



Developing commercial breadfruit production

Breadfruit has the potential to become a significant export crop for Fiji and other Pacific island countries. This project has been working with smallholder farmers in Fiji to assist them to move to growing breadfruit as a commercial and export crop. Project activities have included identifying suitable varieties, developing breadfruit orchards, and setting up the post-harvest systems needed for export of fresh breadfruit. The work has been carried out within the Pacific Breadfruit Project.

Project highlights

- The first breadfruit exports under the project took place in January 2014. Fiji is now in a position to begin taking full advantage of the significant overseas market for fresh breadfruit and to develop a commercial breadfruit industry.
- As of the end of December 2014, there were 42 Fijian farmers participating in the Pacific Breadfruit Project, with 2,240 breadfruit trees planted on 18 hectares of land.
- Farmer-owned demonstration orchards are coming into production some 18 months ahead of expectations, boosting the potential of breadfruit as a commercial crop.
- Intercropping of high-value crops, such as pineapple, with breadfruit has been demonstrated as a means to diversify incomes and increase resilience.
- The value of planting breadfruit orchards as a disaster and climate change adaptation strategy has been demonstrated.
- A strong breadfruit knowledge and experience base has been developed in Fiji which can be shared with other Pacific island countries.

More information

Project leader:

Dr Andrew McGregor

E: andrew@kokosiga.com

This is a research activity (Developing commercial breadfruit production systems for the Pacific islands, PRA/2010/005) under ACIAR's Pacific Agribusiness Research for Development Initiative (PARDI) (AGB/2008/044)

Project partners and contributors

- Nature's Way Cooperative
- Secretariat of the Pacific Community
- KokoSiga Ltd
- Ministry of Agriculture, Fiji



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Participatory guarantee scheme — helping farmers reach high-value markets

Local farmers struggle to meet the requirements of high-value domestic markets for vegetables, which are instead usually supplied by imported produce. Individual farmers have little chance of supplying the quantities of high-quality vegetables hotels and supermarkets demand — but working together vastly improves their position. Participatory guarantee schemes (PGS) unite farmers in formal groups, greatly strengthening their negotiating power as well as providing a platform for building skills and developing and sharing new ideas and technologies. These schemes are described as ‘participatory’ because the farmers themselves guarantee particular standards (which may, for instance, include minimal use of pesticides, as well as

volume and timing of deliveries) rather than depending on an expensive, third-party certification system. ACIAR has helped set up participatory guarantee schemes in Fiji and the Solomon Islands, and farmers and buyers are both reaping benefits.

Project highlights

- Four PGS groups have been established in Fiji and two in Solomon Islands.
- Farmers in Fiji have made agreements with several leading resorts (such as the Shangri-la Fijian and the Intercontinental hotels) and are now supplying them with quality vegetables.
- Local expertise is being developed within the Fiji and Solomon Island ministries to support the PGS.
- This activity is linked with the ‘protected cropping’ project, which is working towards enabling farmers to provide quality produce year round.

More information

Prof. Jennifer Carter
E: JCarter@usc.edu.au
Dr Rob Erskine-Smith
E: rob.erskine.smith@gmail.com

This is a research activity (Developing an integrated participatory guarantee scheme in the Pacific islands in support of sustainable production of high-value vegetable crops, PRA/2011/03) under ACIAR’s Pacific Agribusiness Research for Development Initiative (PARDI) (AGB/2008/044)

Project partners and contributors

- University of the Sunshine Coast, Australia
- The World Vegetable Centre (AVRDC), Taiwan
- Ministry of Agriculture and Livestock, Solomon Islands
- Secretariat of the Pacific Community





Strengthening Fiji's papaya exports

Papaya is an increasingly important agricultural export from Fiji — now in third place, behind sugar and taro. Growth of this industry has been threatened by quality and market access issues, as well as unfavourable weather. Central to efforts to strengthen this value chain is Nature's Way Cooperative, whose 260 members include both growers and exporters. The Cooperative treats over 1,000 tonnes of fruit annually (mainly papaya, but also eggplant, mango and breadfruit) to ensure that the produce is free of fruitflies and meets market quality in other ways. Working with the growers and exporters, and drawing in expertise from the Queensland papaya industry, ACIAR has supported research along the value chain, ensuring that high quality seed is available, providing advice on better production and post-harvest handling practices, and developing additional treatments to extend shelf-life.

This work has been complemented by consumer studies to understand how both Fiji and Queensland papayas are meeting market expectations, carried out under the Pacific Agribusiness Research for Development Initiative (PARDI).

Project highlights

- A Research and Extension Partnership Committee has been formed to guide R&D investments, and includes exporters, farmers, government officials and technical advisers.
- A certified seed producer's scheme has been established to ensure that locally produced, high-quality seed is available in adequate quantities.
- A commercial hot water dipping treatment to reduce post-harvest losses has been tested and a facility installed.
- Methods for organic papaya production have been tested and shown to be commercially viable.
- Production techniques suitable for sloping land, less vulnerable to flooding, have been evaluated.
- Consumer preferences for papaya in the New Zealand and Australian markets have been clarified.
- The Fiji Papaya Project, initially established with ACIAR support, has provided an entry point and incentives for co-investment by a range of other partners.

More information

Kyle Stice

E: Kyle@kokosiga.com

ACIAR's Pacific Agribusiness Research for Development Initiative (PARDI) (AGB/2008/044) has supported a research activity (Red papaya export market analysis, PRA/2014/01), complementing a larger ACIAR project, Strengthening the Fiji Papaya Industry through applied research and information dissemination (HORT/2008/003)

Project partners and contributors

- Nature's Way Cooperative
- Secretariat of the Pacific Community
- KokoSiga Ltd
- Ministry of Agriculture, Fiji
- Queensland Department of Agriculture and Fisheries, Australia





Protected cropping for quality vegetables year round

To supply high-value domestic markets, such as tourist resorts and city supermarkets, local farmers need to be able to grow good quality vegetables all year round. This research activity is developing greenhouses that protect the crops from unfavourable weather particularly in the rainy season, allowing year-round production. The greenhouses are specially designed for tropical conditions, with higher structures for improved ventilation, trellising and irrigation.

Project highlights

- Five demonstration greenhouses have been constructed in Fiji and Samoa, and are producing crops such as tomato, capsicum, cucumber, coriander (cilantro) and red cabbage.
- Private sector partners are taking protected cropping to commercial levels, with farmers developing their own greenhouses, and one company (so far) building and selling greenhouses.
- Practical training is helping farmers adapt their skills to greenhouse systems.
- New specialty crops are being trialled, for example Lebanese cucumbers.
- Pest management is important in the covered systems. The project team is working closely with another ACIAR project (Strengthening integrated crop management research in the Pacific Islands in support of sustainable intensification of high-value crop production, PC/2010/090) to address this.
- The protected cropping activity is also linked with the 'participatory guarantee scheme' activity, with PGS farmers involved in the demonstration trials.

More information

Project leader:

Dr Elio Jovicich

E: Elio.Jovicich@daf.qld.gov.au

This is a research activity (Developing protected cropping systems for production of high-value vegetables in the South Pacific islands (Fiji and Samoa) and Australia, PRA/2012/05) under ACIAR's Pacific Agribusiness Research for Development Initiative (PARDI) (AGB/2008/044)

Project partners and contributors

- Secretariat of the Pacific Community
- Ministry of Agriculture, Fiji
- Ministry of Agriculture and Fisheries, Samoa
- Marco Polo International Ltd, Fiji
- Soil Health Pacific Ltd, Samoa
- All Season Nursery, Fiji
- University of Queensland, Australia
- Department of Agriculture and Fisheries, Queensland Government, Australia





Rebuilding Samoa's taro industry

Samoan taro is making a comeback in national and international markets after coming close to being wiped out by taro leaf blight in the 1990s. Australia played a major role in supporting the breeding program that succeeded in delivering blight-resistant taro varieties acceptable to Samoan consumers. ACIAR has addressed diverse issues to help get Samoan taro back into the markets. Projects are focusing on product quality by improving soil health and fertility, and developing cleaner export pathways to deliver taro free of pests and diseases. Research under the Pacific Agribusiness Research for Development Initiative (PARDI) tested the acceptability of the latest varieties to consumers in New Zealand (Samoa's key export market)

and worked to develop a 'clean seed system' for these market-preferred varieties. Finally, the Australian Government-funded Pacific Horticulture and Agriculture Market Access (PHAMA) program has worked with a range of partners, in Samoa and in the importing countries, to address market access issues.

Project highlights

- A range of taro varieties have been screened and defined in terms of various market opportunities.
- A promising line for the export market has been produced as confirmed by the sensory and nutritional evaluation work.
- Improved methods for multiplying and delivering disease-free and pest-free material.
- Development of private-sector nurseries for multiplication and dissemination of clean planting material.
- Early-stage development of crop and market-related information.

More information

Valerie S. Tuia
E: valeriet@spc.int
Moafanua Tolo Iosefa
E: tolo@spc.int

ACIAR projects:

Improving soil health in support of sustainable development in the Pacific (PC/2009/003), Developing cleaner export pathways for Pacific agriculture commodities (HORT/2007/118) and research activity 'Developing a clean seed system for market-ready taro cultivars in Samoa' (PRA/2011/04) under ACIAR's Pacific Agribusiness Research for Development Initiative (PARDI) (AGB/2008/044)

Project partners and contributors

- Ministry of Agriculture and Fisheries, Samoa
- Scientific Research Organisation of Samoa
- Secretariat of the Pacific Community
- University of the South Pacific
- Pacific Horticulture and Agriculture Market Access Program (Australia)





Building the kava market

The kava research represents a recent addition to ACIAR's Pacific Agribusiness Research and Development Initiative (PARDI) portfolio and formal research activities began in 2014.

The project is supporting the development of a rapid propagation system for clean planting material. Kava dieback is a problem in many countries in the Pacific, and has been known to wipe out production. A causal relationship between kava dieback and cucumber mosaic virus (CMV) infection has been demonstrated and testing for CMV provides a means by which 'clean' plants can be selected. Virus testing and tissue culture provide an opportunity

to develop an effective propagation system for generating 'clean' planting material of kava. This work complements an investment by the Australian Government-funded Pacific Horticulture and Agriculture Market Access (PHAMA) program in defining kava varieties and establishing quality standards.

Project highlights

- Scoping study to assess kava production potential and market demand.
- Collaboration with Fiji-based South Pacific Elixirs (SPE) Limited.
- Begin to establish a stock of kava plants from a selected variety which have tested negative for CMV as source plants for generating tissue cultures.

More information

Zane Yoshida

E: Zane@takimai.com

Mary Taylor

E: maryt@oxalis.plus.com

This is a research activity (Development of a mass propagation system for elite varieties of *Piper methysticum* (kava), PRA/2014/01) under ACIAR's Pacific Agribusiness Research for Development Initiative (PARDI) (AGB/2008/044)

Project partners and contributors

- South Pacific Elixirs Pty Ltd
- University of the South Pacific
- University of the Sunshine Coast, Australia
- Pacific Horticulture and Agriculture Market Access (PHAMA)



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Tāki
Mai



Cocoveneer — a new high-value coconut product

Pacific island countries have an estimated 120,000 hectares of senile coconut palms (trees past their most productive age), representing a sustainable supply of coconut wood. If high-value products and markets can be developed, farmers will be motivated to clear unproductive plantations to make way for new coconut and other crops. The ACIAR project 'Improving the value and marketability of coconut wood' demonstrated the technical feasibility of milling the coconuts stems to produce cocoveneer — high-density laminate that can be used for flooring and other products. A second project, 'Development of advanced veneer and other products from coconut wood to enhance livelihoods in South Pacific communities', is now working to put this into practice.

Research is addressing the technical side of producing veneer, the markets and market potential, community benefits, and uses for the soft core that is left behind after peeling.

Project highlights

- Laboratory veneer trials undertaken in France to determine peeler settings for coconut.
- Spindleless lathe acquired, tested and adapted in Australia to suit the project needs, and set up in Fiji. Demonstrations during 2014 drew a great deal of interest, and at least one commercial company in Fiji has already invested in a similar lathe.
- A market survey in Australia gave promising indications, with positive feedback from designers and architects.
- Trials are under way with ACIAR's 'soil health' project on use of soft core residues to improve soils.
- Demonstrations planned in Fiji in 2015 of the entire process from harvesting of trees, peeling, and composting with the residues.

More information

Assoc. Prof. Greg Nolan
E: Gregory.Nolan@utas.edu.au

Sairusi Bulai
E: SairusiB@spc.int

ACIAR project: FST/2009/062,
Development of advanced
veneer and other products
from coconut wood to
enhance livelihoods in
South Pacific communities.

Project partners and contributors

- University of Tasmania, Australia
- Secretariat of the Pacific Community
- Queensland Department of Agriculture and Fisheries, Australia

- Ministry of Fisheries and Forests, Fiji
- Ministry of Natural Resources and Environment, Samoa
- Ministry of Forestry and Research, Solomon Islands





‘Know your market’ — the Fiji Retail Market Study

An ACIAR research activity carried out a comprehensive study of the high-end vegetable market in Fiji. Led by the University of Adelaide, the study covered the major supermarkets in the country, a selection of hotels and resorts, and a survey of 1,000 households in the two main towns of Suva and Nadi. The findings are helping to build a better picture of the value chain for high-value vegetables in Fiji — the shopping behaviours and preferences of consumers at one end of the chain, and the requirements and constraints facing the ‘market channels’, the supermarkets and hotels, and the middlemen. This better understanding of the market is providing a sound basis for targeted interventions on the supply side.

Project highlights

- Multi-partner effort to conduct representative surveys and interviews with consumer households, supermarkets, hotels and resorts, municipal markets, processors, traders and small and large producers across Fiji.
- The Consumer Survey examined urban food consumption and shopping patterns, particularly the role of supermarkets and other ‘modern’ outlets.
- The Producer Survey examined the patterns, determinants, and effects of participation of farmers in restructuring fruit and vegetable value chains.
- The Trader Survey looked at how traders link horticultural producers to different market channels.
- Findings from the surveys are informing other ACIAR projects that are helping Fijian producers reach high-value vegetable markets.

More information

Craig Johns
E: craig.johns@adelaide.edu.au
Assoc. Prof Gurmeet Singh
E: gurmeet.singh@usp.ac.fj

This is a research activity (Fiji retail market transformation study, PRA/2012/02) under ACIAR’s Pacific Agribusiness Research for Development Initiative (PARDI) (AGB/2008/044)

Project partners and contributors

- University of Adelaide, Australia
- Ministry of Agriculture, Fiji
- Fiji Bureau of Statistics
- Secretariat of the Pacific Community
- UN Women





Growing the pearl industry

Coloured pearls are a multimillion dollar industry in the South Pacific, with French Polynesia and the Cook Islands currently the dominant producers. ACIAR is supporting research to develop the pearl industries in Fiji and Tonga, with an emphasis on participation by local communities. An analysis of the pearls value chain identified a shortage of oysters, limited types of products, and a lack of local skills as constraints — all opening up opportunities for local involvement. These opportunities are now being developed.

Project highlights

- Value chain analyses of the Fijian and Tongan cultured pearl industries carried out, identifying constraints and opportunities.
- Development of Industry Development Plans in Fiji and Tonga.
- Establishment of a national village-based spat collection program in Fiji to supply oysters to pearl farmers. Seventeen communities around Fiji are currently growing and collecting spat.
- Increased quantity and quality of round pearls produced in Fiji due to improved husbandry practices.
- The introduction of a pearl product new to Fiji — half-pearls from the winged pearl oyster.
- Increased hatchery production capacity in Tonga and improved supply of oysters to pearl farmers.

More information

Prof. Paul Southgate
E: paul.southgate@usc.edu.au

This is a research activity (Supporting development of the cultured pearl industries in Fiji and Tonga, PRA/2010/01) under the Pacific Agribusiness Research for Development Initiative (PARDI) (AGB/2008/044), (FIS/2009/057) Pearl industry development in the western Pacific and (FIS/2014/018) Understanding pearl-oyster mortality in Fiji

Projects in the pipeline include:

FIS/2014/060 Developing pearl industry-based livelihoods in the western Pacific (proposed) and FIS/2014/103 Pearl livelihood development in Fiji (proposed)

Project partners and contributors

- University of Adelaide, Australia
- James Cook University, Australia
- University of the Sunshine Coast, Australia
- University of the South Pacific
- Secretariat of the Pacific Community
- Ministry of Fisheries and Forests, Fiji
- J Hunter Pearls (Fiji) Ltd
- Ministry of Agriculture and Food, Forests and Fisheries, Tonga





Mother-of-pearl handicrafts

In recent years, the Pacific tourist trade in mother-of-pearl handicrafts and jewellery has been dominated by 'cheap' imported items from South East Asia. Under ACIAR's work to promote development of the Pacific cultured pearl industry, this 'spin-off' industry has great potential as an economic activity for communities. A value chain analysis by project partners found that, in Fiji alone, the industry has an estimated annual value of F\$4 million. The project team is supporting communities and especially women in Fiji and Tonga to develop the skills needed — both artistic and business — to allow them to seize this opportunity.

Project highlights

- Value chain studies to identify the potential for higher end mother-of-pearl jewellery and handicrafts.
- Development of unique jewellery designs for manufacture and sale.
- Workshops and jewellery training sessions with the Ba Women's Forum in Fiji.
- Mother-of-pearl jewellery launch at department store 'Tappoos' in Suva, Sigatoka and Nadi Fiji.
- 'Fijian-made' certification approved.

More information

Theo Simos

E: theosimos@bigpond.com

This is a research activity (Supporting development of the cultured pearl industries in Fiji and Tonga, PRA/2010/01) under ACIAR's Pacific Agribusiness Research for Development Initiative (PARDI) (AGB/2008/044)

Project partners and contributors

- University of Adelaide, Australia
- James Cook University, Australia
- Ba Women's Forum and the community of Ba
- Ba Town Council
- Ministry of Fisheries and Forests, Fiji
- University of the South Pacific





Fairer shares for fishers in the sea cucumber market

The sea cucumber market is booming in many parts of Asia. Every year, Pacific Island countries export between A\$20 million and A\$50 million worth of sea cucumber (also known as *beche-de-mer*), making it one of the most valuable marine exports from the region. But the small-scale fishers who supply the market are not getting good returns for their efforts. A scoping study under the Pacific Agribusiness Research for Development Initiative (PARDI) clarified some of the reasons, which include limited knowledge of the market and of processing methods. Sea cucumbers are also being overfished in many parts, with both ecological and economic impacts.

ACIAR is supporting several projects that aim to improve knowledge on processing, improve incomes of small-scale fishers, and increase sustainability of sea cucumber fisheries.

Project highlights

- The scoping study collected data on current practices in post-harvest processing and supply chains through socio-economic surveys and investigation of supply chains.
- A training manual and DVD have been produced in English, Fijian, Kiribati and Tongan, providing step-by-step instructions on best-practice processing techniques for the different species of sea cucumber. These training products have been used in village-based workshops with fishers and fisheries officers.
- In the next phase of the project, the research team will test how successful the training resources have been and their socio-economic impact, e.g. whether fishers earn more income from applying the best-practice methods, and what types of communities are benefiting most.

More information

Dr Steven Purcell
E: spurcell@scu.edu.au
Ravinesh Ram
E: ravinesh.ram@my.jcu.edu.au

ACIAR projects:

Evaluating the impacts of improving postharvest processing of sea cucumbers in the western Pacific region (FIS/2010/096); Improving community-based aquaculture in Fiji, Kiribati, Samoa and Vanuatu (FIS/2012/076); Improving income of Pacific island fishers through better post-harvest processing of sea cucumber: scoping study (PRA/2010/004) (a research activity under the Pacific Agribusiness Research for Development Initiative (PARDI) (AGB/2008/044))

Project partners and contributors

- Southern Cross University, Australia
- James Cook University, Australia
- University of Adelaide, Australia
- Secretariat of the Pacific Community
- Ministry of Fisheries and Marine Resources Development, Kiribati
- Ministry of Fisheries and Forests, Fiji
- Partners in Community Development Fiji, Fiji
- Ministry of Agriculture and Food, Forests and Fisheries, Tonga





Sea grapes on the menu

ACIAR is supporting research to develop seaweed-based industries in the Pacific islands. A promising species is the edible seaweed *Caulerpa racemosa*, known as sea grapes, *nama* in Fijian and *limu* in Samoan. Consumption of sea grapes is popular among some South Pacific island communities, and there is also potential to develop exports of sea grapes, for example to Japan and Japanese restaurants across Asia. A scoping study has been carried out under the Pacific Agribusiness Research for Development Initiative (PARDI) to explore the possibilities for development, and value adding that will benefit coastal communities.

Project highlights

- The scoping study identified harvesting regions of sea grapes. Some 250 harvesters currently collect sea grapes in Fiji, Samoa and Tonga, with a combined annual crop of around 125 tonnes.
- The village-to-consumer value chain was mapped to help identify opportunities for improvements.
- Information was gathered on the impact of harvesting on the natural resource.
- Cultivation techniques are being explored to help support sustainable harvesting at the village level.
- Preservation trials have been carried out to extend the shelf-life of sea grapes, which could open up new markets.

More information

Cherie Morris
E: cherie.morris@usp.ac.fj
Prof. Robin South
E: robin.south@orda.com.au

ACIAR projects:

Diversification of seaweed industries in Pacific island countries (FIS/2010/098); research activity 'Value-adding and supply chain development for fisheries products in Fiji, Samoa, and Tonga' (PRA/2010/02) under the Pacific Agribusiness Research for Development Initiative (PARDI) (AGB/2008/044)

Project partners and contributors

- James Cook University, Australia
- University of Adelaide, Australia
- University of the South Pacific
- Ministry of Fisheries and Forests Fiji
- Pacific Seaweeds
- Gunu village women
- Ba Provincial Council





Adding value to tilapia

Coastal capture fisheries are under increasing pressure and are no longer meeting the protein needs of Pacific island communities. Aquaculture can go a long way to bridging the gap. A major regional project supported by ACIAR is helping to develop aquaculture of local species, as well as a world-wide favourite, tilapia. Tilapia is a hardy, fast-growing freshwater fish, but tastes quite different to the marine fish traditionally consumed in the Pacific. It is currently farmed in an ad-hoc fashion in a number of Pacific island communities. In Fiji, there are approximately 400 subsistence farmers and semi-commercial farmers who have ponds growing tilapia.

ACIAR's Pacific Agribusiness Research for Development Initiative (PARDI) has looked at the acceptability of tilapia to various consumers in Samoa and Fiji and at ways of 'adding value' to this species, while extending its shelf-life, for instance by smoking.

Project highlights

- Completion of a tilapia farming and value-adding scoping study.
- Public taste evaluation events in Samoa and Fiji showed preference for smoked fillets and smoked whole fish.
- Cost-benefit analysis of the smoking process carried out, including product development, packaging etc.
- Identification of supply chain and market opportunities for value-added products.

More information

Cherie Morris
E: cherie.morris@usp.ac.fj
Prof. Robin South
E: robin.south@orda.com.au

ACIAR projects:

Improving community-based aquaculture in Fiji, Kiribati, Samoa and Vanuatu (FIS/2012/076); a research activity 'Value-adding and supply chain development for fisheries products in Fiji, Samoa, and Tonga' (PRA/2010/02) under the Pacific Agribusiness Research for Development Initiative (PARDI) (AGB/2008/044)

Project partners and contributors

- James Cook University, Australia
- Queensland University of Technology, Australia
- Secretariat of the Pacific Community
- University of the South Pacific
- Ministry of Fisheries and Forests, Fiji
- Ministry of Agriculture and Fisheries, Samoa
- Ministry of Agriculture, Livestock, Forestry, Fisheries and Biosecurity, Vanuatu

