GOOD GARDENING AND GROWING ROOT AND GRAIN CROPS IN NEPAL

PRACTICAL WAYS OF GROWING LOCAL FOOD PLANTS AND DOING IT WELL

Rotary

FOOD PLANT SOLUTIONS
ROTARY ACTION GROUP
Solutions to Malnutrition and Food Security

A project of the Rotary Club of Devonport North and District 9830

REGISTERED CHARITY

Good gardening and growing root and grain crops in Nepal

Rotary FOOD PLANT SOLUTIONS ROTARY ACTION GROUP
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Food Plant Solutions produces educational materials to enable people to understand the nutritional value of local food plants and increase awareness of highly nutritious plants that are adapted to the local environment. Some of these plants are under-utilised species and many are superior to imported foods and plants. Food Plant Solutions produces these materials because every minute of every day, five children under the age of five die from malnutrition.

We welcome and encourage your support.

Food Plant Solutions - A project of the Rotary Club of Devonport North & Rotary District 9830.

This booklet is based on information from the Food Plants International (FPI) database developed by Tasmanian agricultural scientist Bruce French, AO.

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Good nutrition is simple

Grow and eat a wide range of food plants.

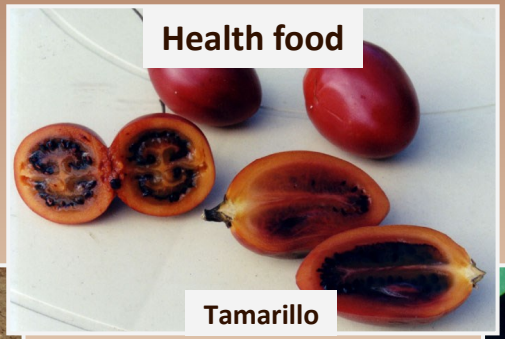
Then if a nutrient is missing from one plant, it will be included in other plants and produce a balanced diet.

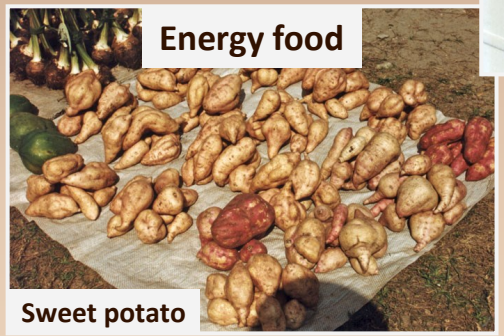
Brier rose

Sweet potato

Healthy Diets

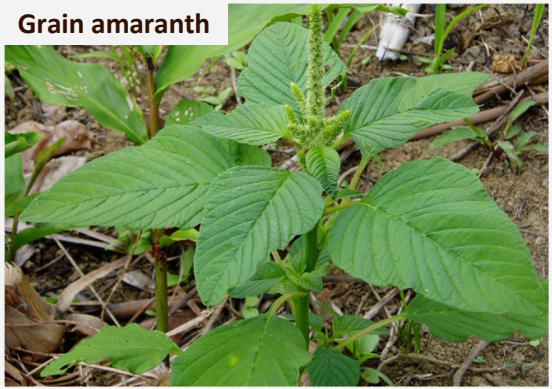
All people, and especially children, should eat a wide range of food plants to stay healthy. This should include some plants from each of the food groups – energy foods, growth foods and health foods. Then each of the nutrients required by our bodies will be met in a balanced manner.





Local plants give a regular food supply

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


Grain amaranth

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


Taro

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


Lima bean

Agroecology - growing plants in a natural way

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

Agroecology - 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

Yams, bananas & vegetables.

Amaranth and maize mixed.

Information on gardening

Deficiencies

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

Seed-saving

Pests

Diseases

Are your plants healthy?

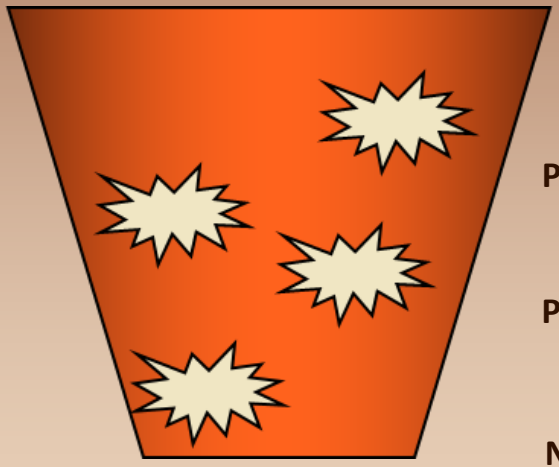
Plants show special signs when they are not growing well.

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

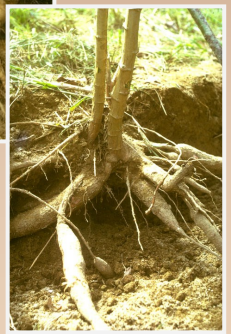
Different plants grow on different soil types

Yams need fertile soil

Taros need good soil

Chinese taro can grow on moderate soils

Sweet potato grows on poorer soils



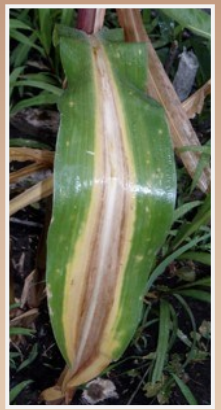
Cassava will produce on poor soils

Decreasing soil fertility

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!

Lima bean

Lablab 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 compost 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 enough to kill weeds and pests.

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.

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.

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

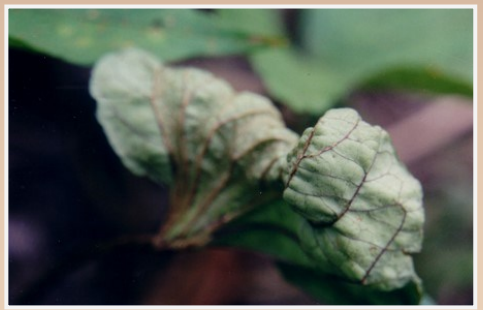
Some diseases tell a story

Elsinoe scab on sweet potato usually tells us three things:

- **The soil is getting poor and low in nutrients.**
- **The sweet potato is a variety that gets the disease more easily.**
- **The 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.**



Taro diseases

Alomae / Bobone virus

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

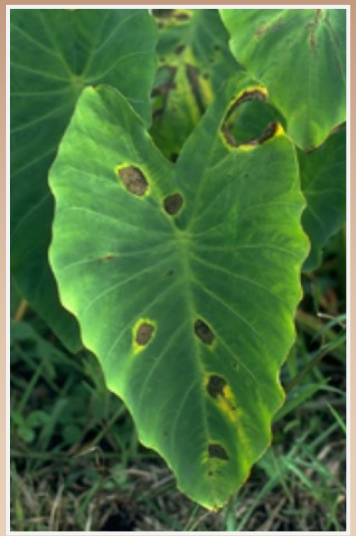
Taro blight - a devastating fungal disease. The fungus washes in the rain on hot, wet nights.

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

Taro diseases

Taro mosaic virus

Taro shot hole - a minor fungal disease



Taro diffuse yellow leaf spot

Taro insect pests

White fly

Cluster caterpillar

Taro beetle

Taro insect pests

Taro hawkmoth

Aphids sucking sap

Grasshopper nymphs

Sweet potato diseases

Wrinkled sweet potato leaves.

This fungus scab gets bad when soils are poor, and also occurs on varieties that are not resistant.

Yam diseases

Yam anthracnose – leaves can turn black and die early due to a fungus that gets worse in older plants, in wet seasons, and when plants get damaged.

Yam rust –
yellow rust-coloured lumps can occur in some varieties and damage leaves.

Yam diseases

A virus-affected yam with small yellow leaves. Diseased plants should not be used for planting material.

This obvious leaf spot due to a fungus does not cause serious damage if plants are growing well.

Root and grain crops in Nepal


Common millet

Many root and grain crops suit the climate of Nepal.

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


Foxtail millet


Taro


Finger millet

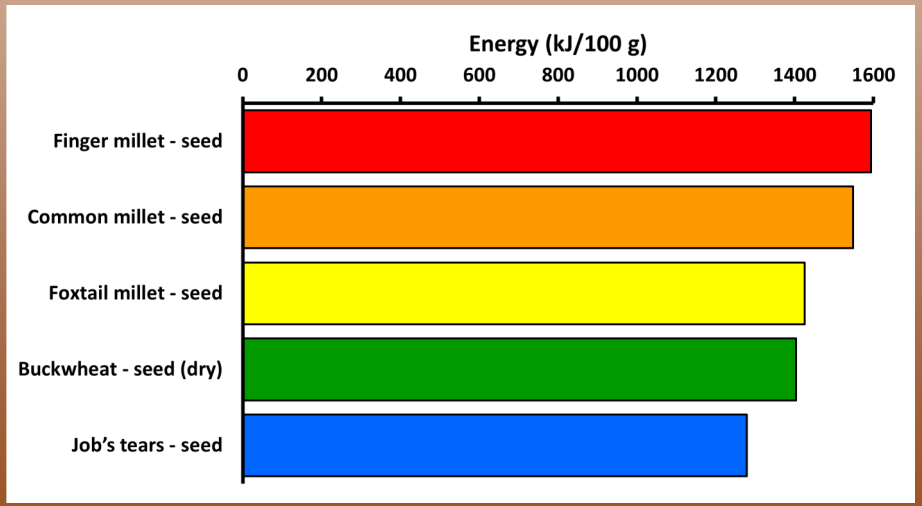

Sweet potato

Root and grain crops provide energy


Common millet

Root and seed crops are important foods for energy.


Job's tears



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

Growing sweet potato

Sweet potato needs:

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

There are many different types of sweet potato.

Some grow quickly, but only give small amounts of food.

Grow a mixture to make meals more interesting.

Growing yams

- Yams should be planted into loose, friable, fertile soil.
- They need plenty of sun.
- They should have strong stakes about 2 m tall.
- A large section of the top of the old yam tuber is the best planting material.
- Yam tops are normally stored in a cool, dry place until they develop shoots.

A well staked yam

Planting tops

Common millet

- The seeds can be cooked and eaten whole or ground into flour.
- They can be used in bread, pasta or dumplings.

- They are fermented into *tempeh* or *miso.*
- The seeds can be sprouted and added to soups and salads.

Panicum miliaceum

Foxtail millet

- It can be cooked and eaten like rice.
- The seeds can be parched, popped, added to soups and sauces or made into porridge, cakes, puddings and dumplings.
- The sprouted seeds can be used as a vegetable.
- The seeds can also be made into syrup.

Setaria italica

Buckwheat

- **The seeds are eaten in porridge and biscuits etc.**
- **The seeds can be made into flour and eaten in pancakes, noodles and breads.**
- **Seeds can be soaked overnight then sprouted and eaten.**

Fagopyrum esculentum

Finger millet

- The seeds are eaten either roasted or ground into flour.
- The flour is used for porridge and flat bread.
- The leaves are also edible.

Eleusine coracana

Millet seed can be stored without damage for up to 10 years.

Acknowledgements

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For further details contact us at: info@foodplantsolutions.org, website: www.foodplantsolutions.org

Image acknowledgements

Most images used in this publication are drawn from the Food Plants International database. Acknowledgement is given for images of the following plants sourced from the internet.

Scientific name	Common name	Image URL
Eleusine coracana	Finger millet	https://5.imimg.com/data5/SELLER/Default/2021/7/GG/TS/AM/4544355/finger-millet-seed.jpg
Eleusine coracana	Finger millet	https://world-crops.com/wp-content/uploads/Finger-Millet-by-DFID-6721454911_25204fcd9b_z.jpg
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Setaria italica	Foxtail millet	https://tse4.mm.bing.net/th/id/OIP.qIc2IvXXwP7n_IULc8Y-ggHaHa?rs=1&pid=ImgDetMain
Setaria italica	Foxtail millet	https://www.infoflora.ch/assets/db_doc/atlasFloreVaudoise/20230321_import_AtlasFloreVaudoise_CHB/Setaria-italica_Bornand-Christophe_2001_dia2001_2839.jpg

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