

Regional Approach to Risk Assessment for Aquaculture in the Pacific Islands



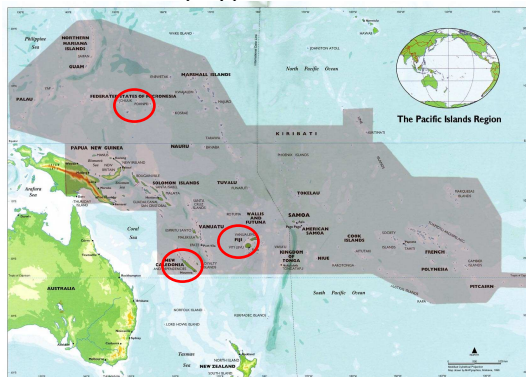
Ben Ponia, Aquaculture Adviser
Secretariat of the Pacific Community
New Caledonia



SPC Region & Organization

22 Pacific Island & 4 metropolitan member countries, formed 1947

- Agriculture, Fisheries, Public Health, Statistics, Culture etc
- 350 staffs; US\$50 Mill budget; Offices in New Caledonia, Fiji, Micronesia



SPC Pacific Island Member Countries and Territories

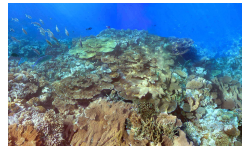
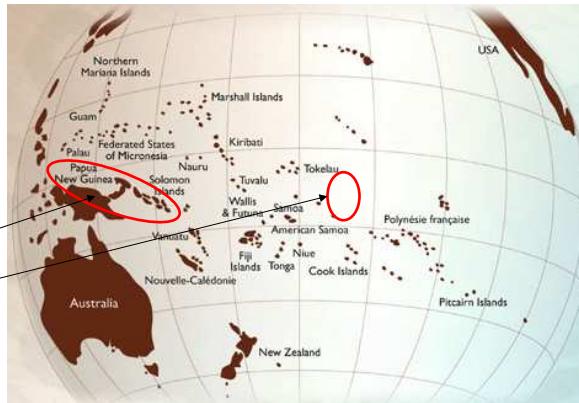


SPC HQ - Noumea



Characteristics of the Pacific Islands

- 30 million Km²
- 98% ocean area
- 7,500 islands
- 500 habitable biospheres
- Hotspot of biodiversity
 - Coral triangle
 - Phoenix group
- Strong spirit of regionalism
 - SPC/SPREP/ForSEC etc
 - Pacific Invasive Learning Network



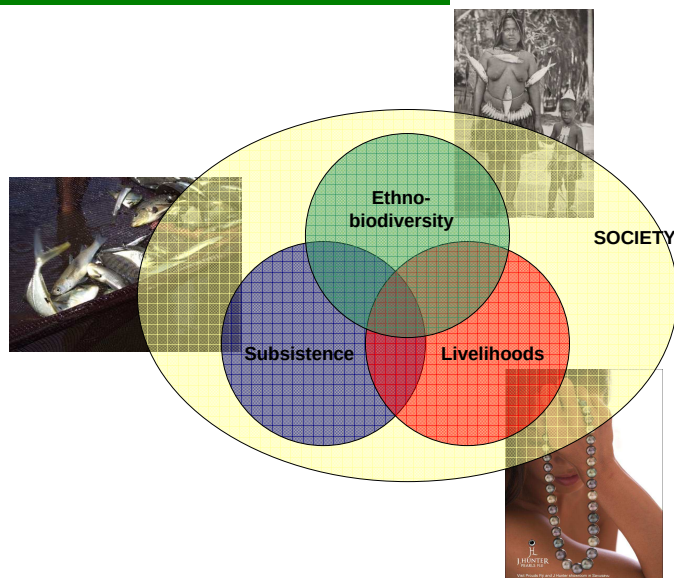
Coral – Marshall Is



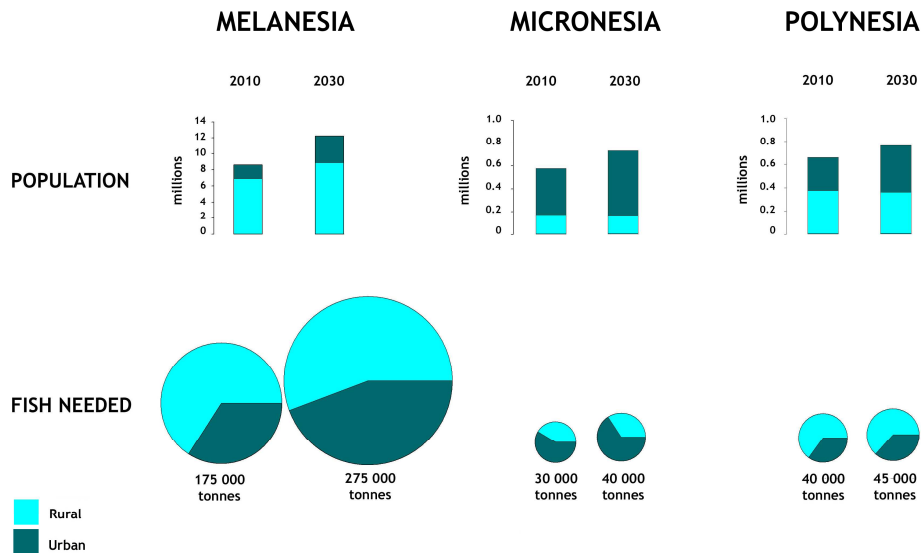
Whale – Tonga



Aquatic Resources



Demographic Challenge: 50% Growth



Aquaculture in the Pacific: Diversity



Commonly Farmed & Introduced Species

CULTURED

Mollusks



Fish



Crustaceans



Non-invertebrates



INTRODUCED

1. **Mozambique tilapia**
2. **Nile tilapia**
3. **Peneaid shrimp**
4. **Trochus**
5. **Giant Clam**
6. **Giant F.W Prawn**
7. **Eucheuma seaweed**
8. **Common carp**
9. **Oyster**
10. **Greensnail**

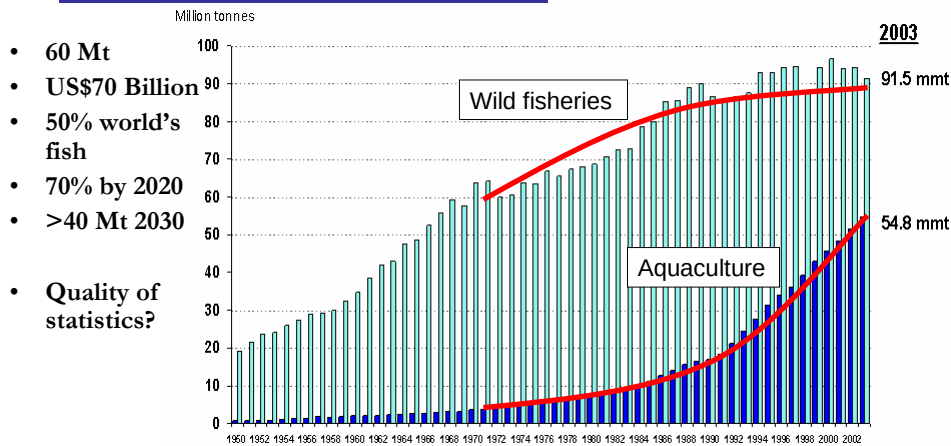
***Ecologically Invasive**



Mozambique tilapia



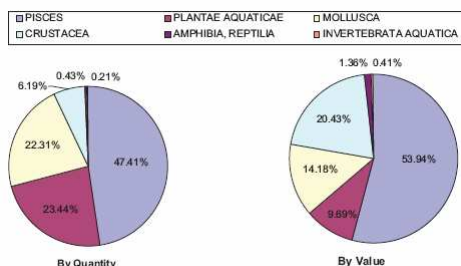
Global Aquaculture



Aquaculture – Species Diversification

World aquaculture production by grouping:

- Fish
- Crustacean
- Molluscs
- Aquatic plants



Nos Aquaculture

Species:

• 1950

- 34 families
- 72 spp

• 2004

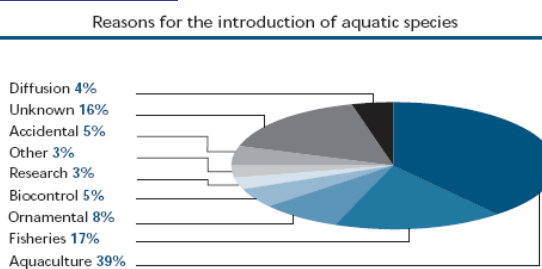
- 115 families
- 336 spp

Continent	No. families	No. species
World	245	336
North America	22	38
Central and Eastern Europe	21	51
Western Europe	36	83
Latin America and the Caribbean	33	71
Sub-Saharan Africa	26	46
Asia and the Pacific region	86	204
Near East and North Africa	21	36

Aquaculture – Cultured & Introduced spp

FAO database on Introductions of Aquatic Species (DIAS):

- More 4,000 species
- Ten most common
- Mostly aquaculture



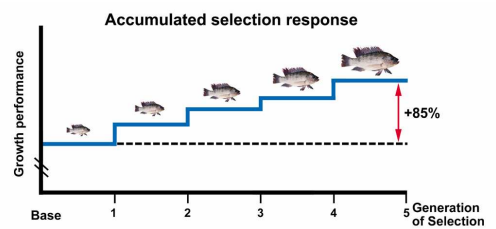
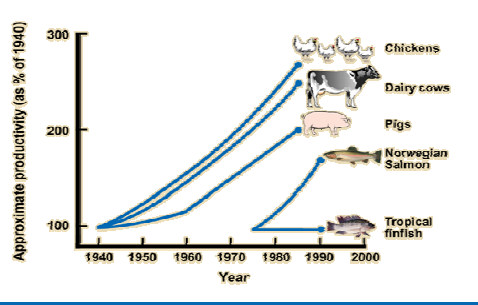
1. Common carp (*Cyprinus carpio*)
2. Rainbow trout (*Oncorhynchus mykiss*)
3. Mozambique tilapia (*Oreochromis mossambica*)
4. Silver carp (*Hypophthalmichthys molitrix*)
5. Grass carp (*Ctenopharyngodon idella*)
6. Nile tilapia (*Tilapia nilotica*)
7. Large-mouth bass (*Micropterus salmoides*)
8. Mosquito fish (*Gambusia affinis*)
9. Big head carp (*Aristichthys nobilis*)
10. Goldfish (*Carassius auratus*)

FAO Database on Introductions of Aquatic Species (DIAS)



Genetic Improvement – Tilapia Farming

- Genetic improvement in livestock increased productivity:
 - Chicken = 3x
- Tropical finfish aquaculture
 - Tilapia most researched
 - 85% improvement over base rates (GIFT)
 - Other strains
 - Tilapia referred as “aquatic chicken”



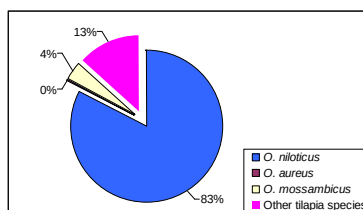
Courtesy: M. Gupta

Tilapia Aquaculture - World

- 2005 global sales = US\$2.5 Billion
- 2010 production estimated 3 million tonnes

United States

- US\$0.5 Billion
- 5th largest fish sale (fresh fillet most valuable)
(K. Fitzsimmons)



Courtesy: M. Gupta



Tilapia in Pacific – Food Security

Papua New Guinea

Trout/tilapia Highlands

Cage-culture Highlands

Carp/tilapia Morobe

15-20,000 fish ponds

Samoa

Lake restocking

Nauru

rehabilitation

Fingerlings

Eradication

Restocking

Tilapia in Pacific – Livelihoods

Vanuatu

Red Tilapia – Cage Culture

Fiji

Guam

Hydroponic

Cook Is

Intensive

Mariana's

Recirculating

American Samoa

Quest for Species - Disease Resistance

Case Study: White Spot Syndrome Virus (WSSV)



Emergence in Asia



Spread to America's

From M. Renataso, P. Walker



Quest for Species - Disease Resistance

- Introduction better disease resistant *P. vannamei* from Latin America
- Rapid shift from *P. monodon* to *P. vannamei*
 - up to 80% production
 - 2 million tonnes?
- Most widespread aquatic introduction in recent history



P. monodon



Extensive

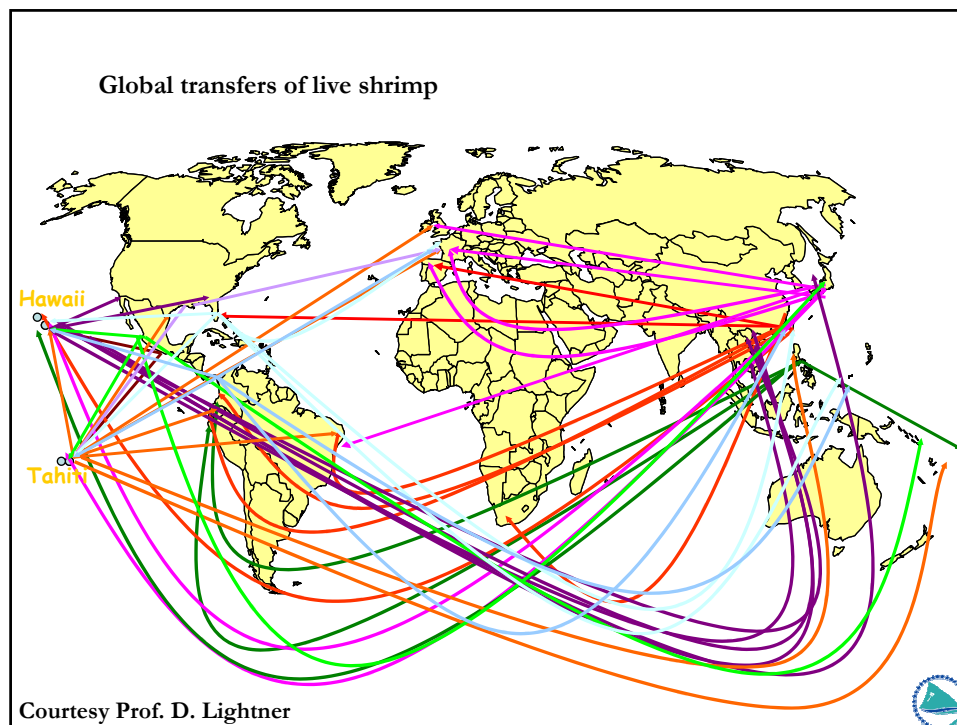


Semi-Intensive



Intensive





Shrimp farming – Pacific Is

New Caledonia

A collage of five images related to shrimp farming in New Caledonia. The top image shows a hand holding a large, live shrimp. Below it are four smaller images: a pond with a mountain in the background, a field with a pond, a processing facility with workers, and a group of people working at a table.

Fiji

A photograph of a large, rectangular shrimp pond in Fiji. The pond is filled with water and has a concrete border. There are some structures and people visible in the background.

Saipan

A photograph of a shrimp pond in Saipan. The pond is filled with water and has a concrete border. There are some structures and people visible in the background.

PNG

A photograph of a shrimp pond in PNG. The pond is filled with water and has a concrete border. There are some structures and people visible in the background.

Vanuatu

A photograph of a shrimp pond in Vanuatu. The pond is filled with water and has a concrete border. There are some structures and people visible in the background.

Tahiti

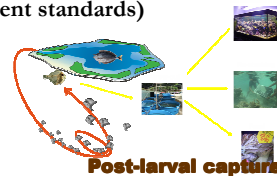
A photograph of a shrimp pond in Tahiti. The pond is filled with water and has a concrete border. There are some structures and people visible in the background.

Other Issues

- Marine Ornamentals
 - Significant export
 - New EU regulations – OIE vs CITES
 - MAC standards (expensive, idealistic, excellent standards)
- Capture based aquaculture
 - Collection of seedstock from wild
 - Ornamentals, food fish, tourism
 - Post-larval trapping technique
- Culture based fisheries
 - Restocking programs vs Ranching
 - Model natural dispersion vs. intentional
- Live-reef Fish Trade
 - Groupers



Ornamental Fish



Post-larval capture



Sea cucumber



LRF Fish



Risk Analysis – Pacific/Aquaculture

- SPC Regional guidelines “Best Principles” for live animal movement
 - Voluntary code of conduct; Generic approach
- Model Import Risk Assessment (IRA) for Pacific
 - Zero risk approach
 - *Penaeus stylirostris* shrimp from Brunei to Fiji (Pathogens – Outcome)
 - *Macrobrachim rosenbergii* from Fiji to Cook Islands (Ecology - Outcome)
- Need for semi-qualitative approach
 - E.g insecurity-Australia
 - But lacking policy decisions on what is “Acceptable Level of Protection”

Consequences

	<i>Catastrophic</i>	<i>High</i>	<i>Medium</i>	<i>Low</i>	<i>Negligible</i>
<i>High</i>	Reject	Reject	Reject	Reject	Accept
<i>Medium</i>	Reject	Reject	Reject	Accept	Accept
<i>Low</i>	Reject	Accept	Accept	Accept	Accept
<i>Negligible</i>	Accept	Accept	Accept	Accept	Accept

Acceptable level of Protection (ALOP)



Aquatic Bio-security – Pacific

- Take a holistic approach “Aquatic Bio-security”
 - CS: Fisheries, Environment, Quarantine & Veterinarian, Public health, FAO, OIE
 - Merge with ecosystems approach fisheries & Aquaculture (EAFA)
- Framework for risk analysis for aquaculture
 - More risk factors: ecological (invasive); pathogens (disease); genetic pollution; environmental degradation; public health/food safety social/economic impact
 - Adopt Risk Analysis Framework of OIE
- SPC Regional aquatic bio-security consultation
 - Cross-sectral reps from 22 Pacific Islands
 - Lack of capacity for risk analysis
 - Lack of info - hazards databases; Responsibilities competent authority
 - Simple risk management strategies e.g coordinating bodies
 - Live-reef fish trade; marine ornamentals; post-larval trapping
- International support
 - FAO, OIE, CBD, WTO, CITIES etc



Thank You

