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Overview of aquaculture and stocking research in the Western Pacific region

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Structure of Presentation

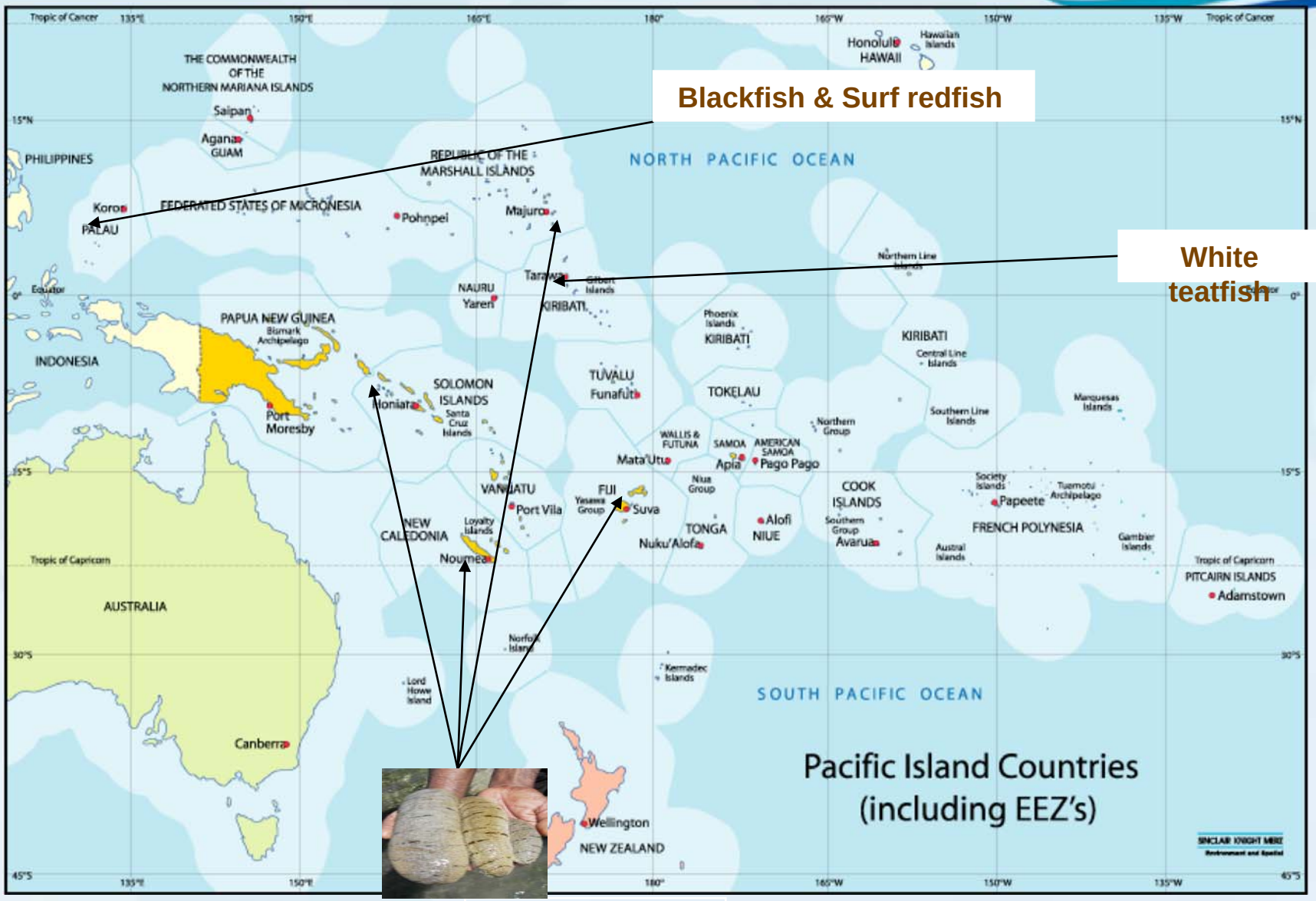
1. Overview
2. Country Synergies:
   a. availability of high interest species
   b. History of sea cucumber aquaculture
   c. National strategy
   d. Hatchery capacity
   e. Community based management capacity
   f. Broodstock availability
   g. Strengths
   h. Constraints
5. Commonalities (attributes & constraints)

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



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

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

FSM

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*)

FSM...continue

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

Solomon Islands

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.

Samoa....continue

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

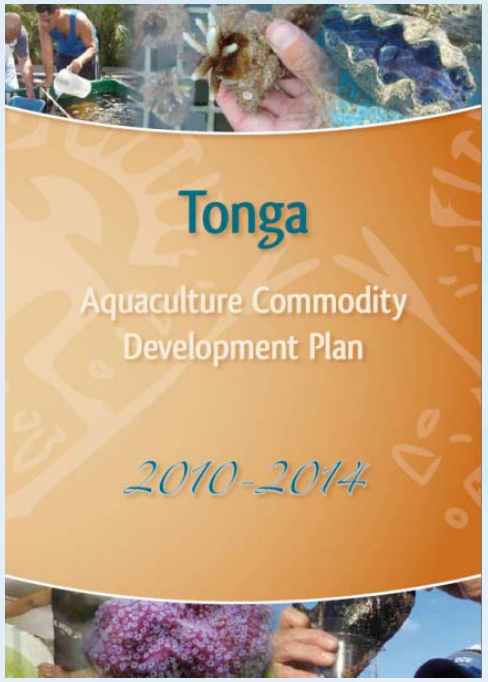
- White teatfish
- Golden sandfish

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 algae 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

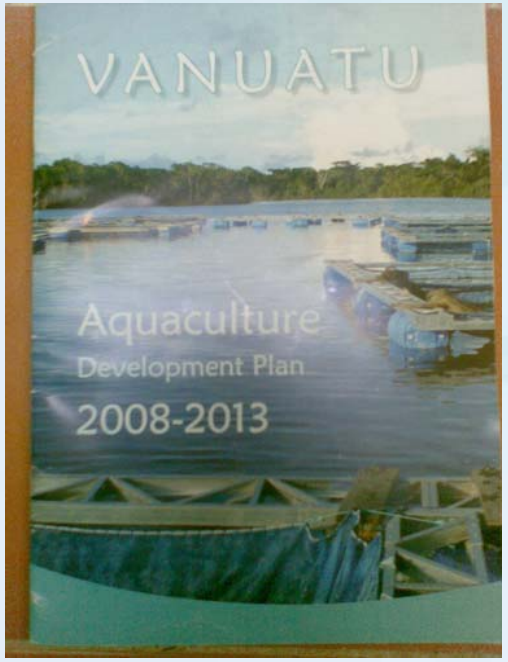
- White teatfish
- Sandfish

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