

Why is that child hungry ?

from a Natural Resource Management
perspective.

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Ecosystem functions

- Plant cover (energy flow)
- Water cycle
- Plant and animal diversity
- Living soil (nutrient cycle)



Vegetative Cover

(Energy flow)

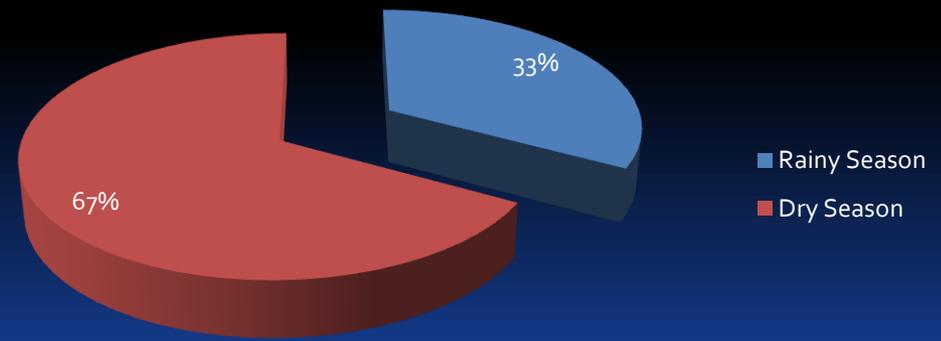




By relying predominantly on annual crops, only 33% of the days in the year are utilized i.e. Only 33% of available sunlight. If drought or other calamities occur 0% of the available sunlight may be used for food production.

= lost opportunity.

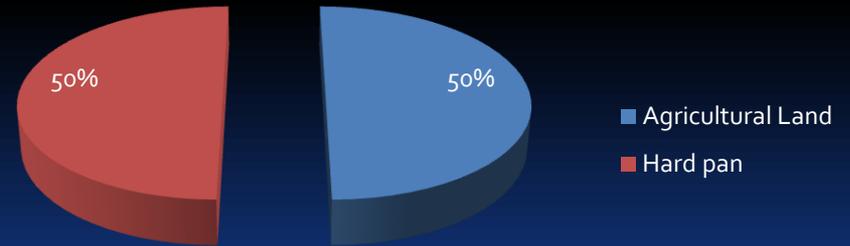
% of days in year utilized

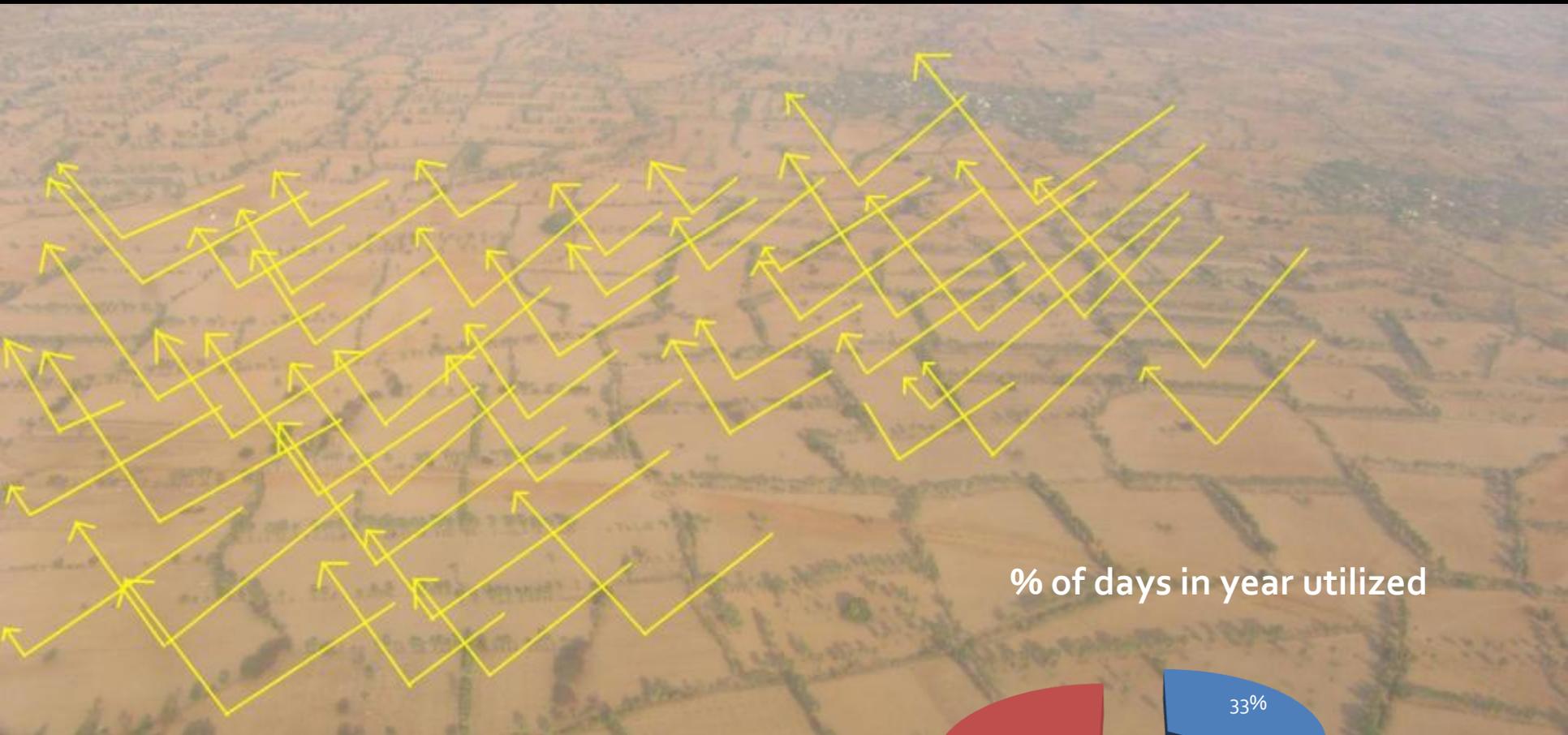




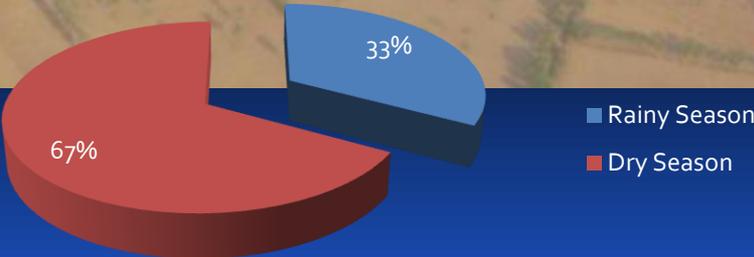
% of land by land type

In some regions, 50% of the landmass is idle for 100% of the time = a lost opportunity.





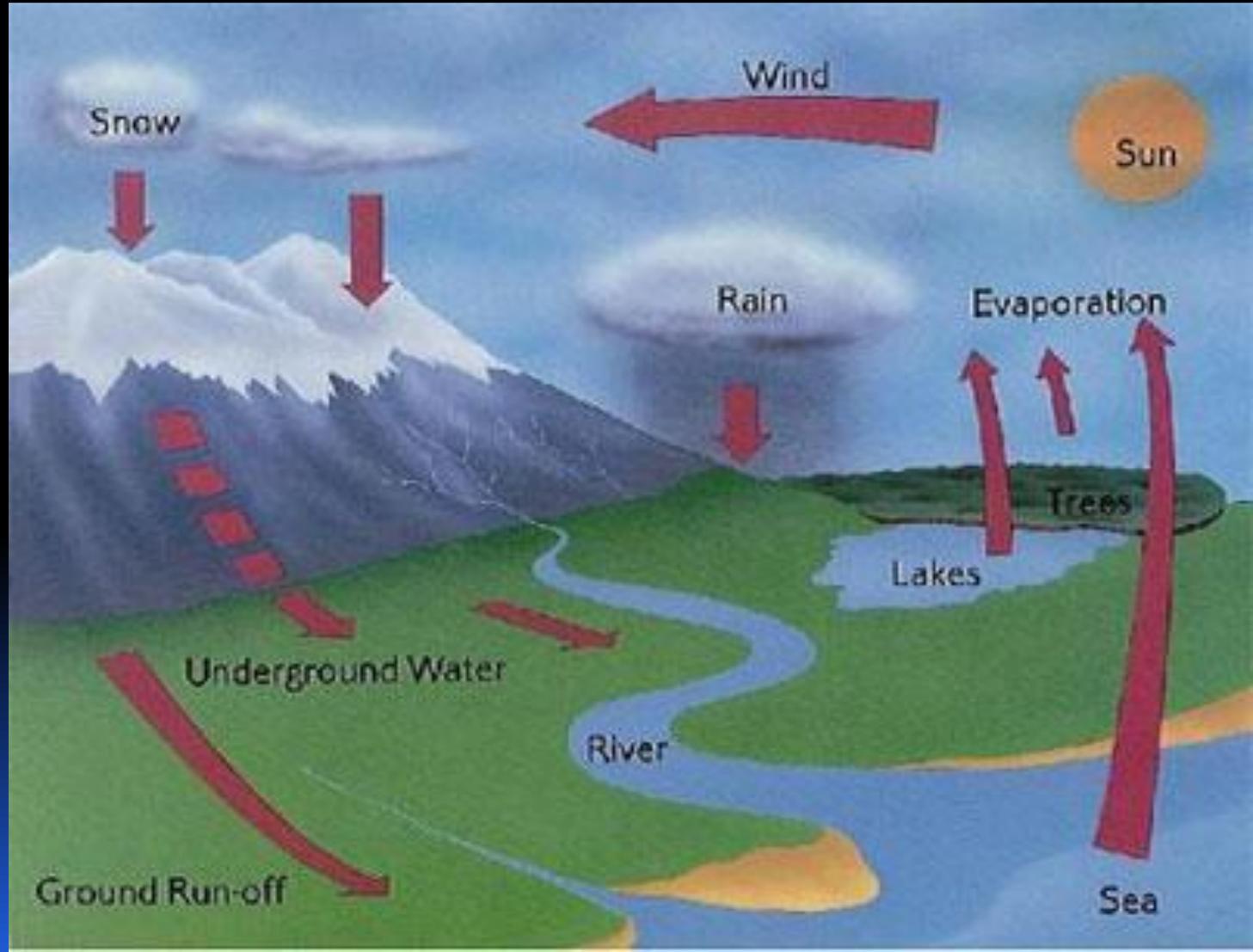
% of days in year utilized



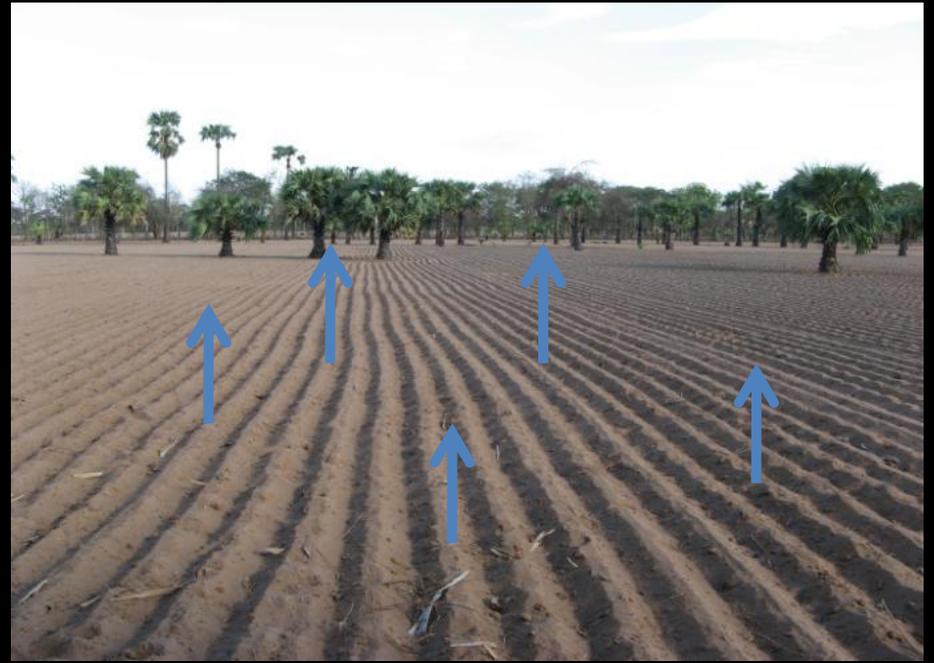
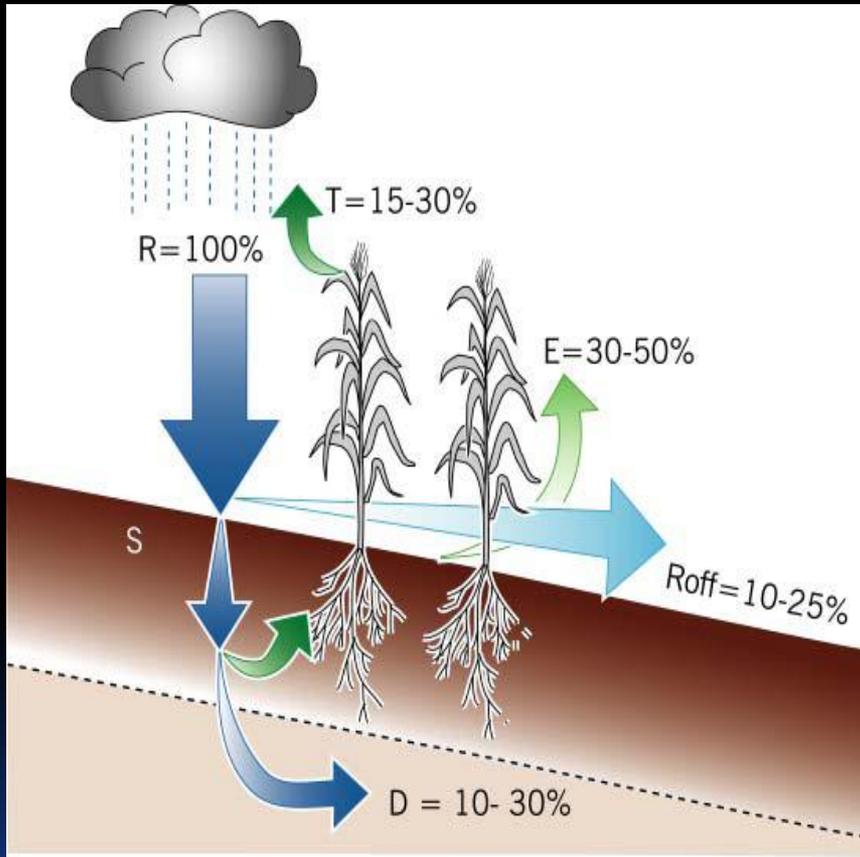




Water Cycle







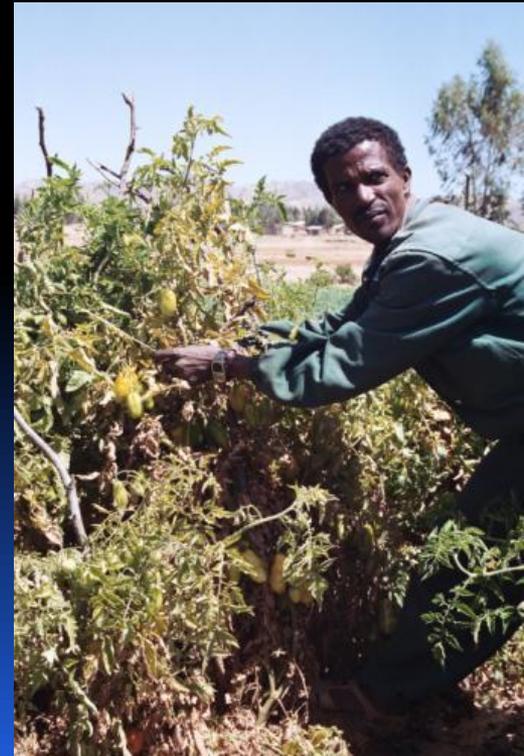


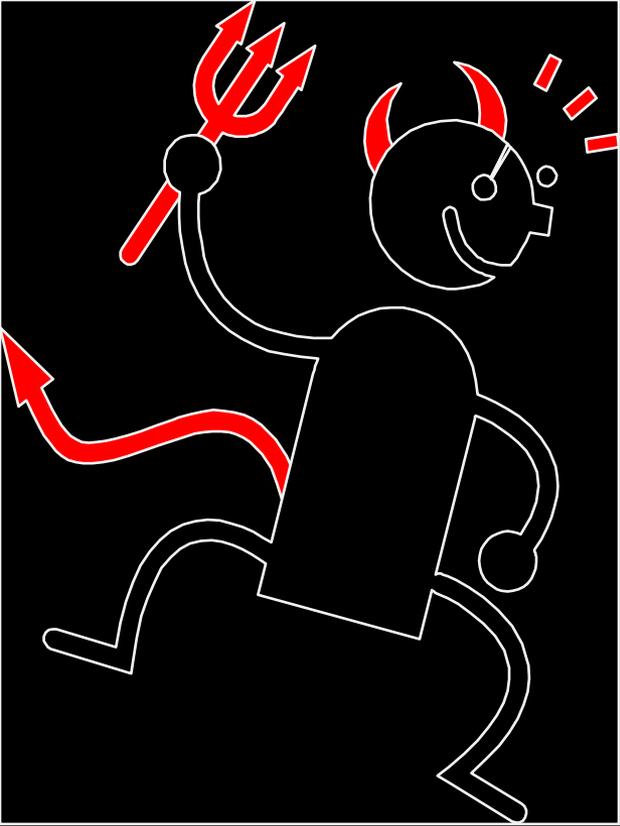
Mulching impacts on –
moisture,
fertility,
erosion,
temperature,
weed control,
labour requirements
soil carbon,
food security,
income..

Zimbabwe test farm:

Conventional	CA
28.5 tons soil /ha lost	1 ton soil/ha lost.
90% rainfall runoff	6% rainfall runoff.







Its time to
Stop demonizing drought
and natural calamities.

Drought is normal, not an
unexpected event. With
climate change drought will
become more common.

We must learn to live with
drought.

Biodiversity

trying to balance a pot on a single stone!

drought →

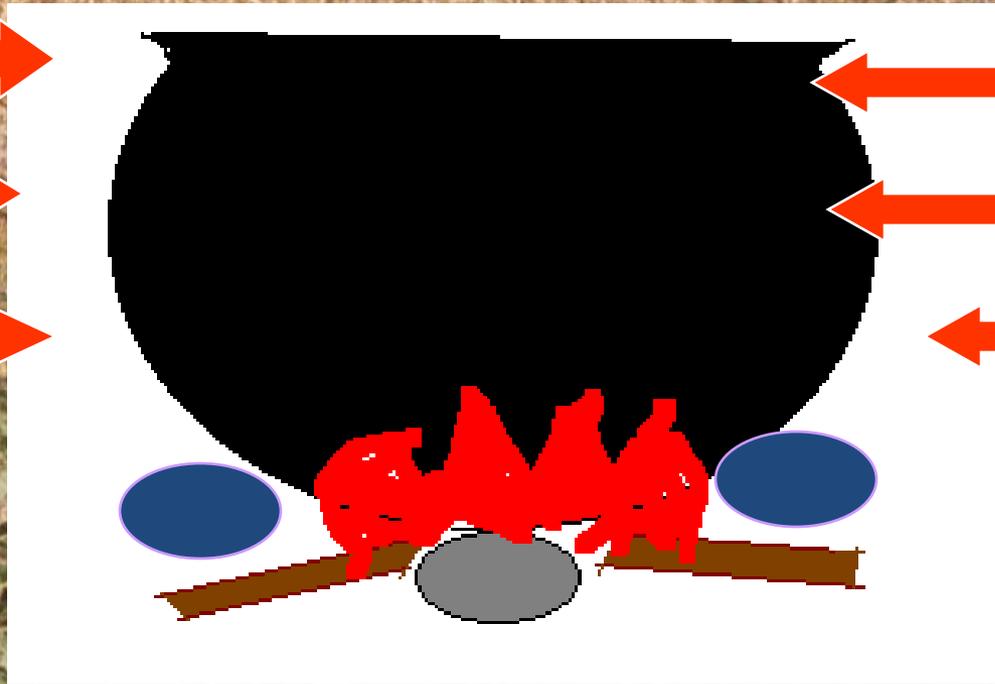
Pests →

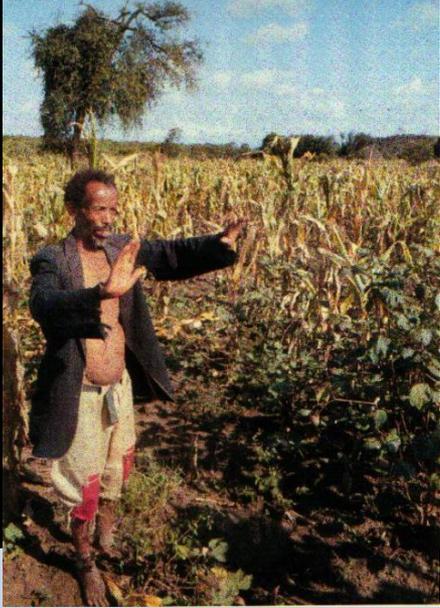
diseases →

← Too much rain

← Strong winds

← hail





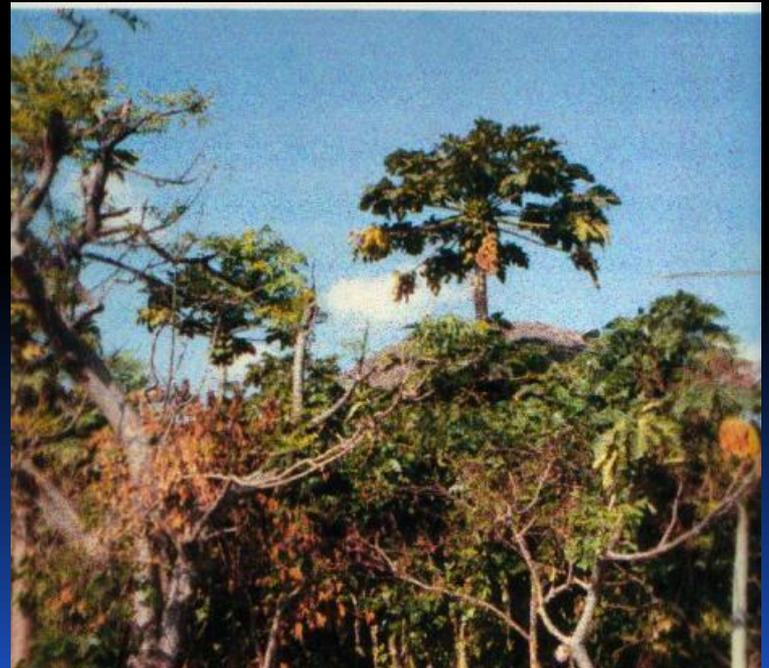
Hungry again:

Southern Ethiopia.

Failed maize & sorghum crops.

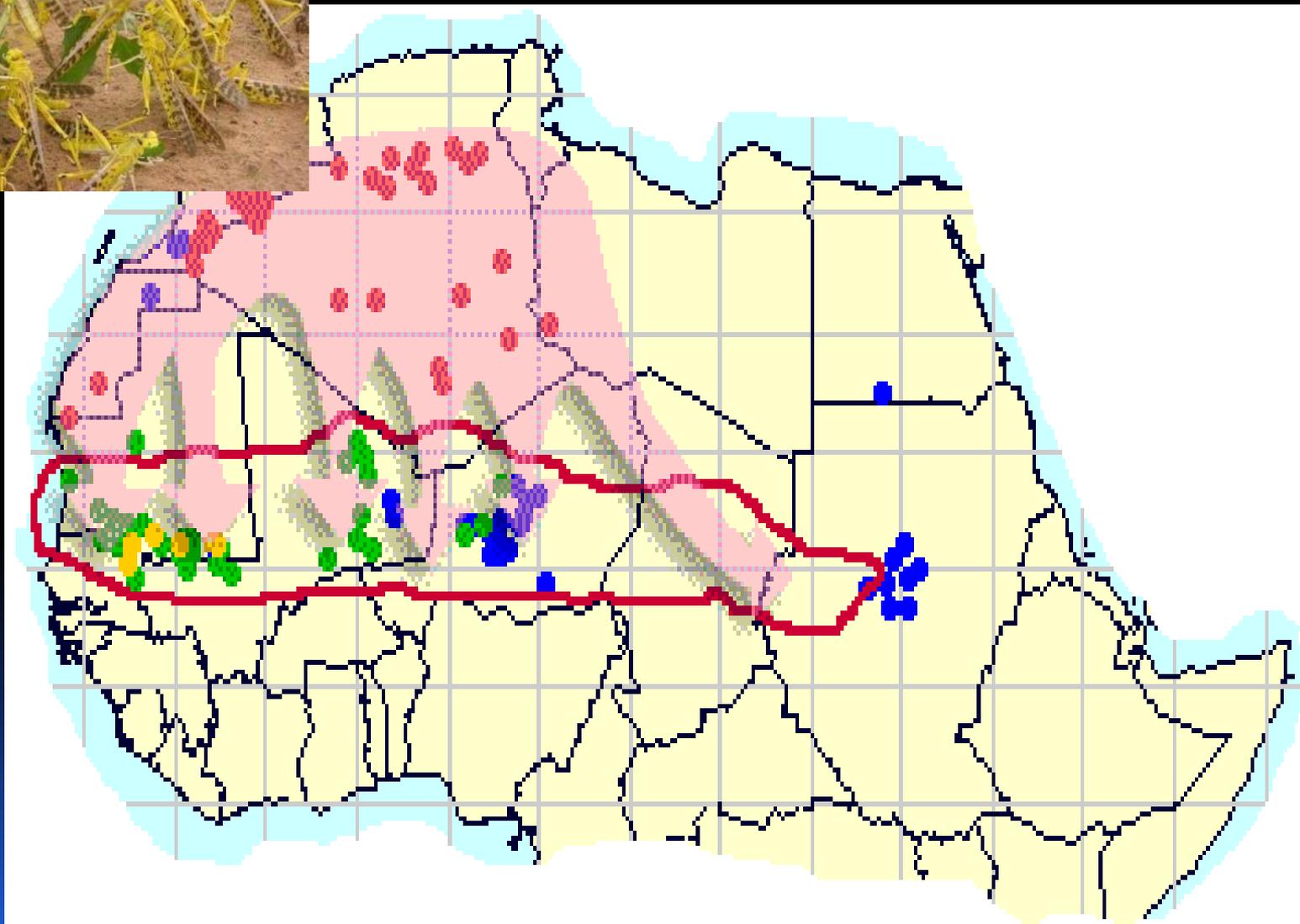


Same community:
Thriving, bio-diverse, non-
irrigated garden.





Biodiversity



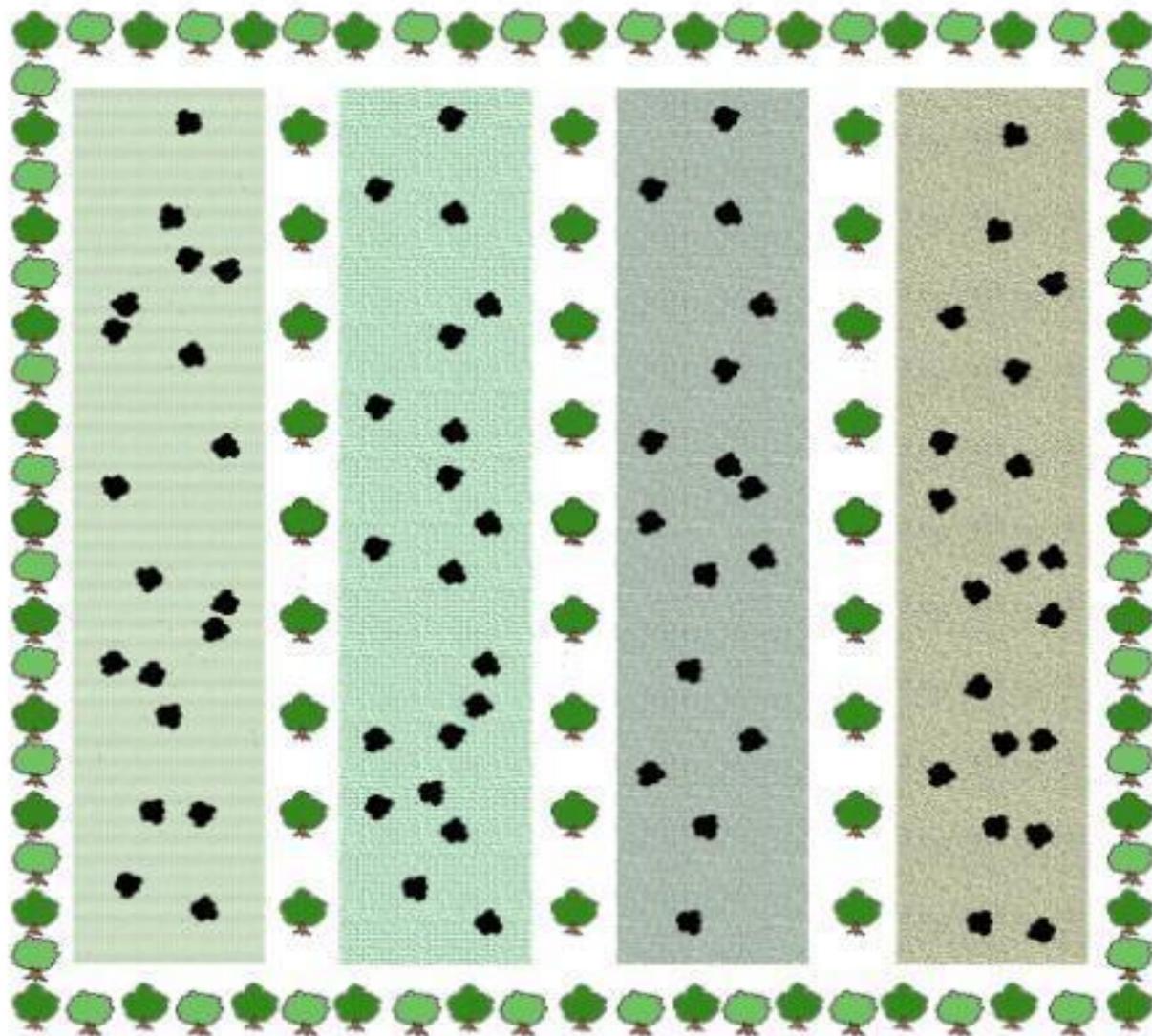


Bosica senegelensis



Moringa





KEY:

 *Acacia coleii* (67)

 indigenous trees (FMNR)

 *Acacia torulosa* (40)

 Annual crops

**Average annual economic benefits from a
1/2 ha FMAFS vs control farm at Magajin
Kware (2007-2009)**

FMAFS Component	FMAFS (cfa)	Control (cfa)	% Increase
Annual crops	34,630	11,460	202 %
FMNR wood	6,500		
Acacia wood	5,660		
Acacia seed	10,750		
Total benefits	57,450	11,460	502 %







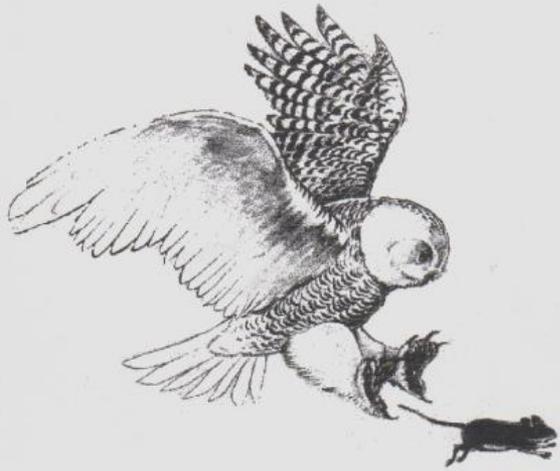
Roselle



Cassava

Apple of the Sahel





Not only diversity of
domesticated crops and
animals.





Management of biodiversity

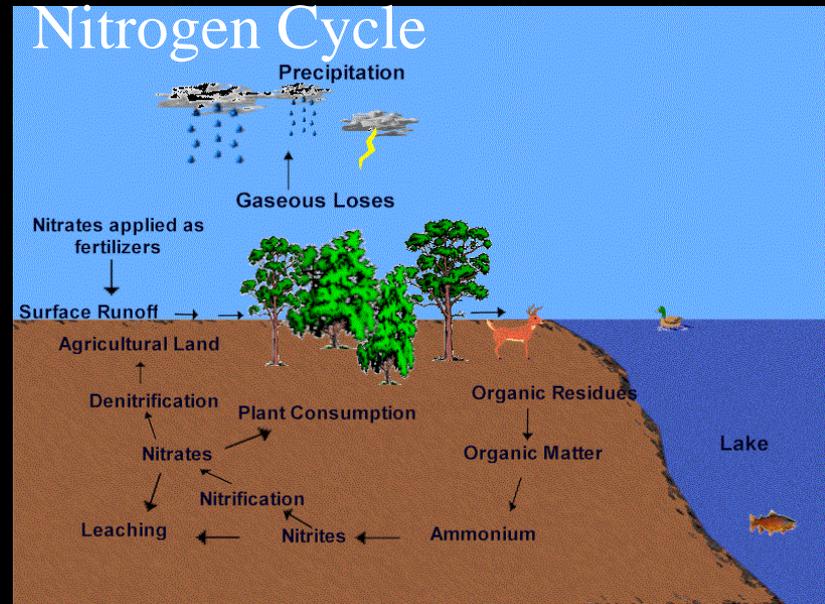
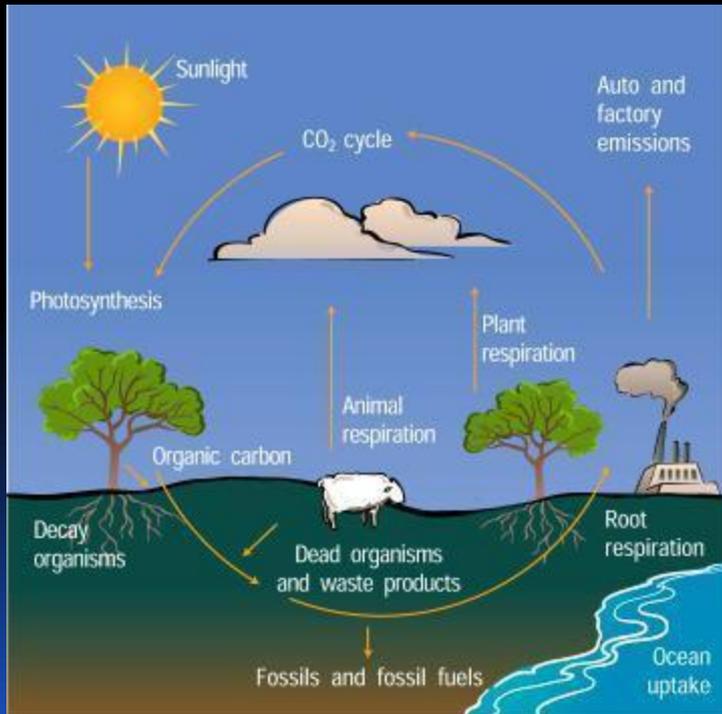
- enables farmers to benefit from 100% of the landscape instead of just 20-50%.
- enables farmers to be productive for 100% of the year, instead of just 25 – 50%

and

- enables farmers to continue being productive even in the face of environmental shocks such as drought, floods, severe storms and pest attack.

Nutrient Cycle

CO₂ cycle





Living Soil

- ~1 gram of productive soil contains
- ~ 100 million - 1 billion bacteria.
- ~ 25,000 species of bacteria
- ~ 8,000 species of fungi.

Healthy soil behaves like a living organism. All life and sustenance comes from the soil. If we treat the soil with respect, we go a long way towards creating food security.





Zai holes prepared in the dry season.

Severe drought year. Millet in foreground and background planted on same day.







Soil Fertility and tree cover.

Soil beneath shrubs form 'fertile islands' in fallow sites and millet fields in semi-arid Niger.

Significantly higher concentrations (38–51% for C, N, P and 22% for K⁺) *were found in the soil under the shrubs.*

This work shows that shrubs are of vital importance for the accumulation of nutrients and maintenance of soil fertility within agro-ecosystems of Niger.

Wezel et al. ORSTOM. 1999.



Reduced soil temperatures – increased crop survival and performance.



Protection from strong winds.







**Nodules housing nitrogen
fixing bacteria on leguminous plant.**



Why is that child hungry?

From a natural resource management perspective, that child is hungry because her life support system, the environment, has been damaged. It cannot provide abundantly, as it was created to.

That child is hungry because only 50% of the land is converting sunlight energy to usable energy for 30% of the year, while 75% of the rainfall runs off or evaporates, 95% of the available biodiversity goes unused and 90% of the soils are infertile and biologically dead.

Fortunately, like God, the environment is very forgiving, and will give us a second chance – if we turn from our destructive ways and walk humbly with it.