




Kava quality manual

For the export of kava from Vanuatu

Australian AID

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Contents

Introduction

This manual contains guidelines for the production and export of kava from Vanuatu. It describes the important steps in production, processing and handling that are necessary for a good quality export product. Information is also included on the chemical properties of kava, the latest knowledge on how to identify different kava varieties and recommended standards for kava products.

The focus of the manual is the production and export of kava as a product used in food.

Preparation of this manual builds on previous publications on kava production in Vanuatu and the Pacific and the technical information and knowledge of many people. In particular: Pacific Kava: A producer's guide (SPC, 2001), A Short Guide to Kava (Vincent Lebot, Patricia Siméoni and the Vanuatu Chamber of Commerce and Industry), and input from Biosecurity Vanuatu, Vincent Lebot (CIRAD) , Scot C. Nelson (University of Hawaii) and kava exporters.

Growing checklist

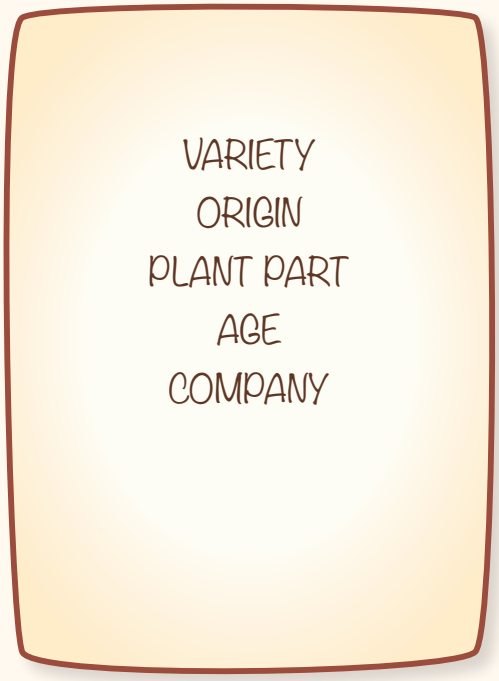
- ☐ **Grow noble varieties of kava.**
- ☐ **Only use organic methods of cultivation.**
- ☐ Use fresh soil in the nursery and only plant healthy seedlings or stem material.
- ☐ Plant in well drained locations or on raised mounds.
- ☐ Grow kava with other crops instead of mono-cropping.
- ☐ Rotate kava with other crops and do not plant successive crops of kava in the same place.
- ☐ Do not grow kava with vegetables (e.g. cucumber, pumpkin, tomato, watermelon or chillies) or ginger or where they were growing recently.
- ☐ Apply mulch or compost to young plants.
- ☐ Apply mulch, compost or fresh soil from the bush to plants after 2–3 years.
- ☐ Inspect kava plants regularly and remove sick or damaged stems and burn.
- ☐ Remove weeds.

Points in **bold text** must be done to meet the legal requirements to export kava from Vanuatu.

Farmer/buyer checklist

- ☐ **Grow kava for at least 5 years before harvesting for the export market.**
- ☐ Wash the kava as thoroughly as possible after harvest.
- ☐ Use a sharp clean knife to separate the different parts of the kava plant then remove poor quality material.
- ☐ Peel the rhizomes twice then cut into even sized thin chips.
- ☐ Keep pieces of kava off of the ground and protected from contamination (soil, insects, grass, plastic, animal waste).
- ☐ Dry the kava thoroughly (until it can be snapped) and protect it from rain, smoke or other smells.
- ☐ Remove poor quality material then separately pack each variety and part into clean polypropylene bags.
- ☐ Label the bags with at least the name of the variety and plant part — can also add the age of the kava.
- ☐ Keep the packed kava as dry and clean as possible during transport.

Points in **bold text** must be done to meet the legal requirements to export kava from Vanuatu.



Exporter/seller checklist

- ☐ Inspect, sort, remove poor quality material and re-dry if needed.
- ☐ Keep different varieties and parts separate and clearly identified.
- ☐ Protect dried material from rain, smoke or other smells and contamination.
- ☐ Store dried material for as short a time as possible (ideally less than 3 months).
- ☐ Keep records on the kava received, processed and sold including variety, age, source and amount.
- ☐ Optional testing by exporter or Biosecurity Vanuatu for total levels and profile (or types) of kavalactones.
- ☐ **Each export consignment must pass inspection by Biosecurity Vanuatu and may need to be fumigated.**
- ☐ **Only export roots or chips of noble varieties (unless importer has provided a written notice to Biosecurity Vanuatu).**
- ☐ Pack in new, clean bags or other containers that are clearly labelled and properly closed.
- ☐ **Label bags with the name of variety, island of origin and distinct organs (plant parts).**
- ☐ Each bag must only contain a single variety and plant part and nothing else.
- ☐ **Exporter must be licenced by the Vanuatu Commodities Marketing Board and their facility approved by Biosecurity Vanuatu.**

Points in **bold text** must be done to meet the legal requirements to export kava from Vanuatu.

Regulation of kava production and export

The production and export of kava is regulated by several different laws in Vanuatu including the Plant Protection Act, the Kava Act, the Vanuatu Commodities Act and the Vanuatu Foreign Investment Promotion Act.

The Plant Protection Act gives Biosecurity Vanuatu[1] the ability to specify the general quality standards and requirements to be met for kava intended for export. The Kava Quality Management Procedures (Export) of BV set the requirements for export facilities, licencing and inspection (quarantine and quality).

The Kava Act specifies that organic cultivation must be used, the age and varieties that can be exported, required labelling, who can export and that propagative material cannot be exported. The Vanuatu Foreign Investment Promotion Act also specifies that only citizens of Vanuatu and local companies can export kava.

A biosecurity inspector (R) with a kava exporter (L) in a kava facility

1 Biosecurity Vanuatu (BV) was created in February 2013 when the Quarantine Plant and Animal Production/Health Section was separated from the old Department of Livestock and Quarantine Services (DLQS). All quarantine and inspection activities for kava are now done by BV.

Types of kava products

Definition of kava and kava products

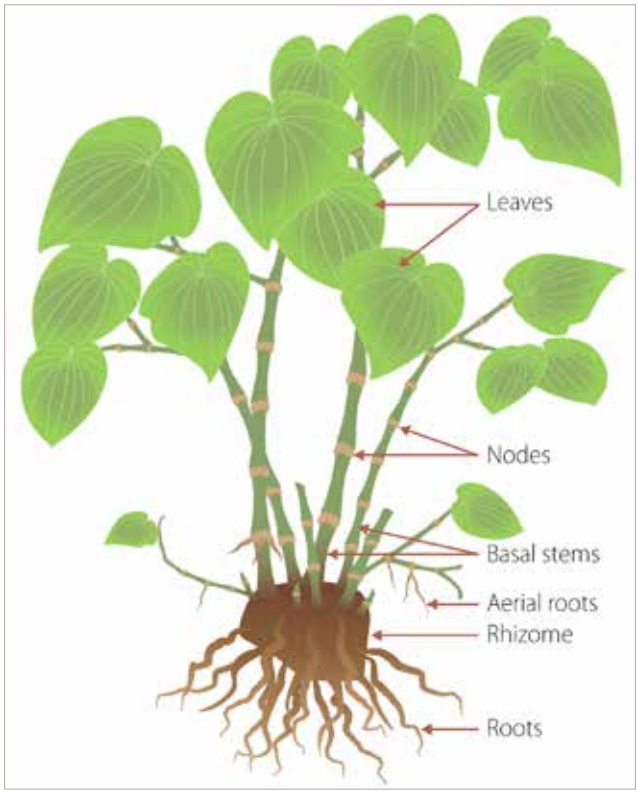
The Kava Act defines kava as the plant *Piper methysticum* or the traditional beverage made by cold water extraction of the plants underground parts and basal stumps. Kava products are defined as including dried kava, bark, peelings and makas (residue).

Plant parts

There are five different parts of the kava plant used for commercial products, and their use and kavalactone levels are different (see table).

Adventitious or aerial roots are the roots that grow from the stems. Aerial roots or any other plant part including the peelings that is exposed to the sun will contain a chemical that is toxic to humans (the alkaloid pipermethystine) and should not be consumed. Trade in peelings is discouraged as they can contain toxins.

The upper stem (above the second node or about 20cm above the rhizome) is low (3–5%) in kavalactones and is only used as planting material. Any parts of the kava plant that can be used for propagation cannot be exported from Vanuatu. Plant parts that can be used for propagation include: fresh stumps, shoots, growing buds, lateral branches and roots.



Parts of the kava plant

Plant parts and kavalactone content

Plant part	Kavalactone range	Notes	Colour of dried product	Recommended minimum total % kavalactone for dried product
Roots	Very high (8–16%)	Dried for export or sold fresh on local market.	Between grey and brown	10% (minimum 3% kavain)
Rhizome	Medium (3–8%)	Also called the stump or rootstock. Peeled, made into chips and dried for export or sold fresh on local market.	White (if not peeled twice it will be grey outside and white inside)	5% (minimum 1% kavain)
Skin from the rhizome	High (7–11%)	Also called peelings. Only for export if buyer outside of Vanuatu requests it.	Greyish brown or dark	-
Basal stems	Low–medium (4–6%)	Below the first node or ~20cm.	Grey outside and white inside	-
"Makas"	Variable	Residues after preparation of traditional kava beverage.	Greyish white	-

Varieties of kava

Telling varieties apart

There are many varieties of kava with more than 80 in Vanuatu, 12 in Fiji, 10 in Samoa, 7 in Tonga, 2 in Pohnpei and 13 in Hawaii. The selection of variety is the most important decision in producing quality kava.

Kava varieties in Vanuatu are divided into: noble, medicinal, two day and wichmannii. The names and origin of these varieties are listed in the Kava Act.

Only noble kava can be exported from Vanuatu unless an overseas buyer specifically requests that two day or medicinal kava is provided. Wichmannii kava cannot be exported from Vanuatu.

Only noble and medicinal kava can be sold on the local market in Vanuatu. Two day kava must not be sold on the local market in Vanuatu.

Kava varieties can be separated according to their appearance and kavalactones including:

- general appearance (normal, erect, prostrate)
- stem colour (pale green, dark green, green with purple shading, purple, black)
- internode shape (short and thick, long and thick, long and thin)
- leaf colour (pale green, dark green, purple)
- leaf hairs (hairs on both surfaces, hairs on lower surface only, no hairs)
- total amount and types of kavalactones.

Noble varieties

Noble varieties have been identified by traditional and scientific methods as producing good quality beverages and other products. There are over 20 recognised noble varieties in Vanuatu and 13 that are **high priority** on the main kava producing islands.

Noble varieties of kava in Vanuatu

Variety	Origin
Melomelo	Ambae
Gorgor	Ambrym
Asiyai	Aneityum
Biyaj	
Palimet	Emae
Miela	
Olitao	
Kelai (or Miaome)	Epi
Ge wiswisket	Gaua
Ge gusug	
Borogoru	Maewo
Silese	Malekula
Melmel or **Sese**[a]	Pentecost
Borogu	
Urukara	Santo
Bir Sul	
Bir Kar	
Palarasul	
Palasa	
Poivota	
Pia	Tanna
Ahouia	
Leay	
Amon	
Puariki	Tongoa
Pualiu	
Naga miwok	Vanua Lava
Ge vemea	

a Melmel and Sese are the same variety, called Melmel in the north of Pentecost and Sese in central Pentecost.

False and wild kavas

True kava is the plant *Piper methysticum*. Related plants are widespread in the Pacific and are a threat to the kava industry. These false or wild kavas do not contain the kavalactones of true kava and should not be planted or sold.

"Tonga kava" or "Fiji kava" (*Piper aduncum*) has different leaves to true kava but its stems look almost the same. The leaves are bigger and lighter green than true kava and new plants can grow from its roots.

"Wild kava" (*Piper wichmannii*) grows commonly in Vanuatu and its leaves and stems look similar to true kava. There are green and red varieties, the leaves are green and shiny and it has green and red flowers. The roots are not as flexible as true kava and when dried they may not smell like true kava and can be a different colour. Wild kava grows into a sizeable plant and a child can even climb up its branches.

Leaf of "Wild kava" (*Piper wichmannii*)

Stems of "Wild kava" (*Piper wichmannii*)

"Wild kava" (*Piper wichmannii*)

Kavalactones

What are kavalactones?

Kavalactones are the active components of kava. There are six major kavalactones and the amount of each one is different between varieties and part of the plant. The six kavalactones and their identification numbers are:

1. desmethoxyyangonin (DMY)
2. dihydroxykavain (DHK)
3. yangonin (Y)
4. kavain (K)
5. dihydromethysticin (DHM)
6. methysticin (M)

The "chemotype" of a kava variety is based on the relative amount of these six kavalactones. It is a list of the kavalactone identification numbers in decreasing order of their proportion. For example, Borogu (423561) is rich in 4 (kavain or K) and low in 1 (desmethoxyyangonin or DMY). The chemotype of all noble varieties in Vanuatu begins with 42 or 24. The chemotype of medicinal or two day kava does not begin with 42 or 24.

The chemotype is mainly controlled by the kava variety and plant part but the total amount of kavalactones also varies depending on the age of the plant and where it is grown. Soil type plays a role in determining the chemotype of a particular kava variety.

Kavalactone testing is important as it is the only reliable way to recognise different varieties once they have been harvested and dried.

The main scientific method to measure kavalactones is HPLC (high performance liquid chromatography). HPLC is a complex test that requires specific analytical equipment and laboratory conditions. Other testing methods such as near-infrared reflectance spectroscopy (NIRS) are under development and may be more practical for routine testing in the Pacific region.

Kavalactones and kava quality

The total amount and chemotype of kavalactones is one of the most important factors for kava quality. Premium prices can be available for exporters that can reliably provide kava that meets or is above minimum requirements for % kavalactone and chemotype. This requires strict control over the variety, age of plant at harvest and what plant parts are used.

A relationship exists between the traditional use and chemotype of kava. For example, varieties favoured for regular consumption in the Pacific region are rich in 4 (kavain or K). Kavain is absorbed relatively quickly compared to DHK (2) and DHM (5). Varieties rich in DHK and DHM are two day kava and can cause nausea.

The total kavalactone level is highest in the roots and decrease toward the aerial parts of the plant. Inversely, the potentially toxic alkaloid compounds increase in parts above the soil. The concentrations are highest in the green branches and leaves, which explains why leaves and branches should not be exported.

Propagation, planting and growing

Site selection

Kava can grow in equatorial or wet sub-tropical climates and needs a high temperature (20–35°C) all year round. It grows best when there is high rainfall (over 2,200mm annually), enough shade and protection from the wind.

Soil needs to be good quality (deep, light, fertile and rich in organic matter) and well drained.

Slopes of small hills are better than level ground as the water can quickly drain away. On level ground it can be useful to plant on ridges (about 80cm wide and 40cm high every 2m) to provide better drainage and root growth. The ridges can be made by hand, hand tools or using machinery.

Choose a site that is protected from the wind which can damage plants and make it easier for disease to develop. Gardens surrounded by bush or with trees to provide shade and windbreaks are ideal.

Planting *Gliricidia*, pigeon peas, bananas or pawpaws around the garden can provide good shade for young plants and help prevent weeds growing. However, too much shade is not healthy for the plants as it can promote disease and reduce their growth rates.

Planting material

Kava is easily propagated with cuttings. The cuttings can either be planted directly into the ground or in a nursery.

Key points for successful propagation:

- Take cuttings from vigorous, healthy plants that have just been harvested.
- Take cuttings from the middle part of the plant that are strong and woody (young stems will rot quickly).
- Cut stems near nodes.

Stems cut from a healthy plant at harvest

Cuttings (pieces of stem) with one to four nodes

- Check that the cuttings are free from insects and rot.
- Don't move material between islands.
- Only use planting material from known sources.
- Only use direct planting if you have plenty of planting material and can take a lot of care of the young plants.
- For commercial purposes only use planting materials of the noble kava varieties from your island or region.

Nurseries

Kava can be propagated by in-ground nursery beds or in plastic bags as pots:

Bed

Dig a bed 15cm deep, 2m wide and 4m long. Line it with soil rich in organic material or compost about 10cm deep.

Line up long cuttings with 5–10 nodes or pieces with 1 or 2 nodes. Leave 10cm between cuttings so it will be easier to pull them out and plant them in the garden later on.

Cover the cuttings with about 2cm of soil and give them plenty of water.

Build a roof (use natangora or coconut leaves) to provide shade and water regularly.

Remove any weeds growing near the young plants.

After 3–4 weeks roots and leaf shoots will emerge from each node.

Carefully uncover the stems, cut into one node pieces, place in plastic bags (polypots) filled with soil and compost, then leave in the nursery to grow until large enough to plant in the garden.

Plastic bag

Almost fill plastic bags with soil and compost.

Lay 1 or 2 node pieces flat and cover with soil and give them plenty of water. Or, plant two pieces with 4 nodes upright in each plastic bag with two nodes below the surface and two above it.

Build a roof (use natangora or coconut leaves) to provide shade and water regularly.

Remove any weeds growing near the young plants.

A 1-node stem cutting growing in a nursery bed

A dug-up, 1-node cutting with new growth ready for transfer to a plastic bag

A cutting with new growth planted in a plastic bag

New plants in plastic bags under shade

Direct planting

Plant two stems with four or five nodes upright in one hole in the ground. Put two nodes below the surface and the other two or three above it. Or, plant several stems with one or two nodes in a hole in the ground.

Cover with soil and mulch to retain moisture.

Water regularly and provide shade to ensure the cuttings and young plants remain moist.

Remove any weeds growing near the young plants.

Check that the cuttings are growing and replace any that are weak or have died.

A 2-node stem reading for planting

Plant stem upright in a hole in the ground, with one or two nodes buried

Planting

Young plants in the nursery are ready for planting in the garden when they are 20–30cm high and 2–3 months old.

Dig a hole 30cm deep and a little wider than the plastic bag.

Carefully remove the plastic bag and put the young plant in the hole.

Add more soil around the plant and provide plenty of water.

Make sure the plants remain moist, water regularly and use mulch if needed. The first 6 months of growth are when kava can suffer badly from lack of water.

Remove weeds growing near the kava plants.

Regularly ridge or mound up the soil around the base of the kava plant to encourage new shoots, discourage weeds and stop the rhizome being exposed to light.

Add compost, mulch or animal manure to help keep the kava plants growing vigorously. This is more important 2–3 years after planting. Commercial fertiliser must not be used on kava in Vanuatu and it can easily burn the plants.

Cropping methods

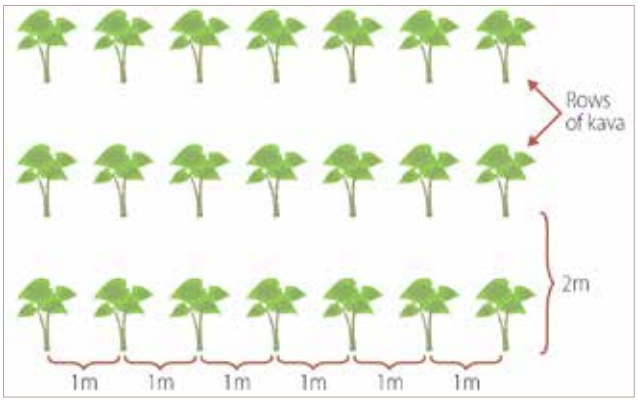
Kava can be grown as a single crop (mono-cropping) or with another crop (inter-cropping). Mono-cropping is not recommended as it can lead to severe disease problems and reduce production levels. Inter-cropping is a better technique because you can grow food or cash crops at the same time as the kava and the other plants can help protect the kava from weeds, pests and wind and provide shade.

After harvesting kava the area should be rested for at least 3 or more years. It should not be used to grow kava or other crops. While the soil is resting you can grow plants like glycine which are legumes. These plants can nourish the soil by fixing nitrogen and stop the bush or weeds from returning.

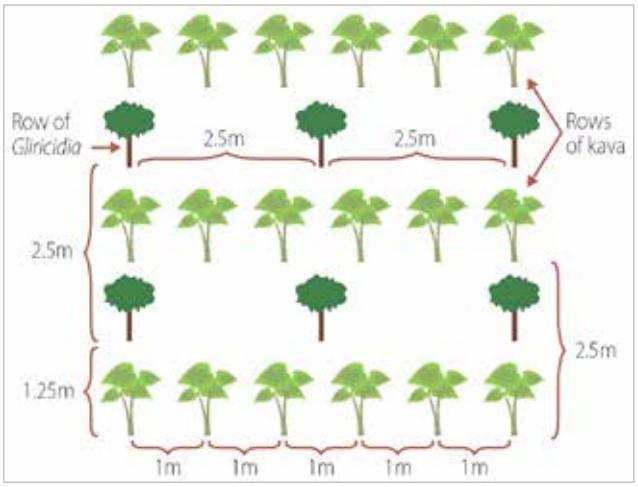
Kava as a single crop

Plant in rows with the plants spaced 1m apart and 2m between the rows. Only plant in close spacing (e.g. 1m squares) if your soil is rich and the kava plants will have enough nutrition.

If using *Gliricidia* as shade the space between the rows of *Gliricidia* should be 2.5m. The kava should also be planted in rows every 2.5m with 1m between each kava plant.



Spacing kava when planted as a single crop



Spacing kava and *Gliricidia* when planted together

Kava with another crop

The choice of crop to grow with kava depends on the age of the kava plants and the slope, rainfall and soil in your area. When the kava plants are small it is useful if the other crop provides shade. When the kava plants are bigger and need more sunlight it is useful if the other crop provides a ground cover.

Kava with yam or kumala

These are good combinations because yams and kumala cover the soil and keep it damp, and weeds cannot grow underneath the leaves and vines of these two crops.

Yams need a site where the soil is fairly dry but the kava needs enough rain plus drainage. So slopes or small hills are suitable. Kumala will grow when the ground is fairly dry and also when it is a little wet. Kumala and kava both need a site with good drainage.

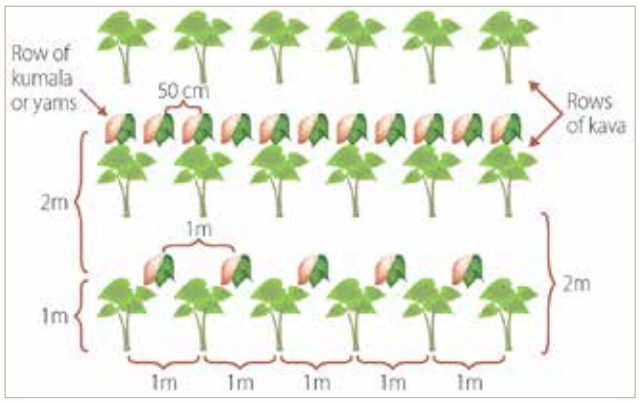
In the first year clear the garden and plant yams or kumala and kava at the same time. Use kava plants from a nursery because it is already 20–30cm high and the yam vines will not damage it. In the second year plant kumala and if the kava is not too big you can do a third year with kumala.

Crop rotation for kava with kumala and yams

Style	Year 1	Year 2	Year 3	Year 4	Years 5–8
1	kava + yams	kumala	kumala	kava	glycine
2	kava + yams	kumala	kava	kava	glycine
3	kava + kumala	kumala	kava	kava	glycine

Spacing:

- Kava: 2m between rows and 1m between plants
- Yams: between the kava rows, one yam every 50cm or 1m
- Kumala: between the kava rows, one kumala every 50cm or 1m.



Spacing kava and kumala or yams when planted together, kumala and yams at either 50cm or 1m spacing

Kava with taro

Planting kava with taro is suitable for places that are fairly wet such as near streams. The taro can provide shade for young kava plants and stop it rotting from too much water but they can compete if there is not enough water.

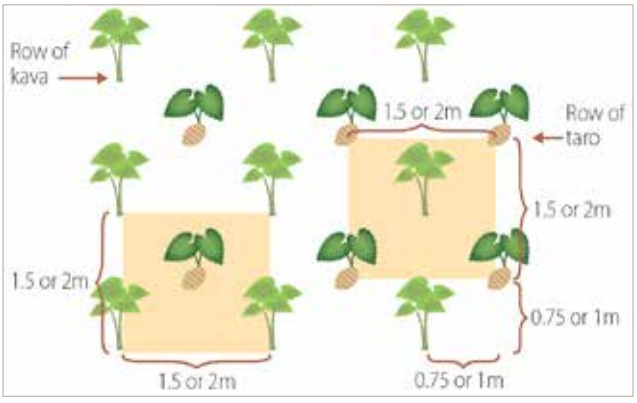
In the first year plant taro and kava at the same time. You can put kava cuttings directly into the ground or use plants from a nursery. After you have harvested the taro the kava can stay on its own until harvest or you can plant kumala in the second year.

Crop rotation for kava with taro

Style	Year 1	Year 2	Year 3	Year 4	Years 5–8
1	kava + taro	kava	kava	kava	glycine
2	kava + taro	kumala	kava	kava	glycine

Spacing:

- If it rains a lot but the soil dries out quickly, use a 2m square for taro and the same for kava
- If it rains a lot and the soil tends to retain water, use a 1.5m square for taro and the same for kava.



Spacing kava and taro when planted together, smaller distances for soil that retains water, larger distances for drier soil

Kava with peanuts

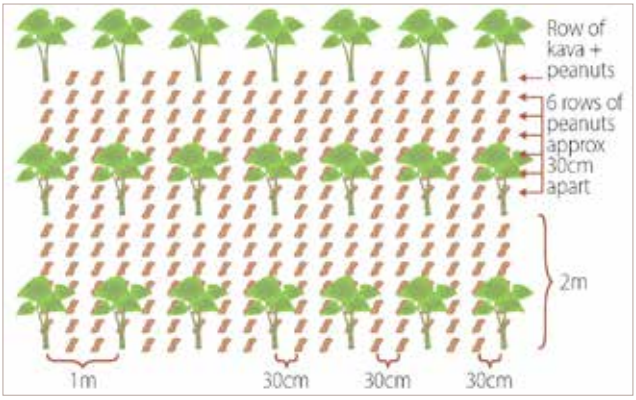
Planting kava with peanuts is a good option. Peanuts make a good ground cover and they fix nitrogen to make the soil rich. When you harvest the peanuts it is important to leave the trash in the garden as mulch. In the first year you can plant three crops of peanuts because they are ready to harvest after 3–4 months. From the second year the kava can stay on its own until harvest.

Crop rotation for kava with peanuts

Style	Year 1	Year 2	Year 3	Year 4	Years 5–8
1	kava + 3 or 4 crops of peanuts	kava	kava	kava	glycine

Spacing:

- Kava: 2m between rows and 1m between plants
- Peanuts: 30cm square.

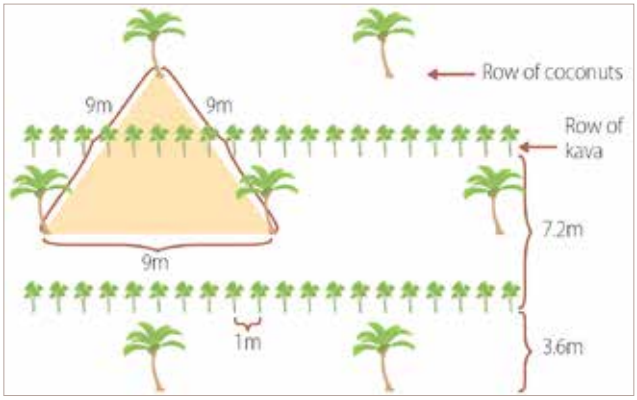


Spacing kava and peanuts when planted together

Kava with coconuts

There are about 96,000 hectares planted to coconuts in Vanuatu. Some coconut plantations use land where kava cannot grow but some can be under-planted with kava. You need to be careful because the coconut roots can damage kava roots and they can compete for water. You always need to choose a site that is well watered.

Spacing: 1 row between two rows of coconuts and 1m between plants. If the coconuts are planted in 9m triangles put a row of kava 3.6m away from the row of coconuts.



Spacing kava and coconuts when planted together

Kava with ginger or vegetables

Planting kava with ginger or vegetables like cabbage, cucumber, pumpkin, tomato, watermelon or chillies should be avoided. Pests that attack these crops also attack kava and cause plants to be very weak or die.

Spacing and yield for kava with various crops

Intercrop	Spacing	Approximate kava plants per hectare	Potential weight of green kava per hectare
Kava single crop — in rich soil	2m between rows, 1m between plants	5000	50 tons
Kava single crop — with *Gliricidia*	2.5m between rows, 1m between plants	4000	40 tons
Yams or kumala	Kava: 2m between rows, 1m between plants Yams/kumala: between the kava rows, one plant every 50cm or 1m	5000	50 tons
Taro — soil dries quickly	2m square	2500	25 tons
Taro — soil retains water	1.5m square	4444	45 tons
Peanuts	Kava: 2m between rows, 1m between plants Peanuts: 30cm square	5000	50 tons
Coconuts	Kava: 1 row between 2 rows of coconuts, 1m between plants Coconuts: 9m triangle	1428	14 tons

Hectare = square with 100m sides. Potential yield based on the plants growing well and weighing 10kg after 3 years.

Weeds, pests and diseases

Weeds

Weeds can be a big problem for kava production. Weeds can compete with kava for water and space, and spread diseases. Kava must be produced organically in Vanuatu so artificial herbicides must not be used. To avoid weeds:

- Grow new kava plants in a nursery so when you plant them in the garden they are strong enough to deal with weeds.
- Plant kava with another crop that covers the ground such as kumala, yams and peanuts.
- Plant kava underneath *Gliricidia*.
- Plant kava close to each other to start with then remove some of the plants when they get bigger.
- Use mulch such as dry grass or coconut leaves around the kava plants.
- Develop a weed management plan to keep weeds out.

Pests and diseases

Kava can be attacked by a wide range of pests including insects, rats, nematodes and dieback. Kava must be produced organically in Vanuatu so artificial pesticides must not be used.

Insects

Ants

Can be a problem in the dry season but do not like rain and can only cause death in young plants (6–8 months old). They can build nests in the roots and rhizome of the kava plant. Inside the root system they live together with a white scale insect. The damage to the roots prevents the shoots from growing properly and can cause other insects and diseases to enter.

Advice: In area where there are lots of ants, wait until the rainy season to plant kava.

Weevils

Can burrow into the roots or stem and cause them to turn black and rot.

Advice: Do not plant kava in sites where weevils are known to occur; do not plant successive crops of kava in the same place.

Aphids

Small insects that feed on leaves which can damage the plant and spread diseases like dieback.

Advice: Remove weeds and do not plant kava with vegetables like cabbage, cucumber, pumpkin, tomato, watermelon or chillies.

Rats

Rats can eat kava and damage the plantation.

Advice: If kumala is planted with kava the rats will eat the kumala but not the kava.

Nematodes

Nematodes are very small worm-like pests found in the soil throughout Vanuatu. They feed on and damage the roots and rhizome which can make the plant weak, become rotten or die. Infected roots can be swollen and poor tasting.

Advice: use healthy planting material, intercrop with plants that can deter nematodes (e.g. marigold or turmeric), do not grow kava with vegetables or ginger or in soil where they were growing recently.

Stem infected with nematodes

Root swollen and "knotted" due to infection by nematodes

Cross-section of root infected with nematodes showing secondary rotting

Dieback

Kava dieback can be a very serious disease for kava production. It is caused by a virus called cucumber mosaic virus or CMV and is also affected by the environment and other stresses such as low nutrients in the soil. It has been found on Efate, Santo, Tanna, Banks, Torres and Epi and may also be present in other parts of Vanuatu. It is spread between plants by small insects (aphids) and can quickly spread within mono-crops or large plantings.

The leaves of infected plants may become yellow with dead and brown edges. There may also be crinkling, blistering or puckering on the leaves. The inside of the stems rots, then the outside will rot and turn black either at the tip, stem branches or nodes. As the rot spreads the stems may rot from the tip down to the base or collapse in the middle. Plants can become very weak or die, especially in the first year. A weak plant becomes very susceptible to weevil attack.

Stem showing rot and partial collapse

Plant showing blackening and collapse

Advice: Only plant healthy seedlings or stem material. Regularly check kava plants and remove any stems or leaves with symptoms of dieback (snap off the stems near the base rather than using a knife). Burn infected materials immediately after removal. Remove weeds and other plants that can be infected by dieback such as cabbage, cucumber, pumpkin, tomato, watermelon or chillies. Promote good growth as vigorous kava plants are less likely to be affected (e.g. fertile soil, mulching, good drainage, shading, protection from wind).

Other diseases

Kava can get diseases from dead wood and stumps on recently cleared land or in poorly drained soil. A fungus in the dead wood and stumps can attack the roots of young kava plants. The first sign of the disease is that the kava leaves droop and have black spots and they can smell. The black marks spread to the stems, then the roots and the plant can die in 3 weeks.

Advice: only plant stems from kava plants that look healthy; choose sites that are well drained, clean and fertile.

Harvesting

As kava gets older the rhizome and roots get bigger and also have more dry matter (so less moisture). The size and dry matter of the rhizome and roots depends on the variety and location. For example, harvested 3 year old Borogu were measured and were about 10kg green with 70% the main rhizome and 30% roots.

Kava for export needs to be at least 5 years old before it is harvested for export markets. Plants need to be at least 3 years old to be sold on the local market.

Care needs to be taken to avoid damaging the rhizome and root and to try and harvest as many of the roots as possible.

Remove the leaves and cut all stems off above the first two nodes.

Dig around and under the rhizome and as many roots as possible.

Harvesting is a lot easier if the kava was planted on ridges than on level ground.

Depending on the variety the large rhizome can be 30–60cm thick and the upper roots can be 2m long.

Cutting stems off a plant using bush knives

Digging around a plant after cutting off the stems

Digging around a plant with stems still attached

A plant removed from the ground

Removing soil from around the harvested roots and rhizome

Post-harvest handling

The steps in post-harvest handling will depend on the requirements of the buyer and export market. The majority of kava is exported as dried pieces of roots and rhizomes but also in powdered and other more highly processed forms. Depending on the export market the kava may need to be supplied to the processor/ exporter in a dried or fresh form. It is good to know where, or which garden and part of the island each kava variety was harvested from.

Fresh unwashed stumps in a bag

Fresh unwashed roots in a bag

Care must always be taken to keep each variety separate after it is harvested.

Care is also needed to wash the harvested kava very well and avoid it getting dirty again or contaminated. Contamination can include soil, insects, grass, foreign material like plastic or animal waste.

Post-harvest handling — farmer to exporter

Washing

After harvesting the kava must be thoroughly washed in clean water to remove soil. The soil can reduce the quality of the kava by encouraging rots and buyers or importers may not accept dirty product. To help wash kava thoroughly it can be useful to remove soil then soak it in water overnight.

Roots and rhizomes are contained between screens of mesh on a rack ready for thorough washing with high pressure water

Fresh roots being washed with high pressure water (left) and unwashed roots (right)

Fresh roots being further soaked and washed in a tub of water

Fresh, washed rhizomes ready for peeling and cutting into chips

Cutting into separate parts

Washed kava needs to be separated into different parts. After separating the parts they might need to be washed again before cutting and drying.

Use a sharp and clean knife to cut kava into the required pieces.

Keep the pieces off of the ground — use tarpaulins, wire racks, metal sheets or other material. It is important to have washed the kava very well and prevent it getting contaminated. Contamination can be from soil, insects, grass, foreign material like plastic or animal waste.

Cut the roots off and put them aside.

Peel the rhizome and put the peelings aside. The rhizome is peeled to remove the outer layers which can contain toxins (alkaloids).

Allow the peeled rhizome to dry slightly then peel again. The peeled rhizome can be soaked in water overnight before cutting it into chips.

Cut the rhizome into chips and put them aside.

Peel the strong stems below the first node twice, cut into chips and put them aside.

Cutting fresh, washed rhizomes into chips

Twice-peeled material (left) is preferred to once-peeled material (right)

Chopped material on mesh drying racks in the open

A cover made with a wooden frame and clear perspex being placed on a stack of drying racks to protect the racks from the rain

A tilted corrugated iron drying rack

Drying

Drying is a very important step in producing good quality kava. Kava that is not dried properly is poor quality and can result in a lot of waste. The kava needs to be dried properly to stop mould and rotting. The mould may not be easily visible but can reduce the quality of the kava by affecting the colour and taste.

To get 1kg of dried kava needs 4–6kg of green kava.

The kava needs to be dried to 12% or less moisture. It is dry enough when it can easily be snapped. It needs more drying if it is soft and can bend.

Never dry the kava directly on the ground. Use a metal bed, wire racks or other material that keeps it at least 50cm off the ground and allows the air to circulate.

Drying in the sun is good when there is not much rain. In rainy weather the kava should be dried under a well-ventilated shelter or building. The shelter can be made from clear plastic or plant material.

Avoid drying the kava near smoke or other products that may leave any odours or residues.

Dryers that circulate normal or hot air can work well. Do not dry kava on copra or cocoa driers as the kava can pick up odours or residues. Testing is needed on suitable designs and operation of hot air driers so the kava does not get too hot. Kava should not be dried at more than 70°C (too hot to touch) as it can discolour or have reduced kavalactone.

Kava can be re-dried several times but the quality can deteriorate.

Chips were cut too thick so won't dry properly

A diesel-powered drying chamber with black plastic covering held in place with timber

A diesel-powered drying chamber uncovered to show dried material

Rewashing dried material

Dried material that has been rewashed and redried (left) and not rewashed (right)

Sorting and packing for transport to exporter

After drying, each variety and part should be sorted. Sorting is important to remove poor quality material before transporting to the exporter. For example you should reject chips that are black in the centre, old, have insect holes or are mouldy. The poor quality material cannot be exported so it is better to remove it at the farm rather than get a reduced price from your exporter or need to sort it again after transport.

Sorted material should be packed separately into clean bags, for example: a bag with just Borogu roots, a bag just with Palarasul chips. No other material should be mixed with the kava.

Clean white woven polypropylene bags are the best type as they let the dried kava breathe. One bag can hold about 25kg of dried chips, 18kg of dried roots or up to 40–45kg of green kava. Do not use bags that are dirty or have been used for other products like copra that can contaminate the kava or leave an odour. Hessian bags should not be used for dried kava as they can contaminate it with fibres and stay damp.

Label the bags with the name of the variety and the plant part for delivery to the exporter.

Example label for bags of dry kava

Variety:	BOROGU
Origin:	BUNLAP, CENTRAL PENTECOST
Plant part:	DRY ROOTS
Age:	5 YEARS
Company:	COMPANY A LTD

Example label for bags of green or fresh kava

Variety:	PIA
Origin:	MIDDLE BUSH, TANNA
Plant part:	FRESH ROOTS
Age:	6 YEARS
Company:	COMPANY B LTD

Keep the packed kava as dry and clean as possible during transport. Protect the sacks from rain, water splash or mud.

Badly dried material showing soft interior

Dried material showing white external mould growth

Dried material showing white external mould growth

Chip bends rather than snaps because it is not dry enough

Rejected material with various faults

Sorted chips ready for packing

Packing sorted chips into a polypropylene bag

Weighing a bag of chips

Post-harvest handling — exporter to buyer

After delivery to the exporter the kava will normally be unpacked, inspected, sorted, graded into different qualities then re-packed. Re-drying may also be needed which can cause delays and reduce the price paid.

Care needs to be taken to make sure the different varieties and parts are kept separate and clearly identified.

Kava can be stored for several months but care is needed to make sure it does not become too moist or contaminated with foreign material or odours. The moisture, appearance and smell of stored kava should be checked regularly. Re-drying may be necessary before export unless moisture-proof storage containers are used. Kava should not be stored for longer than approximately three months to avoid problems with poor quality.

Emptying a bag of roots to be sorted and graded

Approved exporters and facilities

Kava can only be exported from Vanuatu by exporters that are licenced by the Vanuatu Commodities Marketing Board (VCMB) and have a facility that has been approved by the Biosecurity Vanuatu. The export facility must be clean; well aerated; never be used for other purposes (e.g. housing livestock); be protected against birds, rodents and domestic animals; have sorting and storage areas, running water, toilet, shower, and re-drying facilities.

Kava chips and roots can only be exported from Vanuatu by individual citizens of Vanuatu and local companies owned by Vanuatu citizens.

Bags in storage at an exporter's facility, showing mesh walls and grill windows for good ventilation

Packing bags into a sea container for export

Record keeping

To allow traceability, exporters should keep good records on the kava being received, processed and sold. Records should include: variety and age of the kava provided, who provided it, how much was provided, further processing done, what material was used for each export consignment.

Further processing

Kava can be further processed before export for use as a pre-prepared beverage, a supplement to other food or beverages or for medicinal purposes. Processing can include powdering, aqueous extraction, spray drying or freezing. Solvent extraction has been used but is not recommended due to possible health concerns with the final product.

Kavalactone testing

Exporters may choose to have samples tested for kavalactone or this may be a mandatory requirement of the buyer. The testing can be used to confirm what the variety is, total kavalactone levels and the profile (or types) of kavalactones that are present.

Quarantine inspection, treatment and certification

All kava exported from Vanuatu needs to be inspected by Biosecurity Vanuatu. The exporter must lodge a request for the inspection and provide information on: the name of the variety; the island and location or village of origin, the distinct organs and the age of the kava. The kava must not be placed in bags or other storage containers before the Biosecurity Vanuatu inspection.

The number of units to be inspected depends on the size of the consignment:

Consignment size	Sample size
50–500kg	2 bags*
500–1000kg	5 bags
1000–5000kg	8 bags
5000–10,000kg	12 bags
>10,000kg	15 bags

*Approximately 20–25kg

Dried or processed kava will be rejected if:

- the dried kava is not peeled
- the dried kava includes peelings, branches or leaves (unless the importer provides written notice to Biosecurity Vanuatu detailing the specific kava product and quantity required)
- the kava is adulterated or contaminated with soil or other foreign matter
- it is two day, medicinal or wichmannii kava (unless the importer provides written notice to Biosecurity Vanuatu detailing the specific kava product and quantity required)
- it consists of any material that can be used for propagation
- it is heavily infested with live insects.

Defects that Biosecurity Vanuatu will inspect for are: presence of mould, too high moisture, presence of branches or other contamination. The outcome of the inspection is: approved, rejected or needs to be re-sorted, washed or re-dried before being inspected again.

Biosecurity Vanuatu may choose to have a sample tested for kavalactone levels and profile. This may be done where there are doubts over what varieties are included in the consignment or for research purposes.

Contaminating material found during inspection of kava

If the kava passes the inspection it may need to be fumigated depending on the importing country requirements. This is done to control any live insects that are present. Depending on the location, size of the consignment and whether it will be exported by sea or air freight, it may be treated at the export facility or at a Biosecurity Vanuatu facility using sheet, container or chamber fumigation.

A Phytosanitary Certificate needs to be issued for all export consignments. This is provided by Biosecurity Vanuatu after successful inspection and fumigation. After inspection and fumigation it is important to keep the kava dry and free from contamination. The consignment should be exported as soon as possible.

Packing and labelling for export

The kava should be packed in new, clean bags or other containers, clearly labelled and properly closed.

Each bag must only contain a single variety and plant part. No other material or parts of kava can be mixed in the bags.

Kava or kava products exported from Vanuatu must be labelled with the name of the variety, the island of origin, the distinct organs (plant parts) and the words "Original Vanuatu Kava". Other details to include are the exporting company, the importing company and the country. Depending on the requirements of the buyer, the labelling may need to include the kavalactone levels and age of the kava at harvest.

Example of a correct bag label

Product:	ORIGINAL VANUATU KAVA
Variety:	BOROGU
Origin:	CENTRAL PENTECOST
Plant part:	ROOTS
Age:	5 YEARS
% kavalactone:	16%
Exporter:	COMPANY C LTD
Importer:	NATURAL PRODUCTS LTD
Country:	USA

ORIGINAL VANUATU KAVA
BOROGU
CENTRAL PENTECOST
ROOTS
5 YEARS
16% KAVALACTONE
COMPANY C LTD
NATURAL PRODUCTS LTD
USA

Annex 1: Important noble kava varieties

Glossary of terms used to describe kava varieties

Striated: with streaks or marks

Mottled: with blotches or dapples

Speckled: with dots or spots

Variety: Ahouia

Origin: Tanna

General appearance: normal

Stem colour: light green

Internodes: mottled; different sizes, long and thin

Leaf colour: dark green

Ahouia plant

Ahouia stem

Ahouia leaf

Variety: Borogoru

Origin: Maewo

Variety: Borogu

Origin: Pentecost

Variety: Gorgor

Origin: Ambrym

General appearance: upright

Stem colour: dark green

Internodes: not always the same size; long and thick

Leaf colour: usually green but sometimes purple

Gorgor stem

Gorgor plant

Gorgor leaf

Variety: Ge wiswisket

Origin: Gaua

General appearance: normal

Stem colour: light green

Internodes: mottled; not always the same size; long and thin

Leaf colour: dark green

Ge wiswisket plant

Ge wiswisket stem

Ge wiswisket leaf

Variety: Kelai

Origin: Epi

Variety: Miaome

Origin: Epi

General appearance: normal

Stem colour: green with purple shading

Internodes: striated and mottled; not always the same size, long and thin

Leaf colour: light green

Kelai plant

Kelai stem

Kelai leaf

Variety: Melmel

Origin: Pentecost

Variety: Sese

Origin: Pentecost

General appearance: prostrate

Stem colour: light green

Internodes: uniform, long and thin

Leaf colour: yellow

Sese/Melmel plant

Sese/Melmel stem

Sese/Melmel leaf

Variety: Melomelo

Origin: Ambae

General appearance: upright

Stem colour: dark green

Internodes: not always the same size; long and thick

Leaf colour: usually green but sometimes purple

Melomelo plant

Melomelo stem

Melomelo leaf

Variety: Palarasul

Origin: Santo

General appearance: normal

Stem colour: light green

Internodes: striated and mottled; not always the same size; long and thin

Leaf colour: yellow

Palarasul patch

Palarasul plant

Palarasul stem

Palarasul leaf

Variety: Palasa

Origin: Santo

General appearance: normal

Stem colour: dark green

Internodes: speckled; long and thin

Leaf colour: dark green

Palasa plant

Palasa stem

Palasa leaf

Variety: Pia

Origin: Tanna

General appearance: upright

Stem colour: light green

Internodes: striated and mottled; not always the same size; long and thin

Leaf colour: purple

Pia plant

Pia stem

Pia leaf

Variety: Silese

Origin: Malekula

General appearance: normal

Stem colour: dark green

Internodes: striated and mottled; not always the same size; long and thin

Leaf colour: purple

Silese plant

Silese stem

Silese leaf

Annex 2: Quality factors for kava exported from Vanuatu as a product used in food

Factor	What is involved?
Organic production	Farmer education on organic methods, surveillance of growing areas and testing for residues (buyers, Extension and Biosecurity Vanuatu)
Noble varieties only	Exporters only buying noble varieties
	Farmer education on export variety requirements (buyers/exporters, Extension and Biosecurity Vanuatu)
	Surveillance of growing plants (buyers/exporters, Extension and Biosecurity Vanuatu)
	Development/availability of reliable routine testing methods for % kavalactone and chemotype
	Testing for kavalactone chemotype of plants, green and dried kava (buyers/exporters)
	Random testing of kavalactone chemotype of dried kava during export inspections by Biosecurity Vanuatu
	Research to identify chemotypes of varieties and separate into noble and non-noble
	Descriptions available of the appearance of common noble and non-noble varieties
Peeled rhizomes, roots and peeled basal stems only	Checked by growers and buyers/exporters
	Checked by Biosecurity Vanuatu at export inspection
Single variety and plant parts in each bag	Checked by growers and buyers/exporters
	Checked by Biosecurity Vanuatu at export inspection
Normal odour and colour	Kava washed and dried well, kept away from other odours and kept as dry as possible until export
Free from visible mould, pests, soil and other foreign material	Hygienic methods for processing and storing the kava
	Checked by growers and buyers/exporters
	Checked by Biosecurity Vanuatu at export inspection
Maximum 12% moisture for dried products	Snap test or testing with hygrometer
	Checked by growers and buyers/exporters
	Checked by Biosecurity Vanuatu at export inspection
Minimum 10% total kavalactone in dried roots (minimum 3% kavain)	Kavalactone testing of samples
	Testing to establish normal range of % total kavalactone and % kavain of common varieties
Minimum 5% total kavalactone in dried rhizome (minimum 1% kavain)	Kavalactone testing of samples
	Testing to establish normal range of % total kavalactone and % kavain of common varieties
Packed in new, clean bags and clearly labelled	Name of the variety, island of origin, distinct organs (plant parts) and the words "Original Vanuatu Kava"
Aqueous extraction only	Processors/exporters only developing extraction methods using water
	Inspection and approval of processing facilities by Biosecurity Vanuatu

Annex 3: Names of medicinal and two day kava varieties

The names and origins of the known medicinal and two day kava varieties of Vanuatu are listed in the Kava Act. Examples of important two day varieties are provided here.

Examples of important two day varieties

Variety (two day)	Origin/grown in	Alternative names
Fabukhai	Pentecost	Abogae, Fabu, Vabu, White Kava
Laklak	Pentecost	Fabulakalaka, Laklak
Ni Kawa Vila	Tanna	
Palisi	Santo	Pentecost
Tarivarus	Pentecost, Ambae	Tari, Tariparaus, Tarivarus, Tarivarusi, Tarvarus, Wari






Australian AID