

Good Gardening and Growing Root Crops in Rwanda

*Practical ways of
growing local food
plants and doing it
well*



**FOOD PLANT
SOLUTIONS**
ROTARIAN ACTION GROUP

*Solutions to Malnutrition
and Food Security*

A project of the Rotary Club of Devonport North, District 9830
and Food Plants International

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Good gardening and growing root crops in Rwanda



The Mustard Seed Institute

The vision of the Mustard Seed Institute is to be a community-based social enterprise providing practical and sustainable solutions for extreme poverty eradication and peace building through research and innovation, training and skills transfer, mediation and dialogues. In the rural community of Rwankuba, Eastern Province, Rwanda.

The Mustard Seed Institute has partnered with Food Plant Solutions to improve the health and well being of the local community through education and advocacy on agricultural innovations. With a focus on gaining knowledge about which crops to grow in order to lower malnutrition levels amongst the local children.

In addition to this booklet, other publications have been produced for Rwanda All can be downloaded from our website - www.foodplantsolutions.org



We encourage and welcome your support.

Food Plant Solutions - A project of the Rotary Club of Devonport North,
Rotary District 9830 & Food Plants International

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Good gardening and growing root crops in Rwanda

Practical ways of growing local food plants and doing it well.

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Other publications in this series:

Food Plants for a Healthy Diet in Rwanda

Potentially Important Leafy Greens and Vegetables in Rwanda

Fruit and Nuts in Rwanda

Good nutrition is simple

Grow and eat a wide range of food plants.

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



Healthy Diets

All people, and especially children, should eat a wide range of food plants to stay healthy. This should include some plants from each of the food groups – energy foods, growth foods and health foods. Then each of the nutrients required by our bodies will be met in a balanced manner.



Sweet potato

Energy food



Avocado

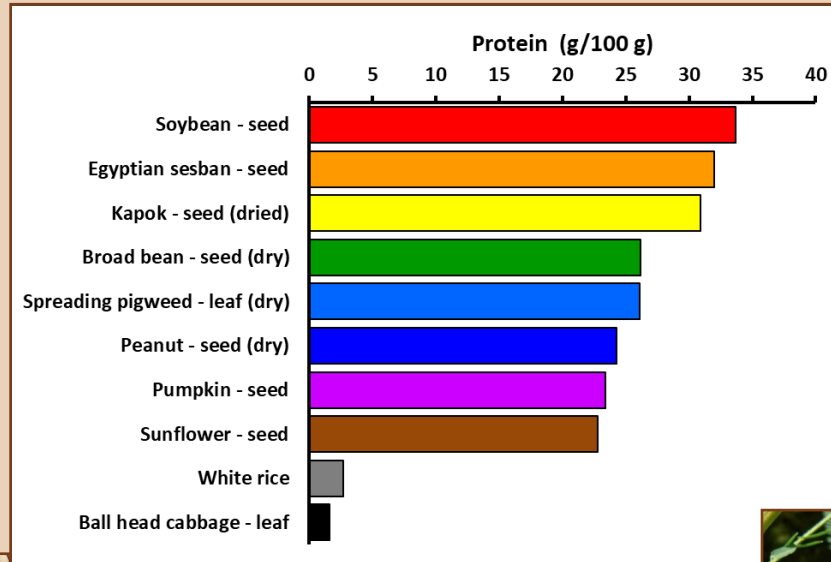
Health food



Peanuts

Growth food

Protein foods



Protein foods

Food plants add an important amount of protein (growth food) into our diets. Fish and meat can improve the quality of the protein.



Sunflower seeds



Kapok

Many seeds can be roasted and eaten as snacks.

Local plants give a regular food supply



Use a range of local or well adapted plants to get a regular supply of food.

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



They each have different ways to survive bad conditions or bad seasons.



Agro-ecology - growing plants a natural way



Growing foods in a mixed garden is a good and simple way to reduce pests and disease.



Agro-ecology - how plants grow in nature

Plants don't grow in rows in nature.

Growing only one type of plant is not used in nature.

Lots of varieties are maintained in nature.

In nature, the right plant grows in the right place.

In nature, fruit is produced in season.

Nutrients are recycled in nature.

Natural systems are sustainable.

In nature, the soil remains alive and humus rich.

Mixed cropping is good

Amaranth and maize mixed.



Yams, bananas & vegetables.

Information on gardening

Deficiencies



Seed-saving

**We all need to learn
together and to share
what we know.**



Pests



Diseases



Are your plants healthy?

Plants show special signs when they are not growing well.

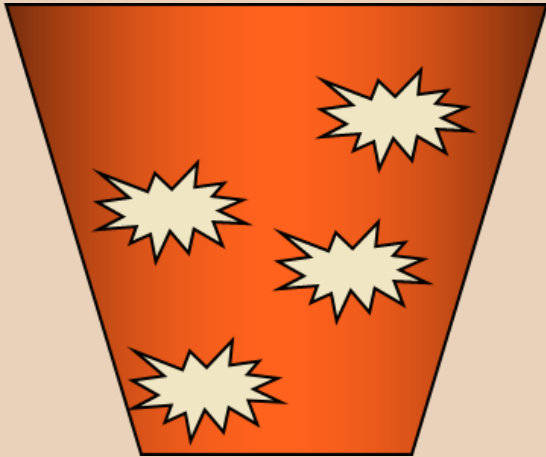
This maize leaf is indicating the plant is short of a nutrient called nitrogen. It shows a dry 'V' shape down the centre of the oldest leaves. Other grass plants show similar signs.

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.



A bucket of nutrients!

If we imagine soil as being like a bucket of nutrients, then we need to fix the lowest hole, (or add the nutrient which is in shortest supply), before the bucket can carry anything more.



We can learn to recognize which nutrients are in shortest supply by looking at plants carefully.

Phosphorus



Potash



Nitrogen



Different plants grow on different soil types



**Yams need
fertile soil.**



**Taros need
good soil.**



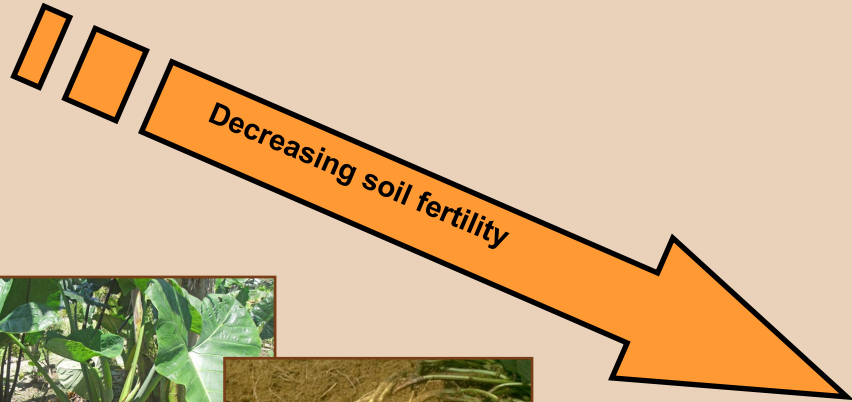
**Chinese taro
survives on
poorer soils.**



**Sweet potato
can grow on
moderate soils.**



**Cassava will
produce on
poor soils**



When nitrogen is short...

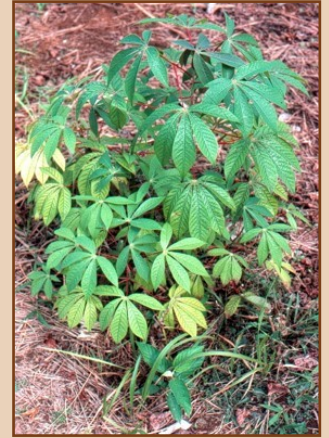


Pineapple plants turn red.

Nitrogen is important for plants to grow healthy leaves.



Grass plants have a dead 'V' shape in the old leaves.



Old leaves go yellow.

Beans provide protein and restore soils

Beans have special bacteria attached to their roots that allow them to take nitrogen from the air and put it into the soil for plants to use. It is free fertiliser!



Mung bean



Marama bean

Climbing beans can be allowed to climb up corn in gardens and still get good crops of both beans and corn.

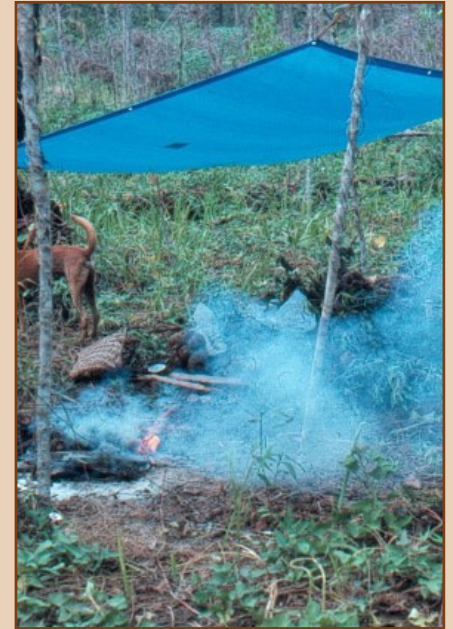
Burning loses nutrients and destroys soils

Burning is a quick and easy way to clear up a garden site, but wherever possible, plant material should be left to rot back into the soil.

This provides nutrients, and helps the bacteria and other living things in the soil that are so important for plant growth.

A soil with humus, or rotted plant material, does not lose nutrients during heavy rain.

Nitrogen (and Sulphur) get lost into the air as plant material is burnt. Other plant nutrients, like potash, remain in the ashes.



Making compost



Don't burn rubbish - compost it!

**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.
- Add some old rotting material to start the process.
- 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.

The reasons for compost

Small bacteria and other living things work hard to break down old plants and other living things into compost.



Because the bacteria are living, they need continual air and water, and a balanced diet of green and dry waste, or they die.

Living things already have plant nutrients in perfect balance for new plant growth, so it is the perfect fertiliser.



To stay healthy, soil needs lots of compost and organic matter to do all the amazing work that goes on unseen within the soil.

Compost should become hot to kill weeds and pests.

Some diseases tell a story

The first rule in managing pests and diseases is to grow the right plant in the right place, and to grow it well, so it can stay healthy.

Peanut rust



Leaf spot in bananas

Some diseases tell a story

Elsinoe scab on sweet potato usually tells us 3 things:

- The soil is getting poor and low in nutrients.
- This sweet potato is a variety that gets the disease more easily.
- This variety of sweet potato may have come from another country without the disease, so it has no resistance.



Reduce the risk by:

- Improving the soil.
- Choose a local, resistant variety.

Pests

Using a range of crops, and a mix of varieties, is normally a good safeguard against bad insect pest damage.

Banana scab moth. Pull the flower bracts off, because the small moth hides under these to keep out of the sun.



Save your own seed

Plants grown from seed that is saved locally usually get a lot less disease, as they are adapted to the area.



Mildew

Many pumpkin family plants get mildew and other diseases.

Air-layering

Air-layering is a special way of taking cuttings. A shallow cut is made around a small branch while it is still on the tree. Some soil and mulch is wrapped around this and covered with plastic. It soon forms roots. It can then be cut off and planted.



If a sweeter or preferred fruit or nut is found, it is best to grow it from cuttings, or air-layering, so the new tree is the same as the old.

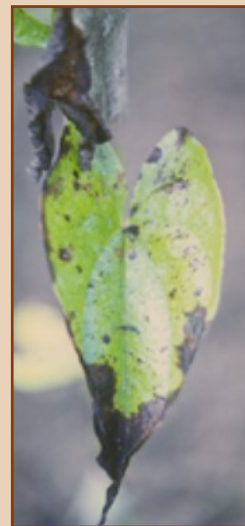
Pests, diseases and deficiencies

Taro blight fungus washes in the rain on hot wet nights.



Wrinkled sweet potato leaves.
This fungus scab gets bad when soils are poor, and also on varieties that are not resistant.

Yam anthracnose - this fungus makes leaves die off early when the leaves get damaged.



Root Crops in Rwanda

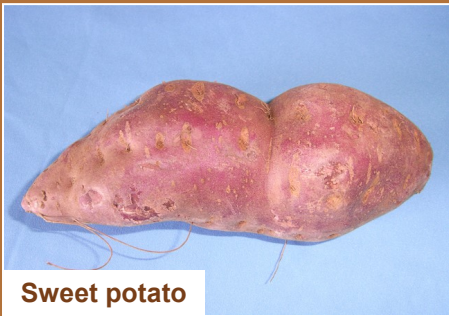


Banana

Root crops are perfect plants for hot tropical climates.



Taro



Sweet potato



Cassava

These foods are the backbone of the country, so we need to get to know them very well.

Growing taro

Taro grows best from the top of larger corms. It can grow in moving water and light shade. It takes 6-9 months to be ready to eat.



Taro diseases

Taro blight and Alomae / Bobone virus are the most serious taro diseases.



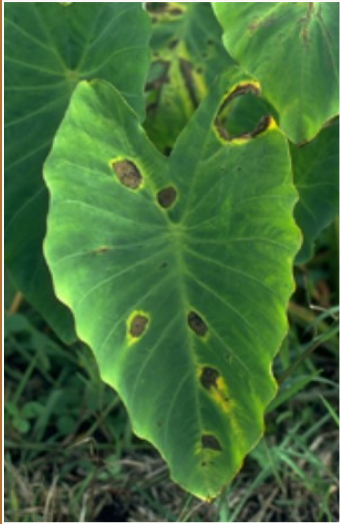
Alomae / Bobone virus

Use a mix of varieties and mixed cropping to reduce damage.



Taro blight - a devastating fungal disease.

Taro diseases



**Taro shot hole - a
minor fungal disease**

Taro mosaic virus



**Taro diffuse yellow
leaf spot**

Taro insect pests



White fly



Cluster caterpillar



Taro beetle

Taro insect pests



**Aphids sucking
sap**

Grasshopper nymphs



Taro hawkmoth



Growing sweet potato

Sweet potato needs:

- Air in the soil. Plant them in mounds if the soil is wet or clay.
- A position in full sun.
- A soil rich in nutrients, particularly potash (ashes).



There are many different kinds of sweet potato. Some grow quickly, but only give small amounts of food. Grow a mixture to make meals more interesting.

Growing cassava

Cassava is a root crop that is easy to grow, can be stored in the ground, will grow in poor soils and survive dry times. Plant woody sections of the stem (about 15cm long) in the ground at any angle.

If the soil is loose, it does not have to be dug first. Crops are usually harvested 10 - 14 months after planting. Yields of roots are lower in very acid soils and in shady places.



Cassava should always be well cooked as it contains a bitter poison called cyanide that can build up in the body and damage nerves. Cooking removes this. Leaves can be cooked and eaten.



Some problems with Cassava

Older leaves going yellow means the soil is short of nitrogen.



Leaves often get brown spots due to a fungus. It does not normally get too bad in good soils.

Like most root crops, cassava produces more food if the soils are rich in potash. Ashes from fires have potash.



Young leaves turn yellow when the soil is sour; - in limestone and coral sites.

Acknowledgements

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Notes:

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