Welcome

As PARDI enters its third year, this newsletter is an invaluable tool to communicate the diversity of our work and to provide early notification of pending project activities, meetings and workshops. I hope this issue of our newsletter provides some insight to the collective efforts of the PARDI team.

Steven Underhill
PARDI Project Leader

PARDI mid-term review update

In August last year, ACIAR commissioned an external review of PARDI's operations and performance. Conducted by Keith Chapman and Barney Smith, the reviewers spent two months interviewing most of the PARDI project team, ACIAR RPMs as well as travelling to Fiji to consult further with Pacific stakeholders. Tabled in late October 2011, the review recommended a series of significant changes to PARDI covering our objectives, milestones, the budget, capacity building strategies, the reporting framework to ACIAR, integrated communications and improvements to project administration.

Given the novel project design that underpins PARDI's operations, the review was an excellent opportunity to reflect on what has worked to date and what hasn’t been so successful. At this point I would like to thank Keith and Barney for the considerable time and effort they invested in the PARDI review — which was a major undertaking. Moreover, I believe the associated changes will greatly improve our operations and delivery.

The PARDI project team has adopted the review recommendations in their entirety. Since December, we have been re-working the project document, budget and...
operations accordingly. The most challenging issue has been a reconstruction of the budget to consolidate the numerous research investment accounts “trust funds” and some changes to the project staffing. Given ACIAR has withheld project installment payments during the review — primarily to assist transition process — ACIAR and the project team are now keen to finalise the review implementations. An important step in the process was a recent meeting between ACIAR RPMs linked to PARDI. Most of the Australian component leaders met at the meeting, which was held in Brisbane, to discuss the amended budget and project objectives.

So what does all this mean in terms of PARDI moving forward?

1. Contracted projects will be collectively administered by The University of Queensland (UQ).
2. All projects led by core PARDI collaborators not already contracted will be directly incorporated in that agencies budget.
3. A significant increase to the Department of Employment, Economic Development and Innovation (DEEDI Qld) to support their leadership of PARDI’s horticulture component; inclusive of a series of new DEEDI-led projects in protective cropping systems and value-addings.
4. The net funds invested in researchable interventions have been increased by $534,713 through a reallocation of funds from UQ. Consequently PARDI is currently investing $4.988M in PRA projects and $0.255M in SRA, with a capacity to also invest in further SRA activities.
5. Component five — capacity and capability activities, have been combined with our agribusiness research and development efforts under the combined leadership of Prof Randy Stringer.
6. A focus on integrating PARDI communications with current SPC web communications.
7. Documentation of PARDI Chain Reviews.

While the adjusted budgets will be provided to all PARDI partners by mid-February, the practicality of adjusting organisational budgets half way through a transition is fairly complex, so UQ and ACIAR are negotiating the best way forward. I anticipate this to be finalised in mid-March.

Project portfolio overview

Our project portfolio has continued to expand to 10 PRA (listed below).

- **ACTIVE PRA 2010.001** Supporting development of the cultured pearl industries in Fiji and Tonga (Paul Southgate JCU)
- **ACTIVE PRA 2010.001b** Supporting development of the cultured pearl industries in Fiji and Tonga (Anand Chand USP)
- **ACTIVE PARDI 2010-002** Value-adding and supply chain development for fisheries products in Fiji, Samoa, and Tonga (Robyn South USP)
- **ACTIVE PRA 2010.003** Developing markets and products for the Pacific Island and PNG Canarium nut industry (Helen Wallace USC)
- **ACTIVE PARDI 2010-004** Improving income of Pacific island fishers through better post-harvest processing of sea cucumber: scouting study (Steve Purcell SCU)
- **ACTIVE PRA 2010.005** Developing commercial breadfruit production systems for the Pacific islands (Andrew McGregor-Kokosiga Fiji)
- **ACTIVE PRA 2011.01** Facilitating Improved livelihoods for Pacific Cocoa Producer Networks Through Premium Market Access (Tim Martyn)
- **ACTIVE PRA 2011.03** Developing an integrated participatory guarantee scheme in the Pacific Islands in support of sustainable production of high-value vegetable crops (Jen Carter USC & AVRDC Taiwan)
- **ACTIVE PRA 2011.04** Developing a clean seed system for market-ready taro cultivars in Samoa (M.Taylor)
- **JUST APPROVED PRA 2011.06** Dr Tim Blumfield (Griffith University) Development of a market mechanism for Teak and other high value timber in the Western Province of the Solomon Islands.

Completed SRA projects include Taro, VCO, Cocoa, Tamarind, and Forestry. Kim Bryceson and Damian Hine (UQ) are currently finalising their two SRA projects (below) and we anticipate finalised reports shortly.

- **SRA 2011.01** Does a Whole of Supply Chain approach deliver market-driven opportunities to generate a sustainable cash economy to local communities in the Pacific (Kim Bryceson UQ)
- **SRA 2011.07** Developing a strategy for assessing and transferring capabilities (Damian Hine UQ)

Our intent is to post all PARDI final projects reports on the SPC website site. Emil Adams (SPC) and Julie Lloyd (UQ) are currently working and anticipate they will be available shortly.
DEEDI scientist appointed to PARDI horticulture role

Department of Employment, Economic Development and Innovation (DEEDI) scientist, Shane Dullahide, has been appointed PARDI Component Leader, Horticulture. Shane’s role is to assist with the coordination of PARDI’s horticulture projects to improve Pacific stakeholder engagement and help to better integrate DEEDI’s horticulture expertise into PARDI.

Shane joins the PARDI team following 40 years experience as a horticultural scientist with the previous Department of Primary Industries and Forestry (DPI&F now DEEDI). He received the DPI&F ‘Research and Development Innovation Award’ in 2000 as Leader of a national ‘pesticide reduction’ project for the apple and pear industries, which resulted in the development of a production system that requires 80% less pesticide input.

New PARDI project under development

PRA 2012.01 Study to investigate benefits of protective cropping systems for vegetables

“The development of protective cropping systems for the production of high-value vegetable crops in the South Pacific Islands”, led by Dr Elio Jovicich (DEEDI), is currently being scoped as a possible new PARDI project.

Given the new ACIAR Integrated crop management project led by Dr Mike Furlong (UQ) and PARDI participatory guarantee (PGS) vegetable project led by Assoc. Prof Jen Carter, additional PARDI investment in protective cropping systems could provide an important value-add to what is emerging as an integrated multi-project approach to improving vegetable supply chains in the Pacific.

Initial planning is for Dr Jovicich to investigate low-cost structures, such as tunnels or high-roof greenhouses covered with polyethylene, and screening materials that can provide sufficient protection to well-managed and appropriate vegetable cultivars. Harvest of high-quality produce can be extended to off-season summer periods by simple, yet effective system enhancements.

Australian-based Dr Jovicich has local and international experience in research into vegetable production systems, including protected cropping, spanning 20 years. According to Dr Jovicich, the new PARDI project will build on knowledge gained from systems used in the Pacific and other tropical regions of the world and will be developed in collaboration with PARDI partners in the Pacific.

This project will link with activities in concurrent projects on vegetable crops (‘Strengthening integrated crop management research in the Pacific Islands in support of sustainable intensification of high-value crop production’, and ‘Developing an integrated participatory guarantee system in the Pacific Islands in support of sustainable production of high-value vegetable crops’).

As part of the project development stage, Elio will meet with PARDI stakeholders and project leaders and ACIAR during a workshop in Sigatoka to discuss collaboration opportunities.
Chocolate lab in the pipeline for Vanuatu

Recent efforts by a number of parties in the South Pacific to gain support for the early development of a chocolate industry in Vanuatu, have resulted in AusAid agreeing to fund a new chocolate laboratory that will enable locals to investigate opportunities to make value-added products from their cocoa.

PARDI supported the bid to gain AusAid funding, and PARDI’s Richard Beyer prepared the major technical report which assessed the overall feasibility and business case for a chocolate factory in the region. A final proposal, “Cocoa Value Adding Initiative: Port Vila Chocolate Factory”, involving input from various parties, included a survey of tourists and local domestic consumers that assessed chocolate consumption habits and willingness to pay for Vanuatu made chocolate bars. A large percentage of respondents showed strong interest in purchasing chocolate made in Vanuatu with local ingredients.

Fiji pearl farmers speak with one voice

A new national body, the Fiji Pearls Association, was announced in October last year to encompass all Fiji pearl farmers and spat producers. Facilitated by the ACIAR/PARDI Pearl development project led by Prof Paul Southgate, the Association will consult with government agencies to help draft improved policies to increase capital investment in the industry.

Ultimately, the Association aims to work with industry to enhance their reputation and bolster their economic potential. As part of their platform, the Association identified four key objectives.

- Promotion of sustainable pearl farming in Fiji.
- Promotion of rural development through spat collection campaigns.
- Promotion of pearling as an economic development tool for the Republic of Fiji.
- Promotion of research to increase the value and quality of Fijian Pearls.

In recent years, the Fiji Pearl industry has been in constant decline. Forty per cent of farms closed down between 2006 and 2011 and export earnings have suffered considerably. Challenges faced by the industry include high capital investment requirements, no security on water tenure, undefined regulation, low pearl producing oyster availability and exposure to weather extremes.

Visit highlights DEEDI involvement in horticulture agribusiness

In late November 2011, DEEDI scientists working within PARDI, Shane Dullahide and Elio Jovicich spent a week in Fiji with PARDI Project Leader Steven Underhill visiting horticulture supply chain and production sites in Nadi, Sigatoka and Suva. The trip was part of an effort to increase DEEDI involvement in the PARDI horticulture agribusiness component and to help assess the development of new horticulture projects in the South Pacific.

The PARDI/DEEDI scientists visited a vapour heat treatment facility, research sites with papaya production and breadfruit multiplication, farms with vegetables grown under protective cropping systems, and outdoor horticulture production and fresh produce markets. Introductory meetings were held with staff from ACIAR and PARDI partner institutions, such as the Ministry of Primary Industries, Secretariat of the Pacific Community, University of the South Pacific, Pacific Horticultural and Agricultural Market Access (PHAMA), Nature’s Way Cooperative, Taiwan Technical Mission and Food and Agriculture Organization.

Eggplants pictured at the Sigatoka market.
New forestry project in the pipeline

PRA 2011.06 ‘Development of a market mechanism for teak in the Western Province of the Solomon Islands’

A proposed new PARDI Forestry project will aim to introduce cooperative strategies that will link individual teak growers in their harvesting and marketing activities, including working towards Forest Stewardship Council (FSC) group certification.

To be led by Dr Tim Blumfield (Griffith University Queensland), the project will work towards building a cooperative strategy for harvesting and marketing among locally based growers and build awareness of the benefits of group FSC certification.

The project will examine barriers to achieving good silvicultural outcomes, such as the reluctance to undertake any form of thinning, and the stimulus that marketing opportunities for teak thinnings may provide. Preliminary work has identified a potential buyer for Western Province teak thinning. If this project goes ahead, it will develop the teak thinning opportunity and demonstrate the commercial feasibility of a barging programme.

Project collaborators will include: the community growers; the Ministry of Forestry staff and extension officers who will liaise with growers and provide support and inventory services; staff from the Secretariat of the Pacific Community, Land Resources Division who will provide support for the FSC certification and also act as one of the secure repositories for the inventory data; and the social research team from The University of Queensland. The project is currently awaiting final funding approval from ACIAR. We are hopeful it should commence shortly.

PARDI communications tools — promoting YOUR work

As many of you are aware, PARDI has been undertaking communications activities to promote our project work and outcomes. As part of our early activities, a PARDI information package including a special PARDI folder and information sheets on canarium, cocoa, breadfruit, pearl, and vegetable research, have been developed. PARDI communications has also been working towards establishing more formal communication networks to promote your work to various audiences, and is devoting considerable time towards improving our publications including our regular newsletter.

Your support is valued, so please send through any updates on your work and seek to use our information package at forthcoming PARDI events. Low resolution copies of the information sheets will soon be emailed to all PARDI project leaders and will also be available on the SPC website. Whole kits (i.e. printed versions of the folder and sheets), are available from Julie Lloyd, 0415 799 890.
New PARDI vegetable project

PRA 2011.03 ‘Developing an integrated participatory guarantee system in the Pacific Islands in support of sustainable production of high-value vegetable crops’ (Project Leader: Assoc Prof Jen Carter, University of the Sunshine Coast)

A newly-approved PARDI vegetable project aims to develop a series of pilot-level integrated participatory guarantee systems (PGS) as a strategy to better link vegetable growers in Fiji (Sigatoka) and the Solomon Islands to high-value domestic markets. In seeking to improve the overall supply chain efficiency, the project team will also develop a series of postharvest quality management systems and the supply of reliable seeds.

The project is based on a partnership between the University of the Sunshine Coast, The World Vegetable Centre, Taiwan, Fiji National University, Fiji’s Ministry of Primary Industries (MPI) and the Solomon Islands Ministry of Agriculture and Livestock.

Two new PhD students from the Pacific, Ms Laisene Tuioiti-Mariner and Mr Salesh Kumar (see the Students section of this newsletter for more on our new PhD students), will be key members of the project team. The project team will work closely with the Taiwanese Technical Mission who, with MPI Fiji, has a history of extensive research and extension to assist Fiji vegetable growers.

As part of a stakeholder consultation process, the project team recently held discussions with Mili Nawaikula (MPI Director of research) and Sigatoka Research Station staff. The project inception workshop was held in Sigatoka on 23-24 February.

Samoa — Taro clean seed research makes good progress

PRA 2011.04 ‘Developing a clean seed system for market-ready taro cultivars in Samoa’ (Project leader: Dr Mary Taylor, CePaCT Manager/Genetic Resources Coordinator)

PARDI work on the development of a clean seed system for Samoan taro has focused in recent months on improving multiplication protocols. Additionally, the Secretariat of the Pacific Community Centre for Pacific Crops and Trees (SPC CePaCT) is investigating the use of a temporary immersion system that allows taro explants to be cultured on liquid medium (temporary immersion).

Temporary immersion has been shown in other crops to increase propagation rates. Additionally, plant material propagated by temporary immersion performs better during the acclimatisation phase than material obtained on semi-solid or liquid medium.

In other progress, a collection of taro varieties considered as good candidates for niche market opportunities is being established in Samoa at the University of the South Pacific, Alafua Campus. Selections are based on farmer and researcher/breeder knowledge and observations. The finalised group for screening will be approved at a meeting in late February with the project team and farmers from the local ‘Taro Improvement Programme’.

A recent new report from The Pacific Horticultural and Agricultural Market Access Programme, “Developing Exports of Samoan taro to New Zealand”, has highlighted a shortage of planting material of selected varieties as one of the major constraints to the development of the export market.
The report also highlighted a need to develop marketing materials that provide information on new taro varieties in order to educate consumers who have been purchasing and using taro from Fiji since the early nineties. The new PARDI taro project is well-placed to resolve these important issues.

The taro project will hold its first planning meeting in February 2012 and a research technician is now engaged to work on the project. The technician, Ulamila Lutu, is based at the SPC CePaCT at Narere, Suva, Fiji.

New cocoa research to bolster industry capacity

PRA 2011.01 Facilitating improved livelihoods for Pacific cocoa producer networks through premium market access

The SPC-led PARDI cocoa livelihoods project, designed to help cocoa farmers in Vanuatu and the Solomon Islands access improved cocoa prices by assisting them into niche and value-added markets, was approved in February 2012.

In preparation of the project starting, cocoa bean samples were solicited in November 2011 from Malekula and Epi islands in Vanuatu, and from Guadalcanal in Solomon Islands. Initial bean samples were evaluated by two premium bean-to-bar chocolate manufacturers (one in Australia and one in USA) for basic quality characteristics, and follow-up samples have been provided with a view to establish long-term purchasing contracts.

In addition to the PARDI-specific work, efforts are underway in Vanuatu to establish a cocoa industry representative body, which will meet for the first time in February. This body will assist with the implementation of the Vanuatu Cocoa Strategy 2010-14, with an emphasis on facilitating improved access to premium niche markets and local value-adding. The establishment of this body is led by the local Department of Industry, in collaboration with the Vanuatu Cocoa Growers Alliance. These developments will enhance PARDI cocoa work in the area.

PHAMA to help improve access to value-added markets

In further South Pacific cocoa developments, PARDI and the AusAID Pacific Horticultural and Agricultural Market Access (PHAMA) project, will work together to improve farmers’ access to niche and value-added markets through quality testing.

PHAMA is committed to evaluating and improving cocoa testing capacity in the Solomon Islands and Vanuatu. Two new projects: “Development of national quality standards for the production and testing of cocoa to meet international market requirements (SOLS06)” and Vanuatu: “Establishment of diagnostic services for value-added products (VAN03)” will help to establish appropriate in-country diagnostic services (including training and accreditation) where it is cost-effective to do so; and to develop reliable and least-cost outsource arrangements for more complex testing requirements with an external service provider.

Close collaboration between national co-coordinators and the wider PHAMA and PARDI teams on these projects will help enable industry in both countries enhance their capacity to carry out testing to determine the moisture, fat content and other quality characteristics of their cocoa product and assist them to determine cocoa quality and market price.
The PARDI Project Update covers our research and development progress since the last PARDI newsletter in August 2011. All PARDI work is focused on the same goal: to create sustainable livelihood development outcomes for the South Pacific crop, fisheries and forestry sectors.

PACIFIC CROPS UPDATE

Working towards a breadfruit export industry

Breadfruit (*Artocarpus altilis*) has the potential to become a substantial horticultural export industry for Fiji and other Pacific Island countries. The development of the industry is constrained, however, by the absence of viable small-holder orchard production systems, ready availability of market-preferred planting material that allows for year-round production, and best practice post-harvesting handling of fresh exports. The PARDI Pacific Breadfruit Project (PBP), which commenced in May 2011, has made good progress in beginning to resolve these constraints.

Recent milestones

- Establishment of a Technical Advisory Board.
- Formation of a research sub-committee.
- First meeting of the research sub-committee.
- Early establishment of mass-propagated, preferred-variety breadfruit trees.
- Observational trials setup to look at how to enhance conventional propagation techniques.
- Marcotting of preferred-variety breadfruit undertaken (October 2011).
- Partnership formed with the Tutu Rural Training Center.

Collaboration between project partners was formalised in 2011 through the establishment of a technical advisory board (TAB), through which the PBP has been able to leverage inputs from other private and public sector partners to address the needs of the industry. The TAB has established a research sub-committee to provide advice on the design of research activities. The research subcommittee held its first meeting in November 2011 at Natures Way Cooperative. The sub-committee
discussed the TAB’s research priority list and the best way forward to conduct trials.

The first major component of the PBP is the mass propagation of preferred-variety breadfruit trees that will enable the establishment of orchards. This propagation activity involves establishing a series of observational trials to look at how to improve local ‘conventional’ propagation techniques. These techniques include marcotting, root cuttings and root suckers. Importantly, the art of marcotting is being perfected and is likely to result in early- and low-bearing breadfruit trees.

In October 2011, marcotting of preferred-variety breadfruit began, some of these first marcotts have now been removed from trees, potted in poly bags and are recovering in the nursery. Early indications show that the team will achieve around a 50% propagation success rate for marcotting. This success rate is considerably higher than previous rates reported by the Hawaii-based Pacific Breadfruit Institute.

In mid-2011, the PBP forged a partnership with the Tutu Rural Training Center on the island of Taveuni. In November 2011, members of the PBP team travelled to Taveuni on a five-day mission to train young farmers in breadfruit propagation techniques and to collect planting material. Over the course of the mission, 263 marcotts were set around the Tutu Center and 1000 root suckers were potted.

In January 2012, a follow-up mission resulted in the removal of 98 marcotts that have since been transported to the Nadi nursery. Nearly 800 of the roots suckers have been transported to Nadi and planted in the nursery.

Project partner the Secretariat of the Pacific Community Centre (SPC CePaCT), is responsible for investigating micro propagation methods and varietal characterisation. CePaCT has recently acquired a bioreactor, and is developing the technology to mass propagate and distribute breadfruit varieties. The PBP expects to receive the first tissue culture material of Bale Kana and Uto Dina from CePaCT in March 2012.
South Pacific breadfruit breeding program

The Secretariat of the Pacific Community’s Centre for Pacific Crops and Trees (SPC CePaCT) plays an important role in the co-involvement PARDI-funded Pacific Breadfruit Project, focused on identifying varieties that will enable year-round breadfruit production and developing efficient systems for propagating the varieties.

The research will also expand on the diversity and reliability of supply of breadfruit planting material that exists in Fiji, Kiribati, Marshalls and Samoa. To date, the CePaCT breadfruit collection has grown to include 32 accessions from which to base future improvement programmes.

Photo one below: Methodology for the propagation of breadfruit in-vitro - the CePaCT tissue culture protocol was developed prior to PARDI and published in 2008.

Photo two below: Current research is aimed at boosting tissue culture multiplication rates and enhancing rooting and growth within various tissue culture mediums.

Photo three below: potted breadfruit plants.

Photo four below: In 2012, our team will test the bioreactor system. It is predicted that this temporary immersion system of in vitro propagation will be a significant improvement on the previous system of semi-solid medium culture, and will help with the provision of planting material of different varieties for orchard establishment. With other crops, this system has been shown to improve plant material quality; increase shoot vigour and reduce hyperhydricity (abnormality symptoms).
ACIAR/PARDI Pearl Project activities July–December 2011

The ACIAR/PARDI Pearl Project pursued a capacity development agenda in Fiji and Tonga during 2011. The project’s focus areas have been the following.

- To strengthen the pearling industry associations in Fiji and Tonga
- To conduct workshops relating to economic capacity building for farmers in Fiji
- And, to hold workshops on half-pearl seeding techniques for farmers in Tonga.

Creating a strong research platform

This James Cook University (JCU)-lead project has facilitated several pearl industry association meetings in Fiji and Tonga which have promoted reinvigoration of these associations and greater collegiality. This provides a strong platform for PARDI project research and facilitates a major project goal: to assist Pacific partner governments to improve regulatory, developmental, legislative and financial environments for pearl farming.

In November, the project engaged Tevita Taumaipeau to help formulate draft development plans for the pearl industries in Fiji and Tonga. Tevita has previously worked with Fisheries and other government departments to develop the pearl industry in Fiji, and subsequently as a consultant for the industry. Tevita began consultations with industry, government and other stakeholders in Fiji in December 2011 and aims to finalise the draft plan for Fiji by May 2012.

Economic modelling workshop

An economic workshop for pearl farmers, fisheries representatives and other pearl industry stakeholders was held in October in Savusavu, Fiji. The workshop was organised by JCU’s Senior Project Scientist, Jamie Whitford, and run by Assoc Prof Damian Hine (The University of Queensland) and Dr Bill Johnson of (DEEDI). The workshop organisers were assisted by postgraduate students from UQ’s Business School. The workshop provided Fijian pearl farmers with an opportunity to tailor economic modelling software (developed by the Queensland Department of Primary Industries) to their particular circumstances. This allowed development of situation-specific economic models for each farmer thus allowing greater confidence to reinvest in their industry and strengthen industry participation.

Spat collecting — a viable pathway to industry involvement?

Economic modelling was also developed during the workshop by UQ postgraduates to test the financial viability of spat collecting as a pathway to pearl industry involvement for communities or individuals in Fiji. The modelling showed that spat collecting has strong economic credibility in Fiji. Research continues with Fiji Fisheries to assess spat collecting potential at different sites across the Fiji Islands. The aim is to provide a sustainable supply of oysters to support industry expansion. Fiji pearl industry partners unanimously identify oyster supply as the most significant constraint for the developing pearl industry. Encouraging individual and community entry into spat collecting is one of the PARDI pearl project’s key objectives.

Half-pearl seeding workshop held in Tonga

A major capacity development activity in Tonga involved collaboration between Pacific island industry partners operating within the ACIAR/PARDI pearl project. Mr Kenji Tokito of Tokito Pearls in Rakiraki, Fiji, provided technical expertise to deliver a workshop on half-pearl seeding. 

fisheries update continued over page > > >
pearl (mabé) seeding at Vava’u, Tonga, in November. Collaboration between the pearling industries from the two project partner countries (i.e. Fiji and Tonga) is an exciting development. Collaboration is likely to produce mutual benefits with respect to pearl seeding, marketing, industry management, potential exports and capacity building. Fifteen people attended the workshop and a follow-up workshop (covering harvesting and more on the activities covered in the first workshop) is planned in 2012 to build capacity within the industry for pearl harvesting, value adding, grading and pearl valuation.

Project appointment

The workshop was attended by Ms Jess Lee who began a one-year Australian Youth Ambassador for Development appointment in October to assist the Ministry of Agriculture, Fisheries and Forests (MAFF) in Tonga with development of the pearling industry through this PARDI Project. Jess has completed a draft manual based on workshop activities. This will be made available to pearl farmers with other extension materials later in 2012. Jess, who previously worked within the Australian pearl industry as a pearl grader, brings valuable new skills to the project. Like Fiji, supply of oysters to pearl farmers in Tonga is a major bottleneck for industry development. The ACIAR/PARDI Pearl Project will work with the aquaculture section of MAFF to strengthen oyster supply through developing hatchery infrastructure and experimenting with high density larval rearing techniques during 2012. This research will involve collaboration with the University of the South Pacific (USP) and will involve an ACIAR/USP scholarship holder.

Project student activity

The ACIAR/PARDI Pearl project coordinates the activities of postgraduate research projects from JCU and the University of the South Pacific (USP). Pranesh Kishore is a USP Master’s graduate (and ex ACIAR/USP Scholarship holder) who is now a John Allright Fellowship holder studying for a PhD at JCU. He is working with J. Hunter Pearls in Savusavu, Fiji, investigating factors that influence pearl quality. Emanuel Ram is a current ACIAR/USP Scholarship holder and is studying for a Master’s at USP. He is investigating spat husbandry in collaboration with another Project partner, Vailili Pearls of Savusavu. Work on genetic mapping of the Fijian pearl resource and its application in developing a sustainable spat collection program in Fiji, will begin in 2012 as a PhD project through JCU. This project will also be conducted by a USP Master’s graduate (and ex ACIAR/USP Scholarship holder) and John Allright Fellowship awardee, Monal Lal.

Environmental and water quality data collection

In conjunction with the Secretariat of the Pacific Community’s South Pacific Applied Geoscience Commission, environmental and water quality data are being collected in Savusavu Bay in Fiji and interpreted for pearl industry benefit. The data will also be linked to the project’s research activities. The project has assisted with mineral analysis of water from pearl farming sites in Taveuni in Fiji. Larval rearing and hatchery technology research for Tonga has been designed and will be conducted during the current pearl oyster spawning season at the MAFF hatchery facility in Sopu, Tonga and USP aquaculture facilities in Fiji.
Localising mother of pearl jewellery and handicraft opportunities

The PARDI pearl project has pinpointed the potential for the Fiji mother of pearl (MOP) industry to become a multi-million dollar local industry and generate employment and income generating opportunities for locals.

During 2011, The University of the South Pacific (USP) team, comprising Dr Anand Chand and Ms Suwastika Naidu with the assistance of USP students, progressed their research into the ‘Potential for import replacement of mother of pearl (MOP) jewellery and MOP products and opportunities for use of local MOP in handicraft manufacture in the Fiji Islands’.

The main objective of this research is to identify the potential for replacement of imported MOP jewellery and handicraft items with local products and quantify the opportunities that exist for local handicraft manufacture in Fiji. To date, the team has examined the following.

- Use of domestic MOP shells to make jewellery and the potential for further industry growth (import replacement). This component of the research is also determining the volume and value of imported MOP shell jewellery as a measure for real industry potential.
- Use of domestic MOP shells to decorate wooden handicrafts, furniture, etc and potential for further growth. The volume and value of MOP shells inserted in Fiji-made wooden handicrafts and furniture.
- Involvement of women’s and men’s groups in the manufacture of MOP shell jewellery and handicrafts.
- Current status of MOP shell designers and handicraft makers in the Fiji islands; availability and quality of manufacturing equipment and the potential for further growth (for import substitution).
- The potential and challenges for import substitution of MOP shell products in Fiji and further growth of MOP industry.

Research findings showed that MOP shell jewellery and MOP inlay in wooden handicraft industries is in its early stages in Fiji. It also highlighted that there is a great demand for MOP shell jewellery and handicrafts across the South Pacific Islands tourist industry. To reach its full potential, policy intervention is needed to turn this potential success into a multi-million dollar industry with broad potential benefits.

Around 95% of MOP shell jewellery on sale in Fiji is imported from China, Indonesia and the Philippines. However, use of MOP as inlay of wooden handicrafts is performed locally. PARDI research findings show that the value of handicrafts increases by around 20% by incorporating small amount of MOP (1-2 cm) in a wooden handicraft item. Retail sales of MOP jewellery in Fiji currently provide income for around 200 locals. In addition, the handicraft industry provides employment for nearly 1,000 locals. The next stage of this project will look in more detail at the potential for value adding using local MOP (pearl shell) in handicraft manufacturers. It will also look into opportunities to improve the quality of locally-produced MOP handicrafts so that they are able to fetch optimum price.
Sea grapes and tilapia research makes good progress

The project ‘Value-adding and supply-chain development for fisheries and aquaculture products in Fiji, Samoa and Tonga’ has made good progress during the second half of 2011. This work is focused on helping improve the long-term success of two important commodities, sea grapes and tilapia.

Highlights

- Field work for market chain analysis of our two commodities, sea grapes (Caulerpa racemosa) and tilapia have been completed, and analysis of the results is in progress, in collaboration with Theo Simos, University of Adelaide.

- Value-adding and product development for tilapia are making good progress under the supervision of Dr Jimaima Lako (USP post-harvest specialist) assisted by Ms Janice Natasha ACIAR MSc Scholarship holder. Following a successful public tasting evaluation exercise held in Apia, Samoa in July 2011, plans are now underway for a second event, to be held in Suva, Fiji in March 2012. These exercises are helping us evaluate the most acceptable products for further development. A report on the outcome of the public taste evaluation of tilapia has been completed, and will be published as a Technical Report by the School of Marine Studies at USP.

- Laboratory testing of preserved sea grapes using market-purchased samples was carried out by USP undergraduate student Asaeli Naika.

- Linkage with Pacific Seaweeds Ltd., a Fiji-based company, who are trialling export of sea grapes from Fiji to New Zealand. They have negotiated supply arrangements with local sea grapes harvesters.

- Scoping studies posted on the aquaculture pages of the Secretariat of the Pacific Community’s website, and will soon be available at the USP’s Institute of Marine Resources Website.

- A fact sheet on sea grapes was produced in collaboration with PARDI, and one on sea grapes has been prepared, in English and Samoan, in collaboration with the Fisheries Department, Government of Samoa.

Project-related reports released since the last PARDI newsletter include:


PARDI market research confirms Hong Kong’s role in sourcing and distribution of dried sea cucumber into mainland China

Sea cucumber is a valuable resource for income generation for many remote coastal communities in most of the Pacific Islands, including Fiji, Kiribati and Tonga. The fisheries have exhibited boom/bust cycles since the mid-1800s. Sea cucumber harvesting and export in many other Pacific islands is currently banned to protect the natural resource.

Sea cucumbers (in particular sandfish, Holothuria scabra) are becoming a priority for development in the aquaculture plans of a number of countries, requiring more support for better resource management plans to be developed and to ensure the natural resource is sustainable for future generations.

Collected live from inshore locations, sea cucumbers undergo a series of gutting, cooking and drying processes to produce a dried, shelf-stable product (market terms; Beche-de-mer, Haishen, Trepang) and shipped by air or sea freight to export markets overseas, particularly China.

There are many species of tropical sea cucumber that are exploited. Demand and prices vary depending on size, condition, species and origin.

Over one week in October 2011, the market visit was conducted by a research team who visited Hong Kong...
and Yidelu markets in Guangzhou province in mainland China.

The visit was part of a research for livelihoods initiative on sea cucumber funded by ACIAR via PARDI.

The PARDI research effort includes the Secretariat of Pacific Community (SPC), the University of the South Pacific (USP) and a consortium of Australian Universities, including the Adelaide University Value Chain Group, James Cook University, Southern Cross University, as well as industry representatives and government agencies in selected Pacific Island Countries (PICs).

**Summary of Market Research Insights**

- Market demand from importers and distributors remains strong as the Chinese continue to advocate the consumption of sea cucumber as a premium food and a medicine for the prevention and treatment of various ailments and diseases. In the mind of consumers, dried sea cucumber, fish maw, abalone and shark fin are the pinnacle expression of health, vitality and lifestyle and invariably coined the term “ginseng of the sea”.

  Used as a core ingredient in many dishes, these products are in high demand by importers as premium seafood ingredients and can command high prices depending on quality, source, specie, size/weight and condition.

- China as a rapidly growing and expanding country and is capable of absorbing all types and qualities of sea cucumber due to the varied degrees of purchasing power and uses principally for foodservice, in home domestic consumption and processing for medicinal purposes. The use and distribution of sea cucumber in China is diverse and varied and all species have a market and corresponding price point.

  - The sea cucumber category is made up two distinct groups of product “Ci-shen” spiky, cold water variety principally *Apostichopus japonicus* which is wild caught and now farmed in northern China, Japan and Korea “Guang-shen” non-spiky, smooth skin of which there are many tropical species. This includes species such as Sandfish, White and Black Teat and many other less popular species that are wild caught, imported by air and sea freight from the Pacific and other parts of the world. Much revered these products are prepared (lengthy cooking washing and reconstitution process) and consumed (Canton style) in the southern provinces of China, Hong Kong, Taiwan and in other Chinese

  fisheries update continued over page > > >
communities that have migrated into Asia from the southern provinces to form large Chinese communities in Singapore, Malaysia, Vietnam.

- "Ci-shen" spiky Apostichopus japonicus is farmed in great numbers in a number of Northern China provinces such as Dalian and Tsingtao and has developed a strong presence and is marketed along with the imported wild caught tropical species in Hong Kong and southern China markets.

- Interviews with buyers and sellers confirmed that sea cucumber shipments from the Pacific and Australia were highly demanded, but there were a number of quality issues that needed to be addressed especially in the cutting, drying and condition of the dried product. There was a perceived benefit in promoting wild-caught tropical species. Australia was considered a favoured supplier of tropical species and considered the benchmark supplier for well-managed, coordinated and superior product management.

- Chinese consumers prefer non-tainted, non-smoked dried products, the skin unbroken and with a good cylindrical shape for best presentation. Buyers are aware that Pacific Islanders are always troubled by extreme weather conditions that hinder the drying process; requesting more education and better drying methods to be established in the Pacific Islands to avoid smoking the products and add value. The role of NGO’s and government agencies working with fishers and processors was suggested as critical to maintain the trade flows and at the same time preserve the resource for the future.

- Hong Kong is the main entrepot of dried sea cucumber into China and controls the importation and distribution into mainland China from Pacific Island communities. There are small direct shipments to other countries such as Singapore, Taiwan and Korea. Hong Kong remains the principal buyer for the outside world and dominates world trade.

- Direct importation into mainland China is therefore not encouraged by Chinese authorities. Longstanding ‘grey channel’ routes, mainly via the sea port of Shenzhen, are used to move product sourced from all parts of the world through the Hong Kong route into China. The port Hai Phong in northern Vietnam is also used to transfer dried marine products into mainland China by Hong Kong traders. Many traders in Guangzhou spoke about the importance of the city of Dianbai (300kms southwest of Guangzhou) as another important trading post where large quantities are deconsolidated and auctioned prior to being sent to Yidelu.

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• Yidelu, a district in Guangzhou, is the wholesale centre of sea cucumber received from Hong Kong via Shenzhen. Yidelu has hundreds of shop fronts offering dried marine and other medicinal/culinary products, such as dried birds nest, mushroom/fungi and many other unique products. Buyers are made up of locals and distributors/wholesalers from all parts of China who travel to Yidelu to purchase sea cucumbers for their markets.

• Japan has a strong market presence and a long history of exploitation and export of “Cishen” spiky sea cucumber to China. Well packaged and presented product in Hong Kong retail can command premium prices up to AUD$2000/ kilogram. Sandfish (Holothuria scabra), a highly demanded “Guangshen” species sourced from Australia and countries throughout the Indo-Pacific, can also command similar prices for the largest specimens but supply and distribution is limited. Lower value, Sandfish, is also imported from South East Asia and the subcontinent.

• While most varieties of sea cucumber are imported in dry form, a small quantity is imported in frozen form and dried in mainland operations where other items such as shark fin are processed and prepared for distribution. This was a new development and there was interest from some importers for more development of this mode of processing as it is felt that Chinese who understand the usage and preparation of the product can better process dry and prepare than risk purchasing variable quality product.

• Accurate Trade statistics and data on the importation of sea cucumber into Hong Kong is difficult to determine but importer estimates vary between 4-5000 tonnes/annum with the main exports coming from the Pacific, Papua New Guinea, Indonesia, Vietnam, Philippines, Maldives, India, Mexico, Canada and from any new sources that can be developed. The majority of product is re-exported to China and to Chinese buyers in Asia. By comparison Singapore imports are estimated by industry insiders to consume some 150 tonnes/ annum of tropical varieties.

Acknowledgement:
Steve Purcell, Ravinesh Ram and Theo Simos would like to acknowledge the assistance of Mr Bobby Tan and Mr Wong Seng Wai of Bobby Tan and Associates Singapore for successfully planning & facilitating meetings and interpreting during the visit program in China.

For further information on China research please contact Theo Simos; theosimos@bigpond.com
Update on PARDI Beche-de-mer scoping study Feb 2012

Sea cucumber scoping study completed

The PARDI beche-de-mer scoping study team has successfully completed the questionnaire-based interviews with fishers and processors in Tonga and Kiribati. Steve Purcell and Karibanang Tamuera made a final trip to Kiritimati Island, in Kiribati’s Northern Line Islands between Cook Islands and Hawaii, in August 2011 to survey sea cucumber fishers and processors. The project’s partner-country researchers, Karibanang Tamuera and Poasi Ngaluafe, finalised this main component and entered data from the structured surveys. During the next few months to the team will cross-tabulate data, perform analyses and present the findings in a final report. The team also plan to disseminate a journal publication on the key findings and a comparison with data from previous comparative surveys conducted in Fiji and New Caledonia.

In October 2011, project researchers Theo Simos and Steve Purcell, conducted market surveys and trade interviews in China. Structured data was collected at wholesalers in Guangzhou and at retailers in Hong Kong to verify price variations among beche-de-mer from species exported from Pacific Islands and to determine product traits that dictate price within species (see picture below). For example, the white teat fish is a species exploited in Fiji, Kiribati and Tonga and sold (dried) for AUS$80-175 per kg. The pair also visited a reprocessing plant and met with importers and scoped various sea cucumber product options. A journal article on the market study results and supply chains will be prepared in 2012.

Differences in post-harvest processing highlighted

As a result of the scoping studies, the differences in post-harvest processing of sea cucumbers among Kiribati, Tonga and Fiji are now apparent as are the great opportunities that will arise from the proposed follow-on project which will apply the findings of this scoping study. During our scoping studies, fishers commonly pleaded for more information on processing methods, which will be the cornerstone of community capacity building for interventions in coming years. This scoping study also provides local industries with better guidance about opportunities to improve supply chains for the benefit of Pacific fishers. The current project’s final report will be completed in May 2012 and the following project will hopefully commence in July 2012.
Canarium nut research makes great progress

The PARDI canarium project on marketing and product development commenced in October 2011. Since the project commenced project staff from the University of the Sunshine Coast (USC), Bruce Randall, Elektra Grant and Helen Wallace, along with Phillip Zekele and Ministry of Forests staff in the Solomon Islands, have measured canarium nut production on a Facilitating Agricultural Commodity Trade (FACT — EU funded) trial on Kolumbangara Island.

The trial consists of a planting of number of five-year old canarium trees sourced from several islands. USC staff worked closely with staff from the Solomon Islands Department of Forests to successfully identify, label, measure and assess for flowering and fruiting, the remaining trees in the FACT trial. Staff from Department of Forests were trained to use a Haglot electronic clinometer to measure tree heights. This clinometer and a tape measure were left with John, Poteitei Village, to increase the locals’ capacity to measure trees. The Village was also supplied with a camera to photograph tree growth and flowers.

Nuts from 30 trees were collected and de-pulped. The kernels were vacuum packed for import into Australia for oil analysis. Data is currently being analysed.

Stakeholder analysis reveals invaluable information

The canarium project team has also recently commenced stakeholder analysis. Researcher, Camilo Esparza, from the University of Adelaide, travelled to Honiara to commence consumer surveys with an initial focus on hotel and restaurant surveys. Researcher, Kim Jones (USC), along with honours student, Elektra Grant (USC), spent three weeks in Western Province, Solomon Islands with canarium nut producers to examine barriers and opportunities for stakeholders in the canarium industry.

Kim and Elektra interviewed village residents, smallholder farmers and members of community organisations in Baniata and Locuru villages on Rendova Island.

foresty update continued over page > > >
Allen Teppet-Burro, who is the program coordinator of the Tetepare Descendants Association (TDA), facilitated the visit to the Island. This area was chosen because of its wealth of canarium nut trees. Moreover, these villages produce baked canarium nuts to sell to the TDA office through their Sustainable Livelihoods Program and in local markets. Elektra was invited to address the TDA Annual General Meeting about her honours research under the PARDI project.

**Early survey findings highlights needs**

One of the early findings from the stakeholder analysis interviews is the need for more basic equipment and improved transport. It was agreed that production of ngali nut could immediately be increased using the current systems if women had more buckets and if a buyer or buyers came to the island to buy the finished product. There is also a need for access to mechanical crackers — manual cracking was the most complained about activity of any in village life. The women crack nuts from dawn to dusk, one nut at a time, taking two days to fill a 20ltr bucket, which sells for about $500SID (about AU$80).

“One of the early findings from the stakeholder analysis interviews is the need for more basic equipment and improved transport.”

Pictured above: Elektra Grant, USC honours student, in Baniata village

Pictured above: Cracking NIS the traditional way.

At right: Flour bucket used to store roasted bai (canarium). A shortage of buckets is a barrier to increased production
Welcome to our new PARDI-linked PhD students

Ms Laisene Tuioti-Mariner of Samoa was recently awarded a University of the Sunshine Coast (USC) PhD scholarship based in Samoa and linked to the new PARDI project “Developing an integrated participatory guarantee system (PGS) in the Pacific Islands in support of sustainable production of high-value vegetable crops”.

Ms Tuioti-Mariner’s PhD will initially seek to understand the underlying social and cultural influences that impact on small-holder grower information and communication technology uptake and grower collaboration in Samoa.

Mr Salesh Kumar was recently awarded a University of the South Pacific (USP)-ACIAR PhD. Mr Kumar will also undertake his PhD linked to the PARDI PGS vegetable project. Co-supervised by Dr Sunil Kumar (USP), Dr Anand Chand and Steven Underhill. Salesh is developing his research plan which will explore the impediments to small-holder farmer transition to commercial enterprise in Fiji. He joins the PARDI from his current position as lecturer at Fiji National University.

Ms Jess Lee who began a one-year Australian Youth Ambassadors for Development appointment in October working with the PARDI/2010/001 project “Supporting development of the cultured pearl industries in Fiji and Tonga”, has completed a draft manual based on workshop activities. This will be made available to pearl farmers with other extension materials later in 2012. Jess, who previously worked in the Australian pearl industry as a pearl grader, brings very valuable new skills to the project.

Pranesh Kishore is a University of the South Pacific (USP) Master’s graduate (and ex ACIAR/USP Scholarship holder) who is now studying for a PhD at James Cook University. He is working with J. Hunter Pearls in Savusavu, Fiji, investigating factors that influence pearl quality as part of the PARDI/2010/001 project “Supporting development of the cultured pearl industries in Fiji and Tonga”.

Emanuel Ram is a current ACIAR/USP Scholarship holder who is studying for a Master’s at USP. He is investigating spat husbandry in collaboration with another project partner, Vailili Pearls of Savusavu, as part of the PARDI/2010/001 project “Supporting development of the cultured pearl industries in Fiji and Tonga”.

Monal Lal (JAF) will be working on genetic mapping of the Fijian pearl resource and its application in developing a sustainable spat collection program in Fiji.

Ms Janice Natasha ACIAR/USP MSc Scholarship holder, is working with Dr Jimaima Lako (USP post-harvest specialist) on PARDI/2010/002 project “Value-adding and supply chain development for fisheries and aquaculture products in Fiji, Samoa, and Tonga”.

Asaeli Naika, a USP undergraduate student, also supported the laboratory testing of preserved sea grapes using market-purchased samples.

Ravinesh Ram (USP) collaborated on PARDI/2010/004 project “Improving income of Pacific island fishers through better post-harvest processing of sea cucumber: scoping study” and has been awarded a JAF to begin his PhD at JCU in July 2012 on work on sea cucumber processing following the completion of the PARDI sea cucumber project.
Canarium

The potential for a more buoyant canarium nut industry across the South Pacific Islands is outlined in this review which pinpoints the research and development opportunities that exist to assist industry growth.

Some of the key reasons why canarium nuts could improve livelihoods in the region include the following.

- World trade in tree nuts is well in excess of US $1000 million and increasing.
- Domestic demand for processed nuts exceeds supply.
- The nut has been important culturally for thousands of years and used as a traditional food.
- The commercial industry is still in its infancy and is attracting private sector investment.

Cocoa

Cocoa is readily grown in Papua New Guinea, Vanuatu and the Solomon Islands and has the potential to become a significant player on the world market given increasing demand across the globe for quality cocoa and cocoa products.

Consumer research outlined in this PARDI review highlights the many opportunities that exist to expand cocoa industries in the South Pacific.
Coconut
This review outlines why coconut is a promising industry for the South Pacific.

Pacific coconut facts
- Hundreds of millions of people consume coconut and coconut products every day (Foale, 2003).
- Coconut trees are native to the Pacific and better suited to local conditions than many other food crops.
- Pacific coconut is a crop with high economic, subsistence and cultural importance. It is the main ingredient in a wide range of products from various parts of the tree and nut.

A PARDI SWOT analysis has helped to reveal the value-adding prospects that could stem from coconut and the challenges this industry must embrace to map out a prosperous and sustainable future.

Tamarind
Tamarind is a versatile fruit that can be value-added to develop a number of different consumer products. Demand for tamarind exceeds supply in Port Villa and similar, unfulfilled demand was recently reported in India.

As mentioned in this PARDI Chain Review, there is potential to capitalise on tamarind food and beverage opportunities and possible pharmaceutical application.

Other publications


MARCH

7
(Fiji)
PARDI Breadfruit Research sub-committee.

12-15
(Adelaide)
Fisheries component meeting (contact Paul Southgate).

14
(Fiji)
March USP agribusiness project development meeting.

16
(Adelaide)
PARDI cocoa project meeting - Grant Vinning and Andrew Sale visit to Adelaide.

18-22
(Adelaide)
USP and Adelaide Uni agribusiness project planning meeting.

Late March
(Tonga, Fiji and Kiribati) PARDI marine project travel by The University of Adelaide.

MARCH/APRIL

(Vanuatu) Canarium stakeholder workshop in Santo, consumer research on Canarium and Tamarind, Vanuatu DOI capacity building and to progress Vanuatu household survey.

March/April
(Fiji)
The University of Adelaide, Fiji household survey.

20 (April)
Final contributions to the PARDI Annual Report.

MAY

7
The University of Adelaide researchers travel to Solomon Islands for consumer research on Canarium.

NOVEMBER

12
(Fiji)
PARDI component leaders and ACIAR RPM annual meeting.