

The Use of Green Manure/Cover Crops to Fertilize the Soil and End the Droughts

by Roland Bunch





The Causes of the Droughts:

1) Climate change.

2) Much more important, the end of fallowing (“slash and burn agriculture” has dramatically reduced the quantity of organic matter in the soil. This factor has reduced the rainwater infiltration from about 60% to less than 20% in many areas.

What can be done?

The only feasible solution for increasing the organic matter of our fields of basic grains is to use gm/ccs.

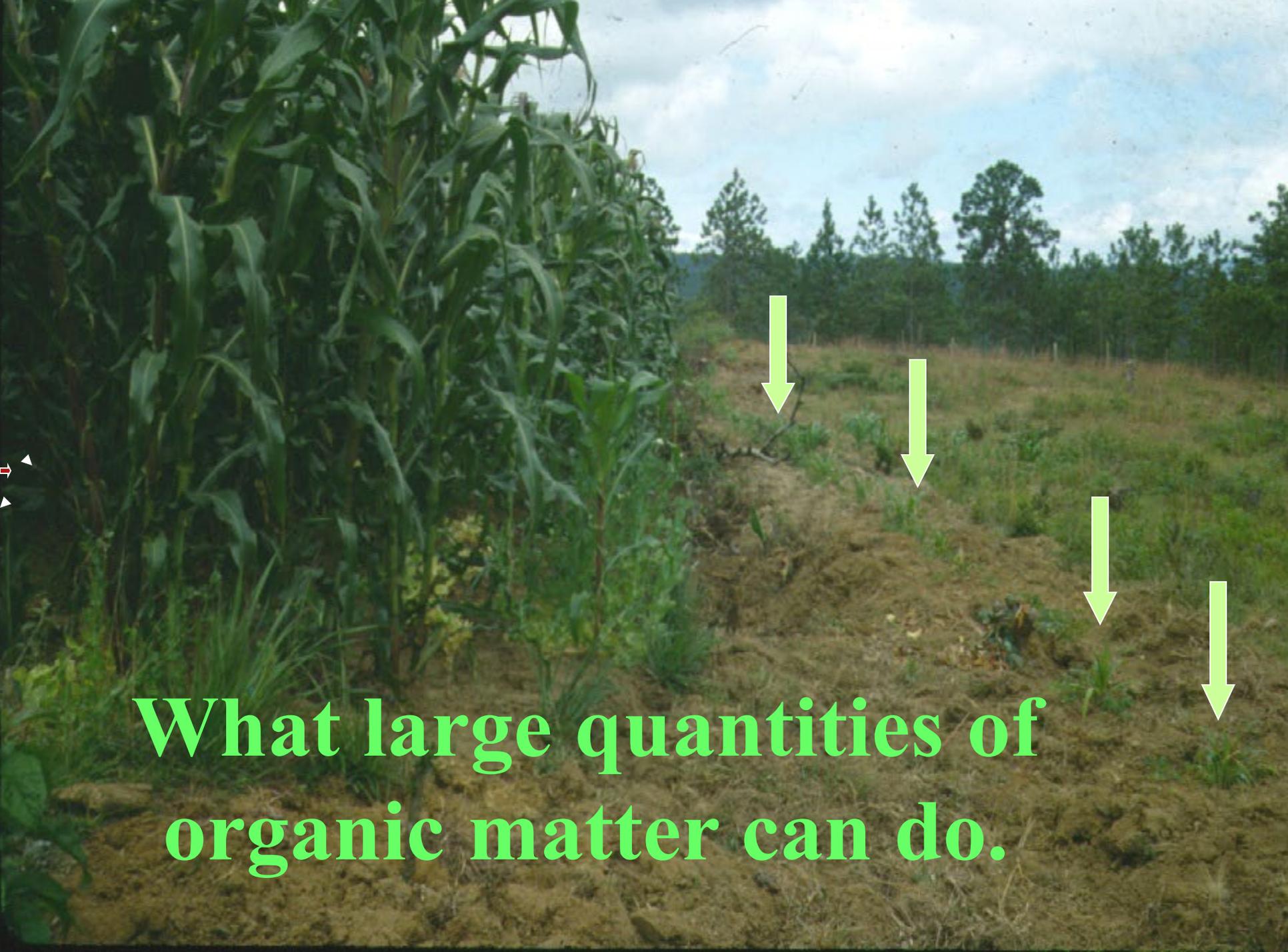
Why? Smallholder farmers do not have enough animal manure to do this, and making enough compost would take months, even if they could acquire enough plant material. Gm/ccs, on the other hand, can produce more than 50 t/ha/year (green weight) of organic matter. Have you ever seen a farmer produce even 10 t of compost in one year?



Green manure/cover crops are:

Any species of plant, usually a legume, whether it is a tree, a bush, a vine, a crawling or a water-borne plant, that farmers use (among other reasons) to increase soil fertility, control weeds, or overcome droughts.

(These are not to be confused with simple “green manures.”)



**What large quantities of
organic matter can do.**

The advantages of gm/ccs:

- 1) They can triple present yields of basic grains.
- 2) These same plants can produce a large quantity of additional food rich in proteins.
- 3) Some of these gm/ccs also reduce the hunger season, or totally end it.
- 4) They can also help reduce the labor needed to control weeds.



5) They can reduce the impact of droughts by up to 80%.

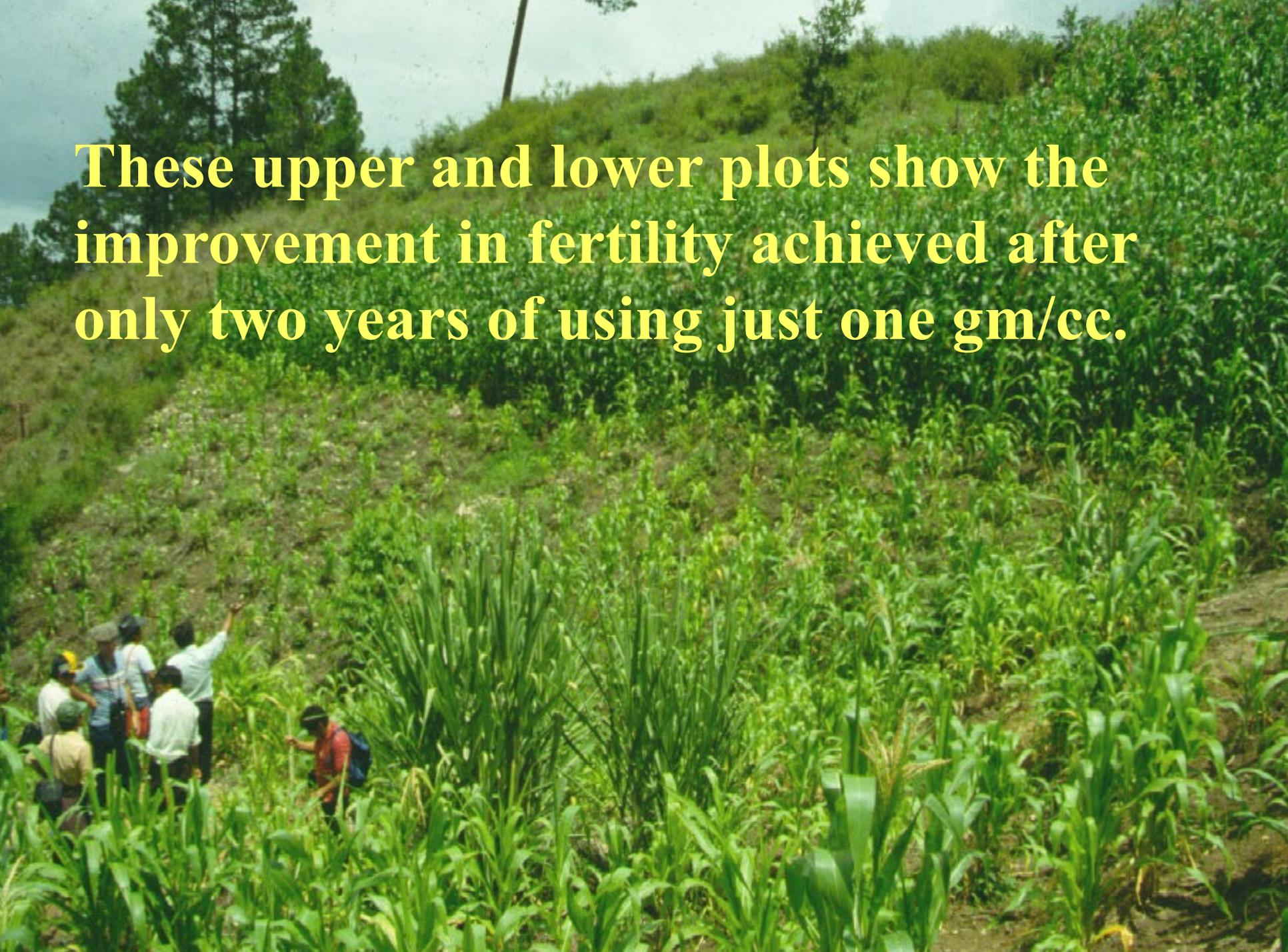
6) They can sequester carbon in the soil, long term, at a rate of up to 4 t/ha/year.

7) They can go a long way toward very cheaply protecting our crops from the impact of global warming (ie they are a very efficient form of “climate-smart agriculture”)



8) They can reduce over-all costs by eliminating or reducing weeding labor, eliminating or reducing tillage, and producing firewood right in farmers' fields.

These upper and lower plots show the improvement in fertility achieved after only two years of using just one gm/cc.



**The same
hillside, from
closer up.**







**Tropical
gm/ccs are
also able to fix
a whole lot
more nitrogen
than our
textbooks will
admit.**



The disadvantages of gm/ccs



- 1) They occupy space in our fields.
- 2) Most of them only show visible results during the second year, and factors such as resistance to drought may take up to 5 or 6 years.
- 3) They can be affected by difficult growing conditions.



4) In some cases, it is difficult to have green leaves available when the next season starts.

5) Free-grazing animals may cause serious losses during the dry season.

The most important rules for managing gm/ccs efficiently:

- 1) By far the most important rule—the Golden Rule—is that the green leaves of the gm/ccs must be on the ground at the time the farmers' plant their next crop.
- 2) Farmers are presently using more than 100 species—we must find out which species will work best in our particular environment.



3) Farmers are not going to change their farming systems to accommodate gm/ccs; we must adapt our gm/ccs to their existing systems.

4) Unless they also produce food, we cannot grow gm/ccs in the place of farmers' food crops; we must grow them below, above, or intercropped with the crops already grown in farmers' fields.



5) Quite frequently, we use as many as four or five species in a field at the same time.

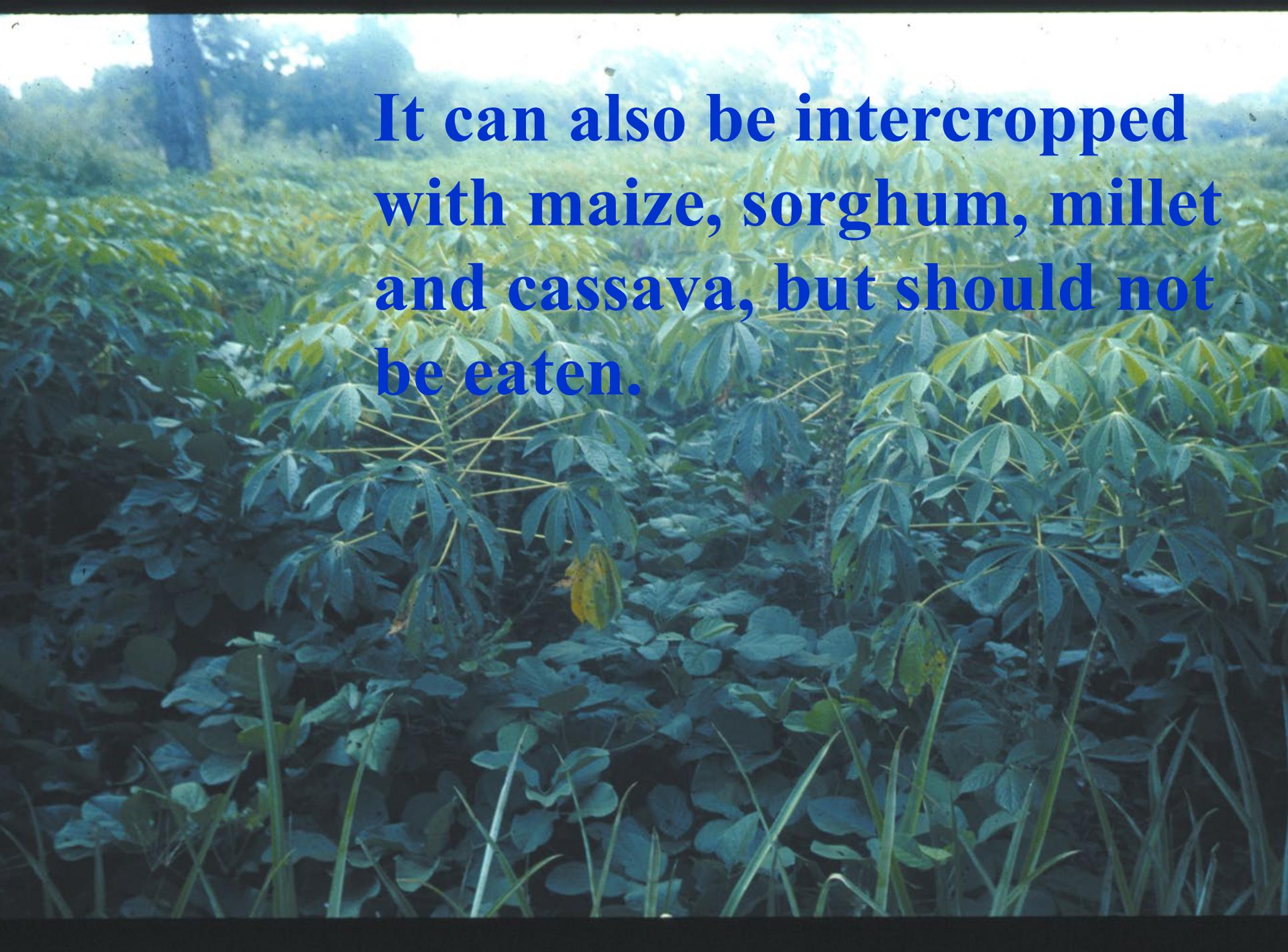
6) Over time, the fields should come as close to imitating the forest as they can while still producing more food than ever before. That is, there should be trees, inntercropped bushes, and short bushes or crawling gm/ccs, all growing in the same field.



Gm/ccs frequently produce high-protein food, and farmers will accept them far more eagerly if they do.

A man wearing a straw hat and a plaid shirt stands in a field of lush, green bushy jack bean plants. The plants are densely packed and appear to be in a field setting. The background shows a line of trees under a clear sky.

The bushy-style jack bean is highly resistant to drought and poor soils and can fix 240 kg/ha of nkitrogen. It is therefore ideal for initiating the process of soil recuperation.

A photograph of a field of green, leafy plants, likely cassava, with a text overlay. The plants have large, deeply lobed leaves and are growing in rows. The background shows a line of trees under a bright sky.

**It can also be intercropped
with maize, sorghum, millet
and cassava, but should not
be eaten.**



Very resistant to droughts after three or four months of good growth, the lablab bean produces very good human food and large quantities of excellent fodder throughout the dry season.



The Advantages of Gliricidia

- 1) The leaves are among the two or three species of tree leaves that best fertilize the soil. One kg of fresh gliricidia leaves will fertilize the soil the same as 1 kg of fresh cow manure.
- 2) Gliricidia is highly resistant to droughts.
- 3) It produces a great deal of animal fodder throughout the dry season, but is not so palatable that the animals will eat it during the wet season when it is needed to fertilize the soil.



- 4) It grows extremely fast. The above photo shows 4-year-old trees that are growing in extremely poor soil with no fertilizer of any kind.

- 5) It is very easy to prune—one never has to climb the tree to prune it. Thus it basically saves labor, because one does not need to walk to forest to cut the firewood.

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- 7) The use of gliricidia in farmers' fields can reduce the pressure on the forests caused by the cutting of firewood.
 - 6) The gliricidia can be propagated by seeds, seedlings, or cuttings.
 - 7) The trunk's bark can, if used with great care, be used to make a very effective poison for rats and mice.



**Thank you for
your attention**