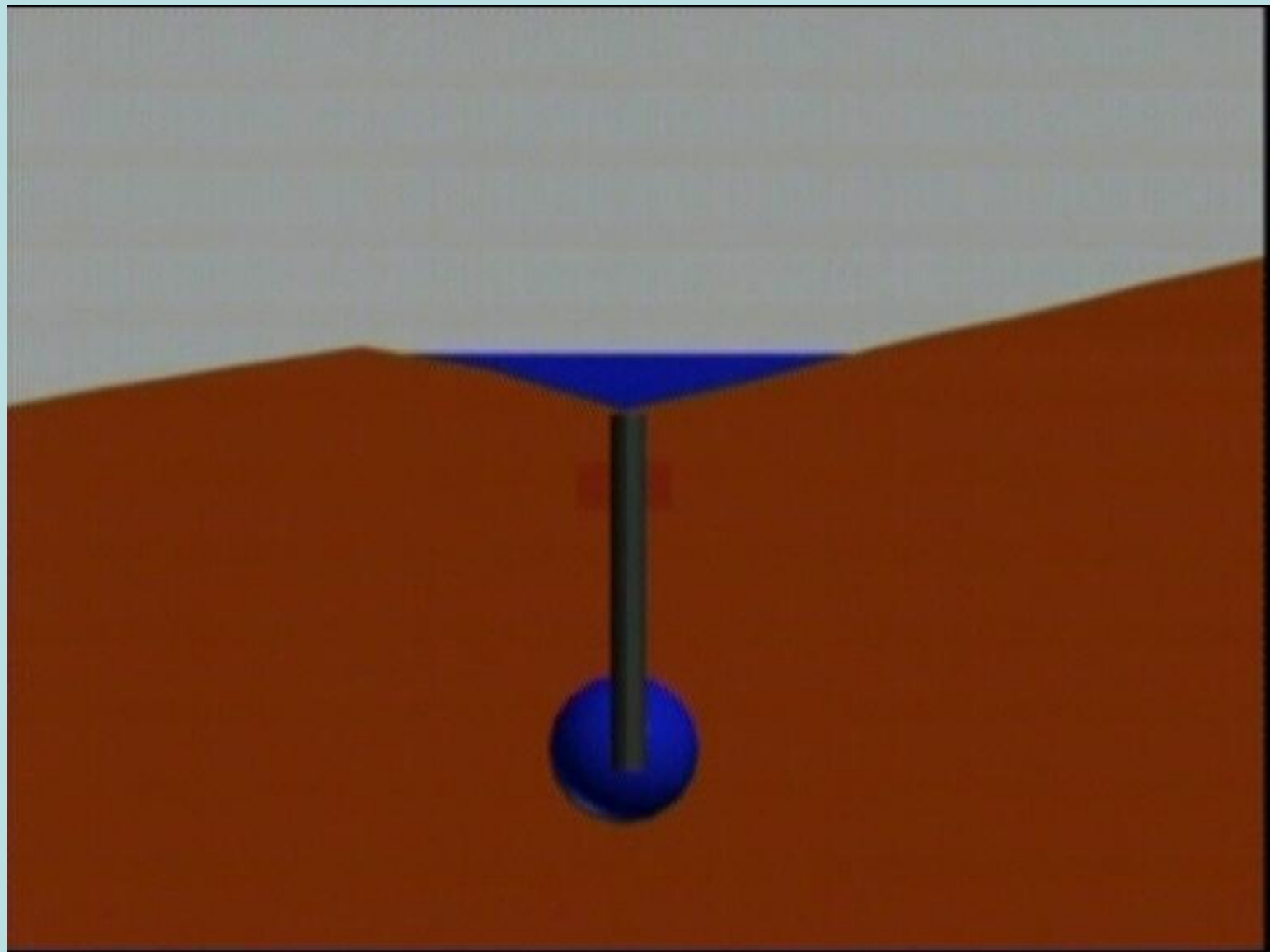


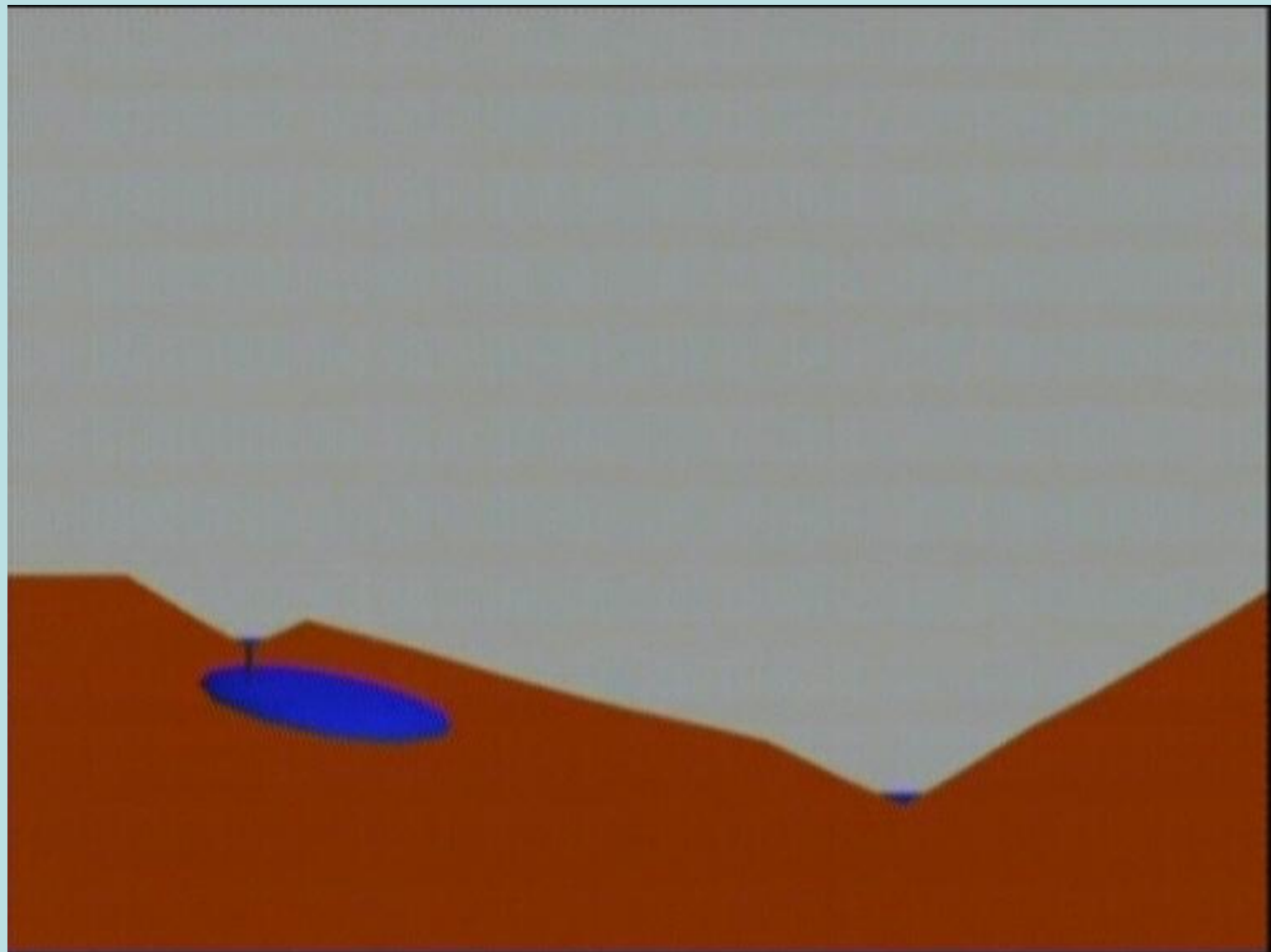


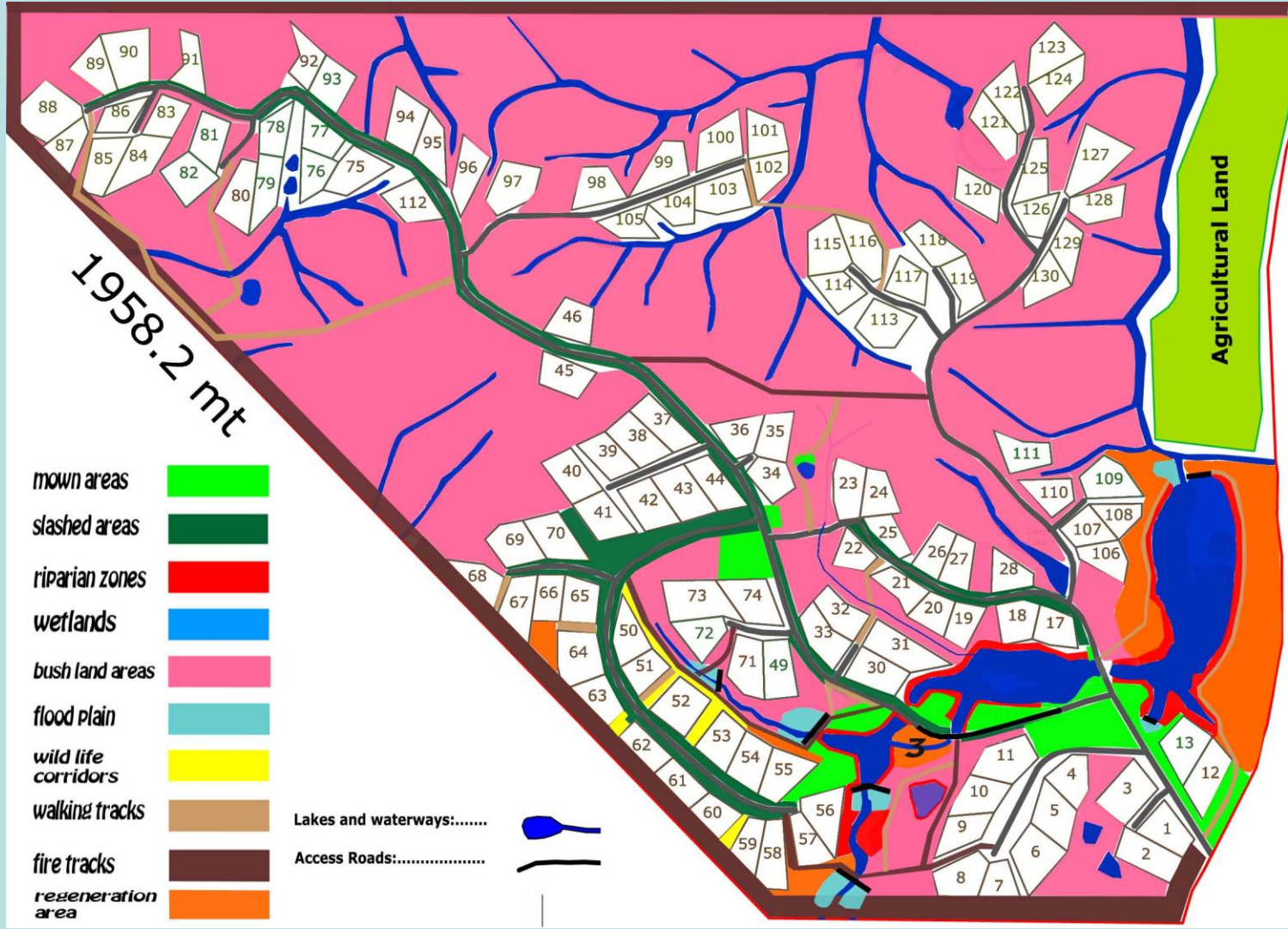


- **The key features are**
- **1) Amplify water into a concentrated area**
- **2) Transport water underground**
- **3) Store water underground to protect from evaporation**
- **其主要特徵是**
 - 1) **闡明水進入一個集中的區域**
 - 2) **運輸地下水**
 - 3) **蓄水地下以防蒸發**

- **Percolation holes**
- 滲流洞





















- Waste water
- 廢水





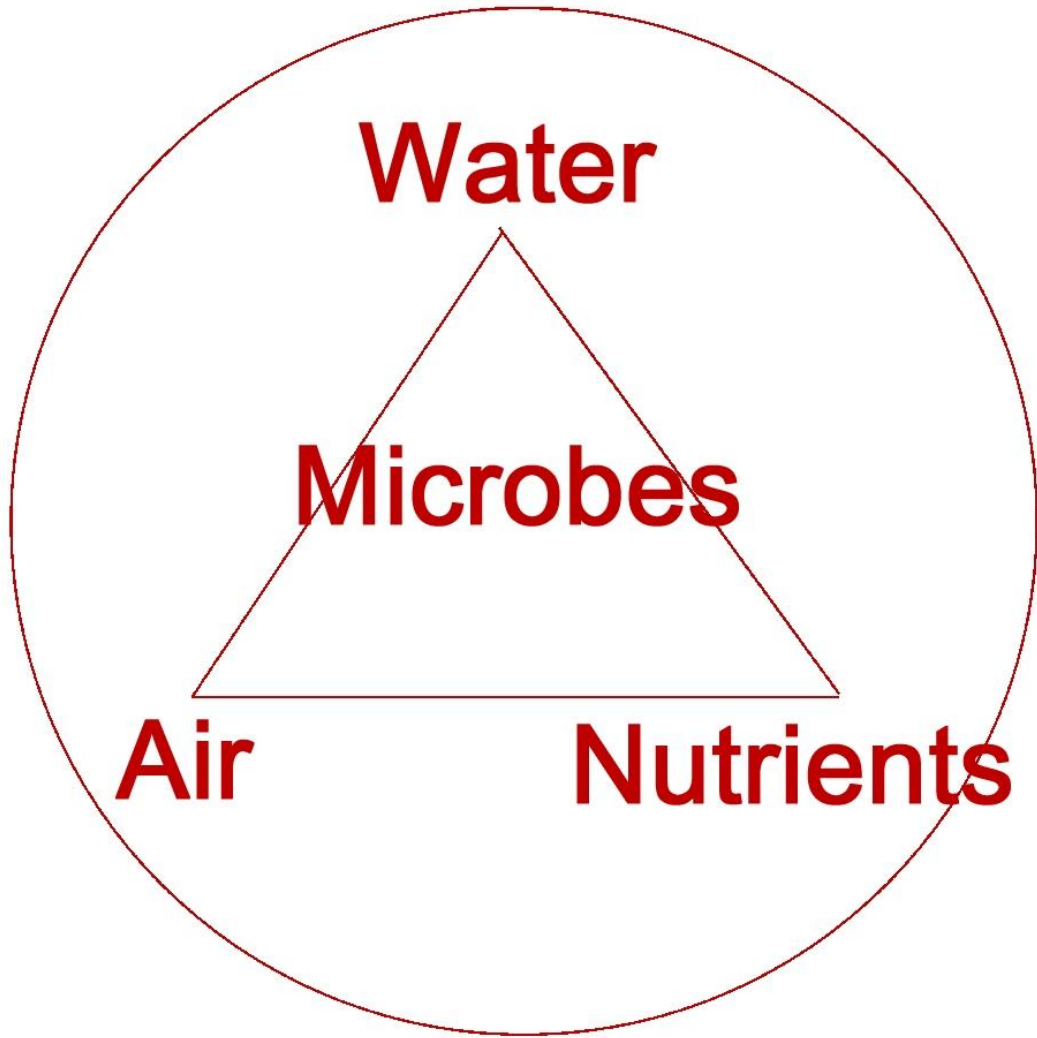






- Overview of Wicking beds
- 第1部分概述排汗病床

- How wicking beds work
- 如何排汗病床工作



Water

Air

Nutrients

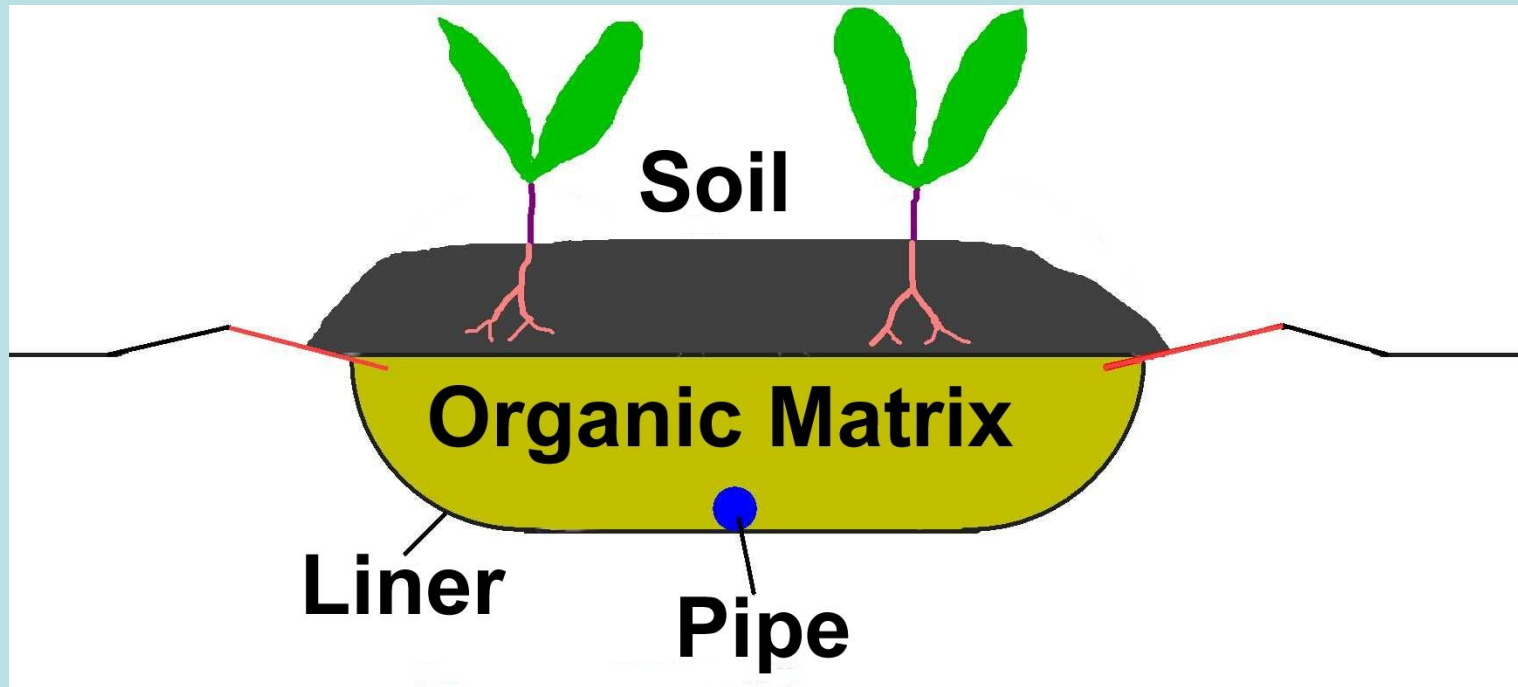
Microbes

水

空氣

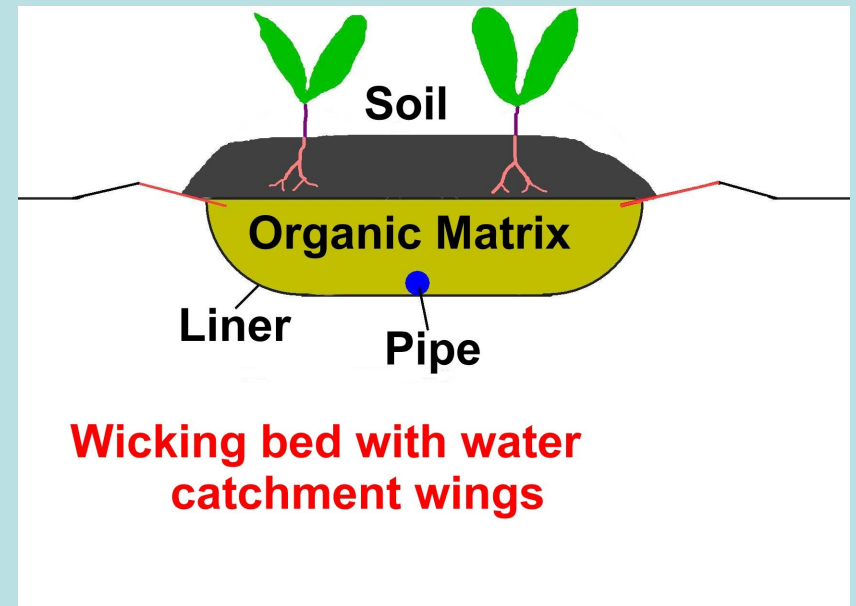
營養素

微生物

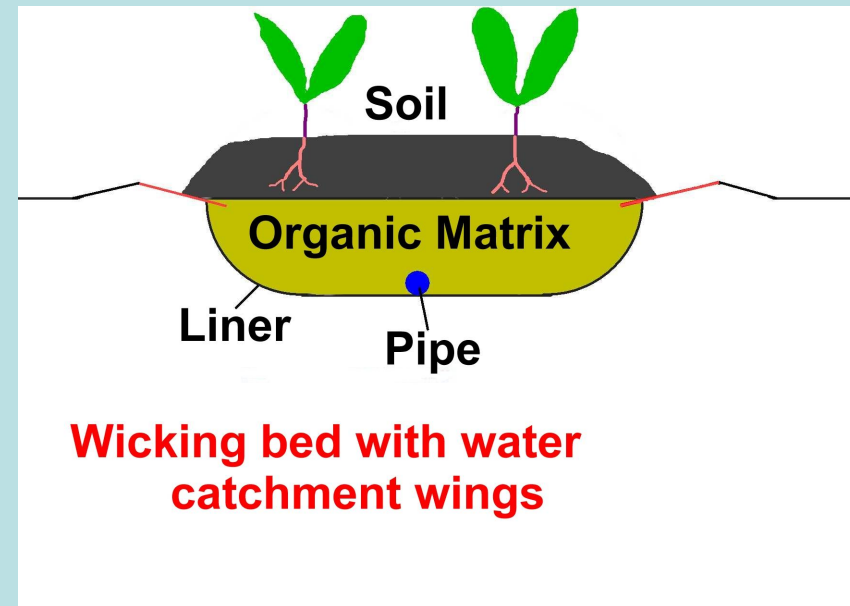


Wicking bed with water catchment wings

- Water wicks up to the root zone from an underground reservoir of water providing a gradient from saturated in the reservoir to dry at the surface
- 水燈芯到根區的一個地下水庫的水源提供了一個梯度飽和的水庫乾涸的表面



- Roots growing in the moist soil have a continuous supply of water, oxygen and nutrients
- 尋根熱潮在潮濕的土壤有一個持續供應的水，氧氣和養分



- Open and closed beds
- 打開和關閉病床

In ground above ground
地面地面





















- **A new horticultural system**

- 一種新的園藝系統

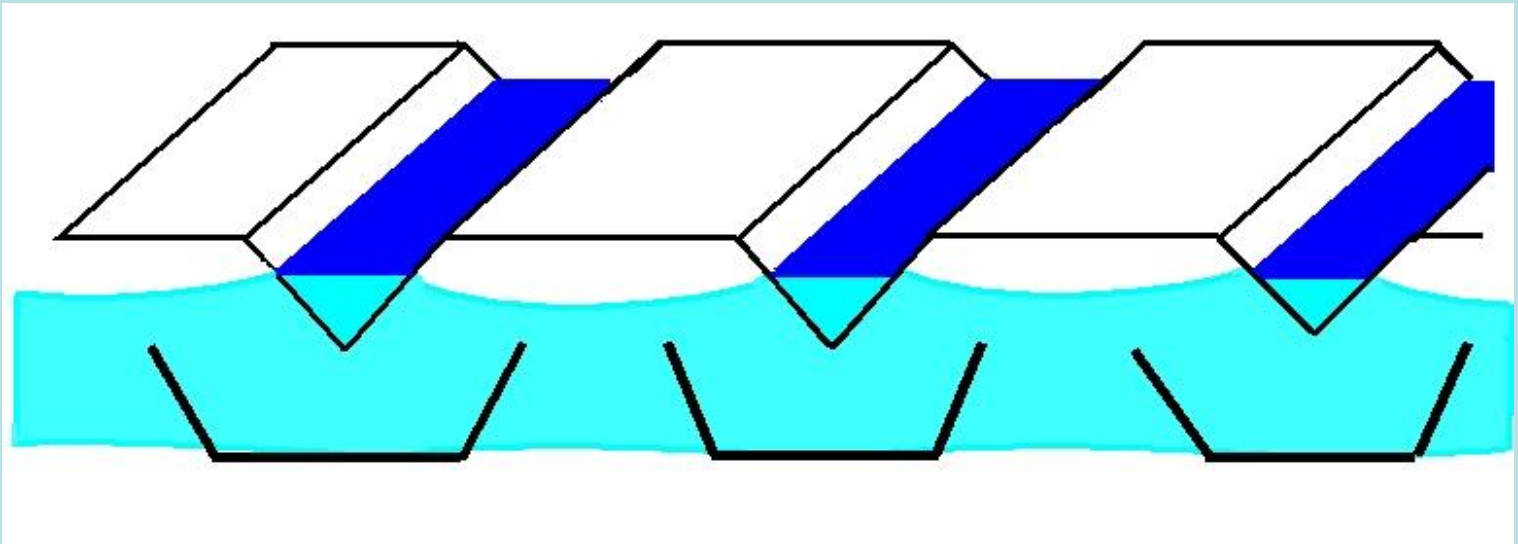
- **Why is it important**

- 為什麼重要

- **Fears about future Food Production**
- 對未來糧食生產的擔憂

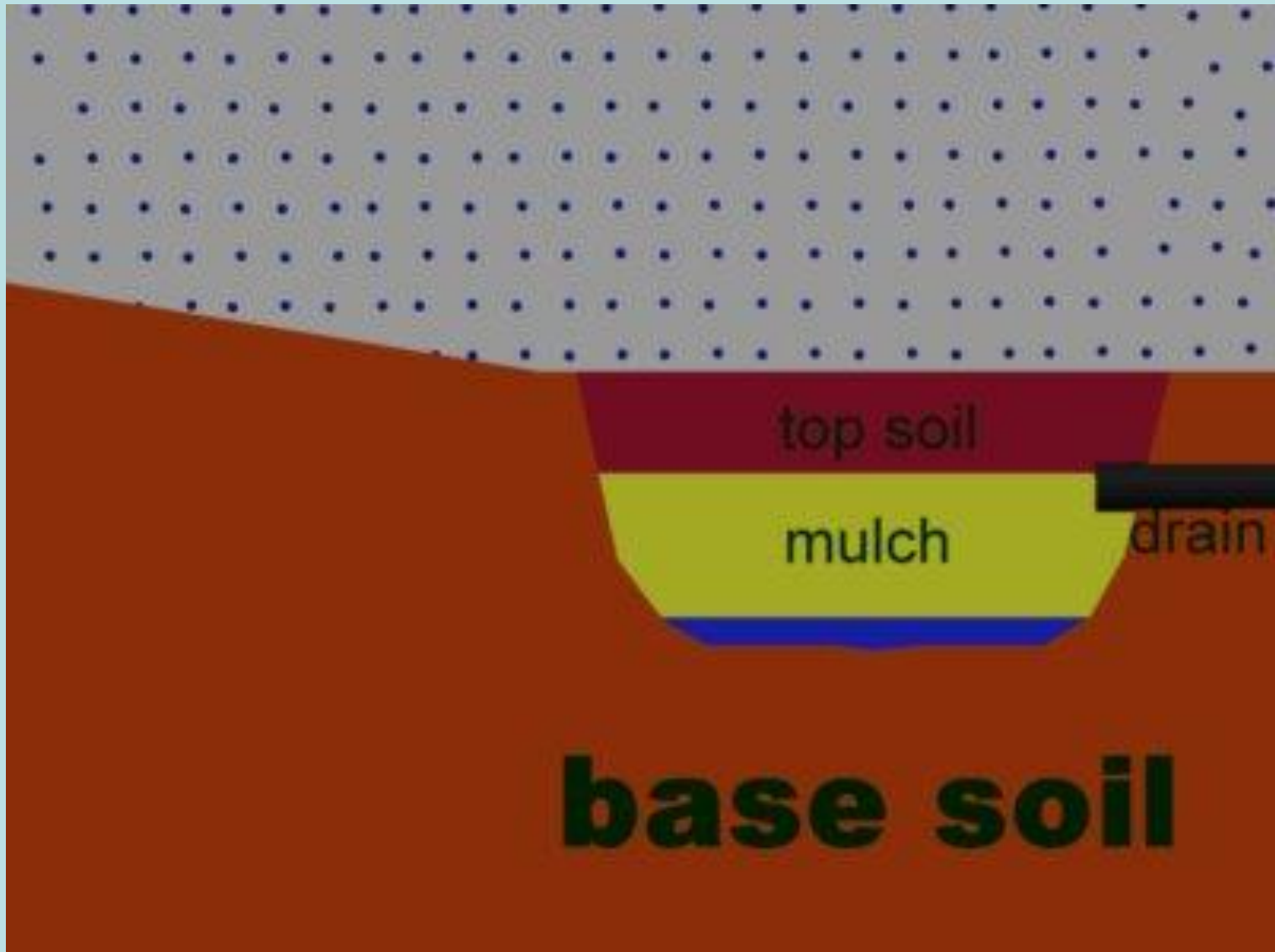
- **Water will be the critical resource for future food production**
- 水將是未來的關鍵資源糧食生產

- **The wicking bed technology**
- **芯吸床技術**



pipe fed wicking bed





top soil

mulch

drain

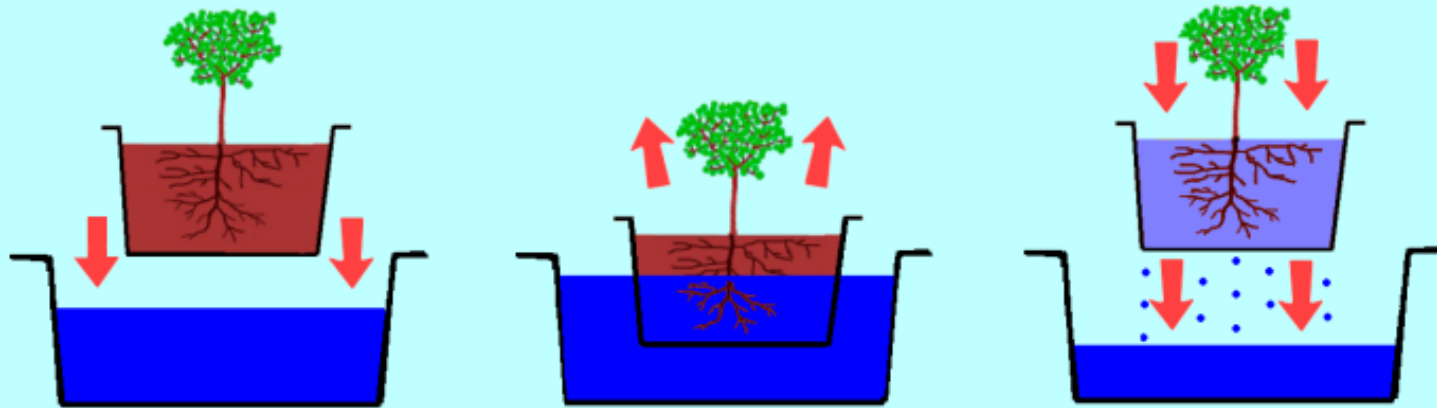
base soil







Flood and drain



Stale air is pushed out, fresh air sucked in
The soil breathes













































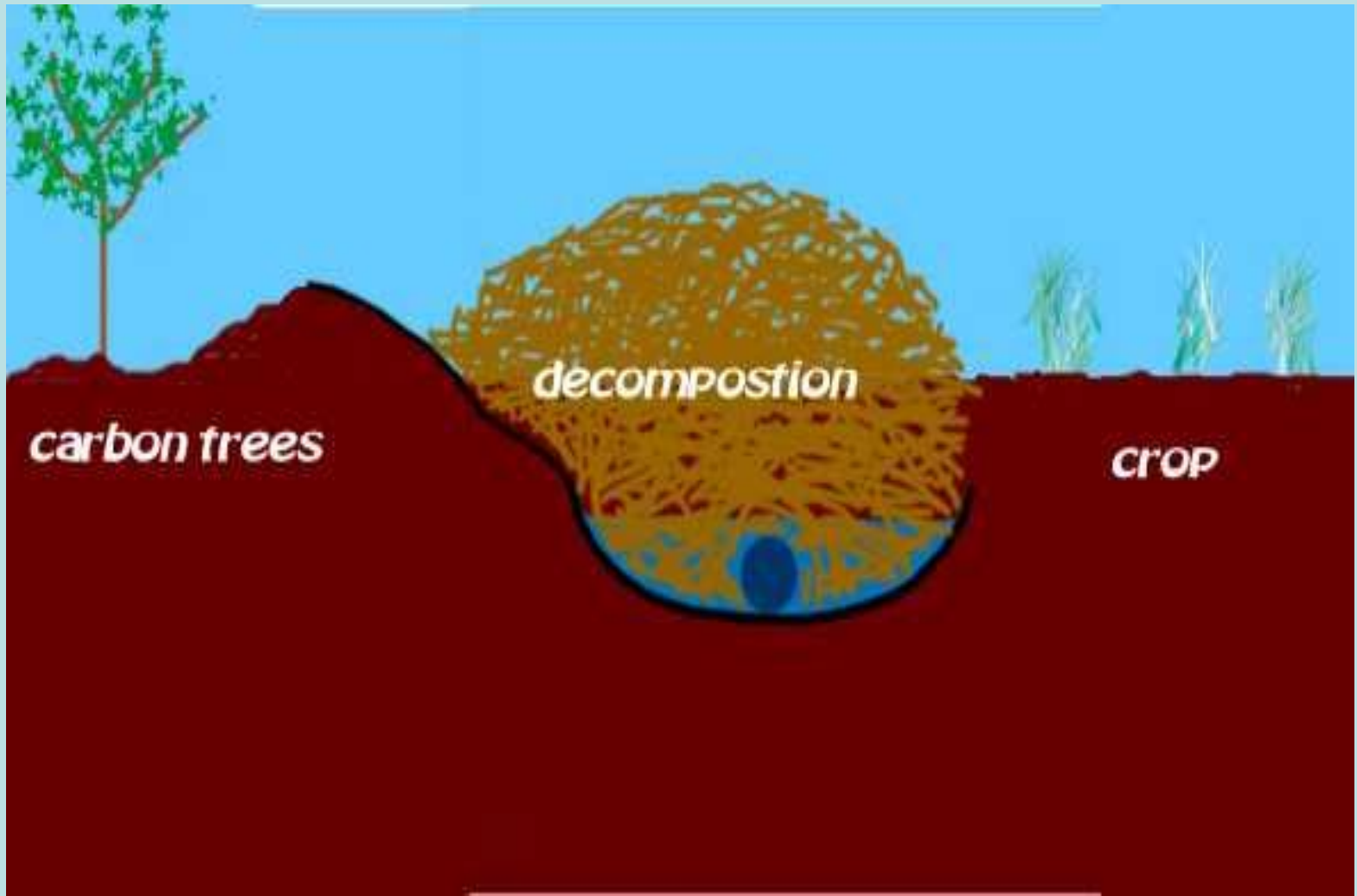


- **Part 6 Carbon capture**
- 第6部分碳捕獲

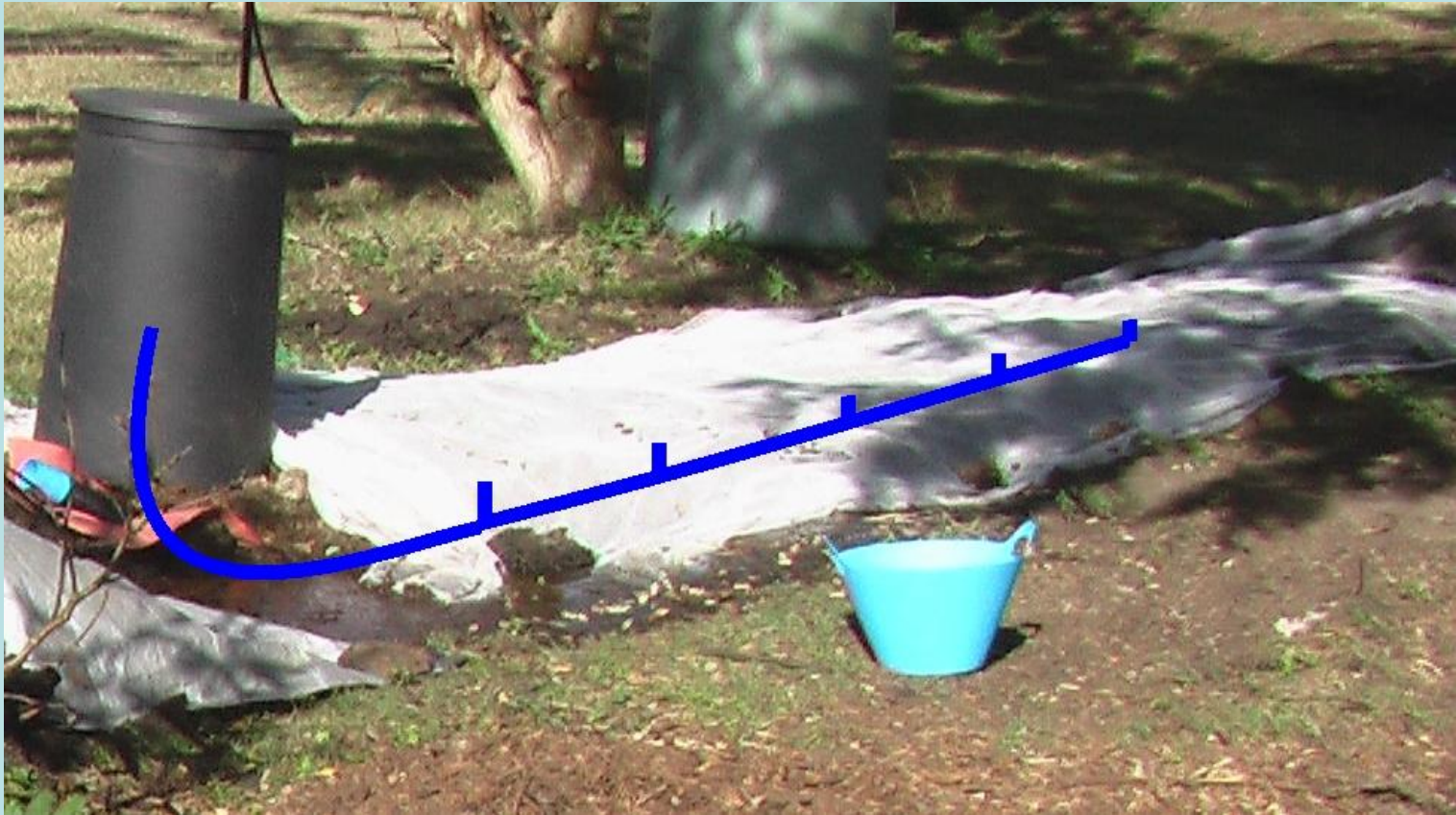




*worms distribute carbon
throughout the soil*









- **Paying farmers to absorb carbon ensures our future food supply and offsets our energy use.**
- **支付農民吸收二氧化碳，確保我們未來的糧食供應和偏移所使用的能源。**

- Measure carbon absorbed by wicking beds
- Compare with traditional decomposition of organic waste

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- **Thank you for listening**
- **More information at**
- **www.waterright.com.au**
- **www.easygrowvegetables.com**