Catch and store energy

Compost is key

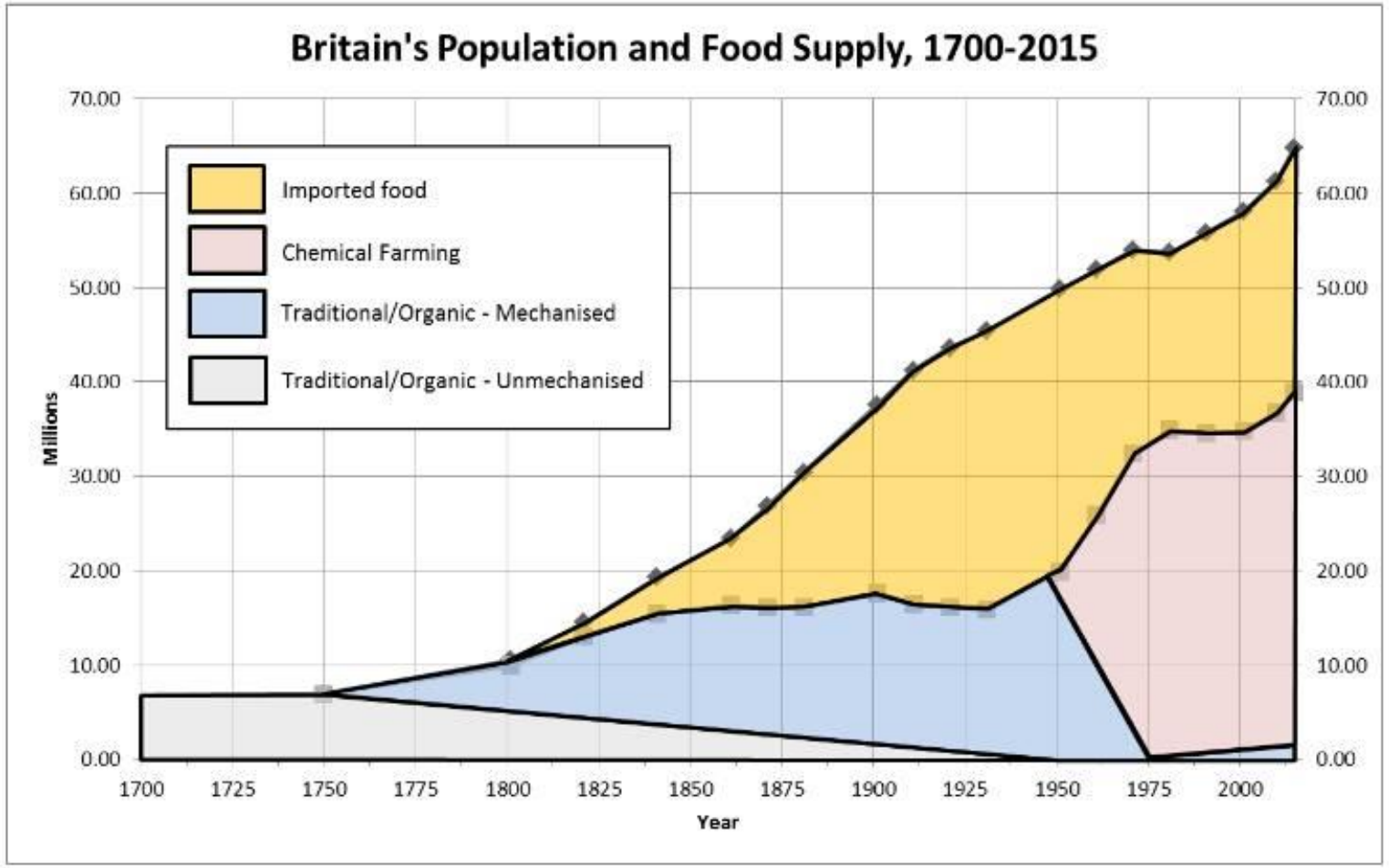
Soil

Third of Earth's soil is acutely degraded due to agriculture

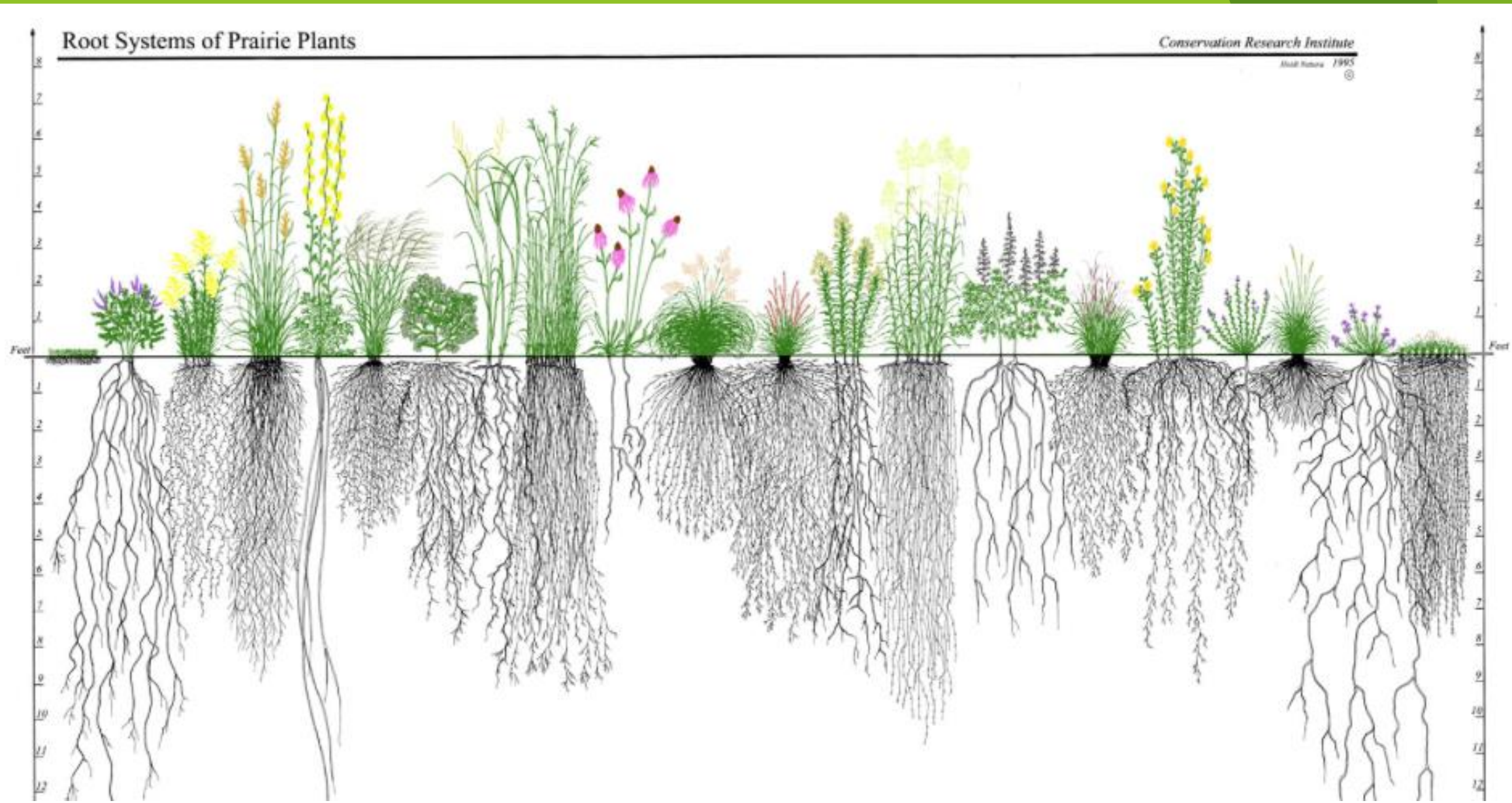
Fertile soil is being lost at rate of 24bn tonnes a year through intensive farming as demand for food increases, says UN-backed study

Jonathan Watts

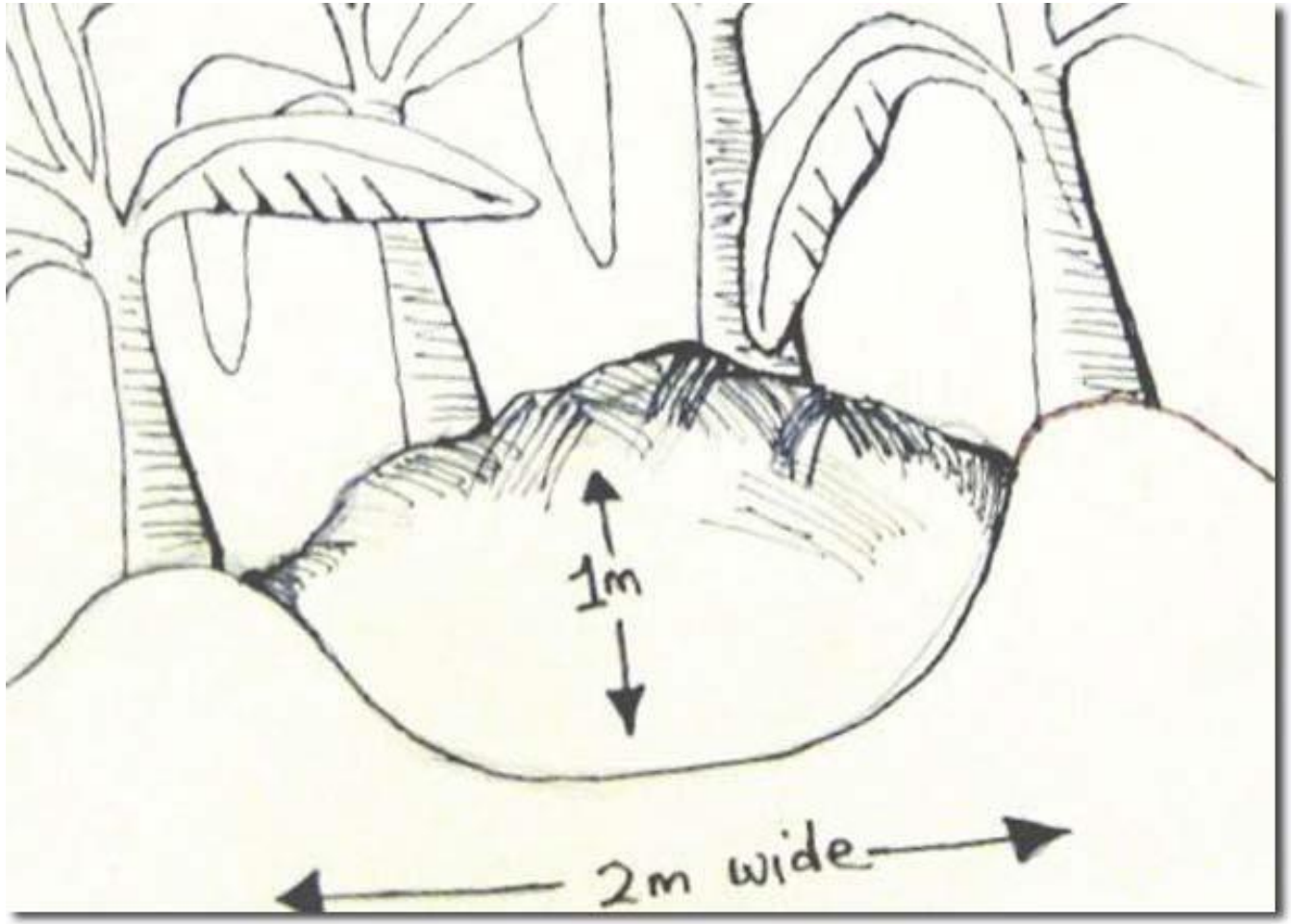
Tuesday 12 September 2017 18.18 BST


Britain's Population and Food Supply, 1700-2015
Imported food
Chemical Farming
Traditional/Organic - Mechanised
Traditional/Organic - Unmechanised
Millions
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1700
1725
1750
1775
1800
1825
1850
1875
1900
1925
1950
1975
2000
Year

Single root depth = competition


Root Systems of Prairie Plants
Conservation Research Institute
1995
Feet
Feet

Community power


1m
2m wide


1991
PAPUA NEW

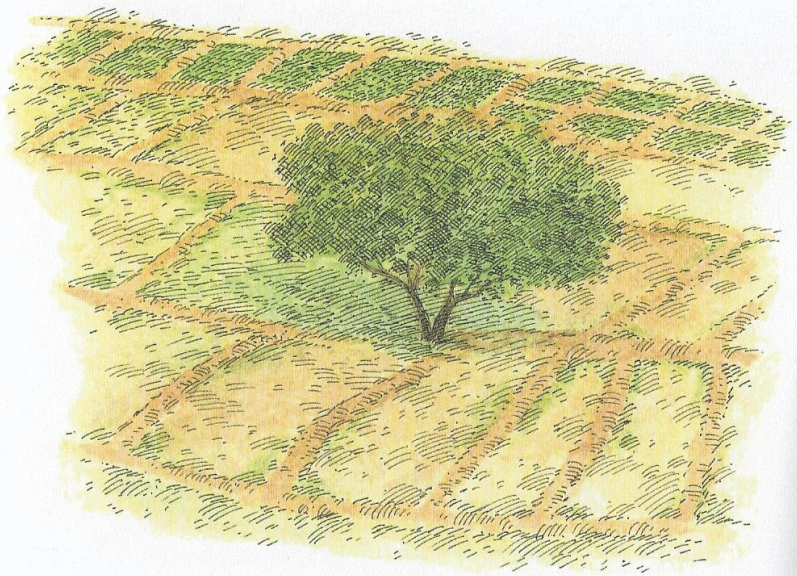

Organic matter
Banana
Cassava
Vetiver, Lemongrass, or Citronella
Sweet Potato
Taro

Yacouba Sawadogo – the man who stopped the desert


DESTA et al. 2005


Why Use Mulch?
tered
ThePermacultureStudent
Watered but Bare
Mulch
Watering only took bare soil from 140F/60
116F/46.6C, but 4-6”/10-15cm of mulch br
it down to 78F/25.5C.
Mulch was ~2x as effective as watering twi
—Matt Powers

Mulch



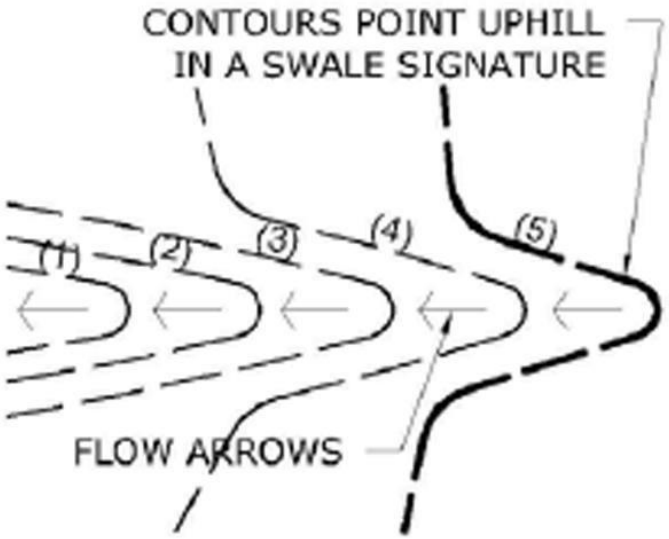
Grid gardens are often used to help capture rainfall in arid regions. Raised beds, developed for wet areas, are more widely known and promoted, but waffle-like sunken beds work better in dry lands. The ridges between basins are compacted, kept weed-free, and often paved with stones. They divert rain into the planted areas, while the depression of the soil in the basin captures water and allows it more time for deeper infiltration. The basin also reduces wind stress and evaporation.

The Anasazi people of the Southwest developed sophisticated rainwater harvesting systems with dams, reservoirs, and control gates. Crop yields were good in most years. Here is a farming terrace with a series of check dams at Mesa Verde.

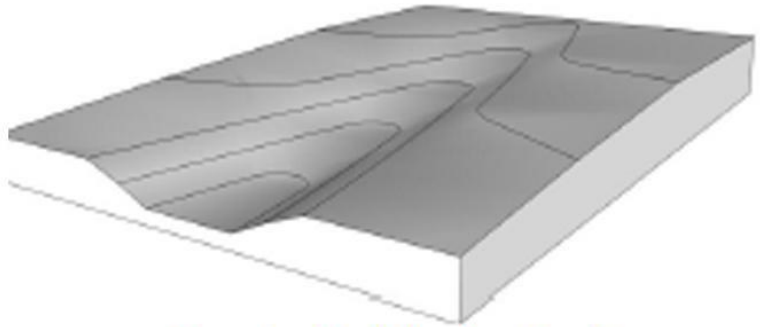
Curb Cuts

Street landscaping in Tucson is increasingly irrigated with rainwater. Curb cuts, which the city now allows with a permit, let water flow out of the street and into landscape plantings. These cuts can be done with hand tools or machines. A concrete cutting contractor would be helpful for multiple cuts. Rainwater harvesting from streets can transform a neighborhood from barren to fruitful.

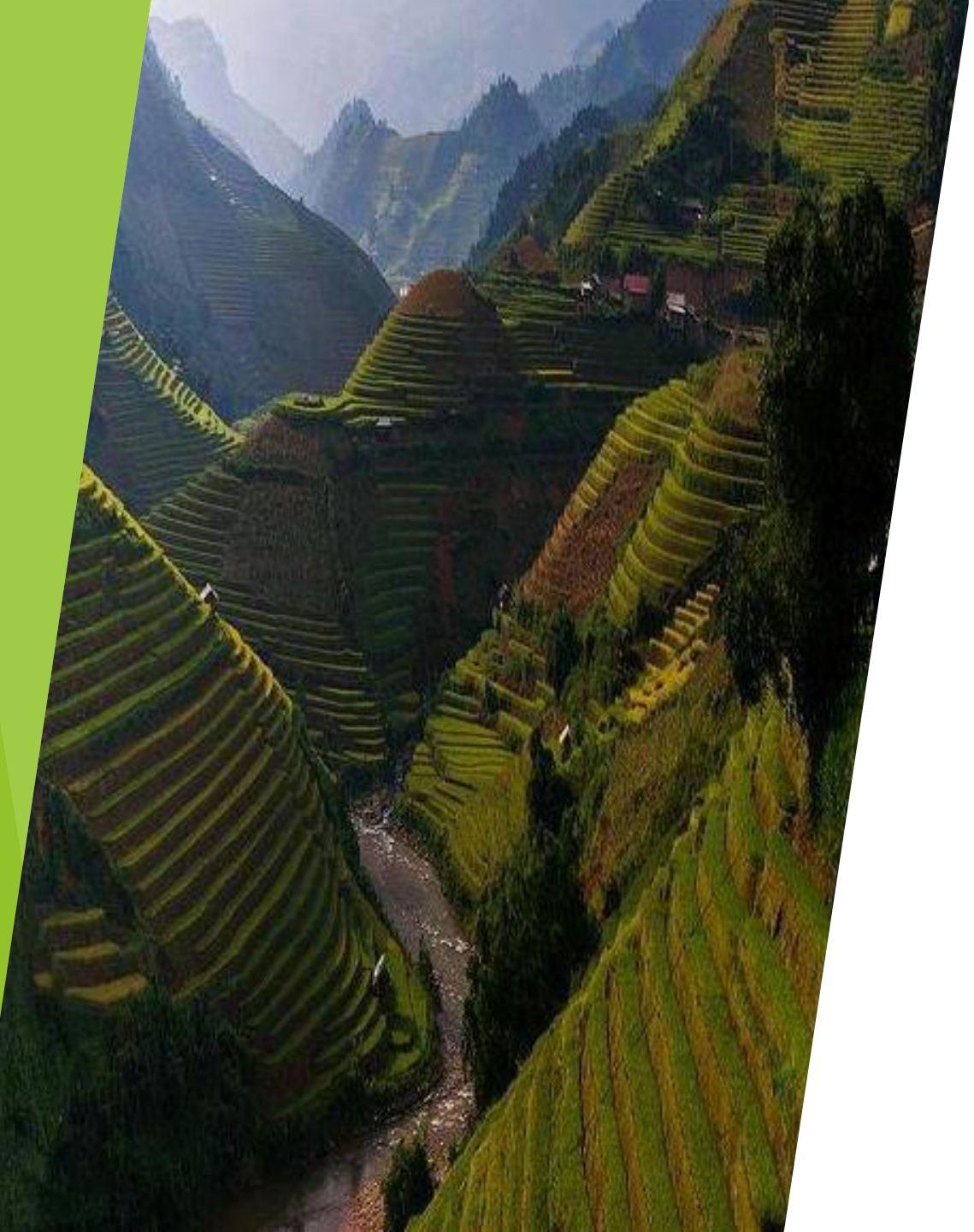
Contour catchment



Swale Signature
1"=20' • Interval = 1'

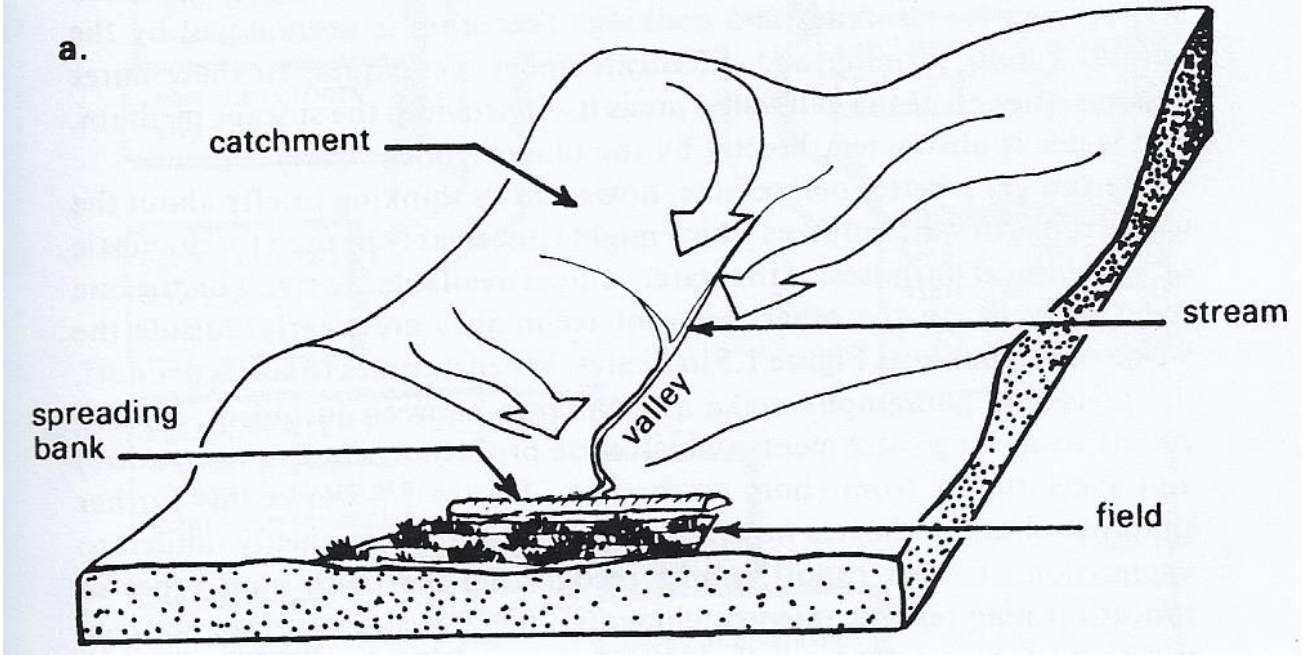


Terrain Model of a Swale



Bhutan

harvesting'. This distinction can be emphasized by saying that in diagram 1.4i, the aim of both systems is to *concentrate* rainwater on cultivated areas, whereas in 1.4ii, it is necessary to *distribute* an already concentrated flood flow onto a field.



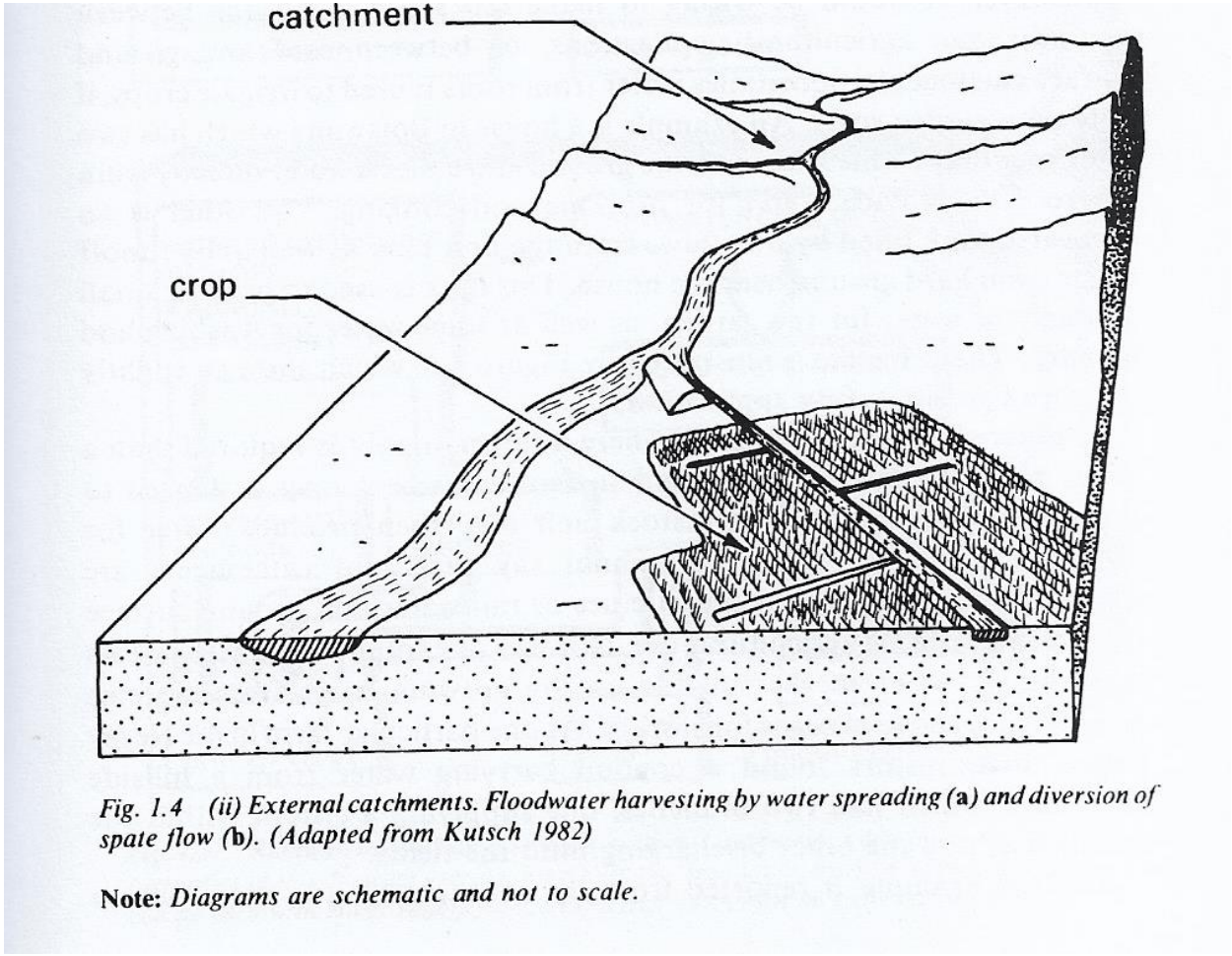
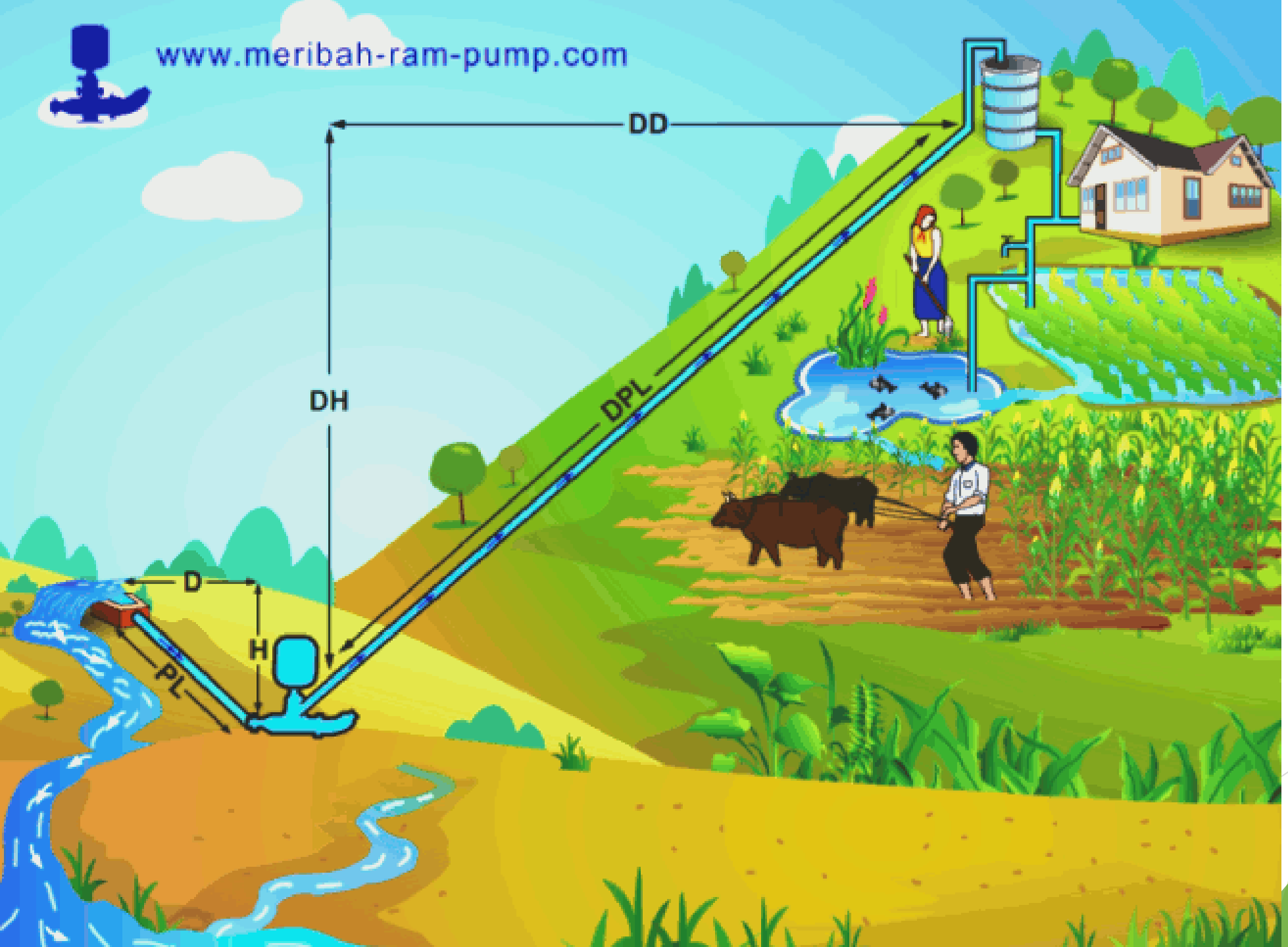
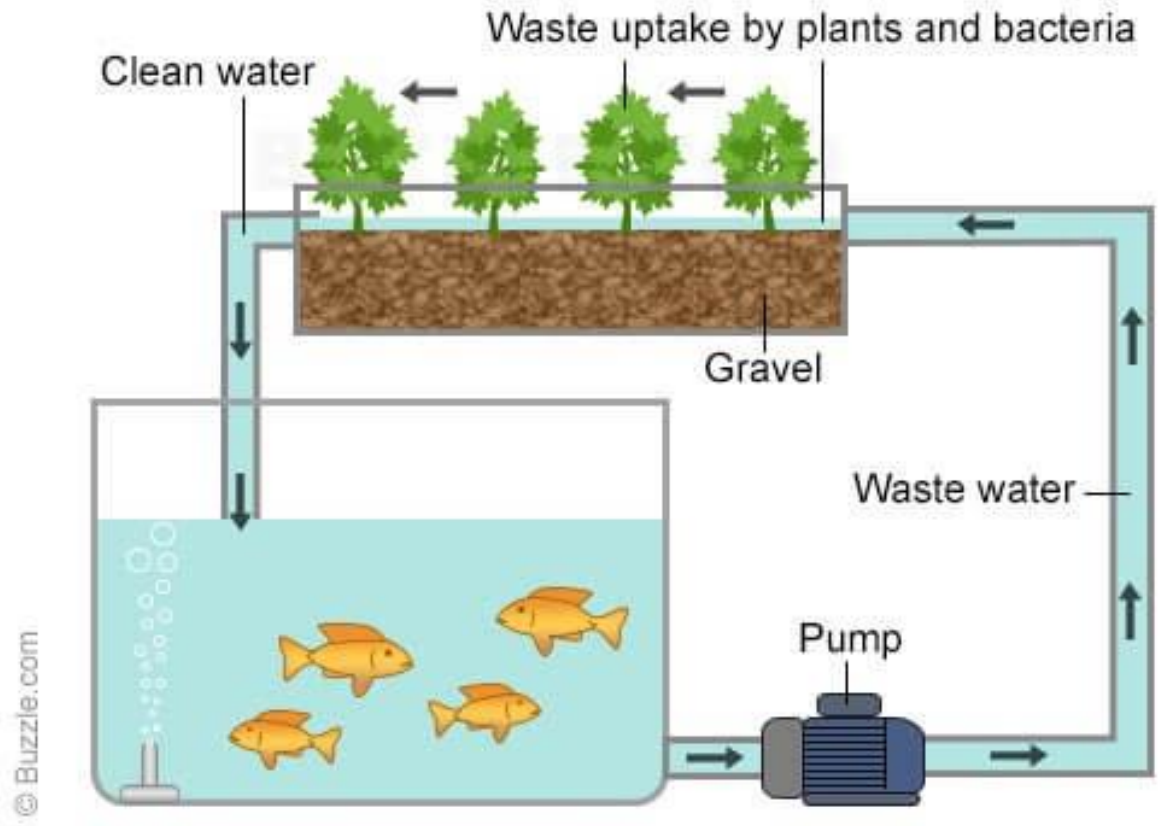


*Fig. 1.4 (ii) External catchments. Floodwater harvesting by water spreading (**a**) and diversion of spate flow (**b**). (Adapted from Kutsch 1982)*

Note: *Diagrams are schematic and not to scale.*


www.meribah-ram-pump.com
DD
DH
DPL
D
H
PL

Media-based System




1
2
3
4

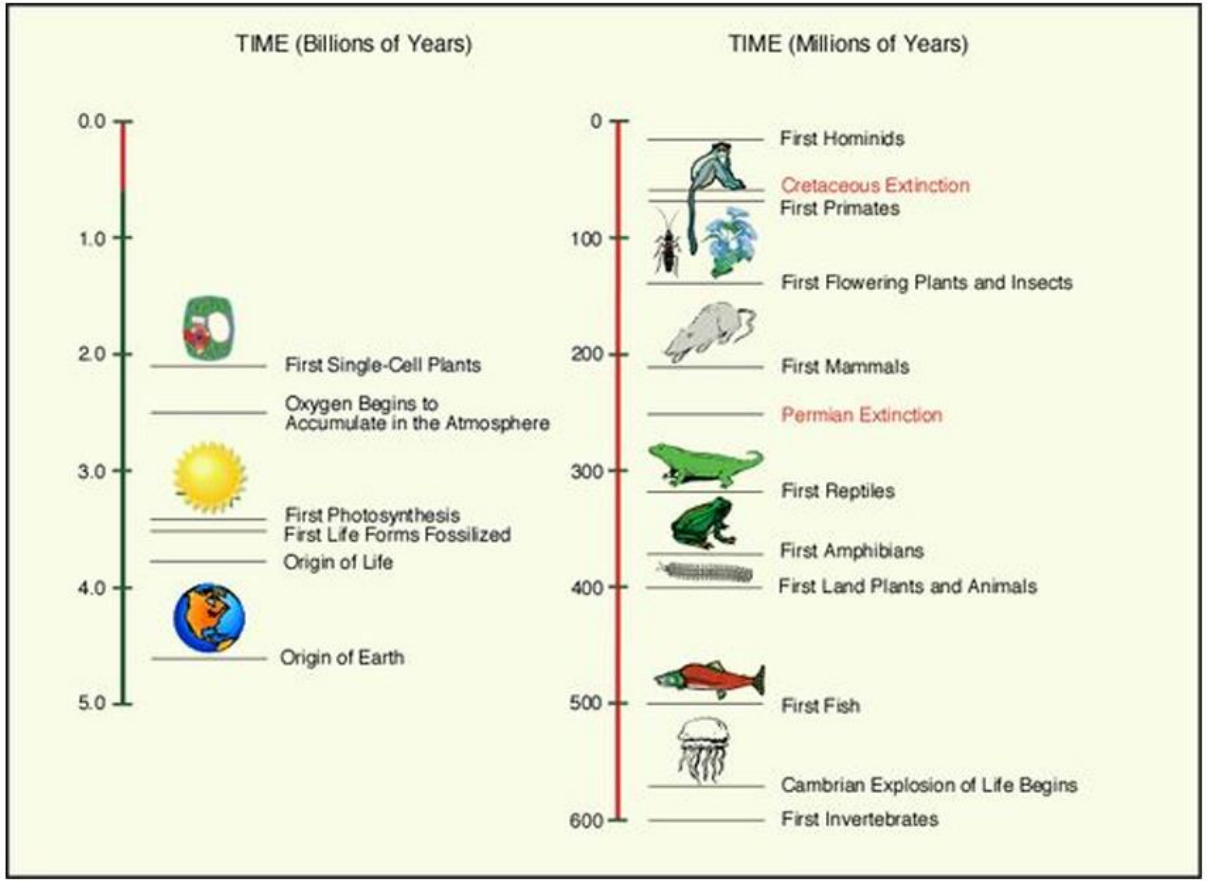
LIMESTONE FARM – May 2017

LIMESTONE FARM – May 2017

Evolution

- Over time nature builds ever more complex systems
- There have been several mass extinctions, but each time diversity is restored a new and in greater number

Evidence suggests the Earth is more than 4.5 billion years old. Life began in very simple forms surprisingly soon afterwards, less than one billion years later. The oldest fossils are about 3.7 billion years old and show simple structures that were already changing the biochemistry of the planet - most notably by producing oxygen. As the atmosphere developed so did the planet's capacity to support complex lifeforms.



It is interesting to also note tha life began in the sea and didnt arrive on land until 400 million years ago Paul Stamets has suggested that the first organisasm to move onto land was fungi and that they have been largely responsible for creating the soils and other habitats on which ohter pecies depend.

Evolution: life on Earth is one big extended family

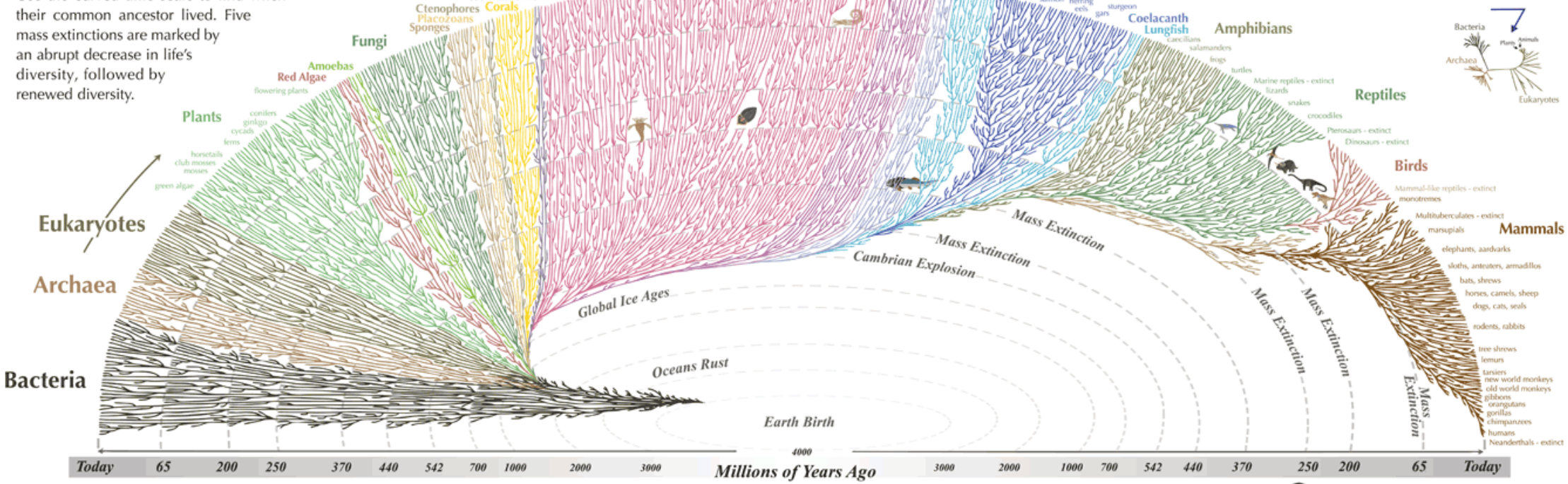
In 1858, Charles Darwin and Alfred Russel Wallace independently proposed a theory of biological evolution to explain the diversity of life on Earth. Since then the fossil record and DNA studies have added, and continue to add, overwhelming support for this view of life's history. Evolution today is one of the best documented and widely accepted principles of modern science.

Life on Earth has changed dramatically through time. The theory of evolution proposes that through the process of natural selection and other natural events stretching over millions of generations, living things diversify, branching from one species into many. This means that all living things are related to one another through common ancestry with earlier, different life forms. In other words, if you follow your family tree far enough back in time, you will find a common ancestor not only with every other living thing, but with every thing that ever lived.

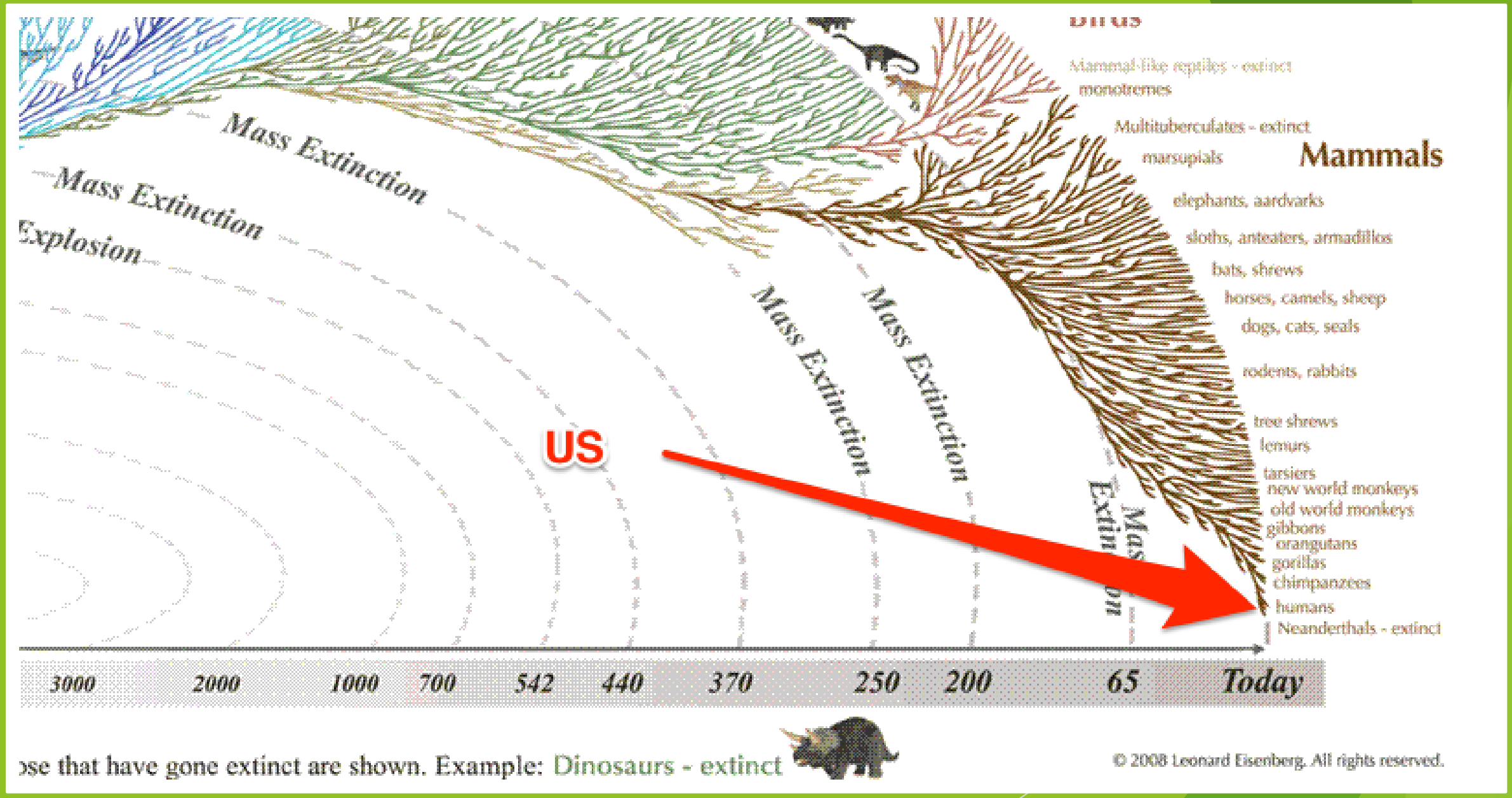
Life's Family Tree

Trace any branch back through time to see how it connects to any other of life's major branches. Use the curved time scale to find when their common ancestor lived. Five mass extinctions are marked by an abrupt decrease in life's diversity, followed by renewed diversity.

This Tree of Life is drawn from the human point of view. That is why humans are the final branch and most Tree of Life details are found in vertebrates (animals with a backbone). A Tree of Life drawn from a bacterial point of view would look very different!



All the major and many of the minor living branches of life are shown on this diagram, but only a few of those that have gone extinct are shown. Example: Dinosaurs - extinct


Mass Extinction
Mass Extinction
Explosion
Mass Extinction
Mass Extinction
Mass Extinction
US
Mammal-like reptiles - extinct
monotremes
Multituberculates - extinct
marsupials
Mammals
elephants, aardvarks
sloths, anteaters, armadillos
bats, shrews
horses, camels, sheep
dogs, cats, seals
rodents, rabbits
tree shrews
lemurs
tarsiers
new world monkeys
old world monkeys
gibbons
orangutans
gorillas
chimpanzees
humans
Neanderthals - extinct
3000
2000
1000
700
542
440
370
250
200
65
Today
ose that have gone extinct are shown. Example: Dinosaurs - extinct
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