

Grow more giant swamp taro

Common name

Giant swamp taro

Pacific names

Kakake (Solomon Islands)

Via or Viakana (Fiji)

Scientific name

Crytosperma chamissonis



Giant swamp taro is a very big type of taro with an edible tuber called a corm. It grows in swamps and can get very large with big glossy leaves. The harvested corm is cooked and eaten. As a tuber it is a carbohydrate – a staple food that provides energy.

Why grow more?

- It is an important food source in many parts of lowland Melanesia.
- Giant swamp taro is a very good emergency food in times of disaster or when other crops fail.
- It is the main root crop of most atolls in the Pacific.
- The plant lasts a long time in the ground. Some varieties can remain in the ground for up to 12–15 years and weigh up to 90 kg at harvest time.
- It grows in swamps – an area not able to be used for most other food crops.
- It can grow in water that is slightly salty.
- It is usually planted in areas surrounded by trees including

species, and as part of an agro-forestry system (in which trees and food crops are grown together).

- Giant swamp taro has important cultural value, at feasts or weddings.
- The plant carries very few pests or diseases.

How to grow it

- Plant in wet areas – in naturally occurring swamps, river edges or dug down into water lenses (fresh water under the soil) on atolls. It grows well in deep, soft, swampy soils with very high organic matter content.
- Add mulch if there is not a lot of organic matter in the soil. On atolls many farmers have traditional methods of mulching this plant to keep it growing.
- It needs plenty of space to grow as it can reach over 5 m in height.
- Most varieties take 1–2 years before they are ready to harvest. After harvesting, plant suckers or the tops of the corm. The first harvest is

being replaced after harvest, so be sure to replant to ensure supplies for the future.

How to use it

Giant swamp taro is usually not the most favoured root crop for eating – plants such as taro are preferred. It can be fibrous and of variable quality – some varieties have less fibre than others. The corm needs to be cooked and eaten within a few days of harvesting.

The corm can be roasted, boiled, baked whole, mashed or grated and combined with coconut milk and or ngali nut/galip nut (*canarium sp*) to make a pudding.

Problems to look out for

Not many – this is a very hardy plant.

Where to get planting materials and more information:

Protecting our food sources in a changing climate



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This set of 10 fact sheets contains information that can assist farmers to strengthen their food production to protect against the impacts of climate change.

The following fact sheets are included in the set:

1. Grow more giant swamp taro
2. Grow more African yam
3. Grow more bush yam
4. Grow more bananas
5. Grow more legume trees
6. Plant more mucuna
7. Make organic garden beds
8. Grow more all year fruiting breadfruit
9. Improving soil fertility
10. Protecting food security through adaptation to climate change

The fact sheets are supported by the *Leadership Manual* and *Farming Technology* handbook.

For more information contact the following organisations:

Papua New Guinea:

National Agriculture Research Institute (NARI), Kana Aburu Haus, Sir Alkan Tololo Research Centre, Bubia, PO Box 4415, LAE 411, Morobe Province, PNG
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Solomon Islands:

Kastom Gaden Association

Vanuatu:

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Grow more African yam

Pacific names

African yam

(Vanuatu & PNG)

Vanuatu yam

(Solomon Islands)

Scientific name

Dioscorea rotundata



In many parts of the Pacific yam is a favourite food. African yam is very similar to other yams already grown in the Pacific. The main reason for growing African yam is that it is much more disease resistant than the traditional Pacific yams. This means that they are a good food plant to add to your garden for food security. Yams produce edible tubers which are carbohydrates, or energy foods.

Why grow more?

African yam is a very useful addition to the yams already grown in the Pacific as it:

- is resistant to fungus that often kills yams. This means it can be planted all year round while other Pacific yams can only be grown in one season.
- can grow in relatively infertile soils – similar to cassava.
- tastes good – which means people like to eat it and it's easy to sell in the market!
- yields well – up to 50% more than traditional Pacific yams.
- is drought tolerant and also grows well in wet places and during wet seasons.

How to grow

- African yam is planted in the same way as other yams – by placing pieces of tubers (sometimes sprouted already) in mounds with stakes.
- It takes 6–9 months to harvest.

How to use it

Cook it just like the traditional yams – it can be boiled, baked, cooked with coconut milk or burnt in the fire, fried or made into chips.

Problems to look out for

Not many – some farmers say it is too vigorous or strong and not to mix it with the traditional yams because the vine will smother them. It is resistant to the fungus which kills a lot of other Pacific yams and does not need very fertile soil to grow well.

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Grow more bush yam

Common names

Bush yam, wild yam

Pacific names

Different varieties have specific local language names across Melanesia

Scientific name

Dioscorea nummularia sp.



Bush yams are the relatives or ancestors of the yams we find in Pacific gardens. They grow naturally in the rainforest and climb up tall rainforest trees. Tubers vary in size and taste – some are large and taste very good while others can be small and bitter. Farmers need to select their best wild yams before planting.

Why grow more?

- Bush yam is very strong and resistant to disease. It is also resistant to leaf damage from fungus and rose beetle, which is often found on common Pacific yams (*Dioscorea alata*).
- It is very high yielding – each plant can produce 15–50 kg of tubers.
- Tubers can remain in the ground for a long period of time.
- Tubers can be stored for 4–6 months without much deterioration.
- It grows in the shade under trees and can be part of agro-forestry systems.

How to grow it

- Plant whole tubers or tuber pieces in softened soil under the base of trees. It's a good idea to select the better tasting varieties for planting, as some bush yams are bitter.
- You may need a stake to help the vine climb up the tree to begin with – once established it will support itself with the tree as a living trellis.
- Some varieties have spines at the base but some do not. Those with spines can be tricky to dig.
- It takes 2–4 years for first harvest and establishment.

How to use it

- Carefully dig out some tubers and bury back the plant so it can continue growing.
- Growing your own bush yams means you know where they are when needed, rather than having to search in the bush and often finding they have already been eaten by wild pigs!
- Bush yam is eaten in the same way as other yams – it

the best tasting bush yams from the bush and then plant these. Some bush yams are bitter so look for the sweet tasting ones.

Problems to look out for

Bush yams need to be grown in the shade. They are vigorous and need a strong tree to climb up.



During fallow, bush yams can be planted to climb the erythrina trees.

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Grow more bananas

Common names

Banana, plantain
(cooking bananas)

Pacific names

Fiji: Leka, jaina

Solomon Islands: Ba'u
(Kwara'ae), husi ('Are 'Are),
huti (Rennell and Bellona),
sou, huki/fuki
(non-Fe'i varieties), toraka
(Makira, Fe'i varieties).

Scientific name

Musa sp.



Bananas are a common food plant in Melanesia. It's good to grow a lot more of them to strengthen food security in response to the impacts of climate change.

Why grow more?

- Bananas are long living plants that can produce well under wet and dry conditions in much of Melanesia. Plantains (cooking bananas) are also considered to be more drought resistant than bananas.
- Bananas are very good at producing food energy compared to other staple crops grown in the Pacific.
- They grow for a long time once planted.
- Some varieties are high in vitamin A (important for healthy eyes).

How to grow it

- Bananas are planted from suckers or pieces of the corn and take 9–18 months to bear fruit.

- The best time for planting is a rainy time of year.
- Bananas grow well with compost or organic matter added to the soil or heaped around the roots.
- They grow well in many different soil types.
- Some varieties grow well under shade and others need full sun. Most can be intercropped as part of mixed farming.
- Bananas are easily blown down by wind so plant them where strong trees or the local landscape protects them from cyclones and other strong winds.
- When planting in salty areas, place in raised beds and surround them with other trees to protect them from the wind.
- Suckers should be managed – keep 1–2 main suckers coming up from each main banana trunk and remove the others. This will lead to larger and healthier bunches of fruit.
- A family with over a hundred

How to use it

Cut down the clump when ready. All bananas can be eaten fresh when ripe. Starchy varieties can be harvested green and cooked – either boiled, baked or roasted – using various traditional recipes, such as tumatuma in Bougainville, PNG. Tasty chips can be made as a value added product and an alternative to imported snack foods.

Problems to look out for

Root borers and nematodes can be a problem.

Many pests and diseases on the bananas are spread through taking infected planting materials (suckers) from one place to another – so be careful when moving planting materials.

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Grow more legume trees

Common name

Gliricidia

Pacific names

Shade tree

(Solomon Islands)

Scientific name

Gliricidia sepium



Gliricidia is a small tree that grows very fast and produces many branches and leaves. It responds well to being cut back and can be pruned heavily on a regular basis. It was originally used to provide shade in cocoa plantations but across the world farmers are realising it can be put into gardens and used as a 'fertiliser tree'.

Why grow more?

This legume tree:

- Can be used to improve soil fertility because it adds organic matter and nitrogen to the soil.
- allows for continuous or long term cropping on one piece of ground without bush fallow.
- creates more diversity in the field.

How to grow it

- Plant mature branch cuttings about 50–100 cm long. Choose the darker coloured branches that are at least 2 years old.
- For typical alley cropping pattern plant cuttings into the ground at 50 cm spacing along rows. They are best planted at wet times of year to improve striking rate.
- The space between rows can range from garden boundaries through to every 5–10 m.
- Farmers are developing many ways to space gliricidia in their gardens – so experiment! The important thing is to make sure you produce enough mulch or organic matter for the soil and that the gliricidia is managed so it does not overshadow the crops.
- Once established, prune the trees regularly to about 1–1.5 m in height.

How to use it

Cut branches and leaves can be used as nitrogen rich mulch around the crops. Nitrogen is also released through root nodules on gliricidia, so it works both underground and on the surface, through mulch, to make plants grow better. Gliricidia branches can also be used as firewood.

Problems to look out for

Make sure you plant mature branches (at least 2 years old) as cuttings as they will have a better chance of growing.

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Plant more mucuna

Common name

Velvet bean

Pacific name

Mucuna (Solomon Islands and Vanuatu)

Scientific name

Mucuna pruriens



Velvet bean or mucuna bean is a very vigorous crawling vine that produces many beans in clumps with a black velvety hair on them. This is a legume plant which can add nitrogen to the soil.

Why grow more?

- Mucuna can be used as a green manure crop to rapidly improve soil fertility. Many consider this the best 'cover crop' for this purpose in the Pacific.
- Builds organic matter which makes soil more fertile.
- Allows for longer use of land before fallow or even permanent cultivation.

How to grow it

- Plant seeds after your final harvest. The crop will need some weeding during the first six weeks, but once established it will cover the ground vigorously and will not need any further weeding.

- For best soil improvement slash and mulch the plant when it is flowering – leave some vines for seed for the next crop.

How to use it

- Slash the beans when they are flowering and either leave the leaves and vines as mulch on the soil or dig them into the soil. This is the time when nitrogen production is at its highest, which is better for the soil.
- Leave some vines to produce mature seeds. Collect the black velvety seed pods when dry and store them for the next planting. Don't store for too long – keep replanting and producing fresh seeds each crop.
- **Not recommended for eating – this crop is for improving the soil, which it does very well.**

Problems to look out for

Don't let the mucuna become a weed in your garden – this plant needs to be carefully managed by the farmer.

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Make organic garden beds



Raised beds can be used for vegetables, bananas and root crops such as taro.

Why they are useful?

- Organic garden beds are a simple method of growing food close to the house.
- They keep the soil fertile if regularly topped up with compost and mulch.
- The beds allow you to grow food in sandy and salty soil if they are above the soil level.
- They provide greens, fruit and vegetables to contribute to a balanced diet.
- Can be done almost anywhere – even in town, on atolls or rocky artificial islands.
- It's easier than composting – just layer the organic matter and start planting!

How to make them

- Select a material for the boundary or edge of the raised beds – this could be coconut logs, coconut husks or banana trunks.
- Collect organic matter such as food scraps, leaves, animal manure, soil, ashes, coconut husks or seaweed. Layer the organic matter until it is at least 30 cm high, or 30 cm deep if you prefer to make trenches. Trenches are better for dry weather and raised beds better for wet weather.
- Plant into small pockets of soil among the organic matter. All vegetables are good for this type of garden – e.g. aibika (island kabis), eggplant, Chinese cabbage, beans or fruit such as pawpaw etc.

- Over time you will need to keep adding more organic matter to the trenches or to keep the beds raised, as the beds will sink as organic matter decomposes.
- You may need to protect the beds from pigs or chickens if they are free ranging in your area.

How to harvest

- Step outside the house and harvest!

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The Centre for Pacific Crops and Trees (CePaCT), Private Mail Bag, Suva, Fiji Islands
T: +679 337 0733
www.spc.int/lrd/

This resource has been developed by Live & Learn Environmental Education with funding through AusAID's International Climate Change Adaptation Initiative - Community-based Adaptation Activity Grants.

Written by Tony Jansen with input from Shane Tutua and Tamara Logan

Grow more all year fruiting breadfruit

Common name

Breadfruit

Pacific names

Beta (Vanuatu)

bia, bulo, nimbalu

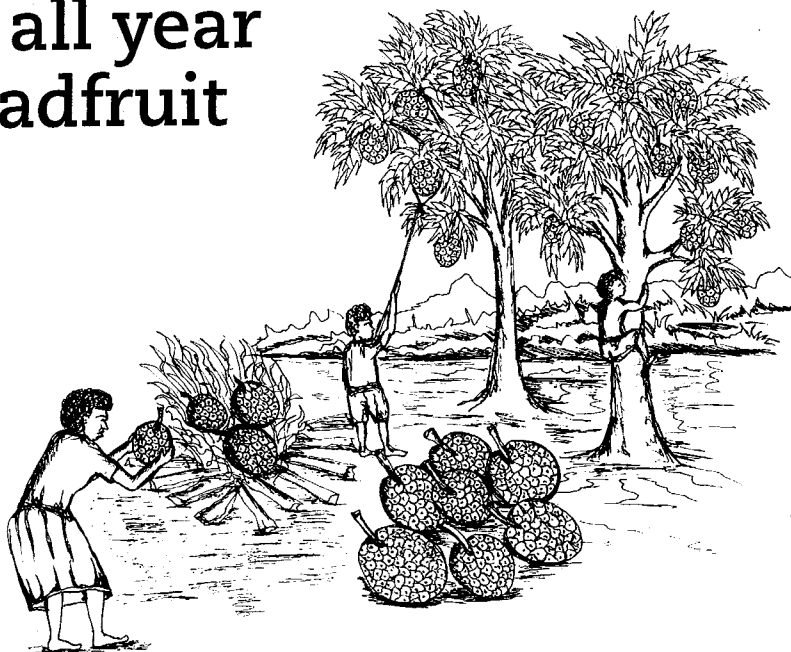
(Solomon Islands)

kapiak (Papua New Guinea)

uto, buco (Fiji)

Scientific name:

Artocarpus altilis



Breadfruit is a medium to large tree with large leaves and fruit. It grows across the Pacific. Many Pacific cultures use breadfruit either as a regular or occasional food. There are many different varieties. Many breadfruit trees are very large and produce fruit with a large number of seeds within short fruiting seasons. All year fruiting breadfruit is a special variety. The tree is smaller, making it easier to harvest, and the fruit has no seeds which makes it easier to cook and provides more food in each fruit.

Why grow more?

Growing a starchy staple food tree such as breadfruit is very good for food security. The trees live longer and fruit reliably. All year fruiting varieties mean the food is available all year – every family should have access to these trees.

How to grow it

Some varieties of breadfruit can be planted from seed. Seedless all year fruiting varieties are grown from root suckers or

Breadfruit grows well in lowland areas of the tropics (up to 650 m altitude). Suits high rainfall. Can be grown in a wide range of soil, from deep, fertile soil through to coral atolls. Once they bear fruit the trees require very little care and provide staple food year after year.

Can be inter-planted in mixed agro-forestry systems as practised in the Reef Islands, Solomon Islands.

How to propagate seedless breadfruit: Identify shoots early, dig around and below them and fill the area with a rich, loose soil mixture. Give the shoot extra water and a little fertiliser. When the shoot is 50 cm high, the parental root can be cut away a part at a time, in order to encourage the plant to strengthen its own roots. This can be done in three or four stages. The result will be strong new trees.

Another technique is to dig up roots, taking cuttings 2–4 cm in diameter and 20–30 cm long and planting them 8–10 cm apart in beds moderately shaded and

Propagation from stem cuttings has not been very successful.

How to use it

Breadfruit trees yield 160–500 kg of fruit per tree per year.

Seeds and the soft flesh are cooked. Seedless varieties need to be harvested from the tree as they will not fall until ripe and then usually smash on the ground. The entire breadfruit can be baked or burnt in the fire.

The nutritional elements contained in breadfruit

Breadfruit is filled with every nutrient imaginable; one could even say that it is the perfect fruit for everyone who cares about nutrition and healthy dieting. Breadfruit contains all of the main nutrients, including proteins, fibre, carbohydrates and fats and is rich in vitamins and minerals.

Where to get planting materials and more information:

Protecting our food sources in a changing climate



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Climate change refers to long-term changes in climate, including average temperature and rainfall. Climate change is caused by greenhouse gases being released into the atmosphere when fuels such as diesel or coal are burnt to power a car or to make electricity. The gases stay in the atmosphere, trapping heat and resulting in an increase in temperature known as 'global warming'. This increase in

temperature is considered to be the key cause of observed changes in the Earth's climate over the past century.

Changes in the Earth's climate will affect our agriculture and 'food security', our ability to grow and access enough food throughout the year. By planning ahead, we can reduce some of the negative effects of climate change at a local level. At the same time we can work to make our agriculture and food security stronger.

This set of 10 fact sheets contains information that can assist farmers to strengthen their food production to protect against the impacts of climate change.

The following fact sheets are included in the set:

1. Grow more giant swamp taro
2. Grow more African yam
3. Grow more bush yam
4. Grow more bananas
5. Grow more legume trees
6. Plant more mucuna
7. Make organic garden beds
8. Grow more all year fruiting breadfruit
9. Improving soil fertility
10. Protecting food security through adaptation to climate change

The fact sheets are supported by the *Leadership Manual* and *Farming Technology* handbook.

For more information contact the following organisations:

Papua New Guinea:

National Agriculture Research Institute (NARI), Kana Aburu Haus, Sir Alkan Tololo Research Centre, Bubia, PO Box 4415, LAE 411, Morobe Province, PNG
T: +675 475 1444/475 1445
F: +675 475 1450
E: narihq@nari.org.pg

Solomon Islands:

Kastom Gaden Association

Vanuatu:

Vanuatu Farm Support Association
Syndicat Agricole & Pastoral de Vanuatu (SAPV)
PO Box 17, Port Vila, Vanuatu
T: +678 25717 F: +678 25717
E: sapv@vanuatu.com.vu

Department of Agriculture, Rural Development Division, PMB 9040, Tagabe Station, Port Vila, Vanuatu

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Improving soil fertility



Healthy soil is critical to food security in response to climate change. There are various low cost, natural approaches the community can adopt to maintain or improve soil fertility or soil health.

Animal manure

Animal manure is an important source of nutrients and organic matter. Chicken manure is the best kind of manure due to the combined urine and waste.

Leave the manure for some time (3 months for chicken manure) before use in your gardens as fresh animal manure, especially chicken manure, will burn the plant. It is also important to ensure that you keep the manure covered until you use it. This will protect it from the sun, rain and wind so it will maintain its strength.

Composting

Composting is nature's way of recycling green waste into fertiliser. Compost is rich in nutrients and organic matter, and provides food for soil micro-organisms (the tiny

Minimum cultivation of soil

The process of growing crops exposes the soil to loss of organic matter and humus, which can affect the quality of the soil. If you do not dig the soil very much you reduce the damage to soil organic matter. Instead of digging large mounds or turning the soil you can just loosen the soil and then plant. This is what is known as minimum cultivation.

Mulching

Mulching is the practice of covering the bare soil to protect it from sun, wind and rain. Mulch is often dead plant materials such as grass clippings, dead leaves and branches. Covering the soil encourages soil organisms to inhabit the soil and improve its quality. In addition, the dead leaves will decompose and return organic matter, as well as nutrients, to the soil. Mulch also helps to protect the soil from erosion.

Composting and mulching can be combined in the tropics. You do this by putting layers of

the soil in rows between your crops. It will break down into humus soil very quickly.

Crop rotation

The productivity of the soil can also be maintained by rotating a variety of crops within your farm or food gardens. Growing a legume crop at some point in time on the plot of land is important to return nutrients to the soil.

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Protecting food security through adaptation to climate change

The threat of climate change and natural disasters to Pacific communities highlights the need to focus on building local economies, agricultural strength, innovation, food security and strengthening ecosystems-based management.

Live & Learn Environmental Education, with funding from AusAID, is working with Pacific communities in Papua New Guinea, the Solomon Islands and Vanuatu to strengthen food security as an adaptive measure against the impacts of climate change. The *Protecting food security through adaptation to climate change* project seeks change in two areas:

- Protecting local food supplies, assets and livelihoods against the effects of increasing weather variability and increased frequency and intensity of extreme weather events including natural disasters and sea level rise;
- Protecting ecosystems and strengthening the provision of environmental services (food).

The project will work with smallholder farmers (both men and women) in 18 communities that have been selected in close consultation with the relevant government departments.

This initiative is part of Live & Learn's ongoing climate change adaptation program seeking to deliver low-cost, community-based adaptation activities that can be easily implemented

Climate change and food security resource kit

A key outcome of this initiative is the production of a resource kit that aims to strengthen food security in response to the impacts of climate change. The three resources aim to build awareness and understanding of innovative, low-cost technologies, and supports the development of community-based adaptation plans to strengthen food security:

Fact sheets

This set of 10 fact sheets promotes simple, innovative and low-cost technologies that encourage diversifying food crops and strengthening soil fertility to support food security. They can be distributed as a set or individually, depending on farmers' needs.

Farm Technology manual

This resource aims to provide a range of traditional and innovative technologies that make a positive contribution to strengthening food security in Melanesia in response to climate change. It is written for farmers and field or extension workers, teachers and those who work with farmers. This innovative resource was written by farmers and field workers who worked alongside local illustrators to develop the guide.

Leadership manual

This manual aims to support community leaders facilitating

Farm Technology

Protecting food security through adaptation to climate change in Melanesia



Leadership Manual

Protecting food security through adaptation to climate change in Melanesia



strengthen food security to prepare for the effects of climate change.

All these resources complement each other, however, they have been designed to be used separately, depending on the needs of communities.

These resources are available from Live & Learn Environmental Education offices:

Solomon Islands
DSE Building, Lombi
Crescent Street,
New China Town
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T: +677 23697
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Kimbe Town, West New Britain
Province, Papua New Guinea
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F: +675 983 4237
E: png@livelearn.org

Vanuatu
Fres Wota Four
(opposite Fres Wota School)
Port Vila, Vanuatu
T: +678 27448
F: +678 27455
E: vanuatu@livelearn.org

For more information about this project, please contact:
Doris Susau
Pacific Regional Manager
doris.susau@livelearn.org
www.livelearn.org



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