FAO SUB-REGIONAL OFFICE FOR THE PACIFIC ISLANDS

REPORT ON THE APPLICATION FOR MARKET ACCESS OF ISLAND CABBAGE (Abelmoschus manihot)) FROM FIJI, VANUATU, SAMOA, COOK ISLANDS AND TONGA TO NEW ZEALAND

By:

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FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

Final Report on the Application for Market Access of Island Cabbage (*Abelmoschus manihot*) from Fiji, Vanuatu, Samoa, Cook Islands and Tonga to New Zealand

(Abelmoschus manihot (L) Medik.)

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Acknowledgements

This Report is an output of requests from governments of Fiji, Vanuatu, Samoa, Cook Islands and Tonga for FAO Technical Assistance to provide support to the five Pacific Island Countries to collect and provide relevant information which will form the basis to enable New Zealand Ministry of Agriculture and Fisheries (NZ MAF) Biosecurity to carry out Risk Analysis Assessment for the Market Access of Island Cabbage (*Abelmoschus manihot*) and Polynesian Plum (*Spondias dulcis*) to New Zealand.

This is a major task, as indicated in my Terms of Reference and tight work programs so as to meet as many Officials and cover wide areas in all the five countries including New Zealand, and it would not have happened without the excellent assistance provided to me throughout my consultations. The information and data presented in this report were collected during these consultations.

Therefore, I am pleased to acknowledge the technical assistance by FAO and in particular Dr. Vili Fuavao, the FAO Sub Regional Representative of SAPA, Dr. Matairangi Purea and Staff for the consultancy and all support on the logistics of travel and work program appointments to the five Pacific Island Countries, including New Zealand.

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I was overwhelmed with the excellent support and helpfulness from the Heads of Agriculture, Senior Staff and Officials, Produce Exporters and Traders, and Growers of Fiji, Vanuatu, Samoa, Cook Islands and Tonga. I had wonderful support in organizing my visits and appointment from the FAO Contact Points in the all five countries. It was a very good feeling to have positive support from the locals, thus giving a good indication of their wishes and desires to open up new market access in New Zealand.

The Secretariat of the Pacific Community is a major provider of Pests and Diseases Database for the Pacific Islands and was the main source for me. Ms Luisa Korodrau and Dr. Lex Thomson were very helpful indeed in accessing information on Pele.

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Executive Summary

Island cabbage is indigenous to Southeast Asia, but an ancient introduction to Melanesia and from Fiji to Western Polynesia. It is a very popular green vegetable or spinach in Vanuatu, Fiji and Tonga, though still a minor crop and less popular in Samoa and Cook Islands. The plant grows extremely well in the main islands of Fiji, Vanuatu, Samoa, Cook Islands and Tonga. Island Cabbage in all five countries is not known by named varieties, but rather by leaf form and leaf color. It is open pollinated, and there are numerous varieties as noted by varying leaf shapes and colors. Three main types are grown throughout the five countries and they are:

i. Round to slightly lobed green leaf, (sometimes referred to as white), very soft and nice texture when cooked;
ii. Deeply lobed and palmate leaves, tend to be more tough and fibrous when harvested late; and
iii. A hybrid of reddish stems and leaf stalks with green leaves

There is no available acreage data in all the five countries. Island cabbage is considered a minor crop though it is common to abundant in both rural and urban food gardens and backyard gardens. It has great potentials for commercial cultivations in all five countries as it is an easy crop to cultivate, fast growing, and very nutritious. Island cabbage is propagated vegetative from stem cuttings. It takes two months to mature and about eight major harvesting before replanting again. Most of the home garden Pele is grown organically, except when they are grown commercially for both the local and export markets.

On consultation with Island Importers of produce in New Zealand, there are strong indications of good market potentials for Island cabbage at the Island retailer shops and flea markets such as Otara and Mangere or around where most Islanders live. There is very good market potential for Island Cabbage in New Zealand for Pacific Islanders and having the Market Access will open up new trading opportunities on this commodity for Fiji, Vanuatu, Samoa, Cook Islands and Tonga.

Fiji is exporting fresh Island cabbage leaves to Canada and also blanched and frozen leaves to USA Mainland, Hawaii, Australia and New Zealand. Tonga also exports small quantities of frozen leaves to New Zealand. The blanching at high heat and frozen form appears to be the best option for export. However, all the five countries would prefer to have both options of fresh and frozen forms open for their choice.

Island cabbage is a Non Fruit fly Host, though it is a host for a wide range of pests and diseases so are its relatives of okra and other hibiscus species. This crop is an easy one to grow and fast growing. It could easily be commercially developed with the appropriate pathways for its cultivation with spray regime, packaging, Quarantine treatment and certification for export to New Zealand. The Fiji Ministry of Primary Industries has a defined production and pesticides spray programs for the commercial cultivation of Island cabbage, though the other four countries have similar production and pesticides spray programs for temperate vegetables which they could use on the Island cabbage too.

All the five countries have approved pathways for export of commodities to New Zealand which could be modified and used for Island cabbage. Shown in Figure 18 of this report is an Appropriate and Suggested Pathway to be developed and adopted for the Export of Fresh Island Cabbage Leaves to New Zealand.

Part 1 - Information on Crop

1. Crop

Scientific name	:	Abelmoschus manihot (L) Medik.
Synonym	:	Hibiscus manihot L.
Family	:	Malvaceae
Common name	:	Island Cabbage
Fiji	:	Bele
Vanuatu	:	Island cabbage
Samoa	:	Lau Pele
Cook Islands	:	Raukau viti
Tonga	:	Pele

2. Distribution and Ecology

Island cabbage is indigenous to Southeast Asia, but an ancient introduction to Melanesia and from Fiji to Western Polynesia. It is a very popular green vegetable or spinach in Vanuatu, Fiji and Tonga. It is a minor crop and less popular in Samoa and Cook Islands. It is found to grow extremely well in Fiji, Vanuatu, Samoa, Cook Islands and Tonga.

3. Variety

The Island Cabbage in all five countries is not known by named varieties, but rather by leaf form and leaf color. Island Cabbage is open pollinated, and there are numerous varieties as noted by varying leaf shapes and color. Vanuatu for instant has over 70 different varieties being tested by the Department of Agriculture and Rural Development. However, on the farmer's fields in the five countries, three main types are grown throughout mainly for their softness, less fibrous and good taste when cooked. These are:

i. Roundish green leaf, (sometimes referred to as white), very soft and nice texture when cooked;

ii. More lobe and palmately shaped leaves, tend to be more tough and fibrous when harvested late; and

iii. A hybrid of reddish green round leaves

Figure 1: Red stems & stalks, green leaves

Figure 2: Round to slightly lobed, green leaves

Figure 3: Deeply lobed and palmate leaves

Figure 4: Deeply lobed and palmate leaves

It is most interesting to note that all five countries appear to have the same preferences for the above three varieties.

4. Botanical Description

It is a fast growing erect perennial sub-shrub one to five meters in height. Leaves are alternate, simple, slightly fleshy, variably – shaped, margins entire to deeply lobed, facilate, surfaces bright green to red – green or purplish. Flowers are moschus like, yellow with dark purple center. Fruits are beaked, oblong and dehiscent capsule containing numerous pubescent seeds.

Figure 5: Flowering plant

Figure 6: Yellow flower with purple center

Figure 7: Maturing fruit capsules

5. Production Area

The Island cabbage is growing extremely well in the wet areas of all the five countries. It is grown in Vanuatu as number one spinach for the local people. In Fiji, and Tonga, it ranks number two to taro leaves. It grows extremely well in Samoa and Cook Islands but is relatively new to them and thus not as common as in Vanuatu, Fiji and Tonga. It is grown both as a backyard and commercial crop in Vanuatu, Fiji and Tonga.

6. Production

There is no available acreage data in all the five countries. It is considered a minor crop though it is common to abundant in both rural an urban food gardens and backyard gardens in Vanuatu, Fiji and Tonga. It is not as common in Samoa and Cook Islands, but it has great potential for more cultivation in all five countries as it is a very easy crop to cultivate, fast growing, and very nutritious.

Island cabbage is commonly propagated vegetative from stem cuttings to maintain true to type varieties though seeds could be use too. Generally, it takes two months to mature and about eight major harvesting before replanting again. Most of the home garden pele is grown organically, except when they are grown commercially for both the local and export markets.

It is only in Fiji that the Ministry of Primary Industries has defined pesticides spray programs for the commercial cultivation of Island cabbage, though the other four countries, especially in Tonga, have similar pesticides spray programs for temperate vegetables that they may use on the Island cabbage too.

7. Temperature and Rainfall

There are many variations in the climatic conditions between the five countries due to the land and ocean mass. However, they all enjoy a tropical maritime climate without great extreme of heat or cold. All five countries experience the same distinct wet season from November to April and dry season from May to October. They are all exposed and vulnerable to the cyclonic periods during the wet season from November to April and similarly to prolong dry spells and prolong wet conditions associated with La Nina and El Nino phenomenon. The high countries of Fiji, Vanuatu and Samoa experience flash flooding during the wet season. The five countries are within the 'Ring of Fire' in the Pacific Ocean and thus experience earthquakes and tsunami threats/warnings.

The Island cabbage is found to be thriving well in the low/medium climates of these five countries. It requires good even rainfall distribution for fast, lush and green growth. It does not do well in dry sites, with the leaves rather leathery appearance and fibrous.

Table 1 below shows the distribution of Average Temperatures, Rainfall and Relative Humidity for the five countries.

Table 1: Distribution of average temperatures, rainfall and relative humidity for five countries

Country	Average Temperature	Average Rainfall	Average Relative Humidity
Fiji	18 - 32˚C	1500 – 6000 mm	65 – 90%
Vanuatu	21 – 27˚C	1500 – 4000 mm	75 – 80%
Samoa	19 - 32.2˚C	2000 - 5000 mm	70 – 91%
Cook Islands	21 – 28˚C	2000 mm	84 %
Tonga	18 – 30˚C	1673 – 2453 mm	80.6%

8. Harvesting

There are two main ways of harvesting:

i. Picking of individual leaves, breaking it off from the leaf stalk. This is mostly for home use and for export.

ii. Cutting off the terminal stem, 6-8 leaves below the terminal bud. This is both for home use and also for sale on the local market.
This technique will encourage growth of new branches and more leaves. Harvesting could be repeated up to eight times or more depending on the health of the plant, before replanting again of new crop.
Also for home use, the leaves are picked for cooking and the stems are used for planting materials.

Figure 8: Farmer harvesting of terminal Pele stems with leaves still attached

9. Marketing

9.1 Local Market

The harvested Pele stems with leaves are tied together into 8-12 pieces per bundle and sold at the local market up to $8.00 each. Pele is marketed in the same manner in Fiji and Tonga. Vanuatu has a much better way of market presentation. The cut stems are harvested at a much earlier stage, when stems and leaves are much younger and succulent. These are taken in baskets to the market, arranged and carefully wrapped in banana leaves and put on sale. The leaves are kept fresh and firm and not easily wilted as in Fiji and Tonga.

Figure 9: Bundles of Pele at Nausori Market, Fiji

Figure 10: Bundles of Pele at Talamahu Market, Tonga

Figure 11: Island Cabbage leaves wrapped in Banana leaves for sale at Port Vila Market, Vanuatu

Figure 22: Well presented Island Cabbage bundle at Port Vila Market, Vanuatu

9.2 Export Market

Island cabbage is a favorite spinach for the Pacific Islanders, particularly for Fiji, Vanuatu and Tonga and to lesser extend in Samoa and Cook Islands. On consultation with Island Importers of produce in New Zealand, there were strong indications of good market potentials for Island cabbage at the Island retailer shops and flea markets such as Otara and Mangere or around where most Islanders live.

Fiji is presently exporting fresh Island cabbage leaves to Canada and also blanched and frozen leaves to USA Mainland, Hawaii, Australia and New Zealand. Tonga also exports small quantities of frozen leaves to New Zealand. It appears that the blanching at high heat and frozen form would be the best options. However, all the five countries would prefer to have both the two options of fresh and frozen forms. In summary, the New Zealand Importers are keen to market island cabbage and looking forward to a fast clearance for this crop.

Figure 33: Fields of commercially grown Island Cabbage (Pele) for both local and export markets

10. Uses

The Pele leaves is a favorite green vegetable or spinach for the indigenous people, particularly in Vanuatu, Fiji and Tonga. The crop is relatively new in Samoa and Cook Islands though they grow there extremely well. The leaves are boiled, baked or steamed in coconut milk together with meat. Over boiled leaves will give a slimy/mucilage appearance which is a character of the hibiscus family hence sometimes referred to as “Slippery cabbage”.

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Part 2 - Pest and Diseases

2A Summary Tables

2A.1. General Plant Pest List for Specific Countries, Identified Commodities and References-SPC Database

2A.1.1. Pest List for a selected Host - Fiji Islands

Host/ Common Names	*	Pest/ Order / Common Names	Literature Reference
Abelmoschus manihot / aibika	n	Aphelenchoides sp. / Tylenchida	Orton Williams K.J., 1980
	n	Criconemella denoudeni / Tylenchina	Orton Williams K.J., 1980
	n	Criconemella onoensis / Tylenchina	Orton Williams K.J., 1980
	n	Helicotylenchus crenacauda / Tylenchina	Orton Williams K.J., 1980

	n	Helicotylenchus dihystera / Tylenchina	Orton Williams K.J., 1980
	n	Helicotylenchus indicus / Tylenchina	Orton Williams K.J., 1980
	n	Helicotylenchus microcephalus / Tylenchina	Orton Williams K.J., 1980
	n	Helicotylenchus sp. / Tylenchina / Galles	Orton Williams K.J., 1980
	n	Hemicriconemoides cocophillus / Tylenchida	Orton Williams K.J., 1980
	n	Hoplolaimus seinhorsti / Tylenchina / lance nematode	Orton Williams K.J., 1980
	n	Meloidogyne arenaria / Tylenchina / peanut root-knot nematode	Orton Williams K.J., 1980
	n	Meloidogyne arenaria / Tylenchina / peanut root-knot nematode	Kirby et al., 1980
	n	Meloidogyne incognita / Tylenchina / root-knot nematode	Orton Williams K.J., 1980
	n	Meloidogyne incognita / Tylenchina / root-knot nematode	Kirby et al., 1980
	n	Meloidogyne javanica / Tylenchina / sugarcane nematode	Orton Williams K.J., 1980
	n	Meloidogyne javanica / Tylenchina / sugarcane nematode	Kirby et al., 1980
	n	Meloidogyne sp. / Tylenchina / root knot nematodes	Orton Williams K.J., 1980
	f	Phytophthora nicotianae / Pythiales / Black shank	Graham K.M., 1971a
	f	Phytophthora nicotianae / Pythiales / Black shank	Dingley et al., 1981
	n	Pratylenchus brachyurus / Tylenchina	Orton Williams K.J., 1980
	n	Pratylenchus sp. / Tylenchina	Orton Williams K.J., 1980
	n	Pratylenchus zeae / Tylenchina / root-lesion nematode of maize	Orton Williams K.J., 1980
	a	Pseudaulacaspis pentagona / Hemiptera / white peach scale	Williams & Watson, 1988
	f	Pseudocercospora abelmoschi / Mycosphaerellales	Landcare Research Survey 2004
	f	Pseudocercospora abelmoschi / Mycosphaerellales	Dingley et al., 1981
	f	Pseudocercospora sp. / Mycosphaerellales	Landcare Research Survey 2004
	n	Radopholus similis / Tylenchina / Burrowing nematode	Kirby et al., 1980
	n	Radopholus similis / Tylenchina / Burrowing nematode	Orton Williams K.J., 1980
	n	Rotylenchulus reniformis / Tylenchina / reniform nematode	Orton Williams K.J., 1980
	n	Xiphinema ensiculiferum / Dorylaimina / dagger nematode	Orton Williams K.J., 1980
	n	Xiphinema insigne / Dorylaimina / dagger nematode	Orton Williams K.J., 1980

	n	Xiphinema krugi / Dorylaimina / dagger nematode	Orton Williams K.J., 1980
There are **32** pest records for Abelmoschus manihot / aibika			

2A.1.2 Pest List for a selected Host – Vanuatu

Host/ Common Names	*	Pest/ Order / Common Names	Literature Reference
Abelmoschus manihot / aibika	v	Carmovirus Hibiscus chlorotic ringspot virus / HCRSV	Davis et al., 2006
	f	Corynespora cassiicola / Pleosporales	McKenzie E.H.C., 1989
	n	Helicotylenchus dihystera / Tylenchina	Ruabete T., 2003
	f	Hymenella sp. / Incertae sedis	Wright J., 2003
	n	Meloidogyne sp. / Tylenchina / root knot nematodes	Gowen S.R., 1985
	n	Meloidogyne sp. / Tylenchina / root knot nematodes	Ruabete T., 2003
	f	Nectria haematococca / Hypocreales	McKenzie E.H.C., 1989
	n	Pratylenchus brachyurus / Tylenchina	Ruabete T., 2003
	a	Pseudaulacaspis pentagona / Hemiptera / white peach scale	Maddison P.A., 1993a
	a	Pseudaulacaspis pentagona / Hemiptera / white peach scale	Williams & Watson, 1988a
	f	Pseudocercospora abelmoschi / Mycosphaerellales	McKenzie E.H.C., 1989
	f	Pseudocercospora abelmoschi / Mycosphaerellales	Johnston A., 1963b
	n	Quinisulcius sp. / Tylenchida	Ruabete T., 2003
	n	Rotylenchulus reniformis / Tylenchina / reniform nematode	Ruabete T., 2003
There are **14** pest records for Abelmoschus manihot / aibika			

2A.1.3 Pest List for a selected Host - Samoa

Host/ Common Names	*	Pest/ Order / Common Names	Literature Reference
Abelmoschus manihot / aibika	a	Adoretus versutus / Coleoptera / indian rose beetle	Stout O.O., 1982a
	a	Anomis flava / Lepidoptera / cotton semi-ooper	Stout O.O., 1982a
	a	Arsipoda tenimberensis / Coleoptera	Stout O.O., 1982a
	a	Chrysodeixis eriosoma / Lepidoptera / green looper caterpillar	Stout O.O., 1982a
	a	Earias vittella / Lepidoptera / spiny bollworm	Stout O.O., 1982a
	a	Haritalodes derogata / Lepidoptera / cotton leaf roller	Stout O.O., 1982a
	n	Helicotylenchus dihystera / Tylenchina	Orton Williams K.J., 1980
	a	Parasaissetia nigra / Hemiptera / Black coffee scale Nigra (pomegranate) scale	Stout O.O., 1982a
	f	Pseudocercospora abelmoschi / Mycosphaerellales	Dingley et al., 1981
	n	Rotylenchulus reniformis / Tylenchina / reniform nematode	Orton Williams K.J., 1980
	a	Spodoptera litura / Lepidoptera / taro armyworm	Stout O.O., 1982a
	a	Tiracola plagiata / Lepidoptera / Cocoa armyworm	Stout O.O., 1982a
	n	Xiphinema ensiculiferum / Dorylaimina / dagger nematode	Orton Williams K.J., 1980
There are **13** pest records for Abelmoschus manihot / aibika			

2A.1.4 Pest List for a selected Host - Cook Islands

Host/ Common Names	*	Pest/ Order / Common Names	Literature Reference
Abelmoschus manihot / aibika	f	Corynespora cassiicola / Pleosporales	McKenzie E., 2003
There is **1** pest record for Abelmoschus manihot / aibika			

2A.1.5 Pest List for a selected Host – Tonga

Host/ Common Names	*	Pest/ Order / Common Names	Literature Reference
Abelmoschus manihot / aibika	a	Acrocercops sp. / Lepidoptera	Engelberger & Foliaki, 1992
	a	Anomis flava / Lepidoptera / cotton semi-	Engelberger &

		ooper	Foliaki, 1992
	n	Aphelenchoides bicaudatus / Tylenchida	Orton Williams K.J., 1980
	n	Aphelenchoides sp. / Tylenchida	Orton Williams K.J., 1980
	a	Aphis fabae / Hemiptera / bean aphid	Engelberger & Foliaki, 1992
	a	Bemisia tabaci Nauru strain / Hemiptera	Engelberger & Foliaki, 1992
	a	Brachylybas variegatus / Hemiptera / brown coreid bug	Engelberger & Foliaki, 1992
	a	Chrysodeixis eriosoma / Lepidoptera / green looper caterpillar	Engelberger & Foliaki, 1992
	a	Earias vittella / Lepidoptera / spiny bollworm	Engelberger & Foliaki, 1992
	n	Helicotylenchus dihystera / Tylenchina	Orton Williams K.J., 1980
	n	Helicotylenchus mucronatus / Tylenchina	Orton Williams K.J., 1980
	n	Helicotylenchus multicinctus / Tylenchina / banana spiral nematode	Orton Williams K.J., 1980
	n	Helicotylenchus sp. / Tylenchina / Galles	Orton Williams K.J., 1980
	a	Maconellicoccus hirsutus / Hemiptera / pink mealybug	Williams & Watson, 1988a
	n	Meloidogyne sp. / Tylenchina / root knot nematodes	Orton Williams K.J., 1980
	f	Nectria haematococca / Hypocreales	Wright J., 2005
	a	Paraputo leveri / Hemiptera	Engelberger & Foliaki, 1992
	a	Parasaissetia nigra / Hemiptera / Black coffee scale Nigra (pomegranate) scale	Engelberger & Foliaki, 1992
	f	Phytophthora nicotianae / Pythiales / Black shank	Wright J., 2005
	n	Pratylenchus brachyurus / Tylenchina	Orton Williams K.J., 1980
	a	Pseudaulacaspis pentagona / Hemiptera / white peach scale	Engelberger & Foliaki, 1992
	a	Pseudaulacaspis pentagona / Hemiptera / white peach scale	Williams & Watson, 1988
	f	Pseudocercospora abelmoschi / Mycosphaerellales	Dingley et al., 1981
	n	Radopholus similis / Tylenchina / Burrowing nematode	Orton Williams K.J., 1980
	n	Rotylenchulus reniformis / Tylenchina / reniform nematode	Orton Williams K.J., 1980
	a	Sphaerorhinus aberrans / Coleoptera	Engelberger & Foliaki, 1992
	a	Tectoris diophthalmus / Hemiptera	Engelberger & Foliaki, 1992
	a	Tiracola plagiata / Lepidoptera / Cocoa armyworm	Engelberger & Foliaki, 1992
	n	Xiphinema brevicolle / Dorylaimina / dagger nematode	Orton Williams K.J., 1980

	n	Xiphinema ensiculiferum / Dorylaimina / dagger nematode	Orton Williams K.J., 1980
	n	Xiphinema rivesi / Dorylaimina / dagger nematode	Orton Williams K.J., 1980
There are **31** pest records for Abelmoschus manihot / aibika			

KEY

*** Pest Group: a** = arthropods; **b** = bacteria; **f** = fungi; **g** = gastropods; **n/a** = n/a; **n** = nematodes; **n/k** = not known; **ve** = vertebrates; **v** = viruses; **w** = weeds;

2A.2 Additional Plant Pest List - UNDP/FAO-SPEC Survey, 1982

Abelmoshus manihot (L.) Mei. (Malvaceae) BELE, PELE

Local Names: Fiji : bele
Niue : pele

Commodity of concern: The clean leaf free of roots an stem which is used as a cooked vegetable.

Virology findings: One possible virus reported.

Nematode findings: No report for this commodity.

Extracted from "Plant Quarantine Guidelines for Movement of Selected Commodities in the Pacific, UNDP/FAO-SPEC Survey of Agricultural Pests & Diseases in the South Pacific" by Oliver O. Stout, 1982.

QUARANTINE ACTION RECOMMENDATIONS	INSECT PESTS OF CONCERN IN PACIFIC AREA	Cook Islands	Fiji	Kiribati	Niue	Tonga	Tuvalu	Western Samoa
	Order: Coleoptera							
Not reported in Survey area; occurs in Papua New Guinea	**Chrysomelidae:** *Arsipoda tenimberenis* (Jacoby)	__	__	__	__	__	__	__

Same as above	– Leaf beetle Eat leaves.							
Same as above	*Cleopotus hibisci* Gressitt – Leaf Beetle	—	—	—	—	—	—	—
If found, treat using *SP-13*	*Nisotra basselae* (Bryant) – Leaf Bettle Eat leaves.	—	—	—	—	—	—	—
Not reported in Survey area; occurs in Papua New Guinea	**Curculionidae:** *Elytrurus griseus* (Guer) - Weevil Adults eat leaf tissue.	—	x	—	—	—	—	—
If found, treat using *SP-13*	*Paratactus* sp.indet - Weevil Adults on foliage	—	—	—	—	—	—	—
If found, treat using *SP-13*	*Sphaerorrhinus aberrans* Fairm. - Weevil Adults eat leaves.	—	—	—	—	x	—	—
If found, treat using *SP-13*	**Scarabaeidae:** *Adoretus versutus* Har. Rose beetle Adults cause holes in leaves	—	x	—	—	x	—	x —
If found, treat using *SP-13*	**Order:** **Heteroptera** **Coreidae:** *Brachylybas variegates* Le Gill.–Brwon coreid bug On foliage.	—	x	—	—	x	—	—
If found, treat using *SP-13*	**Scutelleridae:** *Tectoris diophthalmus* (Thunberg) – Cotton harlequin bug On foliage an fruits.	—	x	x	—	x	x	—
No action necessary If found, treat using *SP-13*	**Order:** **Homoptera** **Aleyrodidae:** *Bemisia tabaci* (gennadius) – Sweet potato whitefly On leaves.	x	x	x	x	x	x	x
No action necessary	**Aphididae:** *Aphis gossypii* Glover – Cotton aphid, Melon aphid On leaves.	x	x	—	—	—	—	—
If found, treat using *SP-13*	*Myzus persicae* (Sulz.) – Peach-potato aphid On leaves.	x	x	x	x	x	—	x
Not reported in Survey	**Coccidae:** *Parasaissetia nigra* (Nietn.) **–** Nigra scale On stems.	—	x	—	—	x	—	—
		—	—	—	—	—	—	—

area; occurs in PNG.WI.	**Diaspididae:** *Pseudaulacaspis pentagona* (Targ.-Tozz) – White peach scale On stems.	—	—	—	—	—	—	—
Not reported in Survey area; occurs in Papua New Guinea	**Flatidae:** *Colgar tricolor* Dist – Flatid planthopper On stems.	—	x	—	—	x	—	—
If found, treat using *SP-13*	**Ricaniidae:** *Euricania disciguttata* (Walker) – Ricaniid planthopper On stems and leaves	x	x	—	x	x	—	x
	Order: **Lepidoptera**							
If found, treat using *SP-13*	**Gracilariidae:** *Acrocercops* sp. Indet. – Leafminer Larvae mine in leaves	x	x	x	x	x	x	x
No action necessary	**Noctuidae:** *Anomis flava* (Fab.) Cotton semi-looper Larvae eat leaves	x	x	—	x	x	—	x
If found, treat using *SP-13*	*Chrysodeix eriosoma* (Doubleday) – Green looper caterpillar Larvae eat leaves.	x	x	x	x	x	—	x
No action necessary	*Earias vitella* (Fab.) – Spiny boolworm Larvae bore in seed pods.	x	x	—	x	x	—	x
If found, treat using *SP-13*	*Spodoptera litrura* (Fab.) – Cluster caterpillar Larvae eat leaves	—	x	—	—	—	—	x
If found, treat using *SP-13*	*Tiracola plagiata* (Walker) – Banana fruit caterpillar, Cacao armyworm Larvae feed on foliage.	—	—	—	—	—	—	—
Not reported in Survey area; occurs in GU, PNG.	**Pyralidae:** *Sylepta derogate* (Fab.) – Cotton leaf roller Larvae eat leaves							
	Order: **Orthoptera**							
	Tettigoniidae:							
	Phaneroptera brevis Serville –							

	Long-horned grasshopper On foliage							

QUARANTINE ACTION REOMMENATIONS	PLANT VIRUS DISEASES REPORTED ON CROPS IN SURVEY AREA	Cook Islands	Fiji	Kiribati	Niue	Tonga	Tuvalu	Western Samoa
No action considered necessary	Unidentified rod-shaped virus particles observed in Tonga and W.Samoa	—	—	—	—	x	—	x

QUARANTINE ACTION REOMMENATIONS	FUNGAL & BACTERIAL PATHOGENS REPORTED CAUSING DISEASES ON CROPS & OTHER HOSTS IN SURVEY AREA	Cook Island	Fiji	Kiribati	Niue	Tonga	Tuvalu	Western Samoa
Unlikely on leaf; no action suggested.	*Phytophthora nicotianae* B. de Haan var. *parasitica* (Dastur) Waterhouse – Root and Collar rot	x	x	—	x	—	—	—
Same as above.	*Pseudocercospora abelmoschi* (Elli & Everh.) Deighton – Leaf spot	—	x	—	—	x	—	x

BELE - SUMMARY OF QUARANTINE RECOMMENDATIONS

There appears to be no plant pests or diseases on this commodity in this Survey Area that requires mandatory quarantine action. Careful inspection should be carried out. Treatment or other quarantine action should proceed without delay if warranted by inspection findings.

2B. Detail Information of Pest and Diseases

1. Microsoft Excel Worksheet of Pele Pest List 09

The key Worksheet for this Section is attached in a separate document as Attachment 1. It is a Microsoft Excel Worksheet called “Pele Pest List 09”. This worksheet was developed and provided by Dr. Fakava and his Staff of NZ MAF Biosecurity to use instead of Annex 1b and Annex 2 of my Terms of Reference.

2 Pest Control, Treatments and Export Pathways

In all the five requesting countries, almost all of their Island cabbage crops for domestic use are grown organically without the use of chemical fertilizers and pesticide spraying except when they are grown commercially for both the local and export markets.

It is noted that Island cabbage is a host for a wide range of pests and diseases so are its relatives of okra and other hibiscus species. This crop is an easy one to grow and fast growing. It

could easily be commercially developed with the appropriate pathways for its cultivation with spray regime, packaging, quarantine treatment and certification for export to New Zealand.

It is only in Fiji that the Ministry of Primary Industries has defined pesticides spray programs for the commercial cultivation of Island cabbage, as shown in Figure 14. The other four countries, as shown in Figures 15, 16 and 17 respectively for Samoa, Cook Islands and Tonga have similar pesticides spray programs for temperate vegetables that they may use on the Island cabbage too.

Figure 44: Farmers Guide for growing Bele (Pele) in Fiji.

Bele *(Abelmoschus manihot)*

Cropping System
November to March, but can be grown all year round

Seed Rate	Spacing	Fertilizer/ Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value
13,400 cuttings/ha **Planting Time** Can be grown all year round	Between rows: 100cm-150cm Plants within rows: 50 cm **Germination** Sprouts 1-2 weeks after planting	**NPK** 13: 13:21 (Basal) **Urea** 100kg/ha. In 4 split applications of 25kg/ha **Poultry Manure:** 12 tonnes/ha at land preparation 2 weeks before planting	**Glyphosate** 100ml/15L of water or **Paraquat** 100ml/15L of water Read instructions on labels and spray carefully. Spray directly on the weeds using a spray shield. Hand weed or hoe as necessary.	**Root and Collar Rot.** Use disease free planting materials and make good drains. (Dip cutting into Sundomil (3.5g/L of water for 5 mins) before planting Do not plant soon after a crop of pawpa, okra or dalo.	**Spiny Ballworm** Apply Orthene (20g/15L) or Attack (40ml/20L of water) or Suncis/Decis 15ml/20L of water **Leaf Miner and Slugs** Apply Sevin (42g/15L of water) or, **Malathion** (30ml/15L) and Slug bait metal dehydes.	Normally leaves become ready after 7-8 weeks. Harvest at 2 to 3 weeks interval depending on individual preference. Replant after the third or fourth harvest **Food Value** Dietary fibre, Potassium, Calcium, Magnesium, Iron, Vitamin A, Vitamin C, Riboflavin

Figure 55: Spray Programs for Various Crops in Samoa.

Pesticide	Rate/Litre-mls	Crop	Pest	Type sprayer
1. Cusol - copper	**4**	**Nursery crops,**	**Fungal diseases**	**Knapsack**
		Taro, tomato		
2. Foschek	**10**	**Taro, pineapple,**	**Phytophthora**	**Knapsack**
		cacao	**diseases**	

3. Manzate	**2 gm**	**Taro, pineapple,**	**Phtophthora**	**Knapsack**
		cacao	**diseases**	
4. Tilt	**65mls/12 L**	**Banana**	**Black leaf streak**	**Mist blower**
5. Punch	**40mls/12 L**	**Banana**	**Black leaf streak**	**Mist blower**
6. Miltek C	**100 ml/12L**	**Banana**	**Black leaf streak**	**Mist blower**
7. Misting Oil	**1.3 L**	**Banana**	**Black leaf streak**	**Mist blower**
8. Bravo	**40**	**Peanut**	**Leaf rust**	**Knapsack**
9. Kelthane	**2 gm**	**Tomato, pepper**	**Mites, Thrips**	**Knapsack**
10, Conqueror	**10**	**All plants**	**Mites, thrips**	**Knapsack**
11. Vydate-	**5**	**Banana**	**General- all**	**Injector gun**
-nemadecides			**nematodes**	
12. Agral	**4**	**General use**		**Wetting agent**

Application for Market Access of Island Cabbage from Fiji, Vanuatu, Cook Islands and Tongatapu to New Zealan

Figure 66: Spray Programs for Vegetable Crops in Cook Islands

Crop	Pest	Pesticide	Rate/Litre ml/g	Waiting period days
Beans	Aphids	Pirimor	0.75	7
	Mites	Kelthane	1.0	7
	Pod borer	Success	0.4	3
	Leaf spot	Kocide	2-3	2
	Leaf spot	Bravo	2-3	14
	Leaf spot	Mancozeb	1.5-2	7
Brassicas	Aphids	Pirimor	0.75	7
	DBM	Success	0.4	3
	DBM	Match	0.5	14
	Leaf spot	Kocide	2-3	3
	Leaf spot	Bravo	2-3	14
	Leaf spot	Mancozeb	1.5-2	7
	Black rot	Mancozeb	1.5-2	7
Capsicums	Aphids	Pirimor	0.75	7
	Aphids	Confidor	0.25	3
	Whiteflies	Confidor	0.25	3
	Ladybird	Agrimec	0.8	3
	Leaf spot	Kocide	2-3	3
	Anthracnose	Bravo	2-3	3
Cucurbits	Aphids	Confidor	0.25	3
	Whiteflies	Confidor	0.25	3
	Leafminers	Agrimec	0.8	3
	Ladybird	Agrimec	0.8	3
	Anthracnose	Bravo	2-3	3
	D/mildew	Bravo	2-3	3
	Gummy stem	Bravo	2-3	3
Eggplant	Leafminer	Agrimec	0.8	3
	Ladybird	Agrime	0.8	3
	Mites	Agrimec	0.8	3
	Leafspot	Kocide	2-3	3
	Anthracnose	Bravo	2-3	14
Lettuce	Leafminer	Agrimec	0.8	21
	Thrips	Rogor	0.75	7
	Leafspot	Mancozeb	1.5-2	14

Tomatoes	Aphids	Pirimor	0.75	7
	Aphids	Confidor	0.25	3
	Whiteflies	Confidor	0.25	3
	Leafminer	Agrimec	0.8	3
	Fruitworm	Success	0.4	3
	Leafmould	Bravo	2-3	3
	Leafpould	Mancozeb	1.5-2	7
	Septoria spot	Kocide	2.3	3

Figure 17: Spray Programs for Vegetable Crops in Tonga

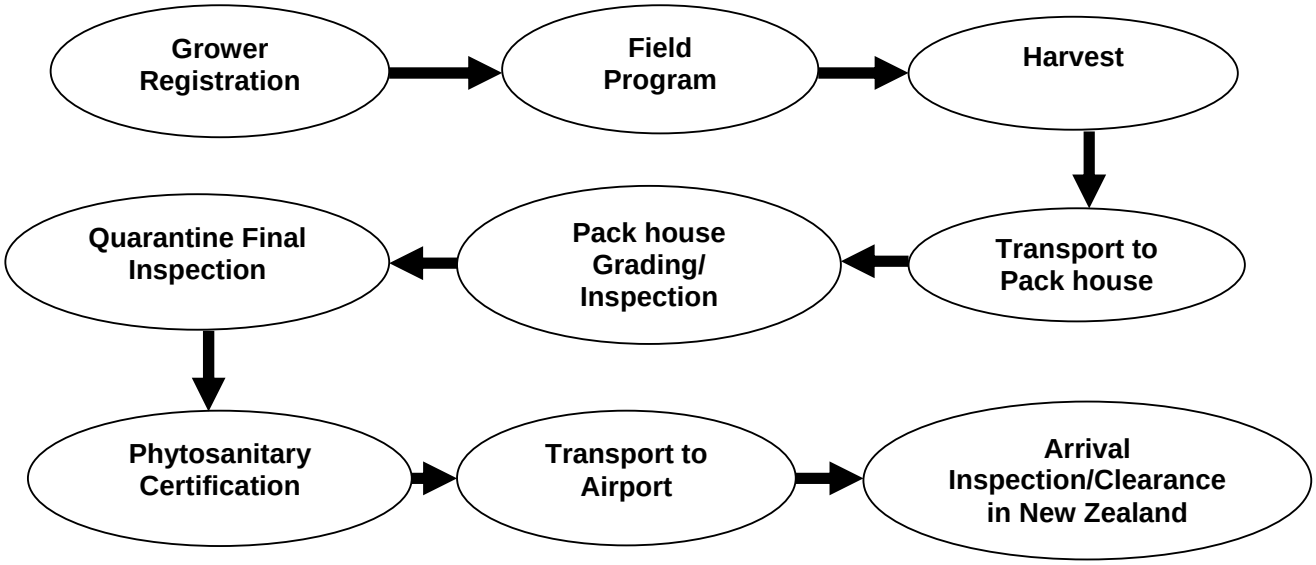
Crop	Pest	Pesticide	Rate (ml)	Waiting period-days
Cabbage	Cabbage moth,	Decis	15	7
	Diamond moth	Steward	30	7-14
		Dipel	30	7-14
	Leaf blight	Manzate	60-75	7
Pumpkin-squash	Aphids, whitefly	Malathion	15	7
		Perfekthion	15	14
		Orthene	5	7
		Surcloprid	5	14
	Powdery mildew	Afugan	5	7-14
		Punch	5	7-14
		Prostar	2.5	7-14
		Neptune	15	7-14
Tomato	Fruit fly, whitefly,	Orthene	5	7
	mites	Perfekthion	15	14
		Malathion	15	7
		Decis	15	7
		Kelthane	15	7
		Suncloprid	5	14
		Velcloprid	2.5	14
	Leaf spot, mould,	Manzate	60-75	7
	Stem rot	Sunomyl	60	14
		Copper	90	7
Capsicum	Fruit fly, Apids,	Orthene	5	7
	Mites	Perfeckthion	15	14
		Malathion	15	7
		Decis	15	7
		Kelthane	30	7
	Leaf spots, fruit	Manzate	60-75	7
	rot	Sunomyl	60	14
Yams	Rose beetles,	Orthene	30	7
	aphids	Decis	15	7
	Leaf blight, leaf	Manzate	120-150	7
	spots,anthracnose	Sunomyl	60	14
		Taratek	60	14
Watermelon	Leafminer, aphid,	Orthene	5	7
	whiteflies, worms	Perfekthion	15	14
		Suncloprid	5	14
		Velcloprid	2.5	14
	slugs	Blitzem,snail bait		

	Powdery mildew	Afugan	5	7-14
	Gummy s/blight	Sunomyl	60	14
		Punch	5	7-14
		Manzate	60-90	7
		Taratek		14

Suggested Export Pathway for Island Cabbage

All the five countries have approved pathways for export of commodities to New Zealand which could be modified and used for Island cabbage. Shown in Figure 18 is a Suggested Export Pathway to be developed and adopted for the Export of Fresh Island Cabbage Leaves to New Zealand:

Figure 18: Suggested Export Pathway for Island Cabbage



C Conclusion

In conclusion, there is very good market potential for Island Cabbage in New Zealand for Pacific Islanders and having the Market Access will open up new trading opportunities on this commodity for Fiji, Vanuatu, Samoa, Cook Islands and Tonga.

D Attachments

Attachment 1: Microsoft Excel Worksheet of Island Cabbage Pest List 09.

This key Worksheet to this report is attached as Attachment 1. It is a separate Microsoft Excel file called *"Pele Pest List 09.xls"*

Attachment 2: Consultancy Terms of Reference

The Terms of Reference for this Consultancy is attached as Attachment 2. It is a separate Microsoft Word Document called *"Consultancy Terms of Reference.doc"*

Attachment 3: Consultancy Travel Itinerary & Work Program

The Consultancy Travel Itinerary & Work Program is attached as Attachment 3. It is a separate Microsoft Word Document called *"Consultancy Travel Itinerary & Work Program.doc"*

Attachment 4: Officials Consulted by Country

The list of Officials Consulted while undertaking this consultancy is attached as Attachment 4. It is a separate Microsoft Word Document called *"Officials Consulted by Country.doc"*

Island cabbage
(*Abelmoschus manihot*)
fresh foliage from
Vanuatu, Fiji, Tonga,
Samoa, Cook Island

The pest list for Island cabbage (*Abelmoschus manihot*) Fresh Foliage from these 5 Pacific countries was prepared from pest lists supplied by each country, and from information fro
Abstracts, Crop Protection compendium, the internet, and

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Scientific name	**Organism type**	**Taxonomy**	**Common name**	**What kind of organism is it?**	**Have strains, biotypes, pathovars, etc. been recorded?**	**Is the organism present in Cook Is?**	**Is the organism present in Fiji?**	**Is the organism present in Tonga?**	**Is the organism present in Vanuatu?**	**Is the organism present in Samoa?**	**Is the organism present in New Zealand?**	**Is the organism under official control in the PRA area?**	**What is the potential for establishment and spread in New Zealand?**
Aspidiotus destructor	ins	Homoptera: Diaspididae	coconut scale	p	n		y			y	n	n	1
Atherigona orientalis	ins	Diptera: Muscidae	muscid fly	hp	n					y	n	n	1
Bactrocera trilineola	ins	Diptera: Tephritidae	fruit fly	p	n	n	n	n	y	n	n	n	1
Bemisia tabaci [all strains except B biotype]	ins	Homoptera: Aleyrodidae	tobaco/sweet potato whitefly	p	y		y	y	y	y	n	n	3
Cyrtopeltis tenuis	ins	Hemiptera: Miridae	tomato capsid	dp	n						n	n	2
Epilachna vigintioctopunctata	ins	Coleoptera: Coccinellidae	28-spot ladybird	p	n			y		y	n	n	2
Eudocima fullonia	ins	Lepidoptera: Noctuidae	fruit-piercing moth	p	y	y	y	y		y	n	n	1
Ferrisia virgata	ins	Homoptera: Pseudococcidae	striped mealybug	p	n					y	n	n	3

Helicoverpa assulta	ins	Lepidoptera: Noctuidae	cape gooseberry budworm	p	n					y	n	n	2
Icerya seychellarum	ins	Homoptera: Margarodidae	Seychelles scale	p	n	y				y	n	n	1
Leptoglossus gonagra	ins	Hemiptera: Coreidae	coreid bug	p	n					y	n	n	3
Maruca vitrata	ins	Lepidoptera: Pyralidae	bean pod borer	p	n			y	y	y	n	n	1
Pinnaspis strachani	ins	Homoptera: Diaspididae	hibiscus snow scale	p	n	y			y	y	n	n	2
Planococcus citri	ins	Homoptera: Pseudococcidae	citrus mealybug	p	n	y			y	y	n	n	3
Planococcus minor	ins	Homoptera: Pseudococcidae	passionvine mealybug	p	n				y	y	n	n	3
Pseudaulacaspis pentagona	ins	Hemiptera: Diaspididae	mulberry scale, white peach sale	p	n		y	y	y	y	n	n	3
Tetranychus marianae	mit	Acarina: Tetranychidae		p	n					y	n	n	2
Achatina fulica	mol	Gastropoda: Achatinidae	giant African snail	hp	n	n	n	n	y	y	n	n	1
Colletotrichum acutatum	fun	mitosporic fungi (Coelomycetes)	anthracnose	p	n				y	y	y	n	.
Colletotrichum capsici	fun	mitosporic fungi (Coelomycetes)	anthracnose	p	n				y	y	y	n	.
Corynespora cassiicola	fun	mitosporic fungi (Hyphomycetes): Hyphomycetales: Dematiaceae	leaf spot	p	n	y			y	y	y	n	.

Gibberella fujikuroi (anamorph Fusarium fujikuroi)	fun	Ascomycota: Hypocreales: Hypocreaceae	sugar cane sett rotrotfusarium rot	p	n	y				y	y	n	.
Glomerella cingulata (anamorph Colletotrichum gloeosporioides)	fun	Ascomycota: Phyllachorales: Phyllachoraceae	anthracnose	p	y	y			y	y	y	n	.
Pythium myriotylum	fun	Oomycota: Pythiales: Pythiaceae	rhizome and root rot	p	n				y	y	y	n	.
Aphis gossypii	ins	Homoptera: Aphididae	cotton aphid, melon aphid	p	n	y	y	y	y	y	y	n	.
Aphis spiraecola	ins	Homoptera: Aphididae	green citrus aphid	p	n						y	n	.
Helicoverpa armigera	ins	Lepidoptera: Noctuidae	tomato fruitworm	p	n			y		y	y	n	.
Hemiberlesia lataniae	ins	Hemiptera: Diaspididae	latania scale	p	n					y	y	n	.
Nezara viridula	ins	Hemiptera: Pentatomidae	green vegetable bug	p	n					y	y	n	.
Parasaissetia nigra	ins	Hemiptera: Coccodae	black coffee scale	p	n	y	y	y	y	y	y	n	.
Pseudococcus longispinus	ins	Homoptera: Pseudococcidae	longtailed mealybug	p	n						y	n	.
Saissetia coffeae	ins	Homoptera: Coccidae	hemispherical scale	p	n	y				y	y	n	.
Spodoptera litura	ins	Lepidoptera: Noctuidae	taro army worm,cluster caterpillar	p	n	y	y	y	y	y	y	n	.
Thrips tabaci	ins	Thysanoptera: Thripidae	onion thrips	p	n						y	n	.
Aculops lycopersici	mit	Acarina: Eriophyidae	tomato russet mite	p	n						y	n	.
Brevipalpus obovatus	mit	Acarina: Tenuipalpidae	privet mite	p	n						y	n	.
Polyphagotarsonemus latus	mit	Acarina: Tarsonemidae	broad mite	p	y					y	y	n	.

KEY		
Organism type	bac	bacterium
	due	disease of unknown etiology
	fun	funus
	ins	insect
	mit	mit
	nem	nematode
	phy	phytoplasma
	vir	virus
Quarantine status	R	Regulated
	NR	Non-regulated
	UQS	Undetermined quarantine status
International regulations governing PRA for this organism	OIE	Office International des Epizooties
	IPPC	International Plant Protection Convention
Interested governement agencies?	p	Plants Biosecurity
	f	Forest Biosecurity
	a	Animal Biosecurity
	c	Department of Conservation
	h	Health Department
Probability of entry through this pathway	0	Nil
	1	Low to moderate
	2	Moderate to high
	3	Very High
	uk	unknown

Anomis flava	ins	Lepidotera Noctuidae	Cotton semi-looper	p	y	y	y		y
Aphis fabae	ins	Hemiptera	bean aphid	p			y		
Chrysodeixis eriosoma	ins	Lepidoptera Gracilariidae	green looper caterpillar		y	y	y	y	y
Bemisia tabaci [nauru strain)	ins	Homoptera Aleyrodidae	sweet potato	p		y	y		y

			whitefly						
Brachylybas variegatus	ins	Heteroptera Coreidae	brown coreid bug	p	n	y	y		n
Earias vitella	ins	Lepidoptera Noctuidae	spiny bollworm	p	y	y	y		y
Maconellicoccus hirsutus.	ins	Hemiptera	pink mealybug	p			y	y	y
Paraputo leveri	ins	Hemiptera		p			y		
Sphaerorhinus aberrans	ins	Coleoptera		p			y		
Tectoris diophthalmus	ins	Heteroptera Scutelleridae	cotton harlequin bug	p		y	y		
Tiracola plagiata	ins	Lepidoptera Noctuidae	banana fruit caterpillar,	p	y	y	y		y
Elytrurus griseus	ins	Coleoptera: Curculionidae	weevil	p	n	y	n		n
Sphaerorrhinus aberrans	ins	Coleoptera Curculionidae	weevil	p	n	n	y		n
Adoretus versutus	ins	Coleoptera Scarabaeidae	rose beetle	p	y	y	y	y	y
Myzus persicae	ins	Homptera Aphididae	peach potato apid	p	y	y	n		n
Pseudaulacaspis pentagona	ins	Homoptera Diaspiidae	white peach scale	p		y	y	y	
Acrocercops sp.	ins	Lepidoptera Gracilariidae	leafminer	p		y	y		
Sylepta derogata	ins	Lepioptera Pyralidae	cotton leaf roller	p		y			y
Phytophthora nicotianae	fun	Pythiales	root & collar rot, black shank	p	y	y	y		
Pseudocercospora abelmoschi	fun	Mycosphaerellales	leaf spot, leaf mould	p		y	y	y	y
Nectria haematococca	fun	Fusarium solani	potato dry rot	p			y	y	y
Aphelenchoides bicaudatus	nem			p			y		y
Aphelenchoides sp.	nem	Tylenchida		p		y	y		y
Helicotylenchus dihystera	nem	Tylenchina		p		y	y	y	y
Helicotylenchus mucronatus	nem		banana spiral nemtode	p			y		y
Helicotylenchus sp.	nema	Tylenchina Galles		p		y	y		y
Meloidogyne sp.	nema	Tylenchina	root knot nematode	p	y	y	y	y	y
Pratylenchus brachyurus	nema	Tylenchina	root lesion nematode	p	y	y	y	y	y
Radopholus similis	nema	Tylenchina	burrowing nematde	p	y	y	y		
Rotylenchulus reniformis	nem	Tylenchina	renform nematode	p	y	y	y	y	y
Xiphinema brevicolle	nem	Dorylaimina	dagger nematode	p			y		y
Xiphinema ensiculiferum	nem	Dorylaimina	dagger nematode	p		y	y		y
Xiphinema rivesi	nem	Dorylaimina	dagger nematode	p			y		
Xiphinema insigne	nem	Dorylaimina	dagger nematode	p	y	y	n		
Xiphinema krugi	nem	Dorylaimina	dagger nematode	p		y	n		

Meloidogyne incognita.	nem	Tylenchina	root knot nematode	p		y	y		y
Meloidogyne arenaria	nem	Tylenchina	peanut root knot nematode	p		y	n		
Meloidogyne javanica	nem	Tylenchina	sugarcane nematode	p		y	y		
Pratylenchus sp.	nem	Tylenchina		p		y			
Pratylenchus zeae	nem	Tylenchina	root-lesion nematode of maize	p		y	n		y
Helicotylenchus crenacauda	nem	Tylenchina		p		y	n		
Helicotylenchus indicus	nem	Tylenchina		p		y	n		
Helicotylenchus microcephalus	nem	Tylenchina		p		y	y		
Hemicriconemoides coophillus	nem	Tylenchida		p		y	n		y
Hoplolaimus seinhorsti	nem	Tylenhina	lance nematode	p		y	n		
Criconemella denoudeni	nem	Tylenchina		p		y	n		
Criconemella onoensis	nem	Tylenchina		p		y	n		
Ditylenchus sp.	nem			p		y			
Pseudocercospora sp.	fun	Mycosphaerellales		p		y		y	
Corynespora cassiicola	fun	Pleosporales		p	y				y
Hymenella sp.	fun		cephalosporium stripe	p			n	y	
Quinisulcius sp.	nema		stunt nematode	p			n	y	
Hibiscus chlorotic ring spot	vir	Virus	hibiscus chlorotic ring -spot	p		y		y	
Uncharacterized viruses	vir	Virus	White , mottling leaf	p			y		y
Arsipoda tenimberensis	ins	Coleoptera					n		y

14	15	16	17	18	19	20	21	22	23
What is the potential for establishment and spread in New Zealand?	Impact of damage to plants worldwide?	Impact of damage on domestic production of plants in PRA area?	Impact on exports from PRA area?	Impact on the environment in PRA area?	Is it a vector of a viable quarantine organism(s)?	Regulated non-quarantine pest as defined by IPPC?	Would it be a new organism under the HSNO Act?	QUARANTINE STATUS	Enter via a vector?
1	2	2	1	1	n	n	y	R	n
1	1	1	1	1	n	n	y	R	n
1	2	1	3	1	n	n	y	R	n
3	2	2	2	1	y	n	y	R	n
2	1	1	1	1	y	n	y	R	n
2	2	2	1	1	n	n	y	R	n
1	2	2	2	1	n	n	y	R	n
3	2	2	2	2	n	n	y	R	n
2	2	1	1	1	n	n	y	R	n
1	1	1	1	1	n	n	y	R	n
3	1	1	1	1	y	n	y	R	n

1	1	1	1	1	n	n	y	R	n
2	1	2	2	2	n	n	y	R	n
3	2	2	2	2	y	n	y	R	n
3	1	2	2	1	n	n	y	R	n
3	2	2	2	2	n	n	y	R	n
2	1	1	1	1	n	n	y	R	n
1	3	2	2	2	y	n	y	R	n
.	.	.	.	.	n	n	n	NR	.
.	.	.	.	.	n	n	n	NR	.
.	.	.	.	.	n	n	n	NR	.
.	.	.	.	.	n	n	n	NR	.
.	.	.	.	.	n	n	n	NR	.
.	.	.	.	.	n	n	n	NR	.

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.	.	.	.	.	y	n	n	NR	.
.	.	.	.	.	n	n	n	NR	.
.	.	.	.	.	n	n	n	NR	.
.	.	.	.	.	y	n	n	NR	.
.	.	.	.	.	n	n	n	NR	.
.	.	.	.	.	y	n	n	NR	.
.	.	.	.	.	n	n	n	NR	.

Application for Pacific Market Access of Island cabbage *Abelmoschus manihot* and Polynesian plum *Spondia dulcis* to New Zealand Market (Vanuatu, Fiji, Cook Islands, Samoa, Tonga)

Background

Under the National Medium Term Priority Framework (NMTPF) for the Pacific region, countries have identified commodity market access as a priority, firstly for the improvement of their economy in terms of income earned from exports, secondly for livelihood and income generation for rural farmers. The Southwest Pacific Agriculture Ministers meeting held in Cook Islands (2005) and Marshall Islands (2007) recommended for FAO to assist member countries in the Pacific in identifying potential commodities for export market access to New Zealand and Australia. Pacific Island countries had made submissions for various commodities to importing country authorities in the past four years, but with conflicting response due to insufficient commodity data provided by the countries which showed some deficiencies. This has created a critical gap in country's efforts in advancing to the next stage of compliance to the importing country's requirements. Hence this request for FAO technical assistance to provide support to the five Pacific Island Countries.

Pacific island countries have raised concern for the slow progress and time consuming process of developing Import Health Standards (IHS) for market access to New Zealand. The Ministry of Agriculture and Fisheries (MAF) Biosecurity New Zealand (BSNZ) has the capacity to service only 2 import risk analysis for commodity requests from the Pacific Islands, which is currently for the citrus fruit from Samoa and for the coconut from Tuvalu, during the last two years work programme. One of the major attributing factor to the delay have been due to Pacific Island countries' limited capacities in providing durable data for example the pest-lists of the commodity and detailed supporting documentation of related information for risk assessment of selected commodities.

In order for Pacific Island Countries to comply with the MAF BNZ requirements, the technical information that MAF BNZ requires from each country at this stage is summarised below.

- crop scientific name and common name(s)
- plant pest(s) of interest, scientific names of plant pests and classification (order, family etc)
- estimated production area in country of origin
- production processes for these crops and cultivation methods (eg. if grown commercially in a small or large scale, pesticides that may be applied, grading and quality control activities etc)
- pest management and general surveillance programs, proposed measures and treatments
- harvesting methods and post-harvesting activities

• details on hosts (including variety if relevant), plant parts attacked, and symptoms/damage
• marketing potential, and export destinations/existing protocols if any

Fiji, Tonga, Vanuatu, Cook Islands and Samoa have requested market access for Island cabbage *Abelmoschus manihot* and Polynesian plum *Spondia dulcis* to New Zealand. As new commodities to New Zealand, MAF BNZ requires a full risk analysis to be done prior to approval.

In line with the above, the proposed technical assistance is to assist member countries in the Pacific to collect and provide relevant information which will form the basis for the risk analysis assessment for Island cabbage and Polynesian plum. Such assistances will help to fast track the processing and developing of import health standards for these two commodities from the Pacific to access the New Zealand market.

Duties and Responsibilities

Under the general supervision of the FAO Sub Regional Representative in SAPA, in close collaboration with the SAPA Plant Protection Officer and MAF Biosecurity New Zealand Plant Import team, the international retired consultant will review and collect relevant information and publications available. He/she will consult appropriate persons, organisations, and countries on the selected commodities, and will develop a report **for each commodity** based on the report outline given in Annex I attached. The retired expert is required to travel to the selected countries for 10 days per country (travel & transit included) plus 4 days with the SPC data base and 6 days to complete the documents ready for submission.

Duration

The assignment will be for a total of 60 days. The retired expert is required to travel to these countries including visit to SPC in Suva for data extracting as required for the document preparation. This is considered necessary in order to facilitate effective consultations and easy access to information and people who will directly involved with the market and trade of specified commodities.

Language of Work and Report

English is the language of work and all written communications and report are to be in the English language in MS Word document.

The author shall submit two sets of reports by the 24 July 2009.

1. for Polynesian plum
2. for Island Cabbage

Annex 1

Application for Market Access of Island cabbage *Abelmoschus manihot* and Polynesian plum *Spondia dulcis* from Pacific to the New Zealand Market

Outline of Proposed Report

A. Executive Summary (1 page)

Part 1: Information of Crop/Commodity

- Crop
- Distribution and ecology
- Variety
- Botanical Description
- Producing Area
- Production
- Temperature and rainfall
- Harvesting
- Marketing
- References

Part 2: Pest and Diseases

a. Summary Tables

- Plant Pest List for specific countries and identified commodities
- References

b. Detail Information of Pests/Disease Associated with Specified commodities

- Organism type
- Name of organisms
- Association with fruit
- Distribution
- Biology
- Control measures
- Any past Research work carried out on these pests in relation to Quarantine treatment for export.

-References

Annex 2

Detail Information of Pests/Diseases/Insect Associated with …….

1. Organism type : Insect

2. Name of organism

Scientific name **:**

Common name :

Family :

Order :

3. Association with plant

( ) Strong /severe ( ) Weak/moderate ( ) Zero

4. Distribution in the country

(Only part or all production areas)

5. Biology

5.1 Plant parts affected

5.2.1.1.1 Description of organism

5.2.1.1.2 Description of damage/symptom

5.2.1.1.3 Major hosts

6. Control measures

(Treatment available, and methods, timing of control)

The table below details the travel undertaken during the consultancy and the working program of the consultant.

DATE	DAY		ACTIVITIES
May 22	Fri	5:05pm	• Vava'u to Nuku'alofa – Air Chatham Pacific CP709 Depart 5:05am Arrive: 6:00pm.
May 23	Sat	4:30pm	• Tonga/Nadi Air Pacific FJ210, depart 4:30pm arrive 5:00pm
May 24	Sun	7:00am	• Nadi/Suva Air Pacific FJ007 depart 7:00am arrive 7:30am Free
May 25	Mon	10:00am	• Meet Director SPC, 'Aleki Sisifa and Technical Staff • Briefing on consultancy and sourcing of appropriate technical information • Review literature and information
May 26	Tuesday		• Continue with SPC • Review of literature & information
May 27	Wed	10:00am 2:00pm	• Meet CEO of Fiji MAF and Heads of Research, Extension and Quarantine • Briefing on consultancy & logistics • Review of literature • Meet Head of Quarantine • Visits to treatment facilities • Review literature & information • Review literature & information
May 28	Thu	9:00am 2:00pm	• Meet Head of Research • Review of literature • Meet Head of Extension • Review literature & information • Farm Visits
May 29	Friday	9:00am 3:00pm	• Continue Farm visits with Extension and meet potential Exporters & visit handling facilities • Round up meeting with CEO MAF, Heads of Research, Extension & Quarantine
May 30	Sat	8:00am	• Visit Produce Markets • Suva – Nadi FJ0024 Depart 7:25pm Arrive 7:55pm
May 31	Sunday		Free
June 1	Monday	9:00am 1:30pm	• Meet Quarantine Staff Nadi Airport – Visit airport facilities and treatment plants • Meet Extension Officer of District for visit to Possible Exporters & handling facilities, Market & Farm visits all day
June 2	Tue	11:40am 3:00pm	• Nadi – Port Vila FJ0261 Depart: 11:40am Arrive: 12:20pm • Meet Director Vanuatu MAF and Heads of Research, Extension and Quarantine • Briefing on Consultancy, set up program & logistics • Review literature & information

June 3	Wed	9:00am 2.00pm	• Meet Head of Quarantine • Visit Treatment Facilities • Review literature & information • Meet Head of Research • Review literature& information.
June 4	Thu	9:00am	• Meet Head of Extension • Review literature & information • Farm Visits all day
June 5	Fri	9:00am 2:00pm	• With Extension meet possible Exporters, visit handling facilities & produce market • Round up Meeting with Director MAF, Heads of Research, Extension & Quarantine
June 6	Sat	9.30am	• Port Vila - Nadi Air Pacific FJ260 Depart: 9.30am. Arrive 11.55am.
June 7	Sun	1:45am	• Nadi – Apia Air Pacific FJ0253 Depart: 1:45am Arrive: 4:35am Sat. June 6
June 6	Sat	8:00am	• Visit Produce Markets
June 7	Sun		Free
June 8	Mon .	10:00am	• Meet FAO /SAPA Representative – Dr. Vili Fuavao and appropriate officers • Briefing on consultancy progress • Review literature & information
June 9	Tue	10:00am 2:00pm	• Meet CEO Samoa MAF, Heads of Research, Extension & Quarantine • Briefing on Consultancy, set up program and logistics • Review literature and information • Meet Head of Quarantine • Visit treatment Facilities • Review literature & information
June 10	Wed	9:00am 2:00pm	• Meet Head of Research • Review literature & information • Meet Head of Extension • Review literature & information • Farm Visits
June 11	Thu	9:00am	• Continue Farm Visits all day with Extension
June 12	Fri .	9:00am 2:00pm	• With Extension meet possible Exporters, visit handling facilities • Round up meeting with CEO MAF, Heads of Research, Extension & Quarantine
June 13	Sat	8:00am	• Visit Produce Market
June 14	Sun	10:15pm	Free
June 15	Mon	10:00am 7:00pm	• Round up meeting with FAO/SAPA Representative, Dr. Vili Fuavao and Staff • Apia – Auckland Air NZ 0863 Depart: 7:00pm Arrive: 10:10pm Tuesday June 16.

June 17	Wed	8:45am	• Auckland – Rarotonga Air NZ 0846 Depart: 8:45am Arrive: 2:40pm Tuesday June 16
June 17	Wed	10:00am 2:00pm	• Meet CEO/Secretary Cook Islands MAF, Heads of Research, Extension & Quarantine • Briefing on Consultancy, set up program & logistics • Review literature & information • Meet Head of Quarantine • Visit treatment facilities • Review literature& information
June 18	Thu	9:00am 2:00pm	• Meet Head of Research • Review literature & information • Meet Head of Extension • Review literature • Farm visits
June 19	Fri	9:00am	• Continue with Extension Farm Visits all day
June 20	Sat	8:00am	• With Extension, visit produce markets
June 21	Sun		Free
June 22	Mon	9:00am	• With Extension, meet possible Exporters & visit handling facilities • Report writing
June 23	Tue	10:00am 3:40pm	• Round up meeting with Secretary of MAF, Heads of Research, Extension & Quarantine • Rarotonga – Auckland Air NZ 0845 Depart: 3:40pm Arrive: 6:15pm Wednesday June 24
June 24	Wed		On route to Auckland
June 25	Thu	9:00am 11:00am 2:00pm	• Meet Gordon Hogg, Turners & Growers, 2 Monahan Rd., Mt Wellington. Ph: 0508 800 100 • Bobby Kumaran, Tropical Fresh Ltd., 54 Tidal Rd., Mangere. Ph: 09 275 5200 • Clive Imrie, Rachel Barker, Auckland Ports, 23 Quey St. Auckland. Meet NZ Biosecurity visit Port Facilities and observe procedures for receiving produce • Meet NZ Bioseurity to visit Airport facilities and procedures on receiving produce
June 26	Fri	9.00am 11:00am 1:30pm	• David Murphy, Airport Passenger Clearance Directorate • Kerry McGuire, Air Cargo Clearance • Bill Hall, Director, Quarantine Treatment Centre. Ph: 09 2755589.
June 27	Sat 5:00pm	9:00am	• Visit Otara & Mangere Flea market • NZ Flight to Wellington
June 28	Sun		Free
June 29	Mon	9:00am	• Meet Senior Advisor (Pacific Market Access), MAF Biosecurity NZ – Dr. Viliami Fakava & Appropriate Officials • Briefing on Consultancy & Discuss progress • Review literature • Meet Deb Anthony, Adviser Risk Analysis Group • Rest of day with Bio-security, review literature

June 30	Tue	9.30am 1:00pm 5:00pm	• Continue visit MAF Bio-security. Review of Literature • Meet Richard Ivess, SPS, Ministry of Foreign Affairs & Trade • Shiroma Satyapala, Team Manager, Risk Analysis • Depart for Auckland, Air NZ.
July 1	Wed	11:00am	• Meet Mohammed Hafiz, Asia Pacific Food Centre • Mrs. Sulia Va'enuku, Manager, Morning Star Freighting, Otahuhu • Mr. Ngongo Tameifuna, Manager, Kailand Fresh, Otahuhu
July 2	Thursday	11:00am 12:00pm	• Visit PITIC, Trade Commissioner, Mr. Chris Cocker & Staff Briefing on Consultancies, discuss market potentials for Pele & Vi • Meet Drs. Veronica E. Herrera, Lalith Kumarasinghe PHEL Investigation and Diagnostic Centres, MAF Biosecurity New Zealand, MAF 231Morrin Road, ST. Johns • Meet Dr. Trevor Crosby and Dr. Eric McKenzie, Landcare Research Private Bag 92170, Auckland Mail Centre, Auckland 1142, 231 Morrin Road, ST John
July 3	Fri	10:10pm	• Auckland – Nuku'alofa Air NZ0868 Depart: 10:10pm Arrive: 2:00am Saturday July 4.
July 4	Sat	8:00am	• Visit Produce Markets, Nuku'alofa
July 5	Sun		Free
July 6	Mon	10:00am 2:00pm	• Meet Prince Tu'ipelehake, Minister, MAFFF • Meet Director of Tonga MAFFF, Heads of Research, Extension, & Quarantine • Briefing on consultancy, set up program and logistics • Review information and literature • Head of Quarantine & Quality Management Division • Visit the treatment facilities • Review literature and information
July 7	Tue	9:00am 2:00pm	• Meet Head of Research & Extension Division • Review literature & information • Meet Head of Extension Division • Review literature • Farm Visits with Extension
July 8	Wed	9:00am	• Farm Visits, • Visit William Edwards, Grower & Exporter, visit export facilities • Visit Mr. Minolu Nishi, Grower & Exporter, visit export facilities
July 9	Thu	9:30am	• Round up meeting with Prince Tu'ipelehake, Minister, MAFFF • Round up meeting with Peni Vea, Director, MAFFF • Depart for Vava'u, Air Chatham Pacific • End of Mission

Officials consulted while undertaking this consultancy by Country.

FIJI

1. Dr. Richard Beyer, Permanent Secretary for Agriculture, Ministry of Primary Industries (MPI), PMB, Raiwaga, P.O.Box 8, Suva Fiji. Phone: 679-330 1611/338 4233. E-mail: beyer@connect.com.fj

2. Mr. Waisiki N. Gonemaituba, Chief Economist/FAO National Correspondent, MPI, Ph: 679- 310 0290, E-mail: waisiki 05@yahoo.com

3. Mr. Hiagi MunivaiForaete, Director of Quarantine and Inspection Division, MPI. Ph: 679-330 2067. E-mail: hforaete@govnet.gov.fj

4. Mr. Moti Lal Autar, Director of Research Division, Koronivia Research Station (KRS), MPI.

5. Director of Extension Division, MPI.

6. Ms. Meveia Fong-Lomavatu, Plant Pathology Section, KRS, MPI.

7. Mr.Kininamoumou, Principal Agricultural Officer (Central) Extension Division, MPI

8. Mr. Ariano Tambulevu, Agricultural Technical Officer, Head office, MPI.

9. Mr. Viliame Wawaidranu Ratoto, Quarantine Officer, Suva, MPI.

10. Mr. Sataya Nand, Agriculture Technical Officer, Quarantine, Suva, MPI.

11. Mr. Ram, Managing Director, Garden City Export Packers, Lot 17, Dabea Rd, Valelevu, Nasinu, Suva, Fiji. Ph: 679-334 2866.

12. Mr. Tu'ivai, Driver, Suva, MPI.

13. Ms. Luisa Korodrau, Information Assistant, (Biosecurity) and Trade Facilitation Land Resources Division, Secretariat of the Pacific Community (SPC), Suva, Fiji, Ph: 679- 337 0733. E-mail: luisaK@spc.int

14. Dr. Lex A. J. Thomson, FACT Team Leader, Agri-forestry Export Production Specialist, SPC, Suva, Fiji. Ph: 679-337 0733. E-mail: lext@spc.int

15. Mr. Steve Hazelman, ICE Support Team, SPC, Suva, Fiji. Mob: 990 0330

16. Mr. Francis Lemeki Ratucicivi, Senior Agriculture Officer, (Western) Quarantine, NAdi Airport, MPI. E-mail: maxi_raducicivi@yahoo.com

17. Mr. Daya Nand Sharma, Agriculture Officer, Quarantine, Nadi Airport, MPI.
E-mail: sharmadn@connect.com

18. Mr. Surend Pratap, Agriculture Technical Officer, Quarantine, Nadi Airport, MPI.
E-mail: suren.Protap@govnet.gov.fj

19. Mr. Sant Kumar, Manager, Nature's Way Cooperatives (HTFA), Nadi Airport, Fiji.

20. Ms. Nikhat, Manager, Green Valley Fresh Ltd., Navaka, Nadi, Fiji.

21. Mr. Mausio, Agriculture Technical Officer, Extension on Crops, Sigatoka Valley, MPI.

22. Mr. Sairusi Vunitabua, Officer in Charge, Lautoka Sea-port, Quarantine, MPI. Ph: 679-666 5984. E-mail: sairusibv@yahoo.com

23. Mr. Kumar, Manager, Valley Fruits and Vege Ltd. Sigatoka Valley, Fiji.

VANUATU

1. Mr. Ruben Markward Bakeo, Director, Department of Agriculture & Rural Development, PMB 040, Port Villa, Vanuatu. Ph: 678-22 525/24 160.

2. Mr. James Wasi, Provincial Principal Agricultural Officer, Extension & Technical Section, also FAO National Correspondent, Ministry of Agriculture, Quarantine, Forestry & Fisheries, PMB 039, Port Villa, Vanuatu. Ph: 678-23406. E-mail: jwasi@vanuatu.gov.vu

3. Mr. Bennel Tarilongi, Director, Department of Livestock & Quarantine, PMB 9095, Port Villa, Vanuatu. Ph: 678-23 519. E-mail: btarilongi@vanuatu.gov.vu

4. Mr. Francis Qarani, Senior Quarantine Officer, Department of Livestock & Quarantine, PMB 9095, Port Villa, Vanuatu. Ph: 678-23519. E-mail: fgarani@vanuatu.gov.vu

5. Ms. Merriam Toalak, Assistant Plant protection Officer, Department of Livestock & Quarantine, PMB 9095, Port Villa, Vanuatu. Ph: 678-23519/23130. E-mail: mseth@vanuatu.gov.au

6. Mr. Franlois Wabak, Horticultural Officer, Department of Agriculture & Rural Development, PMB 039, Port Villa, Vanuatu.

7. Dr. Vincent Labot, Crop Specialist, Department of Agriculture & Rural Development, PMB 039, Port Villa, Vanuatu.

8. Ms. Cornelia Wyllie, Manager, Vanuatu Direct Ltd., Rainbow Gardens, P.O. Box 156, Port Vila, Vanuatu. Ph: 678-26720/ mob: 5544720. E-mail: cornelia.wyllie@vanuatudirect.com.au

9. Mr. Joe Noklam, Teouma Custom Village, Good Farmer of mixed cropping of root crops, fruits and ornamentals. Good crops of pele & vi for local markets.

10. Mr. Charles Longham, Director, Kava Store, B.P. 654, Port Vila, Vanuatu. A well-known food processor of tropical produce. Ph: 678-22 757. E-mail: kavastore@vanuatu.com.vu

11. Mr. Keith Chapman, InterAgConsult, 8 Port St., Buderim 4556, Queensland, Australia. Ph: 61 7 54456430. E-mail: keith.buderim@gmail.com, web; www.interagoonsult.com

SAMOA

1. Mr. Asuao Kirifi Pouono, Chief Executive Officer, Ministry of Agriculture & Fisheries, ACB Building, APIA. Ph: 685-22561/22562/22563, Fax: 685-24576/21865. E-mail: kapouono@lesamoa.net, maffm@lesamoa.net

2. Mr. Pelenato Fonoti, Acting/CEO of Quarantine, MAF, Apia. E-mail: aceo@samoaquarantine.gov.ws

3. Mr. Frank Fong, A/CEO, Aministration & Policy, MAF,ACB Building, Apia, Samoa. E-mail: frank.fong@maf.gov.ws

4. Ms. Emele M. Ainuu, A/CEO Researh & Extension, Nuu Research Station, MAF, Apia, Samoa. E-mail: emi@lesamoa.net

5. Mr. Parate Matalavea, Principal Agriultural Officer, Nuu Research Station, MAF, Apia, Samoa. E-mail pmatalavea@lesamoa.net

6. Mr. Pueatu Tanielu, Senior Crop Physiologist, Nuu Research Station, Apia, Samoa. E-mail:liutanielu@gmail.com

7. Ms. Faalelei Laiti, Research Officer, Fruit fly Project, Nuu Research Station, MAF, Apia. E-mail: ftlaiti@lesamoa.net

8. Mr. Mu Vaamainuu, Advisory Officer, Crops Division, Nuu Research Station, MAF, Apia. Ph: 685 - 0605/23416. E-mail: vaamainuu@gmail.com

9. Mrs. Lydia Hazelman, Grower, Apia.

10. Mr. Frank Tauiliili, Grower, Apia.

11. Mrs. Adi Tafuna'i, Director, Women in Business, Apia, Samoa.

12. Mrs. Rosa, Women in Business, Grower, Apia, Samoa.

13. Ms. Sinamoga, Organic project Officer, Women in Business, Apia, Samoa. E-mail: organics@womeninbusiness.ws

14. Mr. Mohamed Umar, Retired Director, IRETA, Apia, Samoa

15. Hon. Tuisugaletaua A. Sofara Aveau, Minister of Works, Transport & Infrastructure, Private Bag, Apia, Samoa. Ph: 685 26032. E-mail:tsaveau@lesamoa.net

16. Dr. Matairangi Purea, Plant Protection Officer, SAPA, FAO, Apia, Samoa. Ph: 685-22127, Fax: 685-22126, Web: www.faopacific.ws E-mail: Mat.Purea@fao.org

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19. Ms. Tinai Salamasina SAPA, FAO, Apia, Samoa. Ph: 685-22127, Fax: 685-22126. Email: Tinai@fao.org

COOK ISLANDS

1. Mr. Ngamataio, Secretary for Agriculture, Ministry of Agriulture, P.O.Box 96, Rarotonga, Cook Islands. Ph: 682-21705/28711. Fax: 682-21881. E-mail; mataio@agriculture.gov.ck Web: www.agricultire.co.ck

2. Mr. William Wigmore, Director Research Division, MOA, Rarotonga, Cook Islands. Ph: 682 28711. Fax: 682 21881. E-mail: cimoa@oyster.net.ck

3. Mr. Ngatoko, Director, Biosecurity Division, MOA, Rarotonga, Cook Islands. E-mail: nagatoko@agriculture.gov.ck

4. Dr. Maja Poeschko, Entomologist, MOA, Apia, Cook Islands. Email: research@oyster.net.ck

5. Mr. Anau Mariarangi, Retired Agriculturist, Avarua, Rarotonga, Cook Islands. E-mail: anau@oyster.net.ck

6. Mr. Eugene Tatuava, Managing Director, Rarotonga Freight Services Ltd., Box 158, Rarotonga, Cook Islands. Ph: 682 23361. Fax: 682 21391, E-mail: eugene@rarofreight.co.ck

NEW ZEALAND

1. Dr. Viliami Fakava, Senior Adviser, Plant Imports (Pacific), Import/Borer Standards, MAF Biosecurity NZ, Pastoral House, 25 The Terrace, P. O. Box 2526, Wellington 6011, New Zealand. Ph: 64 4 894 0554, Fax: 64 4894 0662, mob: 029 894 0554, email: viliami.fakava@maf.gov.nz, web: www.biosecurity.gov.nz

2. Mr. Richard Ivess, Senior Specialist (SPS), Trade Negotiations Division, Ministry of Foreign Affairs & Trade, 195 Lambton Quay, Private Bag 18 901, Wellington 5045, New Zealand. Ph: 64 4 439 8000, Fax: 64 4 439 8522, E-mail: richard.ivess@mfat.govt.nz, DD: 64 4 439 8078.

3. Deb Anthony, Adviser, Risk Analysis Group, MAF Biosecurity NZ, Pastoral House, 25 The Terrace, P. O. Box 2526, Wellington 6011, New Zealand.

4. Dr. Shiroma Satyapara, Team manager, Risk Analysis Group, MAF Biosecurity NZ, Pastoral House, 25 The Terrace, P. O. Box 2526, Wellington 6011, New Zealand

5. Ms. Rachel Barker, Auckland Ports, MAF Biosecurity Service, 23 Quay St., Auckland. E-mail: Rachel.barker@maf.govt.nz , web: www.biosecurity.govt.nz-standards-regulations

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