



# Pacific Horticultural and Agricultural Market Access Program (PHAMA)

## Report to the Fiji Market Access Working Group (FMAWG)

Development of a Report to the FMAWG outlining Export Issues for Taro to  
Australia and New Zealand

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## Abbreviations

<b>Abbreviation</b>	<b>Description</b>
ACIAR	Australian Centre for International Agricultural Research
ALOP	Appropriate Level Of Protection (Australia)
AQIS	Australian Quarantine and Inspection Service
FACT	Facilitating Agricultural Commodity Trade
FMAWG	Fiji Market Access Working Group
HIS	Import Health Standard
ISPM	International Standards for Phytosanitary Measures
NZMAF	New Zealand Ministry of Agriculture and Forestry
PCN	Potato Cyst Nematode
PHAMA	Pacific Horticulture and Agriculture Market Access Program
STPP	Short Term Personnel Project
URS	URS Australia Pty Ltd

## Executive Summary

There has been considerable focus in recent years on the taro export supply chain in Fiji, and the Pacific as a whole, with the objective of improving and expanding export opportunities. There are still, however, significant impediments that are yet to be overcome before this objective can be achieved.

Major quality and phytosanitary issues in the supply chain continue to hinder current access, and, if left unchecked, could result in a reduction in opportunities rather than a desired expansion.

The Pacific Horticulture and Agriculture Market Access Program (PHAMA), along with two current Australian Centre for International Agricultural Research (ACIAR) projects, is concentrating on resolving these issues through complementary and systematic research into the underlying issues. While there is no short term resolution available it is expected that significant gains will be made in the mid-term.

It has been recommended that the Fiji Market Access Working Group (FMAWG) continue to keep apprised of the ongoing outcomes of these programs and projects, and to encourage respective industry and government parties to participate in, and lend their full support to, these activities as necessary.

## Recommendations

Based on the issues identified during the course of this study it is recommended to the FMAWG that:

- The FMAWG should remain apprised of the outputs of the PHAMA program and ACIAR projects detailed in this report.
- The FMAWG should participate in these programs and projects wherever practical, and encourage respective industry and government parties to participate in, and lend their full support to, all activities as necessary.
- The FMAWG considers the value of two key quarantine export staff attending taro inspections in both New Zealand and Australia to gain an understanding of the methodology and techniques used during taro import inspections in these countries, with the aim of implementing changes to Fiji's taro export inspections to reflect the rigour of these inspections.

## Background

### 1.1 The Fijian Taro Export Industry

As Fiji's second largest agricultural export taro is a significant contributor to the local economy, with annual exports of approximately F\$20 million being achieved. Taro is grown throughout Fiji, however export taro crops are predominantly concentrated on the Island of Tavenui, and to a lesser scale, on the main Island of Vitu Levu close to the Port of Suva.

Given its importance in Fiji and throughout the Pacific taro has received considerable attention over the past few years in terms of its agronomy, management and the export supply chain. Significant issues relating to the quality and phytosanitary status of Fijian taro entering the Australian and New Zealand markets during the past few years have seriously impeded any growth in the export industry. The European Union-funded Facilitating Agricultural Commodity Trade (FACT) project recently commissioned a Pacific Island Taro Market Access Scoping Study which provided an in-depth review of these issues and recommendations for their resolution.

The Australian Centre for International Agricultural Research (ACIAR) has been very active in taro research in the South Pacific during the past few years, and is currently funding research into soil health improvement and assisting Pacific Island Countries implement supply chain standards and potential treatments to facilitate taro exports.

### 1.2 Australia's Phytosanitary Requirements for Imported Taro Corms

Australia's import requirements for taro corms (*Colocasia esculenta*) for consumption are based on global imports. That is, the requirements provide for any taro-producing country that desires to export taro corms to Australia.

#### 1.2.1 Generic Import Conditions

The following, generic, import conditions are applicable to imports of all fruits and vegetables into Australia:

- An import permit is required.
- Phytosanitary certification must accompany each consignment.
- Consignments must be free of live insects, disease symptoms, soil, trash and other debris, and seed contaminants.
- Consignments must be insect-proofed and packed in clean, new packaging material.

## 1.2.2 Specific Import Conditions

The following, specific, import conditions are applicable to imports of taro corms from all countries:

- All varieties of taro (*Colocasia esculenta*), except *Colocasia esculenta* var. *antiquorum* (small corm taro) are permitted entry into Australia. In order to ensure that var. *antiquorum* does not enter Australia fresh taro corms must conform with the morphological criteria particular to *Colocasia esculenta* var. *esculenta*, being:
  - Corms must be at least 15cm in length or at least 7cm in diameter at the widest point,
  - Corms must be at least 300g in weight,
  - Corms must be free of lateral buds or shoots,
  - Corms must lack shaggy hairs.
- Each consignment must be accompanied by a phytosanitary certificate endorsed with the following additional declarations:
  - “The taro in this consignment is *Colocasia esculenta* var. *esculenta* and not *Colocasia esculenta* var. *antiquorum*.”,
  - “The tubers have been inspected and are topped and free from all foliage including petiole bases, and free from sprouting suckers and attached daughter corms, and are free from soil.”,
  - “The product is free from Potato Cyst Nematode (PCN) (*Globodera rostochiensis* and *Globodera pallida*) and potato black wart fungus (*Synchytrium endobioticum*)”, OR “PCN (*Globodera rostochiensis* and *Globodera pallida*) and potato black wart fungus (*Synchytrium endobioticum*) are not known to occur in the country of origin.”

## 1.3 New Zealand’s Phytosanitary Requirements for Imported Taro Corms

New Zealand’s import requirements for taro corms are provided on a Country:Commodity basis; not all countries have access into New Zealand for this commodity. New Zealand’s Import Health Standard (IHS) for taro from Fiji is a ‘roll over’, meaning that it has been in existence for some time and predates the new IHS schedule arrangement used by New Zealand.

The following import conditions apply to taro from Fiji and are generic for imports of all fruits and vegetables into New Zealand:

- Phytosanitary certification must accompany all consignments,
- Consignments must be free of live insects, disease symptoms, soil, trash and other debris, and seed contaminants.
- Consignments must be packed in clean packaging material.

## The Taro Export Pathway in Fiji

The taro export supply chain has been well documented in Fiji, with the recent FACT market access scoping study lead by Dr Andrew McGregor<sup>1</sup> providing extensive coverage of the pathway and associated issues. The quality and quarantine issues detailed in the study were discussed with government and industry parties in Suva as part of this Pacific Horticulture and Agriculture Market Access Program (PHAMA) Short Term Personnel Project (STPP). The following discussion draws on the FACT scoping study and the PHAMA STPP visit to Suva to give a brief overview of the pathway along with the major issues that are experienced during each process. The discussion will concentrate on the major production area of Taveuni.

### 2.1 Production

Taro is grown throughout Fiji, however, the bulk of the export crop (approximately 70%) is produced on the Island of Taveuni. The remainder of the export crop is predominantly grown on the Island of Viti Levu within a relatively close proximity to the Port of Suva. Production on Taveuni is limited by land availability; crop rotation (including fallow periods) is often not integrated into production and has been identified as the major contributor to declining productivity on the Island.

Access to good quality planting material has also been identified as an issue. Smaller size planting material correlates with small corm production, which is also likely a symptom the decline in soil health on Taveuni.

No significant pest and disease issues affecting production were noted during the Short Term Personnel Project meetings. Taro beetles (*Papuana* spp.) are a major production pest of taro but are restricted to the Island of Viti Levu. The serious fungal disease Taro leaf blight (*Phytophthora colocasiae*) and serious viral diseases Alomae and *Colocasia* bobone disease are not present in Fiji.

### 2.2 Harvest

Corms are preferably harvested at full maturity (up to 10 months of age), however there is pressure from time to time to harvest at an earlier stage. At full maturity the root mass has reduced, making harvest easier, and water content is down leading to less spoilage in the corms. Harvesting at an earlier stage, when the root mass is still vigorous, is more difficult and can be more damaging to the corm. Post harvest rot onset is typically quicker in immature corms.

Soil and extraneous plant material (fibre and roots) are removed from corms in-field. Corms not of healthy, uniform appearance, or with physical damage or disease symptoms, are rejected in the field. However, cleaning is often very rudimentary and it can often be difficult to observe damage or disease symptoms where significant soil or debris remains on the corm. Headsets are trimmed to a length of approximately 15 – 20cm and the outer petiole is removed before corms are packed into polythene sacks and moved from the field. Sacks are typically overpacked and hold between 25-30 corms. The reason for overpacking is because freight charges are based on the number of sacks, not weight.

Sacks are moved from the field to a collection point. Handling of the sacks can be very rough, with an emphasis on getting the job done quickly rather than preserving the quality of the corms. Sacks are

<sup>1</sup> McGregor A, Afeaki P, Armstrong J, Hamilton A, Hollyer J, Masamdu R, Nalder K (2011) Pacific Island Market Access Scoping Study. Facilitating Agricultural Commodity Trade Project.

plied at the collection point, where they are typically exposed to the elements and may sit for hours until they are collected.

### **2.3 Transport to the Middle-Buyer Premise**

It is usual, at least in the major production area of Taveuni, that a middle-buyer is involved in the taro export supply chain. The middle buyer essentially acts between the grower and exporter and performs an intermediate grading function. It is usual for the middle-buyer to collect taro from the grower's farm. Sacks of taro are stacked onto the truck at the grower's property, generally with little regard to the treatment of the product. Bags may be stacked as high as possible to enable maximum use of the payload. Little regard is given to corms at the bottom of the stack.

Access roads between the production site and middle-buyers are reportedly in poor condition with the load receiving significant jolting, shaking and vibration.

### **2.4 Middle-Buyer Processing**

Upon arrival at the middle-buyer's premise the sacks of taro are roughly unloaded and the corms tipped from the sacks onto the floor. It is unclear what level of cleaning is undertaken at this point in the supply chain before taro are graded and repackaged into sacks (~50-60kg each) for transport to the exporter on Viti Levu.

Repackaged taro may be kept at the middle-buyer's premise for up to two days until a roll on-roll off ferry is available to move product to the Island of Viti Levu. Storage conditions are basic with no cooling facilities.

### **2.5 Transport to the Exporter's Premise**

Sacks are stacked onto a truck, approximately 10 bags high, and transported to the ferry. Sacks of taro remain on the truck during the voyage to Viti Levu, which takes approximately 12-14 hours. On arrival, the taro is transported to the exporter's premise. The total time that sacks remain on the truck is approximately 18-20 hours.

### **2.6 Exporter Processing**

Taro are roughly tipped onto concrete floors for processing. Taro may be washed either by hand or in a tumble washer, depending on the exporter. Headsets are trimmed to approximately 10cm for the New Zealand market or taro are completely topped for the Australian market. Taro are repacked into clean sacks, typically while they are still wet, and tightly packed into a shipping container. It is only at this point, sometimes up to five days after the taro is harvested, that it is cooled to the optimal storage temperature (~10°C).

## Issues and Opportunities

Issues relating to taro production and handling in the supply chain have been well-documented, and were briefly outlined in the preceding section. Some of these production and handling issues can be directly linked to the quality and phytosanitary issues the Fijian taro industry is facing in the New Zealand and Australian markets, while others need to be considered in isolation.

These issues associated with the New Zealand and Australian markets are outlined in the discussion below, and linkage to production and handling issues in the supply chain are provided where applicable.

Where there are opportunities for PHAMA or other programs or projects to assist in resolving these issues these opportunities are identified in the boxed sections.

### 3.1 The New Zealand Market

#### 3.1.1 Phytosanitary Issues

Interceptions of insects and other invertebrates on Fijian taro shipments at the New Zealand border are common. A significant proportion of Fijian taro consignments are treated prior to release in New Zealand, a process that is costly to the taro industry in terms of treatments costs and reduced shelf life of the corms. It is questionable whether the requirement for treatment is justified in many instances, however, a concerted effort to resolve the issue has yet to be mounted.

#### *Nematodes*

In Fiji's experience over the past few years nematodes have been intercepted on a large proportion of consignments, and this has been the subject of much frustration to exporters, importers and the New Zealand Ministry of Agriculture and Forestry (NZMAF). While it is probable that many of these nematodes would be saprophytic and not of quarantine concern, consignments have been held and subjected to fumigation, with a resultant reduction in the profit margin and shelf life of these consignments.

It is apparent that the major factor in these unwanted, and perhaps unnecessary, fumigation treatments is the inability of NZMAF to make an identification of these nematode species at the time of interception. Nematode identification is a specialist activity which requires substantial training and cannot reasonably be expected of inspection staff at the border, and in many instances, from generalist pathologists that undertake identifications of interceptions.

Given that identifications can be expensive, and often inconclusive, it is likely that importers are opting to have consignments fumigated without identifications being undertaken to facilitate their timely release and meet market demands.

Both PHAMA and the ACIAR Research Project PC2007/118 *Developing cleaner export pathways for Pacific Island commodities* are assisting to improve and resolve this issue. PHAMA may assist in clarifying the taxonomy of nematode species present in Fiji and facilitate negotiations with NZMAF to review their quarantine status, with the aim of reducing the level of quarantine interventions experienced at the New Zealand border. ACIAR Research Project PC2007/118 will complement this approach through providing research into potential treatments for planting material and harvested taro corms to reduce the nematode load on exported corms.

An additional ACIAR Research Project, PC/2009/003 *Improving soil health in support of sustainable development in the Pacific*, will link into both PHAMA and PC2007/118 through its research into soil health with the intention of producing better crops at harvest with lower pest loads.

### **Mites**

*Rhizoglyphus* spp. mites, particularly *R. minutus*, are regularly intercepted on Fijian taro consignments. These mites were considered actionable in the past, and consignments were directed for methyl bromide fumigation treatment to enable their release in New Zealand. The situation has now for the most part been resolved, with the status of *R. minutus* being changed to a non-actionable pest in the mid-2000's.

### **Hitchhiking organisms**

Interceptions of contaminating organisms generally result in the need for fumigation. Organisms such as snails, ants, millipedes/centipedes, beetles, worms, spiders and weed seeds, while not necessarily a pest of taro, may result in quarantine action at the New Zealand border when detected in association with imported commodities. While some hitchhiker organisms may be regarded as non-regulated and subject to no quarantine action it is often the case with contaminated consignments that more than one species of contaminating organism is present. It is likely that at least one species will be considered actionable (either because of its regulated status or because it cannot be identified to a suitable taxonomic level) and quarantine treatment will be necessary.

In the case of taro corms that are thoroughly washed and graded before packing the point of contamination by hitchhiking organisms will generally be following washing operations. It is important to minimise contamination levels following washing through maintaining good hygiene during packing and loading operations. Equally important is the use of clean packing materials and maintaining the hygiene within shipping containers during loading.

ACIAR Research Project PC2007/118 *Developing cleaner export pathways for Pacific Island commodities* will assist the taro export chain to reach and maintain the requisite levels of hygiene needed for the taro export market. Specifically, the project will be looking to determine minimum packhouse sanitary standards to ensure taro is processed and packaged to meet export market requirements.

### **Aligning export phytosanitary inspections with New Zealand import inspections**

Achieving a high phytosanitary status of export product is important to achieving long term viability of the taro export pathway. While an understanding of New Zealand's phytosanitary conditions for imported taro is critical to achieving this status, an understanding of New Zealand's import inspection

regime is equally important. These import inspections are, in effect, an audit to determine whether an exporting country has met New Zealand's requirements.

In order to confirm, with a reasonable level of confidence, that export product meets New Zealand's phytosanitary requirements it is desirable to align the export inspection with that expected to be undertaken by NZMAF. Issues that should be considered include:

- What sample size does NZMAF use?
- How are samples drawn from a consignment?
- What inspection conditions and techniques does NZMAF use? For example:
  - Lighting levels
  - Magnification assistance
  - Inspection bench design
  - Amount of time spent inspecting each corm
  - Specific sites on the corm where inspection is targeted towards
- How does NZMAF inspect packaging material?
- What level of hygiene is acceptable to NZMAF for the interior of shipping containers?

A significant issue in relation to phytosanitary export inspections is the limited availability of remedial actions that can be performed where a consignment is rejected for quarantine or hitchhiker pests. Unpacking and sorting/re-washing corms is inefficient and will result in a significant reduction in returns. The only real option for rejected export consignments at this time, other than diversion to the domestic market, is a fumigation treatment.

There may be an opportunity for PHAMA to assist the Quarantine Service to better understand NZMAF import inspections through helping to facilitate a visit of key Quarantine export personnel to New Zealand to observe NZMAF import inspections. It would also be desirable for key, respected, farmers to attend this observational visit so they can report back to the farming community in Fiji.

### 3.1.2 Quality Issues

Quality issues may either be linked to phytosanitary issues or may be independent of these. Quality considerations begin at the time of production and occur throughout the supply chain. A key issue during the production phase in the past was the lack of commercial focus of many growers; many preferring to grow the product using traditional subsistence farming techniques. Limited field control measures, application of fertilisers and access to water can all have a negative effect on the consistency of yield and corm shape/size.

Two significant issues have been identified in the production phase that are negatively impacting on the quality of harvested corms; poor soil structure/fertility from overuse of the land and limited access to quality planting material are both resulting in a decline in the quality of the harvested product.

A major issue for the taro export pathway is that of handling, from the time of harvest through to the time of export. Poor handling techniques result in damage to corms which are subsequently rejected for export during grading/sorting operations. There is an urgent identified need for quality standards to be developed for each process in the supply chain, and for these standards to be promoted to all parties involved and for their ongoing implementation to be measured.

ACIAR Research Project PC/2009/003 *Improving soil health in support of sustainable development in the Pacific* will develop methods to produce better quality corms with lower pest loads. ACIAR Research Project PC2007/118 *Developing cleaner export pathways for Pacific Island commodities* will research methods to assist the taro supply chain export better quality taro. Standards for all aspects of the supply chain will be developed. The broader PHAMA program may facilitate ongoing audits of the implementation of standards by the respective quarantine agencies.

## 3.2 The Australian Market

### 3.2.1 Review of the Import Conditions for Fresh Taro Corms from All Countries

Australian quarantine conditions for imports of two varieties of taro corms have been in place for many years. In 2006, Australia implemented emergency phytosanitary measures to prohibit the importation of corms of the variety *Colocasia esculenta* var. *antiquorum* due to concerns that these corms could be used as planting material. In accordance with ISPM 13 *Guidelines for the notification of non-compliance and emergency action*, Australia was obliged to evaluate their emergency action to determine whether it remained technically justifiable, and a review of the import conditions for fresh taro corms was subsequently initiated.

On 16 March 2011 Biosecurity Australia notified interested parties of the release of the document *Draft review of the import conditions for fresh taro corms*, and invited comments on this draft review document. The comment period closed on 20 May 2011.

The draft review identified thirty one quarantine pests associated with fresh taro corms, five of which were determined to have an unrestricted risk exceeding Australia's ALOP and therefore require additional risk management measures to be adopted. Two of these pests are identified as being present in Fiji; the taro planthopper (*Tarophagus proserpina*) and Taro vein chlorosis virus.

Proposed measures for the taro planthopper include inspection and remedial action along with topping of taro corms (similar to what is currently required). The measures proposed for Taro vein chlorosis virus also include the topping of taro corms, along with the prohibition of small corm taro from countries where Taro vein chlorosis virus is present.

While the presence of these two pests in Fiji will not preclude entry of taro into Australia under the proposed conditions, maintaining the requirement to top Fijian taro corms will continue to adversely impact on trade. Topping taro corms greatly reduces the marketable amount of each corm, increases handling costs and can significantly reduce their shelf life. In addition, the continued prohibition of small corm taro from Fiji will effectively continue to prevent Fiji from entering the market for these small corm taros, a potential niche that could be considered in the future.

The PHAMA program has analysed the Draft Review document and provided comments on the assessments of likelihoods, probabilities and unrestricted risk assessments for these two pests. This analysis considers the unrestricted risk of both pests to be Very Low, which meets Australia's ALOP. If these revisions are accepted by Australia the requirement to top taro corms would be removed for Fijian taro.

### 3.2.2 Phytosanitary Issues

Although Australia's proposed phytosanitary conditions relate only to two organisms of significance in Fiji the detection of other organisms on taro consignments at the Australian border will still present issues as it has in the past. Identifications can be time-consuming and inconclusive, and even though a pest may not be considered to be actionable significant delays in having consignments released or additional costs incurred for treatments may still be necessary. To avoid these quarantine interventions it is necessary to seek to maintain a high phytosanitary status of the export product.

#### **Mites**

Mites are regularly intercepted on Fijian taro at the Australian border. *Rhizoglyphus minutus* is commonly identified, and in the past has been considered actionable. However, once the recently proposed import conditions become policy the status of *R. minutus* will be changed to non-actionable, hopefully with a corresponding reduction in the number of fumigation treatments directed for this pest.

It should be recognised that the detection of any mites on imported consignments may tend to slow down clearance of the consignment and result in its fumigation, as identification can be time-consuming and often inconclusive.

#### **Mealybugs**

Mealybugs are another pest that are regularly intercepted and often classified as actionable pests, resulting in the need for fumigation treatment.

#### **Nematodes**

As with New Zealand, another organism commonly intercepted by Australian quarantine inspectors on Fijian taro is nematodes. Fortunately, Australia seems better equipped than New Zealand to make quarantine decisions based on higher-level taxonomic identifications of these nematodes, and fumigation treatments are much less common upon the detection of these organisms.

#### **Hitchhikers**

As is the case with New Zealand, Australia intercepts a wide range of contaminating organisms on Fijian taro, an indication of sub-standard hygiene practices during packing and loading operations. Snails, slugs, spiders, worms and weed seeds are commonly intercepted on taro consignments and result in delays in getting consignments cleared, as well as the need for fumigation in some instances.

Weed seeds present a significant issue in that methyl bromide fumigation is not a recognised treatment. Consignments cannot be cleared subject to fumigation while seed identification is being carried out, and deterioration of the consignment can occur while it is held pending the identification. The only remedial action available for actionable weed seeds is to re-sort/clean the consignment, and this is often not a viable proposition so destruction/reship would be preferred.

#### **Disease symptoms**

In the past interceptions of suspected disease symptoms on Fijian taro were relatively uncommon and not considered to have a major impact on trade. During 2010 rejections due to the detection of disease symptoms increased markedly, resulting in the re-export of a significant number of consignments. Identifications of the causal organisms were not carried out in most cases. The

incidence of rejections due to the detection of disease symptoms has since reduced, however, it still occurs.

McGregor et al (2011) suggests the sharp rise in detections of disease symptoms in 2010 was probably contributed to by the effects of Tropical Cyclone Thomas that severely impacted the Island of Taveuni in mid-March 2010. It is likely such a severe weather event will occur in the future.

ACIAR Research Project PC2007/118 *Developing cleaner export pathways for Pacific Island commodities* will assist the taro export chain to reach and maintain the requisite levels of hygiene needed for the taro export market. Specifically, the project will be looking to determine minimum packhouse sanitary standards to ensure taro is processed and packaged to meet export market requirements.

### ***Aligning export phytosanitary inspections with Australian import inspections***

Achieving a high phytosanitary status of export product is important to achieving long term viability of the taro export pathway. While an understanding of Australia's phytosanitary conditions for imported taro is critical to achieving this status, an understanding of Australia's import inspection regime is equally important. These import inspections are, in effect, an audit to determine whether an exporting country has met Australia's requirements.

In order to confirm, with a reasonable level of confidence, that export product meets Australia's phytosanitary requirements it is desirable to align the export inspection with that expected to be undertaken by AQIS. Issues that should be considered include:

- What sample size does AQIS use?
- How are samples drawn from a consignment?
- What inspection conditions and techniques does AQIS use? For example:
  - Lighting levels
  - Magnification assistance
  - Inspection bench design
  - Amount of time spent inspecting each corm
  - Specific sites on the corm where inspection is targeted towards
- How does AQIS inspect packaging material?
- What level of hygiene is acceptable to AQIS for the interior of shipping containers?

A significant issue in relation to phytosanitary export inspections is the limited availability of remedial actions that can be performed where a consignment is rejected for quarantine or hitchhiker pests. Unpacking and sorting/re-washing corms is inefficient and will result in a significant reduction in returns. The only real option for rejected export consignments at this time, other than diversion to the domestic market, is a fumigation treatment.

There may be an opportunity for PHAMA to assist the Quarantine Service to better understand AQIS import inspections through helping to facilitate a visit of key Quarantine export personnel to Australia to observe AQIS import inspections. It would also be desirable for key, respected, farmers to attend this observational visit so they can report back to the farming community in Fiji.

### 3.2.3 Quality Issues

Those quality issues, and programs/projects that can assist in addressing these issues, outlined previously in relation to the New Zealand market are equally applicable to the Australian market. In addition to these issues, the maintained requirement to top taro corms under Australia's proposed taro import conditions will continue to cause quality issues in relation to reduced shelf life and increased potential for post-harvest rots to establish in the corms.

ACIAR Research Project PC2007/118 *Developing cleaner export pathways for Pacific Island commodities* will research methods to assist the taro supply chain export better quality taro. Part of this research will focus on post-harvest handling techniques that may help to minimise the establishment of post-harvest rots in taro corms.

### 3.2.4 Freight

Sea freight between Suva and Australia typically lands in Brisbane as the first port of call. This may take around five days. Sydney and Melbourne are a further 2-3 days each after the call at Brisbane. Given that taro may have been harvested for a period of up to 5 days at the time it leaves Suva its respective age by the time it would reach Brisbane, Sydney and Melbourne could be approximately 10, 12 and 14 days respectively.

Taro that had been handled carefully and maintained under optimal conditions from the time of harvest could reasonably be expected to be in good condition and have a reasonable shelf life remaining, even by the time it reached Port Melbourne. However, Fijian taro is typically not afforded this luxury and it could be expected that taro would be towards the end of its shelf life by the time it reaches and is distributed in Australia. The additional requirement to top taro effectively precludes sea freight as a viable option.

Air freight is the obvious choice, however, it is significantly more expensive than sea freight and the additional costs resulting from quarantine interventions at the Australian border significantly reduce the already small profit margin.

## Conclusions

Significant issues in relation to the markets in Australia and New Zealand, as well as the taro supply chain in Fiji, have been identified in preceding discussions. The following broad conclusions can be made:

### 4.1.1 The New Zealand Market

The New Zealand market for taro presents an ongoing opportunity for Fiji, however, there are significant barriers that will need to be overcome before potential returns from this market can be fully realised. Both quality and phytosanitary issues in the supply chain need to be addressed in order to be able to supply a consistently high quality product that is cleared with minimal border interventions.

The ACIAR Projects PC/2009/003 *Improving soil health in support of sustainable development in the Pacific* and PC2007/118 *Developing cleaner export pathways for Pacific Island commodities* will complement each other in helping to resolve these quality and phytosanitary issues. PC/2009/003

will develop methods to produce better quality corms with lower pest loads. PC2007/118 will research methods to assist the taro supply chain export better quality taro and develop standards for all aspects of the supply chain to reflect these methods. The broader PHAMA program may facilitate ongoing audits of the implementation of standards by the respective quarantine agencies.

A concerted approach to resolving the ongoing nematode issue also needs to commence. The PHAMA program may assist in clarifying the taxonomy of nematode species present in Fiji and facilitate negotiations with NZMAF to review their quarantine status, with the aim of reducing the level of quarantine interventions experienced at the New Zealand border.

To enable Fiji's quarantine export inspectors to be confident about the phytosanitary status of the product they are certifying for export it would be beneficial for them to reflect New Zealand import inspections, to the same degree of rigour, when undertaking export inspections. The PHAMA program may be able to assist key Fijian export inspectors to visit New Zealand and observe taro import inspections to gain a better appreciation of the inspection methodology and techniques used.

### 4.1.2 The Australian Market

If Australia's proposed import conditions for taro corms become policy the current requirement for topping of taro corms will remain due to the presence of the taro planthopper (*Tarophagus proserpina*) and Taro vein chlorosis virus in Fiji. The PHAMA program has analysed the Draft Review document and provided comments on the assessments of likelihoods, probabilities and unrestricted risk assessments for these two pests. This analysis considers the unrestricted risk of both pests to be Very Low, which meets Australia's ALOP. If these revisions are accepted by Australia the requirement to top taro corms would be removed for Fijian taro, and if other quality issues relating to handling of taro through the supply chain can be improved sea freight could become much more viable.

Unless the quality and phytosanitary status of export product can be improved there will still be issues associated with the detection of hitchhiking pests and disease symptoms on Fijian taro, and it can be reasonably expected that fumigation treatments and the need to re-export consignments will still be a relatively common occurrence.

The ACIAR Projects PC/2009/003 *Improving soil health in support of sustainable development in the Pacific* and PC2007/118 *Developing cleaner export pathways for Pacific Island commodities* will complement each other in helping to resolve these quality and phytosanitary issues. PC/2009/003

will develop methods to produce better quality corms with lower pest loads. PC2007/118 will research methods to assist the taro supply chain export better quality taro and develop standards for all aspects of the supply chain to reflect these methods. The broader PHAMA program may facilitate ongoing audits of the implementation of standards by the respective quarantine agencies.

To enable Fiji's quarantine export inspectors to be confident about the phytosanitary status of the product they are certifying for export it would be beneficial for them to reflect Australian import inspections, to the same degree of rigour, when undertaking export inspections. The PHAMA program may be able to assist key Fijian export inspectors to visit Australia and observe taro import inspections to gain a better appreciation of the inspection methodology and techniques used.

## Limitations

URS Corporation Pty Ltd (URS) has prepared this report in accordance with the usual care and thoroughness of the consulting profession for the use of AusAID and only those third parties who have been authorised in writing by URS to rely on the report. It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this report. It is prepared in accordance with the scope of work and for the purpose outlined in the Proposal dated 20 January 2011.

The methodology adopted and sources of information used by URS are outlined in this report. URS has made no independent verification of this information beyond the agreed scope of works and URS assumes no responsibility for any inaccuracies or omissions. No indications were found during our investigations that information contained in this report as provided to URS was false.

This report was prepared between April and May 2011 and is based on the conditions encountered and information reviewed at the time of preparation. URS disclaims responsibility for any changes that may have occurred after this time.

This report should be read in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties.

## Appendix A

### Appendix A Acknowledgements

This review involved the participation of people from industry and government sectors in Fiji. Appreciation goes to the following for their time and contributions to this short term personnel project:

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