

Helping hungry people feed themselves  
...by being good stewards of God's amazing  
natural resources.



# Food plants and good gardening for healthy diets in Zambia



An introduction by Bruce R French - Food Plants International

# Loving God's world and living in it with Him

God has provided  
thousands of food  
plants for people to  
enjoy



God Himself  
is a gardener



The earth is the Lord's and everything in it

Enjoying the diversity

There are many edible flowers!





The world and all who live in it Psalm 24:1



# Feeding children well is very important

Children need protein to grow well

Children need iron to keep their blood good

Children need Vitamin A for good eyesight.

Everybody needs a wide range of food plants to get a balanced diet

A mug only full of maize causes malnutrition!





## Nutrition is simple

- eat a wide range  
of food plants

**Then if one nutrient is  
missing from the first plant  
it will be included in other  
plants and produce a  
balanced diet**

**There is good nutrition in diversity!**

# Food security is simple

- grow a range of local or well adapted plants

Because they are local they will have already survived local conditions and pests

There is security in diversity!

Because there is a variety they have different tolerance to adverse conditions



# It's God's world after all!



Finger millet

He makes grass grow for the cattle  
and plants for people to cultivate –  
bringing forth food from the earth

Psalm 104: 14



Greater yam





# God has provided lots of good local food plants to grow

Local plants  
suit local  
conditions and  
don't fail



Local plants  
are adapted to  
local pests and  
disease



# Our Creation mandate

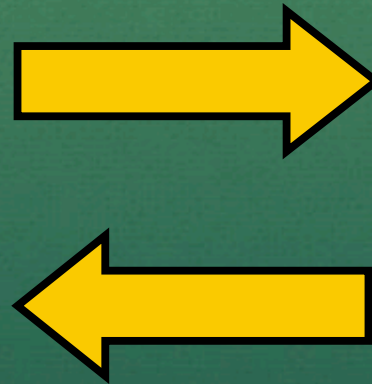
Gen 1:28

**Subdue  
and have  
dominion**

Christians enjoy and  
use God's world and  
also look after and  
care for God's world

Gen 2:15

**Serve  
and  
preserve**



Not just greedy materialists simply  
after whatever we can get

Not just people who think nature  
is sacred and won't use it

# *Who Jesus is – Colossians 1:15f*

He (Jesus) is the image of the invisible God,  
the firstborn over all creation.

For by him *all things* were created:

things in heaven and on earth,

visible and invisible,

whether thrones or powers or rulers or authorities;

*all things were created by him*

*and for him.*

# Jesus is LORD of all or He is not Lord at all

## Religious box ?

- Prayer
- Church
- Bible study
- Evangelism
- Worship
- Personal morality

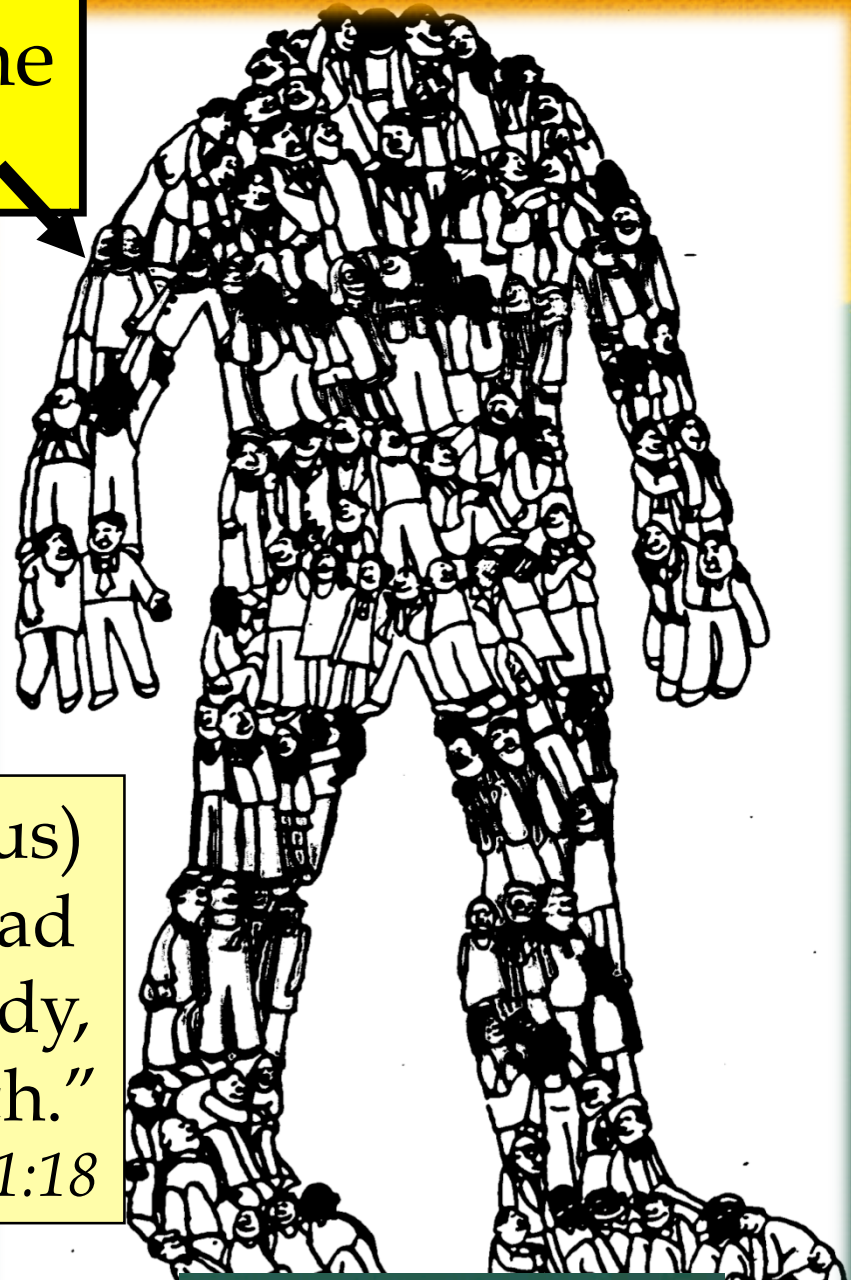
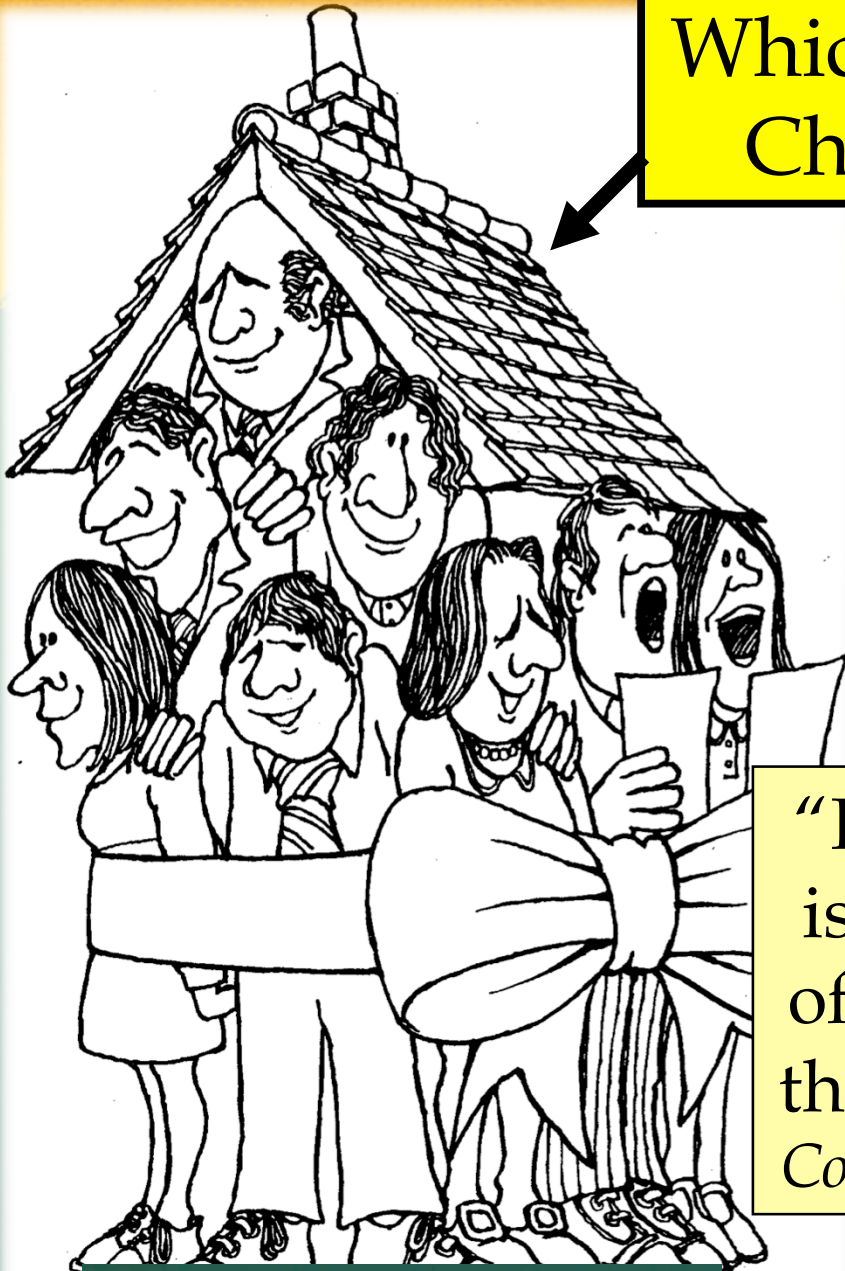
## Secular box ?

- Cropping
- Cows
- Cars
- Carpentry
- Cooking
- Conversations

How do all these activities show that we know and love Jesus?

Christians don't have 2 "boxes" because they do everything for Jesus and with Jesus – He is LORD of all.

Which is the Church?



“He (Jesus) is the head of the body, the church.”  
*Colossians 1:18*

Only 1 or 2 hours per week

Or 168 hours per week

# Learning from God



Isaiah 28:23-25a

Listen and hear my voice;  
pay attention and hear what I say.

When a farmer ploughs for planting,  
do they plough continually?

Do they keep on breaking up  
and harrowing the soil?

When they have levelled the surface,  
do they not sow caraway and scatter cumin?



Caraway



Cumin

The challenge for us is to learn how to grow local plants – not these Mediterranean plants

# Everything in its place

Do they not plant wheat in its place,  
barley in its plot,  
and spelt in its field?

*Their God instructs them  
and teaches them the right way.*

Caraway is not threshed with a sledge,  
nor is a cartwheel rolled over cumin;  
caraway is beaten out with a rod,  
and cumin with a stick.

Isaiah 28:25b-27

**These are all Mediterranean plants for where the Bible was written!  
We need to learn from God about millets, sorghum and corn!**



Wheat



Barley



Spelt

**Wrong plant**

**Wrong place**

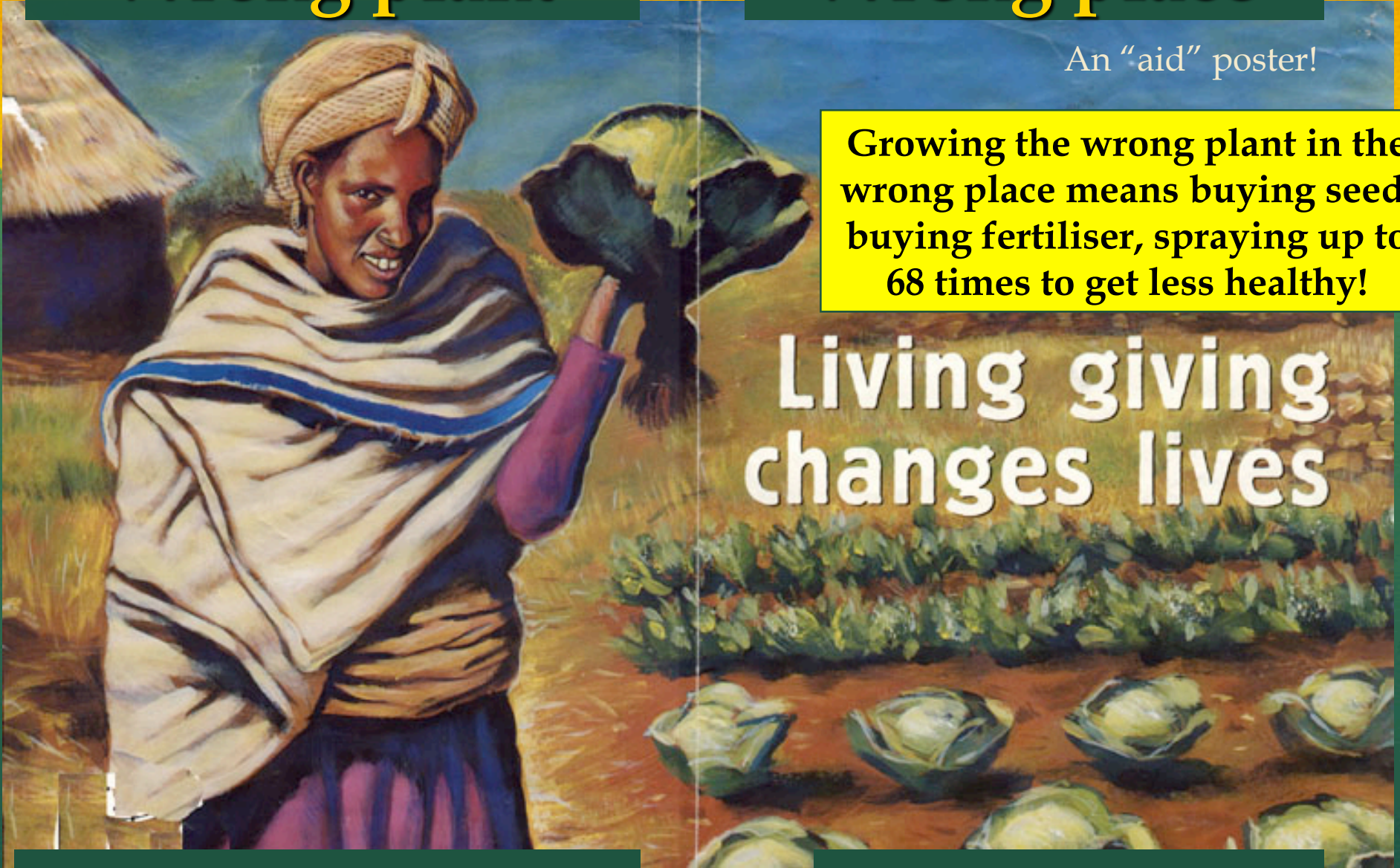
An "aid" poster!

**Growing the wrong plant in the wrong place means buying seed, buying fertiliser, spraying up to 68 times to get less healthy!**

**Living giving changes lives**

**Wrong methods**

**Wrong food**







Momienh

Protein	4 times
Vit A	6-8 times
Vit C	7-20 times
Iron	7-8 times
Zinc	4 times
And it suits the tropics!	



Right plant Right place  
 Wet & dry (drought)  
 Longan 榴莲  
 Guava 番石榴  
 Mango 芒果  
 Sweet sop 甜蜜  
 Soursop 释迦  
 Pineapple 凤梨  
 Pineapple 凤梨  
 poor soils  
 more fruit if cool weather  
 less fruit if wet weather



?



The right plant in the right place

Many local tropical plants are far better food value

# Gardening with God

The Bible tells us God  
has put “us in charge  
with things under our  
control”

Genesis 1



The Bible also  
tells us to “serve  
and preserve”  
God’s world

Genesis 2



Learning to garden  
by watching and  
working with God

In Isaiah 28:23 we are reminded that God teaches  
people how to put the right plant in the right place.

God grows plants naturally by using local plants  
that suit local conditions.

The Psalmist reminds us in Psalm 104, that God  
enjoys his gardening



# Some beautiful tropical green leafy vegetables - God's vitamin & mineral supplements



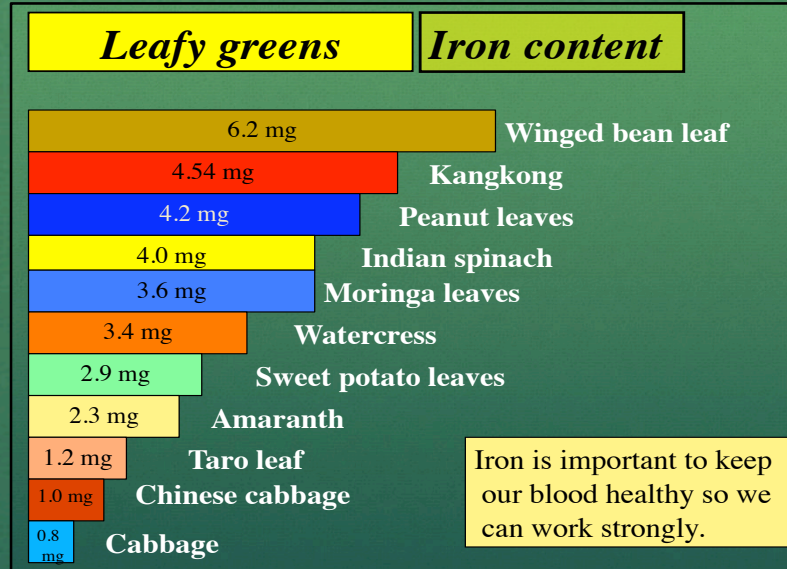
Kangkong



Okra



Amaranth



Iron is important to keep our blood healthy so we can work strongly.



Indian spinach



Sweet potato leaves



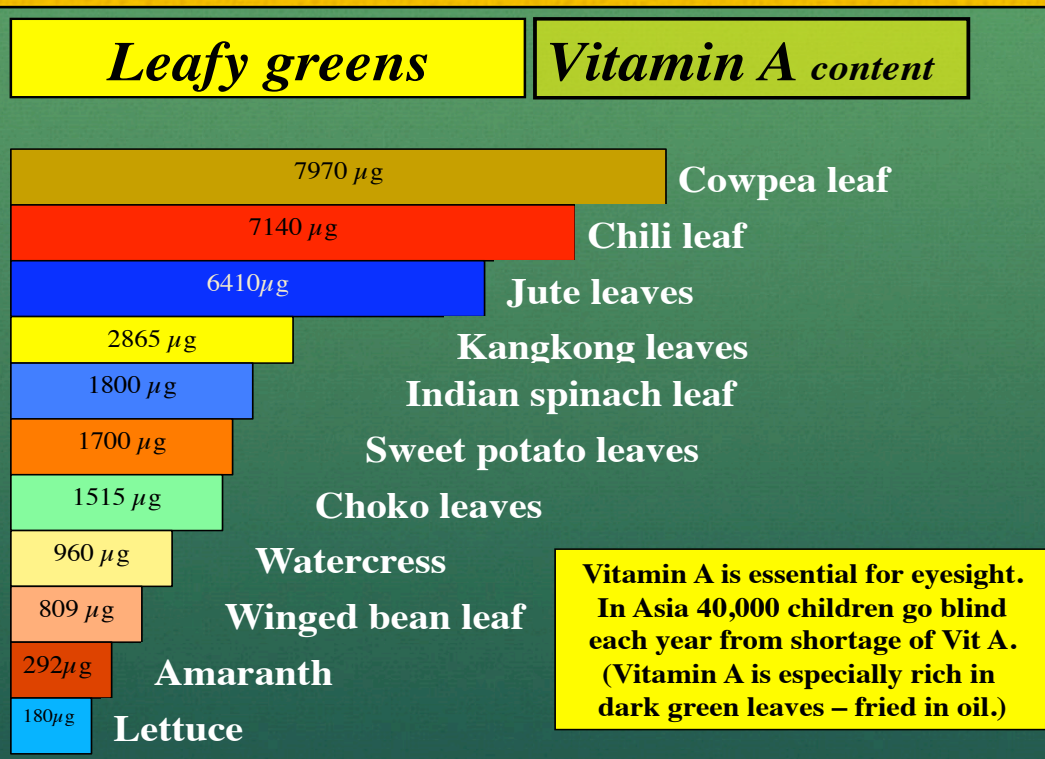
Moringa



Watercress

# Vitamin A for good eyesight

Choose dark green edible leaves



# Protein for healthy growth



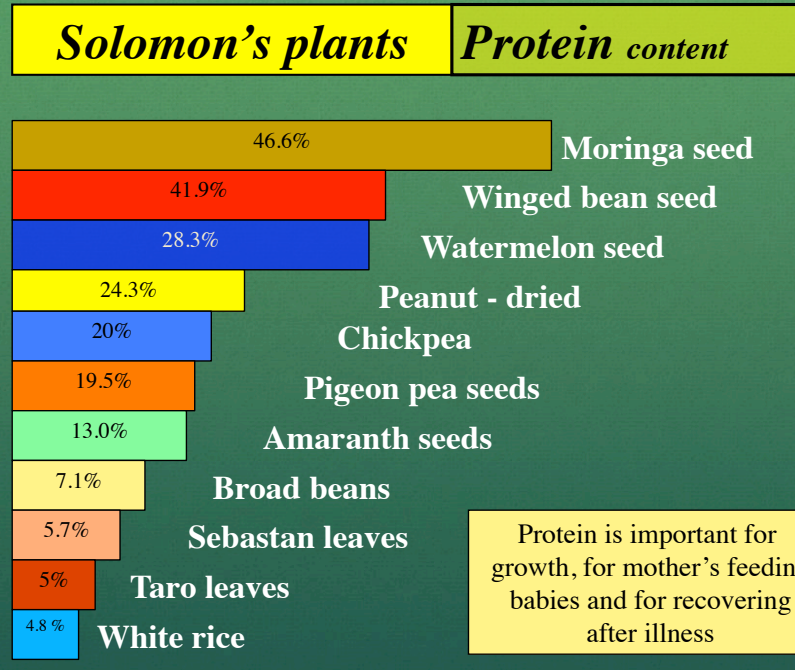
Amaranth



Pigeon pea



Broad bean



Protein is important for growth, for mother's feeding babies and for recovering after illness



Winged bean



Soybean



Chickpea



Peanut

# Trees and good soil

When the children of Israel were about to enter the promised land they asked 2 important questions.

**Are there any trees on the land?**

**Is the soil good?**

Numbers 13:20

The clue to all good gardening is to look after the soil and to make good use of trees.



A living soil



A dead soil



**Trees are important**

Avoid burning when clearing as it loses important nutrients and damages the soil

Some trees can be kept and gardens made underneath. Trees recycle nutrients



Soil loss from tree removal

# Fruit for flavour and vitamins



Mango



Figs



Doum palm



Avocado



Guava



Pineapple



Key apple



Tamarind



Carob

Plant fruit trees now for your children and grandchildren later



# Growing plants well

**Plants show us when they are not growing well**

Of the 16 main nutrients needed for plants to grow well, this corn leaf is indicating the plant is short of one called nitrogen. It shows a dry V shape down the centre of the oldest leaves. Other grass plants show similar signs. All green leaves need nitrogen.

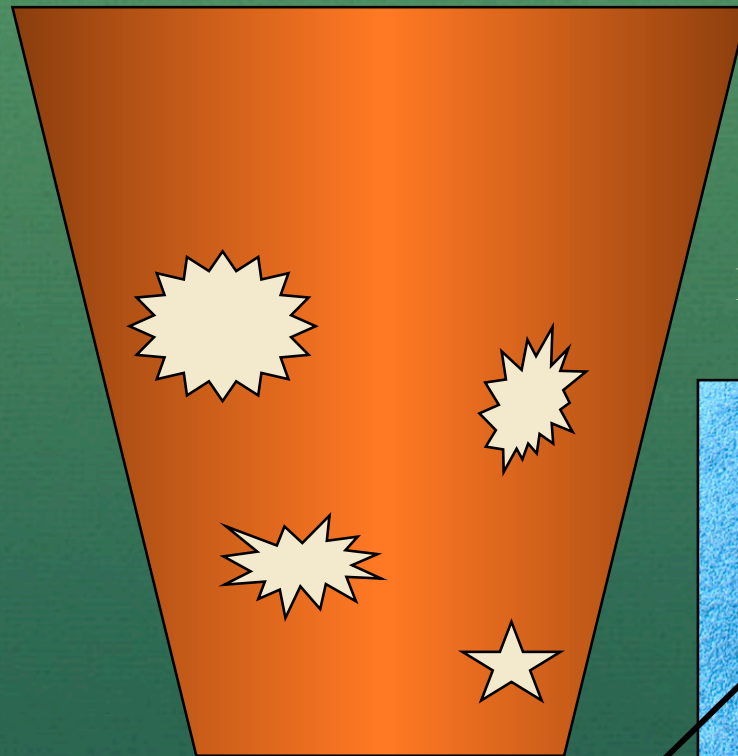
*Nitrogen is in the air but plants cannot use it unless small bacteria in the soil and on the roots of bean family plants change it into a form plants can use.*

*Using compost and plants in the bean family put nitrogen back into the soil*



# Plants need 16 nutrients to grow

If we imagine soil as being like a bucket of nutrients or plant food that is needed for the plants to grow, then we need to fix the bottom hole, or add the nutrient which is in shortest supply, before the bucket can carry anything more!



Signs shown by plants

Phosphorus



Potash

Nitrogen

By looking at plants carefully we can learn to recognize which things are in shortest supply

# Making compost

Compost is too much hard work for large gardens



**If it has lived once it can live again**



Don't burn rubbish, compost it!

**Use green and brown, wet and dry and keep it moist**



Compost is perfect for small backyard gardens

# How to make compost

## The rules for compost making:

- Build a simple, open box to keep animals out
- Mix green leafy and dry plant material
- Allow air to get into the compost
- Keep the compost bed moist
- Add anything that has been living before
- If possible, turn the heap to allow it to heat up and break down properly
- Add some old rotting material to start the process

**Compost allows things  
that were alive to live  
again!**



# Growing plants well

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# Growing more food needs care!



Managing disease



Conserving nutrients



Restoring fertility



Stopping inbreeding

We need to do  
the best good  
gardening we  
can

We need better  
knowledge of  
food plant  
resources

# Plant a mixture of plants together



In nature God never plants only one variety of plant. This is a good ecological way to grow plants. It gives more stable production.

Pests and disease always cause less damage in mixed groups of plants



# Some of the many food legumes useful to restore soil fertility



Pigeon pea



Leucaena



Cowpea



Peanut



Winged bean



Lablab

All legumes or plants in the bean family can put nitrogen back into the soil



# Droughts and famines become more serious when people grow the wrong plants



**Rice needs lots of water**



**Corn needs lots of water**



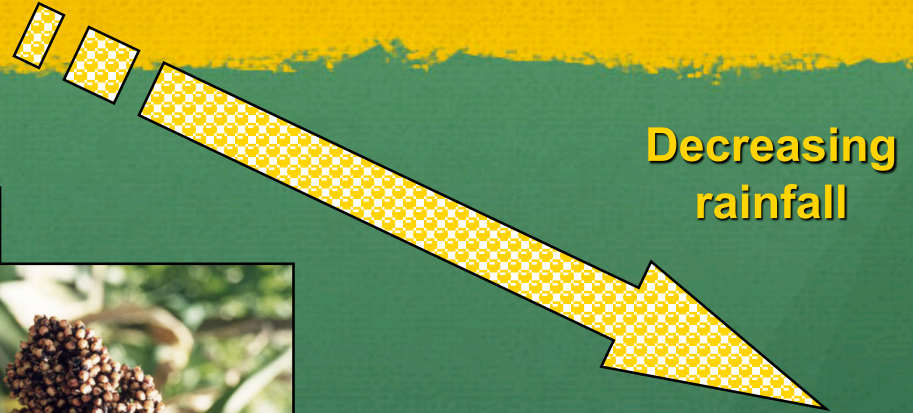
**Sorghum needs less water**



**Finger millet less water**



**Bulrush millet suits dry areas**



**Tropical cereal grains**

Protect you family by growing a range of different grain crops

# Sorghum suits African soils, rainfall and conditions



There are several hundred kinds of sorghum



Choose kinds of sorghum to suit soils, climate, pests, disease, birds and other problems



Open kinds get less mould

Grow and keep a range of kinds of sorghum to suit changing conditions



Sorghum tolerates more soils and drought better than maize

# Striga in sorghum fields



A sorghum field

The leaves of both Cock's comb and Cowpea can be cooked and eaten. Cowpea also adds nitrogen to the soil. Its seeds can be eaten.



Photo from Wikipedia

A Striga plant

Sorghum and pearl millet can be damaged by plants called "Striga" that grow on the roots of the plant and damage the crop

It has been found that intercropping sorghum with Cock's comb or Cowpea helps reduce the damage from Striga.



Cock's comb

*Celosia argentea*



Cowpea

*Vigna unguiculata subsp unguiculata*

Olupot, J. R. & others. 2003, Crop Protection. 22: 463-468

# Coping with *Quelea* in sorghum fields



Photo from Wikipedia

*Quelea* are the most common bird in the world and can devastate sorghum crops

Apart from trying to watch sorghum crops for days on end, the only known control is to try to catch the birds in nets in their resting places in the evening – then eating them of course!

A *Quelea* bird



Photo from South Africa tours and travel



**Light coloured sorghum gets more bird damage but is also the more nutritious kind of sorghum**

**Dark coloured sorghums have antinutrients and tannin and are less well liked by people and also birds!**



# Pearl millet

*Pennisetum glaucum*



Suits very arid  
regions

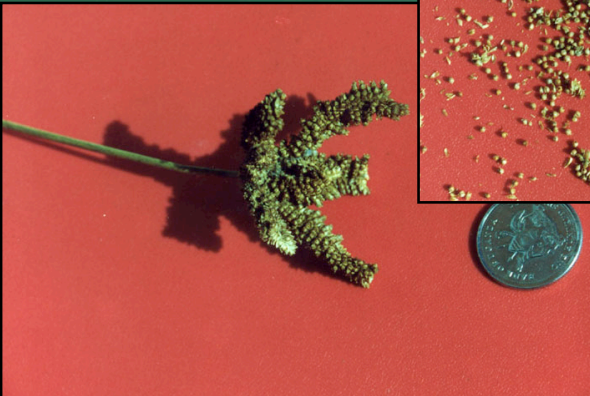
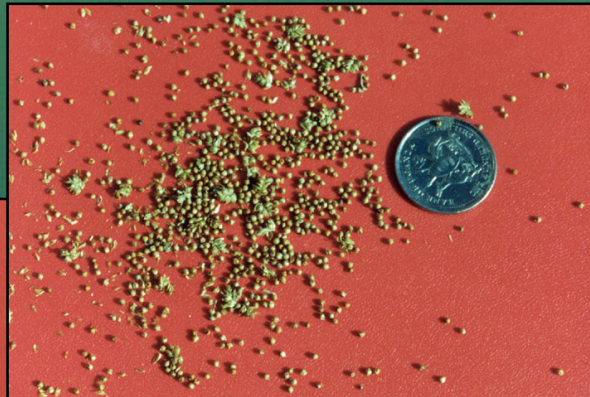


# Finger millet



*Eleusine corocana*

**Suits arid regions**



# Saving your own seed

**In many small gardens, corn plants and cobs are small, because the seed is inbred.**



You can't save your own seed from hybrid corn

**If you get all the seed off one cob, these are all related and will become inbred and small.**

**Seed from a range of cobs, or better still, from a range of gardens, should be mixed together to stop inbreeding.**



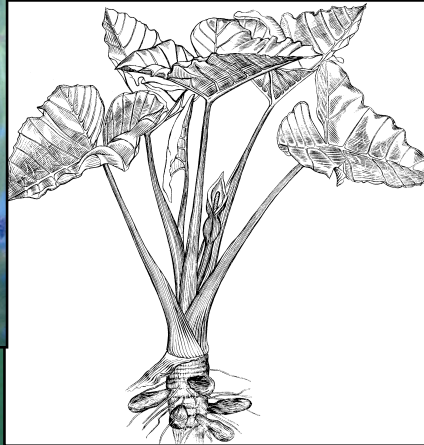
# Changing plants to grow on poorer and poorer soils is “mining” the ground



Yams need fertile soil



Taros need good soil



Xanthosoma taro survives on poorer soils



Sweet potato can grow on moderate soils



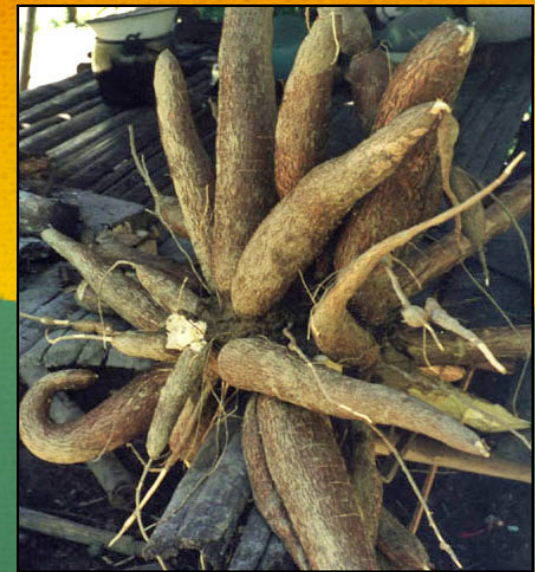
Cassava will still produce on poor soils

Decreasing soil fertility

**Tropical root crops**



# Cassava - the most common tropical root crop



Cassava can survive drought and will grow in poor soils but must be well cooked

Young leaves can be cooked and eaten



Needs cooking to remove cyanide



Virus affected in Africa

# *Traditional leafy vegetables*

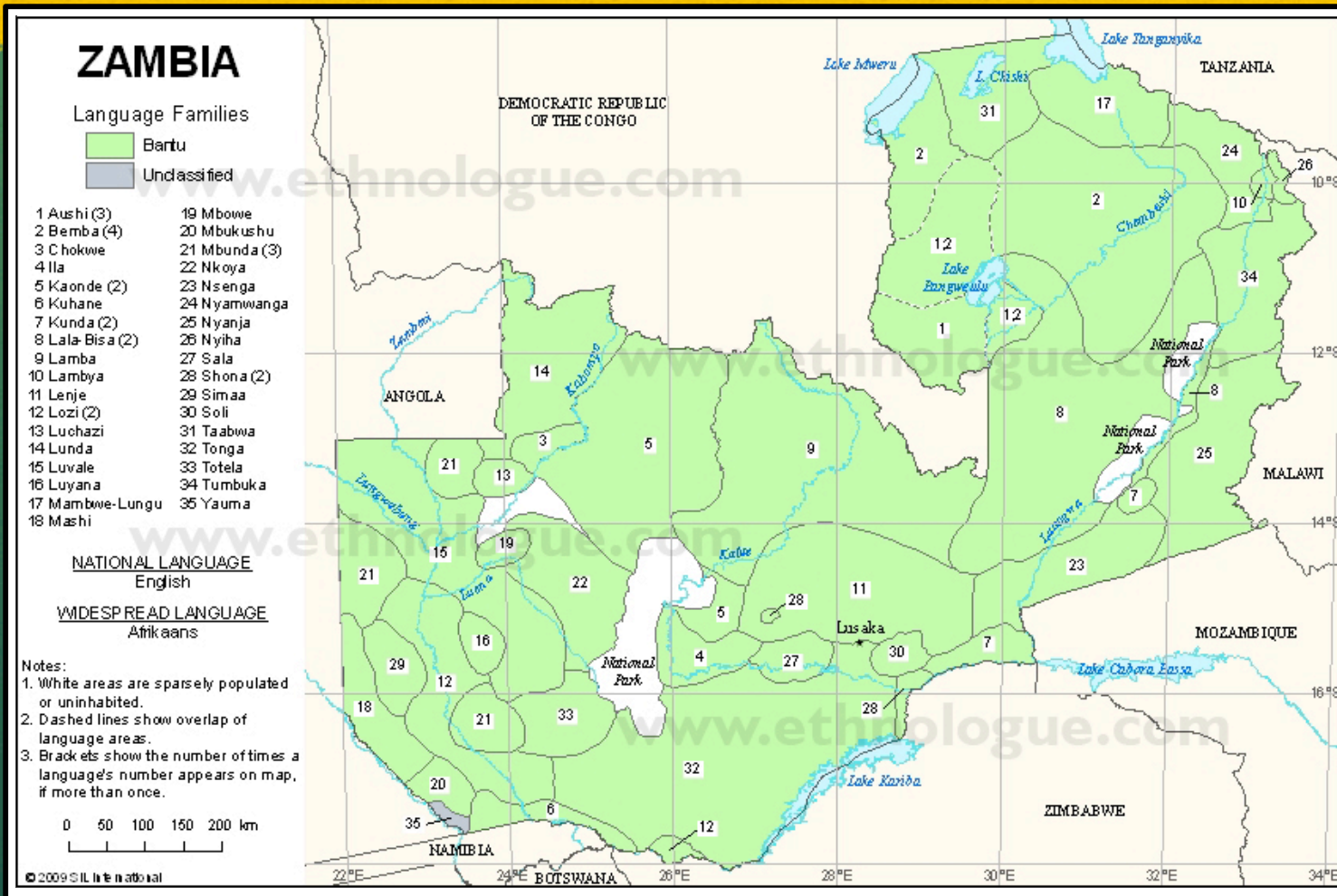
*“The use of traditional leafy vegetables in communities has been noted in several studies. These studies highlighted concerns about the loss of knowledge. The aim of this work was to enhance the role of African leafy vegetables in the nutrition of vulnerable groups in South Africa through improved preparation, promotion of consumption, processing, landrace improvement program, and management of their genetic diversity.”*

# Quote in Eden project UK

"When I first started farming, I grew vegetables such as cabbages, Kales and tomatoes. We used to think that modern crops were better than the foods we grew up eating. Now I grow crops like spinach, nightshade, spiderplants, amaranthus, jute plants, sweet potatoes and pumpkins. They suit Kenya's climate and soils and are rich in important micronutrients. Most are sold from supermarkets in Nairobi.

Stephen Kimondo, Kenyan Farmer

# Naming plants in Zambia



Local plants have local language names. Because of the large number of languages in the world, scientists have given every plant a name in the Latin language and this remains the same whatever local language the person is speaking or writing. It is like a reference or link to the same plant somewhere else. Reverend Dennis Fowler has published a book of local Zambian plant names linked with these scientific names.

# Food Plants International

Compiling information on food plants of the world and getting the information back to those who need it most

- For other information see the Food Plants International website [www.foodplantsinternational.com](http://www.foodplantsinternational.com)
- Information and pictures in this book may be used freely without any need for acknowledgement.
- A powerpoint copy can be supplied for people who wish to translate it into other languages in Zambia
- For contact Bruce R French, 38 West St, Burnie Tasmania, 7320 Australia. Email:bfrench@vision.net.au