



FIJI KAVA QUALITY MANUAL



FIJI KAVA

QUALITY

M A N U A L



Prepared, printed and distributed with assistance from the Australian Government and New Zealand Government through the Pacific Horticultural and Agricultural Market Access (PHAMA) program, Pacific Community’s Pacific Agriculture Policy Project (SPC PAPP) and the University of the South Pacific (USP).

The PHAMA program is administered by AECOM-Kalang and aims to improve economic growth and livelihoods in Pacific countries by increasing Pacific horticultural and agricultural exports to international markets.



CONTENTS

FOREWORD.....	6
INTRODUCTION.....	7
AIM OF THE MANUAL.....	8
WHAT IS KAVA QUALITY?.....	9
THE ROLE OF KAVALACTONES IN KAVA QUALITY.....	10
QUALITY ASSURANCE.....	11
GOOD AGRONOMIC PRACTICES.....	12
SITE SELECTION.....	13
FIJI KAVA DESCRIPTION.....	14
VARIETY SELECTION.....	15
FIJI KAVA VARIETIES.....	15
PROPAGATION & PLANTING.....	42
SPROUTING KAVA CUTTINGS.....	44
DIRECT PLANTING.....	46
TRANSPLANTING SPROUTED KAVA.....	46
CARING FOR YOUNG KAVA PLANTS.....	46
WEEDS, PESTS AND DISEASE MANAGEMENT.....	48
WEEDS.....	49
PEST.....	49
DISEASE.....	50
SYMPTOMS OF DISEASES.....	51
ADDITIONAL AGRICULTURAL PRACTICES.....	52
PRACTICES TO ADOPT.....	53
GOOD CROP HUSBANDRY.....	53
FERTILIZER USE.....	53
CHEMICAL USE.....	54
KEEPING RECORDS.....	54
FARM WORKERS.....	56
HARVEST AND POST-HARVEST.....	58
HARVEST.....	59
POST-HARVEST.....	60
CUTTING/ SEPARATION.....	60
WASHING.....	60
CUTTING/CHIPPING.....	62
DRYING.....	62
PACKING.....	67
STORAGE ON FARM.....	68
TRANSPORTATION.....	69
QUALITY ISSUES.....	69
SORTING.....	69
QUALITY AFTER THE FARM — BUYERS, PROCESSORS AND EXPORTERS.....	70
PROCESSING.....	71
PACKAGING.....	71
STORAGE.....	71
CONCLUSION.....	72
APPENDIX.....	73
APPENDIX 1: KAVA CHEMOTYPE.....	74
APPENDIX 2: FALSE KAVA - YAQONA NI TOGA.....	75



FOREWORD

Kava is an integral part of life in Fiji.

The place of kava or 'Yaqona' in the cultural life of Fijians is so central that it is referred to as 'wai ni vanua' (drink for the people). It has also been adopted by the European, Fijians of Indian descent and other communities that have made Fiji their home. It has become the national drink of Fiji and is part of our identity as Fijians.

Although kava has been grown in Fiji for centuries, it has only been in the recent past that production statistics have been recorded based on the transition of kava from subsistence to cash crop. Reflecting the increased demand for kava in the local and overseas markets, commercial production has consistently increased from a low of about 900 tonnes in the 1990s to 6,000 tonnes in 2015.

Next to Taro (Dalo) and ginger, the Kava industry is a major contributor to Fiji's national economy. Kava exports were valued at \$FJD8.8 million in 2015 and continued effort by all is needed to again reach the earnings in the 1980's of over \$FJD35 million per year.

With the renewed interest of markets for Kava in Europe and a viable and growing market in the United States of America, Fiji must explore every opportunity to protect kava as a true Fijian product and its Pacific heritage and status in terms of competing in international markets.

The Ministry of Agriculture has supported the creation of the Kava Bill 2016 and Kava Standard and Manual as part of ensuring that the trade of kava domestically and internationally is done according to appropriate standards and procedures. This is also part of a regional strategy by all kava-producing countries in the Pacific to have comprehensive legislation and supporting procedures in place.

The manual is a guide for all involved in the production of kava. It is a tool we can use to gauge our progress at improving the quality of the kava. It is also an indication that we are developing in our approach towards global food safety standards and regulations.

With this manual, stakeholders can better equip themselves with the information and advice they need to advance at domestic, regional and international levels.

As a nation, the manual presents us with an opportunity to elevate our reputation at regional and international levels as a producer and supplier of quality kava. Having gone through the manual, it is clear to see that nothing can be achieved in isolation. It will take a concerted effort and teamwork by all stakeholders to ensure its successful implementation.

It is my sincere hope that regardless of the different roles and objectives we have, as stakeholders we must strive to work together for the greater good of this industry and our country and that is to ensure we produce a quality and reputable product that Fiji and the world can continue to enjoy.



.....

Hon. Inia B Seruiratu

Minister for Agriculture, Rural and Maritime Development.



INTRODUCTION



KAVA (*Piper methysticum*)

Yaqona is a Fijian term commonly used to refer to the drink made from roots of the *Piper methysticum* plant. The word is also used in reference to the plant itself and its derivatives.

Among the dialects spoken in Fiji, the names used in reference to yaqona can vary but in published international literature, yaqona is generally referred to as kava.

The significance of kava is deeply rooted and embedded in the Fijian way of life. For centuries, it was exclusively used during traditional cultural ceremonies. While it remains an integral part of Fijian customs, the use of the drink has extended beyond the ambits of traditional and cultural protocols. It has evolved into a popular social drink in the modern Fiji; known for its calming effects that widely appeal to working urbanites.

Today, kava has become a very lucrative cash crop and is in great demand by both, local and overseas, markets. The drink is prepared from the dried and pounded roots (waka) and sliced rhizomes (lewena) of the kava plant. Dried kava is commonly traded or used to prepare the drink but green kava is still used in Fijian traditional ceremonies and gatherings in villages and provinces.

There are other Pacific Island Countries that grow and export kava and for Fiji to be competing in the local and overseas markets, there is a need to ensure that Fijian kava is recognised as being of consistent high quality.

To assist in achieving this objective, a National Fijian Quality Standard for kava has been developed to set minimum standards for export kava. This manual has been developed to help address Fiji kava quality issues and raise awareness of these issues with Fiji kava producers, middlemen, processors and exporters.

AIM OF THE MANUAL

This manual has been developed to help kava producers and suppliers in Fiji provide customers with the best quality kava. The aim is to ensure that Fiji kava:

- is produced and stored according to good hygiene standards maintaining its quality,
- is safe to consume and
- is locally and internationally renowned and recognised as a quality product.

Using good cultural practice has a range of benefits, including reducing the amount of kava lost due to spoilage and being able to meet the requirements of different buyers or consumers. It is also important that farmers and processors of kava are aware and operate in accordance with any government regulations or other market requirements related to kava production and trade. Government regulation and other market requirements will change from time to time, and it is important to check with the Ministry of Agriculture, other government ministries (e.g. Ministry of Industry, Trade and Tourism, Biosecurity Authority of Fiji, Ministry of Health) and buyers for updates and changes.



WHAT IS KAVA QUALITY?

Quality is what makes one particular kava more sought after than another. The focus of this manual is on improving the quality and consistency of dried kava being produced and traded so that Fijian kava maintains and improves its reputation with customers.

There are a number of things that can influence the quality of kava and around the tanoa, regular kava drinkers will argue about the best location for growing kava, which farmer grows the best, what variety is the strongest and the best age at which kava should be harvested. There are many disagreements about what makes good kava, but everyone agrees that bad smells and tastes in kava spoil a good talanoa session.

The quality of kava is generally judged by the smell and colour of the dry kava, the colour of the prepared kava drink, and taste and effect of the kava once it is drunk. The kava should be dry, pale (not yellow) and not have any musty or 'off' smells. Prepared kava drink should be pale brown, whilst older plants may produce a drink that is more yellow and should not have any 'off' tastes. The effect of the kava drink is determined by chemicals called kavalactones which are discussed below.

For other uses of kava such as selling it pre-pounded, preparation of extracts for use in herbal or pharmaceutical products, or formulation into dried or liquid ready-to-drink formulations, the quality may also be judged by other characteristics. This may include the total amount of kavalactones present, the amount of a particular kavalactone, freedom from soil or other contaminants, or the presence of different parts of the kava plant such as roots (or waka), chips (or lewena).

Poor quality can lead to disappointed customers and loss of future sales and this is an area that kava farmers, middlemen, processors and exporter all need to work on to improve. The continued good reputation of Fijian kava in the international marketplace relies on all those involved in kava production for export working together to maintain and improve the reputation of Fijian kava. This manual looks at how kava is produced and handled, and explains how to produce good quality kava and what practices to avoid.



THE ROLE OF KAVALACTONES IN KAVA QUALITY

The “kick” or physiological effects experienced when consuming kava is due to the active chemical components collectively called kavalactones. The physiological effects of kava are usually viewed as an important characteristic of kava quality amongst customers, alongside characteristics such as where it was grown, taste and cleanliness.

There are six major kavalactones and a numbering system has been devised to identify them;

- 1= desmethoxy yangonin (DMY),
- 2= dihydro kavain (DHK),
- 3= yangonin (YAN),
- 4= kavain (KAV),
- 5= dihydromethysticin (DHM) and
- 6= methysticin (METH).

The kava is tested in a suitably equipped laboratory to determine the amounts of the six kavalactones it contains. The chemotype or kavalactone profile is then determined by ranking the proportions of six kavalactones from highest to the lowest amount (i.e. in descending order). For example, kava with a chemotype of 426531 has high concentrations by kavain (KAV), followed in decreasing concentrations by dihydro kavain (DHK), methysticin (METH), dihydromethysticin (DHM), yangonin (YAN) and desmethoxy yangonin (DMY). Buyers and producers generally focus on the first three kavalactones of the chemotype as the indicator of quality, looking for relatively high proportions of dihydrokavain (DHK, 2), kavain (KAV, 4) and meththystiin (METH, 6). In addition to desirable chemotypes, the total amount of kavalactones within the kava is also important.

Buyers may seek to buy varieties of kava based on their chemotypes and total kavalactone content, and it is important that farmers are aware of the needs of buyers in this regard.



QUALITY ASSURANCE

Consistent quality can be very important for buyers, particularly where they seek to use kava in the manufacture of products (for example products such as 'Taki Mai' and pharmaceutical products) or to market a product under a particular brand (for example 'Lami Kava'). These buyers want to make sure that the products they make meet particular quality standards to ensure the kava does not become spoilt, it is safe for the end customer to consume and that there is consistency in its taste and kavalactone characteristics. These companies may seek assurances from kava sellers that the kava meets their requirements.

Current requirements for specifying kava quality that are commonly used includes particular parts of the plants, visual or appearance, smell, taste, variety, region of origin and moisture content. The requirements will vary depending on what the kava is going to be used for and the specific interests of the buyer and importing country regulatory requirements.

In the future buyers may also specify additional measures of quality, such as the quantity and type of active compounds (kavalactones); microbial contami-

nation or spoilage; and/or freedom from chemical residues or heavy metals. The buyer may also ask for the product to comply with international standards or national specifications where these exist.

Formal quality assurance standards could be implemented by large producers and exporters where the market has justified the cost, or the business operator has sufficient interest in developing good practice in line with business aspirations. Formal standards, such as HACCP, may be a requirement in some markets.

In some cases international buyers may seek to inspect kava being sold, the facilities being used to process the kava and farms where kava is being sourced. For some markets buyers may want farmers to use particular practices or ask for records of how kava is grown and processed. For this reason, kava sellers and middlemen should have an understanding of kava production and the farms where it is being produced and understand market requirements if they are looking to sell into international markets.





GOOD AGRONOMIC PRACTICES

SITE SELECTION

It is important that a site is selected to promote the growth of healthy kava plants. Site selection can influence the productivity of the kava, determine ease of harvest and detect the possible occurrences of pests and disease, which are all things that can influence kava quality.

It is important to know what the best local conditions for growing kava are, and farmers should talk to other farmers and Ministry of Agriculture staff about what varieties grown best and the best places to grow them (for example, do certain varieties grow best in shady areas, on hill slopes, on hill tops or in gullies, are some more resistant to dry conditions etc). Keeping records of how the different varieties grow in different locations can be useful for this.

Kava grows 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.

The roots of kava are the most important part of the plant that is marketable so ideal soils should be fertile and loose and well drained to allow for vigorous root growth. The soil needs to be of good quality (deep, light, fertile and rich in organic matter) and well drained. Deep, loose, fresh friable soil that is rich in organic matter is best for kava production.

Optimum production can be achieved from silica-clayey soils with a pH range of 5.5 – 6.5. Slopes of small hills usually provide a better site than level ground as the slope allows for the water to drain away. Land preparation on slopes and in traditional farming systems usually use minimum tillage using a digging fork or a traditional digging stick. Mechanised land preparation is uncommon, and could create problems with erosion. The soil should be loosened and well mixed with organic matter before planting.

On flat land, it is useful to plant on high mounds of about 40cm high and 2 meters apart. There should be adequate drainage and water logged area should be avoided. Waterlogged areas suppresses root growth and may cause wilts and rots. This is the reason why planting on slopes is always preferable than flat land.

In some places there are risks that the kava could be contaminated from pollution in the soil, air or water by hazardous chemicals and these places should be avoided. Past land uses, such as if the area had been planted with a previous crop of kava may also have an impact on disease and the eventual quality and quantity of kava that is produced from a site. Areas that had been planted previously with kava should be avoided if it had a history of pest and diseases especially “kava dieback”.

Care needs to be taken to ensure kava is not planted too close to streams, so that pesticides and fertilizers applied to the crop are not washed into the water and pollute the streams.

Good site selection is an important decision a kava farmer should embark on before growing kava. Other considerations for site selections are proximity to roads and water sources for washing or the general accessibility of kava plantations. In kava-growing outer islands and provinces this is usually of secondary importance as a site for good and healthy crop growth is always considered first.





FIJI KAVA DESCRIPTION

VARIETY SELECTION

A survey in Fiji in 2014 covered extensive visits to kava farms in key production areas in Viti Levu, Vanua Levu, Taveuni, Kadavu and Ovalau. The survey found that thirteen (13) varieties of kava were grown in Fiji- all of which were desirable and had chemotypes that made them suitable for consumption in the domestic and export markets. The survey found there was variation in the varieties used by farmers and that no single kava variety dominated production.

Anecdotal evidence suggests that different kava varieties respond differently to different environments and under conditions of salinity, drought and disease. Further work needs to be done to understand this. Ministry of Agriculture officials will be able to update farmers on this information when it becomes available.

It is important that farmers try to select and grow kava varieties suited to their farms. Unfortunately, information on the growth and yield of different varieties is currently limited so farmers should work with other farmers and the Ministry of Agriculture to discuss how well the different varieties grow in their area. Local kava farmers will have their own views on what varieties grow best in shady areas, on hill slopes, on hill tops or in gullies, in different soil types and can tolerate dry conditions. Farmers may even wish to try and collect a selection of local varieties and conduct their own trials to compare how the different varieties perform. Experience in kava production and keeping records of production are useful tools for farmers to guide their decisions on what varieties are the best for a particular area.

The survey of kava farms in 2014 showed that there were differences in the kavalactone content produced by the different kava varieties on different farms. Future work on the agronomy of these thirteen varieties would assist in understanding differences in performance (yield and kavalactone production) in different environments as well as differences in their resistance to stress such as salinity, drought and disease.

FIJI KAVA VARIETIES

The local names used for the different kava varieties vary from place to place, and are often related to the appearance of the plant or where the planting material came from. This lack of consistency in how names are applied across Fiji is an important point to consider in improving the consistency of kava produced for export so a formal set of names has been developed.

The thirteen varieties are:

- **Kava type 1: Yalu**
- **Kava type 2: Yonolulu**
- **Kava type 3: Qila balavu**
- **Kava type 4: Damu**
- **Kava type 5: Qila leka**
- **Kava type 6: Vula kasa leka**
- **Kava type 7: Vula kasa balavu**
- **Kava type 8: Dokobana vula**
- **Kava type 9: Matakaro leka**
- **Kava type 10: Matakaro balavu**
- **Kava type 11: Dokobana loa**
- **Kava type 12: Loa kasa leka**
- **Kava type 13: Loa kasa balavu**

KAVA TYPE 1:
YALU





The Fijian name for this kava type (Yalu) refers to its similarities with a Fijian climbing plant with large leaves (yalu).

Stems are dark green with either no or very few visible lenticels. Lenticels are brown and may be seen below the upper node on internodes. Some dark green lenticels may be seen in areas where there is chlorosis on the stem. The absence of lenticels means that the stem is smoother to touch than other varieties. The internodes are usually short. The plants sampled tended to grow to chest height and had multiple stems. The very low number of lenticels and dark green colouration of the stem are key features of this kava type.

During the 2014 kava survey Yalu was found to be cultivated on Vanua Levu, Viti Levu and Kadavu. Local names used to describe Yalu include: Badrau (on Vanua Levu), Karawa (on Viti Levu) and Mocikawa (on Kadavu).

KAVA TYPE 2:
YONOLULU





The Fijian name for this kava type (Yonolulu) refers to the multicoloured crepe paper used for decorations and garlands. An alternative spelling, Honolulu, is sometimes used to refer to the variety.

Stems are green with few large green lenticels that occur in the top two thirds of the internode. The small number of lenticels means that the stems feel relatively smooth. Some dark green colouration may be seen above the lower node of the internode. The internodes are usually short and thick. The plants sampled tended to grow to shoulder height and had a bushy habit.

The small number of green lenticels near the top of the internode is a key characteristic of this kava type. The short internode length distinguishes Yonolulu from Qila balavu.

During the 2014 kava survey Yonolulu was found to be cultivated on Kadavu, Viti Levu and Vanua Levu and Ovalau. Local names used to describe Yonolulu include: Mocikawa (on Kadavu), Karawa (on Kadavu and Viti Levu), Matanitabua (on Vanua Levu) and Leka (on Ovalau).

KAVA TYPE 3:
QILA BALAVU





The Fijian name for this kava type (Qila balavu) refers to a strong stick (qila) and the long internodes (balavu).

Stems are green with few lenticels which occur mainly in the top two thirds of the internode. The lenticels are a darker green than the surrounding stems and often have raised brown centres. The size of the dark colouration around lenticels varies between plants. Some dark green colouration or striping may be seen above the lower node of the internode in some plants. The internodes are generally long. The small number of green lenticels near the top of the internode is a key characteristic of this kava type. The long internode length distinguishes Qila balavu from Yonolulu.

During the 2014 kava survey Qila balavu was observed being cultivated on Viti Levu and Taveuni. Local names used to describe Qila balavu include: Dakua (on Viti Levu), Dokobana vula, and Badrau (on Taveuni).

KAVA TYPE 4:
DAMU





The Fijian name for this kava type (Damu) refers to the red (damu) colouration of the stems.

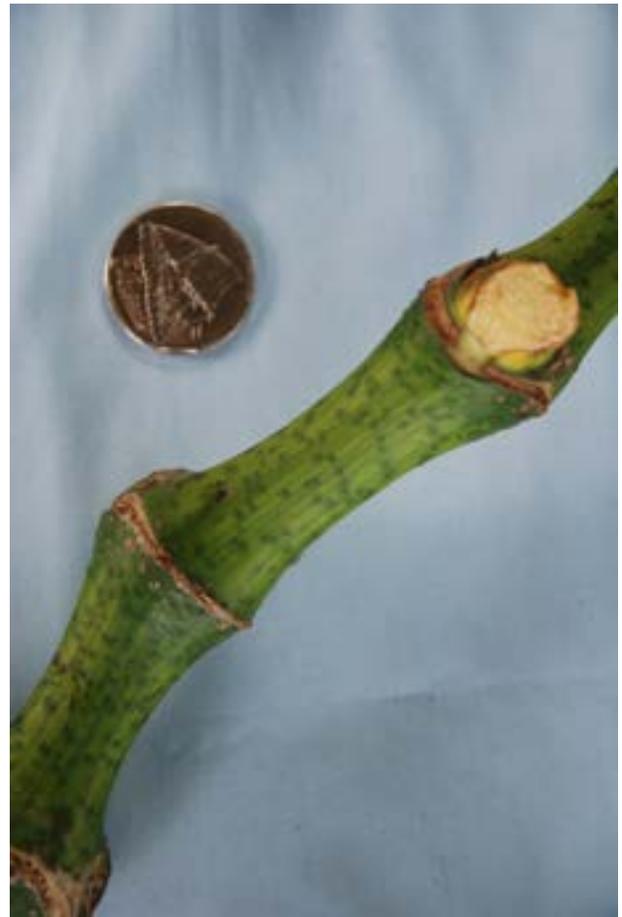
Stems have very few lenticels, occurring mainly in the top third of each internode, and the stems exhibit some purple colour. Colouration in the internode varies between plants, from mainly green through to dark purple. Colour in the internode is darkest above the lower node and becoming lighter towards the top of each internode. Lenticels are purple and often with raised brown coloured centres. Internodes vary in length and are often short and thick but may be long. The plants sampled tended to grow over head height, had few stems and grew with an upright habit.

This kava type is distinguished by the relatively low number of dark or purple coloured lenticels on their internodes and the purple pigmentation in the stems.

During the 2014 kava survey Damu was observed being cultivated on Vanua Levu, Ovalau, Kadavu and Taveuni. Local names used to describe Damu include: Damu (on Vanua Levu, Taveuni, and Ovalau), Kasa Damu (on Vanua Levu), Yalu (on Taveuni), and Kasakasa Kula (on Kadavu).

KAVA TYPE 5:
QILA LEKA





The Fijian name for this kava type (Qila leka) refers to a strong stick (qila) and the short internodes (leka).

Stems are green with very fine, slightly darker green, striations running lengthwise along the node. The stems have many lenticels which are less well defined shape than in other kava varieties. The lenticels are the same green colour as the striations, are raised and may have brown centres. The internodes are generally short. The habit and height of plants sampled was variable, and ranged from waist height to head height and could be either spreading or erect”.

The green striations, less well defined lenticels and relatively short internodes are key characters of this type of kava.

During the 2014 kava survey Qila leka was observed being cultivated on Kadavu, Vanua levu, Taveuni and Ovalau. Local names used to describe Qila leka include: Qereqere (on Kadavu), Qere (on Kadavu), Qila leka (on Vanua levu), Qila (on Vanua levu), Kasa Naloto (on Vanua levu), Dokobana vula (on Vanua levu), Qila (on Taveuni) and Bisinisi (on Ovalau).

KAVA TYPE 6:
VULA KASA LEKA





The Fijian name for this kava type (Vula kasa leka) refers to the pale colour (vula) of the stem (kasa) and the short length of the internodes (leka).

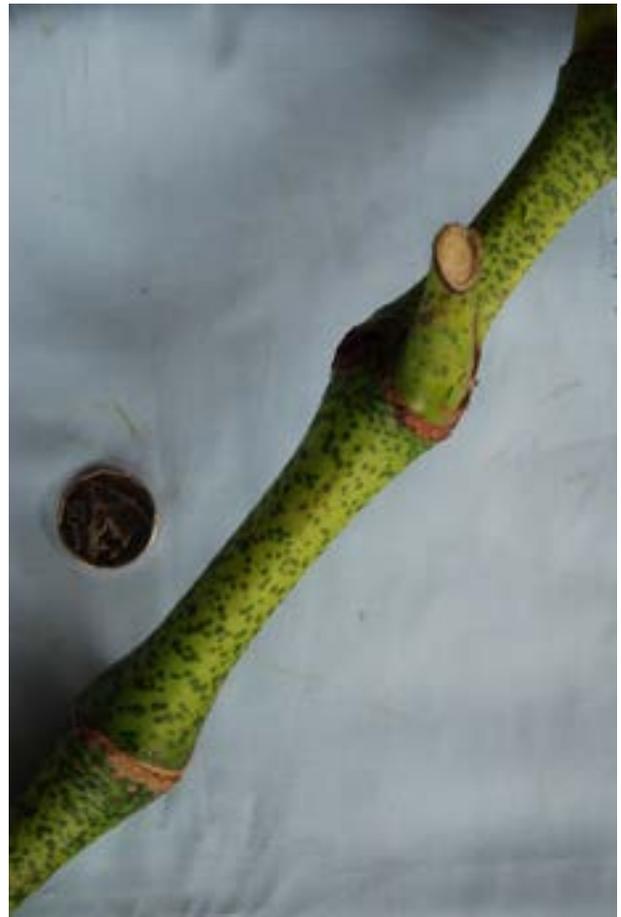
The stems are pale green with many small dark green lenticels spread over the length of each internode. The internodes are usually short and the stems are generally thick, with pronounced nodes and a narrow “waist” in the internode. The plants sampled were generally chest or shoulder height and had a spreading habit with many stems, although some tall plants were seen.

The large number of green lenticels is a key character of both Vula kasa leka and Vula kasa balavu. The short length of the internodes is the character that defines Vula kasa leka from Vula kasa balavu, and this distinction can be difficult to make.

During the 2014 kava survey Vula kasa leka was observed being cultivated on Vanua levu, Viti levu, Ovalau and Kadavu. Local names used to describe Vula kasa leka include: Bisinisi (on Vanua levu), Vau leka (on Vanua levu), Diria (on Viti levu), Dokobana (on Ovalau) and Karawa (on Kadavu).

KAVA TYPE 7:
VULA KASA BALAVU





The Fijian name for this kava type (Vula kasa balavu) refers to the pale colour (vula) of the stem (kasa) and the long length of the internodes (balavu).

The stems are pale green with many small dark green lenticels spread over the length of each internode. The internodes are generally long and thinner than Vula kasa leka. The plants sampled tended to be head height with many stems.

The large number of green lenticels is a key character of both Vula kasa balavu and Vula kasa leka. The longer length of the internodes is the character that defines Vula kasa balavu from Vula kasa leka, and this distinction can be difficult to make.

During the 2014 kava survey Vula kasa balavu was observed being cultivated on Viti Levu, Vanua Levu and Taveuni. Local names used to describe Vula kasa balavu include: Diria (on Viti Levu), Vanua (on Viti Levu), Kava vula leka (on Vanua Levu), Dokobana vula balavu (on Vanua Levu) and Taveuni (Dokobana vula).

KAVA TYPE 8:
DOKOBANA VULA





The Fijian name for this kava type (Dokobana vula) refers to a large branch (bana) or stick used for planting (doko) and the pale colour (vula) of the stem.

Stems are green with many lenticels over the length of each internode. Lenticels are very dark green in colour, often with raised brown centres. Some dark green, verging towards purple pigmentation may be seen just above the lower node of internodes. In some plants dark green triangular stripes may develop from the lower node and stretch up towards the upper node of the stem. These stripes may or may not be present and vary in size. Internodes tend to be long. The plants sampled tended to grow above head height, and varied between a spreading and upright habit.

Dokobana vula differs from Matakaro leka and Matakaro balavu in that the lenticels tend to be very dark green rather than purple, and that purple pigmentation, if present, is restricted to only a small part low on the internode. Dokobana vula tends to have long internodes like Matakaro balavu.

During the 2014 kava survey Dokobana vula was observed being cultivated on Vanua Levu, Kadavu and Ovalau. Local names used to describe Dokobana vula include: Dokobana vula (on Vanua Levu), Vula kasa leka (on Vanua Levu), Kasa naloto (on Vanua Levu), Gau (on Kadavu) and Matakaro (on Ovalau).

KAVA TYPE 9:
MATAKARO LEKA





The Fijian name for this kava type (Matakaro leka) refers to the dark “scab like” (matakaro) lenticels that are characteristic of this kava type and the short internodes (leka).

Stems are green with many lenticels spread along the length of the internode. The lenticels tend to be dark purple, but may be green near the top of internodes. The internode tends to be green in colour although some purple colouration may be seen above the lower node of the internode. The internodes are short.

Matakaro leka is similar to Loa kasa leka, but Loa kasa leka has purple pigment over the length of the internode whereas Matakaro leka has very little pigmentation if any. Matakaro leka has a very strong colour contrast between the lenticels (very dark, almost purple) and the stem (green). The short internodes are the key point of difference between this kava type and Matakaro balavu which has longer internodes.

During the 2014 kava survey Matakaro leka was observed being cultivated on Taveuni, Vanua Levu, Viti levu and Kadavu. Local names used to describe Matakaro leka include: Loa (on Taveuni), Matakaro (on Taveuni), Matakaro leka (on Vanua Levu), Yagona ni koro (on Vanua Levu), Kasa loa leka (on Vanua Levu), Kavoronikaisau (on Vanua Levu), Damu (on Viti levu), Lovoni (on Kadavu) and Bera na vakaco (on Kadavu).

KAVA TYPE 10:
MATAKARO BALAVU





The Fijian name for this kava type (Matakaro balavu) refers to the dark “scab like” (matakaro) lenticels that are characteristic of this kava type and the long internodes (balavu).

Stems are green with many lenticels spread along the length of the internode. The lenticels tend to be dark purple, but may be green near the top of internodes. The internode tends to be green in colour although some purple colouration may be seen on the internode above the lower node. Internodes are long, and this is the key difference between Matakaro balavu and Matakaro leka. The plants sampled tended to be shoulder height, with an upright habit.

Matakaro balavu is similar to Loa kasa balavu, but Loa kasa balavu has purple pigment over the length of the internode whereas Matakaro balavu has very little pigmentation if any. Matakaro balavu has a very strong colour contrast between the lenticels (very dark, almost purple) and the stem (green). The long internodes are the key point of difference between this kava type and Matakaro leka which has shorter internodes.

During the 2014 kava survey Matakaro balavu was observed being cultivated on Taveuni, Vanua levu, Ovalau and Viti Levu. Local names used to describe Matakaro balavu include: Bisinisi (on Taveuni), Dokobana vula (on Taveuni and Vanua levu), Vula kasa balavu (on Vanua levu), Kasa vula (on Vanua levu), Matakaro balavu (on Ovalau) and Kadavu (on Viti Levu).

KAVA TYPE 11:
DOKOBANA LOA





The Fijian name for this kava type (Dokobana loa) refers to a large branch (bana) that could be used for planting (doko) and the dark colour (loa) of the stem.

Stems have many lenticels that are distributed evenly over the length of each internode. The lenticels are purple in colour, and the internodes have purple pigmentation which is darkest above the lower node and fades towards the upper node of the internode. The internodes are generally short. Petioles are generally dark red/purple in colour and the point on the leaf where the petiole joins the leaf has some purple colouration. The plants sampled tended to be head or shoulder height.

A key characteristic of this kava type is that the purple pigmentation fades below the upper node of the internode so that an area of green stem can be seen below the upper node. The areas of green stem distinguish it from Loa kasa leka and Loa kasa balavu.

During the 2014 kava survey Dokobana loa was observed being cultivated on Viti Levu, Kadavu, Vanua Levu and Ovalau. Local names used to describe Dokobana loa include: Damu (on Viti Levu), Loa (on Kadavu and Ovalau), Loa kasa leka (on Vanua Levu), and Loa leka (on Vanua Levu).

KAVA TYPE 12:
LOA KASA LEKA





The Fijian name for this kava type (Loa kasa leka) refers to the dark (loa) colouration of the stems (kasa) and the short length (leka) of the internodes.

Stems have many lenticels along the length of the internode and are dark purple to black in colour. Lenticels are raised, often with dark brown centres. Some green colour may be seen through the purple pigmentation, but the dark colouration dominates. Petioles are generally dark red/purple in colour and the point on the leaf where the petiole joins the leaf has some purple colouration. The internodes are generally short.

Loa kasa leka and Loa kasa balavu are very similar in appearance, but differ in the length of the internodes (Loa kasa leka is shorter).

During the 2014 kava survey Loa kasa leka was observed being cultivated on Vanua Levu, Taveuni, Kadavu and Ovalau. Local names used to describe Loa kasa leka include: Matakaro leka (on Vanua Levu), Dokobana loa (on Vanua Levu and Taveuni), Loa kasa leka (on Vanua Levu), Kasa Loa on Vanua Levu) and Loa (on Kadavu and Ovalau).

KAVA TYPE 13:
LOA KASA BALAVU





The Fijian name for this kava type (Loa kasa balavu) refers to the dark (loa) colouration of the stems (kasa) and the long length (balavu) of the internodes.

Stems have many lenticels along the length of the internode and are dark purple to black in colour. Lenticels are raised, often with dark brown centres. Some green colour may be seen through the purple pigmentation, but the dark colouration dominates. Petioles are generally dark red/purple in colour and the point on the leaf where the petiole joins the leaf has some purple colouration. The internodes are generally long. The plants sampled tended to grow to head height or higher, had few stems and had an erect habit.

Loa kasa balavu and Loa kasa leka are very similar in appearance, but differ in the length of the internodes with loa kasa balavu being longer.

During the 2014 kava survey Loa kasa balavu was observed being cultivated on Vanua Levu, Taveuni, Ovalau and Kadavu. Local names used to describe Loa kasa balavu include: Dokobana loa (on Vanua Levu and Taveuni), Loa kasa balavu (on Vanua Levu), Dokobana loa balavu (on Vanua Levu), Loa (on Ovalau and Kadavu) and Kabakabavale (on Kadavu).



PROPAGATION & PLANTING

PROPAGATION

Kava is propagated using cuttings from mature plants. To encourage healthy young plants it is important to select cuttings from stems of vigorous and healthy plants. Cuttings from older stems and from stems of lame and unhealthy plants are best avoided. One to two nodes in length is the normal cutting length from thick and healthy stems but can increase to four if the internode lengths of the stems are shorter and thinner than usual or if the cutting is taken from nearer the growing tip of the stem. These cuttings can be directly planted in the field or kept in a nursery for sprouting before planting. Farmers need to decide on how best to manage propagation based on their circumstances.

Key points for successful propagation:

- Choose cuttings from vigorous, healthy plants.
- Select clean stems that are free from disease, insects and rot.
- Use cuttings from the middle stems of the plant that are strong and woody. Cuttings from old parts of the plant may not produce shoots, and young tender stems will rot quickly.
- Cut stems near nodes and avoid using the tender growing tip of stems.
- Select cuttings with the eye of the bud still intact and not damaged on the nodes.
- Only use planting materials from farms that are proven to be pest and disease free.





SPROUTING KAVA CUTTINGS

Sprouting of cuttings for planting is not common but can be a very effective way of quickly establishing kava plants. An advantage of pre-sprouting before planting is that sprouted cuttings have a higher percentage of survival. Pre-sprouted cuttings are better able to compete against weeds, attack from pests and growing cuttings in a nursery makes it easier to spot plants that might be affected by disease. Direct planting uses more cuttings than pre-sprouted cuttings and has an unknown percentage of survival. However, care needs to be taken when pre-sprouting cuttings which should be kept damp but not overwatered as too much water can cause disease and poor growth.

There are three main techniques used to sprout cuttings. These are

1. Using potting bags or homemade pots. Potting bags are filled with rich top soil, sand, compost and in some cases sterilized potting mixes. Cuttings can be kept in this way for as long as one to six months before planting. The sprouted cuttings can then be transplanted into the field with minimal disturbance to their roots which allows them to continue growing. A disadvantage of this technique is that potting bags may be too expensive for some farmers.



2. Using woven coconut leaf baskets. Cuttings are put into woven baskets and covered with grass mulch, sometimes with a number of layers of cuttings and grass. They are watered on a daily basis and buds can usually be seen after three to four weeks, at which point they need to be transplanted into the field. Care needs to be taken to avoid damaging young roots when transplanting the sprouted cuttings.



3. Using a nursery bed. Cuttings can be spread out in a single layer and covered with a layer of loosened top soil under a shade and covered with a thick mulch of grass. These heaps need to be kept moist with regular watering. Cuttings will usually be ready for planting after three to four weeks. Care needs to be taken to avoid damaging young roots when transplanting the sprouted cuttings.



DIRECT PLANTING

Being able to identify the variety of kava from the moment it's planted is an important first step in producing quality kava. Remember to keep a record of the variety you are propagating and planting.

Direct planting is best done when there is plenty of planting material and the young kava plants can be visited regularly to care for by watering and weeding. If not properly managed directly planted cuttings may not establish well because of disease, competition between the cuttings and poor growth from irregular watering.

Direct planting is the most common method of establishing kava. Three to five cuttings are planted in a mound. Two nodes are to be below the surface and the other two or three above at an angle and covered with soil. Mulch is used to cover mounds, retain moisture and help in suppression of weeds and sprouting. Weeds growing on the mound are to be removed when sprouts are starting to appear and non-sprouted cuttings can be replaced. It is important that the cuttings planted in each mound are from a single variety. Once the cuttings are established it is also important to ensure that the plants do not compete for nutrients and light.

TRANSPLANTING SPROUTED KAVA

Young plants can be transplanted at any time from when the buds have sprouted until they are 20–30cm high and even 2–6 months old. Care needs to be taken not to damage the roots of older cuttings. The sprouted cuttings should be hardened for a few days before transplanting by reducing the amount of water supplied to it.

To transplant kava cuttings from a potting bag, dig a hole 30cm deep and ensure the width is wider than the potting bags so as to accommodate seedlings and potting soil. Carefully remove the potting bag and put the young plant with potting mix intact in the hole. More soil and mulch is added and plants are to be watered straight after planting. To transplant kava cuttings from nursery beds or baskets they can be planted into the holes soon after they are removed from their beds or basket to avoid drying out. Planting in the afternoon is recommended and also on wet or rainy days to help in quick recovery and early root establishment. Add more soil and mulch around the plants and watering soon after planting is essential if there is no rain.



CARING FOR YOUNG KAVA PLANTS

It is important that young kava plants are watered regularly and the use of mulch to retain moisture during dry periods is highly recommended. The first 6 months of growth is very critical since this is when kava plants tend to suffer from lack of water. Regularly remove weeds growing near the kava plants as weeds tend to compete for nutrients and water. Add compost, mulch or animal manure to help keep the kava plants growing vigorously. This is more important from the initial stages of planting to 2–3 years after planting.

For the provision of shade, traditional farming systems are always ideal for kava production as mixed crops usually provide shade that the kava plant needs during the early stages of growth from planting to at least two to three years.

Protection from wind is important as it can damage plants and make them vulnerable to the onset of diseases. Gardens (smaller sized plantings of kava often mixed with edible crops) or larger scale plantings surrounded by forests or tree crops that provide shade and windbreaks are ideal.





WEEDS, PESTS AND DISEASE MANAGEMENT

WEEDS

A good weed control regime is very important for a healthy crop, starting from planting to two or three years after planting. Weeds can be a big problem for kava production. Weeds can compete with kava for water and space and also spread diseases. For these reasons it is important to control weeds in order to produce good quality kava. Manual weeding around the plants is recommended at least 3 to 4 times a year. Brush cutters can be used with older plants but need to be used with great care so as not to physically damage growing plants.

Chemical weed control is not recommended to be used around and/or too close to growing plants but can be used in open spaces between the plants. This is to be done with great care so as not to damage kava plants or other intercrops.

PESTS

Pests can transmit diseases between plants and also make kava plants more susceptible to disease and decrease growth. This reduces productivity and the quality of kava. There are no records of major pests of kava in Fiji but there are some general pests to be aware of.

These are:

WEEVILS

Weevils are small insects that can damage roots or stems by burrowing into them and encouraging rots to develop. Resting the land after harvesting kava can help reduce populations of weevils.

APHIDS

Aphids are small flying insects that can damage the leaves by feeding on them and spreading diseases like kava dieback and other viruses. Removing weeds and not growing kava near vegetables including cabbage, cucumber, pumpkin, tomato and chillies can help to control aphids.

NEMATODES

Nematodes are very small worm like pests that are found in the soil throughout Fiji. These pests can damage the roots and rhizomes by feeding on them and spreading diseases which can then cause rots to develop. Resting the land after harvesting kava and not growing kava with vegetable crops can help to control nematodes.

SNAILS AND SLUGS

Snails and slugs damage emerging shoots of young plants. Note: Can be controlled by applying snail bait around plants or plantations. Wood ash applied around the plants or plantation may also help to control snails and slugs.



DISEASES

The major disease of economic importance to the kava industry in Fiji is kava dieback.

Kava dieback is caused by a virus (cucumber mosaic virus or CMV) and can be more severe if the kava is also stressed such as due to shortages of water or nutrients. It is spread on infected planting material and by aphids.

The stems of infected plants will rot and die back to the stem which can completely kill the plant. Earlier symptoms can include the leaves becoming yellow and they also may have dead and brown edges and crinkling, blistering or puckering.

There is no single chemical control for kava dieback but instead a package of practices should be followed:

- Start by using healthy seedlings or clean cuttings from healthy plants which come from disease-free areas.
- Stick to traditional methods of growing kava in sites of well separated and spaced intercrops and trees under natural forest systems. Good intercrops are crops such as dalo, dalo-ni-tana and under coconuts-based farming systems.
- Grow only on good soils with adequate shade and avoid nematode infested areas and nematode harbouring plants.
- Regularly check kava plants and destroy infected plants from plantations by removing them from the field and burn or bury them.
- 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).
- It is very important to clean tools like digging forks, sticks and knives between uses in different locations and farms or even between plants to stop the spread of any possible diseases especially kava dieback. All tools are to be cleaned after use and stored in a covered and dry area away from crawling insects and pests.
- The kava crop should be monitored regularly for aphids and if they appear to be a problem, it may be possible to control them with appropriate pesticides.

It is recommended that land should be rested after harvesting kava for a period of least 3 years. During this break that land should not be used to grow kava or other crops that are harvested. This break prevents the build-up of disease in the soil and allows the soil to replenish its nutrients and organic matter.



SYMPTOMS OF DISEASES



Kava dieback



Damage cause by nematodes to the lewena



Damage cause by Mould



Damage cause by Nematodes to the waka



Damage cause by Mould



ADDITIONAL AGRICULTURAL PRACTICES

PRACTICES TO ADOPT

The key to any profitable and sound agriculture enterprise is good agriculture practices. Consistently using good agricultural practices helps to ensure that farmers produce consistent yields of good quality produce.

Kava growing is no different. Kava has always been a traditional crop that is significant to the culture of the Fijian people. Increased commercial production of kava requires a well-managed and sustainable cropping system to ensure continuous economic benefits.



GOOD CROP HUSBANDRY

Care needs to be taken managing kava crops to ensure they are healthy and productive. The aim is to make sure that the kava plant can grow to its full potential, encouraging a healthy and extensive root system. Fertilizer, chemicals, weeds, pests and diseases all have different impacts on the health of the plants and the productivity and quality of kava when it is harvested.

Care should be taken to ensure that kava plantings are free from weeds that might compete for nutrients, light and moisture. Weeds can also get mixed up with kava when it is harvested. The crop should be regularly checked for pests and diseases. The use of fertilizer and other chemicals should be carefully controlled to make sure they are not used excessively.

Ministry of Agriculture officials can advise on the best way of growing kava, including appropriate rotations to use to avoid diseases and pests accumulating and reducing yields. Good Agricultural Practice (GAP) techniques should be followed where appropriate, especially to help to build-up soil organic matter and help retain moisture and nutrients in the soil.

FERTILIZER USE

It is always important to take soil tests before planting to know the fertility of the soil and whether it is necessary or not to use fertilizers. Suitable types of fertilizer and rates can then be worked out from soil test results. In some cases, fertilizer may be required to obtain the best yields of kava, and in these circumstances fertilizer may assist plants compete against disease, pests and weeds. Fertilizers should be applied sparingly and care should be taken not to over-fertilize. Over-fertilizing plants is a waste of money but also can pollute streams and may encourage the growth of weeds. Fertilizer is sometimes applied during early stages of growth to assist kava plants to outgrow weeds and help the kava plants get established. During the early stages of growth a basic fertilizer guide is:

- NPK: Mix 30g with the soil at planting per mound; and
- Urea: 30g per mound at 4 weeks after planting and to be well incorporated with soil.



Most farmers do not use chemical fertilizers, but some farmers are now using mineral fertilizers which slowly release nutrients to the plants in their growth period. Animal manure that has been thoroughly composted to destroy harmful microorganisms and weed seeds can also be used as a fertilizer. Human excreta must not be used as a fertilizer owing to the potential presence of infectious microorganisms or parasites that might accumulate in the soil or contaminate the kava.

CHEMICAL USE

Pesticide and herbicide applications should be avoided as much as possible to avoid residues in the kava and damaging the environment. Integrated pest management and manual control of weeds and pests should be used as much as possible. Any agrochemicals used to promote the growth of or to protect kava plants should be kept to a minimum, and applied only when no alternative measures are available. Chemicals should only be used according to the instructions and the application rates described on their labels. Chemical labels should be carefully read and understood before the chemical is used. Care should be taken to make sure that the chemicals are not used next to streams or run into streams as this will pollute the water and make it unsafe for drinking and other uses.

Applications of chemicals, including the type of chemical and how much was applied, should be recorded in farm records. It is important that the people applying the chemicals understand how it should be applied and use appropriate equipment (such as overalls or spare clothes, gloves, goggles, face mask). Where possible, those applying chemicals should have appropriate training to make sure they know how to handle and apply chemicals safely. Chemicals will often have a minimum time interval between chemical treatment and when plants can be harvested after treatment and this should be written on the label of the chemical. Kava should only be harvested once the minimum time interval has passed.

Empty and used chemical containers should be disposed off safely by burying deeply in safe places well away from water ways and sources.



KEEPING RECORDS

It is useful for farmers to keep regular records of what they do on their farm to produce kava. This can be used to remind farmers of what has been done in past years, and how those practices might have influenced yields and the quality of kava. Regularly reviewing these records can help farmers to identify ways of improving the quality and yields of the kava they produce.

Keeping records is increasingly a normal part of farming in Fiji with basic information such as time of planting, amount harvested and price received being commonly recorded.

The types of activities that are useful to keep in farm records include:

- When and where kava was planted, and the types of varieties planted;
- If particular pests, weeds or diseases occurred in different parts of the farm, how were they controlled and how much did it cost to do this;
- If kava growth was poor on some parts of the farm, if it was affected by disease or drought,
- and whether it requires fertilizer or if the land is unsuitable for planting kava;
- when and where kava was harvested, how much was harvested and how much of each variety was harvested; and
- the selling price of kava at the market.

This type of information can be reviewed by farmers to help them:

- understand the value of their crop;
- improve consistency of production and quality; and
- remember and schedule when to do certain activities such as apply fertilizer or other supplements or control weeds and pests.

Some buyers or middlemen may ask that pesticide is not sprayed on a crop in the weeks before it is harvested, and records can help to show that the crop is free of pesticide. Records can also help farmers understand how profitable their farm is, understanding what return is made from the crop after the costs of fertilizer, pesticides and transport have been taken into account.



FARM WORKERS

Farm workers are an important link in producing quality kava. When a farmer wants to produce good quality kava it is important that farm workers are carefully told what they need to do so that the work is done properly. Farm workers can affect kava quality through their work of planting and maintaining kava crops and also during harvest.

When assisting on the farm, farmers need to clearly explain to workers what needs to be done so they can help ensure the kava crop is productive and of high quality. This is particularly important when workers are using chemicals and they need to know how to apply chemicals safely.







HARVEST AND POST-HARVEST



HARVEST

Harvesting is an important step in producing good quality kava. Care should be taken to harvest as much of the roots as possible and ensure that they remain intact to reduce the chance of spoilage when they are washed, dried and stored. Kava can rot quickly once harvested, and it is easily damaged by careless uprooting of plant, overfilling sacks and rough handling of harvested crop.

Damaging kava at harvest may result in a lower quality product and poor prices. As the kava plants get older their rhizomes and roots get bigger and have more dry matter (so less moisture). The size and dry matter of the rhizome and roots produced by the plant over time depends on the variety and locating.

Harvesting needs to be done once the kava plants are mature enough to ensure that there is an acceptable yield and kavalactone content. This is generally when the plants are at least 3 years old. Plants can be left longer in the field as long as the plants are healthy. Depending on age and the variety, the large rhizome can be 30–60cm thick and the upper roots 2 to 3m long or longer at harvest.

Harvesting of kava plants begins by cutting the leaves and stems of the plants above the first two nodes. If being used for direct planting or propagation the stems should be treated carefully so as not to damage them then separated into the different varieties ready for planting.

Soil around the plant is loosened using a digging fork or stick to expose all surface and subsurface lateral roots before digging under the rhizome for the anchor roots to loosen the plant from the soil before lifting it off the ground. Make sure as many roots as possible are uprooted with the plant.

During harvest, care should be taken to ensure there is little or no damage to the plant and no foreign matter, weeds or toxic plants are mixed with the harvested kava. Clean tools (forks, spades) between uses in different locations to stop the spread of any possible diseases. It is important to clean and sharpen knives before use to avoid introducing disease or damaging propagating material. Clean and store all tools in a covered and dry area (not on the ground) away from animals.

Freshly harvested kava should be cleaned and dried as soon as possible after harvest to avoid further damage and spoilage. Any parts of the kava plants not being used as well as any damaged or diseased kava (including damaged and diseased roots), and any weeds and rubbish should be collected and disposed of in an area of the farm that is not used for planting kava.

POST-HARVEST

The process of washing, cutting, trimming and drying harvested kava is an important step in ensuring quality. This processing helps to: allow the kava to be thoroughly cleaned from soil and foreign materials; reduce drying time; prevent damage from mould, other microorganisms and insects; and reduce or remove toxic chemicals in some plant parts.

Care is needed to make sure that once clean the kava stays clean and does not get dirty or contaminated. Contamination can include soil, insects, grass, foreign material like plastic or animal waste. During all steps in this process, any decomposed and damaged kava should be identified and discarded in order to avoid a loss of product quality.

Depending on the export market the kava may need to be supplied to the processor/exporter in dried or fresh form and certain plant parts. The handling of kava by farm workers during harvest and when washing, drying and packing is important for quality. Good hygiene of workers and clean equipment is an important part of ensuring a quality product.

CUTTING/ SEPARATION

During and after washing the kava roots should be separated to help drying and ensure that soil is properly removed from around the roots. Cutting is done to separate the roots and make sure that all parts of the root can be cleaned. After cutting no large pieces of soil should be attached to the roots, and the roots should be ready for more thorough washing. As part of the separation process contaminated or diseased parts of the plant should be removed and put to one side for disposal. Clean and sharp knives should be used to avoid contamination of the kava.

WASHING

The kava should be thoroughly washed to remove all soil particles. The soil can reduce the quality of the kava by encouraging rot and buyers or importers may not accept a dirty product. Washing should be done in a flowing stream or with high pressure hoses using clean water. Kava can be cleaned in a water tub or an open drum if running water is not available and then rinsed with clean water to ensure it is thoroughly cleaned. Properly cleaned kava should have no visible dirt on its surface. Chemicals (including soaps, detergents and bleaches) should NOT be used during washing. When roots are very dirty they may be soaked overnight to ease the cleaning process.





Washing helps to identify parts of the plant that are damaged and check that it is a good quality product. Thorough washing also helps to speed up drying. Soil particles hold moisture and cause mould to grow on the roots.

Unwashed kava can also cause difficulties for processing, and creates extra work for the middleman/processor as it needs to be properly cleaned before

processing. Where water is not available, all loose soil should be removed from the kava. Shake the roots vigorously during this process to dislodge as much soil as possible, taking care not to damage the roots. The kava should then be dried as quickly and as thoroughly as possible. Once dry, any remaining soil should be removed from the roots by gently scraping with a clean and sharp knife.



CUTTING/CHIPPING

The rhizome of the plant (lewena) where the roots join the stem should be separated and then peeled, well cleaned, and cut/chopped into thin even slices for drying. Lewena should include, at most, only the first two nodes of the stem (kasa). The slices should be no more than 1.5cm thick to ensure quick and even drying. In most cases the chipped lewena is soaked in water overnight before drying. Again, it is important that sharp, clean knives are used and that the lewena is kept off the ground and away from any possible contamination.

Peeling removes the outer layer which can contain toxins (alkaloids) and should be done with a clean, sharp knife or a peeler. Peelings are of very poor quality and should be kept separate and disposed of. Peelings should not be sold or consumed as they are a poor quality product that contain toxins.

The quality of different parts of a kava plant vary significantly, particularly the kavalactone content, and it is important that the different parts of the plant are kept separate. Keeping the different parts of the plant separate also helps to ensure the different parts are dried uniformly and that the different parts can be sold separately at the market. Different buyers may want different products but the recognised kava products are:

- **Roots or waka (loose or bundled)**
- **Chips or lewena (rhizome, must always be peeled).**

To begin with, the roots (waka) are cut off and the waka should then be kept separate from other parts of the plant. The kava may need to be washed again as this process can expose dirt that has been hidden in the plant. It is important that sharp, clean knives are used and that the kava is kept off the ground to avoid contamination from soil, insects, grass, or foreign material like plastic or animal waste.

The stems (kasa) are a low quality product with low quantities of kavalactones and are not recommended to be sold or consumed.

DRYING

Thorough drying is crucial. The biggest challenges are getting the moisture content as low as possible to prevent the kava from mould and that it does not get dirty or contaminated during this process. Kava that is not dried properly is lower quality and can result in a lot of waste. Care must be taken to achieve uniform drying and this is helped by regularly turning or stirring the pieces of kava.

Typically, 4 to 6kg of green kava is required to produce 1 kg of dried kava. The kava needs to be dried to 12% or less moisture to prevent mould growth. When it is dry enough it should easily snap when bent with your fingers. It needs more drying if it is soft and can bend. The different plant parts should be dried separately because they take different times to dry.

Care should be taken when transporting the kava to be dried so that the kava is not damaged. Damage can result from overfilling sacks, throwing sacks or stacking sacks on top of each other. Plastic or 'non breathable' bags should not be used, and fresh kava should not be stored in bags or tarpaulins. The time between harvest, washing and transport of crop to the drying site should be kept as short as possible. Where possible the washing site and drying site should be close together to avoid contamination between washing and drying and minimise any damage that might occur in transport. The kava should be inspected and sorted prior to drying.

Things to look for when spreading the kava out to dry include:

- inspect for and remove contamination such as other plants, stones; and
- inspect for and remove diseased and damaged plant parts, and check for irregular appearance, size, colour, and odour that might indicate bad taste.

Natural drying

Kava is usually dried in the open air in direct sunlight by placing the washed and cut kava in thin even layers on drying racks or metal roof sheets. The drying racks should be placed at least 50cm above the ground to help air circulation and prevent the drying kava from being contaminated by animals, soil, plant material or other foreign matter .





Drying racks should be kept clean and regularly maintained

At night, kava on drying racks should be covered to protect it from rain and dew. 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. It is possible to re-dry kava a number of times but the quality will deteriorate and it is more likely to be affected by mould.

Never dry the kava directly on the ground. If a drying frame is not available then dry the kava on a clean concrete surface that has been covered with a clean tarpaulin or other clean cloth or sheeting.

Drying with heat sources

Dryers can be used to produce high quality kava that is evenly and thoroughly dried, and this can significantly reduce problems with mould. However, dryers need to be well designed to avoid other quality problems such as smoky odours or damaging the kava because of intense heat. Dryers that circulate normal or hot air can both work well. These include drying ovens/rooms and solar driers; by indirect fire; or baking. The use of dryers is currently uncommon in Fiji .

When using dryers, the kava should be dried at no more than 60°C (too hot to touch) otherwise it can discolour or have reduced kavalactone levels. Do not dry kava in dryers for copra or cocoa as it can pick up odours or residues.

Dryers are not commonly used in Fiji and work is needed to develop suitable designs and procedures

Dried kava should be checked for spoilage and other damage as well as any foreign materials before it is sorted and packed. Sorting is important to remove poor quality material and ensuring kava is high quality before it is transported to market. For example kava that is black, old, has insect holes or is mouldy are all indicators of poor quality. DO NOT add sticks, stones or other contaminants to the kava being taken to market. A kava buyer may not buy the kava or may buy it at a reduced price when these contaminants are seen.

Depending upon the buyer it may be possible for a farmer to get better prices by separating the kava into different levels of quality



PACKING

The clean and dry kava should be packed in clean, dry sacks, bags or boxes especially for chipped lewena. Clean white woven polypropylene bags are generally the best type as they let the dried kava breathe.

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. Reusable packaging materials such as sacks and tarpaulins should be well cleaned and dried before re-use. When not used, packing materials must be stored in a clean and dry place. Dried waka are usually tied in bundles and bales and then stored.

It is good practice to label the packed kava with the name of the farmer, the variety and the plant part (e.g. waka, lewena) for delivery to the buyer. Whenever possible, the way the kava is packed should be agreed between the supplier and the buyer. For example, the buyer may prefer loose kava rather than those tied into bundles so that it is easier to check for quality. Buyers may also have particular requirements for how the kava varieties and plant parts need to be separated, sorted or labelled.

It is important that kava is stored in a clean, dry and well ventilated place and protected from contamination to maintain its quality before it is taken to market. Avoid storing kava near strong smelling substances such as farm or household chemicals, kerosene, petrol, diesel or spices as this may contaminate or affect the aroma of the kava.

Where possible, the kava should be kept off the floor and away from walls to help the circulation of air and reduce the possibility of mould. Hanging bundles of dried kava roots (waka) from ceilings is a good method of storage.

The floor should be tidy, without cracks and easy to clean. Care should be taken if mice/rodent baits or other pest control measures are used so that they do not come into contact or otherwise contaminate the kava. Whenever possible, the conditions for temporary storage and transport should be agreed between the supplier and buyer.





STORAGE ON FARM

TRANSPORTATION

It is possible to damage the quality of kava during transportation. Care needs to be taken when transporting the kava that it remains clean, dry, well ventilated and protected from contamination. Beyond the farm gate quality issues for kava remains important.

QUALITY ISSUES

For farmers, remember you will have high quality kava if it:

- is mature (generally at least three years old);
- is clean and free of soil;
- is dry and free of mould;
- is not heat damaged;
- is separated into lewena and waka;
- contains no foreign matter or other adulteration;
- has good appearance and aroma; and
- is labelled and packed in clean bags or other material under hygienic conditions.

SORTING

Once purchased by a kava trader, the kava should again be checked for quality and sorted prior to storage. The way kava is sorted and graded will depend on the kava buyer and the markets to which they are selling. Kava buyers expect to receive clean and dry kava, but they do need to check the quality of the product they are purchasing. After delivery the kava will normally be unpacked, inspected, sorted and graded into different qualities.

Kava that is wet or does not pass the “snap test” should be re-dried thoroughly to ensure it does not go mouldy during storage. Dirty, mouldy or otherwise contaminated kava should be further cleaned, sorted or disposed of.

It may be appropriate for the trader to taste test kava if it appears damaged or dirty before processing it to make sure it does not affect the quality of the rest of their product.





QUALITY AFTER THE FARM — BUYERS, PROCESSORS AND EXPORTERS

PROCESSING

Kava is often further processed before sale, usually by pounding the dried material so it can be purchased as a powder ready for preparing the traditional beverage. Care needs to be taken ensure that the quality of the kava is maintained during processing and its subsequent packaging. Processing can impact on quality by introducing contaminants if equipment is not clean. It may also be possible to overheat the kava during processing which can reduce quality. To produce a quality product it is important that processors use consistent qualities of kava and that they have in place standard operating procedures for processing their kava.

In general, equipment used in the processing of kava should be:

- regularly checked and serviced to ensure that they are in good working condition at all times
- regularly well cleaned to ensure that any remaining material or residue does not contaminate subsequent batches
- be made from appropriate materials that can withstand the processing routine without any abrasions to contaminate the processed kava.

Additional care is needed in the design and operations of facilities where kava is further processed to ensure that food safety issues are identified and managed. In addition the hygiene of workers, inside and outside of the processing facility is also very important

PACKAGING

Packaging for processed kava is very important to maintain quality after being processed. Materials for packaging and methods of packaging plays an important role for maintaining the quality of processed kava to the standard enjoyed by consumers. Using of plastic and vacuum packaging is seen to be efficient for maintaining quality of the processed kava product.

STORAGE

It is important that traders also store kava in places that are clean, dry, well ventilated and protected from contamination. Well packaged processed kava can have long storage life.



CONCLUSION

The Fiji kava quality manual is produced with the ultimate goal of improving and maintaining the quality of Fijian kava and its products. It is to ensure that stakeholders have access to key scientific, agronomic and other technical information so that Fijian kava and its product are safe and of the best quality to meet local and overseas markets expectations. The manual is a living document and subject to changes and improvements in response to the evolving understanding of good production practices and market requirements and demands.





APPENDIX

APPENIX 1

KAVA CHEMOTYPE

Generally kava is traded as dried waka (roots) and pieces of dried lewena (stem) cut into slices or chips. It is quite impossible to recognize the different kava varieties when they are dried. The chemotype of kava once it has been dried can only be determined by laboratory testing. The chemotype of waka and lewena can be different even though they may have been taken from the same plant. Otherwise, chemotype is consistent across plants of the same variety, and also remains consistent when plants of the same variety are grown in different locations. The chemotype of a variety does not vary with age, however the total concentration of kava lactones does increase with the age of the kava plants.

Laboratory testing is used to determine both the total amount of kavalactones, as well as the concentrations of the six kavalactones used to determine chemotype. Because chemotype of the waka and lewena can differ it is important to take care when collecting samples to be sent to the laboratory for testing. A preliminary analysis of the varieties sampled during the 2014 kava survey is included below for information. Further work and analysis is required to ensure that these results are truly representative of the Fiji kava varieties, and it is important that the laboratory chemists are consulted when you are looking to sample varieties and interpret the results of kavalactone analysis.



Table 1: Variety and Chemotype of Fijian Kava, based on preliminary analysis by the USP IAS laboratory and single samples of different varieties sent to HerbResearch (Germany).

	VARIETY	IAS- CHEMOTYPE	GERMANY
1	Vula Kasa Leka	426531 (Lewena)	426531
		426531 (Waka)	
2	Vula Kasa Balavu	426351 (Lewena)	
		426531 (Waka)	
3	Dokobana Loa	426351 (Lewena)	426531
		426531 (Waka)	
4	Dokobana Vula	426531 (Lewena)	426351
		463251(Waka)	
5	Damu	426351 (Lewena)	426531
		462351 (Waka)	
6	Loa Kasa Balavu	426531 (Lewena)	
		462351 (Waka)	
7	Loa Kasa Leka	426531 (Lewena)	426531
		462351 (Waka)	
8	Matakaro Leka	426531 (Lewena)	426531
		462351 (Waka)	
9	Matakaro Balavu	426351 (Lewena)	426531
		462351 (Waka)	
10	Qila Balavu	426531 (Lewena)	462351
		462351 (Waka)	
11	Qila Leka	246531 (Lewena)	426531
		426531 (Waka)	
12	Yonolulu	426351 (Lewena)	462351
		46235(Waka)	
13	Yalu	462351 (Lewena)	426531
		426351 (Waka)	

APPENIX 2

BE AWARE: FALSE KAVA - YAQONA NI TOGA

Kava varieties vary in appearance, but they all belong to a single species called *Piper methysticum*. A weed called false kava (*Piper auritum*) or *Yaqona ni Toga* shares some similarities in appearance, and care should be taken to not mistake false kava for kava when planting or establishing new farms.





False kava stems have long thick internodes and are a pale yellow-green colour. Lenticels are seen as many small brown, raised dots that are evenly distributed over the length of the internode. The pale yellow-green leaves of false kava are large and have a pinnate vein pattern with unequally lobed basis. The leaves have a dense margin of short hairs along the edges. False kava plants tend to grow quite tall (above head height), and each plant usually has a single stem. The plant can spread by producing sprouts from its roots. This spreading growth is not seen in kava.

When false kava is mixed it greatly decreases quality and causes nausea. False kava creates a bad taste when mixed with kava and does not have any 'kick'. False kava does not have the same properties of true kava. False kava is very invasive, grows twice as fast as true kava and quickly takes over the habitat in has invaded. False kava can be easily identified and plants should be uprooted and destroyed if found on a farm to prevent its spread. It is very important that false kava is not mixed with kava.





Prepared, printed and distributed with assistance from the Australian Government and New Zealand Government through the Pacific Horticultural and Agricultural Market Access (PHAMA) program, Pacific Community's Pacific Agriculture Policy Project (SPC PAPP) and the University of the South Pacific (USP).

The PHAMA program is administered by AECOM-Kalang and aims to improve economic growth and livelihoods in Pacific countries by increasing Pacific horticultural and agricultural exports to international markets.



PHAMA
Pacific Horticultural & Agricultural
Market Access Program
An Australian Government initiative



Pacific
Community
Communauté
du Pacifique



USP
THE UNIVERSITY OF THE
SOUTH PACIFIC

AECOM

KALANG