Overview of aquaculture and stocking research in the Western Pacific region

Robert Jimmy
SPC Aquaculture Adviser

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Structure of Presentation

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Overview

• Sea cucumber represents an important income source to coastal communities in many Pacific Islands.
• Mainly an export market commodity but also a subsistence fishery in some Pacific Island Countries & Communities.
• Catches from Asia and Pacific regions known to be the highest, about 36 species harvested in the Pacific region.
• Stocks known to be under heavy pressure, catching smaller individuals and low valued species increasing.
• PICTs are resorting to extreme measures of fishing moratoria to encourage stock recovery.
• Concern about over exploitation has led to initiatives to promote sea ranching and restocking as income generating activity and a means to rejuvenate wild stocks.
Sea cucumber release efforts

Blackfish & Surf redfish

White teatfish

Sandfish
Fiji Islands

Availability of high interest species
• White teatfish and Sandfish

History of sea cucumber aquaculture
• ACIAR sandfish projects at Savusavu and Galoa
• First spawning started in 2009, trainings also provided to wardens.

National strategy
• Fisheries Department aquaculture priority included in Workplan from 2011
• A regulation on sea cucumber in place. Sandfish reserved for subsistence fishery and prohibited from export.
Fiji Islands

Hatchery capacity

• Private blacklip pearl oyster hatchery (Savusavu)
• Government shrimp hatchery (Galoa)
• Proposed multi-species hatchery (Savusavu) to begin in second quarter 2011
• Govt and private sector staff trained on sandfish under ACIAR project
Fiji....continue

Community-based management capacity
• Yes, active FLMMA projects in Fiji: 259 registered MPAs

Broodstock availability
• Sandfish are available, although localised scarcity.
• White teatfish availability unknown but probable

![Image of a pond with a net]
Fiji….continue

**Strengths:**
- Strengths are hatcheries and trained staff, algal lab facilities, presence of USP collaborators

**Constraints**
- Government micro-algae production facility and expertise
- Need for more people to be trained on seed production & grow-out
Availability of high interest species
• White teatfish, Sandfish, *Actinopyga spp* and lollyfish

History of sea cucumber aquaculture
• Hatchery based releasing Project for sandfish, Land Grant Program, Pohnpei
• Private hatchery and sea ranching in Yap for *Actinopyga spp*
• 1 staff was trained in Fiji in 2008 (ACIAR) and has transferred their knowledge to other staff
FSM...continue

National strategy
- National Aquaculture Strategy (2002) identified as a priority species for development; there is a regulation on licensing system in place for Yap; Pohnpei, all harvests banned since 1995; in Kosrae: all exports banned; in Chuuk: intensive fishing activity and no sea cucumber fisheries management systems in place.

Hatchery capacity
- Functional Hatchery at College of Micronesia in Pohnpei.
- There is a hatchery facility in Yap since 2007 (*Actinopyga spp*)
Community-based management capacity
• Yes, MPAs are getting support, communities are now requesting that those MPAs be stocked with sea cucumber

Broodstock availability
• Yes, in Yap and Pohnpei. Sufficient sandfish in the wild. Often used 100-200 adults for spawning.
• Kosrae and Chuuk not surveyed but likely to be the same

Constraints
• Lack of local investors
• Lack of skills and local technicians so have to rely on foreign technicians.
• Need to be better communication between national and local government, private sector and traditional tenure holders
Kiribati

Availability of high interest species
• White teatfish

History of sea cucumber aquaculture
• Japan OFCF hatchery projects initiated in 1995, started production in 1997 and released about 10k per year from 1999-2004 and again in 2008-2009
• ACIAR research on release strategies
Kiribati...continue

National strategy
• Government wishes to develop white teatfish further
• No specific legislation to sea cucumber.
• Sea cucumber fishery management plan currently formulated.
• Wish to introduce sandfish

Hatchery capacity
• White teatfish hatchery
• Government Pearl oyster hatchery
Kiribati...continue

Community-based management capacity
• No community based MPA in Gilbert & Line group, only Phoenix Islands Protected Area (PIPA). A few CBFM Plans.

Broodstock availability
• White teatfish becoming difficult to find
• Sandfish-none, – it would need to be introduced
Constraints...Kiribati

- Scarcity of broodstock.
- Keeping broodstock in captivity. White teatfish not suitable for pond culture.
- High mortality rate during juvenile stage
- Release effectiveness unknown.
- Very cryptic—very difficult to monitor post release juveniles.
- High turnover in staffing, trained staff moving, therefore need for continuous training/capacity building
New Caledonia

Availability of high interest species
• White teatfish, sandfish and black teatfish

History of sea cucumber aquaculture
• Large WorldFish-ACIAR St. Vincent Project on juvenile grow-out, release techniques and pond trials (2001-2007)

National strategy
• Govt is supporting development with pilot projects and research for sandfish

Hatchery capacity
• One private sea cucumber hatchery under construction and another being proposed.
• Have six shrimp hatcheries and two for fishes
New Caledonia

Community-based management capacity
• 23 MPAs in Province Sud and 4 in Province Nord.
• Community Based Fisheries Management (CBFM) in one community.

Broodstock availability
• Yes, still have good stocks, both in and out of MPAs, but high variability between sites.
• Genetic survey of broodstock has been conducted.
New Caledonia-constraints

- Spawning season may be limited by cold temperature.
- Production and growout cost assessment need to be conducted.
- Expert advice sought on protocols, especially for grow-out.
- Need to develop tagging methods for monitoring (sea ranching and restocking).
- Availability of juveniles for restocking and enhancement may be limited by hatchery capacity.
Palau

Availability of high interest species
• White teatfish
• Sandfish
• Surf redfish & blackfish

History of sea cucumber aquaculture
• Started a project since 2009 producing *Actinopyga mauritina* & *A. miliaris*.

National strategy
• Government aims to develop sea cucumber aquaculture

Hatchery capacity
• Yes, Palau has the expertise in producing surf redfish and blackfish
• Palau Community College has a hatchery under the Land Grant System.
Palau

**Community-based management capacity**
- There is active support for MPAs (e.g. HOPE Network)

**Broodstock availability**
- Unknown but probably available as for Pohnpei and Yap.

**Constraints**
- No specific technical skills base for sea cucumber. Project run by Korean technicians
- Micro-algae production facility and expertise
Papua New Guinea

Availability of high interest species
• White teatfish
• Sandfish

History of sea cucumber aquaculture
• None

National strategy
• Priority species, especially since sea cucumber harvest moratorium imposed.

Hatchery capacity
• Private pearl and shrimp hatcheries
• New government multi-species hatchery at Kavieng
Papua New Guinea

Community-based management capacity
• PNG CLMMA is active in New Britain and New Ireland
• Current moratorium on fishing will benefit release activities

Broodstock availability
• Yes, although over-fishing will have reduced numbers of large animals

Constraints
• No specific expertise for sea cucumber
• No specific expertise for micro-algae production
Availability of high interest species
• White teatfish
• Sandfish
• Peanutfish (Dragonfish) *Stichopus horrens*: to target in a new project, to be developed by Japan (OFCF).

History of sea cucumber aquaculture
• Large WorldFish-ACIAR project on hatchery techniques (1996-2000).
Solomon Is...continue

National strategy
• One of 4 priorities government wishes to develop, according to 2009 National Aquaculture Development Plan.

Hatchery capacity
• WorldFish Center Nusa Tupe clam hatchery
• OFCF/Government sea cucumber (peanutfish) hatchery, have 4 local technical staffs but need training on sea cucumber.
Solomon Islands...continue

Community-based management capacity
• Three main active MPA’s are in place.
• SLMMA and WWF both active in engaging with communities

Broodstock availability
• Yes for sandfish, but severe overfishing has probably limited broodstock availability however this needs a survey.
• Broodstock for peanut fish readily available and will be collected from the 3 MPA sites

Constraints
• Micro-algae production facility and expertise
• Peanutfish is a new species for aquaculture so not much information about it yet.
Samoa

Availability of high interest species
• White teatfish
• Dragonfish (S. horrens) are targeted by the fishery.
• Sandfish not available in Samoa.

History of sea cucumber aquaculture
• None

National strategy
• Sea cucumber restocking is in the Aquaculture Section Workplan for 2011-2015 (subject to hatchery)
• Government’s current main priority is management of the sea cucumber fishery.
• A private sector initiative to introduce sandfish for aquaculture is now underway.
• Ban on commercial harvest for export for any sea cucumber species, ban on harvest within reserves.
Samoa

**Hatchery capacity**
- Clam hatchery has been de-commissioned. Does not have a mariculture hatchery facility at the moment. Proposed new hatchery not built yet.

**Community-based management capacity**
- Yes, history of community based management since 1995, (Fisheries By-laws) good success with trochus
- 54 village level reserves, 2 district levels MPAs, 84 villages CBFMs, currently effective.
Broodstock availability
- Sandfish not present in Samoa
- White teatfish and other high valued species in good sizes are very scarce.

Constraints
- No specific expertise for sea cucumber
- Micro-algae production facility and expertise is lacking
- Low biomas of high valued species from previous surveys
Tonga

Availability of high interest species
• White teatfish
• Golden sandfish

History of sea cucumber aquaculture
• None

National strategy
• Aquaculture Plan identifies sea cucumber species as highest priority for aquaculture.
• Sea cucumber plan 2009 in place for the fishery
Tonga

Hatchery capacity
• Trained on *H scabra* in 2008 under ACIAR at DPI in Cairns
• Clam and pearl oysters produced at SOPU Government hatchery
• New micro algal facility in place but not yet operating.

Community-based management capacity
• Yes, history of community based management
• SMA in place since 2002, regulation in 2008

Broodstock availability
• Yes, for sandfish

Constraints
• MPAs are not very effective due to enforcement problems
• Micro-algal unit not yet operating due to lack of funds.
Vanuatu

Availability of high interest species
- White teatfish
- Sandfish

History of sea cucumber aquaculture
- Two imports of hatchery juveniles of sandfish from Australia (2006-2007) but has not been effective.

National strategy
- Sea cucumber aquaculture is identified as a priority in the National Aquaculture Strategy
- Draft sea cucumber fishery management plan in place.
- Moratorium on export in place for 5 years since 2008
Vanuatu

Hatchery capacity
- Private shrimp hatchery
- Government clam/trochus hatchery
- No specific training on sea cucumber.

Community-based management capacity
- Traditional community based “taboo” areas and MPAs are in place (e.g. VBRMA Network).
- CMT very active but commercial pressures intense.

Broodstock availability
- Probably okay.
- Will conduct a survey in 2011-2012 to find out stock status.

Constraints
- No specific expertise for sea cucumber
- Micro-algae production facility and expertise
- Lack of hatchery space
Attributes for the Pacific

• Pristine environment
  • Good environmental conditions for growing species

• Community Based Management Systems in place in many areas.

• Simple harvesting technique, does not require large investment capital for processing.

• Does not require large investment into retraining, easily adapt to traditional practices.

• Hatchery facility requirement can easily adapt to other species being cultured e.g. Pearls, giant clams and trochus.
Challenges

- In some places, difficulty in finding sufficient number of broodstock for aquaculture;
- Expertise in sea cucumber culture is limiting in the PICTs;
- Optimal restocking method not yet proven;
- Land based nursery areas can be limiting;
- Land disputes can affect released juveniles/broodstock if released sites are open access or under dispute.
- Control and enforcement of restocked populations to prevent poaching.
- Care must be taken to preserve genetic integrity where ever possible. Translocating juveniles can cause irreversible genetic problems;
- There needs to be more research into the economic and practical feasibility of restocking.
THANK YOU