

IMPROVING ACCESS TO HIGH QUALITY SEED FOR PACIFIC ISLAND FARMERS

SCOPING STUDY REPORT

*Improving access to high quality seed for Pacific island farmers
through farmer organisations in Fiji, Samoa,
Solomon Islands, Tonga and Vanuatu*

2014

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LIST OF ACRONYMS

APSA	Asian Pacific Seed Association
AVRDC	Asian Vegetable Research and Development Centre
CePaCT	Centre for Pacific Crops and Trees
DSAP	Development of Sustainable Agriculture Program
FAO	Food and Agriculture Organization of the United Nations
FOA	Fiji Organic Association
FRIEND	Foundation for Rural Integrated Enterprises and Development
FSA	Farmer Support Association
KGA	Kastom Gaden Association
MAF	Ministry of Agriculture and Fisheries - Samoa
MAFFF	Ministry of Agriculture, Food, Forests and Fisheries - Tonga
MAL	Ministry of Agriculture and Livestock – Solomon Islands
MOA	Ministry of Agriculture - Fiji
NGO	Non- Government Organization
NT	Nishi Trading
PHAMA	Pacific Horticultural and Agricultural Market Access Program
PIFON	Pacific Island Farmer Organisations Network
PMN	Planting Materials Network
PRAP	Pacific Regional Agriculture Programme
SFA	Samoa Farmers Association
SPC	Secretariat of the Pacific Community
SPRAD	South Pacific Regional Agricultural Development Project
TTT	Teitei Taveuni Farmers Association
VAS	Vanuatu Agriculture Supplies

ACKNOWLEDGEMENTS

Thanks and appreciation is extended to all local consultants as per table 1, informants as per the list of key informants and information sources and a few others who shared their information and insights throughout the process of compiling this study.

EXECUTIVE SUMMARY

Poor access to high quality vegetable seed has been identified by the Pacific Island Farmer Organisations Network (PIFON) and its associated member organisations as being a significant factor in limiting seed propagated vegetable production for Pacific Island farmers. In an effort to better understand this problem and identify opportunities for improvement Terracircle coordinated the scoping study 'Improving access to high quality seed for Pacific Island Farmers' at the request of the PIFON. The study aimed to evaluate the current supply chain for both hybrid and open pollinated vegetable seed in Pacific Island countries, specifically Fiji, Samoa, the Solomon Islands, Tonga and Vanuatu in order to identify opportunities available to Farmer Organisations to improve access to seed for farmers.

The specific objectives of this study were to:

1. Identify what vegetable varieties are currently available in each country considering both open pollinated landraces and commercial hybrid varieties.
2. Identify current systems for seed production and distribution including who is producing seed and who is selling seeds.
3. Identify some of the priority needs of farmers in relation to varieties including identification of crops and characteristics sought.
4. Determine the capacity in each country to introduce new appropriate seed material, make seed more readily available and locally produce and distribute open pollinated seeds.
5. Capture lessons learnt from activities in the region related to seed access and seed production.
6. Identify roles and opportunities that farmer organisations may play in influencing improved seed supply.

To carry out this assignment, Terracircle consultant Emma Stone worked with local consultants from Farmer Organisations in each of the participating countries. In the case of Fiji and the Solomon Islands Emma worked directly with the local consultant and relevant stakeholders while in country. In the case of Samoa, Tonga and Vanuatu Emma worked with the consultants remotely with communications limited to electronic mail.

In regards to the commercial seed sector, the study identified some differentiation in the range of seeds available between the countries with Fiji having the greatest range of seed companies available in country with 10 seed companies represented. Samoa, the Solomon Islands, Tonga and Vanuatu had respectively 5, 5, 7 and 6 seed companies represented in retail outlets. While the calculations of the varieties available from each seed company within each country were not comprehensive generally the range of varieties also varied between countries and between companies with Yates and Known-You generally presenting greater diversity in varieties than other companies. Access to commercial seed was largely restricted to the country capital in all countries. The Solomon Islands and Fiji offered a moderate level of access outside of the capital through agents in provincial centres however this was largely limited to Yates seeds.

In regards to open pollinated seed most countries acknowledged a basic level of seed production occurring by subsistence farmers of some open pollinated landraces and exchange

of such occurring through the informal sector. With the exception of SPE/Zai na Tina farm in the Solomon Islands there was no other evidence of no private commercial ventures in seed production occurring. It was identified that the Ministry of Agriculture in Fiji and historically the Solomon Islands achieved some seed production albeit at low levels and with very limited accessibility to farmers.

An assessment of access to seed following emergency situations, such as natural disasters, was also included in this study. Largely this was not considered a point of significant concern in any country as the private sector appeared to be well positioned to respond to the needs for commercial seed in a timely period. It was however identified that there is very limited attention to replenishing access to local open pollinated landraces within disaster response programs.

Local consultants identified a range of opportunities to improve seed quality and access across all of the above areas. Following the evaluation of the country profiles the researcher collated and expanded these opportunities and devised a range of recommendations appropriate for Farmer Organisations to facilitate improved access and quality of seed both within the formal and informal sectors. The focus areas of these recommendations were:

- Strengthening access to commercial seed in rural areas
- Strengthening quality of seed, both imported and locally produced through training and support in seed handling and storage
- Increasing the diversity of seed companies present in Samoa, Solomon Islands, Tonga and Vanuatu to match that of Fiji
- Strengthening the informal seed sector through training and support in seed production and promoting exchange opportunities
- Identifying and improving access to suitable and improved varieties through undertaking plant variety evaluations in different locations to determine the best varieties for different climatic and cultural conditions.

INTRODUCTION

Pacific Islanders have a high level of subsistence food production and production of food for local markets. Vegetative propagated crops such as sweet potato, taro, bananas, cassava, yam and aibika are the staple foods and by far the largest component of food supply in the Pacific Islands. The planting materials of these vegetatively propagated crops are typically supplied by informal and traditional 'seed sectors'. While the importance of these agricultural crops is recognised, the consumption of vegetables, which are mostly grown from seed form an important part of nutritional health and livelihoods throughout the Pacific Islands. Increased consumption of vegetables is widely advocated to address growing nutritional health issues (such as vitamin A deficiency and Diabetes) resulting from increasing consumption of imported and highly refined foods¹.

Additionally cultivation of seed based vegetable crops is an increasingly important livelihood option. For example in the Solomon Islands vegetable production for local markets is often the

¹ WHO (Western Pacific Regional Office) 2009 FAO/SPC/UNICEF/WHO/PIFS concept paper: A Pacific Food Summit 2010: Facilitating action for a food secure Pacific. WHO, Manila, May 2009.

most important source of income for meeting basic needs. Access to quality seed of appropriate varieties is a fundamental starting point for improving agricultural productivity and food security. Access to quality vegetable seed through both the informal and the formal sectors has been a long standing limitation for Pacific Island farmers (FAO 1996, FAO 1999, Pole 2009). With traditional crops being vegetatively propagated seed production is largely absent from agricultural practice. Further, the supply chain for commercial imported seed is challenged by numerous obstacles including lack of seed handling skills and practice by retailers and consumers, limited access to adequate storage conditions in a tropical climate and the proximity of rural farmers to retail outlets.

This report evaluates the current accessibility to vegetable seed for five Pacific Island countries being Fiji, Samoa, Solomon Islands, Tonga and Vanuatu and presents recommendations to address constraints and take advantage of opportunities to improve seed accessibility and seed quality of both hybrid cultivars and open pollinated landraces suitable for local conditions.

The over arching aim of this report is to inform programs, projects and activities designed to improve access, quality and suitability vegetable seed to Pacific Island farmers.

The objectives of this study were to:

- Identify what vegetable varieties are currently available in each country considering both open pollinated landraces and commercial hybrid varieties.
- Identify current systems for seed production and distribution including who is producing seed and who is selling seeds.
- Identify some of the priority needs of farmers in relation to varieties including identification of crops and characteristics sought.
- Determine the capacity in each country to introduce new appropriate seed material, make seed more readily available and locally produce and distribute open pollinated seeds.
- Capture lessons learnt from activities in the region related to seed access and seed production.
- Identify roles and opportunities that farmer organisations may play in influencing improved seed supply.

BACKGROUND

There is a strong relationship between the provision of food on a sustainable basis and a sustainable seed supply for agricultural production. Production, in turn, is potentiated by seed of adequate quality for use². An assessment of seed production and supply to the Asia Pacific region was conducted by FAO in 1996³. This assessment identified significant weaknesses in seed supply and presented a range of strategies to improve both the formal and informal seed sectors. In 1999 the Asia Pacific Seed Association (APSA) organised a convergence of stakeholders for the Asia Pacific region occurring in Bangkok. The output of this meeting was the comprehensive report '*Seed Policy and programmes for Asia and the Pacific*'⁴ with numerous recommendations aligning with those presented within the FOA 1996 assessment. Over the last 15 years seed production and accessibility has improved significantly in Asia. A thriving private seed industry with commercial seed producers exists in many Asian countries including Thailand, Philippines, Taiwan, Japan, ROC and India. Unfortunately there has been very little progress in the Pacific Islands with no achievement of commercial seed growers, very small improvements to access to imported seed and limited developments in farmers producing and exchanging seed of local open pollinated varieties.

In 2009 the FAO again gave focus to the supply of seeds to the Pacific with a study conducted on seed availability, accessibility and suitability in Kiribati, Tonga and Vanuatu⁵. This study again identified common issues of very limited supply of seed and no formal seed policies within government. The recommendations made within the 2009 study focused on building the capacity of the Ministries of Agriculture within these countries to develop a centralised government directed seed supply system with National Seed Centres in each country and a Regional Seed Centre at CePaCT-SPC. While CePaCT has significantly advanced the capacity to conserve the genetic diversity of the regions traditional vegetatively propagated food crops little focus has been given to seed produced vegetable crops. The recommendations of FAO's 2009 report have largely failed to come to fruition and the issue of accessibility of quality seed remains almost unchanged across the region.

Mention should be made of the *International Treaty on Plant Genetic Resources for Food and Agriculture*. Fiji and Samoa are both members of the Treaty. In 1997 at a regional meeting Pacific Heads of Agriculture resolved to put in place, both in their countries and through regional cooperation, policies to conserve, protect and best utilise their plant genetic resources. The Treaty was adopted in 2001. The sustainable use of plant genetic resources for food and agriculture is one of the three main objectives of the Treaty. Article 6 specifically focussed on this and is closely related to the focus of this study.

² Boyce, K. 2000, Paper presented to APSA conference, p.2

³ FAO, 1996 'Seed Production and Improvement: Assessment for Asia and the Pacific', Paper presented in the *Proceedings of the Regional Technical Meeting on Seed Policy and Programmes for Asia and the Pacific 1999*, Seed and Plant Genetic Resources Service, Plant Production and Protection Division, FAO, pp.29-59.

⁴ FAO, 1999 *Seed policy and programmes for Asia and the Pacific Proceedings of the Regional Technical Meeting on Seed Policy and Programmes for Asia and the Pacific 1999*.

⁵ Pole, F. 2009 *Consultation on seed availability seed accessibility and suitability for Kiribati, Kingdom of Tonga and Vanuatu*, FAO Sub-Regional Office for the Pacific Islands.

Article 6. Sustainable Use of Plant Genetic Resources

- **6.1** The Contracting Parties shall develop and maintain appropriate policy and legal measures that promote the sustainable use of plant genetic resources for food and agriculture.
- **6.2** The sustainable use of plant genetic resources for food and agriculture may include such measures as:
 - a)** pursuing fair agricultural policies that promote, as appropriate, the development and maintenance of diverse farming systems that enhance the sustainable use of agricultural biological diversity and other natural resources;
 - b)** strengthening research which enhances and conserves biological diversity by maximizing intra- and inter-specific variation for the benefit of farmers, especially those who generate and use their own varieties and apply ecological principles in maintaining soil fertility and in combating diseases, weeds and pests;
 - c)** promoting, as appropriate, plant breeding efforts which, with the participation of farmers, particularly in developing countries, strengthen the capacity to develop varieties particularly adapted to social, economic and ecological conditions, including in marginal areas;
 - d)** broadening the genetic base of crops and increasing the range of genetic diversity available to farmers;
 - e)** promoting, as appropriate, the expanded use of local and locally adapted crops, varieties and underutilized species;
 - f)** supporting, as appropriate, the wider use of diversity of varieties and species in onfarm management, conservation and sustainable use of crops and creating strong links to plant breeding and agricultural development in order to reduce crop vulnerability and genetic erosion, and promote increased world food production compatible with sustainable development; and
 - g)** reviewing, and, as appropriate, adjusting breeding strategies and regulations concerning variety release and seed distribution

RESEARCH METHODOLOGY

This study was carried out in five selected countries in the Pacific region specifically being Fiji, Samoa, Solomon Islands, Tonga and Vanuatu. Representatives from local farmer organisations in each of the participating countries were contracted to develop a country profile of seed supply within in their respective country. These local consultants, listed below, gathered data through consultation with various stakeholders involved in the seed industry including: seed importers, seed retailers, farmer's and staff of associated Ministries and not-for profit organisations. The local consultants sought information through surveys, interviews and other information sources relating to seed availability, seed quality and seed suitability within both the formal and informal seed sectors including consideration to hybrid and open pollinated commercial varieties and local open pollinated landraces. Data and comments from the different stakeholders were compiled into the country profile by the local consultants and provided to the researcher. Based on evaluation of the country profiles, the researcher developed recommendations of activities and pathways available to Farmer Organisations to influence improved access to quality seed of appropriate varieties for Pacific Island farmers. The country profiles were collated by the following consultants.

Table 1: Consultants utilised to prepare country specific profiles

Country	Local Consultant	Organisation
Fiji	Kyle Stice *with the assistance of researcher (Emma Stone)	Pacific Island Farmer Organisations Network
Samoa	Malcolm Hazelman	Samoa Farmers Association
Solomon Islands	Thecla Vaspusy *with the assistance of researcher (Emma Stone)	Kastom Gaden Association
Tonga	Minoru Nishi	Nishi Trading
Vanuatu	Jillian Greenhalgh and Charles Rogers	Farmer Support Association

RESULTS









































































This section is a collation of country specific seed profiles developed for Fiji, Samoa, Solomon Islands, Tonga and Vanuatu.

COLLATED RESULTS FOR IMPORTED COMMERCIAL SEED

The seed companies present in each of the PIC's is detailed in Table 2. The numbers of seed companies represented within each country varied from 5 in Samoa and the Solomon Islands to 10 in Fiji. Known-You, Yates and Terranova were the most readily available generally offering good quantity and range. Takii also was present in each of the 5 countries with limited range.

While the origin of the companies is listed below this is not a clear indication of the origin of the seed that they are distributing. In many cases seed companies contract seed growers from other countries/regions. For example buying Yates seed does not assure you that the seed is produced in Australia.

Table 2: Imported commercial seed companies available

Company	Source Country	Fiji		Samoa		Solomon Is		Tonga		Vanuatu	
Supplier of Quantity/Range		Quantity	Range	Quantity	Range	Quantity	Range	Quantity	Range	Quantity	Range
Major 											
Minor 											
Bonanza Seeds International Inc.	USA					-				-	
Clover Seeds Com.Ltd.	Hong Kong									-	
Chia Tai	Thailand										
Hop Ti											
King Seeds	New Zealand										
Known-You Seeds Co. Ltd.	ROC, Taiwan										
Kyowa Seeds Co. Ltd	Japan										
Rijk Zwaan Pty Ltd	Australia										
Sakata Seeds	Japan					-					
South Pacific Seeds (SPS)	New Zealand										
Takii & Co.Ltd.	ROC, Taiwan										
Terranova	New Zealand										
Yates Australia	Australia										
Total number of companies		10		5		5		7		6	

COMMERCIAL SEED COMPANY PROFILES.

BONANZA SEEDS, established in 1978, is an American company based in California. As a supplier of open pollinated varieties for over 30 years it has recently extended production into hybrid varieties as well. Bonanza claims to be distributing seeds to over 72 countries. Currently Bonanza seed is available in Fiji and Tonga. It is unclear whether the varieties stocked are hybrid or open pollinated varieties. Within the course of this research it has not been possible to

determine whether production of Bonanza seeds is restricted to California or whether they also stock seed grown in other areas / countries. Hop Tiy is the exclusive distributor for Bonanza for the Pacific. More information about this company can be found at <http://www.bonanzaseeds.com/>

CLOVER SEEDS COMPANY is a company based in Hong Kong. It was first established in 1929 as a seed packaging company importing seed in bulk from other countries. The company developed to contract production of hybrid seeds in China and in the 1980s also commenced operating as a plant breeder. Predominantly seeds purchased from this company are produced in China in 4 different provincial areas covering a range of climates. More information about this company can be found at <http://www.cloverseed.com.hk/index.php?>

CHAI TAI SEEDS. is a seed supplier based in Thailand. The website suggests that Chai Tai seed is grown in many Asian countries including: Vietnam, Philippines, China, Bangladesh, Myanmar, India, Pakistan, Sri Lanka, Indonesia and Nepal. A catalogue of their range of seeds is available at: <http://www.chiataigroup.com/Product/Seed.aspx> Further enquiries about this company and their distribution can be made at: inter_cts@chiataigroup.com

HOP TIY is a Fiji based company. While they do not produce seeds they import seeds from a range of other companies packaged under the Hop Tiy label.

KING SEEDS is a New Zealand based company with some export potential. To date they have exported seeds to Fiji and Samoa. More information about this company can be sought from <http://www.kingsseeds.co.nz/Customer+Service/Need+some+extra+information/Overseas+Customers.html> or email enquiries directed to sales@kingsseeds.co.nz

KNOWN-YOU SEEDS is a seed company based in Taiwan. Solfish is the exclusive distributor for Known You seeds in the Solomon Islands and Hop Tiy is the exclusive distributor for Fiji. More information about this company is available at http://www.knownyou.com/en_index.jsp

KYOWA SEEDS is a Japanese company that belong to France's largest seed group – the Limagrain group. Currently they have a limited distribution to Tonga. Their catalogue can be located at <http://www.mikadoseed.com/Product/EnCategory>

RIJK ZWANN has a head office in De Lier, the Netherlands and conducts breeding and production worldwide. Currently Rijk Zwann is only represented in Fiji. The contact for seed distribution to the Pacific Islands is Rijk Zwaan Australia Pty. Ltd Daylesford, Victoria Australia. Enquiries can be directed to vegieseeds@rijkszwaan.com.au

SAKATA SEED CORPORATION was established in 1913 in Japan. It is now a major seed company with seed producers, breeders and sales divisions located from a range of countries around the world.

SOUTH PACIFIC SEEDS is an Australian based vegetable seed production and marketing company formed in 1986. The SOUTH PACIFIC SEEDS group claims to be the largest specialist vegetable seed company in Oceania. SOUTH PACIFIC SEEDS has a marketing arm that sources vegetable varieties from many breeders around the world and then distributes them to professional vegetable growers and a production arm that multiplies vegetable seeds for plant breeding companies. SPS are not plant breeders. They have a number of subsidiary companies within the group including: SPS NZ Terranova Seeds (Auckland), Terranova Seeds (Sydney), SPS

Chile (Chile), North Pacific Seeds (California). SPC produce seeds in the above mentioned 4 countries. Their seed production in Australia occurs in the South East regions of the country. More information about the company can be found at <http://www.spssales.com.au/> or <http://www.sps-seedproduction.com/our-company.html>

TAKII SEEDS was established as a family based company in Kyoto Japan in 1835. It has since grown into a major seed company and while the headquarters remain in Kyoto they have with overseas stations in U.S.A, Brazil, Chile, the Netherlands, France, India, Indonesia, Thai, China and Korea. The Takii product line is available at <http://www.takiiseed.com/products/> Further enquiries about this company can be directed by post to C.P.O Box 7, Kyoto 600-8686 Japan or by phone to 81-75-365-0123. The Takii website does not list an email contact.

TERRANOVA (NZ) is a subsidiary company of SPS Seeds. They are based in New Zealand and Australia and export seeds around the world. While Terranova varieties currently available in the Pacific are in bulk packets they are currently developing a small seed packet range specifically for the Pacific to address issues of reduced quality resulting from poor seed handling when seed is repackaged locally. Further information about their range and cultural notes about their varieties can be found at <http://terranoaseeds.biz/> Sales enquiries can be made to their Export Sales Manager Greg Campbell at greg.campbell@tnseeds.com

YATES is a New Zealand and Australian based company founded in 1883. It is now a subsidiary company of the Dulux Group. All Yates packets available in the Pacific Islands are small packets. They do not supply bulk packets. While more information about their range is available at <http://www.yates.com.au/products/seeds> this site does not specifically identify varieties suited to the tropics.

LIST OF APPROVED SEED SOURCES

Biosecurity in the following countries have a list that identifies which seed companies have been approved for importation.

Fiji: Publically available list identifies 45 different seed companies from across Asia, Pacific, Canada and the USA. However, not all of these companies trade in vegetable seed.

Solomon Islands: Biosecurity has established a list of which seed companies are approved for importation to the Solomon Islands. Unfortunately this list is not readily available and was not able to be sourced in time for the release of this report.

Vanuatu: The list of approved seed sources for Vanuatu is attached as Appendix 3.

Samoa: Samoa's Quarantine Division of MAF has established an *Approved Imports List* of vegetables and herbs including countries from which seeds of named crop varieties can be imported. A total of some 59 vegetable crops plus herbs approved for importation into Samoa are listed. The countries from which importation is allowed include mainly New Zealand, Australia, American Samoa, Fiji, Hawaii, United States of America plus others as approved on a case by case basis. The list is updated from time to time. It was not, however, evident from the interviews that seed importers as well as farmers knew about such a list to guide their introductions nor was it mentioned in vegetable extension leaflets available from MAF. Queries were raised as to why seeds of certain crops were allowed or prohibited for introduction from certain countries (e.g. the same corn seeds being allowed from the USA but not from American

Samoa or Known You Company seeds allowed from Taiwan but not if bought via Hop Tip in Fiji). Larger producers identified an interest for more flexibility to enable them to import vegetable crop varieties beyond the ones listed under the Approved Imports List.

MOST POPULAR IMPORTED COMMERCIAL SEED VARIETIES

Table 3: Most popular imported seed varieties in Vanuatu, Fiji, Tonga and Samoa.

CROP	VARIETY			
	VANUATU	FIJI	TONGA	SAMOA
Beans (Dwarf)	Contender Gourmets Delight Stringless Pioneer Snap beans	Contender Long Bean	Contender	
Beetroot	Super King Cylindra			
Broccoli	Shogun Summer King			
Cabbage (Green)	Copenhagen Market Golden Acre Racer Drumhead K.K.cross hybrid	KK cross FF cross Autumn summer	Summervcross	KK cross FS cross Pacific Green Emerald Green Coronent
Cabbage (Chinese)	Kwang Moon Chi Hi Li Pak Choi Hybrid Wong Bok Saladeer	Pak Choi Bok Choi Petsi	Pak Choi	Pak Choi Green Stem Saladeer Shanghai
Capsicum	Giant Bell Marconi Hot Yolo Wonder	Blue Star	Santino	
Carrot	Topweight Kuroda		Topweight New Kuroda Red Cored Superbunch Chantenay	New Kuroda
Corn				Golden Hybrid
Cucumber		Telegraphic Moneymaker	Gremlin	Bountiful Merry Savaldor Genuine Moneymaker Camelot
Eggplant		Black Beauty Black Bell Known you 'long purple'		Black King Long Purple Early Long
Lettuce	Green Mignonette Buttercrunch Boxhill		Lucky Tropical	
Tomato	Beefsteak Grosse Lisse	Rising Sun #1 and #2	Rebel	Big Beef Rising Sun #2

	Roma	Beefsteak		Headmaster Tropic Boy
Watermelon	Sugar Baby Candy Red Charleston Grey Allsweet hybrid Mickey Lee	Emperor #2 Field Master	Charleston 805	Farmers Giant Ruby Black Adder

Samoa: Farmers interviewed, especially the small producers and some retailers, were generally not familiar with variety names of the crops they grew or even of variety names of those that had resulted from field research such as that undertaken by the Sino-Samoa Agricultural and Technical Development Project and/or MAF - Nu'u. Given the lack of a formal list of recommended crop varieties arising from a recognized research entity in recent times, such as from MAF, there appears to be a tendency by retailers of seeds to order seeds as they please, be influenced by seed companies and their glossy catalogues, or base seed imports on clientele requests and/or their own observations and non scientific variety evaluations.

Solomon Islands: Information for favored varieties was not obtained in the Solomon Islands. Where farmers were interviewed in most cases they did not recall variety name with the exception of one farmer indicating a preference for KK cross Cabbage.

COUNTRY SPECIFIC PROFILES

FIJI

KEY INFORMANTS AND INFORMATION SOURCES

- Mr Kyle Stice (Manager - Pacific Island Farmer Organisations Network)
- Mr Peter Kiger and Mr Alex Sandys (Teitei Taveuni Farmers Association)
- Mr Yee Wah Sing (Managing Director - Marco Polo International)
- Mr Steven (Manager - Hop Tiy Agricultural Supplies Suva)
- Ms Lavinia Kaumaitotoya (Secretariat / CEO - Fiji Crop and Livestock Council)
- Mr Sant Kumar (President - Fiji Organic Association)
- Ms Rajani Singh (Organic Grower - Organic Agriculture Fiji Ltd)
- Ms Jodi Smith (Organic Grower - Ranadi Plantation)
- Ms Sashi Khan (Director – Foundation for Rural Integrated Enterprises and Development)
- Ministry Of Agriculture (MOA) reports on research station seed production

IMPORTERS AND RETAILERS FOR COMMERCIAL SEED INTO FIJI

Table 4: Importers and retailers for commercial seed into Fiji

Enterprises	Importer	Retailer
Hop Tiy – 1 outlet Suva		
Morris Hedstrom – 23 outlets		
Joes Farm		
Kula Eco Park		
Forsters Enterprise		
City Farm		
Turners and Growers		
SPC		
KK's		
Raki Raki		
Sigatoka Chemicals		
Other small hardware, agricultural and general supplies stores		

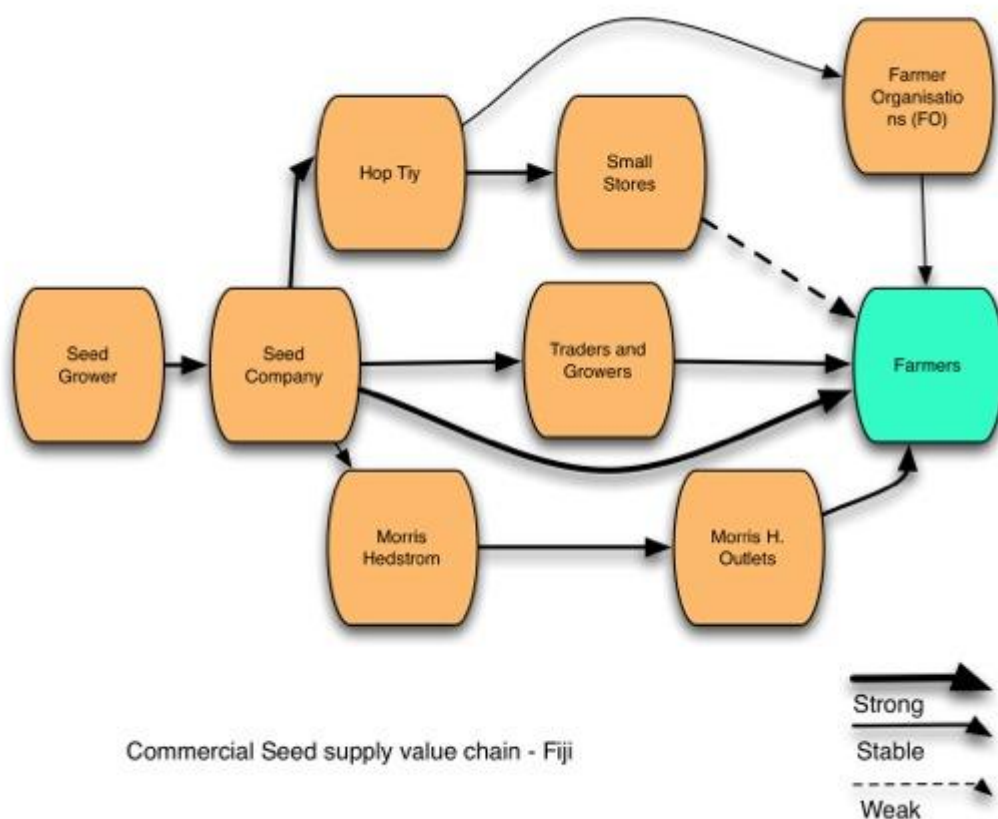
There are 7 importers of vegetable seed in Fiji. Of the above Hop Tiy is clearly the largest seed importer operating both as a wholesaler and retailer. Hop Tiy supplies seed from 6 seed companies and dominates the wholesale market of seeds to other seed retailers. It can be assumed that the majority of seed reaching the majority of farmers is from Hop Tiy. Morris Hedstrom operates as a retailer. They have widespread coverage with 23 outlets across Fiji however not all outlets stock seed. While they currently only stock Yates seed they are working towards expanding their range to include other seed companies. Turners and Growers is a new entrant into the seed market supplying SPS seeds. The other importers listed above are growers predominately importing seed for their own use. There are other individual businesses and farmers that import seeds from time to time for their own purposes.

There are numerous other small retailers across Fiji also purchasing from Hop Tiy who have not been documented above. Additionally, in an effort to keep the costs of seeds a minimum some larger farmers import seeds either direct from seed companies or purchase in bulk from Hop Tiy when in Suva.

REGIONAL RETAILERS PURCHASING FROM FIJI

Obstacles to accessing to seed in many Pacific countries has lead to farmers, businesses and organisations of other Pacific countries making purchase arrangements through Hop Tiy in Fiji. Over the last 12 months these have included orders from Tonga, Samoa and the Solomon Islands. Hop Tiy has a handling fee \$80FJ regardless of order size. Hop Tiy has established arrangements with Biosecurity for use of re-export phyto certificates and in such cases requires no additional treatment of seeds to export to other Pacific Islands. Hop Tiy charges full price for regional orders who are end users of the seed and wholesale prices for those that retailers.

Figure 1: Fiji imported seed supply chain



SAMOA

KEY INFORMANTS AND INFORMATION SOURCES

- Mrs. Fuapepe Rimoni Frost (Manager Sales & Marketing – Agriculture Store Corporation)
- Mr. Edwin Tamasese (Director, Soil Health Pacific Ltd)
- Ms. Leaupepe Lasa Aiono (Owner of the Alafua Shop & Operations Manager, Samoa Farmers Association)
- Ms. Lorraine Moala (Manager, Farm Supplies)
- Mrs. Visceta Meredith, (Co-owner JM Garden Concepts)
- Ms. Malwine Lober (Administration – SMI Hardware)
- Mr. Charlie Westerlund (Chairman - Ah Liki Wholesale and the owner of the Farm at Tanumapua)
- Mr. Ricky Westerlund (Owner of Samoan Fresh Vegetables and Fruits)
- Mr. Bruce Russel (Project Manager, Tindall Foundation & Poutasi Development Trust)
- Mrs. Adimaimalaga Tafuna'i (Executive Director – Women in Business Development Inc)
- Mr. Misa Konelio (Crops - Assistant Chief Executive Officer, Ministry of Agriculture and Fisheries (MAF-Nuu))
- Dr. Seuseu Tauati (MAF Plant Pathologist)
- Mr. Fata Alo Fania (Principal Crops Officer)

- Mr. Toilolo Pueata Tanielu (Principal Development Officer)
- Mr. Tommy Tuuamalii (Senior Crops Advisory Officer, Crops Division, Ministry of Agriculture and Fisheries)
- Mr. Huang (Team Leader, Sino-Samoa Agricultural and Technical Cooperation Project)
- Mrs. Tuimaseve Kuinimeri Asora-Finau (Manager, Plant and Food Technology, Scientific Research Organization of Samoa)
- Mr. Luaiufi Aiono (Agroforestry Technical Officer, ICCRIFS, MNRE)
- Mrs. Emele Ainuu (Food Security Coordinator, Project on Enhancing Resiliency of Food Production Systems to Climate Change, SPC – MAF)
- Mr. Seumanu Gauga Wong Yee (Principal Education Officer – Secondary Curriculum, Ministry of Education Sports and Culture)
- Mr. Telema Enari (Education Officer - Agriculture Science Curriculum Secondary)
- Mrs. Lineta Tamanikaiyaroi (Head of Construction/Lecturer in Tropical Horticulture/Agriculture, National University of Samoa)
- Mr. Falaniko Amosa (Lecturer in Crop Science – University of the South Pacific, School of Agriculture and Food Technology)
- Mr. Asuao Kirifi Pouono (Part-time Farmer & National Market Access Coordinator for Samoa, Pacific Horticultural & Agricultural Market Access Program)
- Mrs. Lagi Poi Leilua (Farmer-Market Seller, Tanumalala)
- Mrs. Amy Choung Kwan (Farmer-Market Seller, Fiaga)
- Mr. Petelo Fuefeai (Farmer-Market Seller, Leauvaa)
- Dr. Seumanutafa Malcolm Hazelman (Volunteer Agriculture/Horticulture Advisor & Home gardener)

IMPORTERS AND RETAILERS FOR COMMERCIAL SEED INTO SAMOA

Table 5: Importers and retailers for commercial seed into Samoa

Enterprises	Importer	Retailer
Agriculture Store Corporation		
Soil Health Pacific Ltd		
Farm Supplies		
JM Garden Concepts		
Leaupepe Lasa Aiono		
University of the South Pacific (USP) School of Agriculture and Food Technology		
Other small hardware, agricultural and general supplies stores		

There are currently 6 main importers of vegetable seed in Samoa. The above listed importers are also the retailers of seed with the exception of the USP.

Government projects (including those supported by donors and international development partners such as the Sino-Samoa Agricultural and Technical Development Project, ACIAR, FAO,

SPC etc) have been known to import seeds direct as well as also relying on the above local sources for seeds.

For a long while, the main and largest importer of vegetable seeds into Samoa was the Agriculture Store Corporation. However, in recent times and with the moves to privatize this Samoan Government Corporation, a few other private entities have entered the seed selling scenario, namely Soil Health Pacific Ltd (which also runs a large seedling nursery operation), Mrs. Leaupepe Lasa Aiono (operating out of her small village store at Alafua and sells mainly to members of the Samoa Farmers Association), and Farm Supplies (which also has another arm serving clients on the island of Savaii).

There are possibly other retail outlets selling seeds either imported directly or obtained from the main retailers listed above. Additionally, in an effort to keep the costs of seeds to a minimum and to ensure availability of seed supplies, some larger farmers, Government ministries, Aid projects and NGOs also import seeds either direct from seed companies overseas or purchase requirements from the same retailers listed above.

Appendix 2 includes a listing of crop hybrids and non-hybrids imported by the Agriculture Store Corporation from mainly Yates Australia between July 2013 and June 2014 as indicative of the types and quantities of seeds imported from just one of the major vegetable seed importers. Note that the items are mainly imported in small packages, not via bulk purchases, the reasons given include that of avoiding storage and other handling requirements and are also said to be quantities and prices affordable for local farmers.

SAMOAN RETAILERS PURCHASING FROM HOP TIY, FIJI

The Hop Tip Company in Fiji was identified as a source of high quality seeds by three seed retailers, namely Mrs. Leaupepe Lasa Aiono, the USP and Soil Health Pacific Ltd. Growers and entities like USP are known to purchase seeds from Hop Tiy when on travel to Fiji or via direct orders. The company has a known reputation as a reliable seed supplier dealing also in crops and crop varieties suitable to Samoan (and Pacific) contexts and conditions. **Appendix 3** includes a current order to Hop Tip Company from Soil Health Pacific Ltd as indicative of crops, varieties and quantities involved.

SOLOMON ISLANDS

KEY INFORMANTS AND INFORMATION SOURCES

- Mr Clement Hadosaia (Manager - Kastom Gaden Association)
- Ms Thecla Vaspusi (Planting Materials Network Coordinator - KGA)
- Mr Phil Braford and Kensley Manuseua (Owner and Senior Sales Supervisor at Island Enterprises Limited – seed retailer for Yates seeds)
- Mr Andrew Sale (National Market Access Coordinator – PHAMA Pacific Horticultural and Agricultural Market Access Program)
- Mrs Ellen Iramu (Project Coordinator - AVRDC)
- Mrs Ethel Saelea (Seed importer and retailer)
- Dr Shane Tutua (Organic grower and seed retailer SPE Analytical and Zai na Tina farm)
- Customer service representative and Michelle Lam Banuk (General manager at Solfish – seed retailer for Known-you seeds)

IMPORTERS AND RETAILERS FOR COMMERCIAL SEED INTO THE SOLOMON ISLANDS

Table 6: Importers and retailers for commercial seed into the Solomon Islands

Enterprises	Importer	Retailer	Seed Company
Island Enterprises Limited			Yates
Ethel Saelea			Terranova & Chai Tai
Solfish			Known-You
SPE Analytical / Zai na Tina farm			Takii
Other small general supplies stores			

There are 4 main importers of vegetable seed in Solomon Islands all of which also retail their seeds. Some of the Chinese retail stores also stock small amounts of seed although many farmers report that they are of low viability and the packets lack any information in English. There are also other individual farmers that import seeds from time to time for their own purposes.

SOLOMON ISLANDS RETAILERS**ETHEL SAELEA**

Outlet: Kairos Conference Centre, Suite 213 in the Hyundai Mall, Mandana Avenue, Honaira. Ph 23246 or 22112. Ethel is the spouse of the Permanent Secretary for the Ministry of Agriculture and Livestock, Jimmy Saelea. Ethel imports Chai Tai and Terranova seed in bulk packets/tins and re-packages the seed into smaller 1 gram units suitable for individual farmers using small plastic bags purchased locally. Although not tested it is understood that these plastics are not moisture permeable as they are the same plastics used to package locally made iceblocks. Ethel does not advertise nor does Kairos stock any other agricultural products. Ethel predominantly uses networking and word of mouth to make her service known to farmers. Ethel also has established agents in Provincial centers as presented below.

Table 7: Provincial agents for Ethel Saelea, Solomon Islands

Location	Contact Person
Auki Market	Hellen Duku
Gizo	Agriculture office
Noro	John Terry
Noro	John Wesley Kere
Munda	Ida Lilo
Kirakira	Daniel Wagatora

ISLAND ENTERPRISES LIMITED

Main store in Ranadi Honiara with another outlet in Noro (Western Province) and agents KML in Gizo (Western Province); Delco Enterprise in Kirakira (Makira/Ulawa Province); Best Farmers and Beta Electrics in Auki (Malaita Province); KML in Taro (Choiseul); PZTR in Lata (Temotu Province), SA in Seghe, Marovo (Western Province). To improve accessibility to rural areas Island Enterprises conducts a fortnightly road show to areas on Guadalcanal outside of Honiara taking products (including seed) to local farmers with their mobile store and also attend 2 GPPOL sites per week on GPPOL pay day. Additionally twice a year they conduct a road show promotion to the provinces in cooperation with the local agents. Island Enterprises sells Yates seeds in the standard small Yates packets of 28 varieties of vegetables (at the time of survey).



Figure 2: PMN Manager Thecla Vaspusy inspecting Yates seed from Island Enterprise

SPE ANALYTICAL



Figure 3: SPE sign

SPE Analytical is a laboratory located in the Best Buys building near the Bank of South Pacific in Ranadi, Honiara, Ph 38585. SPE provides agricultural consultancy, soil and plant analysis and stocks a small range of Takii seeds along with a small range of locally produced OP varieties.

At this stage SPE is known as a seed retailer by word of mouth only and opening hours are limited therefore it is not a readily available source of seed. However, it is a new developing business with an objective to increase range, quantity and accessibility of seeds to farmers.

SOLFISH

Located on Mandana Avenue, Point Cruz, Honiara. Solfish are the exclusive importer for Known-You seeds to the Solomon Islands. They stock approximately 80 varieties of Known-You seed. Seed is reported to be of high quality and climatically appropriate. Within the retail outlet in Point Cruz the seed varieties are displayed as empty packets in a wall display as per Figure 3. Seed is stored in refrigerators in the back of the store and available on request. The large majority of their packets are bulk 10 grams with some 3 gram packets. Prices range from \$35 SDB to \$580 SBD depending on crop, variety and packet size. For example: Known-You Red Rapid Lettuce 10 gm packet \$82; Chinese Cabbage Pai Tsai Praise 10 gm packet \$52; Scarlet Lady Rockmelon 3 gm packet \$371.50; Bright Star Sweet Pepper 10 gm packet \$558.90.

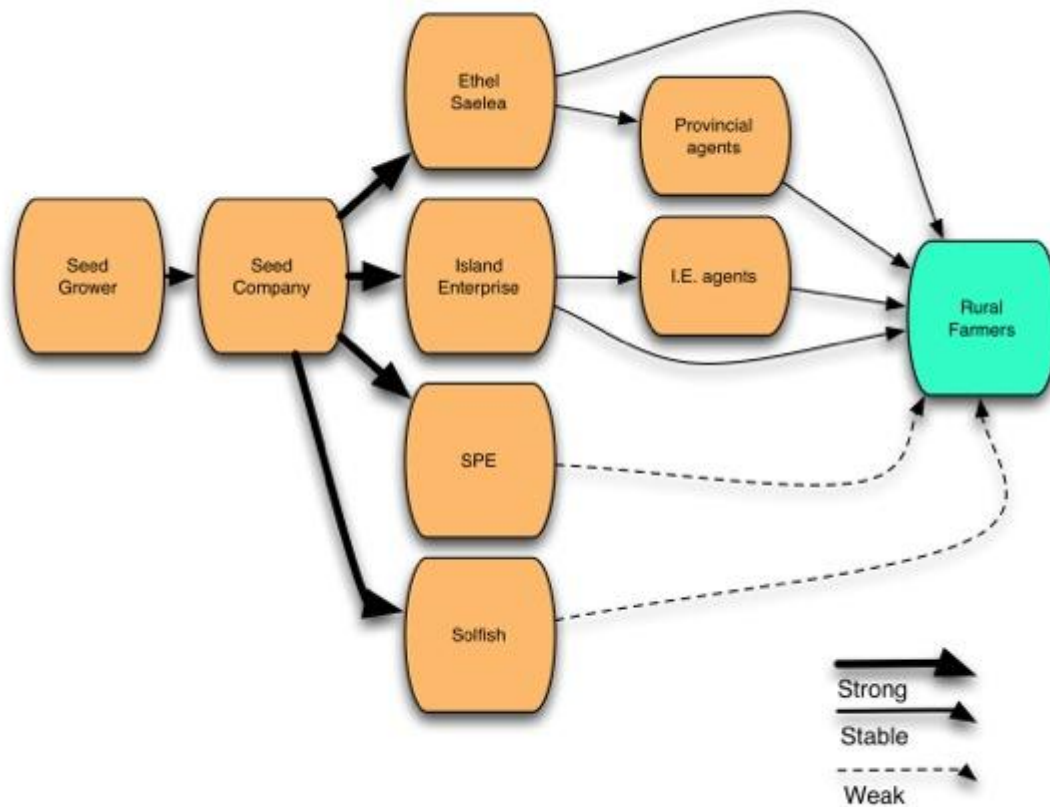


Figure 4: Seed packets in display at Solfish

Solfish has no agents in provincial areas of the Solomon Islands and Solfish are not aware of any customers that purchase seed from Solfish and re-package into small units and strongly discourage such re-packing practise due to the risks of declining seed quality.

FARMSET, an agricultural supplies store in Ranadi also previously sold vegetable seed however they have recently discontinued this service. The reason for this was not identified within this survey.

Figure 5: Solomon Islands imported seed supply chain



TONGA

KEY INFORMANTS AND INFORMATION SOURCES

- Ms Kathryn Logan (Sales Manager of Venture Exports Ltd.)
- Ms Monica Hamilton (Retail Manager of NISHI Trading Co. Ltd)
- Ms Susana Koloi (Sales Manager of Liu Auto)
- Mr Minoru Nishi (Managing Director of NISHI Trading Co. Ltd)
- Farmers

IMPORTERS AND RETAILERS FOR COMMERCIAL SEED INTO TONGA

Table 8: Importers and retailers for commercial seed into Tonga

Enterprises	Type of store	Seed companies	Importer	Retailer
NISHI Trading Co. Ltd	Farming supply store. Large and small seed packets	Yates SPC		
Fimco	Farming supply store. Large seed packets	Terranova		
FarmAgro	Farming supply store. Large seed packets	Terranova		
Liu Auto	Auto parts store. Large seed packets	Bonanza, Clover, Known-You, Sakata, Takii, Terranova		
Billa Farming	Farming supply store. Large seed packets	Terranova		
Pacific Timber and Hardware	Hardware store. Small packets, limited range.	Yates		
Squash Exporters (4 companies from NZ agents)				

All of the 6 importers of seed into Tonga are also retailers with the exception of some growers of Squash for export that import seed for their own purposes. Venture Exports is the agency through which Billa Farming and Fimco access their seeds. Some farmers also obtain their seeds through smuggling them in when they return from visiting overseas (America, New Zealand, China and Australia) or when their family comes to visit Tonga.

All of the above retailers are located in Tongatapu. None of the retailers have agents in other areas. However as family is a major part of the Tongan Culture, farmers in the other island groups rely heavily on their family to purchase in Tongatapu and send on the ferry.

It is understood that there is no repackaging occurring within the above listed retailers. While it may be the case that repackaging of seeds from large packets into smaller units is occurring by individuals this practice the consultant was not aware of any such cases.

VANUATU**KEY INFORMANTS AND INFORMATION SOURCES**

- Florrie Jonathon and Ben Sands (Vanuatu Agricultural Supplies Ltd)
- Farmers from several islands at the Port Vila Municipal Market

VANUATU IMPORTERS AND RETAILERS OF SEEDS**VANUATU AGRICULTURAL SUPPLIES LTD**

Vanuatu Agricultural Supplies (VAS) is by far the major importer and retailer of seeds to Vanuatu. It has its main outlet in Port Vila and a smaller outlet in Luganville, on Espiritu Santo. It sources a wide range of seeds from Yates and Terranova, Australia and New Zealand.

Most farmers appear to buy their seeds from VAS. As many of these farmers supply the Port Vila Municipal Market they can buy the seeds at source when in Port Vila of the market. VAS does sell seeds through some of the small shops on the islands and takes orders directly from the farmers. Farmers at the market generally reported they had good success with germination rates with the packaged seeds from VAS, providing the seed packet was freshly opened and not beyond its use-by date. However, one farmer informed germination failures with both radish and English green cabbage seeds. She had reported this to VAS. The response of VAS to this issue is that if farmers complain they ask the farmer to return the remaining seeds so they can do viability testing on them. The FAO (2009) report on seed availability noted that VAS is a monopoly seed supplier in Vanuatu⁶.

There are also some very small retailers around Vanuatu who supply seeds sourced from VAS to farmers. Some of the Terranova range of seeds, available at VAS, come in both bulk packs and smaller packs. VAS does not break down any seeds into smaller lots. While this practice may be occurring no individual or enterprise was identified as repackaging within this study.

FARMER SUPPORT ASSOCIATION

The Farmer Support Association (FSA) import a very small selection of seeds from Hop Tiy, Fiji for sale to its farmer members in the belief that these seeds are better adapted to tropical conditions therefore resulting in better crop success for its farmers. FSA believes that the viability levels of Yates' seeds are not always high enough.

According to the FAO (2009) report some of the larger farmers import their seeds directly.

CONSTRAINTS AND OPPORTUNITIES RELATING TO IMPORTED SEED

CONSTRAINTS TO SUPPLY OF IMPORTED SEED

Table 9: Summary of constraints identified for commercial seed

Issue code	Issue	Fiji	Samoa	Solomon Islands	Tonga *	Vanuatu
A	Seed varieties / sources					
B	Seed storage					
C	Geographical location					
D	Continuity of supply					
E	Turnover of seed					
F	Repackaging of bulk seed					
G	Quantities required for import					
H	Biosecurity, quarantine issues					
I	Certified organic and OP varieties					Future opportunity

⁶ Pole, F. 2009 *Consultation on seed availability seed accessibility and suitability for Kiribati, Kingdom of Tonga and Vanuatu*, FAO Sub-Regional Office for the Pacific Islands p.3.

* While Tonga did not identify specific issues of concern, the local consultant noted that Tonga shared many of the issues as per Fiji.

KEY ISSUES FOR IMPORTED SEED

The following section provides an outline of the key issues and provides supportive statements as identified by consultants in each country.

SEED VARIETY / SOURCES

Samoa, Solomon Islands and Vanuatu raised concerns that varieties available were not well suited to the local climatic conditions. Fiji and Tonga appear to have a broader range of source companies providing varieties that are considered better suited. Further enquiry is required before this can be confirmed as Yates and Terranova, while Australian/New Zealand based companies may in fact be sourcing their seed from tropical climates.

VANUATU: Whilst there is a wide selection of Yates and Terranova seeds, there is little selection available of seeds sources from more tropical countries. VAS offers a wide range of varieties but there are no sources of the seeds required for legume cover crops such as Mucuna beans, Pigeon peas, Lablab beans etc., which are used to enhance the soil's fertility and structure, and to suppress weed regrowth between crops. In addition, as these are once a year flowering, seed storage is a problem. Furthermore, few of the seeds sold by Yates or Terranova have been specifically developed for the tropics.

SOLOMON ISLANDS: has a poor range of seed companies represented within the country with Yates as distributed by Island Enterprise Ltd and Known-You as distributed by Solfish dominating the market. Known-You is only available in Honiara. There is potential to build on the availability of Takii and Terranova through the existing channels of SPE and Ethel Saelea. Additionally improving awareness of appropriate seed storage conditions for agents outside of Honiara would also likely improve quality.

SAMOA: Lack of availability of crop varieties suitable to local conditions. This is likely a result of not basing seed imports on adequate evaluation locally of crop varieties.

SEED STORAGE

Seed storage was identified as a common weakness across all countries. With the exception of the major retailers a low level of awareness was reported concerning the impact temperature and humidity have on seed viability and the mechanisms can be implemented to best mitigate this impact.

FIJI/SAMOA: While in some cases seed is stored by the smaller retailers in cool conditions (such as in refrigerated storage) the storage conditions of seed packets are generally not controlled sufficiently to eliminate risk of moisture absorption and therefore are subject to losses in seed viability.

VANUATU: This is an ongoing issue for anyone trying to store seeds in the tropics without access to a controlled environment.

SOLOMON ISLANDS: While in some cases seed is stored by retailers in cool conditions (such as in refrigerated storage) the storage conditions of seed packets are generally not controlled to eliminate risk of moisture absorption and therefore are subject to losses in seed viability and assistance with locating resources that would assist in better seed storage. Note open tin of seed in refrigerator in Figure 6.



Figure 6: Open bulk seed tin in refrigerated storage

GEOGRAPHIC LOCATION

This issue was consistently raised as a concern across all countries. While the challenge of access to products and services in rural areas is a long term and predictable predicament small rural stores are in abundance. There may be opportunity to introduce seed as a component of the regular products in such stores.

FIJI: Geographic location is a major limiting factor particularly to farmers of small isolated islands and in remote parts of the larger islands to accessing seeds. The further away the farmer from the original seed source, the greater to cost to the farmer and the more likely problems will arise in the supply chain.

VANUATU: While those farmers selling their produce at the Port Vila Municipal Market are able to buy their seeds from VAS when they come to the market, for anyone starting out as a vegetable producer, access to seeds will be difficult. Local stores only stock a very limited supply, if at all.

SOLOMON ISLANDS: As per Fiji. Island Enterprise is demonstrating innovation at reaching rural and provincial farmers through their mobile outlet / road shows. Expanding this form of marketing along with increasing the range of seeds available through mobile marketing and in provincial outlets would provide a significant improvement to accessing hybrid/commercial seeds for farmers outside of Honiara.

SAMOA: Accessing seeds can be a challenge for farmers in rural villages and isolated islands and can further exacerbate storage problems given access limitations regards electricity as well as information and knowledge about seed storage and handling.

TONGA: As per Fiji

CONTINUITY OF SUPPLY

Most retailers claimed that replenishment of stocks was possible within 2 weeks. These delays are predicably longer in rural areas where such delays can result in a missed market opportunity.

VANUATU: A response to a change in market demand may result in VAS running out of particular varieties of seeds. The subsequent delay can have financial consequences for the farmers.

SOLOMON ISLANDS: One farmer indicated that a source of viable seed for the high demand market product of coriander was infrequently available and often commercial seed of the preferred varieties was not available in the peak growing season.

TURNOVER OF SEED

A number of farmers indicated that low viability of seed was likely the result of low turnover. This is especially the case in outlets stocking seed in rural areas where there is a low level of awareness that seed is available and seed is inadequately stored often for long periods of time.

FIJI: Some farmers have expressed concern that seed suppliers/stores in rural / remote locations have a low turnover of seed. It is likely that low turnover and poor storage have a significant impact on seed quality and therefore reduce farmer interest in purchasing seed resulting in further challenges to turnover.

VANUATU: It is not apparent whether all farmers are aware of the need to ensure that the seeds they use are within their use-by-date and, if opened, have been stored correctly.

SOLOMON ISLANDS: While expiry dates on seed packets was not audited as part of this study it is likely that low turnover and poor storage have a significant impact on seed quality and therefore reduce farmer interest in purchasing further seed resulting in further challenges to turnover

SAMOA: Complaints about the lack of consistency of seed supply and poor germination, especially from two retailers, was a common concern by respondents. The problem here is twofold – poor storage and selling seeds past the use by date.

REPACKING OF BULK SEED

Yates seed are sold in small packets suited to an individual small scale grower. These are hermetically sealed and generally considered to be of good germination dependant of storage. However, many farmers expressed in interest in Takii and Known You seeds that are available in larger packets (e.g. 10gm). Repackaging of seed was identified as occurring in Fiji, Samoa, Solomon Islands and likely Tonga. Knowledge about seed handling requirements when repackaging was limited.

FIJI: Many retailers buy seeds in bulk from Hop Tiy and repackage into smaller packets for sale to individual farmers. Seed handling and storage of these other retailers is not controlled and likely to be of low standard with no controls of humidity or contamination within the packing environment. Hop Tiy does not prescribe or provide recommendations for seed handling to retailers who repack. It is generally understood that there is a common practice of seed repacked into small plastic bags that are permeable to moisture. Hop Tiy assure a low humidity environment for their own repackaging and utilize foil packets that are impermeable to moisture. However it was observed that some of the Hop Tiy brand packets were not sealed well and with minimal handling the seals were broken.

SOLOMON IS: Seed importers (Ethel Saelea and SPE) and some provincial retailers purchase seeds in bulk packets and re-package seeds into smaller units for sale to individual farmers. Seed handling and storage in such cases is not controlled and likely to be of low standard with no controls of humidity or contamination within the packing environment. Both Ethel Saelea and Shane Tutua (of SPE) expressed interest in training opportunities to improve their seed handling practices.

SAMOA: Some retailers are now buying seeds in bulk and repacking into smaller packets for sale to individual farmers. Seed handling and storage of these requires improved handling, storage, packaging and labelling etc. At best, the seeds are stored in air conditioned rooms but packaging, labelling and seed testing would be areas needing closer scrutiny to ensure only the best seeds having high viability and vigour are made available to farmers and gardeners. This, however, appears more noticeable with open pollinated seed varieties.

VANUATU: The only major seed retailer is unlikely to start repackaging seeds but FSA needs the technology to deal with the seeds it has bred up. FSA would be likely to work with the RTCs on the

other islands where the seeds would be tested prior to releasing for more widespread farmer use. As they OP seeds will be competing against the commercial seeds the packaging needs to be of a high commercial quality. NB there are two levels of seed processing, at the farmer level for their own use and at a higher level (through FSA) where trialled seeds and bulked up seeds are available for farmers to purchase.

QUANTITIES REQUIRED FOR IMPORT

Some growers and small businesses identified an interest to import directly as their needs within the current supply chain were not being met. This opportunity was limited by the minimum order requirements of seed companies.

VANUATU: Due to suppliers imposing minimum sized orders on importers, it is difficult for smaller businesses to be able to import seeds to their requirements.

SAMOA: In relations to freight, duty charges and hybrid seed costs the costs for seed importations was said to be high whether it be large or small seed orders. Subsidization of such costs by Government was suggested as a possible option.

BIOSECURITY / QUARANTINE ISSUES

The recent introduction of Cucumber Green Mottled Mosaic Virus into the Northern Territory of Australia is posing a major threat for commercial cucurbit growers of the region. It is considered that contaminated seed is a likely source of this virus. The need for Biosecurity regulations and processes to protect Pacific island countries from similar threats is clear. However transparency and consistency in Biosecurity requirements relating to importing seed was identified as a common issue.

FIJI: Retailers raised concerns about the obstacles in the current Biosecurity processes and desired a more transparent and fair process.

SOLOMON ISLANDS: KGA is aware of Biosecurity limitations for importing seed but it has been very difficult to get information out of the department about the current process. A more transparent process is necessary.

SAMOA: Some seed importers would appreciate having a more transparent, simplified and standardized process/procedures for application and approval for seed importations with an identified officer allocated such a responsibility within the Quarantine Office. There was also query as to why seeds of certain crops was allowed or prohibited for introduction from certain countries (e.g. the same corn seeds being allowed from the USA but not from American Samoa or Known You Company seeds allowed from Taiwan but not if bought via Hop Tip in Fiji). A request was received, especially from larger producers, for more flexibility to enable them to import vegetable crop varieties beyond the ones listed under the Approved Imports List.

CERTIFIED ORGANIC AND OPEN POLLINATED VARIETIES

Access to certified organic seed was largely reserved to Fiji where one grower was certified under a US certifying body where the requirement for organic seed was non-negotiable. Most organic certifiers have a clause that allows non organic seed to be used where there isn't another option.

FIJI: It was identified by a number of commercial organic farmers that one of the major limitations to their production, due certification requirements, is access to certified organic seed. At this stage there is no certified organic seed available in Fiji. There are restrictions imposed by Biosecurity that limit importing seed that is not chemically treated. Yates do supply untreated organic seed. Yates have

directed correspondence to Biosecurity in Fiji to request permission based on such seeds passing AQIS standards. This is still unresolved. New Zealand's King Seeds, also registered for import with Biosecurity, have recently launched an extensive organic seed line.

VANUATU: Access to organic seeds may become an issue in the future if farmers wish to pursue organic certification.

SOLOMON ISLANDS: While export of organic produce is not currently occurring, Shane Tutua and Moses Pelomo recently commenced a NASAA training programme to position themselves as authorised certifiers. Having local certifiers is a strong step towards enabling growers to enter the organic export market. NASAA allows exemption from using organic seed if it is not available. Therefore access to certified organic seed was not a major concern. However access to imported open pollinated varieties was sought. Johnson Latoka of the Malaita highlands has been trained by Seed Savers Australia as a seed producer and would like to utilise the unique opportunity of the cooler climate of the highlands to produce seed of open pollinated Brassica's. However Johnson was not able to locate open pollinated varieties to commence production.

OPPORTUNITIES TO IMPROVE QUALITY AND ACCESS TO IMPORTED SEED

The following opportunities have been identified as potential contributors to improved supply of commercial seed. Where country reports specifically identified these opportunities this is marked in the table however these actions may also benefit other PIC's.

Table 10: Opportunities for improving commercial seed access and quality

Areas of opportunity	Related issue code	Fiji	Samoa	Solomon Is	Tonga	Vanuatu
Support linkages between Hop Tiy and retailers in other PIC's to enable broader access to the range available in Fiji. Hop Tiy, Fiji is a secure and seasoned seed distributor with an opportunity to provide a stronger regional service.	A, D, G					
Assist retail outlets to have a wider selection of crops and varieties by linking them directly with seed companies.	A, C					
Improve range of seed varieties that are well suited to the local climatic and pest/disease conditions through regular consultation with seed companies and development of catalogues providing such information.	A					
Regional coordination (e.g. via SPC) of research on crop variety evaluations to make results widely known so as to influence crop variety seed orders.	A					
Ensure availability of information on selected crop varieties (consider a list of recommended crop varieties updated annually) to be used as a basis for seed orders/purchases.	A, D					
Access to suitable packaging (non-permeable packets) retailers who re-package seeds to ensure seed quality is retained. Negotiations for importing such packaging has commenced with Marco Polo (Fiji) who has the capacity to act as a regional distributor.	F					
Provision of training and guidelines for seed handling / repackaging and storage for retailers. Develop a handbook for retailers addressing these issues.	B, F					
Retailers to monitor turnover, ensuring packets have a date of packaging and used by date and conduct regular viability testing on their supplies. Support seed retailers with improving labelling and	E					

the provision of varietal information to their customers.						
Where seed permeable plastics are used retailers to store in moisture proof containers with silica gel. Ensure silica gel is replenished according to colour indicator.	B					
Facilitate seed retailer's access to silica gel. Provide handling guidelines for silica gel to ensure safe handling.	B					
Promote additional retailers particularly in rural areas *.Work with existing supply chain mechanisms (existing distribution systems to rural stores).	C					
Raise awareness and exchange information about what agents in the seed supply chain are doing elsewhere in the region.	All					
Seek opportunities to improve access to certified organic seed.	I					
Lobby for Biosecurity and associated roles of Ministry to develop a more transparent, simplified and standardized process/procedure for application and approval for seed importation from existing or new suppliers. Ensure the process is summarised and readily available within an <i>Importation Procedure</i> fact sheet and an identified officer allocated with such a responsibility within the Quarantine Office. This will enable new suppliers and new seed sources and crops from existing suppliers. Additionally lobby for such regulatory issues to be harmonised across the different PIC's.	A, H					
Lobby Biosecurity/Quarantine office to make the "Approved Imports List" for vegetable seeds widely known and publically available.	A, H					
Establish a regional Pacific Seed Association. Establish membership within region (through such an association) to APSA ⁷ (Asian Pacific Seed Association) and disseminate information / resources / networks emerging through APSA to relevant stakeholders.	A					
Pursue opportunities for government to subsidize importation costs (freight/duty).	G					
Consider bulk buying of seeds regionally, either via PIFON or an agency such as SPC, as a means to reduce costs and to ensure quality control regards varieties and quality of seeds imported.	G					

*Promoting additional retailers may be relevant in some cases especially where one outlet holds a monopoly over supply or there is an absence of retailers in a certain area. However as Turner notes 'there is a delicate balance between encouraging competition, while supporting those suppliers who have demonstrated a long-term commitment to the seed trade' (1999)⁸. It may be a higher and more stable priority to improve the service of the existing seed dealers.

RESULTS FOR LOCALLY PRODUCED OPEN POLLINATED SEED

Seed saving is not a part of traditional agricultural systems in the Pacific Islands. However, since the introduction of seed based vegetables, many farmers have adopted the practice of saving their own seed of open pollinated (OP) varieties and sharing and exchanging seeds with others.

⁷ As of Nov 2013 the membership of APSA comprised of 568 members being from 47 countries including seed associations, public and private seed enterprises and government agencies. APSA suggest membership benefits include: Improved access to the seed industry in Asia Pacific, Opportunities to interact with key persons in the global seed industry; Access to Standing Committee and Special Interest Group forums; Exclusive access to seed trade, country, technical reports, import/export statistics and other seed industry data; Access to exclusive training programmes and study tours; Complimentary issues of the APSA Magazine **ASIAN SEED**; Access to APSA's membership database and the Asia & Pacific Seed Trade Directory. Asian Seed Congress (ASC) of 2015 to be held in Goa, India. APSA membership is \$800-\$900 USD.

⁸ Turner, M 1999 Draft regional policy on crop varieties and seed. Prepared for the Secretariat of the Pacific Community, Suva, Fiji.

Though there has been a rise in the interest and availability of imported commercial seed, which is largely hybrid seed, this informal seed sector remains a major source of seed for subsistence farmers. There is a general lack of information about the size and capacity of this informal seed sector and the varying practices and problems that are occurring. A comprehensive evaluation would be beyond the scope of this study. Nevertheless there is clearly a strong need to support and promote this sector. Crop and genetic diversity is widely recognised as an essential component of food security. Hybrids are largely bred to thrive in intensive agricultural systems providing high yields to service the market and ensuring more efficient systems of production. However increasing adoption of hybrid varieties has the potential to undermine the existing diversity of local OP landraces.

In seed saving of OP varieties farmers have the opportunity to manage the adaptation of plant landraces to their local conditions including increasing the plants natural ability to resist local stressors. This further increases the resiliency and self sufficiency of farmers and their communities. Opportunities to strengthen the informal seed sector are identified below. There are very few cases of formal seed supply actors of locally produced OP seed. Presented below is a case study of the Planting Materials Network (PMN) in the Solomon Islands. This organisation has been producing and distributing OP varieties since 1996. While this has been a stable and beneficial program there are a range of opportunities to improve the production, quality and sustainability of the PMN and for this model to be replicated in other areas.

COUNTRY SPECIFIC PROFILES

FIJI

LOCAL PRODUCERS OF OPEN POLLINATED SEEDS

Production of open pollinated seed occurs on a small scale in Fiji. Seed of a small range of crops is produced by the Ministry of Agriculture (MOA) Sigatoka and Legalega research stations for sale and by private farmers generally for their own purposes. Records of quantities of seed produced by these research stations over the 2011 and 2012 period are provided below.

Table 11: Seed produced through Fiji Ministry of Agriculture in 2011 and 2012

Research Station	Crop	Kg of Seed Produced 2011	Kg of Seed Produced 2012
Sigatoka Research Station	Eggplant	38.6	16.1
	Tomatoes	3.9	11
	Sweet corn	0	50
	Maize	0	300
	Chilli	0 (prior 2007 seed produced)	0
Legalega Research station	Cow pea	144	104
	Pigeon pea	65	186
	Mung	0	28
	Peanut	100	148

Data provided by MOA Research Division

The quantity and quality of seed produced at the above research stations varies significantly from year to year.

Several bilateral quarantine agreements (BQA's) with importing countries require that seed be produced by the MOA including eggplant and chilies from New Zealand.

AVAILABILITY OF LOCALLY PRODUCED OPEN POLLINATED SEEDS

There is very limited access for farmers to purchase seed of open pollinated varieties. Seed produced by MOA are available direct from the research station requiring farmers to travel to the research station. On occasion MOA extension officers will carry seeds available for sale with them when doing extension work. It is common for exchange between individual farmers of local open pollinated varieties. Hop Tiy has, in the past, made some attempts to sell locally produced OP varieties in partnership with MOA. Hop Tiy has felt that these attempts have not generated sales of the scale to justify maintaining this service. However Hop Tiy would consider purchasing dried bulk seed again if seed quality was assured.

MOST POPULAR OPEN POLLINATED SEED VARIETIES IN FIJI

Eggplant	Long Purple, Chahat, Round Purple, Sigatoka Beauty
Okra	Dark Green and Light Green
Tomato	Alafua Large, Alton
Chilies	Red Fire, Hot Rod, Bongo, Birds Eye
Cow Peas	Mana, Rachna
Pigeon Pea	Bharpoor, Kamica
Corn	Nirila, Hawaiian Super Sweet, Local Yellow (Sila)

SAMOA

LOCAL SEED PRODUCERS OF OPEN POLLINATED SEEDS

There is currently no organized local production of OP vegetable seeds in Samoa although many small vegetable producers that sell produce at local markets (including some of the larger market gardeners) do keep some of their own seeds especially of crops such as beans, chilies, cucumbers, eggplants, okra, pumpkins, sweet corn and tomato. Variety names for such crops are, however, generally not known except for tomatoes where "Roma-types" are the most popular. Past regional projects such as the South Pacific Regional Agricultural Development project (SPRAD) and the Pacific Regional Agriculture Programme (PRAP) which had evaluated and recommended selected crop varieties of amaranth, eggplants, Kang Kong and tomatoes were supposed to have been made available to MAF to maintain with the intention that MAF would make seeds available to farmers. However such efforts, including those in recent times by MAF themselves (e.g. the AVRDC breeding lines) have all appeared short-lived and unsustainable. Farmers interviewed in Samoa were not aware of MAF seed sources like those from the Fiji Sigatoka Research Station where suitable crop varieties such as the bacterial wilt resistant Alafua series of tomatoes are made available.

AVAILABILITY OF LOCALLY PRODUCED OPEN POLLINATED SEEDS

There is no access for farmers to purchase any seeds of OP varieties that are produced locally in Samoa. Past involvement via projects undertaken by the USP and other regional projects and those by MAF, as mentioned previously, have been short-lived despite such been a responsibility delegated to MAF at the conclusion of such projects. However, it is common for farmers to collect and keep their own seeds of OP varieties including exchange between individual farmers. This has been especially true for varieties of crops such as beans, cucumber, eggplant, okra, pumpkin, sweet corn and tomato.

MOST POPULAR OPEN POLLINATED SEED VARIETIES IMPORTED INTO SAMOA

Dwarf Beans:	Contender, Blue Lake, Royal Streak, Labroudor
Climbing Beans:	Blue Lake Climbing, Long Bean, Kentucky Blue, Snake, Golden Wax
Chinese cabbage:	Kwang Moon, Pak Choi, Pak Choi Green
Cucumber:	Moneymaker, Slicemaster, Soarer, Supermarket
Chilies:	Long Red Cayenne, Marconi Hot, Birds eye type
Corn:	Hawaiian Super Sweet
Eggplant:	Black Beauty
Okra:	Clemson Spineless
Pepper:	Yolo Wonder
Tomato:	Beefsteak, Big Beef, Gross Lisse, Tropic VF, Roma VF, Moneymaker
Water melon:	Sugar Baby, Charleston Grey, Charleston Grey # 805, Candy Red

Note: a) The above list might be incomplete and needs also to be checked against company catalogues for correctness regards whether the varieties are all OP ones; b) The Sino-Samoa Agricultural & Technical Development Project is promoting a number of crops and crop varieties but variety names are unknown as they are all in Chinese while Quarantine scrutiny might also be applied on what is introduced to avoid pest introductions; c) MAF, including Aid supported projects, tend to focus more on Open Pollinated (OP) varieties with views towards farmers producing and keeping their own seeds; d) Small vegetable producers including the education and training arms under Government tend also to use and promote more OP vegetable varieties based on past familiarity with the crop varieties, cheapness of the seeds and the fact they can keep and re-use seeds from crop harvests.

SOLOMON ISLANDS

LOCAL SEED PRODUCERS OF OPEN POLLINATED SEEDS

MINISTRY OF AGRICULTURE AND LIVESTOCK

The Ministry of Agriculture and Livestock (MAL) previously produced some OP vegetable seed at the Dodo Creek agriculture research station however this facility was destroyed during the tension in 2000. While some seed trialing and production is occurring, MAL is yet to build its capacity to be a regular source of seed. In February 2014 MAL in partnership with AVRDC launched a new variety of OP tomato locally named MAL-SI/LE/01/14. At this launch MAL distributed 237 packets of seed of this new variety.

PLANTING MATERIALS NETWORK

As a branch of the Kastom Gaden Association, the Plant Materials Network (PMN) has been producing OP seed since 1996. The objectives of the PMN are to:

- preserve, through use, the agricultural biodiversity of the Solomon Islands
- produce, process and distribute agriculturally useful plants
- provide training in seed saving
- assist rural communities to establish regional seed saving centres.⁹

⁹ Kastom Gaden Association, 2014 'Solomon Islands Planting Material Network'
<http://kastomgaden.org/about/kg-a-history/planting-material-network/>

Throughout the near 20 years of operation seed production has primarily been occurring at the Kastom Gaden Association headquarters at Burns Creek, Honiara. Over the years there has been regular training in seed saving to members of the PMN and periods of emphasis on decentralising seed production and supporting the establishment of regional seed centres. The PMN database has records of 482 accessions of different varieties of agricultural plants that have been produced and distributed through the PMN. However some of these accessions have been lost over time from the PMN collection.

The PMN packages seed into small handmade paper envelopes. This packaging method was developed as a model that could be replicated in the village / provincial setting where access to resources is limited. During the 2014 June-August quarter the PMN produced, packaged and distributed 22,000 seed packets of a range of vegetables including Beans, Eggplants, Tomato, Corn, Cucumber and Pumpkin. It was identified that the scale of seed production within PMN justifies an improved packaging system utilising impermeable plastics or foil packets to ensure better retention of viability.

Seeds produced by the PMN are available, generally free of charge, to PMN members with the exception of members requesting bulk quantities. They are distributed to farmers during provincial field work by KGA trainers and officers and to all PMN members who receive the PMN newsletter. Members are also able to collect seed from the KGA headquarters in Burns Creek at any time during working hours. The PMN also facilitates bulking and exchange of green manure and cover crop seeds (such as Mucuna) other planting materials (such as Taro and Sweet Potato) by members of the network and partner organisations in the provincial areas.

The major limiting factors for the production of OP seed by the PMN are:

(a) Size of the growing area. The growing area of Burns Creek has reduced over time due to the expansion of other KGA activities including the establishment of student facilities (sleeping and kitchen quarters); the livestock program which produces chickens and ducks; and the expansion of office facilities. The growing area for seed has been reduced to <0.5 hectare. This is not large enough to support the production of seed to meet the demands of the members and cannot adequately accommodate necessary crop rotation and isolation distances required for quality seed production. Therefore the PMN seed quality as well as quantity has been declining for some years. Attempts to foster regional centres for seed production have not been successful due to a number of factors including lack of technical support and financial incentive.

(b) Financial sustainability. The model of free distribution of seed is unsustainable in the long term. Along with meeting the costs associated with seed production there needs to be a financial incentive to engage PMN members in provincial areas as seed producers. Applying a business model where farmers receive both technical support and monitoring of quality by the PMN coordinator and payment for their product is necessary to ensure the PMN can continue seed distribution.

There are a number of other of other factors that limit the seed quantity and quality produced by the PMN. These have been detailed in a recent review of production. The PMN is currently implementing a number of new systems to improve seed quality including new drying systems and new packaging materials.

SPE ANALYTICAL

Shane Tutua of SPE Analytical / Zai na Tina Farm sells a small range of OP varieties including Corn, Bean and Eggplant, although not as named varieties, along with the new line of OP Tomato seeds developed by AVRDC which has been locally branded as Rose's Choice Tomato.

The key limiting factors for supply of OP seed through SPE are:

(a) Lack of staff dedicated to the task of seed production. This includes lack of experience and technical expertise. SPE produces seed at Zai na Tina farm and outsources to a farmer at Henderson to produce seed on a contract basis. In both cases seed is the secondary output of production with vegetable production for market predominating.

(b) Packaging, storage and distribution. The items of packaging, storage and distribution as listed above in imported seed also apply to open pollinated seed produced by SPE.

In addition to the 3 above listed actors in formal OP seed production seed is also produced and shared on a small scale informally by a few individual farmers. In such cases it is generally replanted immediately due to challenges of storage.

TONGA

No known local OP seed production beyond some farmers saving some seed for their own use.

VANUATU

LOCAL SEED PRODUCERS OF OPEN POLLINATED SEEDS

Vegetable seeds can be easily and cheaply imported into Vanuatu unless they are open pollinated or something special such as those produced by AVRDC. Production of open pollinated seed (OP) occurs on a very small scale in Vanuatu. Some of the farmers are saving their own seeds for crops such as tomatoes, eggplants, capsicums and Chinese white bun cabbages. However, without a history of growing vegetables from seeds, the knowledge of seed saving and storage is limited amongst farmers. In addition, because seeds are such a small cost of vegetable production, there is little incentive for farmers to save their own seeds. However, they are forgoing the possibility of developing crops more suited to their specific environment.

In July 2014, a meeting was held with representatives from ADRA, Save the Children, Live and Learn, Department of the Environment, Wan Smolbag, Peace Corps, some schools, Vanuatu Direct, farmers, FSA and the Department of Agriculture and Rural Development to investigate the level of interest in developing some mechanism for multiplying and distributing open pollinated seeds. Initially, the focus would be on Efate farmers. There is to be a further workshop on 29 August, 2014 for a sharing of knowledge and some practical experience of saving and storing seeds, hosted by the Department of Agriculture & Rural Development. Some OP seeds will be distributed to the stakeholders.

CONSTRAINTS AND OPPORTUNITIES RELATING TO OP SEED

CONSTRAINTS TO SUPPLY OF OP SEED

Table 12: Summary of constraints identified for locally produced OP seed

Issue code	Issue	Fiji	Samoa	Solomon Islands	Tonga *	Vanuatu
A	Quality of seed, Limited knowledge of production and processing					
B	Seed storage and packaging					
C	Distribution channels					
D	Continuity of supply					
E	Limited documentation on OP varieties					
F	Absence or deficiency of seed for legume cover crops					
G						

* While Tonga did not identify specific issues of concern, the local consultant noted that Tonga shared many of the issues as per Fiji.

KEY ISSUES FOR LOCALLY PRODUCED OP SEED

The following section provides an outline of the key issues and provides supportive statements as identified by consultants in each country.

QUALITY OF SEED – LIMITED KNOWLEDGE OF PRODUCTION AND PROCESSING

This issue was consistently raised by all countries. Building the knowledge and technical capacity of farmers to produce, process and store seed effectively is considered a high priority across all of the participating PIC's.

VANUATU: No traditional knowledge in this area as Vanuatu farmers have only relatively recently started growing vegetables from seed. While some farmers are saving their own seed, we know very little about who they are or how successful their seed saving is.

SAMOA: As per Vanuatu above. Also there is no formal mechanism to locate farmers that are producing OP seed or to determine how successful their seed saving is.

VANUATU: FSA believes Vanuatu needs help to develop knowledge in open pollinated seed production around seed collection/harvesting, extraction, drying, processing, packaging and storage. It is assumed the technology is available for small scale processing of OP seeds which is more advanced than the Kastom Garden model being used in the Solomons but doesn't require the high technological requirements used by the major seed producers. The Kastom Garden model is unlikely to work well with the quantities of seed that would be required to meet Vanuatu farmers' needs.

SEED STORAGE AND PACKAGING

Ensuring seed viability for stored seed is closely linked to processing. Seed that is stored before it has been dried to its optimal moisture content is likely to be affected by mould and fungi.

There is a very low level of knowledge of low tech methods to determine moisture content and

to prevent mould are fungi. The issue of access to packaging materials and seed handling practices for packaging are similar to those mentioned in commercial seed.

SAMOA: The packaging, storage and location of retail outlets of imported seed presents challenges as mentioned above. These issues apply even more so for OP seeds, where packaging locally is required.

VANUATU: The items of packaging and storage, as listed above in imported seed, also apply to open pollinated seed.

DISTRIBUTION CHANNELS

With the exception of the PMN and SPE in the Solomon Islands there was no evidence of OP seed available through any of the formal seed supply channels. Distribution of such seed and varieties is therefore dependant on the informal sector and sharing between farmers. While this is a strong and reliable pathway it is limited as growers are required to know someone with the variety they are seeking.

CONTINUITY OF SUPPLY

Where projects or programme activities do focus on production and distribution of OP seed they are criticised as often short lived as the focus of the organisation changes.

SAMOA: There is a lack of continuity in ventures /programs to maintain production and make selected crop varieties available via entities like MAF. SFA would like to see availability of certain popular OP crop varieties from overseas and local retailers when local supplies are in short supply.

FIJI: Assessing the quantities of seed produced by MOA over a 10 year period indicates that some years there is a strong focus on this activity while other years seed production is largely neglected.

LIMITED DOCUMENTATION ON OP VARIETIES

All countries reported a low level or absence of information relating to OP varieties. Strengthening this area would be of great benefit. This calls for field trials, plant evaluations, documentation of varietal traits and mechanisms through which this information can be shared.

SAMOA: Limited documentation of open pollinated varieties. It would be beneficial to identify and document the performance of different varieties in different conditions. Farmers / growers are not aware of the importance of crop variety names on which to base future seed selections and purchases. Need for improved awareness / availability of selected OP crop varieties that are adaptable to local situations including pest resistance or tolerance.

SOLOMON ISLANDS: The PMN has a database of basic information relating to accessions however detail of plant characteristics is very limited. Advancing this requires a focus on plant evaluations and time/resources to populate the database.

VANUATU: There is no documentation on open pollinated varieties. Inventories / database of varietal information / characteristics required but FSA is not sure how this can be achieved.

ABSENCE OR SHORTAGE OF SEED FOR LEGUME COVER CROPS

There is a general lack of access to seed for green manure and cover crop varieties such as Mucuna. Distribution of these important crops is largely serviced through the informal sector

which requires the grower to know someone with sufficient seed/planting material to be in a position to share and at a time when the grower is in a position to plant it.

FIJI: Farmer members of TTT are producing large quantities of Mucuna seed and are interested to distribute it. However they are facing challenges to prevent infestation of weevils and borers and ensuring viability beyond 3 months. Assistance with processing and storage systems has been requested.

SOLOMON ISLANDS: The PMN seed farm at Burns Creek is not large enough to produce seed to meet the demand for these crops. Some members of the PMN are producing and sharing seed and planting materials for green manure / cover crops (Mucuna, Glyricidia) however the distribution channels are limiting. Island Enterprise (IE) did trial selling cover crop seed (imported) at some stage many years ago however most of the stock went to waste. The IE manager felt that there was not enough demand to justify stocking it. They are willing to try again with small quantities of locally produced seed if the seed quality is good.

OPPORTUNITIES TO IMPROVE QUALITY AND ACCESS TO OPEN POLLINATED SEED

The following opportunities have been identified as potential contributors to improved supply of locally produced OP seed. Where country reports specifically identified these opportunities this is marked in the table however these actions may also benefit other PIC's.

Table 13: Opportunities for improving OP seed access and quality

Areas of opportunity	Related issue code	Fiji	Samoa	Solomon Is	Tonga	Vanuatu
Improve distribution of locally produced OP seeds with OP seeds available through retailers to enable locally adapted and cheaper seeds.	C					
Technical best practice guidelines - Develop seed production procedures and standards to support farmers producing OP seeds for commercial supply. Produce a basic handbook/fact sheets for farmers saving seed for their own purposes or for exchange to ensure they produce viable seed. Review the PMN Community Seed Saving Manual.	A					
Improve quality of locally produced OP seeds through practical on-farm training in seed production, processing and storage.	A,B					
Increase quantity of locally produced OP seeds by those currently engaged in production (eg. Ministry, PMN) by contracting local farmers to produce seed and overseeing to ensure quality production.	A,C,D					
Foster a local seed production industry. Build capacity of FO's and farmers who demonstrate potential as seed producers. Provide technical and budgetary support for F.O.'s and such farmers (F.O's have networks to spread knowledge to local farmers).	A,D					
Raise awareness of the value of seed saving of OP varieties to increase number of farmers benefitting from continual adaptation of varieties to local environment and growing conditions.	A,C					
PMN to (continue to) provide training in seed production to farmers. PMN to improve the level of technical support for seed growers. PMN to expand training role to support other FO's and farmers in other PIC's.	A					
Identify farmers that are successfully producing seed and facilitate information exchange through field visits.	A					
Develop mechanisms for exchange - local seed / plant material swaps, seed fairs and agricultural events.	C					
Improve farmer knowledge and skills in keeping records regarding the	E					

performance of OP crop varieties. Emphasize the value of keeping such records. Document farmer feedback on open pollinated seeds/varieties including indication of germination rates and performance.						
Ministry/SPC etc. to provide farmers with access to/ awareness of contemporary research and information relating to seed production and technologies to support improvements in seed quality (e.g. links to International Seed Testing Association).	E					
Conduct comparative field trials of OP lines against hybrid lines.	E					
Reduce risks of cross pollination by ensuring cooperation between farmers producing OP seed (i.e. of varieties subject to cross pollination) and neighbouring growers.	A					
Establish a supply of OP sweet corn as available existing sweet corn varieties are hybrids and not bred for the tropics.						
Gain access to certified organic vegetable seeds . Due to biosecurity requiring imported seed to be treated this may require production and local certification of organic seed.	A,C,D ,E					
Gain access to appropriate technologies that support seed processing and storage (e.g. sieves, silica gel).	A,B					
Improve production and distribution of seed for cover / green manure crops .	F					

EMERGENCY SEED DISTRIBUTION

Cyclones, hurricanes and flooding are common in the Pacific Islands, on occasions, devastating gardens and farms resulting in crop losses, serious impacts on seed/plant stocks and the diversity of local open landraces. Following such disasters the National Disaster Council, with the National Emergency Operations Centre and the National Disaster Management Office (or other equivalent government agencies) lead and coordinate all response programs.

FIJI

The National Emergency Operation Centre, in their situation report following the flooding of April 2012, indicated that vegetable seedlings were distributed by TTM Seedlings and seed was distributed by Hop Tiy. Representatives from MOA are responsible to evaluate impacts and needs and facilitate the delivery of seeds and seedlings to farmers in such circumstances.

SAMOA

In recent times, FAO have provided support of seed purchased from local retailers. FSA identified farmers also have succeeded in maintaining supplies unless on rare occasions they are destroyed by such calamities. Seed retailers maintain that it is easy for them to secure seed imports within two weeks of such natural disaster events. Some retailers also had past experience with making seedlings available for sale to meet post - hurricane support. The MAF staffs are generally involved in post hurricane crop damage assessments and assist with seed and seedling distribution to farmers in need.

SOLOMON ISLANDS

The MAL are primarily responsible for facilitating the delivery of planting materials to farmers in need. Following the flooding in Guadalcanal in April 2014, Government designated leaders and their humanitarian partners were mobilised in sector or cluster areas. A range of NGO agencies were involved including UNICEF, Red Cross, Caritas, Save the Children and World

Vision. The MAL, in partnership with KGA, were largely responsible for coordinating the agricultural component of the flood recovery program. The Solomon Environment Beautification Committee, SEBC (previously Honiara Beautification Committee) were contracted to produce vegetable seedlings on a large scale to speed the recovery process. SEBC utilised both hybrid Known-You seed from Solfish and OP seed from the PMN and Eden's Seeds (sourced directly from Australia by staff of SEBC).

TONGA

The consultant from Tonga acknowledged the work of the organisation MORDI (Mainstreaming of Rural Development Innovation) in supplying seeds and formal training in addition to the assistance from MAFFF under the National Emergency Management Office in supplying seeds following Cyclone Ian in January 2014.

VANUATU

FSA advised that the vegetable growing season and cyclone season tend not to coincide so seed supply is less of an issue than it might be otherwise. Farmers' initial focus after a cyclone tends to be on food security with an expectation that rice will be provided. As there is a lot of clean-up work to do, the immediate demand for seeds is not great. This should provide VAS with adequate opportunity to source the likely required seeds. FSA believes that the only seed worth storing for disaster response is corn seed. After a disaster, a farmer is more likely to concentrate on providing shelter for his family than to clear up the tangle of fallen trees on his land in order to plant a new garden. Corn has the benefit of only requiring a small hole to drop the seed into so could be planted before the land is cleared. In addition, there is an incentive to keep fresh corn seed since the unused seed can be used for stock food and thus, not wasted.

CONSTRAINTS TO SEED SUPPLY FOLLOWING DISASTER

Largely access to seed during disaster recovery programs was not considered a significant concern within any of the participating countries. While the demand for seed may not be immediately available locally the supply chain of the private sector in all countries seemed well positioned to meeting the requirements of commercial seed within a short time frame in such cases. There was concern raised in Fiji that the needs for seed in such circumstances may result in depleting the supplies that would have otherwise supplied the original market for those seeds resulting in a shortage for normal consumers. Fiji, Samoa and the Solomon Islands all identified that within disaster response programs seeds may often be distributed to those that may not use them or will not use them to maximum benefit therefore resulting in seed wastage. Samoa also raised concerns that some crop varieties distributed via such efforts may be unsuitable and not adaptable to the local situation.

With the exception of efforts to distribute seed from the PMN in the Solomon Islands no other country identified inclusion of conservation and revitalisation of OP landraces or distribution of OP seed in recovery programs.

OPPORTUNITIES TO IMPROVE SEED SUPPLY FOLLOWING DISASTER

The following opportunities have been identified as potential contributors to improving supply seed following disaster. Where country reports specifically identified these opportunities this is marked in the table however these actions may also benefit other PIC's.

Table 14. Opportunities to improve seed supply following disaster

Areas of opportunity	Fiji	Samoa	Solomon Is	Tonga	Vanuatu
Ensure mechanisms are in place to respond quickly to seed orders.					
Include representatives of seed retailers in the disaster management scheme and committees to ensure seed supply needs are addressed in the planning and response programs.					
Recovery programs to replenish OP seed supplies in addition to provision of commercial (likely hybrid) varieties. The distribution of hybrid vegetable seeds is focused on re-establishing food supply. Actions to revitalise genetic diversity should also be implemented.					
Consult with Ministry and disaster recovery agencies regarding establishing reserve OP seed bank to enable conservation of OP landraces.					
Combine provision of seed with training in seed propagation / nurseries. Conduct follow-up to ensure farmers are competent with practice and seed stocks have been effectively utilised.					
Ensure strong communications and partnerships among the varying agencies involved in disaster relief / recovery.					

RECOMMENDATIONS

Appendix 1 provides a detailed list of actions that may be suitable for implementation by Farmer Organisations to improve or influence improvements to seed supply. These actions can be broadly grouped into supporting:

- **TECHNICAL CAPACITY** through tools, publications and training e.g. development of seed production and handling guidelines, development of varietal inventories; training activities for seed retailers and seed producers, facilitating access to resources (packaging materials),
- **NETWORKING** e.g. facilitating dialogue between farmers, seed suppliers and seed companies, supporting farmer to farmer exchange of seed production skills and varieties and,
- **ADVOCACY** e.g. advocate retailers to extend the range of seed companies they are stocking; advocate and support Ministry's to utilise contracted growers for multiplication of seed

This study engaged a wide range of stakeholders across five countries. Additionally it required an act of balancing the interests of the formal private seed sector and the informal seed sector. This contributes to the complexity of the following recommendations and the demand for such diverse types of activities. The priorities of the Farmer Organisations in the target countries modulated this list. Expectedly, the suitability of the actions will vary according to context sensitivity and the strengths and capacities of the varying Farmer Organisations. Projects of this nature may be undertaken as modules, either based on action type, theme or geographical focus.

While some effort has been made through the course of this study to consult with the participating Farmer Organisations regarding the range of actions and determine interest and

priorities further consultation is advised. Hosting a workshop with representatives from the Farmer Organisations may be the best forum for such consultation so that dialogue between organisations can occur.

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APPENDICIES

APPENDIX 1 – OPPORTUNITIES FOR FARMER ORGANISATIONS TO IMPROVE SEED SUPPLY

							Interest expressed				
Action	Priority	Responsible Party	Partners	Indicative duration	Indicative budget	Fiji/ TTT	SFA	KGA	Nishi	FSA	
	H M L										
Commercial sector											
1. Support existing retailers to better reach rural farmers by:											
a) advocate alternative pathways to reach rural farmers (e.g. engage agents in village stores working with existing supply chain mechanisms to rural stores, prepaid orders delivered through Ministry or NGO agriculture extension officers when on field tours, regular mobile stores / road shows). Particular emphasis on strengthening the weakest points of the supply chain (as identified in Figure 1 for Fiji and Figure 5 for the Solomon Islands and where relevant in Samoa, Fiji and Vanuatu).		PIFON	Seed retailers, F.O.	6 months	LOW						
b) develop a <i>National Seed Resources Guide</i> assist farmers to locate seed suppliers (include information of variety attributes). This guide includes details of all seed suppliers and their range of seeds. This would need to be updated as new suppliers enter the market and product lines change. Copies of the guide held by Farmer Organisations and agricultural extension officers within government and non-government sectors.		FO	Retailers	1 month	VERY LOW						
2. Support existing retailers to provide better range to farmers by:											
a) support linkages between Hop Ti and retailers in other PIC's to enable broader access to the range available in Fiji. Hop Ti, Fiji is a secure and seasoned seed distributor with an opportunity to provide a stronger regional service.		FO	Retailers, Hop Ti	1 month	VERY LOW						
b) advocate retailers to extend the range of seed companies they are stocking (e.g. Morris Hedstrom who have good retail outlet coverage to extend beyond Yates).		PIFON	Retailers, seed companies	2 months	LOW						
c) advocate retailers stock imported OP varieties and indicate to the customer which varieties are OP. It is likely that some of the seed currently stocked in retail outlets is OP but this information is not disclosed on the packet. One retailer suggested that Yates packets marked Code A were OP varieties however this has not been confirmed.		PIFON	Retailers, seed companies	6 months	LOW						
d) advocate retailers stock OP (local or imported) variety of sweet corn.		FO	Retailers, seed growers	6 months	LOW						
e) advocate retailers stock locally grown seed of green manure / cover crops and		FO	Retailers,	6 months	LOW						

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facilitate purchases of seed from local seed growers for such crops. Support this venture with promotional material (brochure <i>An introduction into using green manure crops</i> including case studies of the benefits of using green manure e.g. Mucuna with Teveuni) to retailers to support their marketing of the seed. Island Enterprise and SPE in the Solomon Islands and Hop Tiy in Fiji have expressed willingness to trial this venture and may be a good place to pilot this activity.			seed growers							
f) advocate for Biosecurity to make publically available up to date lists of approved seed companies/varieties		PIFON	Biosecurity	3 months	LOW					
g) advocate retailers stock locally grown OP varieties and facilitate purchase agreements between retailer and local seed grower.		FO	Retailers, seed growers	2 years	LOW					
h) partner with the retailer to review the varieties they are stocking to ensure they are climatically appropriate		PIFON	Retailers, Seed companies	6 months	MEDIUM					
i) advocate / coordinate the development of a list of recommended varieties (with Ministry's, SPC, farmers and retailers) to be forwarded to farmers and retailers. Advocate this list to be considered by retailers when placing seed orders.		PIFON	Ministry's, SPC, Seed companies	3 months then reviewed annually	MEDIUM					
3. Support existing retailers to provide better quality seed to rural farmers by:										
a) provide <i>Module 1 training for seed retailers</i> in optimal seed storage and handling (incl: recommending seeds are kept in cool conditions with empty packets on display)		PIFON	Retailers	3 months	HIGH					
b) for retailers / agents / customers who are repackaging seed facilitate <i>Module 2 training in seed packaging and handling</i> covering areas of: environmental conditions for repackaging (e.g. sealed room, dehumidifiers) and labelling of repackaged seed (Crop variety name, net weight or count, minimum germination percentage, name and address of the company packaging the seed, source company, date of packaging and date of expiry as per original packet)		PIFON	Retailers	3 months	HIGH					
c) assist seed retailers who re-package seeds to access suitable packaging (non-permeable) to ensure seed quality is retained. Negotiations for importing such packaging has commenced with Marco Polo (Fiji) who has the capacity to act as a regional distributor.		PIFON	Retailers, suppliers (Marco Polo)	3 months	LOW					
d) identify opportunities for seed companies currently available to provide seed in smaller packets to avoid seed performance drop off as a result of repackaging . For example Terranova is currently launching a small packet range. This will result in higher costs but will give greater assurance of quality for farmers wanting to buy small packets.		PIFON	Seed companies, retailers	3 months	LOW					
e) assist seed retailers to access other materials and appropriate technologies that support improved seed handling, packaging and storage (e.g. heat / vacuum sealers, scales, silica gel). Where heat sealing is not an option or packaging is not appropriate		PIFON	Retailers, suppliers	3 months	LOW					

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identify other storage options e.g. airtight containers										
f) promote regular dialogue between seed retailers/importers and seed companies regarding varietal performance and new varieties		FO	Farmers, retailers	Ongoing	LOW					
g) identify opportunities and facilitate partnerships between rural seed retailers and other agencies to enable access better storage facilities (air-conditioned / refrigerated) i.e. option may exist for a rural store to store seed in a refrigerator owned by a member of the community/training centre/health clinic.		FO	Retailers, other agencies to be identified	6 months	MEDIUM					
h) develop <i>Guidelines for Transportation and Post Purchase Handling</i> of seeds, providing such to retailers and advocate they forward on this information to their customers		PIFON	Retailers	< 1 month	LOW					
i) advocate for farmers to provide feedback to their supplier on the quality of the seed (germination rate) and the suitability of the variety		FO	Farmers, retailers	Ongoing	LOW					
j) conduct regular anonymous audits of retailers seed stocks to ensure seed is within used by date. Consider conducting independent germination tests of seed from retailers.		FO	Retailers	Ongoing	LOW	Not discussed with FO's				
4. Support retailer collaboration with other retailers both within country and within region by:										
a) advocate for and support establishment of a <i>Pacific Regional Seed Association</i>		PIFON	Retailers	1 year	MEDIUM					
b) consider membership the Asia Pacific Seed Association (APSA) to link stakeholders in PIC's to wider networks. Disseminate information, resources and opportunities provided by APSA to F.O's, seed retailers and farmers.		PIFON	Retailers, FO's, farmers	Ongoing	LOW					
c) trial a <i>Regional Seed Congress</i> to bring seed retailers and seed companies together providing forums, information and resources and enabling networking		PIFON	Retailers	2 years	VERY HIGH	Not discussed with FO's				
5. Support new retailers or farmers who wish to import directly by:										
a) review regulatory framework for seed importation (country specific requirements, variety release and registration, quarantine, trade barriers, import licences, biosafety regulations and other measures that regulate seed movement). Develop a <i>Seed Importation Fact Sheet</i> for retailers and farmers that explains these frameworks and provides directions on how to work within them. See also 2 (i)		PIFON	Seed importers, Biosecurity	3 months	LOW					
Locally produced open pollinated seed										
6. Support local OP seed production through information exchange and technology transfers										
a) organise practical <i>training in on-farm seed production and processing</i> targeting farmers that have to potential to be contracted seed growers. Cover conversion of raw seed to clean, viable, storable seed and packaging.		PIFON	Farmers, seed growers	2 years	HIGH					
b) support the development of model farms demonstrating on-farm seed production (ideally working towards being sustainable private enterprises)		FO	PIFON	2 years	MEDIUM					
c) coordinate and support field visits/study tours/learning exchanges for seed growers to learn from expertise within country and regionally (Asia/Pacific).		PIFON	FO, host sites/farms	1-2 years	MEDIUM					

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d) link seed growers with resource people who can provide technical advice as required		PIFON	Advisors, seed growers	Ongoing	MEDIUM					
e) advise seed growers to plan their production of seed in cooperation with surrounding farmers considering staggered plantings and isolation factors, to manage cross pollination risks and maintain high varietal purity of OP varieties		FO	Seed growers, farmers	Ongoing	LOW					
f) develop case studies and guidelines for management of insect and fungal problems affecting seed quality in storage including low tech solutions for village based systems (neem, ash/ charcoal treatments), chemical treatment options (fungicides, insecticides - pyrethrum dust, thrium) and organic treatments		PIFON	FO	2 months	LOW					
g) support farmer to farmer exchanges between committed seed growers to share experiences		FO	Seed growers	1-2 year	MEDIUM					
h) advocate for and support establishment of a <i>Pacific Regional Seed Growers Association</i>		PIFON	Seed growers	>2 years	HIGH	Not discussed with FO's				
7. Support seed growers through tools and resources										
a) develop and distribute Technical Fact Sheets for Seed Production in specific crops		PIFON	FO	6 months	MEDIUM					
b) facilitate access to seed production and processing equipment for seed growers e.g. isolation bags and cages, seed sieves (imported or purchased/constructed locally), mesh tray's, mesh bags, air driers, temperature controllers/regulators		FO	PIFON, suppliers, farmers	1 year	MEDIUM					
c) develop a template record sheet for seed crops in the field		PIFON	FO	< 1 month	V. LOW	Not discussed with FO's				
d) develop a template record sheet for seed harvest and handling		PIFON	FO	< 1 month	V. LOW	Not discussed with FO's				
e) produce a <i>Seed Production as an Agricultural Enterprise</i> fact sheet providing case studies on growing seed noting how this differs from produce as the harvest crop		PIFON	FO	< 1 month	LOW					
f) develop short video clips for seed production for different crops		PIFON	FO	1 year	HIGH					
8. Support commercial distribution of locally grown OP seed										
a) locate and share high performing OP sweet corn varieties with seed growers to enable further bulking and distribution of such		FO	Seed growers	6 months	LOW					
b) advocate and support Ministry's to utilise contracted growers for multiplication of seed to further foster development of a private seed sector		PIFON	FO, Ministry's	6 months	LOW					
c) link local seed growers and retailers for purchase of quality seed (including green manure/cover crop seed)		FO	Retailers, Farmers	Ongoing	LOW					
d) link seed growers and organic certifiers to build opportunities for locally produced certified organic seed		FO	PIFON, Farmers, Organic certifiers	Ongoing as need arises	LOW					
e) develop a purchase agreement template that can be used to guide agreements between local seed growers and retailers		PIFON	Retailers, farmers	2 months	MEDIUM					

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9. Increase skills and awareness of subsistence farmers to save their own seed										
a) raise awareness of the value and practice of seed saving of open pollinated varieties to enable continual adaptation of varieties to local environment and growing conditions		FO	Agriculture extension officers, NGOs	Ongoing	LOW					
b) review / modify Kastom Gaden's <i>Community Seed Saving Manual</i> as a handbook for village level seed production for the informal seed sector to assist farmers to produce viable and storable seed reliably.		PIFON	FO	6 months	MEDIUM					
c) facilitate information exchange of local crop husbandry practices utilised to produce and store seed compiled in a range of media including print case studies and short documentary film. See also 6 (g).		PIFON	FO, farmers	1 year	MEDIUM					
10. Support exchange distribution of locally grown OP seed										
a) develop mechanisms for exchange - local seed / plant material swaps, seed fairs and agricultural events.		FO	Farmers	Ongoing	MEDIUM					
11. Identifying and improving access to suitable and improved varieties										
a) develop inventories and baseline data of in-situ on-farm collections/local varietal availability and performance documenting varietal characteristics (including pest and diseases resistance, yield, nutritional value, climate conditions). F.O. to develop/maintain databases of varietal information. PIFON to support establishment of databases and initial training with ongoing maintenance to be managed by F.O. Begin with reviewing PMN database.		PIFON to provide template and training	FO, farmers, Ministry's	6 months then ongoing	HIGH					
b) facilitate training in plant evaluation for farmers for the purposes of seed production		PIFON	FO, farmers	1 year	HIGH					
c) conduct comparative field trials of different varieties / cultivars (incl. OP lines against hybrid lines).		FO	Farmers	> 2 years	MEDIUM					
d) support farmers to improve knowledge and skills in keeping records regarding the performance of crop varieties. Emphasize the value of keeping such records. Document farmer feedback on seeds/varieties including indication of germination rates and performance.		FO	Farmers	> 2 years	LOW					
e) link farmers and plant breeders to support participatory breeding of local OP crops including training in: identifying characteristics, controlled pollination, seed production and selection, replication trials. Involve farmers in participatory variety selection of OP and imported varieties		PIFON	Farmers, plant breeders, AVRDC	> 2 years	HIGH					
f) identify rootstock varieties and promote trials of grafting of Solanaceae and Cucurbits		FO	Farmers	1 year	LOW					
12. Support strong and functional seed policies										
a) pursue opportunities for government to subsidize importation costs (freight/duty).		PIFON	Ministry's	1 year	LOW					
b) register interest to be recognised as a stakeholder in development of National Seed		PIFON	Ministry's	> 2 years	LOW					

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Policies and act to represent the voice of farmer members										
c) lobby for regional harmonization of seed rules and regulations to facilitate trans-border movement of seeds across PIC's		PIFON	Ministry's	> 2 years	MEDIUM	Not discussed with FO's				
13. Support seed distribution following disasters										
a) advocate recovery programs to replenish OP seed supplies in addition to provision of commercial (likely hybrid) varieties.		PIFON	Ministry's, disaster recovery agencies, FO	1 year	LOW					
b) advocate for establishment of reserve OP seed bank to enable conservation of OP landraces		PIFON	Ministry's & disaster recovery agencies	> 2 years	LOW					
c) provide seed and training in seed propagation / nurseries post disasters. Conduct follow-up to ensure farmers are competent with practice and seed stocks have been effectively utilised.		FO	Ministry's & disaster recovery agencies	As required	HIGH					
d) advocate representatives of seed retailers are engaged with disaster management committees to ensure seed supply needs are addressed in the planning and response programs and seed needs can be met quickly		PIFON	Ministry's & disaster recovery agencies, FO	1 year	LOW					

APPENDIX 2 - LIST OF HYBRID SEED VARIETIES AVAILABLE IN FIJI, SOLOMON ISLANDS, TONGA AND VANUATU

Crop	Variety	Seed Supplier	Country	Seed Retailer
Amaranth	Lu-Hsien	Known-You	Solomon Islands	Solfish
	Red Garmet	Yates	Vanuatu	VAS
Artichoke	Artichoke	Yates	Vanuatu	VAS
Balsalm Pear	Jade Dragon	Known-You	Solomon Islands	Solfish
	Jadeite	Known-You	Fiji	Hop Tiy
	Moon Beauty	Known-You	Solomon Islands	Solfish
	New Moon	Known-You	Solomon Islands	Solfish
Bean	Asparagus Bean- Ky Bush	Known-You	Solomon Islands	Solfish
	Asparagus Bean- Green Pod Kaohsiung	Known-You	Solomon Islands	Solfish
	Asparagus Bean- Green Arrow	Known-You	Solomon Islands	Solfish
	Blue Lake Stringless	Yates	Vanuatu	VAS
	Borlotti	Yates	Vanuatu	VAS
	Broad Bean -Early Long	Yates	Vanuatu	VAS
	Brown Beauty	Yates	Vanuatu	VAS
	Bountiful Butter	Yates	Vanuatu	VAS
	Contender	SPS	Tonga / Fiji / Samoa	Nishi
	Contender	Terranova	Tonga / Vanuatu	Venture / VAS
	Farmers 162 Snap Bean	Known-You	Solomon Islands	Solfish
	Gourmet Delight	Yates	Vanuatu	VAS
	Labrador	Terranova	Vanuatu	VAS
	Python	SPS	Tonga / Fiji / Samoa	Nishi / Turners and Growers
	Snap Stringless	Yates	Vanuatu	VAS
	Shiny Fardenlosa	SPS	Tonga / Fiji / Samoa	Nishi
	Stringless Pioneer	Yates	Vanuatu	VAS
Beetroot	Cylindra	Yates	Vanuatu	VAS
	Detroit Red	Terranova	Vanuatu	VAS
	Red Ace	SPS	Tonga / Fiji / Samoa	Nishi / Turners and Growers
	Super King	Yates	Vanuatu	VAS
Broccoli	Brumby	SPS	Tonga / Fiji / Samoa	Nishi / Turners and Growers
	Chief	Known-You	Solomon Islands	Solfish
	Green Beret	Terranova	Vanuatu	VAS

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	King Green	Known-You	Fiji	Hop Tiy
	Shogun	Yates	Vanuatu	VAS
	Summer King	Yates	Vanuatu	VAS
	Tender Green	Known-You	Solomon Islands	Solfish
Cabbage	Copenhagen Market	Yates	Vanuatu	VAS
	Eureka	Yates / Terranova	Vanuatu	VAS
	Green Coronet	Terranova	Vanuatu	VAS
	Green Fighter	Takii	Vanuatu	FSA
	Golden Acre	Yates	Vanuatu	VAS
	KiKi	SPS	Tonga / Fiji / Samoa	Nishi / Turners and Growers
	KK Cross	Yates	Solomon Islands / Vanuatu	Is Ent / VAS
	KK Cross	Terranova	Tonga / Vanuatu	Venture / VAS
	KK Cross	Takii	Fiji	Hop Tiy
	KK Cross F1	Takii	Solomon Islands	SPE Analytical
	KK Cross Grand	Takii	Fiji	Hop Tiy
	Racer Drummerhead	Yates	Vanuatu	VAS
	Red Baron (Red)	Terranova	Vanuatu	VAS / FSA
	Ruby King	Known-You	Fiji	Hop Tiy
	Sugarloaf	Yates	Vanuatu	VAS
	Summer Autumn	Known-You	Fiji	Hop Tiy
	Summercross	SPS	Tonga / Fiji / Samoa	Nishi
	Summer Tide	Known-You	Solomon Islands / Fiji	Solfish, Hop Tiy
	Tropical Delight	Known-You	Solomon Islands / Fiji	Solfish, Hop Tiy
	60 Day Ball Cabbage	Chai Tai	Solomon Islands	Ethel Saelea
Capsicum	Alice	Terranova	Tonga / Vanuatu	Venture / VAS
	Blue Star	Known-You	Solomon Islands	Solfish
	Bright Star	Known-You	Solomon Islands	Solfish
	Californian Wonder	SPS	Tonga / Fiji / Samoa	Nishi
	Californian Wonder	Terranova	Tonga / Vanuatu	Venture / VAS
	Cayenne Birdseye Chilli	SPS	Tonga / Fiji / Samoa	Nishi / Turners and Growers
	Cayenne Caysan Chilli	SPS	Tonga / Fiji / Samoa	Nishi / Turners and Growers
	Colour Salad Collection	Yates	Solomon Islands / Vanuatu	Is Ent / VAS
	Giant Bell	Yates	Solomon Islands / Fiji / Vanuatu	Is Ent / Hop Tiy / VAS
	Giant Green	Terranova	Chantenay Red Cored	Chantenay Red Cored
	Golden Star	Known-You	Solomon Islands	Solfish

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	Habenaro Chilli	Yates	Vanuatu	VAS
	Ky Long Chili - Hot	Known-You	Solomon Islands	Solfish
	Ky Passion -Hot	Known-You	Solomon Islands	Solfish
	Long Red Cayenne - Chilli	Yates	Solomon Islands / Fiji / Vanuatu	Is Ent / Hop Tiy / VAS
	Marconi Hot - Chilli	Yates	Solomon Islands / Fiji / Vanuatu	Is Ent / Hop Tiy / VAS
	Olga	Terranova	Tonga	Venture
	Red Air - Hot	Known-You	Solomon Islands	Solfish
	Red Star	Known-You	Solomon Islands / Fiji	Solfish / Hop Tiy
	Santino	SPS	Tonga / Fiji / Samoa	Nishi
	Sweet Yolo	Hop Tiy	Fiji	Hop Tiy
	Sweetie Star	Known-You	Solomon Islands	Solfish
	Yellow	Yates	Solomon Islands / Fiji / Vanuatu	Is Ent / Hop Tiy / VAS
	Yolo Wonder	Yates	Solomon Islands / Fiji / Vanuatu	Is Ent / Hop Tiy / VAS
	Yolo Wonder B	Terranova	Tonga / Vanuatu	Venture / VAS
Carrot	All Seasons	Yates / Terranova	Vanuatu	VAS
	Baby Carrot	Yates	Fiji / Vanuatu	Hop Tiy / VAS
	Chantenay Red Cored	Terranova	Tonga / Vanuatu	Venture / VAS
	Chantenay Red Cored	Yates	Vanuatu	VAS
	Kuroda	SPS	Tonga / Fiji / Samoa	Nishi / Turners and Growers
	Kuroda	Yates	Solomon Islands / Vanuatu	Is Ent / VAS
	Manchester Table	Yates	Vanuatu	VAS
	New Kuroda	Takii	Fiji / Vanuatu	Hop Tiy / FSA
	New Kuroda	Terranova	Tonga / Vanuatu	Venture / VAS
	Parisian Round	Yates	Vanuatu	VAS
	Purple	Yates	Vanuatu	VAS
	Supabunch	SPS	Tonga / Fiji / Samoa	Nishi / Turners and Growers
	Topweight	Yates	Solomon Islands / Vanuatu	Is Ent / VAS
	Topweight	Terranova	Vanuatu	VAS
Cauliflower	All Year	Yates	Vanuatu	VAS
	Charming Snow	Known-You	Solomon Islands	Solfish
	Phenomenal	Yates	Fiji / Vanuatu	Hop Tiy / FSA
	Selection 174	Terranova	Vanuatu	VAS
	White Contesta	Sakata	Fiji	Hop Tiy
	White Tropic	SPS	Tonga / Fiji / Samoa	Nishi / Turners and Growers

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Celery	CY 90-64	Known-You	Solomon Islands / Fiji	Solfish / Hop Tiy
	Dewcrisp Green	Yates	Vanuatu	VAS
	Valiant	SPS	Tonga / Fiji / Samoa	Nishi / Turners and Growers
Chinese Cabbage	Chi Hi Li	Yates	Vanuatu	VAS
	Chinese Cabbage Fine Zone	Known-You	Solomon Islands	Solfish
	Chinese Cabbage Oragami	SPS	Tonga / Fiji / Samoa	Nishi / Turners and Growers
	Chinese Kale Green Delicacy	Known-You	Solomon Islands	Solfish
	Chinese Kale New Veg-Gin	Known-You	Solomon Islands	Solfish
	Jade Crown	Known-You	Solomon Islands	Solfish
	Joi Choi	Sakata	Fiji	Hop Tiy
	Kailaan	Yates	Vanuatu	VAS
	Pak Choi - Green Stem	Clover	Fiji	Hop Tiy
	Pak Choi - Green Stem OP	Terranova	Vanuatu	VAS
	Pak Choi Hybrid	Terranova	Vanuatu	VAS
	Pak Choi Hybrid	Yates	Solomon Islands / Vanuatu	Is Ent / VAS
	Pak Choi - Joi Choi	SPS	Tonga / Fiji / Samoa	Nishi / Turners and Growers
	Pak Choi - Kwan Moon	Yates	Vanuatu	VAS
	Pak Choi - Kwan Moon	Terranova	Vanuatu	VAS
	Pak Choi - Kwan Moon	Hop Tiy	Fiji / Vanuatu	Hop Tiy / FSA
	Pak Choi - Green Stem Hybrid	Terranova	Vanuatu	VAS
	Pak Choi White Tropical type	Takii	Fiji	Hop Tiy
	Pak Choi White Stem	Terranova	Tonga / Vanuatu	Venture / VAS
	Pai Tsai - All In	Known-You	Solomon Islands	Solfish
	Pai Tsai - Bino	Known-You	Solomon Islands	Solfish
	Pai Tsai - Ching Chiang	Known-You	Solomon Islands	Solfish
	Pai Tsai - Fun-Yen	Known-You	Solomon Islands	Solfish
	Pai Tsai - Ky Early	Known-You	Solomon Islands	Solfish
	Pai Tsai - Praise	Known-You	Solomon Islands	Solfish
	Pai Tsai - San Feng No.2	Known-You	Solomon Islands	Solfish
	Pai Tsai Yu-Tsai Sum	Known-You	Solomon Islands	Solfish
	Saladeer	Terranova	Tonga / Vanuatu	Venture / VAS
	Saladeer	Takii	Solomon Islands / Fiji	SPE Analytical / Hop Tiy
	Saladeer	Yates	Vanuatu	VAS
	Saladeer Bow ploy	Chai Tai	Solomon Islands	Ethel Saelea
	Tropical Delight	Sakata	Vanuatu	FSA
	Tsoi Sum	Yates	Solomon Islands / Vanuatu	Is Ent / VAS

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	Tsoi Sum	Chai Tai	Solomon Islands	Ethel Saelea
	Water Convolvulus	Known-You	Solomon Islands	Solfish
	Wong Bok	Yates	Solomon Islands / Vanuatu	Is Ent / VAS
Corn	Bicolour Sweetcron Peso	SPS	Tonga / Fiji / Samoa	Nishi / Turners and Growers
	Chicago Hybrid	Terranova	Vanuatu	VAS
	Early Chief	Yates	Vanuatu	VAS
	Honey Sweet	Yates	Solomon Islands / Vanuatu	Is Ent / VAS
	Honey Jean No.2	Known-You	Solomon Islands	Solfish
	Madison Gold F1	Terranova	Vanuatu	VAS
	Snow Jean Sweet Corn	Known-You	Solomon Islands	Solfish
	Sun n Snow	Yates	Vanuatu	VAS
	Super Sweet Bright Jean	Known-You	Solomon Islands	Solfish
Cucumber	Beta Alpha	Yates	Solomon Islands / Vanuatu	Is Ent / VAS
	Bonefide	Known- You	Fiji	Hop Tiy
	Bountiful No 2	Known-You	Solomon Islands / Fiji	Solfish / Hop Tiy
	Burpless Hybrid	Yates	Vanuatu	VAS
	Camelot Hybrid	Terranova	Vanuatu	VAS
	Crystal Apple	Yates	Vanuatu	VAS
	Genuine	Known- You	Fiji	Hop Tiy
	Genuine	Terranova	Tonga / Vanuatu	Venture / VAS
	Gizmo (Long)	SPS	Tonga / Fiji / Samoa	Nishi / Turners and Growers
	Gremlin	SPS	Tonga / Fiji / Samoa	Nishi / Turners and Growers
	Jane Swallow	Known-You	Solomon Islands	Solfish
	Lebanese	Yates	Fiji	Hop Tiy
	Lissome Swallow	Known- You	Fiji	Hop Tiy
	Long Green	Yates	Vanuatu	VAS
	Long White	Yates	Solomon Islands / Fiji / Vanuatu	Is Ent / Hop Tiy / VAS
	Money Maker	Yates	Solomon Islands / Fiji / Vanuatu	Is Ent / Hop Tiy / VAS
	Money Maker	Terranova	Tonga / Vanuatu	Venture / VAS
	Riches	Known-You	Solomon Islands	Solfish
	Slicemaster	Yates	Solomon Islands / Vanuatu	Is Ent / VAS
	Soare	Takii	Fiji	Hop Tiy
	Soare	Yates	Vanuatu	VAS
	Supermarket	Yates	Solomon Islands /	Is Ent / Hop

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			Fiji / Vanuatu	Tiy / VAS
	Supermarket	Terranova	Vanuatu	VAS
	Zipangu	Takii	Fiji	Hop Tiy
	*variety name not recorded	Bonanza	Fiji	Hop Tiy
Eggplant	Black Beauty	Yates	Solomon Islands / Fiji / Vanuatu	Is Ent / Hop Tiy / VAS
	Black King	Terranova	Vanuatu	VAS
	Black Knight (Oval)	SPS	Tonga / Fiji / Samoa	Nishi
	Black Night	Yates	Vanuatu	VAS
	Florida Market	Bonanza	Fiji	Hop Tiy
	Long Purple	Bonanza	Fiji	Hop Tiy
	Midnight (Long)	SPS	Tonga / Fiji / Samoa	Nishi / Turners and Growers
	Ping Tung Long	AVRDC	Solomon Islands	SPE Analytical
	Tubbinness	Known-You	Solomon Islands	Solfish
	White Star	Yates	Vanuatu	VAS
Gourd	Bottle Gourd Pretty Lover	Known-You	Solomon Islands	Solfish
	Bottle Gourd Long Life	Known-You	Solomon Islands	Solfish
	Sponge Gourd - Merit	Known-You	Solomon Islands	Solfish
	Wax Gourd - Concord	Known-You	Solomon Islands	Solfish
	Wax Gourd - Calm Heart	Known-You	Solomon Islands	Solfish
Herbs	Basil Genovese	SPS	Tonga / Fiji / Samoa	Nishi / Turners and Growers
	Borage	Yates	Vanuatu	VAS
	Chives	Yates	Vanuatu	VAS
	Chinese Chives Nien Hwa	Known-You	Solomon Islands	Solfish
	Cinamon Basil	Yates	Vanuatu	VAS
	Coriander - Favor	Known-You	Solomon Islands	Solfish
	Coriander - Cilantro	SPS	Tonga / Fiji / Samoa	Nishi / Turners and Growers
	Coriander	Terranova	Vanuatu	VAS
	Coriander	Yates	Vanuatu	VAS
	Cress - Salad	Yates	Vanuatu	VAS
	Dill	Yates	Vanuatu	VAS
	Garlic Chives	Yates	Vanuatu	VAS
	Lemon Balm	Yates	Vanuatu	VAS
	Lemon Grass	Yates	Vanuatu	VAS
	Marjorum	Yates	Vanuatu	VAS
	Mustard Leaf - Red	Yates	Vanuatu	VAS
	Mint - Triple	Yates	Vanuatu	VAS
	Oregano	Yates	Vanuatu	VAS

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	Parsley - Amount	Takii	Fiji	Hop Tiy
	Parsley Curled	Yates	Vanuatu	VAS
	Parsley Flatleaf Grande	SPS	Tonga / Fiji / Samoa	Nishi / Turners and Growers
	Parsley Italian Plain Leaf	Yates	Vanuatu	VAS
	Parsley Italian Plain Leaf	Terranova	Vanuatu	VAS
	Parsley Curled Italian Giant	Terranova	Vanuatu	VAS
	Parsley Verta	Terranova	Vanuatu	VAS
	Peppermint	Yates	Vanuatu	VAS
	Rocket Large leaved	Yates	Vanuatu	VAS
	Rocket Emerald	Yates	Vanuatu	VAS
	Sage	Yates	Vanuatu	VAS
	Sisho Perilla	Yates	Vanuatu	VAS
	Spearmint	Yates	Vanuatu	VAS
	Sweet Basil	Yates	Vanuatu	VAS
	Thyme	Yates	Vanuatu	VAS
	Watercress	Yates	Vanuatu	VAS
Leek	Commando	Yates	Vanuatu	VAS
	Musselbrook	Yates	Fiji / Vanuatu	Hop Tiy / VAS
Lettuce	Box Hill	Yates	Fiji / Vanuatu	Hop Tiy / VAS
	Buttercrunch	Yates	Fiji / Vanuatu	Hop Tiy / VAS
	Cos Head	Yates	Vanuatu	VAS
	Endive Green Curls	Yates	Vanuatu	VAS
	General	Known-You	Fiji	Hop Tiy
	Georgia	Known-You	Solomon Islands	Solfish
	Gourmet Mix	Yates	Vanuatu	VAS
	Green Frill Verde	SPS	Tonga / Fiji / Samoa	Nishi / Turners and Growers
	Green Mignonette	Terranova	Vanuatu	VAS
	Green Mignonette	Yates	Fiji / Vanuatu	Hop Tiy / VAS
	Grand Rapid	Known-You	Solomon Islands / Fiji	Solfish / Hop Tiy
	Green Wave	Takii	Fiji	Hop Tiy
	Iceberg Cinderella	SPS	Tonga / Fiji / Samoa	Nishi / Turners and Growers
	Iceberg Lucky	SPS	Tonga / Fiji / Samoa	Nishi / Turners and Growers
	Kaiser	Takii	Solomon Islands / Fiji	SPE Analytical / Hop Tiy
	Mibuna	Yates	Vanuatu	VAS
	Mizuna	Yates	Vanuatu	VAS
	Raddichio	Yates	Vanuatu	VAS

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	Red Fire	Takii	Solomon Islands / Fiji	SPE Analytical / Hop Tiy
	Red Frill Tuska	SPS	Tonga / Fiji / Samoa	Nishi
	Red Rapid	Known-You	Solomon Islands / Fiji	Solfish / Hop Tiy
	Salad Mix	Yates	Vanuatu	VAS
	Tropical	Terranova	Tonga / Vanuatu	Venture / VAS
	Yatesdate	Yates	Vanuatu	VAS
	609	Yates	Fiji	Hop Tiy
Melon	Amy	Known-You	Solomon Islands	Solfish
	Emerald Green	Known-You	Solomon Islands	Solfish
	Hales Best Rockmelon	Yates	Vanuatu	VAS
	Hales Jumbo Rockmelon	Terranova	Vanuatu	VAS
	Honey Dew	Yates	Solomon Islands	Is Ent
	Lambkin	Known-You	Solomon Islands	Solfish
	Planters Jumbo Rockmelon	Terranova	Vanuatu	VAS
	Scarlet Lady	Known-You	Solomon Islands	Solfish
	Scarlet Red	Known-You	Fiji	Hop Tiy
	Silver Light	Known-You	Solomon Islands	Solfish
Okra	Chant	Known-You	Solomon Islands	Solfish
	*variety name not recorded	Bonanza	Fiji	Hop Tiy
	Clemson Spineless	Yates	Fiji / Vanuatu	Hop Tiy / VAS
	Long Green	Yates	Vanuatu	VAS
Onion	Bunching Paragon	SPS	Tonga / Fiji / Samoa	Nishi / Turners and Growers
	Bunching Straight Leaf	Yates	Vanuatu	VAS
	Californian Red	Yates	Fiji / Vanuatu	Hop Tiy / VAS
	Fragrant Bunching Onion	Known-You	Solomon Islands	Solfish
	Galadalan Brown	Terranova	Vanuatu	FSA / VAS
	Galadalan Brown	Yates	Vanuatu	VAS
	Hunter River White	Yates	Vanuatu	VAS
	Long White Bunching	Yates	Fiji	Hop Tiy
	Red Star	Takii	Fiji	Hop Tiy
	Superex Brown	Takii	Fiji	Hop Tiy
	White Lisbon	Terranova	Vanuatu	VAS
	White Lisbon	Yates	Fiji / Vanuatu	Hop Tiy / VAS
	Zeffa Bunching Spring Onion	Terranova	Tonga / Vanuatu	Venture / VAS

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Other	Papaya Red Lady	Known-You	Solomon Islands	Solfish
	Papaya Tainung No.2	Known-You	Solomon Islands	Solfish
Pea	Snow Pea	Terranova	Vanuatu	VAS
Pumpkin	Butternut	Yates	Vanuatu	VAS
	Butternut	SPS	Tonga / Fiji / Samoa	Nishi / Turners and Growers
	Butternut	Yates	Solomon Islands / Fiji / Vanuatu	Is Ent / Hop Tiy / VAS
	Crown Prince Hybrid	Terranova	Vanuatu	VAS
	Grey Crown Hybrid	Yates	Vanuatu	VAS
	Queensland Blue	Yates	Solomon Islands / Vanuatu	Is Ent / VAS
	Sampson F1	Terranova	Vanuatu	VAS
	Winter Squash Befit	Known-You	Solomon Islands	Solfish
	Winter Squash Crowning	Known-You	Solomon Islands	Solfish
	Winter Squash First Taste	Known-You	Solomon Islands	Solfish
Radish	Daikon Japanese White	SPS	Tonga / Fiji / Samoa	Nishi / Turners and Growers
	Ever Lasting White	Yates	Fiji	Hop Tiy
	Everest Long White	Yates	Vanuatu	VAS
	Everest Hybrid	Terranova	Vanuatu	VAS
	French Breakfast	Yates	Vanuatu	VAS
	Long White Chinese	Terranova	Vanuatu	VAS
	Magnet	Known-You	Solomon Islands	Solfish
	Mary	Known-You	Solomon Islands	Solfish
	Mascot	Known-You	Solomon Islands	Solfish
	Red Brigade F1	Terranova	Vanuatu	VAS
	Salad Crunch	Yates	Vanuatu	VAS
	White Icicle	Yates	Vanuatu	VAS
	White Long CLS16	Hop Tiy	Fiji	Hop Tiy
Silverbeet	Master Green	Yates	Vanuatu	VAS
	Perpetual Green	Yates	Vanuatu	VAS
	Rainbow Chard	Yates	Vanuatu	VAS
	Ruby Chard	Yates	Vanuatu	VAS
Snake Bean	Yard Long	Terranova	Vanuatu	VAS
Snow Pea	KY Giant Pod No.2	Known-You	Solomon Islands	Solfish
Spinach	Baby Leaf	Yates	Vanuatu	VAS

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	Donkey Rz	Terranova	Vanuatu	VAS
	Farmers 392	Known-You	Solomon Islands	Solfish
	Puma Hybrid	Terranova	Vanuatu	VAS
	Summer Supreme	Yates	Vanuatu	VAS
Squash / Zucchini / Courgette	Black Adder	Terranova	Vanuatu	VAS
	Black Jack	Yates	Fiji / Vanuatu	Hop Tiy / VAS
	Black Mamba	Terranova	Vanuatu	VAS
	Congo	SPS	Tonga / Fiji / Samoa	Nishi / Turners and Growers
	Delica F1	Terranova	Vanuatu	VAS
	Greyzini	Yates	Vanuatu	VAS
	Lebanese	Yates	Vanuatu	VAS
	Marrow	Yates	Vanuatu	VAS
	Squash Mix	Yates	Vanuatu	VAS
	Summer Squash Cherub	Known-You	Solomon Islands	Solfish
Tomato	Beefsteak	Yates	Solomon Islands / Fiji / Vanuatu	Is Ent / Hop Tiy / VAS
	Big Beef	Yates	Vanuatu	VAS
	Bright Pearl	Known-You	Solomon Islands	Solfish
	Burkes Backyard Italian	Yates	Vanuatu	VAS
	Cherry Bite	SPS	Tonga / Fiji / Samoa	Nishi / Turners and Growers
	Floradade	Terranova	Vanuatu	VAS
	Grosse Lisse	Yates	Solomon Islands / Fiji / Vanuatu	Is Ent / Hop Tiy / VAS
	Heatmaster	Terranova	Vanuatu	VAS
	Heirloom favourites	Yates	Vanuatu	VAS
	Improve Apollo	Yates	Vanuatu	VAS
	Juliette	Known-You	Solomon Islands	Solfish
	King Kong	Known-You	Solomon Islands	Solfish
	King Kong No.2	Takii	Fiji	Hop Tiy
	Moneymaker	Yates	Vanuatu	VAS
	Moneymaker	SPS	Tonga / Fiji / Samoa	Nishi / Turners and Growers
	Morgage Lifter	Yates	Vanuatu	VAS
	Nova	Known-You	Solomon Islands	Solfish
	Rebel	SPS	Tonga / Fiji / Samoa	Nishi / Turners and Growers
	Rising Sun F1	Clover	Fiji	Hop Tiy
	Roma VF	Bonanza	Fiji	Hop Tiy
	Roma	Yates	Solomon Islands /	Is Ent / VAS

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			Vanuatu	
	Sensation	Known-You	Solomon Islands	Solfish
	Small fry	Yates	Fiji / Vanuatu	Hop Tiy / VAS
	Summerstar Hybrid	Yates	Solomon Islands / Fiji / Vanuatu	Is Ent / Hop Tiy / VAS
	Tiny Tim	Yates	Fiji / Vanuatu	Hop Tiy / VAS
	Tommy Toe	Yates	Vanuatu	VAS
	Tropic Boy	Terranova	Tonga / Vanuatu	Venture / VAS
	Zola Hybrid	Terranova	Vanuatu	VAS
Watermelon	All Sweet	Terranova	Vanuatu	VAS
	Candy Red	Terranova	Vanuatu	VAS
	Candy Red	Yates	Vanuatu	VAS
	Country Sweet	Yates	Vanuatu	VAS
	Charleston Grey	SPS	Tonga / Fiji / Samoa	Nishi / Turners and Growers
	Charleston Grey	Yates	Solomon Islands / Vanuatu	Is Ent / VAS
	Charleston 805	Terranova	Tonga / Vanuatu	Venture / VAS
	China Dragon	Known-You	Solomon Islands	Solfish
	Empire No.2	Known-You	Solomon Islands / Fiji / Vanuatu	Solfish / Hop Tiy / FSA
	Extreme	Known-You	Solomon Islands	Solfish
	Farmers Giant	Known-You	Fiji / Vanuatu	Hop Tiy / FSA
	Field Master F1	Clover	Fiji	Hop Tiy
	Fire Star Hybrid	Terranova	Vanuatu	VAS
	Felicity	Known-You	Solomon Islands	Solfish
	Flower Mountain	Known-You	Solomon Islands	Solfish
	Frontier 747 Hybrid	Chai Tai	Solomon Islands	Kairos
	Golden Crown	Known-You	Solomon Islands	Solfish
	Grand Dutchess	Known-You	Solomon Islands	Solfish
	Hybrid No 1179	Chai Tai	Solomon Islands	Kairos
	Mickeylee OP	Terranova	Tonga / Vanuatu	Venture / VAS
	Mickey Lee	SPS	Tonga / Fiji / Samoa	Nishi / Turners and Growers
	Prime	Known-You	Solomon Islands	Solfish
	Summerfun	Terranova	Solomon Islands	Kairos
	Summer Sun	Yates	Solomon Islands / Vanuatu	Is Ent / VAS
	Sugar Baby	Terranova	Vanuatu	VAS
	Sugar Baby	Yates	Solomon Islands / Vanuatu	Is Ent / VAS
	Sugar Belle	SPS	Tonga / Fiji / Samoa	Nishi / Turners and Growers
	*variety name not recorded	Bonanza	Fiji	Hop Tiy

APPENDIX 3 – VEGETABLE SEED ORDERS BY THE AGRICULTURE STORE CORPORATION, SAMOA 2013-2014

QUANTITIES ORDERED

YATES SEEDS PACKETS – AUSTRALIA *	Jul-13	Sep-13	Dec-13	Mar-14	Jun-14	TOTAL
PRODUCT DESCRIPTION	QUANTITIES ORDERED					
Beans Stringless Blue Lake Climbing	100	-	100	-	300	500
Cabbage - KK Cross	200	300	100	300	500	1,400
Capsicum - Giant Bell	200	300	200	300	400	1,400
Capsicum - Long Red Cayenne	100	100	100	100	200	600
Capsicum – Yellow	100	100	100	100	200	600
Capsicum - Yolo Wonder	300	300	300	300	400	1,600
Capsicum - Marconi Hot	100	-	100	-	127	327
Chinese Cabbage - Kwang Moon	300	600	300	600	300	2,100
Chinese Cabbage - Pak Choi White	300	300	300	300	500	1,700
Chinese Cabbage - Wong Bok	-	100	-	100	-	200
Chinese Cabbage – Saladeer	-	100	-	100	-	200
Cucumber – Moneymaker	1,000	600	600	600	1,000	3,800
Cucumber – Slicemaster	200	300	200	300	1,000	2,000
Cucumber – Soarer	400	400	400	400	1,000	2,600
Cucumber – Supermarket	1,000	600	600	600	1,000	3,800
Celery - Dewcrisp Green	-	100	-	100	-	200
Herbs – Coriander	50	100	50	100	200	500
Herbs - Parsley Italian Plain Leaf	100	100	100	100	200	600
Herbs - Sweet Basil	100	100	100	100	200	600
Herbs – Dill	50	100	50	100	-	300
Herbs – Chive	-	100	-	100	-	200
Herbs - Parsley Curled	-	100	-	100	-	200
Herbs – Marjoram	-	100	-	100	-	200
Herbs – Oregon	-	100	-	100	-	200
Herbs – Sage	-	100	-	100	-	200
Herbs – Thyme	-	100	-	100	-	200
Lettuce – Boxhill	100	100	100	100	100	500
Lettuce Green Mignonette	-	100	-	100	-	200
Lettuce Salad Mix	-	100	-	100	-	200
Egg Plant Black Beauty	800	-	500	-	800	2,100
Pumpkin - Queensland Blue	100	200	100	200	200	800
Pumpkin – Buttercup	-	100	-	100	-	200
Sweetcorn - Early Chief	200	100	200	100	200	800
Sweetcorn – Honeysweet	300	300	300	300	726	1,926
Tomato – Beefsteak	200	300	200	300	400	1,400
Tomato - Big Beef	100	200	100	200	200	800
Tomato - Grosse Lisse	200	200	200	200	400	1,200
Tomato – Roma	300	300	300	300	800	2,000
Okra - Long Green	-	100	-	-	150	250

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Watermelon - Charleston Grey	-	100	-	-	100	200
Radish Everest Long White	-	100	-	100	-	200
						-
	6,900	7,500	5,700	7,300	11,603	39,003

* All Yates packets are small hermetically sealed packets.

APPENDIX 4 – INDICATIVE VEGETABLE SEED ORDER SHP LTD

This list is indicative of Soil Health Pacific Ltd collated orders for the period of one year

Crop	Variety	Quantity	Measure
Asparagus		50	grms
Beans	Long Bean	2	kg
Beans	Kentucky Wonder	2	kg
Beans	Kentucky Blue	2	kg
Broccoli	Diplomat	50	grms
Cauliflower	Nova	50	grms
Chinese Cabbage	Pak Joy	2	kg
Chinese Cabbage	Saladeer	2	kg
Chinese Cabbage	PAK Choi Green Stem CL128	2	kg
Clerery	Imperial	2	kg
Cucumber	Bountiful	2	kg
Cucumber	Zinpangu	2	kg
Cucumber	Slice Master	2	kg
Dwarf Bean	Bean Contender	4	kg
Dwarf Bean	Blue Lake	2	kg
Eggplant	Black Beauty	2	kg
Eggplant	Early Long	2	kg
Eggplant	Black Beauty	50	grms
Eggplant	Early Long Purple	50	grms
Green Pepper	Yolo Wonder	2	kg
Green Pepper	Red pepper	2	kg
Green Pepper	Yellow pepper	2	kg
Green Pepper	Purple Pepper	2	kg
Green Pepper	Orange Pepper	2	kg
Head Cabbage	FS	2	kg
Head Cabbage	KK Cross	2	kg
Herbs	Coriander	2	kg
Herbs	Parsley	2	kg
Herbs	Dill	2	kg
Herbs	Basil	2	kg
Herbs	Mint	2	kg
Lettuce	Kaiser	2	kg
Lettuce	Red Rabbit	2	kg
Lettuce	Great lakes	2	kg
Lettuce	Seven Wonder	2	kg
Okra	Clemson Spineless	2	kg
Pumpkins	Ponderos	2	kg
Raddish	Luck	50	grms
Raddish	White	50	grms
Raddish	Pahongpao	50	grms
Spinach	Spinach	50	grms

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Spring Onion	Bunching	2	kg
Sweet Corn	Madison 4	2	kg
Sweet Corn	Golden Hybrid	4	kg
Tomato	Raising Sun 2	2	kg
Tomato	Beefsteak	2	kg
Tomato	Roma VF	2	kg
Tomato	Money Maker	2	kg
Tomato	Summer Taste	2	kg
Watermelon	Sugar Baby	2	kg
Zucchini		50	grms

APPENDIX 5 - APPROVED SEED SUPPLIERS TO FIJI

Sourced from Biosecurity Authority of Fiji.

[Http://www.baf.com.fj/30-imports/88-list-of-approved-seed-sources](http://www.baf.com.fj/30-imports/88-list-of-approved-seed-sources)

FIJI LIST OF APPROVED SEED SOURCES

AUSTRALIA

1. MR FOTHERGILLS SEEDS PTY LTD, AUSTRALIA
2. SOUTH PACIFIC SEEDS, NSW 2680, AUSTRALIA
3. RIJK ZWANN (AUST) PTY. LTD., AUSTRALIA
4. SOUTH PACIFIC SEEDS LTD, NZ.
5. BLUE RIBBON SEED & PULSE EXPORTERS. QUEENSLAND. AUSTRALIA
6. CSIRO
7. YATES AUSTRALIA, NSW 2211, AUSTRALIA
8. SHIPARDS HERB FARM, QUEENSLAND, AUSTRALIA
9. QUEENSLAND AGRICULTURE SEEDS
10. HERITAGE SEEDS, BRISBANE MARKETS, AUSTRALIA.
11. AVMA TRADING COMPANY, MELBOURNE, AUSTRALIA.
12. FREELANE FORESTRY SERVICES PTY. LTD., WEST AUSTRALIA 6236, AUSTRALIA
13. BGP INTERNATIONAL PTY LTD, SOUTH MELBOURNE, VICTORIA, AUSTRALIA.
14. PIONEER SEEDS LTD

NEW ZEALAND

1. KING SEEDS, KATIKATI 3166, NEW ZEALAND
2. ALEX MCDONALD LTD. NZ, CHRISTCHURCH,NZ
3. HYDRATORQ LTD, NZ
4. PARKLAND IRRIGATION PTY. LTD., AUCKLAND, NZ.
5. PACIFIC PURCHASING LTD, PO BOX 13608, AUCKLAND, NZ
6. YATES/VENTURE EXPORTS LTD, AUCKLAND, NZ
7. VENTURE EXPORTS

8. LUISETTI SEEDS LTD., RANGIORA 7440,NZ

9. TERRANOVA SEEDS LTD., AUCKLAND, NZ.

10. EGMONT SEED COMPANY LTD

UNITED STATES OF AMERICA

1. BONANZA SEEDS INTERNATIONAL INC., CA 95991, USA

2. HARRIS MORAN SEED COMPANY, MODESTO. CA 95352, USA

3. RENNES GARDEN SEEDMAN CO.

4. CORONA SEEDS, CALIFORNIA, USA

5. JACKLIN SEED, IDAHO, USA

6. JOHNNY'S SELECTED SEEDS, WINSLOW, USA

7. NINOLE ORCHARD, HAWAII, USA

8. AMERICAN SEED CO, USA

CANADA

1. TERRALINK HORTICULTURE INC. LTD., ABBOTSFORD, CANADA.

HAWAII

1. UNIVERSITY OF HAWAII - PAPAYA SEEDS ONLY

TAIWAN

1. KNOWN-YOU SEED CO LTD, KAOHSIUNG, TAIWAN

2. AVRDC-THE WORLD VEGETABLE CENTRE, BOX 42, SHANHUA, TAINAN 74199, TAIWAN

3. INTERNATIONAL CO-OPERATION DEV FUND, TIEN MOU WEST ROAD, TAIPEI 11157

JAPAN

1. TAKII & CO. LTD., KYOTO 8686, JAPAN

THAILAND

1. KING FOOD ENTERPRISES LTD. - YELLOW MUSTARD

HONG KONG

1. CLOVER SEED CO. LTD., BOX2288, HONK KONG.

2. TAK SANG AGRICULTURAL & SEED LTD, WONG CHUK HANG, HONG KONG
SEEDOFHK@NETVIGATOR.COM

MAURITIUS

1. FLORA MARKETING, MAURITIS

SOLOMON IS

1. SOLOMON IS FORESTRY DEPT. - TEAK SEEDS

VANUATU

1. VANUATU FORESTRY DEPARTMENT - SANDALWOOD SEEDS

SINGAPORE

1. NEEVIMEX TRADING, SINGAPORE - INDIAN SANDALWOOD SEEDS

APPENDIX 6 - APPROVED SEED SUPPLIERS TO VANUATU

Sourced from *Plant Import Specifications Manual*, Department of Livestock and Quarantine,
Issue No. 2, Revision Date 26/06/2012

AUSTRALIA		
Arthur Yates Ltd	Northrup KWG	Southern Cross Seeds Ltd
Bejo Seeds	Pacific Seeds Pty Ltd	Triagro
Blue Ribbon	Pioneer Seeds	Yates Australia
Colgrave Seeds	Progressive Seeds Pty Ltd	Terranova Seeds Pty Ltd
Henderson Seeds	Rijk Zwann	Searles seeds J.C&A.T Seale PTY LTD
Heritage Seeds Pty Ltd	Seminis Vegetable Seeds Australia Ltd	Queensland agricultural seeds Pty Ltd
Lefroy Valley South	S & G Seeds	Mr. Fothergills Seeds Pty Ltd
New World Seeds Pty Ltd	South Pacific Seeds Ltd	Eden Seeds, Australia.
Wrightson seeds Tel: 07 4092 1174 Fax: 07 4092 3084 26 Reynolds Street Mareeba, Queensland, Australia		
JAPAN		
Dai ichi Seeds Co Ltd	Kaneko Seeds Co Ltd	Takii & Co Ltd
Fujita Seed Co	Nozaki Saishujo	Tokita Seed Co
Kadoya Co	Sakata Seed Corp	Watanabe Seed Co Ltd
NEW ZEALAND		
Canterbury Seed Co	New Zealand Agriseeds Ltd	South Pacific Seeds (NZ) Ltd
Corson Grain Ltd	Peter B Dow & Co	Terranova Seeds Ltd
Cropmark NZ Ltd	Prebble Seeds Ltd	Watkins new Zealand Ltd
Excel Seeds NZ Ltd	Pyne Gould Guinness Ltd	Webbing & Stewart Seeds
Genetic Technologies Ltd	Rijk Zwann	Wrightson Seeds Ltd
Midlands Seed Ltd	Seminis Vegetable Seeds NZ Ltd	Yates New Zealand Ltd
New World Seeds Ltd	Syngenta Ltd	
USA		
Abbot & Cobb	Environmental Seed Producers	Nicklow Seeds
Alf Christianson Seeds Co	Ferry Morse Seeds	Pan America Seeds
Asgrow Seeds Co	Foundation	Petoseed/Seminis
Bakker Bros of Idaho	Goldsmith Seeds	Roger Bros Seeds
Ball Seed Corporation	Harris Moran Seeds	Seeds by Design Inc
Bodger Seed Ltd	Hollar & Co Inc	Shamrock Seed Co Inc
Burpee Seeds	Horace Anderson Seeds	Sun Seeds
California Asparagus Seed	Illinois Seed	Waller Seeds
Crookhams	Intermountain Bean Co Ltd	Sunland Seeds Idaho
Dessert's Cal Seed	Johnny's Seeds	
Dessert Seeds LLC, California	Bonanza Seed International, Inc. seedsales@bonanzaseeds.com	
NETHERLANDS		

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Rijk Zwaan	De Ruiter Seeds Hybrid Seeds Bergschenhoek The Netherlands	Syngenta Seeds B.V. Westeinde 62, P O Box 2 1600AA Enkhuizen Holland
INDIA		
Gautam Global		
THAILAND		
Tropical Seeds	Chia Tai Seeds Co Ltd	
VIETNAM		
Green-Seeds Co Ltd		
TAIWAN		
Known-You Seed Co Ltd	Evergrow seed Co Ltd	
Asian Vegetable Research and Development Center (AVRDC) P.O.Box 42 Shanhua, Taiwan		
HONG KONG		
Clover Seeds Company Ltd. info@cloverseed.com.hk		
GERMANY		
Rare Palm Seeds Ltd		
PNG		
PNG Oil Palm Company Ltd.		
FIJI		
Hop Tiy & Co Ltd GPO Box 729, Suva Tel: 330 0309 or 330 0875 Fax: 330 2985		
COSTA RICA		
Compact Seeds & Clones, San Jose		
ISRAEL		
Hazera Genetics Ltd Berurium M.P. Shikmim Israel Tel: +972 8 850 8850 Email: sales@hazera.com http: www.hazera.com	C.T.S limited A Haharash Street Hod Hasharon 45240 Israel Tel: 09 – 762 6 257	Zeraim Gedera Ltd. P O Box 103, Gedera Israel Tel: 08-9446220 Fax: 08-9446262 Email: zeraim@zeraim.co.il
NEW CALEDONIA		
Institut Agronomique néo-Caledonien (IAC) Tel: (687) 43.73.15 Fax: (687) 43.73.16		
CHINA		
China National Machinery &	Beihai Green Kingdom &	Beidahuang Trade Seed group

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Equipment Import/Export Corp Xuanwu District, Hainan Province	Landscape-Creating Co. Ltd Beihai Rd huajie lvxinyuan, Beihai, Guangxi	Co. Ltd 242 Hongqi St. Harbin China
	PHILLIPINES	
Jatropha Global Snd. Bhd C/o Aguilawin Industries Del. Phils. 405 Victoria Heights Subdivision, Lanang, Davao City 6000 Philippines		
	FRANCE	
Tropica Technisem. 7 Av. Du Garigliano 91601 Saigny sur Orge. France	Les Doigts Verts Castros Gerand 1, avenue de la Gardette, BP 23 33 564 Carbon-blanc Cedex Tel: 05 57 80 90 90 Email: info@lesdoigtsverts.com Website: www.lesdoigtsverts.com And its' branch companies such as Le Paysan (include website)	Technisem 49160 Longue-Jumelles France Website: www.technisem.com
	HAWAII	
University of Hawaii CTAHR-Agr. Diagnostic Svc. Ctr. 1910 East West Rd, Sherm. Lab #134 Honolulu, Hawaii 96822 Phone: (808) 956-8053 Fax: (808) 956-2592		
	BRAZIL	
ProfiGen do Brasil Ltda - Estrada do Couto Km 03, Santa Cruz do Sul - RS - Brasil Fone/Fax: (51) 3704-9244 Celulares: (51) 8452-3184 ou 8452-3185		