Australian Government
Australian Centre for International Agricultural Research
PARDI

# ACIAR

## Pacific Agribusiness Research for Development Initiative (PARDI)

## Fisheries Program

Value-adding and supply chain development for fisheries and aquaculture products in Fiji, Samoa and Tonga

2011-2014 Cherie Morris

SECRETARIAT OF THE PACIFIC COMMUNITY (SPC)
USP THE UNIVERSITY OF THE SOUTH PACIFIC
THE UNIVERSITY of ADELAIDE
JAMES COOK UNIVERSITY AUSTRALIA
University of the Sunshine Coast

# Program Objective

**Objective**: Strengthen value chains for selected fisheries products through the effective development and delivery of the commissioned projects

**Commodities**: - Fisheries Products (Tilapia, *Caulerpa* )

Project : Value adding and supply chain development for fisheries and aquaculture products in Fiji, Samoa and Tonga

Team: USP, Fisheries Depts, consultants, students and communities

# Project Objective 1

- To complete a scoping study of the current status of the selected aquaculture and fisheries commodities [*Tilapia* and *Caulerpa* (seagrapes)], and the current use of value-adding (product development) of these commodities in Fiji, Samoa and Tonga.

# Objective 2

To investigate the supply chain and market opportunities for value-added products in these countries.


Australian Government
Australian Centre for International Agricultural Research
PARDI

# Objective 3

a. To identify and test existing and new value-added products that:

- can fit into established or new market chains
- are accepted and are in demand in the marketplace
- will provide income generation, improved food security, and enhanced livelihoods

b. To develop and market test preservation, packaging and shelf-life extension methods for new value-added products.

USP
THE UNIVERSITY OF THE SOUTH PACIFIC

# Outcomes – Obj. 1

## 1. Technical reports:

- South, G.R., Morris, C., Bala S. & Lober, M. (2012) Scoping study for tilapia (*Oreochromis sp.*) in Fiji, Samoa and Tonga. USP Institute of Marine Resources Technical Report 04/2012. 18 pp. ISBN 978-982-9143-10-5.

- South, G.R., Morris, C., Bala, S., & Lober, M. (2012). Scoping study for *Caulerpa* (sea grapes) in Fiji, Samoa and Tonga. USP Institute of Marine Resources Technical Report 03/2012 (19 pp.) ISBN 978-982-9143-09-9.

# Seagrape scoping results

- Harvesting and marketing of sea grapes are subsistence activities in all three countries.
- There is a long-standing and strong niche market for sea grapes in Fiji, somewhat less so in Samoa and small in Tonga.
- The total annual value of the crop in the three countries is estimated at <$0.5 million USD.
- The supply chain works well in Fiji and Samoa; the supply chain in Tonga has not yet been analysed.

Australian Government
Australian Centre for International Agricultural Research

PARDI

USP
THE UNIVERSITY OF THE SOUTH PACIFIC

# Seagrapes scoping results

- Post-harvest treatment was more or less the same in all three countries, with the crop having a life of 3-4 days.
- Possibilities of preserving sea grapes (e.g. In brine) should be investigated.
- Cultivation of sea grapes has potential in all three countries, but remains in the experimental stage.

# Tilapia scoping results

- Tilapia farming should be encouraged to develop in Samoa, and it's potential in Tonga should be further investigated.
- Public acceptance of tilapia in Samoa must be encouraged.
- There was a need to improve the supply chain in Fiji; the commercial potential in Samoa should be pursued.
- Potential for value-adding in Fiji: the country has the necessary expertise and processing plants that meet global standards.

# Outcomes – Obj. 2

Australian Government
Australian Centre for International Agricultural Research
PARDI

- Activity 1: Supply chain analysis
- 1. Technical report: Morris, C. & Bala, S. (2012). Supply chain for sea grapes (*Caulerpa racemosa*) in Fiji. USP Institute of Marine Resources Technical Report 05/2012. 15 pp. ISBN 978-982-9143-11-2

  - Findings:
  - Highest production from Yasawa & Rakiraki + others supply main urban markets on Viti Levu
  - About six sites supply 2 urban markets on Vanua Levu
  - Mixture of wholesale & retail sales
  - 1 trial shipment of brined seagrapes sent to NZ By Pacific Seaweeds Ltd.

USP
THE UNIVERSITY OF THE SOUTH PACIFIC

# Outcomes – Obj. 2

Australian Government
Australian Centre for International Agricultural Research
PARDI

- 2. Results of the supply chain for *Caulerpa* in Fiji, Samoa and Tonga were completed and presented at the *International Seaweed Symposium* in Bali, Indonesia (August 2013) and were accepted for publication in the *Journal of Applied Phycology* (2014). Open access from 16th February 2014.

USP
THE UNIVERSITY OF THE SOUTH PACIFIC

# Outcomes – Obj. 2

Australian Government
Australian Centre for International Agricultural Research
PARDI

- 3. The supply chain analyses for tilapia in Fiji and Samoa were completed by T. Simos and were presented by Shirleen Bala (Fiji only) at the 12th Pacific Science Inter-Congress in Fiji in July 2013.

USP
THE UNIVERSITY OF THE SOUTH PACIFIC

# Outcomes – Obj. 2

Australian Government
Australian Centre for International Agricultural Research
PARDI

- Activity 2: Analysis of opportunities for value-adding of products
- 1. Public sensory evaluation of tilapia value-added products were held in Apia, Samoa in July 2011 and in Suva, Fiji in April 2012.
- 2. Technical report: Tilapia products sensory evaluation (Samoa)
  - Findings: Most preferred tilapia product was Pate followed by smoked
  - Odour was highest ranked attribute for pate

USP
THE UNIVERSITY OF THE SOUTH PACIFIC

# Outcomes – Obj. 2

Australian Government
Australian Centre for International Agricultural Research
PARDI


Public Sensory Evaluations in Samoa (above) & Fiji (right)

# Outcomes – Obj. 2

Australian Government
Australian Centre for International Agricultural Research
PARDI

- 3. Consumer preference tasting of *Oreochromis niloticus* value-added products: cold smoked fish, surimi and fish paste. Abstract *International Conference on chemistry, Environment and Climate Change – focus on the Pacific.* September 17th, 2011.

- 4. Janice Natasha completed her MSc thesis on tilapia  value adding (2012)

USP
THE UNIVERSITY OF THE SOUTH PACIFIC

# Outcomes – Obj. 3

Australian Government
Australian Centre for International Agricultural Research
PARDI

- Value added products developed & tested:

- 1. Preservation methods for *Caulerpa* were established and tested during the Fiji public taste evaluation in 2011.(J. Lako).

- 2. Technical report: Lako, J. (2012) Seagrapes post harvest and value addition in Fiji. USP/SMS Technical Report 06/2012. 26 pp.

USP
THE UNIVERSITY OF THE SOUTH PACIFIC

# Outcomes – Obj. 3

Australian Government
Australian Centre for International Agricultural Research
PARDI

- Findings: Shelf-life of seagrapes can be extended by i) heat treating & storing in 5% brine & ii) rinsing fresh seagrapes in 5% brine & storing in 35% brine – if kept chilled can last for 12 months



USP
THE UNIVERSITY OF THE SOUTH PACIFIC

# Outcomes – Obj. 3

Australian Government
Australian Centre for International Agricultural Research
PARDI

- 3. Technical report: Lako, J., Morris, C. and Bala, S. (2014). Processing and Trial Marketing of Smoked Tilapia in Fiji.

  Findings:

  - A cost benefit analysis of 50 smoked tilapia whole fish showed that total operating cost was high (53% of cost of production)
  - The tilapia processing and trial marketing exercise showed that improvements were needed in the following areas; size of tilapia whole fish and fillets, quantity processed, packaging and product promotion.

USP
THE UNIVERSITY OF THE SOUTH PACIFIC


PRECOOKED

# Outcomes – Obj. 3

Australian Government
Australian Centre for International Agricultural Research
PARDI

- 4. Work in partnership with *Pacific Seaweeds Ltd.* (Fiji) was on-going.

USP
THE UNIVERSITY OF THE SOUTH PACIFIC

Australian Government
Australian Centre for International Agricultural Research
PARDI

# Additional research 2014

- Technical report: Morris, C. Bala, S. (2014) Preliminary standing biomass assessment of *Caulerpa racemosa* at two commercially harvested sites in Fiji. Institute of Marine Resources Technical Report 8/2014

- Loumoli H (2014) Socio-economics of the *Caulerpa* industry in Fiji - funded by the ACIAR-USP Scholarship Programme.

USP
THE UNIVERSITY OF THE SOUTH PACIFIC

# Looking Forwards – *Caulerpa*

- Refine development for value-added *Caulerpa* products

- A new collaboration with the ACIAR funded Seaweed Diversification Project (Nick Paul, JCU) commenced

- Provide support for ACIAR Scholarship Students working on *Kappaphycus* and on seagrapes – Tomasi Tikobua

# Looking Forwards - Tilapia

- Assess the feasibility and economics of growing larger size (600-700g) fish for value adding
- Further work market testing
- Involve the private sector in commercial production and marketing of value added tilapia products- possibility of tapping into the tourism market

- **Project leader**: Prof. G. Robin South, Faculty of Business and Economics, University of the South Pacific, Alafua Campus, Samoa

- **Fiji team members**: Dr Jimaima Lako, Sch. of Biological & Chemical Sciences, USP, Suva. Ms Cherie Morris and Ms Shirleen Bala, Institute of Marine Resources. USP, Suva

- **MSc Students** (ACIAR Scholarship Holders) Ms Janice Natasha, USP, Suva; Mr Hikaione Loumoli, USP, Alafua.

- **PG Student assistant**s: Asaeli Naika, Eseta Drova, Madeleine Solo, Amit Kumar

- **Consultants**: Dr Richard Beyer, Fiji; Mr Theo Simos, University of Adelaide; Ms Malwine Lober, Apia, Samoa; Letila Mitchell, Suva.

- **Technical Support** (web sites and publishing) Ms Koila Valemei, USP Suva.

Australian Government
Australian Centre for International Agricultural Research
PARDI

# Acknowledgements


- PARDI for funding , and FBE and USP Alafua Campus for financial management.
- Fisheries Division, Government of Fiji
- Fisheries Department, Government of Samoa.
- Prof Paul Southgate, JCU
- Theo Simos, University of Adelaide
- Jope Lesavua and student assistants at the USP Post-Harvest Facility in Suva.

*Thank You*